EFFECTS OF PICTURE EXCHANGE TRAINING ON COMMUNICATION TOPOGRAPHIES

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The Picture Exchange Communication System (PECS) has been used with children with autism and other developmental disabilities as an alternative to vocal communication. Some researchers have reported rapid acquisition of picture-exchange requesting as well as increased vocal speech and increased spontaneous social interactions following PECS training. Earlier research has found that although 3 children with autism learned to exchange pictures for preferred items during PECS training, requesting topographies did not change and vocal speech did not increase after PECS training. The present study evaluated the effects of PECS training on requesting topographies, especially vocal speech, with 3 participants with autism and mental retardation. Only one participant maintained picture-exchange requesting, and none of the participants showed an increase in vocal speech during probe sessions conducted after each PECS training phase.
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INTRODUCTION

Communication training is a high priority in the education of children with autism. Development of communication skills is essential to enable children with autism to get their basic needs met, to interact with family members and peers, and to be successful at school and in the community. For many children with autism, however, acquisition of vocal verbal behavior is very difficult, and they communicate mainly by pulling on adults’ hands or simply by grabbing things they want (often termed prelinguistic or pre-symbolic forms of communication). Picture-based communication systems may be a viable option for them. One widely used but understudied method is the Picture Exchange Communication System (PECS). PECS is said to teach children with autism to communicate at a more advanced and symbolic level than they might otherwise and also claims to increase frequency of spontaneous vocal communication in children with autism (Bondy & Frost, 1993, 1994).

PECS, developed by Andrew Bondy and Lori Frost, is an augmentative communication system designed to teach children with autism and related disorders to communicate functionally and rapidly (Bondy & Frost, 1993, 2001). PECS is based on the principles of behavior analysis and includes prompting, reinforcement and error correction procedures to teach spontaneous, functional communication (Bondy & Frost, 2001). During PECS training a learner is taught to hand pictures or icons to a communication partner in order to communicate, initially by requesting preferred items. For instance, in the earliest PECS training phase a learner with autism may be taught to hand a picture of juice to an adult, who then says something like “Oh, you want juice” and gives the learner some juice.
PECS training has many different phases but Phases 1-3 were the focus for this study. In Phase 1 the participant is taught to approach an adult, give the icon/photo, and receive the preferred item. In Phase 2 the distance between the participant, the adult and pictures (or icons) gradually increases. In Phase 3a discriminations between preferred items and non-preferred items are taught and in Phase 3b discriminations between multiple preferred items are taught.

Bondy and Frost (1993) described PECS as it was developed in the Delaware Autism Program. Eighty-five children under the age of 5 participated in that study. Each of the children learned the initial phase of exchanging the icon/photo within 1 month of training. Sixty-six of the children continued to use PECS for at least 1 year. Of the 66, 41 of the children used only speech at the end of the study, and 13 used speech and an augmentative system (Bondy & Peterson, 1990). Within 1 year the children began speaking and stopped using pictures to communicate effectively (Bondy & Frost, 1993).

Bondy and Frost presented a case study of a 36-month-old child who participated in the Delaware project (Bondy & Frost, 1994). The child was reported to have learned Phases 1-3 within 2 months of the introduction of the system. By the end of the second month the child was using the sentence strip “I want___”. By the end of the fourth month, the child was using speech while moving each picture to the sentence strip. After 11 months of PECS training the child was reported to use only speech to communicate.

