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A STUDY OF THE IMPACT OF THE PICTURE EXCHANGE
COMMUNICATION SYSTEM ON VERBAL LANGUAGE AND
STEREOTYPIC BEHAVIOR IN PRESCHOOL CHILDREN WITH AUTISM

By
Theresa Caratozzolo

A Thesis

Submitted in partial fulfillment of the requirement of the
Master of Arts Degree
Of
The Graduate School
at
Rowan University
May 10, 1999

Approved by

Date Approved 5/10/99

ABSTRACT

Theresa Caratozzolo

A Study of the Impact of the Picture Exchange Communication System (PECS)
on Verbal language and Stereotypic Behavior in Preschool Children with Autism.
1999

Dr. Kuder, Thesis Advisor
Masters of Arts Special Education

The Picture Exchange Communication System was designed to give children with autism, developmental disorders, and social-communication disorders a way to communicate with the world around them. It is a picture based communication device that puts emphasis on the child initiating interactions. PECS utilizes many behavioral teaching techniques such as shaping, fading, backward chaining, and delayed prompting to teach children to make requests and communicate with others.

Even with the emphasis on spontaneous interactions without the use of speech, verbal language is likely to develop as a secondary outcome for those children who have the ability to develop and use speech. Studies at the Delaware Autistic Program in Newark, Delaware have found that high percentages of preschool children who receive PECS intervention will develop verbal language, whether it be independent of PECS or in combination with it. Those children in the study that failed to develop speech fall within the severely to profoundly mentally retarded range of intellectual functioning.

This study was conducted to measure the impact of PECS on verbal language and stereotypical behaviors in preschool children with autism and developmental disorders. Two preschool classrooms at Gloucester County Special Services School District's Child Development Center were used for the study. A total of twelve children were observed to collect data on verbal language and stereotypic behavior.

The study found no consistent evidence that children who use PECS will experience an increase in verbal language or a decrease in stereotypic behavior. Although there is some evidence of an increase in verbal language over time, there are inconsistencies both between the subjects and the period of time that they were observed. Similar evidence and inconsistencies were found with decreases in stereotypic behavior. This is in part due to the nature of autism and inconsistencies in speech and behavior on a day to day basis.

MINI-ABSTRACT

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This study was conducted to measure the impact of the Picture Exchange Communication System (PECS) on verbal language and stereotypic behavior. Two preschool classrooms of twelve children at Gloucester County Special Services School District's Child Development Center were used as the sample group. Data was conducted through classroom observations to measure the number of occurrences of verbal language and stereotypic behavior.

The study found no consistent evidence that children who use PECS will experience an increase in verbal language or a decrease in stereotypic behavior. Although there is some evidence of an increase in verbal language over time, there are inconsistencies both between the subjects and the period of time that they were observed. Similar evidence and inconsistencies were found with decreases in stereotypic behavior. This is in part due to the nature of autism and inconsistencies in speech and behavior on a day to day basis.

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Chapter One

Introduction

Research Question

Does the implementation of the Picture Exchange Communication System (PECS) increase the use of verbal language while decreasing stereotypic behavior in preschool aged children diagnosed with autism or a pervasive developmental disorder?

Hypothesis

The use of a functional communication system, such as PECS, will enhance and promote the use of verbal language in young children diagnosed with autism. The use of an augmentative communication device will provide the student with a means of communication, and in turn, will lower frustration levels. Lowered frustration levels will result in improved behavior and the ability to begin to learn how to communicate effectively, ultimately resulting in the use of appropriate verbal language.

I feel that my research will find some improvement in verbal language and behavior. However, due to the nature of autism, these improvements will be small in comparison to non-autistic children.

Procedure

I will be using two preschool classrooms for children with autism and related pervasive developmental disorders located in Gloucester County Special Services School District's Child Development Center in Turnersville, New Jersey.

The sample that I will be using consists of children who have been diagnosed with Autism or a pervasive developmental disorder such as Rett's disorder, Asperger's syndrome, or pervasive developmental disorder, not otherwise specified (PDD-NOS). The children are no older than five and have limited or no verbal language at the beginning of PECS training.

I will be using data that has been collected by the special education teachers of the preschool classrooms and the speech and language therapists, as well as data that I have collected through classroom observations.

Data collection by the teachers includes the Hawaii Early Learning Profile (HELP), the Childhood Autism Rating Scale (CARS), and the Autism Behavior Checklist.

Introduction

For this study, I will be looking at a preschool autistic program that uses the Picture Exchange Communication System (PECS) that was developed by Frost and Bondy (1994). I will be looking at whether or not PECS increases the use of verbal language while improving stereotypic behavior in this population.

Background

For three years, I had the opportunity to work with a student with autism in a public school setting. Initially, one of the toughest barriers was the student's lack of communication skills. Autism is characterized by deficits in communication and social interaction. Because of these problems, children with autism have difficulty functioning in mainstream settings. While working with this student, I assisted the special education teacher in developing ways to increase her communication skills. We used pictures, food reinforcers, songs, and sign language in an effort to increase and assist her verbal language. Working with that child sparked an interest in me to study autism as well as speech and language related issues in autism.

Why Study This?

It is necessary to study PECS because it is a relatively new approach to communication and not many studies have been conducted outside of the Delaware Autistic Program (DAP), where it was first researched. By studying and researching PECS and its possible benefits for verbal language and behavior, we may be able to discover methods for enhancing the verbal skills and behavior of students with autism. By researching PECS, I will be able to gather more information about its effectiveness.

In addition, when working with students with autism, you need to use a variety of techniques in order to discover what will work best for that individual.

I feel that it is the responsibility of the special education teacher to research various techniques and to have a working knowledge of what is available to use with special needs populations.

Why is This Important?

This research is important not only for teachers of students with autism, but for any special education teacher who works with students diagnosed with a PDD or severe communication impairment. As I stated earlier, it is important for educators to be aware of the resources that are available to them, and to be able to decide which program is most effective.

Implications of the Study

Through this study, I hope to find supporting evidence that PECS is an effective tool in enhancing communication along with increasing verbal language and appropriate behavior. PECS is designed to be used in any setting so that even people without training will be able to understand what the child is “saying” through the use of pictures. Although the program does not focus on verbal language, it does focus on making the child responsible for initiating interaction, and that is a skill that is necessary for improving communication and social skills.

This study will provide further proof that children with autism are able to communicate effectively. Further, it will show that some will be able to move beyond augmentative devices and rely on speech as a primary mode of communication.

Overview of the Remainder of the Thesis

For the remainder of my thesis, I will provide a literature review, information on language programs for children with autism, and presentation of the research findings.

In the literature review chapter, I will be reviewing various articles dealing with autism and language development, alternative communication systems, and language programs used with children with autism.

Throughout my thesis, I will present information dealing with speech and language development among children with autism. I will also present various programs that have been developed to enhance verbal communication in children with autism.

I will describe the group used for this study, discuss the methods used to collect research data, and give the history of PECS and the steps involved in implementing the program. The results of the research will be presented in graph form to show the progress, or lack of progress, made by each student.

Chapter Two

Review of the Literature

Introduction / Background of Autism

Autism was first described as a clinical syndrome by an American child psychiatrist, Leo Kanner, in 1943. The term “autism” comes from the Greek word “autos”, meaning “self”, and is used in psychiatry to mean withdrawn and self-absorbed (Wing, 1972). It was first thought that autism was the early stage of schizophrenia, but it is now clear that the two disorders are separate. Kanner described the children affected by this disorder as being aloof and socially withdrawn. Kanner gave the name “early infantile autism” to describe the disorder, because he thought that it always began in infancy. It is now known that approximately one third of children affected by autism had a period of normal development up until 12 or 18 months of age (Mauk, 1993). Since the first description of autism, there has been debated whether it is the language or social deficits that are primary in autism. In addition, other disorders resembling autism have been described and the term “pervasive developmental disorders (PDD)” is used to describe these various disorders.

It is reported that in the United States alone, up to 115,000 children between ages one to fifteen are affected by autism (Andolsek, 1998). Autism affects about three to four children out of 10,000 (Wing, 1972). It affects boys

four times more than girls (Wing, 1997; Siegel 1996). Autistic spectrum disorders affect ten to fifteen out of 10,000 (Wing, 1997; Siegel 1996).

Studies of intelligence levels have found the mean IQ of the autistic population to be relatively low, but at least 30% of these individuals have an IQ of 70 or better (Mauk, 1993; Rapin, 1991).

Characteristics

Stereotypic and ritualistic behaviors, and social and communication deficits characterize autism.

Most children with autism are found to have some form of an attention deficit, and are likely to have a sleeping disorder. They have abnormal reaction to stimuli, such as noise, and may become fixed on visual stimuli. An insensitivity to pain is common, however, they are tactually defensive and will “arch” when touched. They engage in self-stimulating behavior (e.g., hand flapping, rocking), and even self-mutilating behavior.

Many children with autism are irritable, anxious, or fearful in specific situations, and may laugh or cry without any obvious external cause. Temper tantrums are likely to occur when there is a change in routine. Fascination with an object and refusal to be separated from it is common

Social skill deficits are due in part to the autistic child’s inability to communicate appropriately with the world around them. Some speak in jargon, delayed and immediate echolalia, or use a sing-song voice to communicate.

Autistic children seem to have conversations with themselves, and show no desire to participate in conversation with others.

Baron-Cohen (1992, 1997) has addressed a concept known as “theory of mind” (Volkmar & Klin, 1993) to explain the deficits to communicate and socialize. It is hypothesized that there is a failure to develop a “theory of mind”, which is essential in understanding and predicting what other people think, or that other people might think of them as strange. They do not seem to be phased by social isolation; they seem to seek it. However, older, higher-functioning autistic individuals do become aware of this isolation and may feel ostracized (Rapin, 1991).

