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Are There Shared Characteristics Among Children with Autism who Develop Speech While
Receiving Training in the Picture Exchange Communication System (PECS)?

Katherine Neidhart

Western Michigan University

Are There Shared Characteristics Among Children with Autism who Develop Speech While Receiving Training in the Picture Exchange Communication System (PECS)?

Deficits in social interaction skills and verbal communication skills are characteristic features in individuals diagnosed with autism. Studies have estimated that between one-third and two-thirds of individuals diagnosed with autism never acquire functional speech (Greenberg, Tomaino, & Charlop, 2013). Those individuals with autism who acquire speech tend to have had delayed speech development and unusual speech patterns or speech qualities (Carr & Felce, 2007). Additionally, their speech is rarely used for social interaction (Carr & Felce, 2007). Without intervention, individuals with impairments in verbal and nonverbal communication skills may have these deficits persist throughout their lifetimes; however, the prognosis for these individuals is likely to be improved with early and intensive intervention (Boesch, Wendt, Subramanian, & Hsu, 2013).

A common intervention used to assist with communication deficits in children diagnosed with autism is the use of augmentative and alternative communication (AAC) systems (Ganz & Simpson, 2004). The American-Speech-Language-Hearing Association (2002) defines augmentative and alternative communication as follows:

a set of procedures and processes by which an individual's communication skills (i.e., production as well as comprehension) can be maximized for functional and effective communication. It involves supplementing or replacing natural speech and/or writing with aided (e.g., picture communication symbols, line drawings, Blissymbols, and tangible objects) and/or unaided symbols (e.g., manual signs, gestures, and finger spelling). (Definitions section, para. 2)

Currently, aided, picture-based AAC systems are used most frequently as a means to provide functional communication to nonverbal children with autism (Ganz & Simpson, 2004). The Picture Exchange Communication System (PECS) is one such system, and it is currently one of the most widely used, aided, picture-based AAC systems in the treatment of communication deficits in children with autism (Ganz & Simpson, 2004).

PECS is a picture-based communication system based on the exchange of picture symbols with a communicative partner (Charlop-Christy, Carpenter, Leblanc, & Kellet, 2002). Developed as a training system to teach nonverbal children with autism a way to communicate, PECS is unique in that its protocol is designed to target key deficits in communication with children with autism (Bondy & Frost, 2001). For example, PECS instruction begins with an exchange of a picture symbol to gain a desired object or another reinforcer (Bondy & Frost, 2001). These requesting skills are easily rewarded and maintained with concrete reinforcers, as opposed to social reinforcement, which is not motivating for many children with autism (Ganz & Simpson, 2004). In this way, PECS provides its users a quickly learned, self-initiated functional communication system (Bondy & Frost, 2001). Meta-analyses and systematic reviews of the available literature (e.g., Schlosser & Wendt, 2008; Millar, Light, & Schlosser, 2006) have suggested that PECS is a beneficial intervention for requesting and communication initiation skills in children with autism (Schlosser & Wendt, 2008). Increases in other skills, including the development of functional speech, have been documented after implementing a PECS program, however, the evidence supporting these positive outcomes has been mainly anecdotal (Ganz & Simpson 2004). Given the popularity of PECS, as well as its use and the varied outcome data of its use, recent studies have attempted to begin to provide empirical data on the efficacy of PECS.

There has also been a rise in research regarding the relationship of PECS training and the development of functional speech.

Charlop-Christy et al. (2002) documented increases in social-communicative behaviors, increases in natural speech production, and decreases in problem behaviors in a study involving the implementation of PECS training with three children with autism. Each child received 15 minutes of PECS training twice per week. Data on the mastery of each PECS phase (i.e., 80% frequency correct responding) and the occurrence of speech production, social communicative behaviors, and problem behaviors were recorded during weekly probes. The children were also given opportunities to produce spontaneous speech and imitative speech during academic or play sessions. No vocal prompts were used to induce spontaneous speech; instead, the therapist presented a desired object to a child and the child's behavior was reinforced with the object if any vocalizations were made. A vocal model was paired with a desired object to provide opportunities for imitative speech, and that object was used as a reinforcer for any vocalizations made. Prior to PECS training, two of the participants did not show any imitative or spontaneous speech skills, and one participant showed very minimal speech skills.

