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THE EFFECTIVENESS OF THE USE OF THE PICTURE EXCHANGE COMMUNICATION SYSTEM (PECS) ON THE DEVELOPMENT OF FUNCTIONAL COMMUNICATION SKILLS IN PRESCHOOL CHILDREN WITH AUTISM

by
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A Thesis

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Approved by

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ABSTRACT

Patricia M. Martin
The Effectiveness of the Use of the Picture Exchange Communication
System (PECS) on the Development of Functional Communication
Skills in Preschool Children with Autism
1999
Dr. Stanley Urban
Learning Disabilities: Preschool Handicapped

The purpose of this study was to determine the effectiveness of the use of the Picture Exchange Communication System (PECS) on the development of functional communication skills in four preschool children with autism. The students involved in this study were enrolled in two preschool disabilities-autism classrooms. The classrooms were very similar in the routine and schedule they followed in addition to the teaching and behavioral techniques that were used with each student. Three students were pretested in September 1998, the fourth student was pretested in November 1998. All four students were posttested in March 1999 to measure their individual growth in the use of functional communication skills. A visual inspection of the data collected revealed that overall, all of the students in the study had developed some functional communication skills that would allow them to appropriately communicate their basic wants and needs. The degree of mastery of these skills varied from student to student based on their developmental and functioning levels.

MINI-ABSTRACT

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ACKNOWLEDGMENTS

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CHAPTER ONE

<u>Background</u>

Autism is a severely incapacitating developmental disorder that begins at birth or within the first 2 1/2 - 3 years of life and occurs in about 10 to 15 of every 10,000 births (Hart, 1993). It is four times more common in males than in females and has been found throughout the world in families of all racial, ethnic and social backgrounds (Gerlach, 1997). Most autistic children are perfectly normal looking in appearance, but spend their time engaged in unusual and disturbing behaviors which are very different from those behaviors of normal children. Because there are no medical tests for autism, the diagnosis must be based on observations of the child's behavior.

During the first few years of life, some autistic toddlers attain developmental milestones such as talking, crawling and walking, much earlier than the average child. In other cases, they are considerably delayed. About one-third of autistic children develop normally until they approach 1 1/2 - 3 years of age, at which time autistic symptoms begin to emerge. These children are often referred to as having regressive autism which some believe represents exposure to a virus or vaccinations. Some authorities believe that the onset of seizures during this age may be responsible for this regression (Edelson, 1995). Other authorities feel that some of these children with regressive autism may be manifesting Landau-Kleffner Syndrome.

During childhood, autistic children usually fall behind their peers in the areas of communication, social skills and cognition. In addition, dysfunctional behaviors such as self-stimulating behaviors that are repetitive with no obvious purpose such as rocking, pacing or hand-flapping may appear. Self-abusive

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acts may develop, like hand-biting, head banging and slapping. Sleeping and eating problems, poor eye contact, insensitivity to pain, hyper- or hypo- activity and attention deficits are also very common in these children.

Although the degrees of severity differ greatly from individual to individual, one common characteristic among children with autism is the impairment of communication skills in a social context. Lack of eye contact, rigid or concrete thinking, difficulty in processing information, sensory problems, and echolalic speech are just a few of the factors that might interfere with an individual's ability to create reciprocal social interactions.

The ability to communicate in meaningful and appropriate ways is fundamental to being a part of and fitting into our society. A lack of functional communication skills is a major problem for children with severe cognitive disabilities or autism (Drasgow & Hall, 1996). The development and improvement of techniques that promote functional and generalized communication skills can lead to increased independence and result in an improvement in the overall quality of life for young children with autism. Individuals with autism appear to be limited in both the receptive and expressive language areas as well as in nonverbal communication. They fail to spontaneously develop imitative, gestural or other nonverbal means to communicate (Beukelman & Mirenda, 1992). Therefore, many children with autism tend to exhibit extreme behavioral outbursts or tantrums since they lack the ability to express and/or demonstrate their every day wants and needs through the use of functional communication skills.

Interventions for autism can vary but generally start with an educational program that can provide individually appropriate instruction, social interaction and development, in a highly structured environment. Behavior management or

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applied behavior analysis techniques such as Lovaas and Discrete Trial are being used to teach autistic individuals appropriate behavior. Augmentative and alternative communication techniques such as sign language, facilitated communication and the Picture Exchange Communication System (PECS) are also used as a means for communication.

The term augmentative communication refers to a wide variety of techniques that may be used to supplement an individual's ability to speak (Burkhart, 1993) or as in many children with autism who remain essentially mute, it becomes their voice and only means of functional communication. The Picture Exchange Communication System (PECS) is the augmentative communication system that will be evaluated in this study. However, there are many different programs and techniques other than the PECS that are centered around the use of pictures and symbol systems for communication.

The Picture Prompt System and the Picture Communication Symbols program are two similar systems. They both use related pictures on a sheet or communication card and with the Picture Prompt System, one can use sticker pictures to set up your own cards. An individual communicates by pointing to various pictures to express their wants and needs. The pictures can be bought in black and white and may be copied to create different communication boards; also, colorful sticker sheets can be purchased with the Picture Prompt System to make sticker booklets. The systems are comprehensive yet easy to use once training is completed. They can easily be understood by the general public when used within the community. The boards are light weight so they can be carried with the individual in a wallet or book. A disadvantage to this type of system is that it could be difficult for those individuals who are easily distracted by a whole sheet of pictures or multiple sets of sheets could be needed to

express one thought. Another possible disadvantage with a pointing system is that the individual could point to the pictures or symbols on the sheet but if they are not taught to first get the attention of the person they wish to communicate with their communication attempt will not be successful or functional. Children with autism are also known to tap items as a self stimulatory action and pointing or tapping the pictures might be confused with this stimuli.

Attainment Talkers and Speaking Dynamically are both devices that allow an individual to communicate through the combination of pictures and speech output. The Attainment Talker is similar to a tape recorder in which messages can be recorded to go with various picture inserts. Speaking Dynamically is a powerful speech output communication program that can be used on a regular computer or lap top computer. Both systems, since they possess speech output, allow for the individual using them to produce the speech versus the person they are talking to having to read the message or talk for them. It also aids in communicating longer messages since these devices have the capacity to store long lengths of language. Limitations of these devices are the cost, they can be bulky and heavy to carry around, they always need an energy source whether it be a battery or plug-in source, they are easily broken if dropped and you are limited to what is on the picture insert card with the Attainment Talkers.

The Picture Exchange Communication System (PECS) uses picture symbols to communicate just like the above mentioned systems but in a slightly different way. As stated in it's title, the Picture Exchange Communication System is unique in that it has a social approach or initiation component as part of the program. Children are taught to approach and give a picture of a desired item to a communicative partner in exchange for that item. By doing so, the child initiates a communicative act for a concrete outcome within a social context

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(Bondy & Frost, 1994). Once the child has learned to request wants and needs, they then can move on to commenting on items and other functional communication skills. As the child progresses in the system, they are taught to build picture or even word sentences on a sentence strip thus teaching sentence structure, expanding sentence length and teaching left to right progression in preparation for reading. Again, the uniqueness of this system, which is in the exchange of the picture or sentence strip between the child and communicative partner helps to encourage and promote spontaneous social approaches in these children who are so deficient in this area. The system is very portable, easy to teach young children and is not very expensive to set up. And just as the other picture systems, this system can be easily understood by the general public. Some limitations are in the number of pictures carried in a book at one time or not having a picture when needed but since the pictures are not on a sheet but are each separate they can be easily switched and replaced.

