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A Comparison of the Spontaneous Utterances of Students with Autism Across Two Educational Settings

Mary E. Peterson

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A COMPARISON OF THE SPONTANEOUS UTTERANCES OF STUDENTS WITH AUTISM ACROSS TWO EDUCATIONAL SETTINGS

by

Mary E. Peterson

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Education
Department of Special Education

Western Michigan University
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Students with autism are being mainstreamed into general education classes in increasing numbers. This practice is based on the largely theoretical assumptions that normal peers will provide models of appropriate communication skills as well as increased opportunities for social interaction. However, there are few empirical studies available to corroborate these beliefs.

The purpose of this study was to compare the functional communication of the same group of students with autism across two settings, their general education classrooms and their self-contained, special education classrooms. Each of the students spent time in both settings during each school day. Their spontaneous language was examined to identify the number of utterances produced, the purposes for which they were used, and the appropriateness of the utterances in each setting.

Four elementary students with autism participated in this study. Language samples were collected by placing tape recorders on or near the desks of each participant. In addition, the investigator made on-line language sample transcripts using a pencil and paper to catch words that might be missed from listening to the audiotape. Descriptive notes of each subject’s behavior and environmental events which occurred during
the observations were also made.

Analysis of the data revealed that all four participants produced a greater number of utterances in the special education classrooms than they did in the general education settings. Although the participants generated utterances representative of all the functional communicative categories, there were significant differences in the proportion of utterances produced across subjects and across settings. All of the participants produced a greater number of appropriate utterances in the special education classrooms than they did in the general education rooms, although 3 of the students also produced more inappropriate utterances in the special education environments. For all 4 participants the special education classrooms appeared to facilitate language use more than did the general education settings. Environmental factors, such as class size and teacher behaviors, seemed to influence these results.
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DEDICATION

To my mother, Marcella V. Clink, who has always believed in me. Her unwavering support has helped to smooth my road in life and enabled me to follow my dreams.

Mary E. Peterson
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There were so many individuals who helped and guided me through this dissertation process that my fear is that I will forget to thank someone. I feel very humble when I think of all the individuals who have supported and encouraged me for so long.

I wish to thank the members of my committee. To Dr. George Haus, who encouraged, guided, and sometimes, prodded me through this process, I extend my heartfelt thanks. I owe a great deal to Dr. Nickola Nelson, whose willingness to share her expertise and time made this a very positive learning experience and added much to the final product. I am also grateful to Dr. Alonzo Hannaford and Dr. Uldis Smidchens for their encouragement and advice throughout this process. Thanks are also due to Dr. Abraham Nicolaou for his patient help in defining this problem.

I appreciate the help I received from the school district, the parents, and all of the teachers and students who participated in this study. I learned a great deal from you!

It is not possible to complete a project such as this without the strong support of one's friends and family. Three people deserve special thanks for you have been with me from the beginning. Thank you, Ginny, Karyn, and Stephanie for your nonstop personal, written, and electronic support.

And to my family--we did it! I will be forever grateful to my mother, whose support was unending, and to my Husband, Ray, and my...
Acknowledgments—Continued

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Mary E. Peterson
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CHAPTER I

INTRODUCTION

The answer to the question of where and how best to educate students with special needs remains elusive. As theories and philosophies in the field of special education as a whole have evolved, so, too, have methods of educating the students who are served. It is not uncommon for specific philosophies or methods to be advocated by educators with strongly held beliefs and opinions even though empirical data are not available to support these ideas. This is especially true concerning the debate over whether students with disabilities should be educated in general education or in special education classrooms. In the midst of a debate that threatens to polarize the field of special education are some who have called for moderation and more empirical data upon which to base decisions (Fuchs & Fuchs, 1994; Nesbit, 1994, Vergason & Anderegg, 1993).

In the years immediately following the passage of the Education for All Handicapped Children Act, Public Law (PL) 94-142 (1975), which assured a free, appropriate, public education for all handicapped children, there was an increase in the number of students served in special education classrooms (Polloway, 1984). As concern increased that too many students were being removed from general education classes, Will (1986) suggested that many students with mild disabilities who were being served in special education classrooms could and should be more
appropriately served in general education classes. This concept became known as the Regular Education Initiative (REI). As these students with mild disabilities were returned to general education classrooms, other students with severe impairments moved from institutions or private facilities into self-contained classrooms in the public schools. Some students with severe disabilities also participated in general education activities, usually for nonacademic subjects and usually on a part-time basis; this practice was described as "mainstreaming" (Osborne & Dimattia, 1994). By the late 1980s, some educators (Lipsky & Gartner, 1989; S. Stainback & Stainback, 1988) were advocating for full-time placement of all students with disabilities in general education classrooms, a practice generally described as inclusive education or inclusion (McCarthy, 1994).

The movement to place students with disabilities in general education classrooms is based on the assumption that placing children with disabilities in classrooms with their normal peers will result in increased social interaction between the two groups and that the students with disabilities will model the behavior of the nonhandicapped learners (Snell, 1990; W. Stainback & Stainback, 1990). Although few would reject outright the philosophical reasons (to be discussed later) behind this educational movement, measurement of the actual success of these arrangements, in terms of functional effects, has been minimal (Cipani, 1995; J. Kauffman, 1993; York, Vandercook, MacDonald, Heise-Neff, & Caughey, 1992).
Efficacy Studies

Investigators who have undertaken efficacy studies in this area have encountered a number of methodological problems, including selection bias, the lack of a single classification system to define disabilities precisely and consistently, and differences in curricula and teaching methods (J. M. Coleman, Pullis, & Minnett, 1987). Among the group of studies designed to examine the effects of placement on academic outcomes for students, the majority have investigated a specific variable, such as placement in a specific class or the use of a particular teaching technique, and then measured the results in terms of students' achievement scores. In many of these studies, one group of students in segregated (self-contained) special education classrooms was matched on one or more variables with a similar group in another type of setting (Calhoun & Elliott, 1977; Goldstein, Moss, & Jordan, 1965). The results, in the form of student achievement scores in specific academic areas, have been mixed and inconclusive (Carlberg & Kavale, 1980; Madden & Slavin, 1983).

Another, larger group of studies, which also were designed to determine the efficacy of mainstreaming and inclusive education practices, focused on the social or emotional adjustment of students with disabilities (Cole & Meyer, 1991; Evans, Salisbury, Palombaro, Berryman, & Hollywood, 1992). Most compared two groups of students matched on one or several, but not all, relevant variables. They based their conclusions upon measurement of affective characteristics, such as self-esteem.
More recent studies have shifted the focus of investigation toward measuring participant attitudes, using questionnaires or interviews with teachers and students in general education classrooms, in order to determine the effectiveness of mainstreaming or inclusive education (Janney, Snell, Beers, & Raynes, 1995; Kozleski & Jackson, 1993). Those teachers and students who tended to respond most favorably were those who had been involved in the planning process that placed the special student in the general education classroom and who received support from special education personnel on an ongoing basis. The data have been largely in the form of opinions about the success of the mainstreaming or inclusion experience in which the participants were involved.

Few studies have attempted to describe the actual interaction of special education students within classroom environments; fewer have contributed to the basic, descriptive body of knowledge about the types of functional behaviors demonstrated and the social and communicative interactions that occur between these students with special needs and their nondisabled peers in general education classrooms.

If the goals of education, and specifically, of including students with special needs in general education classrooms, are to increase their opportunities to model the behaviors of their nondisabled peers, to improve their cognitive and communicative skills so that they are able to function as members of their community, and to increase the social interaction between the two groups (Reynolds, Wang, & Walberg, 1987; S. Stainback, Stainback, & Forest, 1989), then students with disabilities need to be provided with the types of environments which best facilitate
the attainment of these goals. In order to structure these environments, teachers and therapists need to know and understand how these students function on a day-to-day basis in classroom situations (Stone & Caro-Martinez, 1990).

Students With Autism

One group of students for whom educational placement has become a controversial issue are students with autism. It is generally agreed that delayed and/or deviant language development is one of the chief identifying characteristics which define all individuals with autism (Kanner, 1943; Rutter, 1978; Schopler & Mesibov, 1985). A second, universal characteristic of these students is their difficulty relating to other people and events (M. Coleman, 1985; Kanner, 1943; Schroeder & Dalrymple, 1992). The preponderance of studies of the language of children with autism have involved clinical language sampling or the sampling of language elicited in contrived or experimental settings (McHale, Simeonsson, Marcus, & Olley, 1980; Stone & Caro-Martinez, 1990; Watson & Lord, 1982; Wetherby, 1986). Additional information about the communication skills of this population has been gleaned from anecdotal records and clinical observations of both normal and special needs children (Menyuk, 1978).

Severe impairments of language and social skills suggest that children with autism might have difficulty functioning successfully in a general education classroom, but recent trends show a movement toward mainstreaming students with all types of severe disabilities, including autism (Biklen, 1992; Knoblock, 1982). Much of the informa-
tion about the success of this movement has been anecdotal and subjective and there is a need for empirical data about the performance of students with autism in general education classrooms (Cipani, 1995; Fuchs & Fuchs, 1995; J. Kauffman, 1993).

There is also a need to study language samples and information about language use in the settings in which the students are most likely to use these skills. Watson and Lord (1982) noted the possibility that a discrepancy might exist between the skills students demonstrated under formal, or structured, testing situations and those which they used in a functional manner. They stated:

Assessment of what a child knows is frequently based on responses made in a highly structured test environment rather than on the (communication) skills that a child exhibits in everyday situations. . . . A child may demonstrate very different skills when assessed in a one-to-one or a highly structured situation than he/she will demonstrate in everyday situations. (p. 2)

Watson, Lord, Schaffer, and Schopler (1989) and Martin (1992) also stressed the importance of observing students in their familiar environments in order to determine not only what skills they have acquired, but if and how they use these skills functionally.

The purpose of this study was to examine the communicative performance of the same students with autism across two classroom settings by comparing the utterances they produced in their self-contained, special education classrooms to those they produced in their general education classes. Specifically, an attempt was made to determine if the students demonstrated intraindividual differences in their patterns of communication in the two classroom settings.
CHAPTER II

LITERATURE REVIEW

Introduction

The nature of this study requires that the review of literature focus on three major topics: a definition of the syndrome of autism, an examination of communicative competence as a prerequisite to student success in a classroom, and a description of educational placement alternatives and their effects on students with disabilities.

Autism

Autism is a lifelong, developmental disability which is characterized by universal deficits in communication skills and reciprocal social interactions and by a markedly restricted repertoire of activities and interests (Fay & Schuler, 1980; Kanner, 1943; Wing, 1988). Individuals with autism comprise a heterogeneous group which is notable for both the interindividual and the intraindividual differences demonstrated by its members (Koegel, Rinch, & Russo, 1982; Rutter, 1978). Overall patterns of development vary from individual to individual as do specific skill levels within each individual (Rutter & Schopler, 1988; Watson & Lord, 1982; Wing, 1988).

The incidence level of persons with autism is generally considered to be 4-5 per 10,000 births (Knoblock, 1982; Ritvo & Freeman, 1978). Improved diagnostic expertise, as well as a growing body of information
on individuals who are referred to as high-functioning individuals with autism, but who may previously have been diagnosed with some other disability (Tsai & Scott-Miller, 1988), have suggested that the incidence level may be somewhat greater, perhaps 12-15 per 10,000 births (Hermelin & Frith, 1985; Rutter & Schopler, 1988). The syndrome is 3-4 times more common in males than in females and is usually diagnosed before a child is 3 years of age (Ritvo & Freeman, 1978). Between 75% and 80% of all individuals with autism have a measured intelligence quotient which places them in the category of mentally impaired (Ritvo & Freeman, 1978; Yirmuya & Sigman, 1991) and 50% of individuals with autism never acquire functional speech and language skills (Fox, 1994; Howlin, 1981; Rutter, 1978; Wing & Attwood, 1987). Yirmuya and Sigman (1991) described autism as "a syndrome that involves an impaired ability to form representations and to engage in symbolic activities" (p. 679). These are abilities that are crucial for the development of language.

The following sections will (a) describe the characteristics which define the syndrome of autism, (b) review the history of attempts to educate students with autism, (c) focus specific attention on communicative competence as it relates both to autism and to success in the classroom, (d) examine some of the specific studies of the language and social skills of individuals with autism, and (e) elaborate other characteristics of autism that affect success in school.

Definition of Autism

The Diagnostic and Statistical Manual of Mental Disorders (4th
ed., DSM-IV, American Psychiatric Association, 1994) includes autistic disorder under the broader category of pervasive developmental disorder, a group of disabilities characterized by impairments in reciprocal social interaction, deficits in communicative skills and imaginative activity, and a markedly restricted repertoire of activities and interests (American Psychiatric Association, 1994). Impairments in social interaction may include a marked lack of awareness of the feelings of others or an inability to "read" social cues; an impaired ability to imitate; a lack of, or abnormal, social play; and impaired ability to make peer friendships (Schroeder & Dalrymple, 1992). As they mature, some higher functioning individuals with autism may demonstrate an interest in developing friendships or interactions with others, but they continue to lack an understanding of the reciprocal nature of such dealings.

Communication Problems of Individuals With Autism

Communication problems change as the individual with autism matures, but basic deficits, especially those in the areas of semantic and pragmatic skills, remain. Disturbances in the development of both receptive and expressive language skills are characteristic and range from an inability to understand simple language and an absence of expressive language ability to impaired receptive skills and unique, or idiosyncratic utterances characterized by the aforementioned semantic and pragmatic deficits. Communication deficits are discussed in greater detail in the following sections.

The DSM-IV definition also describes the restricted range of interests, the stereotyped patterns of behavior, and the insistence upon
routine demonstrated by individuals with autism. Although 75%-80% of all individuals with autism are also mentally impaired, many display an uneven development of their cognitive skills (Fox, 1994; Rutter, 1985). They may show unusual reactions to sensory stimuli, behavior problems, such as hyper- or hypoactivity, impulsivity or aggressiveness, or inappropriate emotional responses. Some individuals with autism may engage in self-stimulatory activities which may interfere with learning or, in the extreme, may become disruptive or self-abusive (Dunlap, Koegel, & Egel, 1979; Fox, 1994).

While many individuals with autism may show some eventual improvement in their emotional social skills, residual deficits, including difficulty participating in group activities, a failure to establish personal friendships, and a lack of empathy for others, may remain (Schopler & Mesibov, 1985). Hermelin and Frith (1985) agreed; but they also noted that, while the social skills of this population may improve somewhat, their language problems, specifically their semantic and pragmatic language problems, tend to persist throughout their lives.

In summary, the "autistic" label encompasses a heterogeneous group of individuals who exhibit a wide range of abilities and skills.

Impairments in communication skills are one of the hallmarks of the autistic syndrome. Individuals with autism are often delayed in beginning to speak and approximately half of this population will never develop meaningful speech and language (M. Coleman, 1985; Stone & LaGreca, 1986). Other communicative impairments may include echolalia, pronoun reversals (Howlin, 1981; Kanner, 1943; Wetherby, 1986) and extreme literalness (Ricks & Wing, 1975; Wetherby, 1986).
Individuals with autism tend to produce utterances which are stereotyped and repetitive (Needleman, Ritvo, & Freeman, 1980). They have difficulty using language for social purposes (Howlin, 1981; Schroeder & Dalrymple, 1992) and their ability to use and to understand nonverbal aspects of communication, such as gestures, facial expressions, and body language, is greatly impaired (Stone & LaGreca, 1986).

Researchers have noted that, while individuals who develop verbal skills may have normal or only slightly delayed phonological and grammatical skills, they continue to demonstrate qualitative impairments of language (Cantwell, Baker, & Rutter, 1978; Fay & Schuler, 1980; Layton, 1987; Stone & LaGreca, 1986). The language of these individuals continues to be processed at the concrete, or literal, level and they have difficulty with verbal abstraction, social reasoning, and generalizing or shifting word meaning from one topic to another (Baltaxe, 1977; Ricks & Wing, 1975; Tsai & Scott-Miller, 1988). They continue to show marked impairments in the ability to initiate and maintain social conversations because they tend to remain focused on their own particular interests rather than on the changing topics of a social exchange (Baltaxe & Simmons, 1977).

Social Impairments

Deficits in reciprocal social interactions are the second identifying characteristic of autism. Kanner's (1943) first observations of the syndrome described the "aloneness" experienced by his subjects. Since then, other investigators have described the inability of individuals with autism to relate to others (M. Coleman, 1985), to "read" the social cues
emitted by normal speakers (Schroeder & Dalrymple, 1992), and to recognize or understand the thoughts and feelings of their peers or communicative partners (Baron-Cohen, 1988). Tsai and Scott-Miller (1988) noted that individuals with autism demonstrate a restricted repertoire of interests and activities, absent or impaired ability to imitate and learn from observing others, and impaired ability to make and maintain peer friendships. These characteristics represent major impediments to social integration for members of this population (Frith, 1989; Sacks, 1995).

Other Salient Characteristics of Autism

Other characteristics that affect some, but not all, members of this population include cognitive impairments, unusual responses to sensory stimuli, and behaviors that may range from passive and withdrawn to disruptive and self-abusive (Dunlap et al., 1979). Some individuals with autism display unusual mobility patterns including excessive activity levels, immobility, toe walking, or ritualistic mannerisms, such as twirling, rocking, or spinning themselves or objects (Ritvo & Freeman, 1978; Rutter, 1985).