The results of the Charlop-Christy et al. (2002) study were very positive. The three school-aged children mastered (i.e., 80% correct responses to each phase's criteria) each of the six phases of PECS, and acquired PECS training during an average of 170 minutes, over an average of 246 total trials. Charlop-Christy et al. (2002) noted that Phase III and Phase V saw the most rapid increase in PECS skills. All three children also saw an increase in spontaneous speech skills, imitative speech skills, social communicative behaviors (i.e., eye contact, joint attention, and cooperative toy play), and mean length of utterance (MLU), and a decrease in problem behaviors (e.g., tantrums, out of seat, escape behaviors, disruptions) during free play and

academic sessions post-PECS training. The researchers also noted that the children also generalized this speech to outside of the training sessions. They believed this outcome may be due to the PECS procedure, and its utilization of child-selected reinforcers. While this study was consistent with past studies regarding speech development and PECS, this study was one of the first to provide empirically controlled data on the PECS program and its effects on promoting speech and other desired behaviors.

Ganz and Simpson (2004) sought to measure the effectiveness of PECS and its “relation to its capacity to (a) increase students’ proficiency in learning to use a functional communication system, (b) increase the number of words used in making verbal requests, (c) increase the complexity of utterances, and (d) decrease non-word vocalizations” (Ganz & Simpson, 2004, p. 397). They studied three participants diagnosed with autism or developmental delay with characteristics of autism. None of the participants had undergone any previous PECS training, nor had any previous exposure to PECS. All of the participants were considered preverbal, or having limited functional speech, and in need of an AAC system. Each child received two to five PECS training sessions per week, for 15 trials per session, until mastery (i.e., 80% correct responses following each phase’s criteria) of each phase. Additionally, each phase was continued for a minimum of five sessions, even if the child had met mastery, allowing for adequate practice in each phase. By the conclusion of the study, all three participants had mastered PECS Phases I-IV. One of the participants had also begun to spontaneously use PECS throughout the day with adults not participating in the study, which is consistent with the findings of generalization in Charlop-Christy et al. (2002). Furthermore, all had demonstrated an increase in intelligible words spoken per trial, using high levels of words per trial, and spoke longer phrases and with more complex syntax. Ganz and Simpson (2004) did note that prior to their study, there was no

literature regarding the outcomes of words per trial, MLU, or complexity of syntax, making their study unable to be compared to any previous studies regarding PECS.

A later study by Carr and Felce (2007) saw a larger increase in speech production in children receiving PECS training versus a control group. The study compared a PECS intervention group with children with autism against a control group of children with autism receiving no special interventions besides their regular classroom provisions. Carr and Felce (2007) specifically recorded the number of words spoken before, during, and after treatment. The PECS group consisted of 24 children, with none having received any prior PECS training beyond the first phase. Three children in the PECS group showed minimal speech skills prior to the intervention. Each child in the PECS group received a total of 15 hours of PECS instruction, up to Phase III, three to four days per week, over a period of 4-5 weeks. In this time, the three children that had demonstrated speech skills prior to PECS intervention increased their total words during and after treatment. Two children, who were nonverbal prior to PECS intervention, produced spoken words post-PECS treatment. The remaining children in the PECS group remained nonverbal. In the control group, only one child demonstrated a small increase in spoken word production, and four children actually decreased their total number of spoken words. In summary of their findings, “only the children in the PECS group produced appreciable post-treatment gains in speech production” (Carr & Felce, 2007, p. 787). However, Carr and Felce (2007) also noted that the speech gains seen in their study occurred only after the PECS training had been implemented up to Phase III, and remarked that there is a need for more research across training of the entire PECS program, up to Phase VI.

The above studies have attempted to add to the limited amount of literature regarding the efficacy of PECS use and the development of speech as a possible outcome of PECS training.