Etiology

The term “developmental disorder” is used to describe autism because it is believed that the child is either born with the disorder, or has the potential for developing the disorder (Siegel, 1996). Even with today’s advanced technologies, the cause of autism is unknown. There are many theories on the cause of autism. Some feel that autism is a result of food allergies (e.g., casein in cow’s milk and gluten in wheat), immunizations (e.g., measles, mumps, and rubella) (Wing, 1997), dysfunction of the immune system, or the presence of candida albican (yeast). It is widely believed that autism is a neurodevelopmental disorder that has a genetic-based etiology (Andolsek, 1998; Rutter, 1996). A shift towards a neurobiological approach began after Rimland’s research on twins and

autism in 1964 (Courchesne, 1989, as cited in Dawson, 1989). Studies have found that pervasive developmental disorders (PDDs) are related to structural differences in the brain that arise during pregnancy, whether from injury or genetics (Siegel, 1996). Recent neurological studies are focusing on the cerebellum as playing a major role in autism.

There is no blood test or brain imaging technique that can detect autism, but these tests may be used with an autistic child to rule out other disorders.

Assessment

The diagnosis of autism is clinically, not laboratory, based. The use of a diagnostic system is central in the diagnosis of autism. The diagnostic system most widely used today is the Diagnostic and Statistical Manual, 4th ed. (DSM IV, American Psychiatric Association, 1994). Since there is no physical test that can diagnose autism, diagnostic systems have gold standard in which to be measured against, and therefore, it cannot be said which diagnostic system is best (Szatmari, Volkmar, and Walter, 1995).

The DSM IV is the most recent edition from the American Psychiatric Association. The DSM IV criteria for a diagnosis of autism consist of twelve symptoms that are divided into three categories. The three categories are (a) a qualitative impairment of social interaction, (b) qualitative impairment in communication, and (c) restricted repetitive and stereotyped behaviors, interests, and activities.

Below is the DSM IV criteria as outlined by Rapin (1997, in Andolsek, 1998):

A total of six or more manifestations from 1, 2, and 3:

1. A qualitative impairment of social interaction (at least two manifestations):
 - a. Marked impairment in the use of multiple types of nonverbal behavior such as eye-to-eye gaze, facial expression, body postures and gestures to regulate social interactions;
 - b. Failure to develop peer relationships appropriate to developmental level;
 - c. Lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by lack of showing, bringing or pointing out objects of interest); and
 - d. Lack of social or emotional reciprocity.
2. Qualitative impairment of communication (at least one manifestation):
 - a. Delay in, or lack of, development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gestures or mime);
 - b. In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others;
 - c. Stereotyped and repetitive use of language or idiosyncratic language; and
 - d. Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.
3. Restrictive and stereotyped patterns of behavior, interests, and activities (at least one behavior manifestation):
 - a. Encompassing preoccupation with one or more restricted, repetitive and stereotyped patterns of interest that is abnormal either in intensity or focus;
 - b. Apparently inflexible adherence to specific, nonfunctional routines or rituals;
 - c. Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements); and
 - d. Persistent preoccupation with parts of objects

Delays or abnormal functioning, with onset before the age of three years, in at least one of the following areas:

Social interaction;
Language as used in social and communication; and
Symbolic or imaginative play.

Autism is considered to be a syndrome because affected individuals will not exhibit all of the characteristics or symptoms of the disorder (Siegel, 1996). Further, a syndrome can have different cause, but an overlapping of

characteristics. No two autistic individuals are alike, and therefore the above criteria may apply in different ways or in intensity.

The diagnosis of autism is made more difficult by other disorders that have autistic-like characteristics. Abuse, neglect, mental retardation, severe hearing impairments, and neurodegenerative disorders have symptoms that closely resemble autism and need to be distinguished as separate from autism. The occurrence of another disorder along with autism is likely and complicates diagnosis. These disorders include mental retardation, seizures, ADHD, sleeping and eating disorders, psychiatric disorders, and behavior disorders. These combinations make the assessment process very complex.

Autistic Spectrum Disorders

In addition to other disorders resembling or occurring with autism, there are other disorders along the autistic spectrum continuum that have many of the same features, but do not fulfill all of the required criteria for a diagnosis of autism. The term “pervasive developmental disorders” is used as an umbrella term to describe the full spectrum of autistic-like disorders, including typical autism, Asperger’s syndrome, Rett’s syndrome, childhood disintegrative disorder (CDD), and pervasive developmental disorders, not otherwise specified (PDD-NOS).

While Kanner was presenting his findings on autism in the United States, Hans Asperger was in Europe describing a similar disorder that is known today as

Asperger's syndrome. Children with Asperger's syndrome have normal or high verbal intelligence, but have many of the same social-emotional characteristics of autism. DSM-IV distinguishes Asperger's syndrome as separate from autism, but some view it as high-functioning autism.

Rett's Disorder is a disorder characterized by a lack of interest in social interaction, manifestation of stereotypic behaviors, and a loss of acquired speech. Rett's has been found to occur only in girls. Over half of this population has sleeping difficulties and seizure disorders. Children with this disorder seem to develop normally up to the first six or eight months of life. Signs, such as hand patting, waving, or involuntary finger movement may be subtle and go unnoticed. Normal development slows and developmental milestones are not met on time. Children with this disorder have difficulty with balance and walking, and will lose already acquired speech skills and the use of purposeful hand movements. Stereotypic behaviors develop, with the most prominent being "hand washing".

Childhood Disintegrative Disorder (CDD), less commonly known as Heller's syndrome, occurs more frequently in boys than in girls. Children develop skills, such as language and social skills, normally up to age two or three. There is then a period of regression that can take only months or even weeks to occur. Previously acquired skills are lost. Skills such as language, bowel and bladder control, and social skills are lost and are replaced with autistic-like

stereotypic behaviors. The diagnosis of CDD is based on the child's early development, which differs from children with autism.

PDD-NOS is thought of as a less severe form of autism. Children diagnosed as PPD-NOS exhibit fewer signs of autism and have less cognitive impairments (Siegel, 1996). This diagnosis is used when symptoms are present, but are not severe enough or as numerous to fulfill the diagnostic requirements for autism.

Rating Scales

There are various instruments that can be used to further differentiate between the full range of PDDs. Mahoney et al (1998) recently reviewed numerous instruments used in the assessment of PDDs including the Autism Diagnostic Interview-Revised (ADI-R, LeCouteur 1989), the Autism Diagnostic Observation Schedule (ADOS, Lord 1989), the Autism Behavior Checklist (ABC), and the Vineland Adaptive Behavior Scales.

The ADI-R is a structured interview administered to parents. It is designed to distinguish between developmental delays and qualitative impairments. Interview questions target impairments in social interaction, verbal and nonverbal communication, and stereotypic behaviors.

The ADOS is a twenty minute structured observation in which the examiner engages the child in nine activities. These activities are designed to elicit PDD behaviors, with a focus on social and communication behaviors.

The ABC contains fifty-seven items that are answered by the parents. The items span five areas: language, relating, body and object use, sensory stimulation, social and self-help.

The Vineland Adaptive Behavior Scale is a structured interview administered to parents. Areas assessed are socialization, communication, and motor and daily living skills.

Language Impairments

Some children with autism never develop speech and must rely on other forms of communication. It is estimated that approximately half of all autistic children develop speech, however, their speech develops much later than in normal children (Wing, 1972). For those children with autism who do develop speech, it is different than normal children's speech. Echolalia and pronoun reversal are speech characteristics that are prominent in autism

Echolalia was described by Fay (1980, in Prizant, 1983) as being the "meaningless repetition of a word or word group just spoken by another person." This characteristic is one of the most cited behaviors in autistic children (Prizant, 1972, in Prizant & Duchan, 1981), and is found in 75% of verbal autistic individuals (Prizant, 1983; Schuler, 1979 in Prizant, 1983). Long and Long (1994, in Kuder, 1997) identified three types of echolalia; immediate, delayed, and mitigated. Immediate echolalia is the repeating of words within a brief time after they have been spoken by another. Delayed echolalia may occur within

hours, days, or even years after being heard. Mitigated echolalia occurs when the original structure of the phrase has been changed when repeated.

Prizant and Dunchan (1981) conducted a study to examine the function of immediate echolalia in autistic children. Their study supported other researcher's beliefs that immediate echolalia enabled autistic children to maintain social interactions (Fay, 1969, in Prizant & Dunchan, 1981), and to express affirmation of the prior phrase (Kanner, 1946, in Prizant & Dunchan, 1981). They found that immediate echolalia serves in seven functional categories: turn taking, declarative, yes answer, request, non-focused, rehearsal, and self-regulatory. Comprehension and interactiveness varied among the seven categories, however, the study did find that immediate echolalia often served with communicative intent.

Prizant and Rydell (in Prizant, 1983) conducted another study to determine the function of delayed echolalia. They found that delayed echolalia serves in fourteen functional categories: turn taking, verbal completion, providing information, labeling (interactive), protest, request, calling, affirmation, directive, non-focused, self-directive, rehearsal, and label (non-interactive).

Language deficits in autism deal not only with the inability to use spoken language appropriately, but also with the use of language in general. Children with autism have deficits in multiple areas of language such as phonology, prosody, syntax, semantics, and pragmatics (Rapin, 1997, in Andolsek, 1998). Of

these, Tager-Flusberg (1981, in Prizant, 1983) claims that semantic and pragmatic skills are more severely affected than phonological and syntactic skills in autistic children.

Rapin (1997, in Andolsek, 1998) outlined the deficits that children with autism have in these areas of language. In the areas of phonology and syntax, children with autism who have the “mixed-receptive-expressive syndrome” (Rapin, 1997, in Andolsek, 1998) have impairments in both reception and expression of these skills.

Prosody refers to the rhythm and melody in which words are spoken. In those children with autism who have speech, it is common for them to use a sing-song voice, rising intonation, a high pitched or monotone voice, or robotic-sounding speech.