Schwartz and Garfinkle (1998) analyzed PECS acquisition data for 31 preschool children between the ages of 3 and 6. Sixteen of the children were diagnosed with autism or pervasive developmental disorder-not otherwise specified (PDD-NOS). The other participants had diagnoses of various developmental disabilities. Each of the participants was enrolled in an
integrated university-affiliated preschool. All of the participants received PECS training as prescribed in the Bondy and Frost manual. PECS acquisition data were collected from each of the children’s data books. All of the children learned to use the PECS system with both adults and peers within their preschool classrooms. On average it took the participants 14 months to communicate functionally using PECS with adults and peers. This study did not address the acquisition of vocal communication skills or other forms of communication. A second study was conducted with 18 participants who were enrolled in the same program. Language samples were collected during snack and free-choice activities within the classrooms. Observations lasted for the duration of the activity or until 50 communicative attempts were made, whichever occurred first. During follow-up, each of the participants was observed three times over a 12-month period across 2 school years (spring, fall, spring), and data were collected on all forms of communication attempts. Spontaneous speech was the only outcome reported. The participants were divided into two groups, “talkers” (5 or more words) and “non-talkers” (fewer than 5 words) based on the first free choice observation. For the group of talkers during free choice, the average number of different unprompted words during the first observation was 12. It increased to 40 at the third observation. During snack the average number of spontaneous words was 8 on the first observation; it increased to 34 during the final observation. For the group of non-talkers during free choice, the average number of words spoken during the first observation was 1, which increased to an average of 4 on the final observation. During snack the group of non-talkers showed little or no increase in spontaneous speech. In summary 44% of the children in this study were reported to have improved in vocal verbal skills after learning PECS. For the group of talkers all of the children stopped using PECS and used only speech to communicate.
However, 56% of the children developed little speech and continued to use PECS as their primary mode of communication. These data suggested that some children who learn to use PECS may be able to acquire unprompted, non-echoic, spoken communication. The severity of the child’s disability may affect the changes in response topographies after PECS training.

Ganz and Simpson (2004) examined the role of PECS training in improving the number of words spoken, increasing the complexity and length of phrases, and decreasing non-word vocalizations. They hypothesized that as the length of utterances increased, non-word vocalizations would decrease in frequency, or as functional communications skills were acquired, non-word vocalizations would decrease. Three children, two with autism and one with developmental delays, participated in the study. Each of the children was taught PECS Phases 1-4. On completion of training all of the children had a larger average number of intelligible words spoken per trial compared to Phase 1 and showed generalization of the skills with a variety of adults. Participant 1 used few words in Phases 1-3, averaging less than one per trial, whereas in Phase 4 she averaged approximately three 3-word phrases per trial (“I want …”). Participant 2 averaged less than 1 word per trial in Phases 1 and 2. During Phase 3 there was a slight increase to almost 1 word per trial. During Phase 4 he began speaking in 3-to-4-word phrases (i.e.; “I want clay”, “I want balloon. White”). Participant 3 averaged less than 1 word per trial during Phases 1 and 2. During Phase 3 he averaged 1 word per trial. During Phase 4, this participant averaged almost 4 words per trial (“Book... I want… I want book”). All of the children met mastery criteria in PECS training in less than 2 months. Additionally, the children were using longer phrases and speaking with more complex syntax. The results of this research suggested that PECS may promote speech in some individuals with autism.
Charlop-Christy, Carpenter, Leblanc, and Kellet (2002) examined PECS acquisition and its effect on emergent speech. Three children with autism, aged 12, 5, and 3 years, participated in the study. One of the children imitated 3-word phrases upon request but used gestures as his primary mode of communication; another child had no spontaneous speech, made attempts to imitate speech, but typically used gestures; and the third child had no spontaneous speech and typically led adults to preferred items and/or pointed. The first child’s spontaneous speech increased from 28% of trials in pre-training to 100% of trials after PECS training. The second child did not demonstrate any spontaneous speech in pre-training but did display spontaneous speech during 83% of the trials at post training. The third child rarely displayed any spontaneous speech during pre-training and after training emitted spontaneous speech on 68% of trials. These results provided the first empirical evidence to support reports by Bondy and Frost that children who learn to use PECS often begin speaking.