All of the studies reported varied gains in speech development, yet measured different areas of speech development. Charlop-Christy et al. (2002) specifically looked at spontaneous and imitative speech skills; Ganz & Simpson (2004) focused on the number of words spoken, the length of utterances, and the complexity of the syntax used in each utterance; and Carr and Felce (2007) recorded the increases in spoken words during and after PECS training compared to a control group. The varied focuses of outcomes make it hard to compare studies to determine consistency of findings. Each study is also limited in their low numbers of participants, requiring a need for future replications to verify their claims (Charlop-Christy et al., 2002; Ganz & Simpson, 2004). There is also a need for further research on the possible profiles of children that are more likely to develop speech while using PECS (Ganz & Simpson, 2004). The varied gains in verbal speech in children with autism using the Picture Exchange Communication System warrant further research to draw any conclusions about the relationship between PECS training and speech gains (Schlosser & Wendt, 2008).

There are numerous factors that could explain why PECS may facilitate verbal speech production. Charlop-Christy et al. (2002) and Carr and Felce (2007) suggest that speech gains could be due to the design and structure of the PECS training program. Researchers have documented that in children with autism, early attempts at speech are often unsuccessful, as their speech may be difficult to understand, which would likely cause the use of speech to decline (Carr & Felce, 2007). Carr and Felce (2007) hypothesized that those children who develop speech during PECS may do so because of the reinforcement of receiving a desired reinforcer after a successful picture exchange, as opposed to social reinforcement. The picture symbols used in PECS provide a visual representation for communication paired with a vocal stimulus, which provides for more mediums for learning communication skills (Charlop-Christy et al.,

2002). Charlop-Christy et al. (2002) hypothesized that the pairing of the spoken phrase spoken by the communicative partner (e.g., I want blocks) with the communicative exchange with a PECS sentence strip or icon may also promote the development of speech. The simultaneous presentation of vocal and pictorial mands may create both responses to be reinforced simultaneously, especially if the child begins to vocally imitate in later stages of PECS (Charlop-Christy et al., 2002). It is also possible that vocal imitation skills are needed as a prerequisite to PECS to aide in functional speech production (Carr & Felce, 2007; Charlop et al., 2002). All of the participants in the study by Charlop-Christy et al. (2002) had demonstrated some ability to imitate, which may have facilitated their ability to imitate verbal speech during and after PECS training. In a systematic review of AAC interventions and their effects on speech in children with autism, it was concluded that the ability to imitate speech prior to AAC intervention is actually the only identified factor related to the development of speech (Balandin, 2009). Due to the varied outcomes resulting from PECS training across studies, Ganz and Simpson (2004) suggested that there is a need for more research regarding the “specific factors, elements, or combination of elements, of the intervention” (Ganz & Simpson, 2004, p. 406) that may cause increases in abilities of speech.

The above studies have allowed for some interpretation of the effectiveness of PECS use and the possible effects on verbal speech production in children with autism. While there has been a recent development in creating a literature base for empirically controlled data documenting the effects of PECS intervention in children with autism, more evidence is needed to make any conclusions (Ganz & Simpson, 2004). However, the value of using PECS and other AAC interventions should not be overlooked (Schlosser & Wendt, 2008). Parents of children with autism often worry that implementation of an AAC system, such as PECS, may hinder their

child's ability to develop speech. However, there is currently no evidence to support the claim that AAC interventions hinder the development of speech production (Schlosser & Wendt, 2008). Serving as a stepping-stone to the development of verbal speech is not the ultimate goal of AAC, and gains in speech production should be viewed as a bonus of AAC interventions (Schlosser & Wendt, 2008). In fact, AAC interventions have been shown to allow for the development of communicative competence, as well as benefit the development of language skills (Schlosser & Wendt, 2008). Most importantly, PECS and other AAC interventions provide children with autism a functional means to communicate, which, regardless of speech development, is an invaluable experience to give a child.

CURRENT STUDY

Through research of PECS and speech production development in children with autism, it is clear in the literature that there are many factors that may contribute to the development of speech as a possible outcome of PECS. The researchers in the above studies have expressed a need for more data on the characteristics and skills of children with autism that may contribute to their success with using PECS, and to the possible development of speech while receiving PECS training.