Research Question

The purpose of this study is to determine the effectiveness of the use of the Picture Exchange Communication System (PECS) on the development of functional communication skills in four preschool children with autism.

Through the use of various augmentative/alternative communication systems or techniques, such as those mentioned above, researchers are finding that many preschool children with autism can be taught functional communication skills. However, just as our knowledge of the causes of autism and the best ways to treat individuals with autism continue to grow and improve as they are researched, the same is to be said of the use of these augmentative communication techniques. Research is still very new and forth coming in this area.

Value of the Study

A child's ability to communicate in meaningful and appropriate ways is fundamental to being a part of our society. Drasgow and Halle (1996) stated how the development and improvement of techniques that promote functional and generalized communication skills can lead to increased independence and result in an improvement in the overall quality of life for young children with severe disabilities. Functional language plays a big part in the daily life of the developing child. When the child's language deficiencies do not allow for communication with the adults and peers who provide stimulation and learning opportunities, there must be a program of functional language training (Warren & Rogers-Warren, 1985). For those children who exhibit extreme behaviors because they can not functionally communicate their wants and needs, these studies showing augmentative communication techniques that do work and are successful at helping these young individuals are very important. That is, if a child with autism can be taught with these augmentative techniques to communicate he or she can get the assistance of others to regulate the types of input that he or she receives therefore helping to fade behavioral difficulties and giving the child some measure of control over the environment. Once this happens, a child is able to benefit more from learning opportunities and social interactions.

Limitations of the Study

Four months into this study, a third preschool classroom was opened. At that time, three of the four students included in this study were transferred from one of the already established preschool classrooms to the new preschool class. During the last two months of this study, January 1999 - February 1999, the three students who were transferred to this classroom had to adjust to a new

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classroom environment, teacher, teacher's assistant and Speech & Language Therapist. Progress during these last two months and posttesting results in March 1999, may have been influenced negatively by this change in classroom placement.

The small sample size should be considered when generalizing the results of this study. The age difference and previous schooling and intervention experiences of each of the two children should be kept in mind as possibly having an effect on pre- and post- measurements. Another limitation that could be experienced as the study progressed is the health and attendance of the students. Finally, once the school staff has determined the child is ready to begin using the Picture Exchange Communication System (PECS) at home, family involvement and their level of cooperation and ability to follow through with the use of the PECS at home may also have an effect on results reported on the posttest.

Definition of Terms

Augmentative and Alternative Communication - an area of clinical practice that attempts to compensate (either temporarily or permanently) for the impairment and disability patterns of individuals with severe expressive communication disorders.

Communicative Partner - the person who is receiving the communicative message and who will respond either verbally or by way of an action in response to the message.

Functional Communication - communication that occurs in response to natural cues and contingencies within the everyday environment.

Generalization - the ability to use learned skills flexibly and adaptively in a variety of situations and circumstances.

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CHAPTER TWO

Review of Related Research and Literature

This review of literature will include three areas: first, research and studies on functional language/communication skills and how these skills are often very inadequate or totally absent in children with autism; second, literature on the use of augmentative and alternative communication systems with young children with autism; third, a review of the six phases of the Picture Exchange Communication System (PECS).

Functional Language/Communication Skills

It is widely accepted that all individuals communicate (National Joint Committee, 1992). The types of specific communication strategies used by learners may vary extensively. Some more common and conventional forms of communication include spoken language, sign language, and graphic mode representations, however, there are also instances in which less conventional communication strategies are used (Reichle & Johnston, 1993). An example of this can be observed when one child bites another child for taking his toy. Although the message being communicated in this situation is quite clear, the form used to communicate the message is somewhat unconventional as well as socially unacceptable.

Often, individuals who lack conventional communication skills sufficient enough to meet their needs will acquire less conventional ways to exhibit communicative functions. Many of these communicative functions fall within the context of challenging behaviors (Reichle & Johnston, 1993). Challenging behavior has been defined as "behavior emitted by a learner that results in self injury or injury of others, causes damages to the physical environment, interferes with the acquisition of new skills, and/or socially isolates the learner"

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(Reichle, York & Sigafoos, 1991, p. 215). These challenging behaviors can vary in their form, frequency, duration, and intensity.

Traditionally, interventionists felt challenging behaviors were nonfunctional behaviors that should be deleted before functional communication skills could be established. Recently, research has demonstrated that a significant amount of challenging behavior may be emitted to convey social intent (Reichle, et al., 1991). As a result of these findings, recent approaches have focused on matching socially acceptable forms with the social function of the challenging behavior in an effort to provide an alternative behavior that is functionally equivalent to the challenging behavior.

The outcome produced by a challenging behavior is referred to as its function (O'Neill, Horner, Albin, Storey & Sprague, 1990). Challenging behaviors can be divided into two general functions, 1). to obtain desired outcomes, and 2). to avoid or escape undesired outcomes (Reichle & Johnston, 1993). In order to eliminate these inappropriate behaviors or communicative acts, we must find and then teach an appropriate functional communicative response or act in its place.

Most children acquire sophisticated functional communication skills without any special assistance (Warren & Rogers-Warren, 1985). Typically, the first words a child uses are centered around play or in frequently repeated family routines such as greetings or goodbyes. Those words are a feature in an often-repeated social exchange and are related to familiar and regular contexts. Those words allow the child to participate in social rituals. In the beginning stages of language development, language is embedded in social participation. Social interaction relates language use and provides the context for language learning. As the number and variety of contexts the child experiences increase,

so do the functions of language (Warren & Rogers-Warren,1985). By age 5, normal children have acquired communication skills that make further cognitive, social, and linguistic development possible during childhood and adolescence (Warren & Rogers-Warren, 1985).

However, there are some children who require some level of organized instruction before they are able to utilize a repertoire of functional communication skills (Warren & Rogers-Warren, 1985). Teaching functional language to developmentally delayed children is one of the primary goals of most special education programs. Regardless of the specific reasons why children fail to fully acquire a communication system, language training will likely be a basic part of their education. Among children with autism, this failure to acquire a communication system is usually at the center of their disability.

To be functional, language must be used in a communicative interaction, and it must affect the listener in specific intended ways; that is, functional language communicates (Warren & Rogers-Warren, 1985). The child learns to control the environment (to cause certain consequences) by using certain sounds and combinations of sounds. This process possibly begins in the first weeks of life when the child begins to use different cries that result in particular consequences (food, being picked up, clean diapers). The function of a word or sentence is established when the child directly experiences the consequences for its use. The child must find those consequences reinforcing if he is to continue using that word or sentence. Truly reinforcing consequences are the key to functional language training. In other words, when teaching words or communicative acts, they must be ones that are likely to be functional for the student immediately. He must be able to use them to make requests, describe things and answer questions. Labels should name objects that are important to

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the student and are frequently found in his environment (Warren & Rogers-Warren, 1985).