Kravitz, Kamps, Kemmerer, and Potucek (2002) also examined the effectiveness of teaching PECS on spontaneous communication skills. One 6-year-old with autism participated in the study. Before PECS training she communicated using 1-to 2-word utterances if prompted, but she was difficult to understand, and frequency of speech was low. The child was taught PECS Phases 1-3 across school and home settings. Spontaneous language (using icons) increased during the PECS treatment conditions across settings and people. In addition, there were more intelligible spontaneous verbalizations, some with icons and some without icons. These data corroborated the descriptive reports by Bondy and Frost (1994) and Schwartz et al. (1998).
Tincani (2004) compared the effects of PECS and sign language training on the acquisition of mands. Two school-age children with autism participated in the study. The children relied on gestures as their primary mode of requesting. Both of the participants were able to imitate some words with teacher prompts. An alternating treatments design was implemented using PECS and sign language training. PECS procedures as developed by Bondy and Frost for Phases 1-3 were implemented. Sign language training procedures were adapted from Sundberg and Partington’s (1998) *Teaching Language to Children with Autism or Other Developmental Disabilities*. One participant demonstrated increased requesting in sign, and the other participant showed increased requesting using PECS. Both showed increases in independent requests above baseline levels with both treatments. Word vocalizations in baseline were zero for both participants and there was an increase in word vocalizations with sign language and PECS training for both participants during intervention. During the “best treatment” phase for the participant who had greater increases in PECS training within the experimental setting, there was an initial increase in independent manding (using PECS). During Phase 3b independent manding decreased. A reinforcement delay procedure was implemented, which resulted in a significant increase in independent manding. During the “best treatment” phase for the participant who demonstrated greater increases in sign language training, there was an increase in word vocalizations immediately following baseline, and vocalizations continued throughout treatment. Although there were mixed results for both of the training modalities, sign language training resulted in more speech than did PECS training for both of the participants.

Magiati and Howlin (2003) evaluated the effects of training teachers to use PECS. Thirty-four children with an age range of 5-12 years participated in the study. All of the children
had the diagnosis of autism. The children’s language abilities varied from non-verbal to use of word phrases as reported by head teachers. The children were divided into two groups: children using fewer than 10 single words and those using more than 10 words. Both groups improved in their overall use of PECS. Other topography changes were slower to occur, but there were steady increases in the overall average of number of words used.

Yoder and Stone (2006) compared rates of acquisition of responsive education and prelinguistic milieu teaching (RPMT) and PECS. Thirty-three preschoolers diagnosed with autism who were non-verbal or low verbal participated in the study. The purpose of the study was to determine relative efficacy of RPMT and PECS in facilitating spoken communication and nonimitative word use. The participants were randomly assigned to either RPMT or PECS training. Participants were trained in PECS throughout all six phases. Spoken communication increased primarily during the PECS intervention.

Howlin et al. (2007) examined the effectiveness of training in the use of PECS. Children between the ages of 4 and 11 years diagnosed with autism participated in the study. Eighty-four children were randomly assigned to one of three groups: immediate treatment, delayed treatment, and no treatment. Classroom teachers participated in a 2-day PECS workshop followed by treatment implementation within their classrooms for a period of 5 months. In the groups that received PECS training rates of initiations and rates of PECS use within the classroom increased with continued consultations from PECS trainers. Those increases were not maintained at follow-up after consultation ended. This study did not demonstrate any increases in frequency of spoken language or improved performance on language tests. Therefore these results do not corroborate reports of increases in spoken language during and after PECS training.
Green, Ames, Bellone, Hutt, and Occhino (unpublished) evaluated the effect of PECS training on matching performances and on various topographies of requesting. Single-subject experimental analyses were conducted to determine if PECS training would result in match-to-sample performances demonstrating conditional relations among PECS pictures, objects (reinforcers), and spoken words, changes in spontaneous requesting over baseline levels, and/or a shift in requesting topography from predominately pre-symbolic (e.g., reaching, pulling adults’ hands to objects) to more symbolic response forms (e.g., exchanging pictures, speaking). The participants were 3 children diagnosed with autism or PDD-NOS and mental retardation. The 3 participants met training criterion on PECS Phases 1-3, but none of them demonstrated increases in the frequencies of spontaneous communications compared to baseline. There was a shift in response topography for 1 participant, from reaching for items to pointing to printed words, sometimes with accompanying vocalizations. There was no shift in response topography from handing cards with printed words and/or pictures for the other 2 participants. There were no observations of these 2 participants speaking while exchanging printing words or pictures.