Rapin (1997, in Andolsek, 1998) states that semantics are an aspect of language in which impaired reception and expression are present in all children with autism. This includes the impaired comprehension of questions, sarcasm, and jokes.

Autistic children do not understand pragmatics; they have difficulty in initiating and participating in conversations, and lack the ability to take turns during conversation. Mutual gaze is an important part of communication that is not used by autistic children. They instead use gaze aversion in social situations to reduce arousal (Miller, 1996). However, gaze aversion is one of the

characteristics of autism that is most likely to improve through training (Rapin, 1991).

Language / Communication Training

There have been many programs developed over the years that address the communication deficits found in autism. Some approaches focus on the acquisition and spontaneity of language, while others focus on the acquisition of an alternative communication system. One of the goals of communication programs for autistic children is to facilitate socialization through language or an alternative communication form.

Time Delay

Time delay is a procedure that has been successfully used in increasing spontaneous verbal responding as well as generalizing verbal language across settings. Training in the procedure begins with the presentation of the target stimulus (e.g., a cookie), and then modeling the appropriate response by the therapist / examiner (i.e., "I want a cookie). Once the child is able to imitate the modeled response, the verbal prompt is delayed. Gradually, the time between the presentation of the stimulus and the verbal prompt is increased until the child requests for the stimulus (cookie) spontaneously, before the verbal prompt is given. Charlop, Schreibman, and Garrison-Thibodeau (1985) defined spontaneity as "a verbal response to a nonverbal discriminative stimulus (an object) in the

absence of a verbal discriminative stimulus.” In other words, speech when there is no verbal prompting from the therapist.

Charlop and colleagues (1985) used time delay to increase spontaneous verbal response along with generalization to various settings. The target phrase, “I want (object’s label)”, was used in the procedure along with training of the object’s label (e.g. cookie, ball). It was found that the children were able to use this phrase in new settings with new, untrained objects.

Matson, Sevin, Fridley, and Love (1990) conducted a similar study using time delay. The target phrases for this study were “thank you”, “you’re welcome”, and “please”. They found that the children were able to generalize the phrases to different settings and situations, and add words to the target phrases such as “water please”. This study did not have any impact on the improvement of inappropriate speech, such as echolalia or perseverative speech, but did support the findings from other time delay studies with autistic children.

A study by Ingenmey and Van Houten (1991) focused on promoting spontaneous speech during play. The findings from this study also supported previous studies. Time delay was effective in increasing the spontaneous speech of an autistic child during car play and drawing.

Time delay has been very successful in training children to use spontaneous speech. One of the reasons for this may be the fact that time delay takes advantage of the autistic child’s use of immediate echolalia (Charlop, 1983,

1985, 1991). The tendency to engage in ritualistic behavior may also have contributed to the success of the studies, being that the children used a target phrase (e.g. “good morning”) at the same time of day everyday (Charlop & Trasowech, 1991).

Facilitated Communication

Facilitated communication (FC) is a communication approach that became popular during the early 1990’s and since its introduction, has received much speculation. The term “facilitated communication” was first coined by Crossley in 1980 when it was used to help people with cerebral palsy communicate through letter and language boards (Biklen 1991). Facilitated communication consists of providing physical support while the child uses a typewriter or computer keyboard to type out his or her own words. Physical support can be hand-over-hand or hand-on-wrist, arm or shoulder. Douglas Biklen was a supporter of this approach, but many others (Simon, Whitehair, and Toll, 1996; Eberlin, McConnachie, Ibel, and Volpe, 1993) disproved its effectiveness through various studies that could not replicate Biklen’s claims.

In 1985, Crossley used facilitated communication with autistic children and found them to have unexpected literary skills (Biklen & Schubert, 1991). The language that was produced through facilitated communication was free of pronoun reversals, incorrect verb tense, or other autistic characteristics. An example taken from a seven-year old autistic boy, only two months after being

trained in facilitated communication is as follows, “I WANT TO BE IN GRADE FIRST”, and “I FEEL LONELY WHJEN I HAVE NO KIDS AT MY HOUSE. I WANT MY MOM TO KNUOW THAT I LIKE TO BE WITGH KIDS”. It seemed amazing for autistic children to be able to communicate in this manner, but Biklen had an explanation for this “phenomenon”.

Biklen (Biklen & Schubert, 1991) refers to Rimland’s 1990 article entitled “Autistic Crypto-Savants” to support his claim that autistic students have unknown literary skills. Rimland’s article mentioned the “possibility that some low functioning autistic persons may in fact be crypto-savants waiting to be discovered” (in Biklen & Schubert, 1991). Biklen (1990 in Biklen & Schubert 1991) goes further and accounts for the learning of math and reading skills as incidental, through the use of flash cards early on, observing others doing schoolwork, and watching educational programs such as “Sesame Street”.

Eberlin, McConnachie, Ibel, and Volpe (1993) attempted to replicate Biklen’s and Crossley’s findings of unexpected literacy in autistic children, but did not find any evidence of unexpected literacy or communication skills. Their study did find that some facilitators influenced the communication of the autistic children. In examining Biklen’s methods, it was determined that scientific validation was not used, but rather case study methods as validation (Eberlin, McConnachie, Ibel, & Volpe, 1993). Eberlin and colleagues (1993) criticized previous studies of Crossley and Biklen because they did not control for possible

facilitator influence, and were weak in diagnostic reliability and validity measures.

In 1994, the New York State Office of Mental Retardation and Developmental Disabilities classified facilitated communication as an experimental procedure with no scientific support (Simon, Whitehair, & Toll, 1996).

Functional Communication

One approach that has been successful in facilitating verbal communication along with improving behavior is functional communication. Functional Communication is an intervention strategy that uses communicative behavior as a functional alternative to inappropriate behavior. The theory behind functional communication is that children learn to misbehave in situations where there is low adult attention (Carr & Durand, 1985). The first study in 1985 found that behavior is maintained through escape and attention seeking behavior. Functional communication has been used to reduce behaviors such as aggression, tantrums (Carr & Durand, 1985), stereotypic behavior (Durand & Carr, 1987 in Durand & Carr, 1991), and other communication disorders (Durand & Carr, 1987 in Durand & Carr, 1991).

Two studies conducted by Carr and Durand (1985 and 1991) concluded that by giving students a functional response to obtain assistance, they will be able

to use it across settings, even with those who have no special training in functional communication.

Sign Language

Lastly, sign language has been used with autistic and has resulted in the reduction of inappropriate behaviors (Carr, 1979; Creedon, 1973; Miller & Miller, 1973; in Horner & Budd 1985). Horner and Budd (1985) conducted a study to assess the relationship of manual sign training and the reduction of maladaptive behavior. The subject of this study was able to generalize sign language to other settings and situations, while the amount of grabbing and yelling behaviors was dramatically reduced. It was found, however, that the generalization of sign language was successful only after it had been taught in a natural classroom setting.

A study by Carr and Kologinsky (1983) supported Simon, Whitehair, and Toll's results. Aggressive and self-stimulatory behavior decreased as the use of sign language increased. One hypothesis is based on reinforcer competition. The reinforcer(s) resulting from the use of sign are stronger than those from the use of inappropriate behavior (Carr & Kologinsky, 1983). Therefore, the children learn to use sign language instead of inappropriate behavior as a means to an end.

One of the obvious downsides to the use of sign language is that it is not universally understood, and therefore must be used in settings where others are trained in its use.

The Picture Exchange Communication System (PECS)

A recent approach to facilitating language development and communication in children with autism is the Picture Exchange Communication System (PECS). PECS was developed by Bondy and Frost during the mid 1980s and was originally developed for use with young children with autism, PDD, and social-communication deficits. It is now used with all ages and with a variety of communication disorders.

The goal of PECS is for the child to spontaneously initiate communicative interactions (Frost & Bondy, 1994). PECS does not stress the use of verbal language, and does not use verbal prompting in its training. Even so, it has been observed that children who were using PECS began to use speech without any formal training (Frost & Bondy 1994). A study by Bondy and Peterson (Bondy & Frost, 1995) was conducted over a five year period at the Delaware Autistic Program using children age five and younger. Out of the 66 children that went through the program, 34 now use functional speech without the use of PECS or any other augmentative device. Fourteen other children use speech along with pictures. The nineteen children of the group who do not use speech are diagnosed severely and profoundly retarded.

What makes PECS different from other communication programs is that it does not require verbal or motor imitation skills as prerequisites as do other communication approaches such as time delay and sign language (Frost & Bondy,

1994). It also uses intrinsic rather than social reinforcers (Bondy, 1988, in Frost & Bondy, 1994).

PECS uses various behavioral techniques such as backward chaining, shaping, anticipatory prompting, delayed prompting, and fading of physical prompts. These techniques are found throughout the six phases of PECS training. Because PECS utilizes behavioral techniques, it is important that training remains consistent.

The materials used during training are picture items, communication board and/or book, and a sentence strip. The picture items vary in size and color, depending on the level that the child is at. In the first phases of training, the pictures are larger, and as more items are added to the child's "vocabulary", the pictures become smaller. Each picture has a Velcro backing so that it can be connected to the communication board, book, and sentence strip.

The communication book has pages that hold the Velcro picture items in place. The cover of the book can serve as the communication board, or a separate board can be used if desired. The communication book should always be accessible to the student. In the beginning stages, the book is with the child. As training progresses, the book is placed in an accessible part of the classroom that remains constant.

The sentence strip is introduced in phase IV of training. The sentence strip is separate from the book, and is to be handed directly to the communicative partner for communication.

Training Phases

The first phase deals with the physical exchange. The first step in this phase is to determine a reinforcer (e.g. cookies, toy). Once a reinforcer has been determined, a picture item is developed to use for training. Two trainers are used; one acts as the communicative partner and the other will provide physical prompts. No verbal prompts are used, but rather discrete trials that use only physical prompting from the trainer to initiate the exchange. As the child is able to initiate the exchange, the physical prompting is faded until the child is able to initiate the exchange with total independence. Additional picture items are developed and trained in this same manner.