In addition to the characteristics already described, Prizant (1989) suggested that individuals with autism may learn through a form of gestalt processing; that is, they tend to take in whole units of information and then to reproduce those units at a later time without processing or analyzing them. This method greatly limits the flexibility and the ability of the learner to adapt to new situations (Prizant, 1989). Prizant and Schuler (1987) observed that persons with autism tend to show
strengths in the areas of "rote memory for both visual and auditory information, . . . visual-spatial judgment, and pattern recognition" (p. 292). They also noted that learners with autism tend to be most successful at tasks that involve nontransient or spatial information. In such tasks the material, including objects, pictures, or printed materials, remains available for the learner to examine as often as necessary. Students with autism tend to have more difficulty with materials of a temporal nature or materials which are seen or heard briefly and then fade away, for example, verbal directions or information presented during a lecture. Some of these deficits respond to remediation and many of them change in nature over a period of time; however, basic impairments remain in the areas of social and communicative skills.

Several additional characteristics of students with autism are of concern and interest to educators. Valcante (1985) described echolalia, stimulus overselectivity, and the inability to imitate, or benefit from observational learning, as characteristics that are likely to have a major impact on the education of an individual with autism.

**Echolalia**

Echolalia, studied extensively by Prizant and others (Prizant, 1982, 1983; Prizant & Duchan, 1981; Prizant & Rydell, 1984) refers to the literal repetition of words or combinations of words spoken by another individual. Echolalia may be an immediate repetition of what is heard, a repetition of an utterance heard in the past, or a mitigated repetition—one that is modified, usually in a way that makes it more linguistically appropriate, as it is repeated. Initially considered to be an inappropriate and
useless aspect of autistic language (Kanner, 1943), echolalia was treated as a hindrance to the communicative process and something to be eliminated. Studies by Prizant and Duchan (1981) and Prizant and Rydell (1984) revealed that, in fact, echolalia did have a number of communicative functions and attempts to eliminate it have since been replaced by attempts to further understand the purposes it serves for individuals.

Frith (1989) suggested that the use of echolalia by individuals with autism may signal a lack of comprehension in communicative situations. It may be an attempt to maintain a conversation or participate in a social situation which the individual does not understand.

Prizant and Duchan (1981) and Prizant and Rydell (1984) videotaped the interactions of students with autism and familiar adults. In the first study, the descriptive analysis of these videotapes yielded seven functional categories or types of echolalia used by their subjects. In the second study, Prizant and Rydell (1984) analyzed the delayed, echolalic utterances of their subjects for both structure and function and described 14 different functions or purposes for which their subjects used echolalia. Among these functions were turn-taking, labeling, affirmation, requesting, and noninteractive types of self-regulation, rehearsal, and jargon. Both studies included only a total of 7 subjects, but suggested that, at least in some cases, echolalia may serve specific communicative purposes.

A second reason for professional interest in echolalia is the possibility that echolalia is a positive indicator of future language development. Baltaxe and Simmons (1977) and Prizant (1982) suggested that those individuals with autism who progress through the various stages
of echolalia tend to develop more functional communication skills than those who continue to use only immediate echolalia or never develop enough language to become echolalic at all. Further, individuals who move from delayed echolalia to a basic form of analytic speech show some flexibility in their ability to process language, not as a whole to simply be repeated, but as units of meaning (Prizant & Schuler, 1987). Echolalia is a concern and of interest because, while it may interfere with communication, it may also be a key to understanding the language of individuals with autism.

**Stimulus Overselectivity**

Stimulus overselectivity, described by Lovaas (as cited in Cook, Anderson, & Rincover, 1982), refers to the tendency of an individual to respond to only a small part of a complex object or situation. This tendency interferes with a student's ability to see "the big picture," to grasp the complex concepts being taught in a classroom, or to understand a social situation. In learning situations which require manipulating more than one set of facts and seeing relationships between the sets, students with autism have a great deal of difficulty.

Autistic people have a great deal of difficulty generalizing learning from one situation to another. They become readily dependent upon cues which were available when the behavior was originally learned. Changing the context . . . leads to changes in the cues available. (Watson et al., 1989, p. 15)

Students who remain perseveratively focused on only one aspect of a learning situation or object have difficulty shifting their focus to new situations which are part of the ongoing learning experiences in most
classrooms. They may also have difficulty acquiring new learning if they do not see the relationship between concepts (Frith, 1989). Frith also suggested that individuals with autism have difficulty determining which aspects of the environment require their attention because they lack the drive for central coherence; that is, they do not have a need to nor do they understand the importance of generalizing across situations. If this were the case, and it is only one of a number of theories at this time, individuals with autism might very well have difficulty sorting relevant information from the vast amount of stimulation that occurs in a general education classroom. Students who could not cope with the multiple facets of a social situation would have difficulty interacting successfully with others.

In a study by Rincover and Koegel (1975) children with autism were taught to respond to a number of verbal commands given by an adult. When a second adult repeated those commands in another setting, 4 of the 10 students did not follow the same directions. Some of the students were more successful when the second adult also used the same gestures that the first adult used while giving the directions.

Koegel, Rincover, and Egel (1982) reported numerous examples of students with autism who displayed an inability to recognize familiar people or objects when one characteristic was changed; for example, one child was unable to recognize his parent when his father removed his glasses. Other students have been reported able to perform academic tasks successfully only when the teacher wore the same clothing or performed the same gestures that were noticed by the child during the initial training session (Rincover & Koegel, 1975). Although all children
pass through this developmental stage as they develop object permanence (Piaget, 1965), individuals with autism may remain at this level and may not develop the ability to generalize.

**Imitation and Observational Learning**

A third question which is of interest to educators is whether or not students with autism can imitate the behaviors of others and, in turn, benefit from observational learning. One of the arguments most frequently put forward for including students with autism in general education classrooms is that normal peers will provide role models for these special needs students (Biklen, 1992; S. Stainback & Stainback, 1988; W. Stainback & Stainback, 1984). Koegel, Egel, and Dunlap (1980) suggested that the ability to learn from observation was probably a prerequisite for the successful integration of students with autism into general education classrooms.

The question of whether students with autism learn by imitating and observing others is really a two-part question: Are they motivated to do so and are they able to do so (Prizant & Schuler, 1987)? Investigators have examined the subject of observational learning in a number of ways.

Based primarily upon personal observations, Park (1982) attributed the lack of imitative behavior observed in her autistic daughter to a lack of motivation and believed that social responses and attention from others were not sufficiently motivating to encourage individuals with autism to imitate others even when they could perform a task. Additional clinical observations by Rutter (1978), DeVilliers and DeVilliers (1987),
and Koegel and Johnson (1989) supported Park's (1982) perception that individuals with autism generally do not imitate the behaviors of others solely for the social reinforcement offered by such behaviors.

Wetherby and Prutting (1984) observed that children with autism appeared to be most successful in learning through trial and error and problem-solving approaches; they were least successful when left to learn through observational learning.

Ihrig and Wolchik (1984) compared the effectiveness of one adult model and one peer model in teaching four boys with autism to give predetermined answers to a set of questions. The subjects, who ranged in age from 95 months to 124 months of age, were considered to be relatively high-functioning based upon their ability to imitate some simple verbal and nonverbal behaviors and their second and third grade-level mathematics skills. All of the subjects were exposed to both models and were randomly assigned to either the adult or the peer model for their first trial. They were reinforced if they repeated the exact response, without prompting, made by the model in each condition. While the researchers found that the subjects imitated both the peer and the adult and that maintenance probes revealed they continued to retain the learned responses, it should be noted that the task was simply to repeat a specific sentence in response to a specific question and that food was used in addition to social reinforcement to reward desired behavior. The researchers questioned whether functional skills could be taught using this method.

Varni, Lovaas, Koegel, and Everett (1979) compared the behavior of 15 children with autism (mean CA = 120 months, range: 60-192
months) to 15 normal children (mean CA = 36 months, range: 12-72 months). The normal children were selected in this age range in order to provide samples of behavior within the learning paradigm established by the researchers. A model performed a preplanned action in response to a direction from the second adult in the experimental situation. After 20 observational trials, the child was given one trial.

There was a direct relationship between the chronological age of the normal children and their ability to perform the tasks; however, there was no such relationship among the children with autism. The results seem to support previous findings that children with autism do not learn by observational learning alone. The researchers also suggested that the responses of the students with autism might be related to problems with overselectivity.

Charlop and Walsh (1986) assessed the efficacy of two procedures to increase the spontaneous affection shown by four boys with autism. Two of the boys, CA = 72 months, MA = 52 months, and CA = 95 months, MA = 74 months, were selected as models for the other two (the learners: CA = 105 months, MA = 43 months and CA = 102 months, MA = 48 months) and were exposed to a time delay procedure in which either the experimenter or the mothers of the boys modeled the phrase "I like you" after a hug. When they reached criterion, repeating the phrase spontaneously two consecutive times with a less than 10-second delay, the boys then served as peer models for the other two subjects. The learners were instructed to watch as the experimenter and the peer modeled the behavior. They were then given the opportunity to respond to the same stimulus. Neither of the learners assimilated the
target behavior during the observation sessions, although both eventually acquired the behavior during subsequent time delay sessions in which the social response was taught in a one-to-one situation.

While it appeared that peer modeling was not effective in this study, it should be noted that the peer models were also students with autism who had recently acquired the target behaviors themselves and who were still reinforced with edibles during the modeling procedures.

In a related study, Strain (1983) trained a peer to involve four boys with autism, ages 7, 8, 9, and 10 years, in play activities during a training session. After the session, the boys were randomly exposed to free-play sessions either with normal peers (integrated group) or with other students with autism (segregated group). All of the boys increased their positive responses to social initiations from peers in the integrated group following the training session with the normal peer, but the rate of interaction with the segregated group remained close to zero. Although some of the differences in the social responses of the students with autism to the integrated versus the segregated group can be attributed to the greater number of social contacts initiated by the normal peers versus the peers with autism, it may also be that the responses of the four subjects encouraged their normal peers to initiate contacts in the first place. Although far from conclusive, the results of this study suggested that students with autism can benefit from and respond to social contacts with normal peers.

One of the few studies to investigate whether communication skills can be taught by modeling appropriate verbal responses was conducted by Beisler and Tsai (1983). The subjects were 5 male
subjects between the ages of 36 and 68 months. All but one of the subjects scored within the normal range of intelligence and all were enrolled in a residential treatment program. Clinicians modeled appropriate conversational behavior and responses while discussing topics of interest to the subjects. The subjects were reinforced for appropriate comments when the clinicians responded to their communicative intent. All of the subjects showed gains in the length of their utterances and in the number of semantic-syntactic rules they employed; all but one showed improved receptive language abilities.

This study was limited by a number of factors. There was no control group and all but one of the subjects had normal intelligence, which placed them in the top 20% of the autistic population. Further, the subjects were all in a residential treatment environment. The limited number of adults present and the institutional structure of the environment may have contributed to a greater degree of consistency in the communicative patterns to which the students were exposed than would a noninstitutional environment. Nevertheless, the investigators believe that, on the basis of this preliminary study, at least some individuals with autism may learn from being exposed to appropriate language patterns and by being reinforced by natural consequences. Further studies of this nature should certainly include students with autism who are also mentally impaired as well as students who do not live in residential settings.

Educational Programs for Students With Autism

Programs and approaches for educating students with autism have
evolved through several definitional and programmatic stages since Kanner (1943) first identified the syndrome. As investigators have tried to explain the etiology of autism, treatment models or approaches have been developed based upon each new theory (Ritvo, 1976; Schopler & Mesibov, 1986; Schreibman, 1988).

Prior to 1970, etiological theories of autism were psychoanalytically- and, to some extent, medically-based (Bettleheim, 1967). A variety of treatment programs, including the use of psychoanalysis, electroshock, and psychotropic drugs were in vogue (Ritvo, 1976). The symptoms of autism were viewed as being similar to those of schizophrenic withdrawal and individuals with autism were treated in institutions and treatment centers (Schopler & Mesibov, 1986). Some therapists advocated the removal of autistic children from their parents in order to undo what was felt to be the process of rejection responsible for the child's withdrawal (Bettleheim, 1967).

Following the psychoanalytic period of the 1950s and the 1960s, the field experienced an increased interest in learning theory principles, and the use of operant conditioning methods to modify the behaviors of individuals with autism became the treatment of choice (Ritvo, 1976). During this time, the 1960s and the 1970s, autism was considered to be a syndrome comprising specific behaviors that could be modified. The schedules for doing so were the main focus of attention. The location of the treatment was a secondary aspect of the treatment plan.

In the 1980s, and continuing to the present time, the treatment of persons with autism became an educational and social policy issue (J. Kauffman, 1990). The changes in educational goals and practices
were rapid. In fewer than 25 years, students with autism moved from institutions with few programs or from the isolation of their homes into the public schools. They moved first from segregated buildings to segregated classrooms in general education buildings and, then gradually, in small, but ever increasing numbers, into general education classrooms. Some professionals in the field now believe that all students with severe disabilities, including autism, should be educated in general education classrooms with their nondisabled peers (Biklen, 1985; Lipsky & Gartner, 1992, W. Stainback & Stainback, 1990). Current treatment for persons with autism focuses on teaching functional skills in the classroom and community settings in which the individual will use those skills (Dalrymple, 1989).

Communicative Competence

Communicative competence (Hymes, 1974) describes the relationship between social skills and language skills. It describes the ability of individuals to adjust patterns of language use to facilitate comprehension by specific audiences, to provide an adequate amount of information to meet the needs of each communication partner, and to understand the social rules which govern the exchange of information (Hymes, 1974). Communicative competence is a vehicle for social acceptance. The level of communicative competence exhibited by individuals determines, at least in part, the extent to which those individuals are able to participate in the routines of their community (Garfin & Lord, 1986; Prutting, 1982).

In addition to the expectations that speakers be able to carry on a
conversation, follow the rules of polite behavior, and modify interactions to accommodate conversational partners, the ability to use language to influence the behavior of others is also an important aspect of communicative competence (Gleason & Weintraub, 1978).

By the time they enter school, most children understand the linguistic rules that govern the use of their language, understand the code that defines the language, and understand the ways in which, or the purposes for which, the code may be used. In addition to this linguistic knowledge, students are also expected to understand that there are social rules which govern their use of language. These rules govern behavior during the communicative process as well as the choice of communicative partners. They are also specific to the culture of individual speakers (Cazden, John, & Hymes, 1972).

Silliman and Wilkinson (1991) found that children who are judged communicatively competent know how to participate effectively in a variety of classroom situations. Included among the skills demonstrated by competent students are those of conversational turn-taking, being able to adjust a conversational style both within and across conversational settings, and being able to discriminate between and deal with new, essential, and trivial information appropriately (Balitx, 1977). Both the relevancy and the timing of students' comments are important factors in their successful participation in group lessons (Eder, 1982).

Competence is required for full classroom participation. Students who lack competence may be unsuccessful in their interactions with others, may experience overall decreased adjustment to school, and may be perceived as less able than their more communicatively-competent
peers (Silliman & Wilkinson, 1991; Wilkinson, 1982).

Communicative competence, the knowledge of both the linguistic and the social rules of language, is an essential skill required for successful participation in the classroom as well as in one's cultural group. It is not enough for students to be able to produce well-articulated, syntactically correct utterances. They must also be able to adjust their responses so that they are appropriate to the context in which they occur and to communicate in an interactive manner (DeStefano, 1984).

Investigations of Communication Skills in Autism

A lack of communicative competence is one of the definitive characteristics of individuals with autism (Simmons & Baltaxe, 1975). Those who do speak usually show serious delays in the acquisition of speech and language (Stone & LaGreca, 1986; Swisher & Demetras, 1985), may be echolalic (Kanner, 1943; Prizant, 1989), and usually demonstrate serious problems with language comprehension (Rutter, 1985). Many also show reversals of pronouns (you/I), unusual patterns of intonation, and literalness of meaning (Fay, 1988; Kanner, 1943; Rutter, 1985). Wing and Attwood (1987) summarized the communication problems of persons with autism by concluding that speech and language are only tools by which these individuals try to have their needs met or through which they pursue their own, often idiosyncratic interests. Most individuals with autism do not use speech and language for purposes of social interaction. They have "particular difficulty using language in relation to the context of discourse" (Landry & Loveland, 1989, p. 283).
Much of the early literature on the linguistic functioning of individuals with autism was anecdotal and focused primarily on the structural aspects of language, specifically, the phonological and syntactic processes employed by this population (Tager-Flusberg, 1981). Those studies that were of an empirical nature were often beset by methodological problems, including differences in diagnostic criteria and subject selection, failures to control for developmental ages or levels, and differences in the methods used to assess linguistic functioning (Tager-Flusberg, 1981). Nevertheless, these studies, when combined with clinical observations and anecdotal records, added to the body of knowledge concerning the linguistic skills of this population.

**Structural Aspects of Language**

Studies of language development in both normal and deviant populations focused initially on the structural aspects of language. The structural components of language refer to the mechanical skills of communication or the form of utterances and include phonological and syntactic skills.

**Phonological Skills**

Phonology refers to the production of individual speech sounds. Bertolucci, Pierce, Streiner, and Eppel (1976) compared the phonemic development of 10 subjects with autism and 10 subjects with mental impairments matched on the basis of nonverbal mental age. Although the autistic subjects were older ($M = 148$ months, $SD = 17$ months) than the mentally impaired subjects ($M = 139$ months, $SD = 42$...
months), when the subjects were asked to name pictures of familiar objects, the pattern of phonemic use demonstrated by the subjects with autism was very similar to that of the individuals with mental impairments. Both groups showed patterns of phonemic development that were delayed, but which were being acquired according to normal developmental sequences.