Autistic children often use unusual or idiosyncratic skills when they interact with others (Neel, 1986). No one skill is found to be better than another. Some skills are more desired, but the value of a particular skill rests in how reliably it works, not in how pleasant it is.

Understanding the specific functions of particular social interactions is essential to planning a communication program for children with autism. Because many do not relate well to other people in a social context, the communication skills program developed must always focus on each individual student's communication functions (Neel, 1986).

Autistic children clearly have severe social deficits. Four basic function types were identified by Neel (1986) to pertain to a broad range of autistic children, however, it has become obvious that not all these children show the same patterns of deficits. The word "form", when used below, is a referent to the individuals various means or skills to communicate (verbal, gestural, sign).

The first type includes children who have a relatively large range of functions and forms. These are generally considered the children with the highest functioning. Often they have good speech, can interact in many different ways, and have the ability to deal with a range of social interactions.

The second type of child also has a relatively broad range of functions, but a limited number of forms to express them. These children are often nonverbal or have very limited language. They will often use the same behavior to express different desires. Parents and teachers are often confused by the child's actions and do not know what the child wants. The social intents of many of these children are misinterpreted or missed altogether because the forms they use

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are so limited. They often have exhibited problematic behaviors that are actually found to be primitive forms of social interaction (Donnellan, Mirenda, Mesaros, & Fassbender, 1984).

The third type of child is one whose forms are relatively sophisticated, but whose desired social functions are limited. These children often have echolalia or use unusual speech patterns. They are often regarded by parents and teachers as being high-functioning children with great promise. When evaluated for the number of social functions they demonstrate, however, they are usually found to be limited.

The fourth type of child demonstrates limited skill in both form and function. These children are often described as loners, isolated, and generally noncommunicative. They desire to be left alone for long periods of time, and often fail to initiate social contacts.

Neel, (1986) completed a list of functional communication skills, some appropriate and some inappropriate, that most children with autism display; examples follow here:

1. *Requesting needs and wants* - Children with autism request a variety of needs and wants using various behaviors, such as pointing, reaching, or asking.

2. *Requesting help* - Asking for help is a special case of requesting needs and wants. It is identified here as a separate function because many children with autism request things but never ask for help. Often teachers and parents feel that such children treat them like robots. Some children never recognize another person as an agent of help.

3. *Protesting* - This function is the refusal or denial of an object or event. It can also include the desire to escape or exit a situation. Children with limited

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verbal skills will often use gestures, tantrums, or leaving the situation as forms of protesting.

4. *Responding to initiations* - This and the next two functions are variations of the ability to engage in some form of social contact. All these functions are part of interacting on a sustained basis with another person. This and the next function do not require sustained social interaction. Other people act only as agents through which the functions are accomplished. Responding to initiations requires the least amount of social skillfulness. If a child reacts to any social contact from another, this function is achieved. It can be as sophisticated as responding verbally or as simple as being led passively to participate in an activity.

5. *Initiating social interactions* - This function requires much more sophistication. A child must take the initiative and seek out another individual. This can be done verbally by asking questions or making a statement. A nonverbal initiation might be made by a child who climbs into someone's lap, touches someone's face, or takes someone by the hand somewhere.

6. *Maintaining social interactions* - Being able to carry on a conversation, even a simple one, is an example of maintaining social interactions. A nonverbal child can maintain social contact by turning pages in a book the child brings to be read, or by bringing more books to read or objects to play with together.

7. *Other functions* - Several other social functions that are commonly seen in children who are not handicapped rarely show up in children with autism. Briefly, these functions include (a) seeking comfort when hurt, (b) asking for reward or affection, (c) expressing interest in the environment, (d)imaginative play-acting or pretending, and (e) communicating experiences not shared by the person with whom the child is interacting. The

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child with autism who shows any of these functions is exceptional indeed.

Many of the above listed functional communication skills can be taught to individuals with autism or those functional skills that they have but are behaviorally inappropriate can be replaced with appropriate skills through the use of functional communication training (FCT). Functional communication training has been an effective strategy for replacing challenging behavior with more socially acceptable behavior that serves the same communicative function (Drasgow & Halle, 1996). Researchers have shown that challenging behavior may have a communicative function and the accompanying reductions in challenging behavior occur when a functionally equivalent form (e.g., the sign for "need a break") replaces the challenging form (e.g., throwing materials on the floor) (O'Neill, et al., 1990). While both forms serve the same function, signing for a break is more socially acceptable than throwing materials on the floor.

Augmentative and Alternative Communication Systems

Verbal communication and/or various types of augmentative and alternative communication systems can be used with the functional communication training to combat challenging behaviors. "Augmentative and alternative communication is an area of clinical practice that attempts to compensate (either temporarily or permanently) for the impairment and disability patterns of individuals with severe expressive communication disorders" (ASHA, 1989, p. 107). It is emphasized that augmentative and alternative communication should always be multimodal in nature and "utilize the individual's full communication capabilities, including any residual speech or vocalizations, gestures, signs, and aided communication" (ASHA, 1991, p.10). An augmentative and alternative communication system is " an integrated group of components,

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including the symbols, aids, strategies, and techniques used by individuals to enhance communication" (ASHA, 1991, p. 10).

People who use or need to have access to augmentative and alternative communication come from all age groups, socioeconomic groups, and ethnic and racial backgrounds. The characteristics they have in common is that, for whatever reason, they require adaptive assistance for speaking and/or writing. The inability to speak or write without adaptive assistance can be due to a variety of impairments that could exist from birth or are acquired impairments. The ultimate goal of an augmentative and alternative communication intervention is not to find a technological solution to the communication problem, but to enable the individual to efficiently and effectively engage in a variety of interactions. Through a review of the augmentative and alternative communication interaction research, four purposes that are fulfilled in communication interactions were found: 1) communication of wants and needs, 2) information transfer, 3) social closeness, and 4) social etiquette (Beukelman and Mirenda, 1992).

An augmentative communication system consists of a vast array of symbols and signals. A symbol is " something that stands for or represents something else" (Beukelman and Mirenda, 1992). Symbols can be divided into those that are aided, which require some type of external assistance such as a device for production, and those that are unaided, which require no external device for production. Some examples of unaided symbols are; gestures, vocalizations, speech, and sign language. Aided symbol can consist of: tangible symbols such as real, miniature, partial or textures objects; representational symbols like photographs or line drawings.

There are many different types of line drawings such as Picture Communication

Symbols, rebus symbols, Picsyms, Pictogram Ideogram Communication Symbols, and Blissymbols. Some formal symbol systems even use a combination of unaided and aided systems. Whatever system is chosen for an individual, it should be done through the process of a careful assessment of their individual needs.

Autistic children typically make little, if any, attempt to use speech for communicating with people in their environments. These children are reported to make little, if any, uses of vocalization or gesture for this purpose. They typically do not respond normally to speech directed to them, and for this reason are sometimes misdiagnosed as having a hearing loss.