The current study sought to identify common characteristics and skills of children with autism who acquire speech while receiving PECS training. This study sought to research and create an inventory of demographics, pre-requisite skills, and other characteristics of children with autism or developmental disorders that are or have received PECS training. The study examined the following characteristics and factors:

- Age and gender

- Family history
- Participant medical history/background
- Pre-treatment skills (i.e., social-communicative skills and imitation skills)
- PECS training (phases mastered)
- Frequency of PECS use (e.g., for all requests throughout the day, only to request snack)
- Environments that PECS is used in (e.g., school, home)
- Other therapy and treatments received (e.g., speech-language therapy, physical therapy, occupational therapy)

The research question addressed by this study is: What characteristics, skills, and other factors are present in children with autism that have developed speech while receiving PECS training?

METHODS

Participants

The participants have been recruited from Mindy Newhouse's study, "Effects of Generalized Imitation Training on Functional Speech Acquisition During Picture Exchange Communication System (PECS) Training", who were recruited from a local intermediate school district.

Both the participants that received imitation training and those participants that did not receive imitation training (i.e., only PECS training received) were included in this study. In total, this study was composed of seven participants. Inclusion criteria included a diagnosis of autism and an age of less than six-years-old.

Setting

The setting for PECS and imitation training involved a secluded section of the classroom to work with the participants. Each setting included typical features (e.g., table, chairs, adequate lighting). Materials that were necessary for PECS and imitation training were present.

The setting for reviewing participant data, including all pre- and post-intervention questionnaires occurred in a private lab in Wood Hall at Western Michigan University.

Research Design

This study involved a self-report survey administered to families and teachers of the participants pre- and post-intervention and served as a social validity measure for Mindy Newhouse's study. With regards to the PECS and imitation interventions, the research design was a delayed multiple baseline design: as each participant was recruited, the process of obtaining data began.

Materials

Materials consisted of the data collected during PECS training, two parent/family questionnaires (see Appendix A and Appendix B), and a comparative data sheet (see Appendix C and Appendix D). Materials needed for PECS training included a communication book with a sentence strip and picture symbols of preferred and non-preferred items attached to the front of the book. The picture symbols and sentence strip were attached with Velcro.

The families of the participants received a questionnaire to complete prior to beginning PECS and imitation training and a follow up questionnaire (see Appendix A and B) to complete after PECS and imitation training interventions. The questionnaires inquired about the participant's communication abilities, family history, and medical history.

A data sheet was used to document the answers to the questionnaire. The data was analyzed to see if there are any factors/characteristics that are common or similar in the participants that have acquired speech while receiving PECS training and those who did not acquire speech. The data obtained in the pre-treatment questionnaire was then compared with the follow-up questionnaire to see if parents' and families' impressions of the participants have changed following intervention. The responses from the families provided social validity data, as well as provided valuable information regarding the characteristics and communication skill sets of the participants. The results of the questionnaires and comparative analysis can be found in the results section.

Independent Variables

The independent variables consisted of physical imitation training and PECS training. Imitation training involved teaching participants to copy a physical action modeled by another person performing the desired action. The first four phases of PECS were taught to participants in the PECS training.

The independent variables for the pre- and post-intervention questionnaires were the questions asked in the questionnaires (Appendices A and B).

Dependent Variables

The dependent variables consisted of characteristics documented by teachers, parents, and researchers as seen in the data collection sheets and questionnaires. The characteristics documented included the participants' medical history, family history, prior and current treatments and services provided to the participants, and social and communicative backgrounds and skills.

With regards to PECS training, data was collected on the dependent variables of echoics, vocal mands, and other vocalizations. Echoics were defined as any vocalization immediately (within 5 seconds) following a person providing a vocal phrase or statement. Furthermore, echoics must have formal similarity and point-to-point correspondence with what the person has said. Formal similarity is a response to an antecedent stimulus that is in the same sense mode as that stimulus (i.e., the response is topographically similar). The sense modes for echoics are typically vocal and auditory. Point-to-point correspondence is defined as a response that is influenced by each component of the verbal stimulus (i.e, the phonemes in the uttered response match the phonemes in the vocal stimulus for a word). Vocal mands were defined as any vocalization that does not immediately follow a vocalization made by another person, or if it did follow, the vocalization did not have point-to-point correspondence and formal similarity, and the vocal mand must be under the control of a motivating operation. Motivating operations were defined as whether or not the participant accepts an item or activity that is the object of vocalization. Any other vocalizations (utterances made by the participant) were defined as any other vocalization that does not meet the criteria to be scored as an echoic or vocal mand.