Tager-Flusberg's (1981) study also supported the observation that phonemic development in individuals with autism followed a normal, albeit delayed, course of development and that deviant patterns of phonemic development were not part of the autistic syndrome.

**Syntactic Skills**

Syntax refers to the rules which govern word order. The limited number of studies that have examined the development of syntax in individuals with autism seem to support a hypothesis of delayed, but not disordered, development. Pierce and Bartolucci (1977) studied 10 students with autism, 10 students with mental impairments, and 10 non-disabled students matched on the basis of their nonlinguistic mental age on the Arthur Adaptation of the Leiter International Performance Scale. Students with mental impairments and nondisabled students with nonlinguistic mental ages of approximately 6 years were selected to match the average nonlinguistic mental age of the students with autism. This selection process did not provide for the random selection of subjects and resulted in a group of students with autism (CA: $M = 128$ months, $SD = 27$ months) and a group of students with mental impairments (CA: $M = 125$ months, $SD = 34$ months), being compared to a group...
of younger children without disabilities (CA: $M = 75$ months, $SD = 3$ months). This age difference illustrates one of the difficulties inherent in studies that attempt to compare students with autism to other student populations. Given the interindividual as well as the intraindividual differences demonstrated by individuals with autism, it is difficult to match subjects on a number of relevant variables. As a result, investigators who match subjects on one or two variables may find that the subjects are very different in terms of other, relevant variables, in this case, age and, possibly, life experiences.

Pierce and Bartolucci (1977) analyzed spontaneous language samples of 50 sentences for both the grammatical forms and the transformational rules used by the subjects. They found that, while the students with autism showed greater delays in syntax than either of the other two groups, their use of the syntactic rules they had acquired followed the developmental patterns of the other two groups.

These results were validated by Tager-Flusberg (1981), Volkmar (1987), and Layton (1987) who observed that, among individuals with autism who spoke, the use of the structured rules of speech and language was not a primary deficit; rather, failure to use language for purposes of social communication was the primary problem.

**Social Aspects of Language**

The focus of investigators studying language problems in autism has gradually shifted toward a more global investigation of communication problems or the social aspects of language. The social aspects of language refer to those components that have to do with meaning and
the use of language in specific contexts in interactive ways. They include semantic skills and pragmatic skills.

**Semantic Skills**

Semantics, as used in studies of language, refers to "the ability to understand and create meaning" (Frith, 1989, p. 120). Fay and Schuler (1980) hypothesized that individuals with autism could not organize an underlying conceptual system because of basic semantic deficits. This has been a difficult concept to explore because studies have been unable to show whether persons with autism truly do not understand meaning or whether they are unable to use the material once they acquire the meanings. Tager-Flusberg (1985), designed two related studies to examine the semantic abilities of children with autism in which she studied three groups of individuals. Fourteen subjects in each of three groups, individuals with autism, individuals with mental impairment, and normal individuals, were matched on the basis of verbal mental age as measured by the Peabody Picture Vocabulary Test-Revised, Form L (PPVT-R, L). The two groups of subjects with autism and mental impairment were also matched on age and verbal IQ. These two groups were chronologically older, with mean ages of 125 months, \( \text{SD} = 36 \) months), and 132 months \( \text{SD} = 39 \) months), respectively, than the group of normal subjects whose mean age was 55 months \( \text{SD} = 8 \) months). The average nonverbal mental age of the subjects with autism \( \text{MA} = 114 \) months, \( \text{SD} = 36 \) months) was higher than that of the nondisabled group \( \text{MA} = 66 \) months, \( \text{SD} = 14 \) months) (Tager-Flusberg, 1985). All of the subjects were asked to demonstrate their
understanding of word meanings by indicating whether a picture did or
did not belong to a specific category. Results indicated that there were
no significant differences between the responses of the subjects with
autism and the other subjects. The fact that there were great differences
in the chronological ages of the subjects with autism and the normal
subjects would seem to support the belief that the semantic skills of
individuals with autism are certainly delayed, if not disordered. However,
this study only asked the subjects to answer the question, "Is this a
[one of the four category headings]?" A "yes" or "no" answer did not provide enough information, in this case, to analyze
where the breakdown in semantic skills occurred.

The second study, involving the same subjects and different pic­
tures and category words, required the subjects to "please give me all
the pictures of a _____" (Tager-Flusberg, 1985, p. 1173). Results
again showed that the responses of the three groups were similar. The
disparity in the nonverbal mental ages between the subjects with autism
and the other subjects again seemed to support the suggestion that
semantic skills were delayed, but not disordered in individuals with
autism.

While both of these studies attempted to investigate the semantic
abilities of students with autism, they actually examined only one aspect
of this language skill--the ability of the subjects to recognize the meaning
of a limited number of words which were spoken by someone else. Both
of these studies used picture stimuli, which were of a spatial or con­
tcrete, not a temporal nature, and, therefore, available for the subjects to
look at for a period of time. In real conversations, spoken words are of a
temporal nature and must be grasped immediately. Studies such as these do not describe what individuals do in their natural environments. Neither can they determine whether the individuals with autism truly do not understand or know the meaning of specific words or if they cannot use their knowledge in novel situations. Further, the tasks required that the subjects know only the meaning of individual words and did not evaluate their ability to make connections or understand relationships between groups. In an earlier paper, Tager-Flusberg (1981) expressed her belief that, while individuals with autism demonstrated basic semantic skills, they were unlikely to use semantic strategies to decode more complex utterances.

Menyuk (1978) addressed this question, basing many of her observations on the language of children with autism upon comparisons of her work on the development of language in normal children with the clinical observations of children with autism made by other investigators. Her observations, and those of Fay and Schuler (1980), suggested that, while students with autism understood the meaning of many words and simple ideas, they were unable to grasp the complex concepts because they could not form basic semantic categories that allow normal individuals to make connections between ideas. According to the reasoning of these investigators, individuals with autism can understand simple, especially concrete ideas, but cannot branch out and see the relationships between ideas. Menyuk and Quill (1985) also found that, while normal children acquired a variety of personal-social terms as part of their early vocabulary, the initial words in the vocabulary of verbal children with autism were usually limited to names of inanimate objects.
Ricks and Wing (1975) suggested that students with autism were severely limited in their semantic ability and could only develop concepts that were based upon perceptual similarity, not upon abstract ideas.

These observations were validated by Simmons and Baltaxe (as cited in Layton, 1987) who examined the language samples of 7 adolescents with autism and found that 4 of the 7 subjects were unable to analyze statements such as "a bachelor is married" (Layton, 1987, p. 11). They cited these problems as evidence of the difficulties with semantic restraints experienced by individuals with autism.

Some students with autism appear to have difficulty using semantic cues or word meaning to recall information (Tager-Flusberg, 1986). Swisher and Demetras (1985) suggested that, until further study was able to determine whether individuals with autism performed poorly in the semantic domain because they did not understand what was said or because they were unable to use their semantic knowledge in a functional way, it was accurate to say that the semantic skills of this population were definitely delayed. Whether their semantic skills were also disordered was less certain.

**Pragmatic Skills**

Although the concept of pragmatic skills has been studied for a number of years, the major focus of investigations of communication disorders in autism has recently shifted toward the ability of individuals with autism to use their communication skills in a functional way in natural environments (Stone & Caro-Martinez, 1990; Watson, 1987). Bates (1974) referred to pragmatics as the study of the appropriate use
of both verbal and nonverbal language in a social context; Keenan (1974) used the term communicative competence to describe the same skills. The concept of communicative competence and its role in a student's success in school has been described in an earlier section of this paper. The characteristics that define this broad, essential area of interpersonal communication include the ability to initiate and maintain a topic of conversation (Bernard-Opitz, 1982; Schuler & Prizant, 1987); to engage in turn-taking behavior (Baltaxe, 1977; Fay & Schuler, 1980); and to demonstrate appropriate eye gaze, body position, and use of gestures and facial expression (Schuler & Prizant, 1987). Additional pragmatic skills required of a speaker include the abilities to consider a conversational partner's point of view, to respond to the nonverbal social cues emitted by such a partner (Baron-Cohen, 1988; Prutting, 1982) and to contribute only relevant and essential information to the communicative exchange (Baltaxe, 1977; Bates, 1976). Indeed, the range of characteristics that define the area of pragmatics is similar to the list of deficits that defines the area of social-communicative problems in persons with autism. Pragmatic deficits in persons with autism are often quite obvious and may become more obvious as a child becomes older (Baltaxe, 1977).

Baltaxe (1977) analyzed the discourse of 5 autistic adolescents with normal intelligence quotients in an informal conversational situation with an interviewer. Her analysis revealed that autistic speakers often failed to switch from the role of listener to that of the speaker in a conversation, that they were often unintentionally rude because they did not understand the rules of acceptability in conversational exchanges,
and they failed to provide appropriate information on a topic because of their inability to determine or understand what their listener already knew. All three of these skill areas represent qualities that are important in the development of communicative competence. Students with autism whose conversation sounds stilted or appears to violate the relevancy requirements of discourse because they cannot adjust to the turn-taking pattern of dialogue will be considered less competent than their non-disabled peers. Students who do not understand the rules governing social exchanges in particular contexts are often considered rude or incompetent. In all of these areas, lack of essential skills results in less communicative competency and may negatively affect a student's chances for success in the classroom.

Bernard-Opitz (1982) studied the communicative behavior of an 8-year-old boy with autism in three environments which differed according to the adults who were present and in the ways in which the adults interacted with the subject. Her results showed that the subject produced a greater number of utterances when in the presence of his mother and his speech clinician, both familiar adults, than he did in the presence of a stranger. The subject also produced more utterances in the presence of both his mother and the stranger when the adults initiated interactions than he did when the adults simply responded to his communicative attempts. While this study was limited by the fact that it involved only one subject, it was of interest to the current discussion because it demonstrated that this subject with autism was able to adjust his utterances according to both the individuals who were present and the social context. It was also important because it refocused the
investigation of the use of language by individuals with autism from examinations of syntactic and semantic skills to the functional use of language by this population. It suggested that one of the directions future research should take was the identification of social contexts or environments that were most facilitative of the development of pragmatic skills in speakers with autism.

Wetherby and Prutting (1984) compared the communicative functions demonstrated by 4 children without disabilities and 4 children with autism in both an unstructured play situation and in a communicative interaction with an investigator. Subjects were matched according to stages of language development, which ranged from the prelinguistic stage with no referential speech to the ability to use more than 50 words and 2-3 word combinations. The 4 students with autism ranged in age from 83 months to 142 months (M = 114 months; SD = not given). The normal subjects ranged in age from 12 months to 26 months (M = 19 months; SD = not given). Whereas the normal subjects showed communicative functions that were consistent with their chronological age, the 4 subjects with autism did not, showing instead a high frequency of requests for objects and action as well as frequent protests, but few attempts at interactive communication. None of the 4 subjects with autism was observed to request information, acknowledge others, or simply comment.

These results seem to lend support for the argument that students with autism demonstrate language development patterns that are disordered, not just delayed. They also suggest a lack of communicative competence in individuals with autism.
Stone and Caro-Martinez (1990) compared the developmental levels and the severity of autistic symptoms demonstrated by 30 students with autism with the spontaneous communication samples they produced in unstructured activities during the school day. These activities included lunch, leisure time in classrooms, and periods while the students were in hallways or moving from one location to another and had the opportunity to interact with peers. The investigators included in the data analysis only "communication that was initiated by the child" (p. 442) and excluded the subjects' responses to questions. Utterances were transcribed verbatim by observers who also noted the forms of communication (verbal or nonverbal), the purpose of each initiation, and the target of the communicator. In order to ensure the collection of at least 50 utterances, all subjects were observed for at least 2 hours, although the observation time had to be extended for some subjects in order to gather a more adequate sample. Instances of spontaneous communication among the subjects were relatively rare and ranged from 0 to 34 utterances ($M = 8.9$, $SD = 8.9$) over a period of 2-3 hours.

When the level of each subject's developmental abilities and the severity of autistic symptoms were compared to his or her communicative performance, a relationship was found between the developmental variables and the communicative functions. Subjects with more severe autistic symptomology were more likely to use nonsymbolic forms of communication and less likely to use speech; when they did speak, they were more likely to engage in social routines and to make requests or to protest. Subjects with less severe cognitive deficits and less severe autistic characteristics were more likely to address a variety of peers and
adults and to use speech for the more advanced functions of giving and seeking information and commenting.

In light of observations that all individuals with autism demonstrate some deficits in the area of pragmatic skills and that pragmatic skills and abilities play an integral part in determining an individual's success in social-communicative contexts/situations, it would appear that pragmatic deficits represent a major barrier to the integration and success of students with autism in general education classrooms.

Studies of the speech and language skills of verbal individuals with autism show that, although many of them develop the linguistic skills required to produce intelligible, structurally sound utterances, they continue to demonstrate the semantic and pragmatic deficits which interfere with communication in social contexts. Their communication is quite literal and fails to utilize the social rules that govern the use of language and define a speaker as communicatively competent. This discrepancy between the structural and the social aspects of language appears to be the rule rather than the exception (Frith, 1989; Mirenda & Schuler, 1988; Prizant, 1983).

Summary

Autism is a severe developmental disability which is usually diagnosed before a child is 3 years of age. While the symptoms vary greatly, both intra- and interindividually, all individuals with autism demonstrate deficits in the areas of interactive social skills and communicative ability. Many of the characteristics of autism may be ameliorated over time; however, communication problems in the areas of
semantic and pragmatic skills and social deficits in the areas of interactive abilities appear to be lifelong and represent significant barriers to the development of communicative competence for persons with autism.

Being communicatively competent, that is, demonstrating the ability to use language appropriately both linguistically and socially, is one of the means by which individuals gain acceptance into their peer group. Successful participation in a classroom, as well as in social activities, requires that an individual be able to initiate and maintain communicative contacts with others, modify or repair conversations when necessary, and follow the social rules which govern interactive exchanges. The very semantic and pragmatic deficits which define autism—an inability to understand meaning or to generalize meaning from one situation to another, an inability to understand another’s point of view or to pick up subtle social cues, or an inability to internalize the rules which govern social interactive behavior are those which also define a lack of communicative competence. For students with autism who do develop communication skills, the process of developing communicative competence is not an automatic one, but a deliberate, difficult, and ongoing procedure.

Mainstreaming

Introduction

Since the passage of Public Law (PL) 94-142 (Education for All Handicapped Children Act, 1975), with its requirement that children with disabilities be educated in the least restrictive environment, increased attention has been paid and greater efforts have been made to educate
all children with disabilities. Although initially many students with severe disabilities were just moved out of large institutions into smaller self-contained, or segregated facilities or schools, more recent efforts have been directed toward including students with severe disabilities in the public schools. Most recently, efforts have shifted toward educating all students with special needs in regular education classrooms (Shanker, 1994). This movement has been referred to by a variety of names, including mainstreaming and inclusive education, and describes the practice of placing students from special education classes into general education classes on either a part-time or a full-time basis.

The History of Special Education

As educational plans and treatment approaches have changed for students with autism, so, too, has the educational system for all students with disabilities. Both the general and special education systems have evolved to meet changing needs and differing philosophies, with the current trend moving toward merging the two systems. This section, however, considers evolution within special education before the merger is addressed.

In the early 1900s, students with mild disabilities either attended classes with their normal peers and learned as best they could, or they remained at home. Living in an institution or remaining at home were the options available to students with more severe disabilities. The only students for whom some type of special program was available were students with visual or hearing impairments. They sometimes attended boarding schools or state institutions established especially for their
training (Hardman, Drew, Egan, & Wolf, 1993).

Separate schools, especially for students with mild emotional or behavior problems or physical disabilities, increased in number during the midpoint of the century. Separate, special education classes in the public schools for mildly mentally impaired and emotionally disturbed students increased in number in the late 1950s and were the impetus for several early studies which examined the efficacy of special classes for mildly mentally impaired students (Polloway, 1984). These classes continued to proliferate in the 1960s and, gradually, programs for more severely disabled students were also developed in private or segregated facilities (Polloway, 1984).

At the same time, the federal government began to provide support for programs to train teachers of students with disabilities and the next two decades saw a proliferation of both special programs in the public schools for students with disabilities and additional efficacy studies. Carlberg and Kavale (1980) and Madden and Slavin (1983) reviewed a number of these studies, to be discussed later, and found the results to be inconclusive. There was no body of evidence that conclusively favored one type of placement over the other.

Even as the number of special education classes in the schools increased, mandated by legislation such as Public Law (PL) 94-142, the Education for All Handicapped Children Act (EHA, 1975)), and encouraged by parent groups such as the Association for Retarded Children (ARC), and some educators (Brown et al., 1989), children with more severe disabilities moved from their special, but segregated, school buildings into special education classrooms in the public schools (Biklen,
Increased attention was refocused on the Least Restrictive Environment (LRE) provision of PL 94-142 (Education for All, 1975), which required that

to the maximum extent appropriate, handicapped children, including children in public and private institutions or other care facilities, are educated with children who are not handicapped and that special classes, separate schooling, or the removal of handicapped children from the regular education environment occurs only when the nature or severity of the handicap is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily. (sec. 612, 5, B, p. 125)

The initial movement that advocated the return of students with mild disabilities to the general education system, at least for part of their educational experience, gained additional momentum and support in the 1990s, especially from some educators in higher education positions who advocated the placement of all students into the general education system (Gartner & Lipsky, 1987; Sailor, 1989; S. Stainback et al., 1989).

