The Teaching of Functional Language Skills in a Second Language to a Child with Autism

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***Abstract**: This article examined the rate of self-initiated communication acquisition, in a second language, of a child with autism. The language treatment objective was to teach functional communication skills in English through the use of Picture Exchange Communication System (PECS). The findings of this study show that it is possible for a child with autism to acquire functional communication skills in his second language even though he did not possess such communication skills in his first language.*

***Keywords**: autism, picture exchange communication (PECS), verbal initiations.*

Children with autism have severe language deficits and socialization problems (American Psychiatric Association, 1994). Although a wide array of intervention techniques such as incidental teaching (Hart & Risley, 1980), pivotal response training (Koegal, Koegal, & Schreibman, 1991), reinforcing communication attempts rather than correct speech responses (Koegal, O'Dell & Dunlap, 1988) have been employed to stimulate speech, researches have shown that approximately 50% of children with autism continued to remain nonverbal (Charlop & Haymes, 1994; Peeters & Gillberg, 1999; Prizant, 1983). Hence, one option is to use Augmentative and Alternative Communication (AAC) to teach communication to these nonverbal children.

There have been many published studies on the use of Augmentative and Alternative Communication systems (AAC) to teach communication skills to non verbal young children with autism and/or with developmental disabilities (Cohen, Allgood, Heller, & Castelle, 2001; Dyches, Davis, Lucido, & Young, 2002; Sigafoos, Didden, & O'Reilly, 2003).The major uses of AAC are to augment vocal behavior, provide an input and output mode for communication and function as a language intervention strategy (Romski & Sevcik, 2005). There are two types of AAC systems: aided and unaided. As the name implies, aided forms of AAC use external support

while unaided forms of AAC do not use external support to assist communication. Examples of aided forms of AAC include communication boards that depict pictures, symbols, line drawings and various types of electronic voice-output communication aides (VOCAs). Unaided forms of AAC include manual signs, natural gestures and facial expressions (Sigafoos & Drasgow, 2001). The Picture Exchange Communication System (PECS) is a popular aided AAC used with children with autism (National Research Council, 2001). It is a training package that teaches the user to exchange a picture of a desired item to a communicative partner for that item. PECS is unique as it teaches communication initiation in social settings (Bondy & Frost, 1994, 2001). In addition, PECS is also a technique known for stimulating speech (Charlop-Christy, Carpenter, Le, LeBlanc, & Kellet, 2002; Ganz & Simpson, 2004).

Ganz and Simpson (2004) taught PECS to three young children, between the ages of three and seven years old, and who had autism and developmental delays. All three children, who had limited functional speech, rapidly mastered PECS and showed increases in length and complexity of word utterances. Charlop-Christy et al. (2002) reported a decrease in problem behavior and increase in speech after a rapid PECS acquisition by three children with autism. These children also demonstrated increases in PECS and verbal requests and non-verbal initiations. Kravits et al. (2002) used PECS to teach a six-year-old girl with autism communication skills. Results showed increases in spontaneous communication skills, an increase in PECS initiation and increases in interaction time with peers both at home and in school. Since much published studies have shown the positive effects of PECS training in eliciting communication skills in children with autism, the purpose of the present study was to examine the effects of teaching PECS to a young child with autism using his second language, English, since attempts to increase his communication skills in his first language, Mandarin, in home settings, had not been successful.

METHODOLOGY

Participant

Ming, a six-year-old Chinese boy with autism, was placed in a preschool program in a special school in Singapore. The child had not received any formal education prior to his placement. His main caregiver was his mother, a housewife who spent much of her time with the boy. His

father had a full-time job as a technician and could only spend quality time with Ming on Sundays, the only day of the week in which he did not have to work. Ming had an elder sibling, an eight-year-old girl, who was in an elementary school. His mother reported that the siblings did not play together as Ming was uninterested in any social interaction. Ming's past-time was spinning anything he could lay his hands on, for example, plates, coins and pens/pencils. When he was tired of spinning, he would be engaged in stereotypic behaviors like rocking and flapping his hands. Any attempts by his parents and sister to communicate with him were unsuccessful as Ming had echolalia and unintelligible speech. Although he could imitate words, which were in Mandarin (the only language spoken at home), he did not demonstrate the ability to label objects, nor could he use words in a functional manner. His parents reported that he frequently engaged in temper tantrums, screaming and hitting himself, for no apparent reasons. His parents initially tried to bring Ming out to community settings such as the supermarket, playground and library, but stopped in their attempts as Ming frequently displayed his tantrums in public. As a result, Ming spent all his time at home until he was enrolled in the special school.