There is some evidence that the interpersonal communication of autistic children can be facilitated in two ways by augmentative communication strategies (Silverman, 1995). First, some children will attempt to communicate with persons in their environment more while using the strategies than they did previously. And, second, a few will begin to use speech for interpersonal communication (Silverman, 1995).

Several types of augmentative communication strategies have been use with autistic children, including the following: communication (conversation) boards, computer and other electronic communication aids, facilitated communication and manual sign language.

The speech-language pathologist is responsible for diagnosing and treating all nonmedical communicative disorders and they are also responsible for selecting an optimum augmentative communication strategy when appropriate. After a strategy has been selected and the necessary hardware and software have been secured, the speech-language pathologist is responsible for teaching the augmentative communication system to the child and all other

professionals and individuals who will be working with the child.

There is little question that augmentative communication can improve significantly the ability to communicate, but the amount of such improvement is not a constant. Some persons are reported to be able to relay almost any message they wish through the use of such strategies, whereas others are only able to learn to communicate a few basic needs with them. A number of factors seem to influence the amount of impact that the use of augmentative communication strategies can have on a severely communicatively impaired child's or adult's ability to encode and relay messages (Silverman, 1995). These factors are: cognitive, motor, sensory, receptive language and inner language status; desire or motivation to communicate, the specific communication mode used, and the attitudes toward the communication mode used (Silverman, 1995).

An augmentative communication strategy, in addition to facilitating communication, may influence a person's communication behavior in other ways, either desirable or undesirable. Perhaps the most important aspect of communication behavior on which it would be necessary to determine the impact is verbal, or speech, output. Does learning and using an augmentative communication system appear to influence a person's attempts at speech communication? Does encouraging a child to use augmentative communication reduce his or her motivation for speech communication? Research has shown that teaching a severely communicatively impaired person to use augmentative communication does not appear to reduce his or her motivation for speech communication (Silverman, 1995). Again, the main purpose of adding an augmentative system is to increase communication. An increase in communication has also been shown to increase speech and not impede it;

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therefore, initiating an augmentative system sooner rather than later will only help speech or verbal output (Maurice, Green & Luce, 1996).

A necessary prerequisite for successful intervention with any augmentative communication system is its acceptance by the user, the user's caregivers, and those with whom he or she communicates. A potential user's reservations about a system tends to cause the system to be used less than it would other wise, thereby reducing its potential for benefiting him or her. If caregivers and persons with whom he or she communicates have similar reservations, they are likely to communicate their feelings to the user verbally, nonverbally, or both. Obviously, any negative reactions to attempts to use augmentative communication are likely to discourage its future use and therefore reduce its potential for benefiting the user (Silverman, 1995). This has been found to be true of the Picture Exchange Communication System (PECS), an augmentative communication system that is often used with individuals with autism and it is the system that is used in the preschool disabilities-autism class which is the focus of this study. This study will be centered around the use of the PECS to promote the acquisition of appropriate functional communication skills in preschool children with autism.

Picture Exchange Communication System

A fundamental goal of teaching children with autism is improved communication, the most socially acceptable form of which is speech. A large number of very young children with autism (those under 5 years of age) enter formal programs without speech or other behaviors that are interpreted as having communicative intent (Bondy & Frost, 1994). For these children, the pace of acquisition of functional communication skills is often the key predictor of long-term success. Therefore, many programs put a great deal of effort into

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teaching these children to talk. However, this can be a very slow and tedious task even when it is successful.

Besides speech, another way for teaching functional communication skills has involved the use of alternative or augmentative communication systems (Reichle, York & Sigafoos, 1991) like the PECS. However, it has been found that many of these augmentative communication systems have not been used much with children under the age of 5. The PECS permits teaching very young children a means of communicating within a social context (Ryan, 1990). Children using PECS are taught to give a picture of a desired item to a communicative partner in exchange for the item. By doing so, the child initiates a communicative act for a concrete outcome within a social context (Bondy & Frost, 1994).

The Picture Exchange Communication System has six different phases that are sequentially taught to each child based on their rate of acquisition. Following is a description of these six phases and how they are taught.

Phase 1: The physical exchange

Young children with autism are not strongly influenced by social rewards, therefore, it is important that communication training begin with functional acts that bring the child into contact with reinforcers. These rewards must be effective and readily identifiable by observers. Communicative acts that bring the child desired items can be taught only if the trainer knows, through the use of observation, what a child wants (Bony & Frost, 1994). The first step in PECS is to determine what items the child consistently wants. This can be done by placing a variety of objects on a table and watch to see what the child picks up and either plays with or eats.

Once the trainer finds an item that is highly desirable to the child, the trainer

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will remove all other items except that one item. Then, with the desired object in full view, and the child beginning to reach for it, a second trainer, who is standing in back of the child, places a picture of the item into the child's hand. While the child is holding the picture, this same trainer physically guides the child to release the picture into the first trainer's outstretched hand. As soon as the child releases the picture into the first trainer's hand, the trainer immediately gives him or her the desired item (i.e. cookie) and says something like "oh, you want cookie." This step is the first exchange that the child makes, the picture is exchanged for the object. The trainer does not refer to the exchange of the picture but, instead, responds as if the child had spoken.

The trainer continues to arrange the environment by holding desired items out to the child while the picture of that item is on the table in front of the child. At no time does the trainer verbally prompt the child to pick up or give the picture to him or her or initiate an exchange. Physical assistance in picking up the picture is faded over time and the first trainer continues to show the child an opened hand whenever the child picks up the picture. An important part of this phase is to be sure to give the child a piece of cookie each time one is requested. Denying access to a requested item, although a natural consequence in the real world, would not sufficiently strengthen the picture exchange at this early stage of acquisition. Once the student is consistently picking up the picture and reaching towards the trainer's open hand, the first trainer fades this open-handed cue by waiting increasingly longer to show his or her hand once the student has picked up the picture. By the end of this phase, the child can pick up a single picture, give it to the trainer and receive the requested item (Bondy & Frost, 1994).

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Phase 2: Expanding Spontaneity

During Phase 1 the trainer is directly in front of or immediately next to the child, the child just has to extend the picture to put it in the trainer's hand. During Phase 2 the trainer gradually moves away from the child and also moves the picture or a communication board with the picture on it farther from the child so that he or she learns to get up and go get the picture and approach the communicative partner to initiate the exchange. It is important to have different trainers receive the picture in the very early PECS training so that the child will initiate the exchange with many different people. At this point, the child is not asked to discriminate the pictures. Rather, the child learns to produce the picture exchange using a variety of pictures made available one at a time. As the child improves in this phase the trainer moves farther away so the child has to travel farther to make the social approach to make the exchange. The successful completion of this phase of training is often vital if the child is to be a spontaneous communicator (Bondy & Frost ,1994).

Phase 3: Picture Discrimination

During Phase 3 the child is taught to discriminate among two or more pictures on the communication board. This training can be accomplished in a variety of ways, depending on the needs of the child. The basic format involves gradually and systematically introducing additional pictures to the communication board. Initially, the trainer sets up situations during which the child is likely to request a certain object. With that object in view, and without verbal prompts such as "What do you want?", the communication board is presented with two pictures on it, one of an object that is contextually appropriate and one of a nonpreferred object. If the child gives the picture of the available object, the trainer provides that object following the exchange. If the

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child gives the other picture, the trainer calmly says, "No, I don't have that," and may provide a gestural prompt toward the appropriate picture.

