The Effectiveness of Picture Exchange Communication System in Improving the Functional Communication Skills of Individuals with Autism Spectrum Disorders

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Abstract
This study explores whether or not effectiveness of Picture Exchange Communication System has positive effects functional communication of children with autism. Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities (Tarbya Fekrya). A pre-post design was used to examine the effectiveness of the Picture Exchange Communication System on functional communication of the target children. Findings from this study indicated the effectiveness of the Picture Exchange Communication System employed in teaching the target children functional communication. On the basis of the findings, the study advocated for the effectiveness of the Picture Exchange Communication System employed in teaching the target children functional communication.

***Keywords*:** Picture Exchange Communication System, functional communication, Autism.

Introduction

Autism is a developmental disability usually diagnosed in children within the first 3 years of life (Volkmar & Klin, 2005). There is no cure for autism (Schreibman, 2005). Symptoms are grouped into the three broad areas that include communication, social interaction, and restricted patterns of behavior (Tsatsanis, 2005). Treatment to remediate symptoms is frequently delivered as language instruction. Addressing lang- uage growth helps make a significant improvement in the quality of life (Adel Abdulla Mohammed & Mourad Ali Eissa, 2014; Mahfouz,2014).

The essential features of ASD include significant impairments in social interaction and communication skills and a highly restricted area of activities and interests (American Psychiatric Association, 2000). Social interaction problems may be exhibited through an impairment in nonverbal behaviors (e.g., eye to eye gaze, body postures, facial expressions) and/or failure to create developmentally appropriate peer relationships. For example, a child with ASD is less likely to initiate peer-related social interactions or respond to social bids from peers.(Adel Abdulla Mohammed& Amaal Ahmed Mostafa,2012).

In addition to social interaction problems, children with ASD have communication skill deficits. Often, these deficits include a delay in or absence of spoken language (e.g., 40% never obtain speech). Children that do develop speech may have difficulty initiating or sustaining conversations with others. Further, these children may develop stereotyped and repetitive use of language or idiosyncratic language (e.g., repeating nonfunctional phrases over and over). Coinciding with impairments in social interaction and communication, children with ASD may exhibit restricted, repetitive, and stereotyped patterns of behavior, interests, and activities. They often demonstrate a preoccupation with idiosyncratic interests to a level considered abnormal in intensity and focus (American Psychiatric Association, 2000). For example, a child may know every fact about the makes and models of cars and sustain conversations related to this topic for hours, but remain unable to hold conversations about any other topic.

They also may engage in inflexible, nonfunctional rituals and routines such as turning a doorknob over and over in each direction before leaving their home. Although these rituals and routines initially may appear to decrease anxiety, the routines typically impede an individual's ability to socialize and function properly within society (Heflin & Alaimo, 2006).

The picture exchange communication system (PECS) is a pictorial system that was developed for children with social-communication deficits (Frost & Bondy, 2002). The system uses basic behavioral principles and techniques such as shaping, differential

reinforcement, and transfer of stimulus control via delay to teach children functional communication using pictures (black-and-white or color drawings) as the communicative referent. The pictures are kept by the child on a notebook (PECS board) with Velcrot. The child is taught to use his or her PECS board and create a ‘‘sentence’’ by selecting picture cards (e.g., ‘‘I want’’ card plus ‘‘juice’’ card) and delivering the cards to a communicative partner as a request for a desired item. PECS emphasizes teaching a child to initiate requests (for seen and unseen items), respond to questions (e.g., “What do you want?”), and make social comments (e.g., ‘‘I see [object]’’).

Kai-Chien Tien(2008) verified the effectiveness of the Picture Exchange Communication System (PECS) for improving the functional communication skills of individuals with autism spectrum disorders (ASD). The research synthesis was focused on the degree to which variations in PECS training are associated with variations in functional communication outcomes (Dunst, Trivette & Cutspec, 2002). The communication consequences of PECS were examined in 13 studies, which included 125 participants with ASD who had been identified as having limited or no functional communication skills. Claims that PECS is an effective intervention for improving functional communication skills appeared to be supported by the available research evidence.