During phase II, expanding spontaneity, the communicative partner positions him/herself further from the child to promote spontaneity. The child uses the communication board and picture items to initiate the exchange with the communicative partner. Physical prompting may be used if the child fails to approach the communicative partner.

Picture discrimination training is used in phase III. Only two objects are used in the beginning of phase III training. A desired object and one that is irrelevant to the child is presented. If the child chooses the desired object, they

receive it and in turn, receive positive reinforcement. If they choose the irrelevant object, then there is no reinforcement because the object is meaningless to the child.

Once discrimination between two objects is mastered, more objects are added to teach discrimination of objects. It is also suggested that pictures are of different size and color to add different elements of discrimination.

Phase IV, sentence structure, uses a sentence strip and the use of an “I want” picture card. The “I want” picture is placed on the strip and the child must choose the picture that expresses what he or she wants. Once the picture is placed on the strip, the child gives it to the communicative partner who then states what the strip *says*. The item is then given to the child as reinforcement.

Phase V builds from phase IV by having the child respond to the question, “what do you want?” The communicative partner asks the question and then uses a pointing prompt by pointing to the “I want” card. The child uses the sentence strip and “I want” picture to communicate the answer. Again, the communicative partner states the response once the exchange has been made and gives the child the item. The pointing prompt is faded as the child is able to initiate the exchange.

In the final phase, responsive and spontaneous commenting, two new pictures are presented on the communication board. The pictures “I want”, “I see”, and “I have” are used to answer the questions “what do you want?”, “what

do you see?”, and “what do you have?” Pointing prompts are used in conjunction with the verbal questions. These prompts are faded until the child uses each picture successfully.

At the end of training, the child has acquired numerous picture items that he/she is able to use with the communication board and sentence strip. Another communication device that is employed in PECS is the communication wallet. This allows the child to take specific picture items outside of the classroom or home in order to communicate with others (e.g. school bus). Picture items are stored on the inside of the wallet, and the outside has a Velcro strip that serves as the communication board.

Advantages of PECS

As mentioned earlier, PECS does not require any prerequisite skills such as motor or verbal imitation skills. Another characteristic of PECS that makes it desirable is that it can be used universally. The child is able to communicate with others who have no special training. For example, PECS can be used successfully at a fast food restaurant with a cashier who is not even familiar with the program.

PECS is an affordable program that does not require intensive training or materials. There is a computer program that assists in developing picture items, or they can be hand-made by the teacher. Training manuals, videotapes, and workshops are readily available and well structured.

Simon, Whitehair, and Toll (1996) compared facilitated communication to the Picture Exchange Communication System (PECS). Simon and colleagues found similar results as Eberlin, McConnachie, Ibel, and Volpe (1993). Their findings suggested that the facilitator influenced the student's responses, whether intentionally or not. Performance was better when the facilitator had no knowledge, rather than when the facilitator was given inaccurate information.

A fourteen- year old boy was used for this study. Even after having reported success in FC, it was found that he preferred to use PECS instead of FC. The boy was able to obtain 100% accuracy using PECS, while FC did not produce any accurate results (Simon, Whitehair, & Toll, 1996).

Chapter Three

Research Design

Subjects

The subjects of this study are students at Gloucester County Special Services School District's Child Development Center in Turnersville, New Jersey, and are enrolled in the autistic preschool program (see Table 1 for additional information). A total of twelve students from two classrooms participated in the study. Each classroom has one special education teacher, and three classroom aides. The students receive art and music education in the special education classroom, and gym outside of the classroom.

The speech and language therapist spends two full days in the classroom per week. The occupational therapist (OT) does small group pull-out for one half hour once a week. The OT also does individual sessions for one half hour once a week. The physical therapist does small group sessions in class for one half hour per week, and any additional time is given to individuals as needed.

Preschool Classroom A

Seven students, ranging from ages 38-54 months, were selected from preschool classroom A to participate in the study.

Student 1 is a 46 months old male who has been diagnosed with pervasive developmental disorder. He entered the autistic preschool program in July of 1998. He is non-verbal and has reduced eye contact. He scored a "moderately

autistic” rating on the C.A.R.S. Stereotypic behaviors include putting objects in his mouth and babbling.

Student 2 is a 46 month old male who has been diagnosed with pervasive developmental disorder. He entered the autistic preschool program in July of 1998. He is nonverbal and exhibits stereotypic behaviors such as hand flapping, rocking, and meaningless hand movements. This student scored a “severely autistic” rating on the C.A.R.S. Stereotypic behaviors include hand and finger movements, hand flapping, rocking, and smelling objects.

Student 3 is a 44 month old male has been diagnosed with mild autism / pervasive developmental disorder. He entered the autistic preschool program in July of 1998. He is non-verbal and exhibits stereotypic behaviors such as hand flapping and rocking. Blake scored a “moderately autistic” rating on the C.A.R.S. Stereotypic behaviors include hand flapping, and rocking.

Student 4 is a 52 month old female who has been in the autistic program since November of 1997 and has been diagnosed with pervasive developmental disorder. This student does have some meaningful language, and especially likes to sing. She scored a “moderately autistic” rating on the C.A.R.S. Stereotypic behaviors include hand flapping, and pushing her cheeks up into the eye area.

Student 5 is a 41 month old male who has been in the autistic program since October of 1997. Although he does have some verbalizations, he has no meaningful language. He scored a “mildly autistic” rating on the C.A.R.S., but

does not have a diagnosis or classification at this time. Stereotypic behaviors include hand flapping and shrieking.

Student 6 is a 42 month old male who has not yet been diagnosed formally, but is effected by a seizure disorder. This student has been in the autistic program since November of 1997 and entered the program non-verbal. He scored a “mildly autistic” rating on the C.A.R.S. Stereotypic behaviors include hand flapping and rocking.

Student 7 is a 54 month old female who has been diagnosed as having Rett’s Syndrome. She entered the program in October of 1998. This student has some verbalizations, but has no meaningful language. She also exhibits stereotypic behaviors common of Rett’s Syndrome, such as “hand washing”, and hand-to-mouth movements. Bridgid scored a “moderately autistic” rating on the C.A.R.S. Stereotypic behaviors include hand washing, hand to mouth movement, and finger movements.

Preschool Classroom B

Five students, ranging from ages 42-65 months, were selected from preschool classroom B to participate in the study.

Student 8 is a 36 month old male who has just entered the program in January of 1999. He is non-verbal and not yet potty trained. He has been diagnosed with pervasive developmental disorder and exhibits stereotypic behaviors such as grinding his teeth, making a chewing motion with his mouth,

and biting his tongue. He is very sensitive to substances on his hands and fingers, such as magic markers, paint, or glue.

Student 9 is a 59 month old male who began the program in September of 1998. This student was born with left occipital deformity and cranial syntosis, and has been diagnosed as having a traumatic brain injury. He is nonverbal and exhibits common stereotypic behaviors such as hand/arm flapping, rocking, jumping in place, and shaking his head from side to side. He is able to use eye contact when communicating with others.

Student 10 is a 65 month old male who began the program in September of 1998. At this time, no formal diagnosis has been made. He has verbalizations, some of which are meaningful. Stereotypic behavior includes hand flapping.

Student 11 is a 42 month old male who began the program in November of 1998 and has been diagnosed with pervasive developmental disorder. This student is very playful and is able to use some language appropriately. He uses immediate echolalia as well as his own spontaneous speech (including laughing). He will gaze when not attending to a task, but does very well with eye contact and tending to a task once focused. Stereotypic behavior includes hand flapping.

Student 12 is a 46 month old male who began the program in February 1999. He has been diagnosed with pervasive developmental disorder and has little or no verbalizations. Stereotypic behaviors include hand flapping and jumping.

Table 1

Descriptive Data				
Subject	Age in Months	Disability	Number of Months in Program	PECS Level
1	46	PDD	8	4
2	46	PDD	8	4
3	44	Mild Autism	8	4
4	52	PDD	16	6
5	42	None	17	4
6	41	None	4	3
7	54	Rett's Syndrome	17	3
8	38	PDD	2	4
9	59	PDD	6	4
10	65	None	6	4
11	42	PDD	4	4
12	46	PDD	1	4

Instruments

Upon entering the preschool program, each child was assessed using the Autism Behavior Checklist (Krug, Arick, & Almond, 1976), the Hawaii Early Learning Profile, or H.E.L.P. Checklist (VORT Corporation, 1988), and the

Childhood Autism Rating Scale, or C.A.R.S. (Western Psychological Services, 1988).

The Autism Behavior Checklist rates behaviors as they relate to sensory, relating, body and language use, language, and social and self-help. Also included in the checklist are stereotypic behaviors such as echolalia, ritualistic behavior, rocking, and hand flapping.

The C.A.R.S. consists of fifteen categories. Each category lists four different statements to describe the child's behavior, ranging from normal or appropriate, mild, moderate, or severe. The total score is then calculated and a rating of non-autistic, mildly-moderately autistic, or severely autistic is assigned. Each child was assessed by the classroom teacher with input from the speech and language therapist.

The H.E.L.P. Checklist consists of six categories: cognitive, expressive language, gross motor, fine motor, social-emotional, and self-help. This checklist was completed soon after entrance into the preschool program, and will then again be completed at the end of the school year.

Procedure

For this study, I used a self-made data recording sheets (see Appendix A) to collect data on verbal language and stereotypic behavior.

Data was collected through classroom observations. A total of twelve observations were conducted over the course of seven weeks. Spontaneous verbal

language and stereotypic behavior were recorded onto data sheets (Appendix A). Data sheets listed the students by number, and had columns to record the condition/activity under which data was recorded, and the number of occurrences of verbal language and stereotypic behaviors.

The conditions under which the children were observed were classroom based. The students were observed during circle time, snack, arts and crafts, and gross and fine motor activities.