The original impetus for the mainstreaming movement came not from empirical studies which showed placement in general education classrooms to be conclusively more effective than placement in segregated, special education classes, but from societal forces which reflected the sociopolitical climate of the 1960s and 1970s (Altman & Meyen, 1975; Keogh & Levitt, 1976). Those who questioned the appropriateness of special classes for learners with mild impairments (Dunn, 1968), and, later, Reynolds et al. (1987) and Will (1986) argued that a dual system of education was both ineffective and inefficient. W. Stainback and Stainback (1984) and Reynolds (1989) viewed classes for students
with mild mental retardation, learning disabilities, and emotional impairments as stigmatizing, isolating, and excessively costly and as providing no advantage over regular class placement. They proposed that students with mild impairments be returned to regular education classroom to be educated with their nondisabled peers and urged increased cooperation between general and special education (Reynolds et al., 1987). They also called for a reform movement which would be supported by empirical data (Wang, Reubenstein, & Reynolds, 1985).

During the initial period of debate, advocates for students with more severe impairments (Biklen, 1985; W. Stainback & Stainback, 1984) supported the return of these students to special education classrooms in their neighborhood schools (Fuchs & Fuchs, 1994). As students with mild disabilities were returned to general education classrooms, advocates for the more severely impaired then urged the inclusion of all students, even those with the most severe disabilities, in general education classrooms (Biklen, 1985; Lipsky & Gartner, 1989).

**Terminology**

In the history of special education, a number of terms have been used to describe the practice of educating students with disabilities in general education classrooms with their nondisabled peers. The Regular Education Initiative (RED) (Will, 1986), as a term and concept has been the almost exclusive property of special educators, who have used it to refer to the merger of special and general education services and to the education of all students in general education classrooms (Lieberman, 1992; York et al., 1992). However, the terms mainstreaming and
inclusion, or inclusive education, have also been used to describe a number of variations in this concept.

M. J. Kaufman, Gottlieb, Agard, and Kukic (1975) defined the concept of mainstreaming as the "temporal, instructional, and social integration of eligible exceptional children with normal peers based on an ongoing, individually determined educational planning and programming process and regular clarification of responsibility among regular and special education administrative, instructional, and support personnel" (p. 2). Gottlieb, Alter, and Gottlieb (1990) defined the concept of mainstreaming as "the process of developing a special education instructional program for academic or social purposes (or both) designed to accommodate a handicapped youngster in a regular education classroom for some part of the school day" (p. 96). Shore (1986) maintained that mainstreaming was not simply placing students with disabilities into regular education classrooms, but required "the provision of appropriate instruction for students who have disabilities in educational settings with the general student population" (p. 88). In actual practice, the term mainstreaming has been applied to practices that range from placing a student with a disability in a general education classroom for an hour a day to placing that student in the general education classroom on a full-time basis. These practices have also tended to emphasize the physical location in which educational services are provided over the attention given to supportive services or curricular adaptations.

Increasingly, the term and the concept of mainstreaming have been replaced by the term inclusion or inclusive education (Biklen, Bogdan, Ferguson, Searl, & Taylor, 1985; York et al., 1992). Although
definitions of inclusion have varied somewhat according to the expectations or purposes of those using it, those who currently seem to be at the forefront of the movement maintain that an inclusive school represents a single system where all students, regardless of ability, are educated in the general education system (Biklen, 1985; Lipsky & Gartner, 1989; W. Stainback & Stainback, 1990). Whichever term is used, the practice of educating students with special needs along with their non-disabled peers, for at least some part of the day, in regular education classrooms has been supported by legal, philosophical, and educational arguments.

**Legal Issues**

Some professionals have argued for placing all students with special needs in general education classrooms on the grounds that such placements were mandated by PL 94-142 and that the term "least restrictive environment" in this law referred to a general education classroom (Bender, 1985). However, Turnbull and Turnbull (1990) stated the belief that the location is secondary to the appropriateness of the educational program. Turnbull (1990) described how the process of litigation has defined the concept of a free, appropriate education.

The landmark case of Brown v Board of Education of Topeka, Kansas in 1954 was notable for two reasons: The U.S. Supreme Court found that segregation of students by race was unconstitutional, and it reaffirmed education as a right, not a privilege. The Court stated, "where the state has undertaken to provide it (education), it is a right which must be made available to all on equal terms" (Brown v Board of
Although the Brown case referred specifically to the educational rights of Black students, 20 years later, the Pennsylvania Association for Retarded Citizens (PARC) filed a class-action suit against the state of Pennsylvania charging that students with mental impairments were being denied their right to a free, public education when they were required to attend private, segregated schools or facilities (PARC v Commonwealth of Pennsylvania, 1972). The Court ruled that Pennsylvania could not deny a free, public education to students with mental impairments. The case of Mills v District of Columbia Board of Education extended this protection to all students with disabilities, including students with severe disabilities.

Section 504 of the Rehabilitation Act of 1973 (as cited in Alper & Ryndak, 1992) stated that "no otherwise qualified handicapped individual in the United States . . . shall solely by reason of his handicap, be excluded from participation in, be denied benefits of . . . any program receiving Federal financial assistance" (p. 376). This act prohibited excluding students with disabilities from public school programs solely on the basis of their disability (Alper & Ryndak, 1992).

In 1975, Congress passed Public Law 94-142, the Education of the Handicapped Act (EHA). In addition to requiring that a free and appropriate education be made available to all school-age students with disabilities in the United States, the law also required that these students be educated in the least restrictive environment. This mandate was interpreted by many educators to mean that students must be placed in general education classrooms. It actually required, however, that
students with disabilities be educated "with their nondisabled peers to the maximum extent appropriate" (Hardman, 1994, p. 2) "unless it has been demonstrated that the student with handicaps cannot benefit from educational services in this setting with the use of supplementary aids and services" (Alper & Ryndak, 1992, p. 376). The amendments to EHA, which renamed the legislation the Individuals With Disabilities Education Act (IDEA) (PL 101-476, 1990), reaffirmed these requirements and added two additional disability categories to be served, autism and traumatic brain injury.

The case of Daniel R. R. v El Paso (1989) addressed the question of educational benefits from a specific educational placement and suggested that, for some students with severe disabilities, a general education classroom might not be the least restrictive environment. Turnbull (as cited in Vergason & Anderegg, 1992) also noted that the least restrictive environment should be defined by the appropriateness of the instruction offered in a particular setting rather than simply by the presence of nondisabled peers.

In summary, litigation and legislation have established the right of children with disabilities to receive a free, appropriate, public education. It has not, however, established that a general education classroom must be the site where those services are provided.

Philosophical Issues

Many of the strongest advocates for including all students in general education classrooms approach the topic from a philosophical rather than from an analytic or empirical position (Biklen, 1985; Davis,
They have argued that it is not an issue to be settled by empirical investigation, but a question of values; it is the right thing to do (Alper & Ryndak, 1992; Biklen, 1985). S. Stainback and Stainback (1985) stated: "The decision to integrate should not be based primarily on the research evidence regarding the possible benefits. Instead, we should recognize that whether or not to integrate is a moral issue, not a 'scientific' issue regarding benefits" (p. 16). They viewed the role of research as a support in determining the most appropriate methodology for teaching specific students. Gaylord-Ross and Peck (1985) suggested that empirical research be directed toward determining how best to achieve integration. Higgins (1990) and Safford and Rosen (1981) also supported mainstreaming on the basis of moral and social arguments. According to McLeskey, Skiba, and Wilcox (1990), "At a most basic level . . . values precede data in most of society's policy decisions. Data can be used to evaluate progress toward the goals established by values, but data cannot alter the value itself" (p. 322).

On the other side of this increasingly divisive issue are those who feel that educators should make changes in the system only after data have been gathered to support such changes (Algozzine, Maheady, Sacca, O'Shea, & O'Shea, 1990; Jenkins, Pious, & Peterson, 1988; Reynolds, 1988). McKinney and Hocutt (1988) warned against trying to marshall support for a particular course of action instead of using reason and empirical evidence to choose the best option among several. Martin (1992) agreed, pointing out the lack of empirical data to favor one type of educational placement over the other. He advocated for "educational
policy based on effectiveness, not on philosophically desirable ends" (p. 15).

Nevertheless, strongly-held beliefs on both sides of the issue, coupled with little definitive empirical evidence continue to polarize educators over this issue of where and how to educate students with disabilities. Among the arguments on each side of the issue are the following:

Arguments for Including All Students

Much of the support for including all students with disabilities in general education classes in the public schools has been based on the principles of normalization and partial participation, as well as a policy of zero-rejection (Alper & Ryndak, 1992). Normalization describes the belief that individuals with disabilities should have access to all community services and facilities available to individuals without disabilities (Nirje, as cited in S. Stainback & Stainback, 1985). The principle of partial participation asserts that individuals whose disabilities limit full participation are, nevertheless, capable of acquiring skills and benefits in a normal environment (Baumgart et al., 1982). The zero-reject policy holds that no student, regardless of disability, should be excluded from the public schools. Under this policy, Brown et al. (1989) urged that all students, including students with severe disabilities, be educated in their neighborhood schools, while others advocated the abolition of segregated special education programs and the inclusion of all students in general education classrooms (Biklen, 1985; Lipsky & Gartner, 1989; S. Stainback & Stainback, 1985).
Advocates of inclusion have cited many reasons why special education should be abolished as well as numerous benefits to be gained by educating all students in general education classrooms. Among the disadvantages of a dual system, Reynolds et al., (1987) noted excessive proceduralism, which consumed too much time and money in efforts to classify or label students. Lilly (1986), Reynolds and Wang (1983), and W. Stainback and Stainback (1984) further argued that the special education system was dysfunctional and ineffective and promoted competition instead of cooperation among educators.

Among the benefits of an inclusive program of education most often cited were opportunities for students with and without disabilities to meet and develop friendships with one another as nondisabled students developed tolerance and understanding of their disabled peers. Students with disabilities would have opportunities to learn appropriate social interaction and communicative skills in the presence of normal role models (Sailor & Haring, 1977; York et al., 1992). While W. Stainback and Stainback (1984) saw value in the special education system, they felt it had reached its major goal, that of making a free, appropriate, public education available to all students with disabilities. They believed the time had come for special education to merge with general education so that all students received an education as an "inherent right," not as a special provision (in a special, or separate, place).

Although many of the early arguments were made on behalf of students with mild disabilities, some advocates for students with severe disabilities, including autism, have presented these same arguments for the inclusion of all students with disabilities. Brown et al. (1989) argued
that if nondisabled peers did not interact with and learn to know students with disabilities, they would develop negative attitudes toward them. They further argued that students with disabilities needed integrated educational settings to practice the skills they did have as well as to learn new skills in functional environments, or environments in which they would be most likely to use them. Gilhool (1989) viewed inclusive education as the means to achieving equal status in society for all individuals with disabilities.

Arguments Against Including All Students

On the other side of the issue, some educators, although not rejecting the concepts of mainstreaming and inclusion outright, have advocated a more cautious approach. Most of these professionals (Algozzine et al., 1990; Jenkins et al., 1988; Reynolds, 1988) supported the concept of including students with mild disabilities in general education programs. The differences in philosophy were primarily centered around (a) this group's arguments for seeking empirical data before abandoning the special education system, and (b) their specific concerns that not all students would be best served by the general education system (Fuchs & Fuchs, 1994; Gerber, 1988; Westby, Watson, & Murphy, 1994). Nesbit (1994) and J. Kauffman (1990) urged moderation and questioned whether a "one size fits all" philosophy could be applied to either inclusive plans or special education programs for all students with disabilities.

Jenkins, Pious, and Jewell (1990) maintained that mainstreaming or inclusive education was not a well-defined blueprint, but an impetus
to encourage educators to focus on the most efficacious ways to provide service for students with disabilities. Burton and Hirschoren (1979) urged that to provide a successful educational experience for the severely impaired population, educators must "systematically and empirically develop a knowledge base for direction in programming" (p. 599). Mesinger (1985) urged waiting until the field of education had the knowledge base to provide services that were as good or better than those which were currently available before abandoning the special education system. Davis (1989) agreed, suggesting that general educators were neither ready nor willing to accept the responsibility for educating all students and that adopting a plan to educate all students in general education classrooms too quickly might be detrimental to the academic and social progress of special needs students. While acknowledging that special education policies and practices should always be open to evaluation and change, if necessary, Gerber (1988) also asserted that special education services would be necessary as long as current knowledge and technology could not optimize the educational experience for every child. Both Byrnes (1990) and J. Kauffman (1993) urged that careful analysis of current educational problems and the development of practical and operational perspectives should augment the (thus far) philosophical and theoretical debate.

Educational Issues

Those who supported the inclusion of students with disabilities into regular education classrooms cited the benefits to students, the avoidance of the negative effects of segregation, and the issue of
equality in support of their arguments. Inclusion was the "fair, ethical, and equitable thing to do" (Snell, 1990, p. 32). Among the negative effects of segregated classrooms to be avoided were low self-esteem, the stigma of labeling, and lowered expectations leading to failure (Gottlieb et al., 1990; Reynolds, 1990). Snell (1990) cited benefits in the form of positive relationships and possible long-term friendships for both students with disabilities and their nondisabled peers in an integrated classroom. Normal peers would provide age appropriate role models for communicative and social behaviors for students with disabilities even as they developed more positive attitudes toward their peers with disabilities (Brown et al., 1989; Snell, 1990; Voeltz, 1982).

L. Paul (1985) focused her argument specifically on the benefits of communicative interactions between peers with the resulting opportunities for gaining and maintaining conversational skills. She also hypothesized that, without peer models, students would neither develop appropriate and adequate conversational skills nor be able to generalize skills that they did have. Berres and Knoblock (1987), Lipsky and Gartner (1989), and Lloyd and Gambatese (1990) expressed the belief that learning which took place under natural conditions with peer models would also generalize to other settings.

**Efficacy Studies Related to Mainstreaming**

Although much of the support for educating students with disabilities with their nondisabled peers was based on moral and philosophical arguments, there were also attempts to demonstrate the efficacy of this educational practice. Many of the first studies focused on students with
mild disabilities and were beset with a number of methodological prob-
lems (Madden & Slavin, 1983).

Problems With Efficacy Studies

The problems with efficacy studies in special education stemmed
from a number of sources, including the large number of variables that
had to be considered. Some of these problems were of a general nature
and affected many types of research studies; others were specific to this
group of studies. They included:

General Problems

Because many of the treatment variables could not be controlled
with precision, efficacy studies in the area of special education present-
ed educators with particular challenges. Care was required to control
threats to internal validity, including the effects of history or the ex-
traneous events that occurred during an experiment, the effects of
maturation or changes in the subject due to the passage of time, and the
effects of testing, if tests were used as part of the study. Subjects often
performed better as they gained experience with a test. Other threats
included problems with the instruments used to measure changes or
differences in subjects, such as unequal tests or testing situations, and
attrition, which occurred when subjects dropped out of a study, leaving
nonequivalent groups (Slavin, 1992). Other confounding variables which
threatened internal validity included extra resources, increased attention,
or some form of unequal attention afforded one group or subject and not
the other. Finally, the use of other than random selection procedures,
experimenter bias or expectations, or the interaction of two or more of these factors affected the outcome of some efficacy studies (Campbell & Stanley, 1966).

**Specific Problems**

In addition to the threats to internal validity already described, specific problems with these studies included a lack of clear-cut definitions of special classes and student disabilities (Jenkins, Odom, & Speltz, 1989; Scriven, 1983), differences in teaching methods and curricula employed in the various classrooms studied, and variations in teacher qualifications (Salend, 1994).

Early studies frequently examined intact rather than randomly assigned groups of students (Tindal, 1985). Researchers often found it difficult, if not impossible, to match students on all relevant variables, which often resulted in inadequate control groups. In some studies, no control groups were used (Carlberg & Kavale, 1980; Cegelka & Taylor, 1970; Guralnick & Groom, 1988).

Hallahan, Keller, McKinney, Lloyd, and Bryan (1988) and Polloway and Smith (1983) noted that many of the efficacy studies, done more than 30 years previously, studied populations that differed from the populations which bear the same label today. For example, students labeled Educable Mentally Retarded (EMR) 30 years ago might have had IQs as high as 75 or 80, while those so classified today have IQs ranging from 50 to 70 and also have significantly subaverage adaptive skills, an area that was not specifically considered in earlier populations (Hardman et al., 1993). Hallahan, Keller, McKinney, Lloyd, and Bryan
(1988) also noted that changing educational practices in both general and special education classrooms made generalizations from one study to another, especially over a period of time, difficult.

Finally, the lack of agreement over exactly what characteristics were being measured in many efficacy studies, and, in some studies, the lack of adequate evaluative instruments threatened not only the validity of many studies, but also the generalizations that could be drawn from them (Carlberg & Kavale, 1980).

**Specific Studies**

A large number of studies in the field of special education were conducted before 1965. These studies focused first on the achievement of educable mentally retarded (EMR) students in segregated facilities versus those in self-contained, special education classrooms in public schools and, later, on students in special education classrooms versus those in general education classes (M. J. Kaufman et al., 1975; Polloway, 1984). Overall, these studies were inconclusive (Carlberg & Kavale, 1980; Madden & Slavin, 1983).