This step is repeated with assistance until the child can respond correctly on 80% of opportunities. An important precaution to take is to rotate the position of the pictures on the board so that the child does not learn to request a particular item by using its location as the primary discrimination cue on the board. More pictures can gradually be added to the board (Bondy & Frost, 1994).

Phase 4: Sentence Structure

When children enter this phase of training, their communication systems generally contain 12 to 20 pictures. During Phase 4 the child is taught to request using the phrase "I want _____." The picture exchange is maintained throughout this phase by teaching the child to place the pictures on a "sentence strip" to form an appropriate phrase, and to give the entire strip to the communicative partner. The sentence strip is a rectangular piece of cardboard that is attached to the bottom right-hand corner of the board using velcro. At the beginning of Phase 4, a single picture depicting "I want" is added to the left end of the sentence strip. With the "I want" picture already on the sentence strip, the child is physically guided to place the picture of what is wanted next to the "I want" picture on the sentence strip, give the strip to the adult, point to each picture as the adult reads the sentence strip as if the child was talking, and then the exchange for the desired item is made. Gradually, the child is taught to place both pictures on the sentence strip. The "I want" picture is kept in a fixed location in the upper left-hand corner on the communication board.

Throughout this stage of training, the trainer should continue to structure the student's regular environment so that numerous opportunities for communicating through picture exchanges are created across the day. An

added dimension of spontaneous communication involves encouraging the student to request items that are not in sight. Thus, the outcome of Phase 4 is that the student requests present and nonpresent items using the phrase "I want". The student continues to locate the communication board, place the appropriate pictures on the sentence strip, approach the adult, and give him or her the sentence strip. At this point the student typically has 20 to 50 pictures on the communication board and is communicating with a variety of partners (Bondy & Frost, 1994).

Phase 5: Responding to "What do you want?"

During Phase 5, the child learns to respond to selected verbal prompts. Previously, the child communicated "spontaneously", each communicative interaction was initiated by the child requesting something from the trainer. In this phase, the child is taught to respond to the direct question "What do you want?" Training begins with a desired object present and the "I want" card on the communication board. The teacher points to the "I want" card while at the same time asking "What do you want?" The child generally picks up the "I want" card, puts it on the sentence strip and completes the "sentence" and the exchange. Over time, the interval between asking, "What do you want?" and pointing to the "I want" picture is increased until the child does it without prompting. Opportunities for spontaneous requests must continue to occur so that the child's requests do not become dependent upon his or her being asked a question. By the end of this phase, the child spontaneously requests desired or needed items and actions, and answers the question "What do you want?", throughout all daily activities (Bondy & Frost, 1994).

Phase 6: Responsive and Spontaneous Commenting

By this time, the child uses the requesting function in a variety of situations

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and with a variety of people. The purpose of Phase 6 is to teach a new communicative function, labeling or naming items. This phase begins with objects that the child already can request but that are not the most highly desired. The trainer places a minimally preferred item on the table, then places a picture with "I see" or "I hear" or some similar phrase on the communication board along with the item picture and the sentence strip. While holding up the item object, the trainer simultaneously asks the child "What do you see?" and points to the "I see" card. If the child does not quickly pick up the "I see" card and place it on the sentence strip, the trainer physically guides him or her to do so. After the card is placed on the strip, the trainer waits 5 seconds to see if the child will place the item picture on the strip. If the child responds appropriately, the trainer comments "Yes, you see a ____" and gives the child a small reward not associated with what was seen. The named item is not given as a reward because receiving that item could confuse the child by signaling that a request had occurred.

After the child is able to answer the question "What do you see?" reliably, the trainer begins randomly asking, "What do you see?" and "What do you want?" The key at this point in the training is to reward appropriate answers to "What do you want?" with the item that is requested and to never reward answering "What do you see?" with the item labeled. Over time, material reinforcers for "What do you see?" are faded in an effort to encourage the behavior being maintained by socially mediated reinforcers (Bondy & Frost, 1994).

Beyond Phase 6: Introducing Additional Language Concepts

By the time children have completed the previous phases of training, their vocabulary is associated with a large number of items that can be requested or labeled. The continuing goal is to improve the child's functional communicative

repertoire by adding various terms to his or her vocabulary (attributes, verb concepts, spatial concepts, etc.), increasing communicative functions, and teaching a discernible yes/no response. The vocabulary items are taught by incorporating them into already existing functions; for example, a child is taught to request a big cookie, a red crayon, a full cup, or is taught to comment about his or her own actions as well as those of others in the room (Bondy & Frost, 1994).

One important aspect of PECS is the speed at which children acquire functional, spontaneous communication skills. However, speech is still the preferred communicative means. It has often been observed that within the first few months of using the PECS with young children with autism, that many children will begin to speak without any direct formal speech training (Bondy & Frost, 1994).

Research on the use of PECS overall is still very limited at this time. However, Bondy & Frost (1994) did follow 85 children, at the Delaware Autistic Program over the course of 5 years, who were taught to communicate with PECS as their initial communicative means. Each of the children entered training without functional speech or alternative communication systems. This group of children did not include any children who displayed some functional speech. The study group was made up of children who possessed essentially no socially acceptable system of communication. Although exact information regarding their intellectual functioning was not available for the children upon their entry into the Delaware Autistic Program, their intellectual functioning levels ranged from near normal to profoundly retarded (Bondy & Frost, 1994). All children in this group were 5 years old or younger when started on the PECS and they were all educationally classified as autistic. Their study showed

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that 95% of these children learned to use two or more pictures within the exchange format.

Almost all learned at least one picture within 1 month of starting the system (Bondy & Frost,1994). The changes in communication skills also have been associated with changes in behavior management targets and various idiosyncrasies associated with autism (Bondy & Battaglini, 1992).

Other literature reviewed continued to stress the importance of the opportunity to request in enabling children with developmental disabilities to access preferred objects and exert some degree of control over the environment (Sigafoos, Kerr, Roberts & Couzens, 1994). They also stated that requesting is more likely to be functional when it is generalized to and maintained in the natural environment (Sigafoos & et al., 1994). In addition, a request is more functional when it occurs under appropriate motivational conditions or spontaneously instead of only when prompted by the teacher or parent. The PECS has spontaneous requesting built in from the very first phase to avoid having to teach this step later. Phillips, Gomez, Baron-Cohen, Laa & Riviere (1995) also stress the importance of requesting and also commenting. These two communicative function normally develop or emerge more or less simultaneously, at the end of the first year of life. However, in children with autism, these communicative functions are either absent or severely inappropriate (Phillips & et al., 1995). Again, the PECS teaches requesting and commenting and thus functional communication.

Summary

Functional communication skills are an essential part of our daily lives for communicating our basic wants and needs. However, children with autism often lack or exhibit inappropriate functional communication skills. As these

individuals get older their deficits become more pronounced and they often begin to exhibit challenging behaviors in which they can cause injury to themselves, others and/or property.