Spontaneous verbal language was defined as verbal language that the child exhibits without using echolalia or a verbal prompt from a teacher or aide. Each single word was recorded as one count of spontaneous verbal language.

Stereotypic behavior was defined as behavior that the child exhibits on a regular basis, based on baseline data and teacher observations and input. Each episode of stereotypic behavior was recorded as one count. Once that behavior stops completely, it was recorded as another count if it starts again.

Statistical Analysis

Once data was collected, it was analyzed and put into both table and graph forms. The tables and graphs represent group and individual outcomes.

Chapter Four

Results

Data was collected to measure the impact of the Picture Exchange Communication System (PECS) on the verbal language and stereotypic behavior in preschool aged children with autism and related disorders. The number of the use of spontaneous verbal language and stereotypic behaviors were recorded to track the occurrences of verbal language and stereotypic behavior (see Table 2). The data collected suggests that the verbal language and stereotypical behavior does not improve based on the number of months in the program

Table 2: Individual Means for Verbal Language and Stereotypic Behavior

Student	Verbal Language Mean	Stereotypic Behavior Mean	Number of Months in Program
1	0	2.55	8
2	.09	.8	8
3	0	1	8
4	1.78	1.89	16
5	.06	1.4	17
6	.64	1.64	4
7	.36	2.45	17
8	.3	2.6	2
9	0	2.6	6
10	.75	.5	6
11	2.13	.1	4
12	0	1.2	1

Results of Verbal Language Production

In order to look at verbal language development over time, the twelve observation sessions were divided into four segments, I, II, III, and IV. Segment I consists of observations 1, 2, and 3. Segment II consists of observation 4, 5, and 6. Segment III consists of observations 7, 8, and 9. Segment IV consists of observations 10, 11, and 12.

On the group level, segments I, II, and III do show an increase in verbal language, but with the addition of segment IV, there is a sharp decrease in verbal language. On an individual level, from segment I through segment IV, three students had increases, two students had decreases, and seven had no change in verbal language. Table 3 displays individual and group means for each segment.

Table 3: Results for Verbal Language Production Over Four Observation Segments

Student	Segment I	Segment II	Segment III	Segment IV
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	9	0	4	0
5	4	1	1	0
6	0	0	0	2
7	1	0	0	2
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	5	12	0
12	0	0	0	0
Mean	2.8	1.5	4.3	1.0
Standard Deviation	3.8	2.4	5.4	1.2

Results of Stereotypic Behavior Production

The twelve observation sessions for collecting data on stereotypic behavior were also divided into four segments. Table 4 displays individual and group means for stereotypic behavior for each segment. When comparing segment I with segment IV on the group level, there is a slight decrease in stereotypic behavior. On the individual level, five students had decreases, four had increases, and two had no change in behavior. Student 5 is the only student who seems to have had a consistent pattern in the decrease of stereotypic behavior (See Table 4).

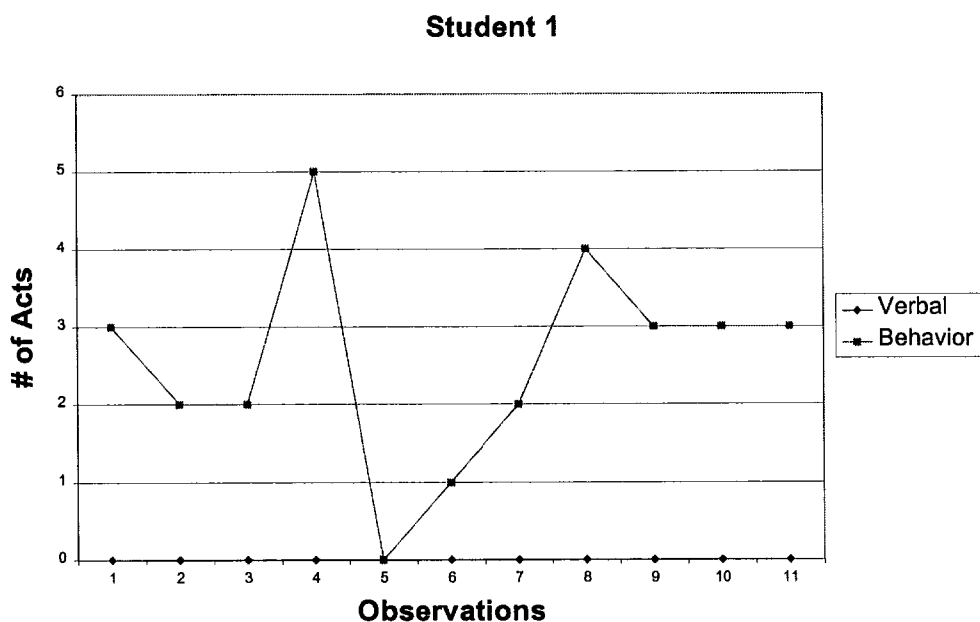
Table 4: Results for Stereotypic Behavior Production Over Four Observation Segments

Student	Segment I	Segment II	Segment III	Segment IV
1	0	0	7	9
2	4	0	0	0
3	5	0	0	0
4	8	0	4	0
5	10	7	5	3
6	0	0	0	6
7	10	0	0	10
8	0	9	0	0
9	0	13	0	0
10	0	0	0	0
11	0	6	3	0
12	0	0	0	0
Mean	7.4	8.8	4.8	7.0
Standard Deviation	2.8	3.1	1.7	3.2

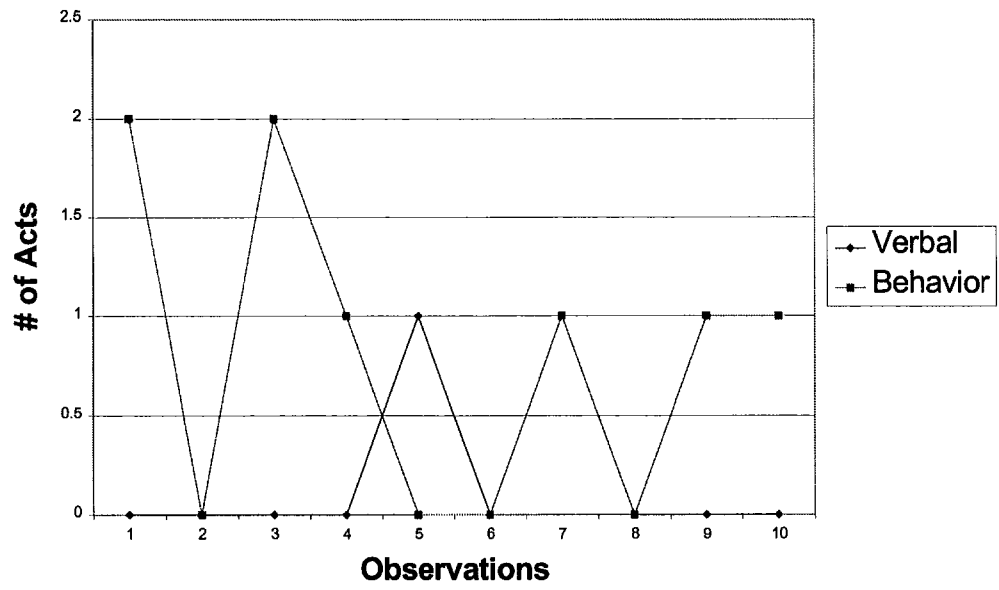
The total mean for all twelve observations for the group in verbal language was 5, while the total mean for stereotypic behavior was much higher at 16.5.

Individual graphs for each child illustrate both verbal language and stereotypic behavior over the course of seven weeks. All children were observed for twelve sessions, however, there are gaps in the number of observations due to the student absences. Data collected on students 7, 8, and 9 indicates that there is an increase in verbal language over time, while data collected for students 2, 4, 5, 9, and 11 show indicates a decrease in stereotypic behavior (See graphs below for students 1 through 12).

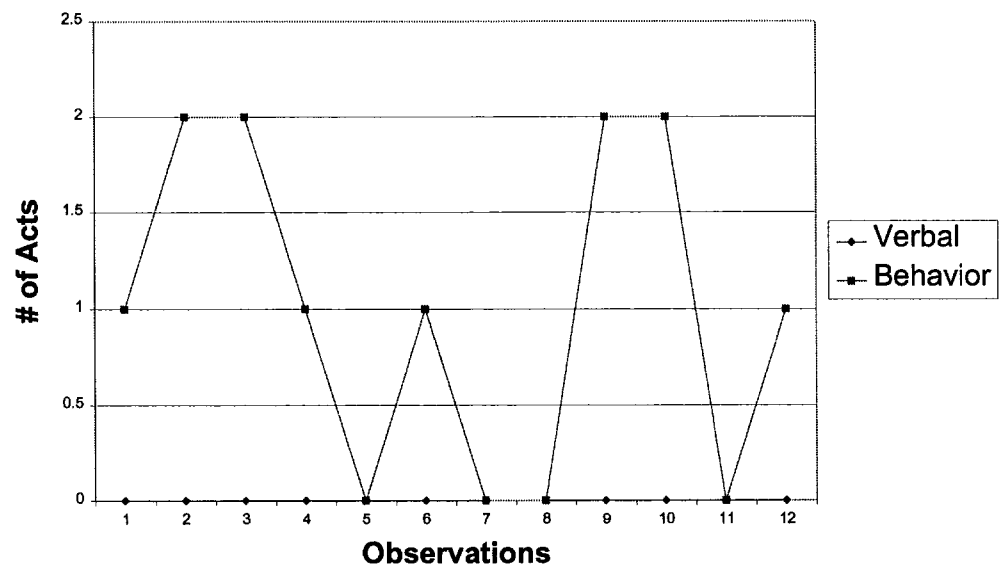
Measures of Verbal Language and Stereotypic Behavior for Individual Students 1 – 12.