One of the more methodologically adequate studies was done by Goldstein et al., (1965). In their study, 125 EMR students, with a mean IQ of 75, were randomly divided into an experimental and a control group. When the study began, the subjects were 6-year-olds who were entering school and had not experienced school failure in general education classrooms before being placed in special education classes. For their first school experience, they were randomly enrolled in either a general education or in a special education classroom.
Over a 4-year period, the EMR students enrolled in special education classes were compared to their EMR peers who had been placed in general education classes in the areas of intellectual development, academic achievement, and social and personal adjustment. Overall, the study found that both groups showed gains of 6 or 7 points in their IQ scores. However, when these students were divided into two groups, those with IQ scores above 80 and those with IQ scores below 80, those in the former group tended to do better in general education classes, while those in the latter group tended to show better academic achievement and social adjustment in special education classes.

Under current diagnostic criteria, many of the students in this study would not have been considered for special education placement at all (Gallagher, 1994). The results, however, suggested that students with fewer impairments may do better in general education classes than their more disabled peers.

After the 1960s, the number of efficacy studies declined. The changing sociopolitical climate, which emphasized individual civil rights and encouraged the belief that students with disabilities had the right to be educated in general education classrooms with their nondisabled peers, also contributed to shifting the focus of research toward the social-emotional adjustment of students with disabilities (Polloway & Snell, 1975). Investigators turned their attention toward the role of peers and the effects of specific educational placements on the social development of special education students (Guralnick & Groom, 1988).

Jenkins, Speltz, and Odom (1985) examined several areas of development, including social development, in a study of 43
preschoolers between the ages of 3 and 6 years of age. Thirty-six of the children were described generally as developmentally delayed, while 7 of the children were recruited as normal peers to participate in the integrated classrooms. Before the study began, the subjects were evaluated in four areas of development by teachers and were ranked in order of their mean level of development. On the basis of this ranking, children were paired and one member of each pair was assigned to an integrated classroom setting while the other became part of a segregated class without normal peer models. A pretest/posttest design was used to evaluate the effects of the two classroom experiences. However, because pretesting showed that random assignment based on teacher rankings did not result in equivalent groups, the results of this study must be questioned. Posttesting revealed no significant differences between the segregated and the integrated classrooms in four of six developmental areas. Jenkins et al., (1985) concluded that while simply placing students with disabilities in classes with nondisabled peers without a plan for integration did not result in enhanced developmental levels for students with disabilities, neither did segregated classes impede the progress of the disabled students.

In another study of peer interactions in integrated and segregated settings, Guralnick and Groom (1988) compared the social interactions of 11 mildly developmentally delayed preschool boys across two different settings. The subjects were each matched with two nondisabled peers in a play group; one peer was matched by chronological age and the other according to developmental level. The subjects were then observed in two settings, the play group and their specialized classroom.
which contained only children with disabilities. When social behaviors were compared across settings, the subjects engaged in a higher rate of appropriate social interactions with peers in the play group or mainstreamed setting. The study also showed that the subjects chose to interact more frequently with nondisabled children of a similar chronological age than they did with nondisabled, younger children of a similar developmental age. Although this study included some potentially problematical methodology, such as observing subjects in their special classes after the play groups had ended and the use of videotaped observations in one setting and live observations in the other setting, the fact that the same subjects were observed in two settings eliminated the especially difficult task of matching subjects on all relevant variables.

Jenkins et al., (1989) observed 3-6-year-old preschoolers with mild to moderate disabilities and their nondisabled peers as they interacted in two different play activities. Students with disabilities were matched with each other on a number of characteristics as were their normal peers. Each group was then randomly assigned to a treatment condition, either a social interaction session mediated by an adult or a child-directed play session.

Although the subjects were preschoolers, three findings of this study are relevant to the present investigation. The social interaction setting, which included adult direction, produced more social interaction between the children with disabilities and those without than did the child-directed setting. The condition of integration, or simply placing students with disabilities in the same group as their nondisabled peers, did not seem to enhance most areas of the development of the disabled
students. Finally, students with disabilities who participated in the interactive play activities in both the integrated and the segregated settings were reported to have scored significantly higher on posttests of language development than did the subjects who participated in the child-centered activities.

Olswang and Carpenter (1978) compared the utterances of nine 3-6-year-old speech and language impaired children across two settings, one as the children interacted with their mothers in their own homes and the other as the children interacted with an unfamiliar clinician in a clinic setting. The children produced a greater number of utterances in the presence of their mothers; but, when the grammatical and semantic elements of the language samples were analyzed, the investigators found no differences between the samples collected in the two settings. This study did not examine the functions or purposes for which language was used.

Some studies have focused specifically on students with autism. Strain (1983) attempted to determine whether a social behavior treatment designed for students with autism would result in behaviors that would generalize in both segregated and integrated environments. A nondisabled peer, a 7-year-old boy, was taught specific social initiations which he then attempted to teach 4 subjects with autism. The subjects, all boys, were 7-10 years of age. After the training sessions, during which the peer trainer focused on each subject for 5 minutes, the subjects joined either an integrated play setting, with other second grade students, or a segregated setting, with other students with disabilities. Results showed that, following the training sessions, all of the subjects
showed increased social responsiveness to peer social initiations. As the social responsiveness of the subjects increased, so, too, did the social initiations made by their peers. An increase in social initiations by the subjects subsequently followed. The integrated settings were associated with higher levels of social interaction than were the segregated settings.

While this study did not conclusively support integrated educational settings over segregated settings as more favorable environments for the development of social skills, it did lend support to those who questioned the practice of providing only segregated services for students with disabilities. Strain (1983) also noted the importance of observing subjects in natural, integrated settings in order to provide opportunities for interaction and in order to obtain an accurate assessment of their potential for social interaction.

Lord and Hopkins (1986) examined the interaction between students with autism and their untrained peers. Six elementary age boys with autism, ages 6 to 12, were each grouped in a triad with a same-age and a kindergarten-age nondisabled student. The same-age peers were each within 6 months of the age of the subjects with whom they were matched; the kindergarten students were chosen because they most closely matched the subjects' mental age. The kindergarten students were also the age group with whom the subjects were most likely to be integrated in the school in which the study took place. During a series of 10 daily, 15 minute play sessions, the subjects played with either the younger or the same age peer. Three of the boys began the study by playing with the kindergarten student first and then, after a week-long
break, playing with the same-age peer. For the other three subjects, the order of the play partners was reversed. Results showed that (a) the same-age peers initiated social interactions with the subjects approximately 5 times more often than did the younger play partners, (b) the same-age peers were more successful in obtaining responses from the subjects than were the younger students, and (c) the majority of the responses made by all participants in this study were nonverbal. Nonverbal initiations or nonverbal initiations involving both a vocalization and a nonverbal gesture, the approach used most often by the same-age peers, were more likely to receive a response from the subjects than were the only-verbal approaches used more often by the younger, nondisabled partners. The investigators also noted that the same-age peers were more successful at modifying their behavior to "meet the cognitive and communicative needs" of the students with autism (Lord & Hopkins, 1986, p. 260).

Fewer studies have focused on the communicative behavior of students with autism in functional contexts, Landry and Loveland (1989) focused on the attention-directing gestures and language used by their subjects in three interactive settings. A group of students with autism was matched according to nonverbal mental age with a group of developmentally language delayed students. These two groups were matched with a group of nondisabled students on the basis of language level as measured by standardized tests. Subjects were observed in an adult-directed situation, a situation in which the subjects were expected to make requests for desired items, and in an unstructured, spontaneous play setting. The students with autism used fewer attention-directing
behaviors than did either of the other two groups, and their behavior seemed less influenced by context than the behaviors of the other subjects. In other words, specific communicative contexts, different situations with the same adult, seemingly had little influence upon the autistic subjects' use of language to direct attention.

Harris, Handleman, Kristoff, Bass, and Gordon (1990) compared the language development of 10 preschool students with autism and 4 nondisabled, preschool students. Five of the students with autism were enrolled in a segregated, self-contained special education classroom; the other 5 students with autism were enrolled with their normal peers in an integrated setting. There were demographic differences among the groups and methodological problems with this study; for example, the mean IQ of the normal group was 108.5 (range: 96-125) whereas the mean IQ scores of the two groups with autism were 62.6 (range: 43-71) and 69 (range: 59-83). The mean receptive language scores of the three groups, as measured by the Peabody Picture Vocabulary Test (PPVT-R, Dunn & Dunn, 1981) were 68.2 (range: 46-97), 60.4 (range: 41-90), and 97 (range: 83-109), respectively. The two groups of students with autism were not randomly assigned to the classrooms, but were placed on the basis of the severity of their behavior. The nondisabled students were recruited by word-of-mouth to provide a normal peer group for the integrated students. In spite of all these differences, when the pretests and posttests of language development for each group were compared, all three groups showed improvement in their rate of development after specific language training. When the scores of the two groups of students with autism were compared, there were no significant differences
between the segregated group and the integrated group, indicating that, for these two groups at least, simply being in a class with normal peers did not seem to provide any special boost in the area of language development.

Summary

The purpose of this literature review was (a) to describe the characteristics of individuals with autism, particularly as those characteristics affect educational programming for this population; (b) to examine the findings in the practice of mainstreaming, or inclusive education, specifically as they relate to students with autism; and (c) to explore and elucidate the assumptions in the literature concerning programming practices for this population.

Individuals with autism present complex combinations of characteristics that may interfere with their development and their integration into all aspects of community living. While members of this heterogeneous population also demonstrate intraindividual differences, investigators generally agree that deficits in social interaction and communication skills are universal. These deficits are lifelong, although they may be ameliorated over time.

A number of treatment approaches for individuals with autism, based on theories of etiology, have been proposed since Kanner (1943) first described the syndrome. From an original emphasis on psychoanalytic theory and treatment, these approaches have evolved over time to their current emphasis on an educational and social interaction approach to remediation.
Within the educational community, educational methods and placements have also changed over time. From an initial emphasis on segregated, and often private, facilities, current programming emphasizes placement in public schools and, increasingly, general education classrooms. The benefits of such placements most often cited include the opportunity for students with autism to imitate and learn from non-disabled peer models.

Much of the current research on the efficacy of these placements has examined the social skills of students with autism in a variety of environments. A number of studies have also examined the ability of these students to learn by imitation or through observational learning. Although the results of these studies have been mixed, it appears that the majority of individuals with autism do not consistently and spontaneously acquire appropriate social skills simply by observing their peers. An important question to be asked is what effect placement with normal peer models will have upon the communication skills of students with autism.

A second focus of this investigation are the problems raised by Byrnes (1990), Davis (1989), and Lieberman (1992). Byrnes pointed out that there is a need to supplement the rhetoric of this debate with "practical and operational perspectives" (p. 345). Lieberman (1992) and Davis (1989) reminded their readers that much of the debate about educational placement has been instigated by and carried on between educators at the university level. If meaningful changes are to take place, teachers, administrators, and parents at the local educational level must be involved in all aspects of the process. The actual functioning of
the students involved must also be examined carefully. Research is needed to provide information about the functional communication skills of students with autism as they function in their educational environments.

Just where those students should be educated continues to be a divisive issue among educators. Even the terminology used to describe the process of educating students with autism in general education classrooms varies, although there seems to be some agreement that mainstreaming refers to placing a student with disabilities into a general education classroom for some part of a school day, while inclusion or inclusive education generally means that the student with disabilities is a full-time member of a general education classroom.

Although there is legal precedent and some conflicting empirical evidence to support the practice of educating all children in general education classrooms, the majority of arguments put forth by advocates of this practice are based on moral or philosophical arguments. They cite the benefits to be gained by students with disabilities who are exposed to normal peer models. These benefits include peer friendships, improved communication skills, and more appropriate social interactions. Some supporters have gone so far as to maintain it is the right thing to do and they are willing to discount or ignore empirical evidence to the contrary (Gallagher, 1994).

Many of those who oppose the wholesale inclusion of all students with disabilities do support the concept of including students with disabilities with their nondisabled peers, but feel that educational placements should be made on a case-by-case basis. They also stress the
need for empirical data upon which to base placement decisions.

The problem is, there are few objective measures by which to judge success in this controversy. Does including students with severe disabilities, including autism, in general education classrooms truly provide social, communicative, and educational benefits superior to those that can be obtained in other educational settings?
CHAPTER III

METHOD

Overview

The purpose of this study was to describe the spontaneous use of language by the same students with autism (N = 4) across two settings: self-contained, special education classrooms for autistically impaired students and general education classrooms with nondisabled peers of a similar chronological age. Language use was examined for both quantity and appropriate fit within the discourse context.

Early studies of the speech and language skills of individuals with autism were based largely on language samples obtained in clinical settings (Scott & Taylor, 1978). Often researchers who were strangers to their subjects attempted to elicit conversation from them in laboratory-like, artificial settings, using unfamiliar toys or pictures.

In the 1970s, when sociolinguistic researchers (Bates, 1974, 1976; Dore, 1974) recognized that a number of contextual variables influenced both the quantity and the quality of elicited language samples, the nature and focus of language studies began to change. Researchers have increasingly begun to believe that "communicative behavior should be studied as it occurs naturally in a familiar context" (Wetherby, 1986, p. 298). Watson and Lord (1982) and Lahey (1988) also noted that there might be a discrepancy between students' linguistic knowledge, as measured in highly structured test situations, and their
actual use of linguistic skills as measured by their behavior in everyday
when students with autism were evaluated, there was not necessarily a
direct relationship between their performance on standardized tests and
their ability to function in everyday situations. Lord and O'Neill (1980)
cautionsed that, while standardized test situations might measure what
individuals were capable of doing, it was still necessary to examine what
individuals did and needed to be able to do in their typical environments.

These positions reflect the sociolinguistic base upon which this
investigation was constructed. Communication does not occur in a vacuum. It is affected by the context in which it occurs and, in turn, it
affects the environment in which it takes place (Stubbs, 1983). Accord­
ingly, each subject was observed in a natural, school environment with
as little intrusion as possible on the part of the investigator.

Questions

This study focused on the following questions:

1. Are there differences in the number of utterances produced in
each setting?

2. What are the communicative functions students with autism
use in the general education and the special education classrooms?

3. Are there differences in the type of communicative functions
the students use in each setting?

4. Are the utterances produced in each setting equally appro­
priate? That is, do the utterances which are produced follow the same
rules of discourse across situations?
Independent Variable

The independent variable was the classroom setting. Two types of classroom settings, in two schools, were used: self-contained, special education classrooms, designed to educate students with autism, and general education classrooms for students without disabilities.

Differences Between Classroom Settings

The most obvious difference between the general education and the special education classrooms was the number of students enrolled in each group. In School A, 4 students were present in the special education class with one teacher and a classroom assistant; 22-25 students and one teacher were present in the general education classrooms. In School B, 5 students were present in the special education classroom with a teacher and a full-time classroom assistant; several other, part-time assistants or observers were also present from time to time. In School B, 20-25 students were present in the general education classrooms, with one exception. One of the observations was made in a classroom being team-taught by two teachers who had combined their general and special education classes. The student who was being observed sat at a table by himself and interacted minimally with the two teachers.

Adult-Student Interaction

The interaction between the students and the adults in the special education classrooms was less formal than it was in the general
education classes. In both of the special education classrooms, students addressed adults by their first names, occasionally adding "Mr." or "Miss" to the first name. In the general education classrooms, students addressed the teachers as Mr. or Miss plus a last name.

Conversations or patterns of discourse recorded on tape and in field notes in both settings revealed less formality and structure in the special education classrooms than in the general education classrooms. Special education teachers discussed academic subjects but also talked with their students about a variety of informal issues, such as sports, family events, and personal likes and dislikes. General education teachers tended to focus on academic issues and rarely discussed personal issues with their students.

Classroom structure also differed between the settings. In general the special education teachers monitored the activities of the students in the classroom more closely than did the general education teachers. If a student was not on task or needed assistance, the special education teachers were likely to redirect that student quickly with either verbal or nonverbal prompting or to structure a situation to facilitate a verbal response. For example, as one special education teacher was reading *Jungle Book*, he regularly checked for student comprehension. The following is a sample of a conversation between the adult (A) and student (S):

A: "What's this thing right here?" (pointing to a picture)
S: "I don't know."
A: "It's a bongo."
S: "Yeah."
A: It's like a drum."
S: "Bongo drum."
A: "Remember that man who was in here last week with one?"

Students in the special education classrooms who needed assistance were likely simply to ask for help or ask a question without raising their hands or waiting to be recognized. Student work assignments in the special education classroom were shorter than those given in general education classrooms. When a special education student finished his work, he often left his work area to play basketball or engage in some other leisure activity in the classroom.

Students in the general education classrooms engaged in more paper and pencil tasks, remained at their desks for longer periods of time, and either turned in work to be corrected later or waited, with their hands raised, for the teacher to come to them. Teachers in these classrooms checked for comprehension less often and tended to stay focused on the lesson. The following is an example of a conversation between the adult (A) and one of the students (S) during a workbook lesson:

S: "I need some help."
A: "Read this one."
S: (Read all but the last word of the sentence.)
A: "Read me this one."
S: "I need help."
A: "And this one."
S: (Read another sentence.)
A: Which one tells us about the whole story?"
S: "The one that says (unintelligible) to see the duck."
A: "Who thinks that's right?" (teacher asked the class)

**Student-Student Interactions**

Students in the special education classrooms engaged in more forms of solitary or parallel play than in interactive games. Many of their conversations were with the adults in the room; and when they did direct their utterances toward a peer, these utterances also seemed to be of a more parallel than an interactive nature.