Setting

The study was conducted in the participant's classroom in a special school in Singapore. There were nine other students, besides Ming, in the classroom. The class teacher was the experimenter herself and she was assisted by two teacher aides.

Materials

Prior to the intervention, Ming's parents were given a checklist to identify his preferred items (which were a spinning top, raisins and peanuts), and non-preferred items (furry toy, apple and banana). Pictures of these preferred and non-preferred items were taken with a digital camera, laminated and had Velcro strips pasted behind each picture. A laminated and Velcro picture symbol, which was obtained from the Picture Communication Symbols library (2002), showing "I want", was placed together with the pictures of the preferred and non-preferred items, in individual plastic pages in a ring folder. A horizontal Velcro strip was placed on the front cover of the folder. The observation intervals were timed using a cassette player.

Research Design

A single-subject changing criterion-like design was used (Ganz & Simpson, 2004). This type of design is useful as replications of treatment effects are possible with a single participant. The participant's performance can also be compared under different conditions (Kazden, 1982). This design comprised of a baseline phase followed by four PECS training phases. Each training session consists of 15 trials for each participant, until mastery level is reached. Mastery level is defined as 80% of independent trials for 3 consecutive 15-trial sessions for each phase.

For all four PECS phases, various preferred and non preferred items were used across all training sessions at various times of the day. As the medium of instruction in all schools in Singapore was English, the language intervention was thus conducted in English.

The independent variables were the training modeling verbalizations (e.g. I want raisin) and the training guidelines, according to Bondy and Frost, 1994, for each phase. The dependent variables were the performance data and the number of independent word and sentence utterances.

Reliability

The experimenter and the two teacher aides took turns to act as the trainer (person who showed preferred items to Ming) and the physical prompter (person behind Ming who physically prompted him to use picture exchange). These two roles were interchanged in all sessions so as to help Ming to generalize his communicative partner.

The percentage of agreement for occurrences of all dependent variables was calculated as thus:

$$\frac{\text{total no. of agreements}}{\text{total no. of agreements + disagreements}} x\,100(\%)$$

Procedure (Bondy and Frost, 1994)

Phase 1: Baseline

The purpose of this baseline is to assess whether Ming had the ability to use picture exchange. A picture of Ming's preferred item (e.g. raisin) was placed in front of him while the trainer showed him a raisin. This procedure was repeated with the other two of Ming's preferred items (i.e. spinning top and peanut). A total of 12 trials (four times with each item) were conducted. Ming reached out for the item on all occasions but he

never picked up the pictures and handed them over to the trainer to exchange for the items.

A baseline observation was also conducted to assess Ming's verbal initiation (independent word/sentence utterances) during pre-training.

Phase 2: Basic picture exchange

Ming was shown a preferred item (e.g. a raisin) by the trainer. When Ming reached for the raisin, the prompter provided hand-over-hand assistance to pick up the picture of the raisin and give it to the trainer. The trainer held out his hand only after Ming had picked up the picture. The partner then gave the raisin to Ming, at the same time saying, "Raisin". Ming was allowed to consume the raisin. The training continued in this way with the prompter gradually fading assistance. The trainer's open-hand cue was gradually faded until Ming reached the trainer with the raisin. The outcome was that Ming was able to independently exchange the picture for the raisin.

Phase 3: Increasing distance and persistence

The picture was placed on the cover of a ring folder. The folder was placed in such a way that Ming had to reach for it. The prompter gradually faded hand-over-hand assistance to remove the picture from the folder. The trainer moved gradually away from Ming so that Ming had to walk greater distances to give the picture to the trainer. The outcome was that Ming was able to independently reach for the folder, remove the picture from the folder, walk to the trainer with the picture and hand the picture to the trainer in exchange for the raisin

Phase 4: Picture discrimination

The corresponding pictures of a preferred and a non-preferred items (e.g. raisin and apple) were presented to Ming. When Ming gave the picture of the preferred item to the trainer, he was given that item. When the picture of non-preferred item was given to the trainer, Ming was given the non-preferred item. When Ming displayed negative reactions, the prompter would then point to the picture of the preferred item until Ming picked up that picture and handed it over to the trainer. Training continued until Ming could give the picture of the preferred item to the trainer. When this stage was reached, two pictures of preferred items (e.g. raisin and

peanut) were presented to Ming. It was possible that Ming might want the raisin but gave the picture of the peanut. He may still be happy to receive the peanut as it was also his preferred item. In order to assess whether what Ming wanted corresponded to his actions, a correspondence check was done. When Ming gave the picture of the peanut to the trainer, the trainer presented both the raisin and the peanut to Ming, saying "Take it". When Ming took the peanut, he was allowed to consume the peanut. However, when Ming took the raisin, the trainer blocked access to the raisin. The prompter then pointed to the correct picture of raisin to get Ming to give the picture of the raisin to the partner.