The study reported here replicated the response topography component of the study by Green et al. (unpublished). This study asked what effect PECS training would have on the communication response topographies of 3 children with autism and mental retardation.
METHOD

Participants

Two male students and one female student, all with a primary diagnosis of autism, participated in the study. All of the participants were students at a private non-profit applied behavior analysis (ABA) school for children with autism and PDD-NOS. Participant 1 was a 6-year-old female who also was diagnosed with epilepsy and mental retardation. She had no functional vocal speech and relied primarily on pointing and pulling the hand of another person to gain access to preferred items and activities. Participant 2 was a 7-year-old male who made some vocal approximations to functional words but relied primarily on pointing and reaching to gain access to preferred items and activities. A third participant began to engage in aberrant behavior (self-injury and aggression) in the first two baseline probe sessions. Attempts were made to condition the examining room as a reinforcing environment. Because these aberrant behaviors continued, the participant was dropped from the experiment and was replaced with a fourth participant who will be designated hereafter as Participant 3. Participant 3 was a 9-year-old male with no functional vocal speech. He requested preferred items and activities by pointing, reaching, or grabbing. All of the participants had received intervention designed to develop their communication skills before they entered the study. Two years prior to entering the study Participant 1 had been exposed to PECS training using line drawings in a different school setting. The child’s family reported that these attempts were unsuccessful. A speech therapist had trained Participant 2 to use single-use pictures to make simple requests; however, PECS protocol was not followed in that training, and the requests trained in speech therapy sessions did not generalize to other settings. Participant 3 had been exposed to PECS and
modified PECS training prior to entering the study, but both attempts were reported as unsuccessful.

Setting and Materials

All sessions were conducted in a 10-ft x 10-ft room that contained a child's desk and two chairs at the participants' school. The participant sat in the chair with the desk in front of him or her. The experimenter’s location varied from directly across from the participant up to 10 ft away, depending on the phase of the training. During at least one-third of the sessions there was an additional observer in the room recording interobserver agreement data.

Paired stimulus preference assessments (Fisher et al., 1992) were conducted at the beginning of the study to identify three reinforcers for each participant. Items used in the experiment were as follows: Participant 1 - Hershey Kisses®, M&M®’s, and cheese crackers; Participant 2 - a pin toy, a therapy band, and a squishy ball; Participant 3 – Starburst® candy, jelly beans, and Peppermint Patties®. Edibles were kept in small plastic bags. Each participant also had a small black 3-ring binder with strips of velcro affixed to the cover on to which laminated 2-in x 3-in photos, corresponding to each reinforcer, were attached in PECS training and in the experimental sessions.

Research Design and Experimental Phases

An A-B design replicated across participants was used to evaluate the effects of PECS training on requesting topographies. Probes of requesting topographies were conducted during baseline (prior to PECS training) and after each of PECS training phases 1-3. PECS phases 1-3 were trained to criterion for each participant before probes on frequency and form of requesting
topographies were conducted. Probe sessions occurred the day after PECS responses met criterion in each of the three phases.

Dependent variables and measurement

The dependent variables were response topographies defined as follows:

Point -- extending an isolated index finger toward the reinforcer.

Pull -- taking trainer’s hand, arm, finger and/or other body part to bring the trainer toward the reinforcer.

Reach -- extending one or both arms toward the reinforcer.

Hand -- picking up a photo from the PECS binder and handing it to the experimenter.

Vocalize -- producing any vocal sound while oriented toward the reinforcer.