When students in the general education classrooms spoke, their conversations were more interactive. That is, they asked questions and expected answers, they made comments that were relevant to another child’s activity, and they adjusted their comments to their listener's inferred needs.

**Dependent Variable**

The dependent variables in this research were the number of utterances produced across settings and the communicative functions of the utterances produced in each setting. The communicative functions included requests for action, requests for attention, requests for permission, requests for clarification, checks for clarification, comments on self, comments on others, comments on an object, seeking information, giving information spontaneously, responses to questions, protests, expressing feelings, engaging in social routines, self-talk, echolalia, meaningless jargon, perseverative comments, and language play.

The list of communicative functions that served as a core for the categories used in this study was developed by Wetherby and Prutting.
(1984). Using that list, this investigator and a professor in the Department of Speech Pathology and Audiology analyzed language samples collected from other mainstreamed students with autism in another school district. As these samples were examined over a period of three or four sessions, the categories were expanded, combined, or otherwise modified until the present list of communicative functions was developed. A complete list of these functions and their definitions as they were used in this study appears in Appendix A.

Subjects

The 4 male students with autism who participated in this study had been diagnosed by their school district as having autism according to the criteria of both the state of Michigan (see Appendix E) and the DSM-IV (APA, 1994). They ranged in age from 5 years, 3 months, to 7 years, 4 months, and all had been involved in a mainstreaming experience for at least one year. All of the students lived at home with one or both parents. Additional demographic information is presented in Table 1. The students also met the following criteria:

1. Each student was able to use oral language to communicate simple wants and needs spontaneously.

2. Each student spent some part of each day in both a special education and a general education classroom.

Each participant was observed in both his special education and general education settings. Each observation included observations and language samples gathered in both settings on a single day.
Table 1
Student Demographic Data

<table>
<thead>
<tr>
<th>Student</th>
<th>Age</th>
<th>Years in AL prog.</th>
<th>% of day in gen. ed.</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>88 months</td>
<td>3.0</td>
<td>40</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>81 months</td>
<td>2.0</td>
<td>65</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>72 months</td>
<td>1.5</td>
<td>35</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>63 months</td>
<td>2.5</td>
<td>35</td>
<td>B</td>
</tr>
</tbody>
</table>

Students were located for this study by contacting the supervisor in charge of programs for students with autism in a large, urban school district in the southwestern part of the state. She provided the names of the two teachers in the district whose students were mainstreamed for at least part of the school day. Those teachers, in turn, were contacted and were asked to identify students in their classes who met all of the criteria for the study. Letters were then sent to the parents of these students requesting permission for their child to participate in the study. In each of the schools, the special education teachers secured permission for the investigator to observe the students in their general education classrooms. The purpose of the study was described to all of the teachers involved as an attempt to observe the functional language used in school settings by students with autism.

The number of participants in this study represented approximately 36% of the total population of students with autism in southwestern Michigan who met all of the criteria for this study. During the
1992-93 school year, there were 1,543 students between the ages of 0 and 26 years of age who were diagnosed as having autism in the state of Michigan (Michigan State Department of Education, 1993). Of that total, 451 students were elementary students between the ages of 5 and 8 years of age.

To further delineate the population, there were 360 students with autism between the ages of 0 and 26 years of age in Region 3, an area which includes 17 intermediate school districts in the western and southwestern part of the Lower Peninsula and which is the area in which the present study took place. Included in this group were 69 students between the ages of 5 and 8 years of age. Given the fact that fewer than half of this population would be expected to be verbal and only about one third of this group would be included in general education classrooms for even a portion of the day (U.S. Department of Education, 1994), four students were deemed to be an adequate number of participants for an investigation such as this.

Because this study involved human subjects, approval for the project was obtained from the Human Subjects Institutional Review Board at Western Michigan University (see Appendix C). Permission to observe the students and to collect the language samples was also obtained from the special education administration of the school district attended by the student subjects. The parents of each student also gave permission for their child to participate in the study in a letter which was sent home by and returned to each student’s special education teacher (see Appendix D).

An attempt was made to use maximum variation sampling (M. Q.
Patton, 1980) by observing as many students, who met all of the criteria, as possible in this school district. Early elementary-age students were selected as subjects because it was felt they would provide models of developing language in students with autism.

One of the students was enrolled in a classroom for the autistically impaired in School A. The other three students were enrolled as members of a similar class in School B. Each of the classes was staffed by a teacher certified by the state of Michigan to teach students with autism and a classroom aide, and both classes were served by the same speech-language pathologist. Each of the teachers made individual arrangements with the general education teachers regarding the amount of time and the academic subjects for which the students with autism were mainstreamed. The special education teachers consulted informally with the general education teachers and one special education teacher reported that he occasionally taught specific lessons in the general education classrooms.

The Data Collection Process

Sampling Schedule

Subjects were observed as they followed their regular, daily schedules. In planning the observation schedule, care was taken to ensure that observation sessions occurred during both morning and afternoon class times and on different days of the week. Each student was observed during at least one morning and one afternoon session on a minimum of two different days. Observations were made for equal
amounts of time in the general and the special education classrooms, but no attempt was made to select the type of activity observed during each session. General education teachers were informed that the investigator was observing a specific student and they had given permission for the observer to be present in the classroom. Aside from the initial introduction and, usually, a greeting as the subject and the observer entered the room, there was little verbal interaction between the general education teachers and the investigator.

A "complete" observation consisted of equal amounts of observation time in both classrooms on a single day. Occasionally, a slightly longer language sample was recorded in one classroom setting because an attempt on the part of the observer to turn off the tape recorder would have interrupted a lesson. When this happened, the observer noted the time and any language and classroom events which were occurring at the time; the tapes were then made equal by omitting the excess material at the end of the longer tape.

Observations were made in the late spring. This time period was selected to maximize the time students would have spent in both classrooms during the school year and so that observations would be completed before end-of-the-year activities disrupted regular classroom routines.

Instrumentation

All of the language samples were collected by the investigator. A small, pocket-size tape recorder (Realistic, Model No. 14-1055A) was placed on the desk of, or as close as possible to each student, and
remained in the "record" mode for the entire observation period. The possibility of attaching a small microphone to each student was considered, but rejected because it was considered too intrusive. The observer also made field notes, including partial written language samples and descriptive information about each classroom setting to be used as an aid in determining communicative intent and to aid in the interpretation of the results of the study.

A Lanier transcriber, with a foot pedal and earphones, was used because it readily allowed replaying sections of any tape and facilitated the typing of transcripts into computer files. Adjustable volume and rate of speech controls also aided in increasing the intelligibility of the utterances.

**Language Sample Collection**

In order to desensitize the students to the presence of the tape recorder, each special education teacher was given an identical recorder about one week prior to the beginning of the study. During that time, the teacher left the recorder in view in the classroom while teaching. If a student asked about it, the question was answered; but no special attention was drawn to the machine. Both teachers reported that, with one exception, the recorders received little, if any, attention. During the actual observation, two of the students paid no attention to the recorders and one of the students made a single request for the machine to be turned off. The fourth student was very interested in the recorder and made requests, at random times and in both settings, to "record me." Because these requests occurred in both settings and the student
could be placated by a promise to record his voice at the end of the day, the presence of the recorder was not felt to have had an adverse effect on data collection. Further, teachers of this student described his behavior as "typical" during these observation periods.

Language Sample Analysis

Qualifications of the Investigator

All of the observations and the transcription of the language samples were done by the investigator, who has a master's degree in speech-language pathology. She holds a number of state endorsements to teach students with disabilities, including students with autism. Prior to accepting her current position as a teacher of students with autism, she taught preschool children with disabilities in a preprimary impaired program (PPI) and worked as a speech-language pathologist.

Sample Size

Questions concerning the number of utterances which constitute an adequate language sample, as well as the number and length of the observations which should be conducted, are germane to the discussion of this procedure. Lahey (1988) suggested that 50-100 utterances were the minimum required for an adequate clinical language sample, but that 200 or more utterances would provide a more acceptable database outside of a clinical setting. She also suggested that 1/2 hour of direct observation was the minimum amount of time required to obtain adequate data.
An attempt was made to observe each student for the maximum time that could be arranged within the limits of the school schedule. Each of the students was observed on a minimum of two different days. The total amount of observation time in each classroom setting ranged from 1.5 to 2.5 hours and represented 326 to 788 utterances. These samples exceed both the minimum observation period and the number of utterances considered adequate for a language sample (Lahey, 1988; Watson et al., 1989).

Language Sample Transcription

All of the taped language samples were transcribed by the investigator. If an utterance could not be understood after five repetitions, it was transcribed as partially or completely unintelligible and not included in the data analysis.

All of the utterances of each student were transcribed verbatim. Adult utterances which immediately preceded or followed a subject's utterance, or which aided in the interpretation of the communicative function of a student's utterance, were also transcribed. Conversations between two adults and adult monologues were not transcribed, but were summarized parenthetically.

Utterances were segmented into minimal terminable units or "T-units" as described by Hunt (1965). A T-unit is defined as "one main clause with all the subordinate clauses attached to it" (Hunt, 1965, p. 20). Utterances of less than a clause were also treated as a unit. They were transcribed according to the conventions of the Systematic Analysis of Language Transcripts (SALT) program (Miller & Chapman, 1985),

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a computerized language sample analysis program which provided a frequency count of various types of utterances. SALT is designed to analyze the language samples of either one or two speakers. It performs a number of functions, including providing mean length of utterance in morphemes and words, distribution of utterances by word and morpheme length, the number of utterances per speaking turn, and frequency tables for types of utterances and any special codes that have been included.

Coding

All of the spontaneous utterances produced by the subjects were coded to indicate their communicative functions. Utterances whose communicative function could not be reliably determined from context clues or because they did not contain enough intelligible words were excluded. Categories used to code the utterances were adapted from a table of communicative functions developed by Wetherby and Prutting (1984). During a series of discussions with a professor who was experienced in the area of language sample analysis, language samples collected during a pilot procedure done by this investigator in another school district were coded for communicative function and the definitions of the functions were refined. During several sessions, lasting a total of approximately 5 hours, functions were added and deleted, and some were combined. The original set of communicative function categories and their definitions may be found in Appendix B. Although all of the original categories were useful in coding the language samples, some of the cells contained such a small number of utterances that analysis was not
meaningful. To make data analysis more manageable and to facilitate the meaningful interpretation of data, the categories were collapsed from 21 categories to 10.

Each utterance was also coded to indicate whether or not it was appropriate or inappropriate. That is, each utterance was examined to determine if it were coherent and predictable, well structured pragmatically, and related to the context of the discussion (Stubbs, 1983). A list of guidelines which were used to determine the appropriateness or inappropriateness of specific utterances is presented in Table 2. Examples of the coded language samples from each of the participants are included in Appendix F.

Reliability

Overview

Three critical areas in the process of data collection and analysis required reliability verification: (1) language sample transcription procedures, (2) coding of language functions and appropriateness, and (3) data entry. Reliability was calculated using the following formula:

\[
\frac{\text{# of times observers agreed}}{\text{# of agreements + disagreements}}
\]

Language Sample Transcription Procedures Reliability

This process required a number of judgments on the part of the investigator, including segmenting utterances and coding for
Table 2
Guidelines for Determining the Appropriateness or Inappropriateness of an Utterance

<table>
<thead>
<tr>
<th>Appropriate</th>
<th>Inappropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td>An utterance was determined to be appropriate if:</td>
<td>An utterance was determined to be inappropriate if:</td>
</tr>
<tr>
<td>1. It related to the topic of discussion; that is, it was a direct response to the comment that preceded it or it expanded upon the topic in a relevant way (Paccia, 1985/1986).</td>
<td>1. The utterance was tangential; that is, the utterance was only partially or distantly related to the topic of discussion.</td>
</tr>
<tr>
<td>2. It met the expectations of conversational discourse; that is, it was coherent and understandable, predictable, and structured according to syntactic and semantic rules (Stubbs, 1983).</td>
<td>2. The utterance represented a complete, unexpected topic shift. Example: A: Open your book to page 10. S: I have a vacuum cleaner at my house.</td>
</tr>
<tr>
<td>3. It was appropriate for both the individual conversational partner and the social context (Bernard-Opitz, 1982).</td>
<td>3. The utterance supplied incorrect information (and the student should have been able to answer correctly). Example: S: That apple is purple.</td>
</tr>
<tr>
<td>4. The utterance was a protest (unless the student was asked if he wanted to participate and he answered &quot;I don't want to&quot;).</td>
<td></td>
</tr>
<tr>
<td>5. The utterance was coded as language play, a perseverative comment, or as a noninteractive comment, as defined in this study.</td>
<td></td>
</tr>
</tbody>
</table>
communicative functions and appropriateness; extensive and continuous reliability checks were conducted.

All of the tapes included in the analysis were transcribed by the investigator. Following the initial transcription, a graduate student in the Department of Speech Pathology and Audiology who was also engaged in a project involving transcript analysis and familiar with the transcription process and the SALT program, independently transcribed 10% of the same tapes. The two sets of transcripts were matched for both word accuracy and the segmentation of utterances. Overall interrater reliability for transcription was 98%.

Language Function and Appropriateness Reliability

Following the discussion sessions to develop the final definitions of communicative functions, the investigator and a professor in the Department of Speech Pathology and Audiology independently coded approximately 10% of the transcripts for both function and appropriateness of the utterances. Overall interrater reliability for the communicative functions and the appropriateness, indicating the number of times both participants agreed, was 92% using the above formula.

To ensure intrarater reliability, all of the transcripts were coded for communicative functions twice in a period of one week by the investigator. Discrepancies in coding were resolved at the time of the second coding by the investigator's review of the coding definitions and by reviewing the transcripts and field notes for context cues. Intrarater reliability was 93%.
Data Entry Reliability

A graduate student in the Department of Speech Pathology and Audiology who was experienced in the use of the SALT program entered all of the codes into the computer files that had been created by the investigator. Both the graduate student and the investigator proofread the completed transcripts to ensure 100% accuracy.
CHAPTER IV

RESULTS

Overview

The purpose of this study was to compare the communicative utterances of students with autism across two educational settings, general education and special education classrooms. Data were collected to answer the following questions:

1. Are there differences in the number of utterances produced in each setting?

2. What are the communicative functions students with autism use in the general and in the special education classrooms?

3. Are there differences in the type of communicative functions the students use in each setting?

4. Are the utterances produced in each setting equally appropriate? That is, do the utterances which are produced follow the rules of discourse?

Each student’s experience was unique because he followed an individualized schedule and participated at his own level of ability. Each student’s experience was similar in that he spent part of his school day in both general and special education classroom settings. Therefore, data are presented in two forms. First, each subject is described as an individual. This description includes the most salient characteristics of autism demonstrated by this student as well as a quantitative and

86
qualitative analysis of his language samples. Each research question and the pertinent data are then discussed as they relate to each student. Secondly, each of the research questions will be discussed in terms of the overall performance of the group.

Individual Student Results

Statistical Analysis of Data

Delineation of the significance of difference between proportions was calculated using procedures recommended by Ferguson (1966). The test used was a z test for significance of the difference between two independent proportions (Ferguson, 1966). In this analysis, the data were treated as if they were independent samples. Several factors led to this decision. Although there is a reasonable expectation that social discourse will be connected, that is, that the content of a response will be related to the utterance that preceded it, this is less true of classroom discourse. Analysis of discourse in classroom situations is based upon the content of teacher-student interactions. This study, however, examined the functions of utterances, not their content.

Student 1

Description of Student

Student 1 was a 7-year-old male. He was often preoccupied with routines and anxious about following schedules and directions. He was easily distracted by noises and perseveratively talked about a limited number of favorite topics. Whenever possible, he avoided actually
interacting with his peers except when he attempted to direct their behavior.

He was one of five members of a classroom for students with autism in School A. He also participated in one general education classroom for reading, in another for mathematics, and he joined general education students for physical education, recess, and lunch. For the most part, he followed his daily schedule independently, walking to and from the general education classes by himself. He followed classroom routines with some prompting from adults. During physical education and recess, a nondisabled, volunteer student served as a "special friend" or "buddy," an arrangement the subject sometimes resisted. During unstructured time in any classroom, he tended to remain by himself.

**Question 1**

Question 1: Were there differences in the number of utterances produced in each setting?

Subject 1 was observed for 2 hours and 58 minutes in his special education classroom on 2 different days in a 2-week period of time. He was observed for the same total amount of time in general education settings during the same 2 days in the 2-week time period. During this time, he was observed as he engaged in the routine activities occurring in that environment.

A summary of Student 1's utterances is shown in Table 3. This table depicts both the number and proportions of utterances Student 1 made in each setting. These figures represent 385 utterances in the
Table 3
Total Number and Percentages of Utterances Produced Across Settings: Student 1

<table>
<thead>
<tr>
<th>Communicative function</th>
<th>General education</th>
<th>Special education</th>
<th>z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of utterances</td>
<td>% of total utterances</td>
<td>Number of utterances</td>
</tr>
<tr>
<td>Request</td>
<td>17</td>
<td>4.42</td>
<td>33</td>
</tr>
<tr>
<td>Clarification</td>
<td>10</td>
<td>2.60</td>
<td>9</td>
</tr>
<tr>
<td>Comments</td>
<td>10</td>
<td>2.60</td>
<td>8</td>
</tr>
<tr>
<td>Information</td>
<td>68</td>
<td>17.66</td>
<td>77</td>
</tr>
<tr>
<td>Responds to questions</td>
<td>123</td>
<td>31.95</td>
<td>195</td>
</tr>
<tr>
<td>Social comments</td>
<td>32</td>
<td>8.31</td>
<td>17</td>
</tr>
<tr>
<td>Protest</td>
<td>9</td>
<td>2.34</td>
<td>20</td>
</tr>
<tr>
<td>Echolalia</td>
<td>7</td>
<td>1.82</td>
<td>8</td>
</tr>
<tr>
<td>Noninteractive comments</td>
<td>108</td>
<td>28.05</td>
<td>24</td>
</tr>
<tr>
<td>Reading</td>
<td>1</td>
<td>0.26</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>385</td>
<td>100.00</td>
<td>403</td>
</tr>
<tr>
<td>Appropriate</td>
<td>244</td>
<td>63.38</td>
<td>279</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>141</td>
<td>36.62</td>
<td>124</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.
general education settings and 403 utterances in the special education settings. The total number of utterances across settings is similar.