Using a multiple baseline design, MARJORIE et al. (2002) examined the acquisition of PECS with 3 children with autism. In addition, the study examined the effects of PECS training on the emergence of speech in play and academic settings. Ancillary measures of social-communicative behaviors and problem behaviors were recorded. Results indicated that all 3 children met the learning criterion for PECS and showed concomitant increases in verbal speech. Ancillary gains were associated with increases in social-communicative behaviors and decreases in problem behaviors. The results are discussed in terms of the provision of empirical support for PECS as well as the concomitant positive side effects of its use.

The purpose of the present study was to examine the extent to which Picture Exchange Communication System can be used to enhance the functional communication skills of individuals with autism Spectrum disorders. The primary research question was, what effects will Picture Exchange Communication System have on the functional communication skills of individuals with autism Spectrum disorders.?.

Method

Participants

Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities(Tarbya Fekrya).All children attended the same classroom within the school. Parental informed consent forms were sent home by the school director and school psychologist to parents of potential participants telling them about the study and requesting them to give permission for their children to participate. Through a previous comprehensive psychological evaluation each targeted child had received a primary diagnosis of Autistic Disorder. All children were also capable of communication using speech assessed through a combination of teacher report and observation. They were so-called high functioning.

Each child also had the following characteristics: (a) meet the full criteria for autism according to The Scale for Screening Autism Disorder(Mohammed, 2003) (b) functional verbal communication, (c) able to read and comprehend words, and (d) ability to follow directions.

Instrument

Functional communication questionnaire. a 20-item teacher-report questionnaire. It is based on the Autism Diagnostic Scale (Adel Abdulla Mohammed, 2003). Respondents are asked to rate their level of agreement using a five point Likert response scale(3 = Always, 2 = Sometimes , 1 = Never). The Cronbach alpha value was high (0.89) indicating excellent internal consistency.

Procedure

Screening: Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities. Each child also had the following characteristics: (a) meet the full criteria for autism according to The Scale for Screening Autism Disorder(Adel Abdulla Mohammed, 2003) (b) functional verbal communication, (c) able to read and comprehend words, and (d) ability to follow directions.

Pre-intervention testing: Teachers were asked to rate child's functional communication skills on the functional communication questionnaire.

General Instructional Procedures: The PECS training consists of six phases, which will be described in detail in the following. *Phase I–"*How" to Communicate. In this phase, the terminal objective is that upon seeing a "highly preferred" item, the child will pick up a picture of the item, reach toward the communicative partner, and release the picture into the trainer's hand (Frost & Bondy, 2002, pp. 67). One trainer entices the child with an object that is highly desired. As the child reaches for the desired object, the second trainer, the facilitator, physically assists the child in picking up a picture for the desired object. The first trainer immediately gives the child a reward along with an appropriate comment, such as "Oh, you want M&M!" when he/she receives the picture.

Phase II – Distance and Persistence. In this stage, the exchange continues with attempts to increase the child's independence. Thus, the terminal objective is that the child goes to his communication book where his picture is stored, pulls the picture off, goes to the trainer, gets the trainer's attention, and releases he picture into he trainer's hand (Frost & Bondy, 2002, pp. 93).The child now is encouraged to use greater spontaneity and persistence, and to generalize the skill he acquired. The facilitator is still available for as needed assistance. Thus, the child learns to remove the picture from a display board for the exchange and must engage in more physical movement than in Phrase I in order to accomplish the exchange. However, the child is still encountering only one symbol on a board at any one time.

Phase III – Picture Discrimination. The terminal object for this phase is that the child requests desired items by going to a communication book, selecting the appropriate pictures from an array, and going to a communication partner and giving him/her the picture (Frost & Bondy, 2002, pp.123). In this stage the child is asked to discriminate between several items on a board, choosing which item he wants, or which activities he wants to try. The child begins by answering forms of the question "What do you want?" but these are faded quickly so the child will make choices spontaneously as well as in response to a question. As the child becomes more comfortable making discriminations, a third item may be added, and so on.