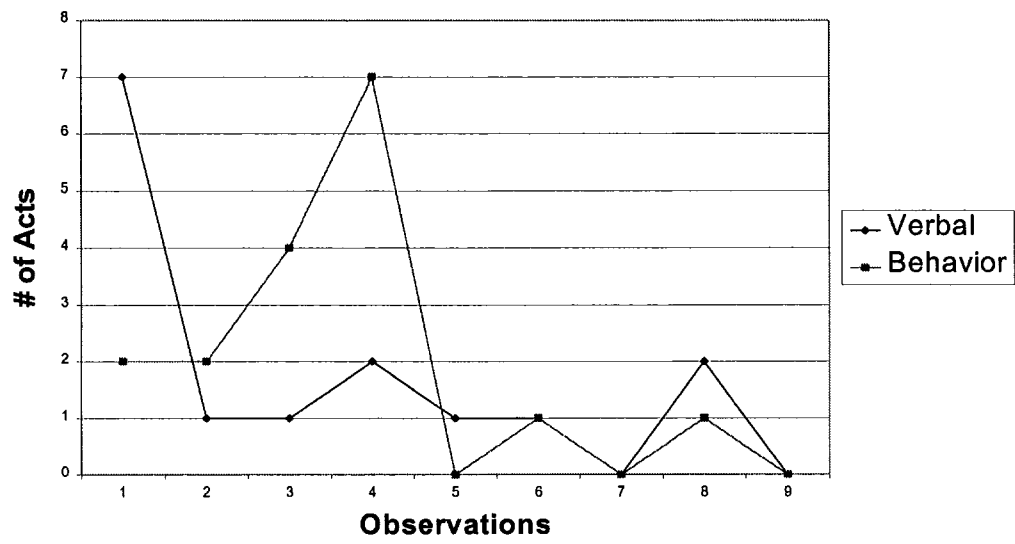
Student 2



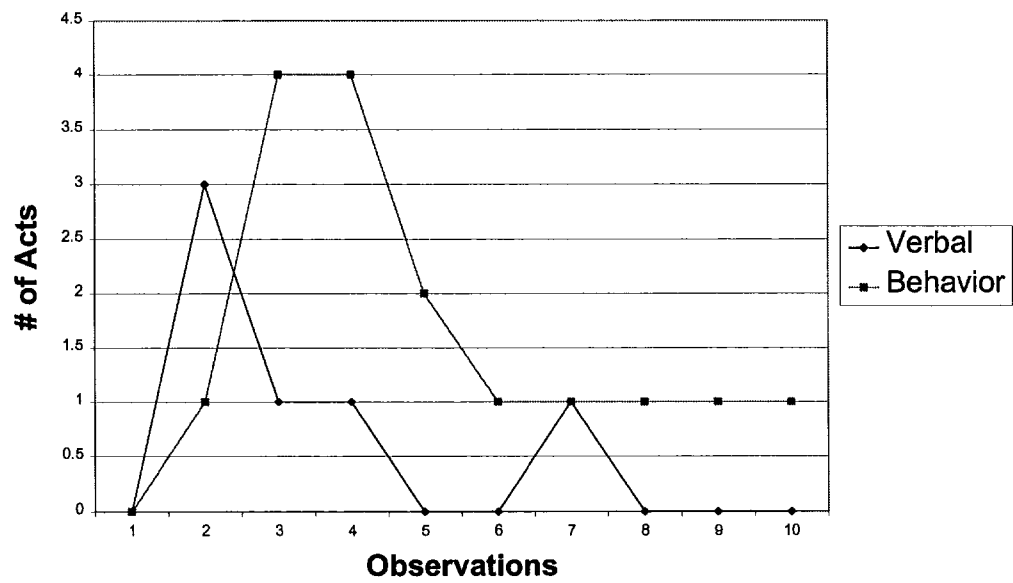
Student 3



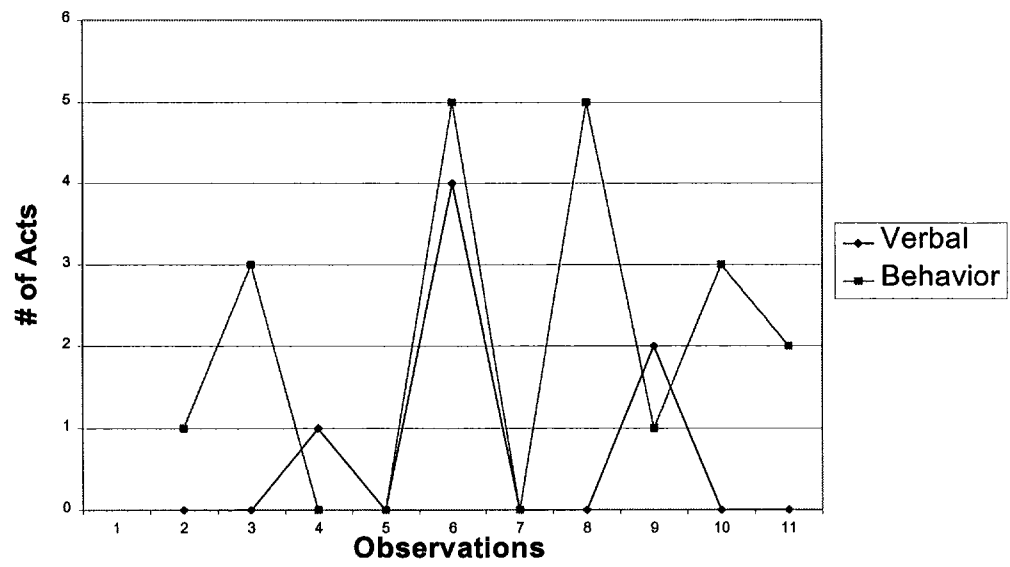
Student 4



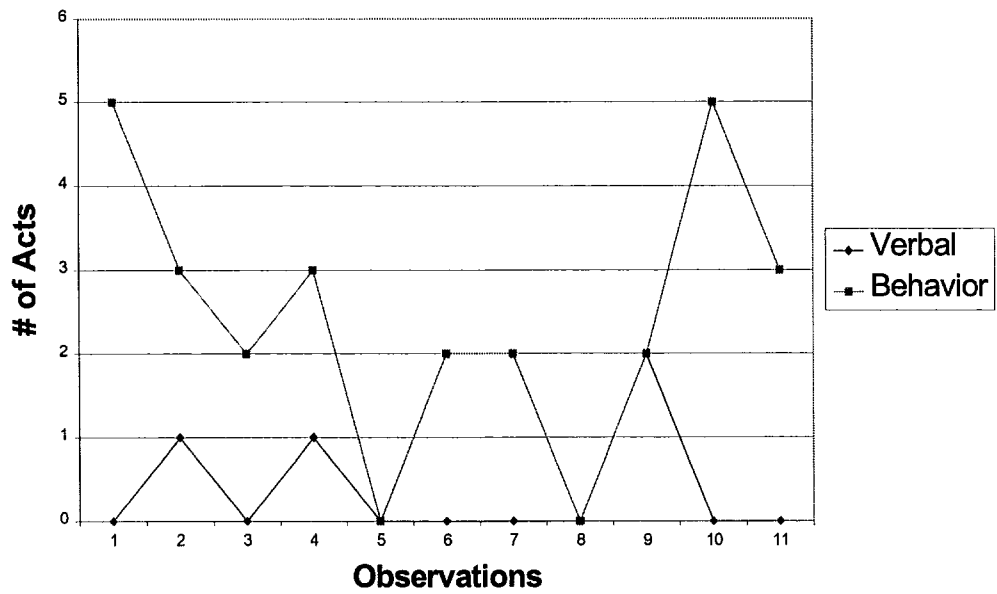
Student 5



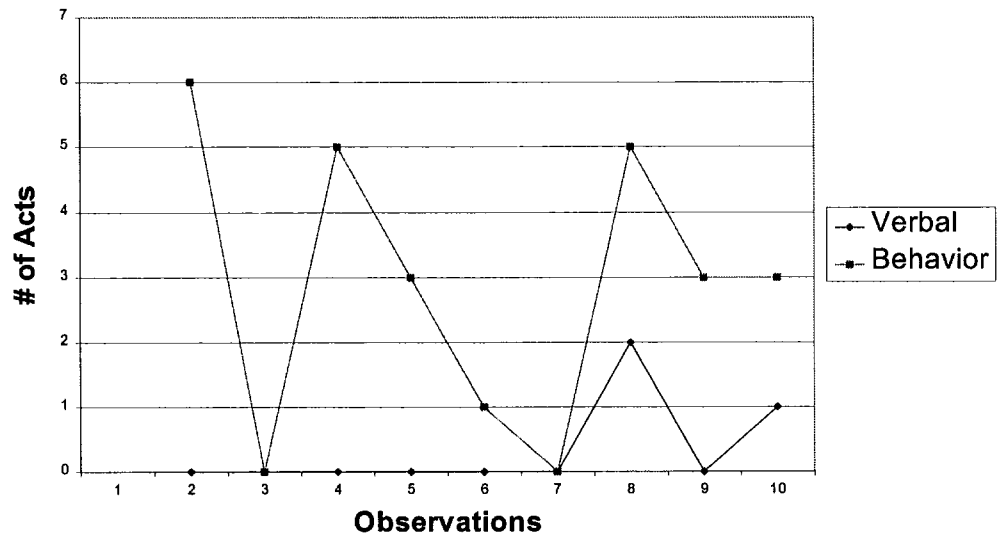
Student 6



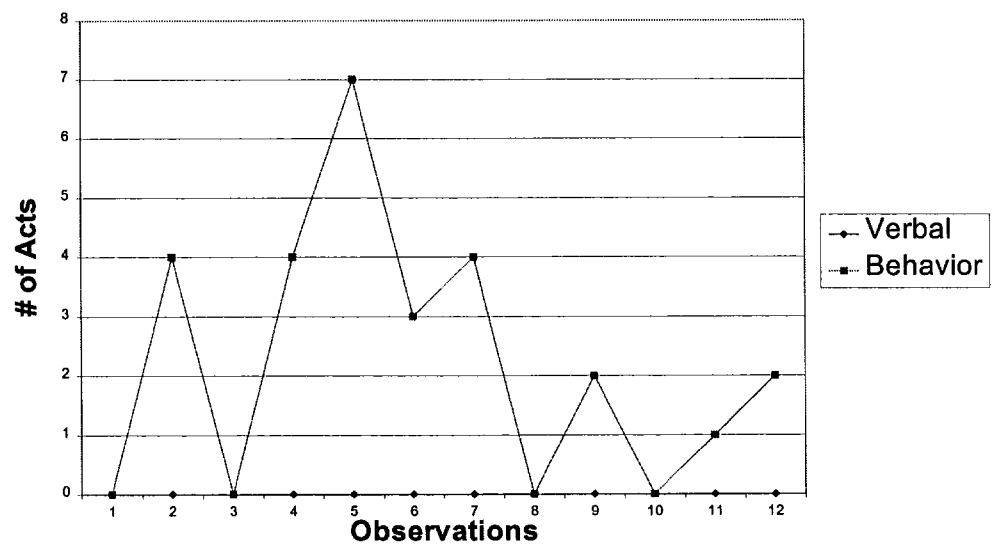
Student 7



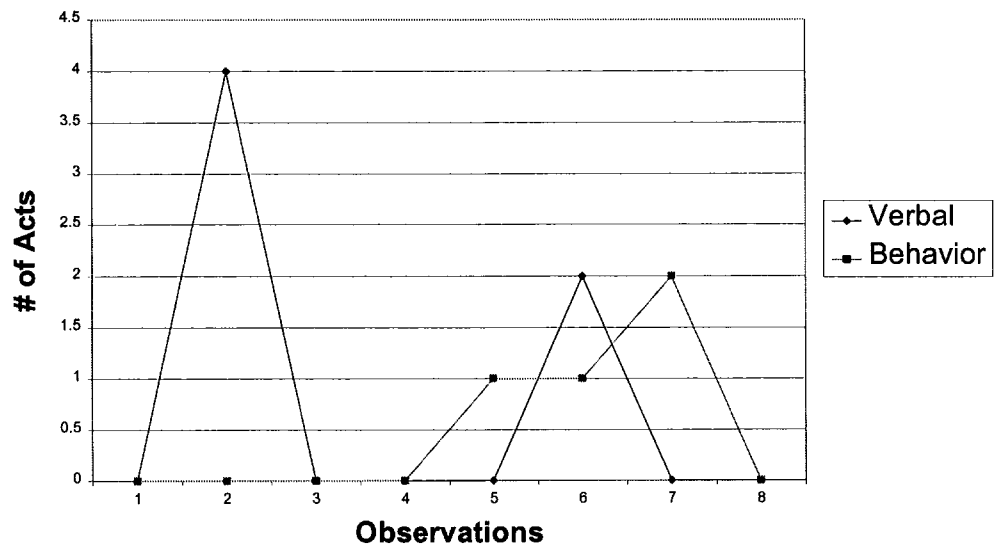
Student 8



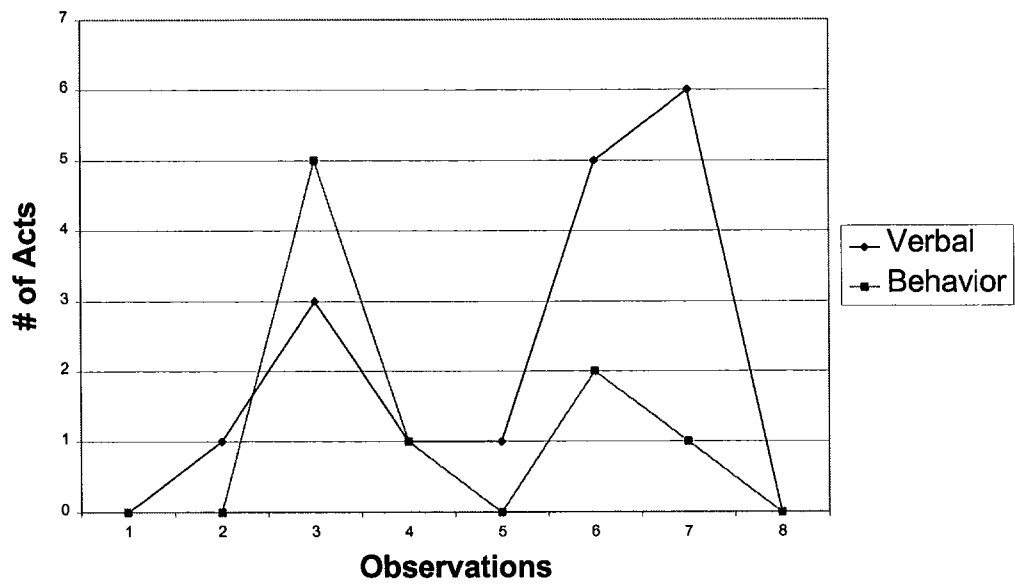
Student 9



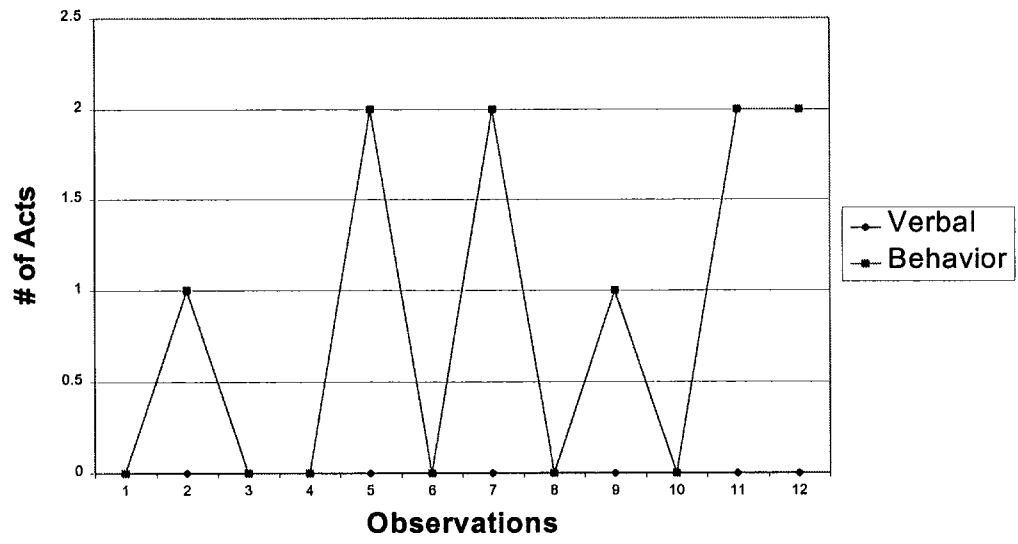
Student 10



Student 11



Student 12



Chapter Five

Discussion

Review of Research Question

For this study, the question “Does the Picture Exchange Communication System (PECS) increase verbal language while decreasing stereotypic behavior in preschool children with autism and related disorders?” was examined. It was hypothesized that the PECS would improve verbal language while decreasing stereotypic behaviors because it provides children with a means in which to communicate, which will in turn, would lower frustration levels, leading to more instruction time and fewer behavior problems.

Review of Results

This study found no consistent evidence that children who use PECS will have an increase in verbal language or a decrease in stereotypic behaviors. Although there is some evidence of an increase in verbal language over time, there are inconsistencies both between students and over time. Similarly, while there is a trend for a decrease in stereotypic behavior, there are also inconsistencies.

Review of Previous Research

Research studies on augmentative communication systems have found mixed results. Initial studies done by Biklen (1991) on the effectiveness of Facilitated Communication found that children with autism were able to convey their

thoughts, feelings, and ideas through the use of a computer keyboard with physical support from a facilitator. Follow up studies were unable to replicate Biklen's findings, but rather found that the facilitator, either knowingly or unknowingly, contributed to the "success" of Functional Communication.