Questions 2 and 3

Question 2: What are the communicative functions students with autism use in general and special education classrooms?

Question 3: Are there differences in the types of communicative functions the students use in each setting?

Significant differences were noted in six areas of communicative functions: noninteractive comments, responds to questions, reading, social comments, requests, and protests. Noninteractive comments represented 28.05% of all utterances in the general education settings (N = 385), but only 5.96% of the total utterances in special education environments (N = 403). This difference in proportion was found to be significant (z = 8.30, p < .01).

A significant difference in the area of responds to questions was also observed (z = -4.70, p < .01). The subject produced 48.39% of his total number of utterances (N = 403) as responses to questions in special education, but only 31.95% of his utterances (N = 385) produced in general education were in this category.

Reading represented 2.98% of this student's utterances in the special education classroom, but only 0.26% of his utterances in general education settings. This difference in proportion was found to be significant (z = -2.99, p < .01).

A significant difference (z = 2.38, p < .05) was also noted in the area of social comments. Student 1 produced 8.31% of his total
utterances in the general education classrooms ($N = 385$) as social responses, while he produced only 4.22% of his total utterances ($N = 403$) in the same category in the special education class.

A significant difference ($z = -2.17, p < .05$) was found across settings in the utterances categorized as requests. In general education settings, 4.42% of this subject's total utterances ($N = 385$) were requests. In the special education settings, 8.19% of his total utterances ($N = 403$) were in this category.

A significant difference ($z = -1.96, p < .05$) was also found across settings in the utterances categorized as protests. In general education settings, 2.34% of this student's total utterances ($N = 385$) were protests. In the special education settings, 4.96% of his total utterances ($N = 403$) were in this category.

There were no significant differences among the remaining categories of communicative functions.

**Question 4**

Question 4: Were the utterances produced in each setting equally appropriate? That is, did the utterances which were produced follow the same rules of discourse across settings?

Differences in the proportion of appropriate and inappropriate utterances produced across settings was analyzed using the significance of difference between independent proportions test (Ferguson, 1966). Results of this analysis indicated that there were no significant differences in either the appropriate or the inappropriate utterances produced across settings.
Summary

Overall, it was found that Student 1 produced a similar total number of utterances across settings. Analysis of the individual categories of utterances indicates significant differences in six categories of communicative function.

Student 2

Description of Student

Student 2 was a 6-year, 9-month-old male. He used his verbal ability, both appropriately and inappropriately, to interact with his peers and the adults in the special education classroom setting. In the general education settings, he usually responded to academic questions and often responded to the limited social contacts initiated by his non-disabled peers, but he did not regularly seek the attention of either the adults or the students in those rooms. He seemed to use either self-talk or noninteractive comments to keep himself focused on tasks in the general education settings.

Student 2 was one of four members of a classroom for students with autism in School B. He spent each morning in a first grade classroom; he also joined general education students for recess, physical education, art, and music. Student 2 ate lunch in his special education classroom. He followed routines in both general and special education settings with only occasional prompting from adults. He tended to remain by himself much of the time in the general education settings, but interacted with both adults and the other students in the special...
education settings.

**Question 1**

Question 1: Were there differences in the number of utterances produced in each setting?

Student 2 was observed for 2 hours and 10 minutes in his special education classroom on 2 different days in a 2-week period of time. He was observed for the same total amount of time in general education settings during the same 2 days in the 2-week time period. During this time, he was observed as he engaged in the routine activities occurring in each environment.

A summary of Student 2’s utterances is shown in Table 4. This table depicts both the number and proportions of utterances Student 2 made in each setting. These figures represent 136 utterances in the general education settings and 544 utterances in the special education settings.

**Questions 2 and 3**

Question 2: What are the communicative functions students with autism use in general and special education classrooms?

Question 3: Are there differences in the types of communicative functions the students use in each setting?

Significant differences were noted in four areas of communicative functions: noninteractive comments, requests, reading, and information. Noninteractive comments represented 38.46% of the subject's total utterances produced in general education environments (N = 143) as
Table 4
Total Number and Percentages of Utterances
Produced Across Settings: Student 2

<table>
<thead>
<tr>
<th>Communicative function</th>
<th>General education</th>
<th>Special education</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of utterances</td>
<td>% of total utterances</td>
<td>Number of utterances</td>
</tr>
<tr>
<td>Request</td>
<td>6</td>
<td>4.20</td>
<td>90</td>
</tr>
<tr>
<td>Clarification</td>
<td>9</td>
<td>6.29</td>
<td>54</td>
</tr>
<tr>
<td>Comments</td>
<td>2</td>
<td>1.40</td>
<td>22</td>
</tr>
<tr>
<td>Information</td>
<td>19</td>
<td>13.29</td>
<td>126</td>
</tr>
<tr>
<td>Responds to questions</td>
<td>29</td>
<td>20.28</td>
<td>107</td>
</tr>
<tr>
<td>Social</td>
<td>8</td>
<td>5.59</td>
<td>32</td>
</tr>
<tr>
<td>Protest</td>
<td>2</td>
<td>1.40</td>
<td>20</td>
</tr>
<tr>
<td>Echolalia</td>
<td>6</td>
<td>4.20</td>
<td>11</td>
</tr>
<tr>
<td>Noninteractive comments</td>
<td>55</td>
<td>38.46</td>
<td>82</td>
</tr>
<tr>
<td>Reading</td>
<td>7</td>
<td>4.89</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>143</td>
<td>100.00</td>
<td>550</td>
</tr>
<tr>
<td>Appropriate</td>
<td>87</td>
<td>60.84</td>
<td>438</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>56</td>
<td>39.16</td>
<td>112</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.
compared to 14.91% of his total utterances in the special education settings \((N = 550)\). The difference in this proportion was found to be significant \((z = 6.30, p < .01)\).

A second significant difference in the area of requests was also observed \((z = -3.75, p < .01)\). The responses in this category represent 13.36% of the total number of utterances \((N = 550)\) produced in special education and 4.20% of the total utterances \((N = 143)\) produced in general education by the subject.

Reading represented 4.89% of this student's utterances in the general education classroom, but only 1.09% of his utterances in special education settings. This difference in proportion was found to be significant \((z = 2.99, p < .01)\).

A significant difference \((z = -2.52, p < .05)\) was noted in the area of information. Student 2 produced 13.29% of his total utterances \((N = 143)\) in the general education classrooms as information responses, and 22.91% of his total utterances \((N = 550)\) in the same category in the special education class.

There were no significant differences among the remaining categories of communicative functions.

**Question 4**

**Question 4:** Were the utterances produced in each setting equally appropriate? That is, did the utterances which were produced follow the same rules of discourse across settings?

Differences in the proportion of appropriate and inappropriate utterances produced across settings were analyzed using the
significance of difference between independent proportions test (Ferguson, 1966). Results of this analysis indicate that 60.84% of the utterances produced in the general education setting were appropriate as compared to 79.64% of the utterances produced in special education settings. This difference was found to be significant ($z = -4.67$, $p < .01$). A significant difference ($z = 4.67$, $p < .01$) was also noted in the proportion of inappropriate utterances produced across the classroom settings. In the general education settings, 39.16% of the total number of utterances were inappropriate. In the special education settings, 20.36% of the utterances were inappropriate.

**Summary**

Overall, it was found that Student 2's distribution of language functions was significantly different across settings. Analysis of these utterances indicated significant differences in types of communicative functions used by this subject as well as in the appropriateness and inappropriate of utterances across settings. It appears that special education settings were more facilitative of appropriate language use for this student than were general education settings.

**Student 3**

**Description of Student**

Student 3 was a 6-year, 3-month-old male. His integration experiences included time spent in an adjacent kindergarten room, as well as physical education and art classes and recess with the same group of
kindergartners. He was less verbal than the first two subjects and tended to use simple grammatical constructions ("I happy"). He frequently hummed or sang tunes to himself and often seemed to be playing with sounds or words. In both settings, he often played by himself or near, but not with, other children. If more than two or three other children came close to him, he tended to move to another part of the room. He followed very regular and familiar routines in both classrooms, with some prompting; but often appeared to be engrossed in his own agenda. He was more withdrawn in the general education settings and seldom approached or was approached by his nondisabled peers. Student 3 was one of four members of a classroom for students with autism in School B.

**Question 1**

Question 1: Were there differences in the number of utterances produced in each setting?

Student 3 was observed for 1 hour and 39 minutes in his special education classroom on 2 different days in a 2-week period of time. He was observed for the same total amount of time in general education settings during the same 2 days in the 2-week time period. During this time, he was observed as he engaged in the routine activities occurring in that environment.

A summary of Student 3's utterances is shown in Table 5. This table depicts both the number and proportions of utterances Student 3 made in each setting. These figures represent 78 utterances in the general education settings and 248 utterances in the special education settings.
Table 5

Total Number and Percentages of Utterances
Produced Across Settings: Student 3

<table>
<thead>
<tr>
<th>Communicative function</th>
<th>General education</th>
<th>Special education</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of utterances</td>
<td>% of total utterances</td>
<td>Number of utterances</td>
</tr>
<tr>
<td>Request</td>
<td>4</td>
<td>5.13</td>
<td>20</td>
</tr>
<tr>
<td>Clarification</td>
<td>1</td>
<td>1.28</td>
<td>2</td>
</tr>
<tr>
<td>Comments</td>
<td>3</td>
<td>3.85</td>
<td>5</td>
</tr>
<tr>
<td>Information</td>
<td>7</td>
<td>8.97</td>
<td>16</td>
</tr>
<tr>
<td>Responds to questions</td>
<td>4</td>
<td>5.13</td>
<td>22</td>
</tr>
<tr>
<td>Social</td>
<td>6</td>
<td>7.69</td>
<td>8</td>
</tr>
<tr>
<td>Protest</td>
<td>1</td>
<td>1.28</td>
<td>3</td>
</tr>
<tr>
<td>Echolalia</td>
<td>16</td>
<td>20.51</td>
<td>42</td>
</tr>
<tr>
<td>Noninteractive comments</td>
<td>36</td>
<td>46.15</td>
<td>130</td>
</tr>
<tr>
<td>Reading</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>100.00</td>
<td>248</td>
</tr>
<tr>
<td>Appropriate</td>
<td>40</td>
<td>51.28</td>
<td>109</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>38</td>
<td>48.72</td>
<td>139</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.
Questions 2 and 3

Question 2: What are the communicative functions students with autism use in general and special education classrooms?

Question 3: Are there differences in the types of communicative functions the students use in each setting?

Student 3’s performance was remarkably similar across educational settings. No significant differences were noted in any of the categories of communicative functions.

Question 4

Question 4: Were the utterances produced in each setting equally appropriate? That is, did the utterances which were produced follow the same rules of discourse across settings?

Differences in the proportion of appropriate and inappropriate utterances produced across settings was analyzed using the significance of difference between independent proportions test (Ferguson, 1966). Student 3’s production of appropriate and inappropriate utterances was similar across settings. Of the total number of utterances produced in the general education setting ($N = 78$), 51.28% of the total were appropriate, while 43.95% of the total produced in the special education settings ($N = 248$) were appropriate. Inappropriate utterances included 48.72% of the total number of utterances ($N = 78$) in the general education classroom and 56.05% in the special education classes.
Summary

Overall, it was found that there were no significant differences in the appropriateness or the inappropriateness of the utterances produced by Student 3 across settings. There were also no significant differences between categories of communicative functions across settings. Although the number of utterances which were produced across settings was dramatically different, the distribution of communicative functions was essentially the same.

Student 4

Description of Student

Student 4 was a 5-year, 3-month-old male. He was the youngest, full-time student in his special education class. Although he was aware of his peers in both types of classrooms, the majority of his behaviors were directed toward exploring his environment and satisfying his wants and needs rather than participating in group activities. In the general education settings, this student tended to seek any help he needed from his peer with autism rather than from the nondisabled students or the teacher. The kindergarten students tended to ask adults to talk to Student 4 rather than talking to him themselves. Student 4’s utterances were grammatically simple and almost half of his utterances in both settings were echolalic or classified as noninteractive comments.

Student 4 was one of four boys in a classroom for students with autism in School B. He spent part of most mornings in an adjacent kindergarten room. Small groups of kindergartners occasionally came to his
classroom to work on specific projects, for example, planting flowers in small pots. Student 4 also participated in art, music, recess, and physical education with the same general education students; he ate lunch in his special education classroom. He followed his daily schedule, as well as specific routines, with regular prompting from adults.

**Question 1**

**Question 1:** Were there differences in the number of utterances produced in each setting?

Student 4 was observed for 2 hours and 2 minutes in his special education classroom on 2 different days in a 2-week period of time. He was observed for the same total amount of time in general education settings during the same 2 days in the 2-week time period. During this time, he was observed as he engaged in the routine activities occurring in each environment.

A summary of Student 4's utterances is shown in Table 6. This table depicts both the number and proportions of utterances Student 4 made in each setting. These figures represent 152 utterances in the general education settings and 375 utterances in the special education settings.

**Questions 2 and 3**

**Question 2:** What are the communicative functions students with autism use in general and special education classrooms?

**Question 3:** Are there differences in the types of communicative functions the students use in each setting?
### Table 6

**Total Number and Percentages of Utterances Produced Across Settings: Student 4**

<table>
<thead>
<tr>
<th>Communicative function</th>
<th>General education</th>
<th>Special education</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of utterances</td>
<td>% of total utterances</td>
<td>Number of utterances</td>
</tr>
<tr>
<td>Request</td>
<td>34</td>
<td>22.37</td>
<td>35</td>
</tr>
<tr>
<td>Clarification</td>
<td>1</td>
<td>0.66</td>
<td>14</td>
</tr>
<tr>
<td>Comments</td>
<td>10</td>
<td>6.58</td>
<td>14</td>
</tr>
<tr>
<td>Information</td>
<td>18</td>
<td>11.84</td>
<td>82</td>
</tr>
<tr>
<td>Responds to questions</td>
<td>5</td>
<td>3.29</td>
<td>23</td>
</tr>
<tr>
<td>Social</td>
<td>13</td>
<td>8.55</td>
<td>59</td>
</tr>
<tr>
<td>Protest</td>
<td>3</td>
<td>1.97</td>
<td>12</td>
</tr>
<tr>
<td>Echolalia</td>
<td>39</td>
<td>25.66</td>
<td>71</td>
</tr>
<tr>
<td>Noninteractive comments</td>
<td>29</td>
<td>19.08</td>
<td>65</td>
</tr>
<tr>
<td>Reading</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>100.00</td>
<td>375</td>
</tr>
<tr>
<td><strong>Appropriate</strong></td>
<td>101</td>
<td>66.45</td>
<td>280</td>
</tr>
<tr>
<td><strong>Inappropriate</strong></td>
<td>51</td>
<td>33.55</td>
<td>95</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.*
Significant differences were noted in three areas of communicative functions: requests, information, and social comments. A significant difference in the area of requests was observed ($z = 4.02, p < .01$) with 22.37% of the total number of utterances occurring in general education rooms ($N = 152$) categorized as requests and only 9.33% of the total number of utterances occurring in special education settings ($N = 375$) so classified.

Utterances categorized as information represented 11.84% of the total number produced in the general education settings ($N = 152$), while 21.87% of the total number of utterances produced in the special education setting ($N = 375$) were in this category. This difference in proportion was found to be significant ($z = -2.66, p < .01$).

A significant difference ($z = -2.34, p < .05$) was noted in the area of social comments. Student 4 produced 8.55% of his total utterances ($N = 152$) in the general education classrooms as social comments, while 15.73% of his total utterances ($N = 375$) in the special education class were in the same category.

There were no significant differences among the remaining categories of communicative functions.

**Question 4**

**Question 4:** Were the utterances produced in each setting equally appropriate? That is, did the utterances which were produced follow the same rules of discourse across settings?

Differences in the proportion of appropriate and inappropriate utterances produced across settings were analyzed using the
significance of difference between independent proportions test (Ferguson, 1966). Results of this analysis indicate that there were no significant differences in either the appropriate or the inappropriate utterances produced by Student 4 across settings.

Summary

Overall, it was found that Student 4 produced dramatically different numbers of utterances across settings in total as well as significantly different proportions of utterances in three categories of communicative functions. There were no significant differences in either the appropriateness or the inappropriateness of utterances across settings.

Summary of Individual Findings

A summary of the significant communicative functions for all of the students is found in Table 7. An examination of this summary reveals that, while there were some significant differences in proportions of communicative functions across settings for each student, except Student 3, there was no recognizable pattern to these differences. Each student's pattern was unique. This uniqueness emphasizes the heterogeneity of the group of participants.