Phase IV – Sentence Structure. The terminal objective is that the child requests present and non-present items using a multi-word phrase by going to the book, picking up a picture/ symbol of "I want," putting it on a sentence strip, picking out the picture of what she wants, putting it on the sentence strip, removing the strip from the communication board, and finally approaching the communicative partner and giving the sentence strip to him (Frost & Bondy, 2002, pp.159). Thus, the child is taught to combine the object picture with the carrier phrase

"I want" on a sentence strip and to give the strip to the adult or communication partner. The two pictures are attached to a sentence strip and the entire strip is exchanged with the communicative partner in return for the pictured item.

Phase V – Responding to "What do you want?" In this stage the child learns to respond to the question "What do you want?" by exchanging the sentence strip. Thus, this phase extends the sentence structure begun in Phase IV. Use of the questioning phrase is deliberately delayed until this phase because the exchange behavior should be automatic by that point in the programming sequence (Frost & Bondy, 2002, pp. 209). Adjectives and other words may be added to the child's repertoire to help her further refine her requests.

Phase VI – Commenting. In this finial stage, the child learns to respond to the questions "What do you want?" "What do you see?" "What do you have?" This phase makes a fundamental shift in the child's communication as well as the expected outcome from the teachers or peers. That is, it is designed to introduce the child to commenting behavior, while the previous stages focused on requesting behavior. Through the use of pictures for "I see," "I hear," "I smell," etc., the child is taught to comment on elements of his/her environment.

Results

Picture Exchange Communication System and Functional Communication

The first objective of the study was to determine if use of Picture Exchange Communication System would be more effective for the treatment group compared to the control group .For this purpose, the post intervention scores of both treatment and control groups were analyzed. Table 1. shows Z Value result for the differences in post- test mean rank scores between experimental and control groups in functional communication. The table shows that (Z) value was(-2.660).This value is significant at the level (0.01) in the favor of experimental group .

Table 3. *Z Values results for the differences in post- test mean rank scores between experimental and control groups in functional communication*

Variables	**Groups**	**N**	**Mean Ranks**	**Sum Ranks**	**Mann-whiteny**	**Z Value**	**Sig**
Functional communication	Ex	5	8	40	Zero	-2.660	0.01
	Cont.	5	3	15			

The second objective of the study was to determine the effect of Picture Exchange Communication System on functional communication in children with autism. The treatment consisted of functional communication training through use of Picture Exchange Communication System.

The children's performance on verbal communication was measured pre and post intervention. Table 4 shows Z Value result for the differences in pre and post test mean rank scores for the experimental group in functional communication questionnaire.

The table shows that (Z) value was(-2.032). This value is significant at the level (0.01). This indicates that use of Video modeling intervention had a positive effect on verbal communication in children with autism.

Table 4. *Z Values results for the comparison of mean rank scores of experimental group at pre- and post intervention in functional communication*

Variables	**Negative Ranks**		**Positive Ranks**		**Z Value**	**Sig.**
	Mean	Sum	Mean	Sum		
functional communication	3	15	Zero	Zero	-2.032	0.01

Discussion

The present study evaluated the effects of Picture Exchange Communication System on functional communication in children with autism. The study results showed that the Picture Exchange Communication System was effective in increasing functional communication of all children participated in this study.

The implementation of Picture Exchange Communication System seemed to be successful across functional communication and with all participants. These findings concerning change in behaviors and generalization support the results of many previous studies on Picture Exchange Communication System (Charlop-Christy,et al., 2002; Frea, et al., 2001; Ganz, & Simpson, 2004; Heneker, & Page, 2003; Jones,2005).

Findings from the current work also suggest that some children with autism may have highly developed visual skills. Results from this study have provided support for the notion that some children with autism benefit, often quickly, from Picture Exchange Communication System

These findings support the use of PECS by providing the first empirically controlled data on the PECS program. We encourage the evaluation of PECS and the continued pursuit of visually presented speech training programs for children with autism..

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