The use of alternative and augmentative communication systems has been found to be very successful in offering these individuals, with limited or no expressive and/or functional communication skills, a means of communicating their daily wants and needs in an appropriate manner. There are many types of augmentative systems, both aided and nonaided forms that have pros and cons. Several issues or concerns that were repeatedly expressed were; are these systems portable, do they allow for generalization, and can they be efficiently and effectively used with and understood by the general public?

The Picture Exchange Communication System is an augmentative communication system that is easy to transport and can be used in many different environments. It allows for generalization of skills and can be easily used with and understood by the general public. PECS has also be found to be a successful augmentative technique for teaching young children, under the age of five, a means of communication. Many of the other types of augmentative and alternative systems either have not been used with young children in general or have not been found to be very successful with the young population.

What will be the effects of the use of the PECS with preschool children with autism who enter a preschool program with an absence of or limited repertoire of appropriate functional communication skills? Will using the Picture Exchange Communication System help to reduce or replace inappropriate functions or challenging behaviors with appropriate functions and/or behaviors? With this review of functional communication skills, augmentative and alternative

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communication systems used with autistic children and the review of the Picture Exchange Communication System in mind, this project will attempt to evaluate the effectiveness of the PECS in the acquisition of functional communication skills in four preschool children with autism.

CHAPTER THREE

Sample

Four children between the ages of 3 and 4 1/2 years old were selected for this study. These children have either been diagnosed with exhibiting autism, PDD-NOS or have manifested developmental delays and characteristics similar to those of individuals with autism. They attend classes at the Gloucester County Special Services School District's Child Development Center which presently services children aged 3 -10 years of age who are diagnosed with autism, PDD or exhibit developmental delays and/or behaviors similar to those individuals with autism. The center has a total enrollment of 49 students and is located in a large township in a suburban area of Gloucester County, New Jersey. The subjects of this study are enrolled in one of two, soon to be three, preschool disabilities/autism classrooms within the center. These classrooms are composed of students ages 3 to 5 years old with varying enrollments of 6 to 7 children per class, who are from other public school districts within Camden, Cumberland, Gloucester and Salem Counties.

The four preschool children who are the subjects of this study were selected out of a group of 16 preschool children. These students were specifically chosen for inclusion in this study since they started in the preschool programs between the months of September and November of 1998. Two of the four students had previously received educational services before entering this preschool program. Two students had received Early Intervention Services and one of these two students had transferred from a preschool handicapped classroom for children with autism from another state. None of the four selected students had previously been trained in the use of PECS before entering this preschool program therefore all four students began receiving PECS training

within the first week of entering the program. In order to protect the identity of the children used in this study and for confidentiality reasons, fictitious names will be used.

<u>Subjects of the Study</u>

<u>Subject 1</u>: Josh started in Classroom 2 on September 10, 1998, he was 3 years 10 months of age, and had no previous formal education experience. Josh had recently been evaluated and was found to be exhibiting possible PDD characteristics. Upon entering the program, he could verbalize only one word, "bye-bye". His functional communication skills consisted of gestures and some "hand leading" (ie. leading adults by the hand). Josh's receptive language skills were also very delayed. His fine motor, gross motor and cognitive skills appeared to be developing with slight delays and much of this could possibly be attributed to his very poor attentional skills and high level of distractibility. Self help skills were scattered with eating and toileting skills developing while his dressing skills were very immature. Josh's social and play skills were also weak however, he did seem to enjoy interactions with the adults in the room and used some toys appropriately in play.

<u>Subject 2</u>: Steven joined Classroom 2 on September 22, 1998. He was 4 years 4 months of age and was transferring from another preschool from out of state. Steven had been diagnosed with exhibiting autistic features. Upon entering the program, Steven was heard to make various humming and moaning sounds but no verbal language was exhibited. Functional communication skills consisted only of some hand leading or guiding actions. His receptive language, cognitive, social and fine motor skills were observed to be extremely delayed. Gross motor and self help skills were developing but were also found to be delayed. Tantrums and many self stimulatory behaviors were also very evident.

Subject 3: John entered Classroom 1 on October 21, 1998. He was 3 years 1 month of age and had not received any type of services prior to turning three, no diagnosis has been made. Expressive language skills were absent upon entering the program. Functional communication skills consisted of gestures and hand guiding. His receptive language, fine motor, self help and cognitive skills were found to be low. Gross motor skills appeared to be age appropriate. Social and play skills are delayed however, John will watch and try to interact with his classmates during play.

Subject 4: Dave entered Classroom 2 on November 2, 1998. He was 3.0 years of age and had received Early Intervention Services prior to turning three. Dave had been diagnosed with PDD-NOS. Upon entering the program, Dave did exhibit some expressive language skills consisting of one and some two word utterances such as "help", " more please" and "yes". Functional communication skills consisted of some verbal language, gestures and hand guiding. Receptive language skills were delayed but developing. His fine motor, gross motor,self help and play skills were very delayed and immature. Cognitive and social skills are also weak but developing.

Treatment Program

Each preschool classroom is staffed with a full time teacher and two teaching assistants. A speech therapist is in the classroom two full days a week and occupational and physical therapists work on a part time basis with the children as their IEP mandates. Classroom 1 has a part time one-to-one assistant for one child due to a medical condition and Classroom 2 has a full time one-to-one assistant for one child due to medical and behavioral issues. The third classroom that will be opened in January of 1999 will be staffed with a full time teacher , two teaching assistants and the same support services of speech,

occupational and physical therapy. This same classroom, Classroom 3, will receive three students who will be transferred from Classroom 2, bringing Classroom 2's student count down from 9 to 6. Classroom 1 will remain with a student count of 7 students. Three of the four students involved in this study will be moved to this new classroom.

The teachers of the preschool disabilities/autism classrooms have had at least two years experience working with young children with autism. The teacher of Classroom 1 taught preschool handicapped children for 10 years and has worked with preschool children with autism for 5 years. Classroom 2's teacher previously worked with the preschool handicapped for 5 years and has taught preschool children with autism for 3 years. And the teacher of Classroom 3 has taught upper primary autism students 6-10 years of age at the center for the past year and a half and will switch to teaching the preschool disabilities - autism class in January.

All of the teachers at the Child Development Center use the same types of teaching/instructional techniques so as to promote consistency from one program to another within the center. The teaching techniques used at the Child Development Center are part of The Pyramid Approach to Education which is an integrative approach to teaching children with autism developed by Andrew S. Bondy, Ph.D. (1996). Teaching techniques are built around the four instructional elements of; lesson formats, prompt strategies, error correction strategies and generalization/maintenance.

In addition to being taught using the same teaching techniques, all of the students entering the programs at the Child Development Center are trained in the use of the Picture Exchange Communication System (PECS). This augmentative communication system is used whenever possible during lessons

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and any other structured and/or incidental opportunities throughout the school day.

Preschool Classroom's 1 & 2 are set up and run very similarly. Each classroom offers the same types of activities and groups with minor differences in the time of day that they may be scheduled due to the inclusion of the student's various specials and support services such as; music, gym, art, OT and PT. It is assumed that Classroom 3 will also be run similar to these two classrooms.