Procedures

PECS training sessions were conducted 3-4 school days a week with a maximum of 2 sessions a day. Each session lasted 10-20 min depending on the number of errors and the error correction procedures implemented. Requesting probe sessions were conducted after mastery of each phase of PECS. The participant and one of two experimenters were present for each probe session. In those sessions the topography of the participant’s response on each trial was recorded on a data sheet (as depicted in Figure 1). If recognized words were vocalized, they were recorded verbatim. If the participant did not make any initiation toward the reinforcer within 10s, NR (no response) was recorded for that trial. The experimenter served as the primary data collector. During at least one-third of the sessions a second observer also recorded the participant’s responses.
Baseline

During baseline requesting probe sessions, the participant sat in a chair at a desk. On the desk was the three-ring binder with three laminated photos of the participant’s preferred items placed on the front of the binder in various locations. The experimenter sat in a chair on the opposite side of the desk with a supply of the participant’s preferred items. A trial began when the experimenter placed the three-ring binder on the desk in front of the participant and held up, played with, or consumed items in view of but out of the participant’s reach. In addition, the experimenter made comments about the items (e.g., “I love these patties”, “Mmm, jellybeans” etc.). If the participant pointed to or reached for an item, handed a laminated photo to the experimenter, pulled the experimenter toward an item, or vocalized, the item was delivered to the participant immediately. The three-ring binder was then removed from the desk, ending the trial. Baseline probe sessions consisted of 10 trials each.

PECS Training Sessions

All participants received PECS training through Phase 3b as described by Bondy and Frost (1994). During Phase 1, one laminated photo of a preferred item was placed on the desk in front of the participant, who was taught via physical and gestural prompting to pick up and hand the card to the experimenter. At that point the experimenter named the item (e.g., “Oh, you want cookie”) and gave the participant the item. In Phase 2 the distance between the participant and the experimenter was increased gradually in 1-ft increments up to 10 ft in various directions within the training room. The distance between the participant and the binder was then increased in 1-ft increments up to 10 ft in various locations within the training room. During this step the experimenter remained in the same location. Lastly, the distance between the participant and
both the binder and the experimenter was gradually increased. In Phase 3a, two photos were placed in front of the participant, one of a preferred item and one of a “distracter” item (e.g., candy and a spoon). When the participant handed one of the photos to the experimenter, s/he was given the corresponding item. During this phase, an error-correction procedure recommended by Bondy and Frost was used to teach the participant to select the photo that corresponded to the preferred item and not the “distracter.” In Phase 3b, photos of three reinforcing items were placed in front of the participant, and again the participant could exchange the photos for the corresponding items.

Each PECS training session consisted of 15-20 trials, depending on the number of errors and correction procedures required. Mastery of each phase was defined as 80% correct responses for two consecutive sessions.

Post-Training Requesting Probes

When the participant’s performance met the mastery criterion for each phase of PECS training, a response topography probe session was conducted the following day. Those sessions consisted of 10 trials conducted under baseline conditions, as described previously.
RESULTS

Results are reported in terms of frequency of response topographies during 10-trial requesting probe sessions. Because the frequency of most topographies was very low in all sessions, data points for specific topographies are shown only when the topography was recorded at a frequency above 0. The symbol * at the 0 value represents all topographies for which no responses were observed for that session, eliminating an indecipherable jumble of data points at 0 frequencies.

Participant 1’s performances are shown in Figure 2. She acquired the behavior trained in PECS Phases 1-3a; however, her performance did not meet criterion for Phase 3b. During the baseline probe session, two requesting topographies were observed for Participant 1. She pointed on 8 trials and reached for preferred items on 2 trials. In the probe session following Phase 1, Participant 1 handed the photo to the experimenter on 9 trials and reached for the item on 1 trial. No other requesting topographies were observed. As PECS training continued, this participant resumed pointing and/or reaching for preferred items in probe sessions. During probe sessions after Phases 2 and 3a, she pointed to items on 5 trials and handed a picture to the experimenter on 5 trials. The participant’s PECS performances did not meet training criterion for Phase 3b after 1 month of training. Two requesting probe sessions were conducted at that point. During the first of these 2 sessions the participant pointed on 4 trials, reached on 3 trials, and exchanged pictures on 3 trials. In the second probe session she pointed on 6 trials and handed a picture to the experimenter on four trials.