Research in Time Delay has found that by delaying and fading verbal prompts, children with autism can learn to use verbal language to communicate (Charlop et al, 1985; Matson, et al, 1990; Ingenmy & Van Houten 1991). The success of Time Delay is in part attributed to autistic children's use of echolalia and the need for ritualistic behavior. For example, a target phrase (e.g. "good morning") is used at the same time of day everyday.

Functional Communication has been studied to measure its effects on children's behavior. The theory behind Functional Communication is that children use aversive behavior in situations where there is low adult attention. By giving children functional phrases to use in everyday situations, the child will be able to use language instead of acting out (Durand & Carr, 1985; 1987; 1991).

There is also supporting research that sign language can be used to reduce inappropriate behavior in children with autism (Carr, 1979; Creedon, 1973; Miller & Miller, 1973). It was found, however, that the use of sign language is only useful when used in the presence of those who understand it, and therefore, is limited.

The Picture Exchange Communication System (PECS) has a universal appeal, because it can be used to communicate with those who have no training with the program. A study by Bondy and Peterson (Bondy & Frost, 1995) was conducted over a five year period at the Delaware Autistic Program using children age five and younger. Out of the 66 children that went through the program, 34 now use functional speech without the use of PECS or any other augmentative device. Fourteen other children use speech along with pictures. The nineteen children of the group who do not use speech are diagnosed severely and profoundly retarded.

One study (Simon et al, 1996) compared PECS and facilitated communication. It was found that the subject, a fourteen year old boy, preferred to use PECS over facilitated communication, and was able to obtain 100% accuracy with PECS.

Limitations

One of the major limitations of this study was the length of time that data was collected. Data was collected over the period of seven weeks, but I feel that if a longer time period were used, more significant outcomes would be evident.