The classrooms are physically divided into different areas. These areas usually consist of a circle group area, a speech area, a snack/lunch time area, a fine motor and/or art area, a play area, a book time area, an area for the teacher to teach individual or group lessons, a computer area, a transitional area where the children have a rug or place card on the floor with their name on it where they sit in between transitions, and an area with cubbies for the children's coats, bookbags and other personal items to be kept. Each student also has his/her own PECS communication book which is hung in a designated area of the classroom which is easily accessible to the student. Various types of other single PECS and/or boards with groups of PECS on them are also hung and available to the students around the classroom to promote opportunities for and the use of communication skills.

The following is an example of a daily schedule for the preschool classrooms. As the children arrive they are asked to unpack their book bags and take off their coats and hang them in their cubby. They are then allowed to play for a short time in the play area or with specific toys or items that have been set out. During this time, children are taken to the bathroom for toileting and to work on other self help skills. Once bathrooming is complete the children clean

up and wait on their name for the next activity. Next, the children are divided into two groups, a circle time group and a fine or gross motor group. After these first groups are finished they switch. At the end of the second set of groups the children return to their name card to wait. Students are asked to complete different types of snack time jobs (get cups, napkins or juice). The children are then called to snack time. Each child will get their communication book and bring it the the snack table to request what they would like for snack. After snack the children clean up and are again taken to the bathroom. While they are waiting their turn to use the bathroom the children may look at books or participate in some other kind of designated activity. Next, a group rotation is held where the children are divided into groups consisting of 1-3 children and they rotate through a series of 3-4 center activities/lessons held by the various staff members. After the group rotation is completed the children transition to lunch time. During this time, functional communication skills and eating skills are encouraged. With lunches finished, the children are given a rest period at which time they may nap or watch a video while also being taken to use the bathroom. Next, the children are divided into two groups and transitioned to either an oral motor or sensory motor activity. Once the first groups are finished the children switch groups. The children then transition to a recess period out on the playground. At the completion of their recess time, the children return to class and participate in a choice play time in which play and social skills are worked on and promoted. Last, the children clean up and wait on their name to be called to pack their bookbags and put their coats on in preparation to go home.

Instrumentation

The Initial Functional Communication Skills form is filled out on each child in

each of the preschool classrooms (see Appendix A). This form was developed by the Pyramid Education Consultants, Inc. to assess a student's initial functional communication skills upon entering a program. The form lists functional communication skills such as; types of skills to, request, protest/reject, affirm/accept; and skills to make greetings and comment. Examples of those skills exhibited can be listed and then they are rated as to if they are appropriate or not. If a functional communication skill is found to be expressed or exhibited inappropriately or not at all then a target priority is set for that skill. The target priority is rated as one of the following; 1 = immediate priority, 2 = moderate priority, and 3 = address at a later date. This form not only helps to assess the child's functional communication skills but also helps to prioritize those skills that need to be taught or those inappropriate communicative acts that need to be replaced with appropriate communicative acts by order of highest to lowest priority.

Collection of Data

The children in both classes were pretested upon their entrance into our programs between the months of September and November 1998. Posttesting was accomplished in March, 1999. An Initial Functional Communication Skills form (see Appendix A) was kept on each student to record the ratings from both the pretest and posttest.

Research Design and Analysis of Data

Pretest and posttest results for the Initial Functional Communication Skills form will be presented. Through the use of tables, the data will be presented to measure what changes in functional communication skills that have been achieved with each student.

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CHAPTER FOUR

Analysis and Interpretation of the Data

Introduction

The four preschool subjects, who were either exhibiting autistic like characteristics or diagnosed has having Autism or PDD, were pretested at the time of their entrance into one of the two Preschool Disabilities-Autism classrooms, between September and November 1998. The pretest, which consisted of the completion of the Initial Functional Communication Skills checklist, determined the level of functional communication skills each subject exhibited at that time and whether these communication skills were appropriate or not. Upon entering the preschool programs, each subject began receiving training in the Picture Exchange Communication System as described in Chapter Two. After six months (four months for one subject who did not enter the program until November) of instruction in their respective classrooms, the subjects were posttested in March 1999 to measure changes in their ability to use functional communication skills and the appropriateness of these skills.

Results

Requesting Skills

During pretesting, when shown edibles or toys, only one of the four subjects, Dave, was able to attempt at times to respond verbally as if to request one of the items shown by either saying "please" or "more". All four subjects did consistently respond to this same presentation of items by inappropriately reaching for or grabbing at the items presented. When help or assistance was needed, none of the four subjects possessed the functional communication skills to request help or assistance from an adult. The same was found when the subjects were given a choice between items such as edibles, toys or specific

Table 1

Pre & Post Test Results for Assessment of Functional
Communication Skills

	A	B	C	D	E
1		Josh	Josh	Steven	Steven
2	Skill	Pretest	Posttest	Pretest	Posttest
3	Request - edibles	N	Y	N	Y
4	Request - toys	N	Y	N	Y
5	Request - activities	N	N	N	N
6	Request - help/assistance	N	Y	N	N
7	Request - social routine	N	N	N	N
8	Request - given choice	N	Y	N	E
9	Request - items for task	N	N	N	N
10	Request - additional work	N	N	N	N
11	Request - break	N	N	N	N
12	Request - information	N	N	N	N
13	Request -clarification	N	N	N	N
14	Request - permission	N	N	N	N
15					
16	Protest/Reject - item	N	Y	N	N
17	Protest/Reject - activity	N	Y	N	N
18					
19	Affirm/Accept	N	E	N	N
20					
21	Greetings - respond	N	Y	N	E
22	Greetings - initiate	E	E	N	N
23					
24	Comment - on items	N	E	N	N
25	Comment - on activities	N	N	N	N
26	Comment - on internal state	N	N	N	N

N = No
Y = Yes
E = Emerging

Table 1 (continued)

Pre & Post Test Results for Assessment of Functional
Communication Skills

	A	B	C	D	E
1		John	John	Dave	Dave
2	Skill	Pretest	Posttest	Pretest	Posttest
3	Request - edibles	N	Y	E	Y
4	Request - toys	N	Y	E	Y
5	Request - activities	N	N	N	N
6	Request - help/assistance	N	E	E	Y
7	Request - social routine	N	N	N	N
8	Request - given choice	N	Y	E	Y
9	Request - items for task	N	N	N	N
10	Request - additional work	N	N	N	N
11	Request - break	N	N	N	N
12	Request - information	N	N	N	N
13	Request -clarification	N	N	N	N
14	Request - permission	N	N	N	N
15					
16	Protest/Reject - item	N	N	E	Y
17	Protest/Reject - activity	N	N	E	Y
18					
19	Affirm/Accept	N	Y	E	Y
20					
21	Greetings - respond	N	Y	N	Y
22	Greetings - initiate	N	N	N	Y
23					
24	Comment - on items	N	N	N	N
25	Comment - on activities	N	N	N	N
26	Comment - on internal state	N	N	N	N

N = No
Y = Yes
E = Emerging

activities, they were unable to appropriately request a specific item or activity (see Table 1).