Procedure

The families and teachers were provided with the pre-intervention questionnaire (see Appendix A) upon the participants beginning intervention. They were also provided with a follow-up questionnaire following the end of interventions. Once receiving feedback from the parents, caregivers, and teachers via the questionnaires, the data was compiled into a comparative data sheet (found in Appendix C and Appendix D). This data was compared to other data that has been collected from the participant's files regarding PECS acquisition and communication skills.

Once participant data was compiled, the data was examined to determine if there are similar characteristics among participants that have acquired speech while receiving PECS training. The data was examined to determine if there are shared characteristics among participants that do not acquire speech while receiving PECS training.

Results

We received the completed pre-intervention surveys from five of the seven participants on April 21, 2015. The results of the pre-intervention questionnaires are discussed below.

Age and Genders

The participants of this study included five participants – two female, aged 3 and 4 years, and three males, two aged 3 years and one aged 5 years.

Relatives with Autism Diagnosis or Speech, Language, or Learning Disorder

None of the participants' families reported any relatives with an autism diagnosis, or speech or language disorder. One participant's family reported that his father had attention-deficit/hyperactivity disorder (ADHD).

Pregnancy/Birth History/Early Development

All of the participants' families reported the participants' mothers had experienced illness during pregnancy. Three of the five participant families reported that the participant's mother experienced Preeclampsia while pregnant. Another participant's family reported that the participant's mother experienced both the flu and bronchitis while pregnant.

All of the participants' families reported a problematic labor or birth. Four of the five participant families reported that labor resulted in an emergency cesarean section (c-section), with three due to the mother's preeclampsia, and one due to Frank Breech.

None of the participants reported a hearing or vision loss. One participant was reported as having received tubes in her ears at 19 months due to ear infections, but they have since been removed.

Speech/Language

Prior to receiving any interventions, three of the participants were reported to using speech as their main form of communication. One participant was reported as not using any speech to communicate and another participant was reported as rarely using speech to communicate.

Of the three participants that were reported to using speech as their main form of communication, it was noted that the participant with the most developed speech repertoire was currently receiving services from the most professionals. These included a pediatrician, occupational therapist, speech-language pathologist, audiologist, and special education services. Conversely, the two children that were reported as not using any speech were receiving the least amount of services of all the participants.

None of the participants' families reported their child as having a functional type of communication system available for use at home or school. Two of the participants (both of which were mainly nonverbal) had receiving prior PECS training at home through Early On, however, neither participant used PECS during the time prior to interventions.

The complete survey results are listed below (see Appendix E). The participant's names have been excluded for confidentiality.

Once all interventions have been completed, the participants' families will be asked to complete the post-intervention questionnaire. This data will be examined to determine if there are any shared characteristics among the participants that develop speech during interventions.

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Appendix A

Pre-Intervention Questionnaire

Name:

Age: _____ **Gender:** _____

Who is filling out this questionnaire? _____

- **Relationship to child:** _____

Contact Information:

Phone: _____

E-mail: _____

Preferred method of contact information:

Family Information:

Who does the child live with?

Language(s) spoken at home:

Are there any family members or relatives of the child who have received a diagnosis of autism or a developmental disorder?

Are there any family members or relatives of the child who have or had a speech, language, or learning disorder?

Participant History

Pregnancy/Birth History/Early Development

Is this your biological child? Yes/ No

During pregnancy with this child, did the mother experience any illnesses?

During pregnancy with this child, did the mother take any substances, either legal or illegal (example: prescription medications, alcohol, drug use)? If yes, what was/were the substance(s)?