Participant 2’s performances in requesting probe sessions are shown in Figure 3. During the 5 baseline probe sessions, 5 requesting topographies were observed for Participant 2.
Reaching occurred between 3 and 8 times/session in the 5 baseline sessions. Pointing occurred between 2 and 7 times/session in the first four baseline sessions, and not at all in the fifth baseline session. There was one occurrence each of vocalizing (session dated 6/5/07) and pulling (session dated 9/7/07). This participant also handed a photo to the experimenter on 3 trials in the final baseline probe sessions.

Participant 2 acquired the behavior of exchanging photos that was trained in PECS Phases 1-3b. In the probe session after Phase 1 Participant 2 handed the photo to the experimenter on 3 trials, reached for items on 5 trials, and pointed on 2 trials. In the probe sessions after Phases 2, 3a, and 3b, Participant 2 handed the photo to the experimenter on all 10 trials in each session; no other topographies were observed. During post-training probe sessions on 12/7/07, 1/4/08 and 1/28/08, Participant 2 handed the photo to the experimenter on 7, 10, and 10 trials, respectively. In the session on 12/7/07, he pointed to items on 2 trials and reached for an item on 1 trial.

Participant 3’s performances in requesting probe sessions are shown in Figure 4. During baseline, Participant 3 reached 2, 3 and 5 times in the first, second and fourth baseline sessions, respectively, and pointed between 5 and 10 times/session during the four baseline sessions.

No other requesting topographies were recorded during baseline. This participant acquired the behavior trained in PECS Phases 1-3b. In the requesting probe session after Phase 1, he pointed to items on 9 trials and reached for the item on 1 trial. In the probe session after Phase 2, he pointed to the items on 8 trials, reached for the item on 1 trial, and handed the photo to the experimenter on 1 trial. In the probe session after Phase 3a, Participant 3, pointed to the
items on 3 trials and reached for the items on 7 trials. In the probe session after Phase 3b, he reached for the item on 1 trial and handed the photo to the experimenter on 9 trials.
DISCUSSION

Changes in requesting topographies over the course of PECS training were observed in all three participants. During baseline requesting probes Participants 1 and 2 mostly reached for or pointed to items. After PECS training their predominant requesting topography was handing photos to the experimenter. For Participant 1 that shift occurred after PECS training phase 1, when she exchanged photos for reinforcers on all 9 requesting probe trials. However that level was not maintained throughout the remainder of PECS training phases. During probe sessions after PECS phases 2 and 3a, requesting was equally divided between exchanging photos and pointing, and by the end of PECS phase 3b pointing occurred slightly more often than exchanging photos. Reaching for items also occurred on three trials in session 5. Because those performances were quite stable over the last four phases of PECS training, it seems unlikely that they would have changed dramatically with further PECS training, but it is possible.

For Participant 2, the shift in topography from reaching or pointing to exchanging photos occurred after PECS training phase 2. From that point on, this participant made requests by handing a photo to the examiner on all 10 probe trials in 5 of the last 6 probe sessions. For this participant PECS training appeared to have produced a reliable change in requesting topography from prelinguistic forms to a more symbolic form of communication.

Participant 3’s requesting topography did not change much relative to baseline until after PECS training phase 3b was completed. Prior to that, he made requests mainly by reaching for or pointing to items. In the requesting probe session conducted after PECS phase 3b, this participant exchanged photos for reinforcers on 9 of 10 trials. Because only one probe session was
conducted at that point, it is not possible to determine if PECS training produced a reliable change in this participant’s requesting topography.