At posttesting, all four subjects were able to request either an edible or toy using the PECS. Dave was also pairing verbal language with the use of the PECS to request items. Two of the four subjects were able to request help or assistance appropriately when needed. Josh could request help by either using the PECS or the "help" sign and Dave was able to ask for assistance either verbally or by signing "help". The other two subjects, John and Steven, were still receiving training on using the PECS and/or the "help" sign to request help appropriately. To request items or activities when given a choice, three of the four subjects, Josh, John and Dave, were able to use the PECS to request specific items or activities appropriately. Steven continued to receive training in this area since he was very inconsistent with his discrimination skills which effected his ability to make accurate choices.

Protest/Rejection Skills

At pretesting, when presented an item or activity that the subjects did not want or like, only one subject, Josh, was able to sometimes appropriately respond in protest by shaking his head "no". Other responses consisted of Steven, Josh and Dave pushing the item away or moving away from the activity. Two of the four subjects, Steven and John, would consistently cry or whine in protest or rejection (see Table 1).

At the time of posttesting, Josh and Dave were able to appropriately reject items or activities. Josh would consistently shake his head "no" and push item away. Dave was able to verbally say "no" and push item away. John and Steven continued to whine and/or push items away to inappropriately communicate protest/rejection.

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Affirm/Accept Skills

To communicate that they wanted or liked an item/activity, only one out of the four subjects, Dave, would attempt to verbally respond by either saying "please" or "more" at pretesting. When shown an item and asked "Do you want this?", all four subjects did consistently reach or grab at items they wanted (see Table 1).

At posttesting, Dave and John were able to appropriately respond to the question "Do you want this?" when shown an item. Dave was able to verbally say "yes" and John would nod his head "yes". Josh would respond by placing his hand on his head or at times he inconsistently used the PECS to respond "yes". Steven continued to receive training to either nod his head "yes" or use the PECS to respond "yes".

Greetings Skills

During pretesting, when greeted by an adult, none of the four subjects were able to respond verbally or gesturally in greeting "hi" or "bye". One of the four subjects was able to initiate a verbal response of "bye-bye" however, this response was usually made at inappropriate times throughout the day such as when leaving the room to go to the bathroom, leaving a group activity or switching groups. The subject did respond appropriately when a puppet was being put away at the end of a song and sometimes when walking out to the bus at the end of the school day (see Table 1).

At posttesting, three out of the four subjects could respond to a greeting consistently. Josh could give a hand shake or high-five, Dave would give a high-five and/or say "hi" and John would respond with a hand shake or hug. Steven would inconsistently give hand shakes or high-fives. Out of the four subjects, only Dave could initiate a greeting with an adult or his peers by waving.

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Commenting Skills

At pretesting, none of the four subjects were able to comment either verbally or gesturally on items, activities or their internal state (see Table 1).

At the time of posttesting, one subject, Josh, was in training on commenting on items such as I hear and I see with inconsistent success. The other three subjects were not ready for this type of training.

Summary

After receiving training in the Picture Exchange Communication System, all four of the students in this study showed some type of improvement in their functional communication skills during posttesting. Each student developed varying skills according to their developmental and functioning levels. All of the student acquired the ability to request edibles and/or toys. Two students developed the ability to request help consistently and three of the four students were able to use the PECS to make a choice when offered edibles, toys or specific activities. When offered items or activities, two students learned to appropriately reject or accept these items or activities. Upon being greeted by an adult, three of the four students were able to respond appropriately in some way. Only one of the four students had progressed to the Phase VI in the PECS training where commenting skills are taught and this student was inconsistent with this skill at the time of posttesting.

Overall, all of the students had developed some functional communication skills that would allow them to appropriately communicate their basic wants and needs. The degree of mastery of these skills varied from student to student based on their developmental and functioning levels. Another factor that may have effected the rate of progress for three of the four students in this study was their move to a new classroom and teacher in the month of January 1999.

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CHAPTER FIVE

Summary

The purpose of this study was to determine the effectiveness of the use of the Picture Exchange Communication System (PECS) on the development of functional communication skills in four preschool children with autism. The students involved in this study were enrolled in two preschool disabilities-autism classrooms. The classrooms were very similar in the routine/schedule they followed in addition to the teaching and behavioral techniques that were used with each student. Three students were pretested in September 1998, the fourth student was pretested in November 1998. All four students were posttested in March 1999 to measure their individual growth in the use of functional communication skills. A visual inspection of the data collected revealed that overall, all of the students in the study had developed some functional communication skills that would allow them to appropriately communicate their basic wants and needs. The degree of mastery of these skills varied from student to student based on their developmental and functioning levels.

Conclusion

It was concluded that once trained in the use of the Picture Exchange Communication System (PECS), the four students studied were able to request or make their wants and needs known in a more appropriate manner. Their functional communication skills improved in that they could now use single pictures, a sentence strip or the use of simple sign language to appropriately communicate to the adults instead of hand leading, gesturing or tantruming to try and make their wants and needs known. Two of the four students were also developing skills to use the PECS to make choices involving attributes such

as colors and size (ie. big and little).

Discussion and Implications

The theory behind the use of the Picture Exchange Communication System (PECS) has been used with individuals with many different types of disabilities however, it has been found to be most useful in promoting functional communication skills in individuals with autism.

My study indicates that the use of the PECS with individuals with autism does improve communication skills and for many of these individuals it offers them their first real means of functional communication. I feel the results of my study could have presented more consistent and higher levels of communication development if the study had been done for a longer period of time. The transferring of three of the students in this study to a new classroom in the fourth month of the study may have also effected the posttesting results and the level of development achieved during the last two months of the study.

Implications for Further Study

A larger sample size would offer the opportunity to obtain more reliable results if this study were to be replicated. Having a larger group of preschool children could allow for a broader range of developmental, intellectual and functioning levels and therefore results exhibited may show the various benefits offered to individuals functioning at these different levels. Also, a longer time in which to conduct the study would be advantageous to make comparisons among individual subjects or between groups.
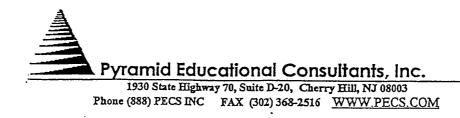
To expand on this study one might want to compare two different teaching techniques used with individuals with autism. A comparison between preschool children who are trained and taught using the PECS versus a group of preschool children who are taught through the use of discrete trial drills solely.

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Appendix A

Pyramid Educational Consultants, Inc.

INITIAL FUNCTIONAL COMMUNICATION SKILLS©

Name:_____ _____   Date_____

Skill	Example	Appro-priate?	Target Priority*
Request- edibles			
Request- toys			
Request- activities			
Request- help/assistance			
Request- social routine			
Request- given choice			
Request- items for task			
Request- additional work			
Request- break			
Request- information			
Request- clarification			
Request- permission			

Skill	Example	Appro-priate?	Target Priority*
Protest/Reject- item			
Protest/Reject- activity			

Skill	Example	Appro-priate?	Target Priority*
Affirm/accept			

Skill	Example	Appro-priate?	Target Priority*
Greetings- respond			
Greetings- initiate			

Skill	Example	Appro-priate?	Target Priority*
Comment- on items			
Comment- on activities			
Comment- on internal state			

*Target Priority: 1=Immediate priority   2=Moderate priority   3=Address at a later date