Was labor or birth at all problematic? If yes, please explain:

Medical History

Has the child ever been hospitalized? Yes / No

- **Age:** _____
- **Reason:** _____

Any hearing problems (current or past)? Yes / No

- **If yes, how was or is this treated:**

Any vision problems (current or past)? Yes / No

- **If yes, how was or is this treated?:**

Prior Treatment

Past professionals child has received services from (check all that apply):

Pediatrician _____ Psychologist _____

Behavior Analyst _____ Neurologist _____

Physical Therapist _____ Occupational Therapist _____

Speech-Language Pathologist _____ Audiologist _____

Special Education Services _____ Other: _____

Current Treatment

Current professionals child is receiving services from (check all that apply):

Pediatrician _____ Psychologist _____

Behavior Analyst _____ Neurologist _____

Physical Therapist _____ Occupational Therapist _____

Speech-Language Pathologist _____ Audiologist _____

Special education services _____ Other: _____

Speech/Communication Information

Does the child use speech to communicate? Yes / No

- If yes, age of first word: _____

- If yes, describe the verbal communication (Words, sounds, etc):

Does the child currently use augmentative and alternative communication (AAC) methods, devices, or systems to communicate? (Examples: sign language, speech-generating devices,

PECS): Yes / No

- **If yes, is it the child's primary method of communication?** _____
- **Type or name of communication system:**

How does the child communicate at home?

How does the child communicate in environments outside of the home (school, public places, etc)

How well is the child understood? (i.e. about what percentage of the time) by:

- **Family members:** _____
- **Teachers:** _____
- **Unfamiliar adults:** _____

Has the child received prior PECS training? (Circle) Yes / No

- **If yes, where did the training take place?**

Prior to PECS treatment, did the child demonstrate any verbal communication?

(Circle) Yes / No

Are there any behavioral issues that may affect the child's ability to communicate?

Does the child currently display any of the following social behaviors when communicating with others? (check all that apply)

Eye contact when listening to a speaker: _____

Eye contact when communicating with a person: _____

Attentive to speakers: _____

Turn-taking (Example: Responds to communication partner, listens to communication partner's response, and responds again): _____

Responds when spoken to: _____

Responsive when name is called: (Wording on this) _____

Responds using facial expression (Example: Smiles in response to speaker) _____

Are there any other concerns regarding the child's speech, language, or behavior that you may have? If yes, please explain:

Signature of person completing form:

Date:

Appendix B

Post-Intervention Questionnaire

Name:

Age: _____

Gender: _____

Who is filling out this questionnaire? _____

- **Relationship to child:** _____

Contact Information:

Phone: _____

E-mail: _____

Preferred method of contact information:

Medical Information

Has there been any changes regarding the child's health since beginning intervention?

Current Treatment

Current professionals child is receiving services from (check all that apply):

Pediatrician _____ **Psychologist** _____
Behavior Analyst _____ **Neurologist** _____
Physical Therapist _____ **Occupational Therapist** _____
Speech-Language Pathologist _____ **Audiologist** _____
Special education services _____ **Other:** _____

Speech/Communication Information

Does the child use speech to communicate? Yes / No

- **If yes, describe the verbal communication (Words, sounds, etc):**

Does the child currently use augmentative and alternative communication (AAC) methods, devices, or systems to communicate? (Examples: sign language, speech-generating devices, PECS): **Yes / No**

- **If yes, is it the child’s primary method of communication?** _____
- **Type or name of communication system:**

How does the child communicate at home?

How does the child communicate in environments outside of the home (school, public places, etc)

How well is the child understood? (i.e. about what percentage of the time) by:

- Family members: _____
- Teachers: _____
- Unfamiliar adults: _____

Prior to PECS treatment, did the child demonstrate any verbal communication? (Circle)

Yes / No

Has using the PECS intervention improved the child's ability to communicate?

- Yes / No **Please Explain Below:**

Does the child currently display any of the following social behaviors when communicating with others? (check all that apply)

Eye contact when listening to a speaker: _____

Eye contact when communicating with a person: _____

Attentive to speakers: _____

Turn-taking (Example: Responds to communication partner, listens to communication partner's response, and responds again): _____

Responds when spoken to: _____

Responsive when name is called: _____

Responds using facial expression (Example: Smiles in response to speaker) _____

Are there any behavioral issues that may affect the child's ability to communicate?

After receiving PECS intervention, has the child demonstrated any changes in problem behaviors?

Signature of person completing form:

Date:

Appendix C

DATA COLLECTION PRE-INTERVENTION

PARTICIPANT AND FAMILY INFORMATION

Participant #					
Age/Gender					
Lives with					
Languages spoken at home					
Relatives with Autism Diagnosis?					
Relatives with speech, language or learning disorder?					