It was important that the trainer said, "Take it" rather than "Take raisin" to ensure Ming discriminated visually rather than auditorily. The training continued until Ming was able to independently make the correct request for the item he desired.

Phase 5: Using sentences

The prompter physically prompted Ming to take the picture symbol depicting "I want" and place it in front of the picture of the chosen item (e.g. raisin) on the Velcro strip. Ming then exchanged the whole strip for the preferred item after the trainer had modeled reading the sentence (e.g. "I want raisin"). The training continued until Ming was able to independently arrange the pictures "I want" and the picture of the preferred item on the sentence strip in the correct order and use this sentence strip to exchange the item.

FINDINGS AND DISCUSSION

The results for Ming are shown in Fig. 1 and Table 1. In the baseline phase (phase 1), Ming did not display any ability to use picture exchange, nor could he utter any words in English. Ming only started to imitate the first word, "raisin" in the second session (trials 16-30) in phase 2. Subsequently, he could also imitate the words "peanut" and "top" in the same session. He took a total of 75 trials (5 sessions) to master this phase. At the end of phase 2, he was able to label correctly the three items when he picked the corresponding pictures. In phase 3, he imitated the word, "Go" when the prompter instructed him to walk to the trainer in order to exchange the picture for his requested item. During the initial stage of phase 3, Ming hesitated to give the picture to the trainer, hence, the prompter prompted him verbally to do so by saying, "Give". Ming thus learned another new word, "Give" and would use this word when he

handed the picture to the trainer. By the end of phase 3, Ming was able to independently say a maximum of three words per trial. He took 45 trials to master phase 3. In phase 4, the word, "No" was introduced to him when he picked the item that did not correspond to the picture he had exchanged. By the end of this phase, he could tell himself, "No" when he saw the item that did not correspond to the picture he picked. Ming took 75 trials to master this phase. Ming was able to independently use the phrase, "I want _____ (desired item)" when he handed the picture to the trainer to exchange his desired item by the end of phase 5. He was able to do so for all the items he requested. In fact, he then understood the concept so well that he would say, "No, _____ (undesired item)" when he saw that it was not the item he

Table 1. Speech Samples for Ming

Trials	**Speech samples**	**Trials**	**Speech samples**
Phase 1		*Phase 4*	
Trial 1	--	Trial 1	"go", "picture", "raisin"
:		Trial 2	"no", "picture", "raisin", "apple"
Trial 12	--	Trial 3	"no", "picture", "raisin", "banana"
		:	
Phase 2		Trial 75	"no", "banana", "apple", "go", "give", "picture", "peanut"
Trial 1	--		
:			
Trial 73	"raisin"		
Trial 74	"peanut"		
Trial 75	"top"		
Phase 3		*Phase 5*	
Trial 1	"go", "raisin"	Trial 1	"I want raisin"
Trial 2	"go", "peanut"	Trial 2	"I want raisin", "no apple"
Trial 3	"go", "top"	:	
:		Trial 45	"I want raisin", "I want peanut", "give me", "no rabbit"
Trial 43	"give", "picture", "raisin"		
Trial 44	"go", "peanut"		
Trial 45	"go", "give", "top"		

wanted and would say, "I want _____ (desired item)", pointing to that item. Ming took 45 trials to master the last phase.

PECS training was conducted on Ming for a period of one month. At the end of one month, Ming was able to label at least three of his preferred items, namely "top", "raisin" and "peanut" as shown in Phase 2 in Table 1. He was also able to label three of his non-preferred items, namely, "rabbit", "apple" and "banana" as indicated in Phases 4 and 5 in Table 1. He was able to indicate precisely what he wanted by saying, "I want _____ (desired item) in Phase 5 as reflected in Table 1. Sometimes, during non-training sessions, Ming would deliberately be given a non-preferred item, for example, a banana, when he requested for a peanut to see his reaction. He would be able to say, "No, banana. I want peanut". This showed that Ming was able to request appropriately those items that he had learnt to label during PECS training and also learnt to reject those items which he did not request. Subsequently, after the one month of PECS training, Ming was also taught to label other items that were commonly present in his every day life and similarly, he was able to request for these items in the same manner as he was taught during PECS training. The average number of words per trial increased from zero in Phase 1 to ten in Phase 5 as shown in Figure 1. The number of phrases/sentences per trial, likewise, increased from zero in Phase 1 to four in Phase 5, which is also shown in Figure 1. However, the data for post-PECS training were not recorded.