Another limitation is the lack of baseline data that was available for when students entered the program. It would have been helpful to have some data on verbal language and stereotypic behavior at the point of entry into the program. Then the baseline data could have been compared to the data collected over the period of two months.

Finally, the nature of Autism and the inconsistencies in language and behavior on a day to day basis prevent the formation of a natural progression in the data. In addition, it is possible that some of the subjects in this group may never develop verbal language.

Suggestions for Future Research

I do feel that further research should focus on the levels of the children upon entry into the program and the progress that is made after PECS intervention. Longitudinal studies of students who use PECS in preschool programs would be helpful to measure the level of verbal communication that each child is able to reach as well as monitoring those children who never develop the use of verbal language.

Another area that needs attention is carry over of the ability to initiate communicative interactions in other areas other than the classroom. PECS was developed for use in the classroom, with the intent that it can be used outside of the classroom as well. There have not been any studies that look at how PECS is being used outside of schools.

Implications of the Study

I feel that this study did find some evidence that PECS does have an impact on the increase of verbal language. In addition, there is also evidence that some children who use PECS to communicate, will rely more and more on verbal language as time goes by, and dependency on PECS will fade. This study has

also found that PECS does not hinder the development of speech in children who use PECS as an initial form of communication.

Conclusion

The Picture Exchange Communication System was designed to give children with autism, developmental disorders, and social-communication disorders a way to communicate with the world around them. It is a picture based communication device that puts emphasis on the child initiating interactions. PECS utilizes many behavioral teaching techniques such as shaping, fading, backward chaining, and delayed prompting to teach children to make requests and communicate with others.

Even with the emphasis on spontaneous interactions without the use of speech, verbal language is likely to develop as a secondary outcome for those children who have the ability to develop and use speech. Studies at the Delaware Autistic Program in Newark, Delaware have found that high percentages of preschool children who receive PECS intervention will develop verbal language, whether it be independent of PECS or in combination with it. Those children in the study that failed to develop speech fall within the severely to profoundly mentally retarded range of intellectual functioning.

This study was conducted to measure the impact of PECS on verbal language and stereotypical behaviors in preschool children with autism and developmental disorders. Two preschool classrooms at Gloucester County

Special Services School District's Child Development Center were used for the study. A total of twelve children were observed to collect data on verbal language and stereotypic behavior.

The study found no consistent evidence that children who use PECS will experience an increase in verbal language or a decrease in stereotypic behavior. Although there is some evidence of an increase in verbal language over time, there are inconsistencies both between the subjects and the period of time that they were observed. Similar evidence and inconsistencies were found with decreases in stereotypic behavior. This is in part due to the nature of autism and inconsistencies in speech and behavior on a day to day basis.

References

Andolsek, K. M., (1998), "Characteristics and Symptoms in Patients with Autism", *American Family Physician*, v57, n4, p809-811.

Baron-Cohen, S., (1992), "The Theory of Mind Hypothesis of Autism: History and Prospects of the Idea", *The Psychologist*, v5, p9-12.

Baron-Cohen, S., (1997), "Mindblind", *Natural History*, v106, n8, p62-66.

Biklen, D., and Schubert, A., (1991), "New Words: The Communication of Students with Autism", *Remedial and Special Education*, v12, n6, p46-57.

Bondy, A. S., and Frost, L. A., (1994), "The Picture Exchange Communication System", *Focus on Autistic Behavior*, v9, n3, p1-16.

Bondy, A. S., and Frost, L. A., (1995), "Educational Approaches in Preschool; Behavior Techniques in a Public School Setting", in Schopler, E., and Mesibov, (1995), Learning and Cognition in Autism, Plenum Press, New York.

Carr, E. G., and Kologinsky, E., (1983), "Acquisition of Sign Language by Autistic Children II: Spontaneity and Generalization Effects", *Journal of Applied Behavior Analysis*, v16, n3, p297-314.

Carr, E. G., and Durand, V. M., (1985), "Reducing Behavior Problems through Functional Communication Training", *Journal of Applied Behavior Analysis*, v18, n2, p111-126.

Charlop, M. H., Schreibman, L., and Garrison-Thibodeau, M., (1985), "Increasing Spontaneous Verbal Responding in Autistic Children Using a Time Delay Procedure", *Journal of Applied Behavior Analysis*, v18, n2, p155-166.

Charlop, M. H., and Trasowech, J. E., (1991), "Increasing Autistic Children's Daily Spontaneous Speech", *Journal of Applied Behavior Analysis*, v24, n4, p747-761.

Courchesne, E., (1997), "Neuroanatomical Systems Involved in Infantile Autism: The Implications of Cerebellar Abnormalities", in Dawson, G., (1989), Autism: nature, Diagnosis, and Treatment, The Guilford Press, New York.

Dawson, G., (1989), Autism: nature, Diagnosis, and Treatment, The Guilford Press, New York.

Durand, V. M., and Carr, E. G., (1991), "functional Communication Training to Reduce Challenging Behavior: Maintenance and Application in New Settings", *Journal of Applied Behavioral Analysis*, v24, n2, p251-264.

Eberlin, M., McConnachie, Ibel, S., and Volpe, L., (1993), "Facilitated Communication: A Failure to Replicate the Phenomenon", *Journal of Autism and Developmental Disorders*, v23, n3, p507-530.

Frost, L. A., and Bondy, A. S., (1994), The Picture Exchange Communication System Training Manual", Pyramid Educational Consultants, Inc.

Horner, R. H., and Budd, C. M. (1985), "Acquisition of Manual Sign Use: Collateral Reduction of Maladaptive Behavior, and Factors Limiting Generalization", *Education and Training of the Mentally Retarded*, v20, p39-47.

Howlin, P. (1998), "Practitioner Review: Psychological and Educational Treatments for Autism", *Journal of Child Psychology and Psychiatry*, v39, n3, p307-322.

Ingenmey, R., and Van Houten, R., (1991), "Using Time Delay to Promote Spontaneous Speech in an Autistic Child", *Journal of Applied Behavior Analysis*, v24, n3, p591-596.

Kuder, S. J. (1997), Teaching Students with Language and Communication Disabilities, Boston, Allyn and Bacon.

Mahoney, W. J., Szatmari, P., MacLean, J. E., Bryson, S. E., Bartoluccia, G., Walter, S. D., Jones, M. B., and Zwaigenbaum, L. (1998), "Reliability and Accuracy of Differentiating Pervasive Development Disorder Subtypes", *Journal of the American Academy of Child and Adolescent Psychiatry*, v37, n3, p278-287.

Matson, J. L., Sevin, J. A., Fridley, D., and Love, S. R., (1990), "Increasing Spontaneous Language in Three Autistic Children", *Journal of Applied Behavior Analysis*, v 23, n2, p227-233.

Matson, J. L. , Sevin, J. A., Box, M. L., and Francis, K. L., (1993), "An Evaluation of Two Methods for Increasing Self-Initiated Verbalizations in Autistic Children", *Journal of Applied Behavior Analysis*, v26, n3, p389-398.

Mauk, J. E., (1993), "Autism and Pervasive Developmental Disorders", *Pediatric Clinics of North America*, v40, n3, p567-578.

Miller, H., (1996), "Eye Contact and Gaze Aversion: Implications for Persons with Autism" *Sensory Integration*, Special Interest Newsletter of the American Occupational Therapy Association, Inc., v19, n2, p1-3.

Prizant, B. M., and Duchan, J. F., (1981), "The Functions of Immediate Echolalia in Autistic Children", *American Speech-Language-Hearing Association*, v46, n , p241-249.

Prizant, B. M., (1983), "Language Acquisition and Communicative Behavior in Autism: Toward an Understanding of the 'Whole' of it", *American Speech-Language-Hearing Association*, v48, p296-307.

Prizant, B. M., and Wetherby, A. M., (1989), "Enhancing Language and Communication in Autism", in Dawson, G., (1989), Autism: Nature, Diagnosis, and Treatment, Guilford Press, New York.

Prizant, B. M., (1996), "Brief Report: Communication, language, Social, and Emotional Development", *Journal of Autism and Developmental Disorders*, v26, n2, p173-178.

Rapin, I., (1991), "Autistic Children: Diagnosis and Clinical Features", supplemental paper from Albert Einstein College of Medicine.

Rutter, M., (1996), "Autism Research: Prospects and Priorities", *Journal of Autism and Developmental Disorders*, v26, n2, p257-273.

Siegel, B., (1996), The World of the Autistic Child, Oxford University Press, New York.

Simon, E. W., Whitechair, P. M., and Toll, D. M., (1996), "A Case Study: Follow-Up Assessment of Facilitated Communication", *Journal of Autism and Developmental Disorders*, v26, n1, p9-18.

Szymanski, L. S. (1998), "Children with Autism: A Developmental Perspective", *Journal of the American Academy of Child and Adolescent Psychiatry*, v37, n3, p338-340.

Szatmari, P., Volkmar, F., and Walter, S., (1995), "Evaluation of Diagnostic Criteria for Autism Using Latent Class Models", *Journal of the American Academy of Child and Adolescent Psychiatry*, v34, n2, p216-223.

Tager-Flusberg, H., (1989), "A Psycholinguistic Perspective on Language Development in the Autistic Child", in Dawson, G., (1989), Autism: Nature, Diagnosis, and Treatment, Guilford Press, New York.

Volkmar, F. R., and Klin, A., (1993), "Theory of Mind Deficits in Autism: Social or Cognitive? Primary or Secondary?", paper presented at the Annual Meeting of the Society for Research in Child Development, New Orleans, Louisiana.

Wing, L., (1972), Autistic Children, Brunner / Mazel, New York.

Wing, L. (1997), "The Autistic Spectrum", *The Lancet*, v350, n9093, p1761-1767.

Appendix A

Data Recording Sheet

Student	Date	Time	Verbal Language	Stereotypic Behavior	Condition
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					