PARTICIPANT HISTORY & MEDICAL INFORMATION

Participant #					
Mother Experienced Illness During Pregnancy					
Substance use by mother during pregnancy					
Problematic Labor or Birth					
Child has been hospitalized & reason					
Hearing Impairment (Current or Past)					
Vision Impairment (Current or Past)					

PRIOR TREATMENT/SERVICES

Participant #					
Pediatrician					
Psychologist					
Behavior Analyst					
Neurologist					
Physical Therapist					
Occupational Therapist					
Speech-Language Pathologist					
Audiologist					
Special Education Services					
Other (List type of service)					

CURRENT TREATMENT/SERVICES

Participant #					
Pediatrician					
Psychologist					
Behavior Analyst					
Neurologist					
Physical Therapist					
Occupational Therapist					
Speech-Language Pathologist					
Audiologist					
Special Education Services					
Other (List type of service)					

SPEECH/COMMUNICATION INFORMATION

Participant #					
Uses speech to communicate					
Age of first word					
Description of Verbal Communication					
Currently using AAC and is it primary method of communication?					
Type of AAC communication used					
How child communicates at home					

SPEECH/COMMUNICATION INFORMATION CONTINUED

Participant #					
How child communicates outside of home					
% Understood by Family Members					
% Understood by Teachers					
% Understood by Unfamiliar Adults					
Received Prior PECS training					
Place where prior PECS training took place					
Prior to PECS training verbal communication demonstrated					

SPEECH/COMMUNICATION INFORMATION CONTINUED

Participant #					
Behavioral Issues that can impact communication					
Eye Contact when Listening to a Speaker					
Eye Contact when Communicating with Speaker					
Attentive to Speaker					
Turn-Taking					
Responds when spoken to					
Responds to name called					

SPEECH/COMMUNICATION INFORMATION CONTINUED

Participant #					
Uses Facial Expressions when Communicating					
Other communicative concerns					

Appendix D

POST-INTERVENTION DATA SHEET

PARTICIPANT INFORMATION/MEDICAL INFORMATION

Participant #					
Age/Gender					
Any changes to participant's health since beginning intervention?					

CURRENT TREATMENT/SERVICES

Participant #					
Pediatrician					
Psychologist					
Behavior Analyst					
Neurologist					
Physical Therapist					
Occupational Therapist					
Speech-Language Pathologist					
Audiologist					
Special Education Services					
Other (List type of service)					

SPEECH/COMMUNICATION INFORMATION

Participant #					
Uses speech to communicate					
Description of Verbal Communication					
Currently using AAC and is it primary method of communication?					
Type of AAC communication used					
How child communicates at home					

SPEECH/COMMUNICATION INFORMATION CONTINUED

Participant #					
How child communicates outside of home					
% Understood by Family Members					
% Understood by Teachers					
% Understood by Unfamiliar Adults					
Prior to PECS training verbal communication demonstrated					
Has using PECS improved ability to communicate & how?					
Participant #					

Eye Contact when Listening to a Speaker					
Eye Contact when Communicating with Speaker					
Attentive to Speaker					
Turn-Taking					
Responds when spoken to					
Responds to name called					
Uses Facial Expressions when Communicating					
Other Communicative Concerns					

Participant #					
Problem Behaviors Affecting Communication					
Has there been a decrease in problem behaviors after receiving PECS training?					

Appendix E

DATA COLLECTION PRE-INTERVENTION

PARTICIPANT AND FAMILY INFORMATION

Participant #	1501	1502	1503	1504	1505
Age/Gender	3 years Female	3 years Male	5 years Male	4 years Female	3 years Male
Lives with	Mother, Father, and one sister	Mother	Mother & Father	Mother & Father	Mother & Family
Languages spoken at home	English	English	English	Tamil	Spanish & English
Relatives with Autism Diagnosis?	No	No	No	No	No
Relatives with speech, language or learning disorder?	No	No	No	No	Father - ADHD