Anecdotal reports from classroom staff suggested that participants used PECS throughout their school days to request preferred items, but did not make requests vocally. Results of this study, therefore, differ from those of earlier studies in which increases in spontaneous verbal requesting after PECS training were reported (Bondy & Frost, 1993, 1994; Ganz & Simpson, 2004, Magiati & Howlin, 2003). Each of those studies included participants who had some spoken language skills when they entered the study. Some of the participants requested some preferred items vocally, and others imitated words when provided a model or had a history of echoic speech. The investigators in all of those studies reported increases in spontaneous vocal language or mean length of utterances after PECS training. Some also reported that several of the participants used speech as their primary mode of communication after PECS training (Bondy & Frost, 1993 & 1994). Schwartz and Garfinkle, (1998) reported that children who were considered “talkers” when they entered that study communicated exclusively by talking after they completed PECS training, whereas, “non-talkers” continued to use picture exchange as their primary mode of communication. In contrast, two of the three participants in the current study had no spoken communication skills when they entered the study. That could have accounted for the fact that those two participants did not demonstrate increases in vocal speech during requesting probes that followed three phases of PECS training.

Participants in the studies by Charlop-Christy, Carpenter, LeBlanc, and Kellet (2002) and Kravitz et al. (2002) were also reported to speak more often and in longer utterances after PECS training than they did in baseline. Those participants had some skills in imitating spoken words
or speaking when prompted when they started the studies. Further, Charlop-Christy, Carpenter, LeBlanc, and Kellet (2002) trained the participants in their study through PECS phase 5 – more than participants in the current study. Those authors also reported that spontaneous speaking occurred only when a delay procedure was incorporated in PECS phases 4 and 5. No delay procedures were used in this study.

Two earlier studies reported no increases in vocal speech or spontaneous requesting following PECS training (Green et al., unpublished; Howlin et al, 2007). As in the current study, those prior studies involved children with autism and mental retardation. Taken together, studies conducted to date suggest that PECS training is generally effective for teaching children with developmental disabilities to use pictures for manding, and, perhaps, for other communicative functions. It is less clear that PECS training provides an avenue to vocal communication. Participants’ general levels of functioning, ages, and entering verbal repertoires may be factors that contribute to such an outcome. The participants in this study lacked speech and functioned at a relatively low level. Anything that might aid in generating speech communication for them would be highly desirable. PECS did not produce that outcome for them. Two of the participants in the current study, however, did acquire the repertoires targeted by the first three phases of PECS training. There was also some evidence that through that training, their requesting topographies changed from prelinguistic forms (reaching, pulling) to a more symbolic form (handing pictures to communication partners). The results reported here may have been affected by several features of the study that limit any conclusions that can be drawn. One has to do with the experimental setting. The training sessions took place in a controlled area unfamiliar to the participants rather than in a more familiar and “natural” setting.
They were also conducted once a day at a specific time rather than throughout the school day, as was the case in several of the other studies of PECS. It is possible that if these participants had received more intensive or prolonged training with PECS, and/or if that training had occurred in more “natural” settings, acquisition of PECS skills as well as shifts in requesting response topographies might have occurred more rapidly. Another limitation pertains to reinforcer effectiveness. Three edible items, determined as preferred at the beginning of the study, were used throughout. Although those items were reserved for use in experimental sessions, it is possible that they lost their effectiveness during the course of the study.
Sample Data Sheet

Experimenter: Aimee Haray, University of North Texas

Participant Code_____________ Trainer_______________ Date____________
Setting___________________ Time ________Secondary Observer____________

Response Definitions:

Point: Extending isolated index finger toward an item
Pull: Taking trainer’s hand, arm, finger and/or other body part to bring trainer toward an item
Reach: Extending one or both open hands toward an item

Hand Icon: Picking up a picture or icon and handing it to the trainer

Vocal: Any vocalization (record any recognizable words verbatim)

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Figure 1. Sample data sheet.
Figure 2. Participant 1 frequencies of request topographies by session.
Figure 3. Participant 2 frequencies of request topographies by session.
Figure 4. Participant 3 frequencies of request topographies by session.
REFERENCES