Ming was able to reach mastery level in independent PECS exchange from phases 2 to 5 (refer to Figure 1). By the end of phase 5, he was very proficient in using PECS to communicate his needs independently to the experimenter and the two teacher aides in the classroom.

Ming's temper tantrums and stereotypic behaviors also decreased after PECS training in school. This could be due to the fact that his needs and wants could now be fully understood by others and he displayed lesser tendencies to engage in undesirable behaviors.

Ming's family members were taught the procedures of PECS training so that they could facilitate communication with him at home. They were advised to use Mandarin, instead of English, to teach Ming at home as Mandarin was their first

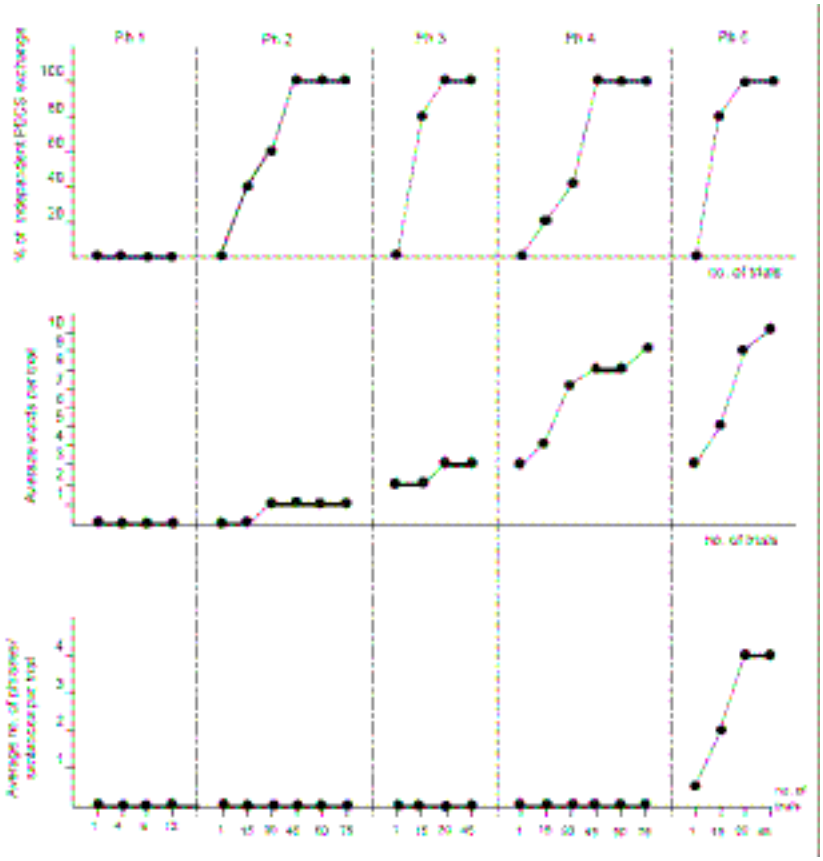

Fig. 1. PECS proficiency (top panel), average number of words per trial (middle panel) and average number of phrases/sentences per trial (bottom panel)

language. However, the family was not enthusiastic in employing PECS technique as they found it "too troublesome". Hence, Ming's communication with his family members did not improve and he still frequently displayed temper tantrums and stereotypic behaviors at home. As a result, Ming could now communicate better with his second language, English, in school and in public settings during outings with his classmates, as compared to his first language, which was used at home. It must be highlighted here that the reason Ming was not able to communicate in his first language, Mandarin, was due to the fact that he had not undergone a

language intervention program conducted in Mandarin. If he was given the opportunity to do so, it was believed that he would be just as fully conversant in his first, as well as his second language.

CONCLUSION AND SUGGESTIONS

There were three limitations to this study. First, there was only one participant in the study. Future research could involve more participants so as to see the benefits of using PECS to teach a second language when there would be a difficulty in learning the first language. Second, teachers should be sent to Ming's home to encourage his family members to employ PECS procedures to teach him to communicate in his first language. If this had happened, Ming might have learnt to communicate his needs and wants to his family members and this would have led to a better quality of life at home. Third, there was no follow-up data for post-PECS training. Future research could include maintenance and generalization results (communication in other settings and with other people) so as to see the benefits of PECS training in the long run.

In conclusion, results showed that Ming rapidly acquired the criterion for object labeling in English and proceeded to demonstrate increases in the number and length of verbal utterances. There was also a significant increase in verbal initiations in English. The findings of this study show that it is possible for a child with autism to acquire functional communication skills in his second language even though he did not possess such communication skills in his first language.

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