PARTICIPANT HISTORY & MEDICAL INFORMATION

Participant #					
Mother Experienced Illness During Pregnancy	Preeclampsia	Preeclampsia	Flu & Bronchitis	No	No response
Substance use by mother during pregnancy	No	No	Phergon (Morning Sickness) 2 Pack Azithromycin (Bronchitis)	No	Marijuana
Problematic Labor or Birth	Yes- <u>Emergency C-Section</u> (due to Preeclampsia)	Yes – <u>Emergency C-Section</u> (due to Preeclampsia) Labor 25 hours (due to <u>severe vomiting and infection from dehydration</u>)	Yes – <u>C- Section</u> (due to <u>Frank Breech</u>) * had multiple ultrasounds prior	Yes – 4 hour labor with contractions starting 48 hours prior	Yes – <u>Emergency C-Section</u> (due to <u>mother’s high blood pressure</u>)
Child has been hospitalized & reason	No	No	No	No	No
Participant #					
Hearing Impairment (Current or Past)	None currently – received tubes in ears at 19 mos. Due	No	No	No	No

	to ear infections, tubes out now.				
Vision Impairment (Current or Past)	No	No	No	No	No

PRIOR TREATMENT/SERVICES

Participant #	1501	1502	1503	1504	1505
Pediatrician	X	X	X		X
Psychologist					
Behavior Analyst					
Neurologist					
Physical Therapist			X	X	X
Occupational Therapist	X		X	X	X
Speech-Language Pathologist	X	X	X	X	
Audiologist	X		X		

Special Education Services	X	X	X	X	
Other (List type of service)					

CURRENT TREATMENT/SERVICES

Participant #					
Pediatrician	X	X	X		X
Psychologist					
Behavior Analyst			X		
Neurologist					
Physical Therapist				X	X
Occupational Therapist	X		X	X	X
Speech-Language Pathologist	X		X	X	
Audiologist	X <i>RELEASED 3/15</i>				
Special Education Services	X	X	X	X	X

Other (List type of service)					
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SPEECH/COMMUNICATION INFORMATION

Participant #					
Uses speech to communicate	Yes	Yes/No	Yes	Yes	No
Age of first word	No Response	“Momma” – 10 months	No Response	7 months	N/A
Description of Verbal Communication	Words, strings of words, sentences	Words, but not repetitively and it’s rare Mostly vowels and babbles	Uses sounds but not always words	Few words in Tamil (“grandma, grandpa)	N/A
Currently using AAC and is it primary method of communication?	No	Yes	Yes	No	No
	N/A	No	Yes	N/A	N/A
Type of AAC communication used	N/A	Sometimes simple signing	PECS & own form of sign language	N/A	N/A
How child communicates at home	No response	Mostly by gesturing or leading	Own version of sign language	Few words and sentences, grabs fingers, points to what’s needed	Tantrums, sounds, Pointing

How child communicates outside of home	Verbal	Mostly by gesturing or leading	Own version of sign language	Few words/sentences, grabs fingers, points to what's needed	Tantrums, sounds, pointing
% Understood by Family Members	90-100%	90%	85%	99% by mother	50%
% Understood by Teachers	90-100%	No Response	85%	No Response	No Response
% Understood by Unfamiliar Adults	80-90%	0%	50%	70%	10%
Received Prior PECS training	No	Yes	Yes	Yes	No
Place where prior PECS training took place	N/A	Home through Early On	Home through Early On	No Response	N/A
Prior to PECS training verbal communication demonstrated	Yes	Yes	No	No	No

SPEECH/COMMUNICATION INFORMATION CONTINUED

Participant #

Behavioral Issues that can impact communication	No	Enjoys Routine Dislikes Change	Yes – can get frustrated when not understanding what he’s saying. Leads to <i>aggression, yelling, and crying</i>	No	No Response
Eye Contact when Listening to a Speaker	X			X	
Eye Contact when Communicating with Speaker	X	X	X	X	
Attentive to Speaker	X				
Turn-Taking	X	X	X		X
Responds when spoken to	X	X	X	X	X
Responds to name called	X	X	X	X	X SOMETIMES
Uses Facial Expressions when Communicating	X	X	X “WILL SMILE WHEN SOME ONE IS GOOFING AROUND WITH HIM”	X	

<p>Other communicative concerns</p>	<p>No response</p>	<p><i>“Main concern is speech because he really doesn’t say words and its hard to understand him”</i></p>	<p>Yes – <i>“when he’s frustrated the anger can get bad”</i></p>	<p>No</p>	<p>No Response</p>
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