Group Results

Data were analyzed for the 4 participants as a group. Each of the subjects was observed for the same amount of time across settings, but total observation time varied across subjects. Therefore, a rate-based unit of analysis, made up of the total number of utterances within each
Table 7
Significant Communicative Functions Across Students

<table>
<thead>
<tr>
<th>Communicative functions</th>
<th>Student 1</th>
<th>Student 2</th>
<th>Student 3</th>
<th>Student 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request</td>
<td>*</td>
<td>**</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>Clarification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Responds to questions</td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>Social comments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Echolalia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noninteractive comments</td>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Reading</td>
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<td>**</td>
</tr>
<tr>
<td>Appropriate utterances</td>
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<td>**</td>
</tr>
<tr>
<td>Inappropriate utterances</td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.

The communicative function divided by the number of minutes each student was observed, was used in order to analyze the group performance.

Research Questions

Each of the research questions is discussed individually, with group data used to support the discussion.
**Question 1**

**Question 1:** Were there differences in the number of utterances produced in each setting?

In the general education settings, the mean number of utterances produced by the 4 subjects was 1.32 utterances per minute ($SD = .59$), while the mean number of utterances in the special education environments was 3.02 per minute ($SD = .88$). A significant difference was not found ($t = -2.73, p < .05$). Differences were calculated using a paired $t$-test procedure (Popham, 1967). A summary of these results can be found in Table 8.

**Questions 2 and 3**

**Question 2:** What are the communicative functions students with autism use in general and special education classrooms.

**Question 3:** Are there differences in the types of communicative functions the students use in each setting?

Ten categories of communicative function were analyzed. In general education settings, the mean number of requests was 0.12 utterances per minute ($SD = 0.11$), while in the special education setting, the mean number of requests was 0.33 ($SD = 0.25, t = -1.48$). The mean number of comments classified as clarification in general education classrooms was 0.04 utterances per minute ($SD = 0.03$), while in special education the mean number of utterances so classified was 0.15 ($SD = 0.18, t = -1.38$). The mean number of utterances classified as comments in general education settings was 0.05 utterances per
<table>
<thead>
<tr>
<th>Utterance type</th>
<th>General education</th>
<th>Special education</th>
<th>t value</th>
<th>df</th>
<th>2-tail prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Requests</td>
<td>0.1152</td>
<td>0.112</td>
<td>0.3318</td>
<td>0.247</td>
<td>-1.48</td>
</tr>
<tr>
<td>Clarification</td>
<td>0.0359</td>
<td>0.031</td>
<td>0.1488</td>
<td>0.182</td>
<td>-1.38</td>
</tr>
<tr>
<td>Comments</td>
<td>0.0460</td>
<td>0.029</td>
<td>0.0949</td>
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</tr>
<tr>
<td>Information</td>
<td>0.1866</td>
<td>0.135</td>
<td>0.5505</td>
<td>0.348</td>
<td>-1.92</td>
</tr>
<tr>
<td>Responds to questions</td>
<td>0.2489</td>
<td>0.307</td>
<td>0.5725</td>
<td>0.435</td>
<td>-3.12</td>
</tr>
<tr>
<td>Social</td>
<td>0.1021</td>
<td>0.056</td>
<td>0.2265</td>
<td>0.187</td>
<td>-1.23</td>
</tr>
<tr>
<td>Protest</td>
<td>0.0252</td>
<td>0.018</td>
<td>0.0959</td>
<td>0.051</td>
<td>-2.82</td>
</tr>
<tr>
<td>Echolalia</td>
<td>0.1417</td>
<td>0.131</td>
<td>0.2797</td>
<td>0.267</td>
<td>-1.90</td>
</tr>
<tr>
<td>Noninteractive comments</td>
<td>0.4078</td>
<td>0.154</td>
<td>0.6501</td>
<td>0.494</td>
<td>-0.83</td>
</tr>
<tr>
<td>Reading</td>
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<td>0.026</td>
<td>0.0284</td>
<td>0.034</td>
<td>-0.84</td>
</tr>
<tr>
<td>Total</td>
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<td>3.0180</td>
<td>0.877</td>
<td>-2.73</td>
</tr>
<tr>
<td>Appropriate</td>
<td>0.8180</td>
<td>0.480</td>
<td>2.0830</td>
<td>0.988</td>
<td>-2.32</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>0.5062</td>
<td>0.192</td>
<td>0.9352</td>
<td>0.320</td>
<td>-1.87</td>
</tr>
</tbody>
</table>
minute (SD = 0.03), while in special education settings the mean number of utterances so classified was 0.09 (SD = 0.06, t = -1.35). In general education settings, the mean number of utterances in the category of information was 0.19 per minute (SD = 0.14), while in the special education setting, the mean number of utterances in the same category was 0.55 utterances per minute (SD = 0.35, t = -1.92). The mean number of comments classified as responds to questions in general education classrooms was 0.25 utterances per minute (SD = 0.31), while in special education the mean number of utterances so classified was 0.57 (SD = 0.44, t = -3.12). The mean number of comments classified as social in general education classrooms was 0.10 utterances per minute (SD = 0.06), while in special education the mean number of utterances so classified was 0.23 (SD = 0.19, t = -1.23). In general education settings, the mean number of utterances in the category of protests was 0.03 per minute (SD = 0.02), while in the special education setting the mean number of utterances in the same category was 0.10 utterances per minute (SD = 0.05, t = -2.82). The mean number of comments classified as echolalia in general education classrooms was 0.14 utterances per minute (SD = 0.13), while in special education the mean number of utterances so classified was 0.28 (SD = 0.27, t = -1.90). The mean number of comments classified as noninteractive in general education classrooms was 0.41 utterances per minute (SD = 0.15), while in special education the mean number of utterances so classified was 0.65 (SD = 0.49, t = -0.83). In general education settings, the mean number of utterances in the category of reading was 0.01 per minute (SD = 0.03), while in the special education setting, the
mean number of utterances in the same category was 0.03 utterances per minute (SD = 0.03, t = -0.84). No significant differences were noted across settings in any of the categories (see Table 8).

**Question 4**

Question 4: Were the utterances produced in each setting equally appropriate? That is, did the utterances which were produced follow the same rules of discourse across settings?

Differences in the mean number of appropriate and inappropriate utterances produced across settings were analyzed using a nondirectional, paired t test (Popham, 1967). Results of this analysis indicated no significant differences in either the appropriate or the inappropriate utterances produced across settings by the group. In the general education classes, the group produced an average of 0.818 appropriate utterances per minute (SD = 0.48, t = -2.30) and an average of 0.51 inappropriate utterances per minute (SD = 0.19, t = -1.87). In the special education setting, the rate was 2.083 appropriate utterances per minute (SD = 0.99) and a mean of 0.94 inappropriate utterances per minute (SD = 0.32, t = -1.87). A summary of these results is contained in Table 8.

**Summary**

Neither the distribution of communicative functions nor the appropriateness or inappropriateness of the utterances was found to be significantly different across settings for the group as a whole. The lack of a recognizable pattern of significant differences across the four students
made the group results insignificant. It also emphasizes the importance of examining individual student performance instead of only group results.
CHAPTER V

DISCUSSION

Summary and Conclusions

Autism is a lifelong, developmental disability characterized by deficits in two major areas: social interaction and communication skills. Individuals with autism have an extreme need for sameness and routine, often function cognitively in the range of mental impairment, and may show unusual reactions to sensory stimuli. They demonstrate a restricted range of interests, an impaired ability to develop interpersonal relationships, and inconsistencies in their capacity to imitate others and benefit from observational learning (Frith, 1989, Sacks, 1995). Many of these problems may be ameliorated over time, but the basic social and communicative deficits persist. These deficits appear to be the antithesis of the skills needed to develop communicative competence and to succeed in a general education classroom. The question of where and how to best educate these students has been the subject of increasingly divisive debate.

An educational placement for students with autism that is currently considered with increasing frequency is that of the general education classroom. Proponents of educating all students in general education classes point out that nondisabled peers will provide models of appropriate social and communicative skills as well as long-term friendship and acceptance for students with autism. Many of the arguments, both for
and against this practice known as mainstreaming or inclusive education, have been based on philosophical points rather than on empirical data.

The literature in the field is notable for its lack of empirical data upon which to base educational placement decisions. The limited number of studies that have been done have not provided unequivocal support for any single educational placement or methodological approach for educating students with autism as a group. The very heterogeneous nature of this population has added to the methodological problems inherent in trying to compare groups of subjects which cannot be matched on all relevant variables. There is a need for a descriptive body of knowledge about the functional behaviors exhibited by students with autism in specific educational settings. The present study attempted to eliminate many of these problems by comparing the performance of individual subjects across educational settings. In attempting to determine if there were quantitative as well as qualitative differences in the utterances produced across settings, and if those utterances were equally appropriate in the two environments, the study examined the functional language skills used by the subjects in their educational environments.

**Quantitative Differences**

A two-tailed \( t \) test for paired samples (Popham, 1967) was used to compare the number of utterances produced by the subjects across settings. This conservative approach was used because the literature does not empirically favor one learning environment over another. Analysis of the total number of utterances revealed no significant difference in
the number of utterances produced across settings. However, comparison of the number of utterances produced by the subjects across settings showed all of the subjects produced a greater, although not significant, number of utterances in their self-contained, special education classrooms than they did in their general education environments during equivalent periods of time. One subject produced more than 3 times as many utterances in the special education setting as he did in general education settings. This is not surprising in view of the fact that the special education classrooms contained fewer students than did the general education rooms and, therefore, provided the students more opportunities to speak (J. Patton & Hales, 1986). Both of the special education teachers had had specific training in facilitating language in their students.

Further, although both classroom environments followed daily schedules and routines, field notes showed that the special education teachers modified lessons and verbal interactions to meet the individual needs of students more often than did the general education teachers. The conversational topics initiated by the special education teachers often focused on the interests of the students or attempted to relate student interests and the subject matter being taught. The general education teachers tended to be more formal and to converse with their students primarily about the subject matter of the lesson.

These observations seem to agree with those of Murphy (1989/1990) who found a relationship between the type of communicative approach used (e.g., facilitative versus directive) and the quantity of utterances produced by her subject. They are also supported by those of

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J. Patton and Hales (1986) and Wigle (1994) who found that opportunities to respond verbally in a classroom increased as the number of students in a classroom decreased. Jenkins et al., (1989) noted that physical integration alone had little effect on improving the language skills of students with disabilities, and that direct teacher intervention was necessary for these students to show improved skills.

Another factor that may have contributed to the differences in the number of utterances produced by the subject in both settings was the low number of communicative interactions between the subjects and their nondisabled peers. A large percentage of utterances produced by Subjects 1 and 2, who also produced the greatest number of utterances overall, were responses to questions (RQ), primarily from teachers. A second function often used spontaneously by these two subjects was that of gives information (GI), although it was used less often than RQ. During much of the structured time in the general education classes, the subjects sat quietly and responded when spoken to; during unstructured time in the same settings, they tended to remain by themselves. In the special education classes, these subjects were more likely to be in one-to-one or small group situations with an adult, which likely facilitated spontaneous communication (Jenkins et al., 1989). Subjects 3 and 4, who produced fewer utterances overall than did the other two subjects, responded to questions less frequently and Subject 3 did not respond to questions from general education teachers at all. Neither Subject 3 nor Subject 4 interacted with their peers in the general education classes and few of the nondisabled students attempted to interact with them.
Qualitative Differences

The traditional view of individuals with autism has been that those who use language do so primarily to protest and otherwise regulate the behavior of others rather than to interact. The 4 elementary-age students studied by Wetherby and Prutting (1984) made infrequent or no use of the following communicative functions: acknowledging others, commenting, requesting information, and self-regulation. The heterogeneous group of 11 students studied by Watson and Lord (1982), in contrast, tended to comment, give information, or make requests more often than they used other functions. Stone and Caro-Martinez (1990) found no evidence of verbal social interaction on the part of their subjects, and none of these studies reported the use of communicative utterances used to express feelings. All of the subjects in this study used communicative utterances for a wider range of functions than have generally been reported in the literature, however.

The high percentage of responses categorized as responds to questions (RQ) produced by Subjects 1 and 2 was not unexpected given the structure of many elementary classrooms. As already discussed, these 2 subjects not only produced the greatest number of utterances overall; but on the basis of subjective observation and field notes, appeared to participate more actively in all classroom activities than did Subjects 3 and 4. In keeping with the study by Watson and Lord (1982), all of the subjects in this study also made regular use of the gives information (GI) function and the requests for action (RA) function, which includes both requests for actions as well as objects in this case.
instances, all of the subjects produced a greater number of each of these types of utterances in the special education setting than in the general education setting. All of the subjects commented and used self-talk (ST) to direct their own behavior. Noncommunicative utterances, such as echolalia, noninteractive comments, and language play, appeared primarily in the utterances of Subjects 3 and 4, although Subject 2 also seemed to use more noninteractive comments when he did not understand the subject matter in the general education class.

There were also differences in the purposes for which the subjects of this study used language and the purposes for which subjects of other studies have used language. For example, Wetherby and Prutting (1984) reported that protests accounted for a large number of the utterances produced by their subjects. All of the subjects in the present study protested, but their utterances so classified represented no more than 4.96% of the total number of utterances produced by any student (range: 1.21% to 4.96%). All of the subjects in this study commented, both about others and about themselves (range: 1.40% to 4.00% of their total number of utterances) and the percentage of utterances categorized as social interaction, including social responses and expressions of feelings, ranged from 3.23% to 15.73% of the individual totals.

Not surprisingly, the communicative category that contained the fewest number of utterances was that of checks comprehension (CC). The purpose of utterances in this category was to determine if a conversational partner understood a message. Students with autism are unable to or have a great deal of difficulty understanding another's point of view and would be unlikely to use such a function, as confirmed by the data.
Differences in the Appropriateness of Utterances

A nondirectional t test of the group results revealed no significant differences in either the appropriate or the inappropriate utterances produced across settings. Analyses of individual performances revealed only a significant difference (z = 4.67, p < .01) in the appropriate utterances produced by Student 2 across settings. Within subjects, all of the students produced a greater number of appropriate utterances than inappropriate utterances in both the general and the special education classrooms. Across settings, they also produced a greater number of appropriate utterances in the special education classrooms than in the general education environments. However, with the exception of Student 1, they also produced a greater number of inappropriate utterances in the special education rooms than in the general education classes. A partial explanation of this fact is simply that these subjects produced more utterances overall in special education than in general education settings. A second possibility is that in the less formal environment of the special education classrooms, especially in School B, the inappropriate utterances were not actively discouraged and, in fact, were sometimes seen as a form of social interaction.

Trends

Given the nonsignificance of the findings when the students were grouped for analysis, it is not possible to draw conclusions, only to discuss the trends which seem to be present. Three strong factors seem to have influenced the outcomes of this study.
The first factor is that of teacher behavior. All of the general education teachers appeared to be focused on the lessons they were teaching and, while they demonstrated mastery of the subject matter, interest in the students, and the use of effective behavior management procedures, there was no obvious attempt to check the comprehension of subject matter by individuals or to encourage the participation of any particular students. Students who were not participating, but who were not being disruptive were often unchallenged.

Teachers in the special education classrooms taught both small group lessons and individual lessons, but they were able to focus on individual students much of the time. Even though several students in the special education classes might be using the same materials, especially in School A, the teacher’s focus was on individual responses. While this attention to individuals could not be as easily achieved in a general education setting, it was the center of the approach in the special education rooms. The result was an increase in the opportunities for each student to respond as well as to receive immediate feedback on that response and encouragement to continue or to expand on the topic.

The second factor was the classroom environment, including the daily routines, the number of students present, and student behavior. In both types of environments, there appeared to be routines that were followed by all of the students. At the time these observations took place, the routines in the general education settings appeared to be well-established and took place somewhat automatically without a great deal of negotiation or discussion among individuals. This may have taken place initially, but was not observed by the investigator. In the special
education settings, there were also routines, but they seemed somewhat more fluid and frequent instances of negotiation were observed between the teachers and the students, if not between the students.

The third factor was that of the differences in the numbers of students in both settings--usually fewer than 10 in special education rooms and usually between 20 and 25 in general education rooms--not only provided more time for individuals to speak in the former setting, but sometimes required that they do so in order to ensure that routines were completed. In the larger groups, there was usually at least one child who could and would perform a task if another child were absent; in the special education settings, a lack of action usually precipitated some verbal discussion in order to accomplish the task.

Although there were a few exceptions on the part of the general education students, they seemed to initiate few social or verbal interactions with the students with autism. When they did interact, it was generally to give directions or commands to the subjects. It should also be noted that those who did attempt to interact often received brief or inappropriate responses, if they received one at all.

The primary function of this study was to describe the purposes for which students with autism used communicative functions and to determine if there were quantitative and/or qualitative differences in the utterances across two educational settings. Further research is needed to replicate these results and to answer questions that arise from an examination of the outcomes which were observed.
The Importance of This Study

The majority of studies of the language of individuals with autism have been reports of a theoretical nature or clinical studies which have attempted to compare subjects with autism to subjects with other disabilities or to nondisabled subjects. In both types of clinical studies, it has been difficult to match subjects on all relevant variables and the results have generally been reported as developmental levels or percentages of some sort. Studies of single subjects have frequently been done in clinical settings, often by examiners who are unfamiliar with the subject and who obtain scores that may represent a subject's ability to perform, but not that subject's actual performance in his natural settings. There is a paucity of descriptive data which represents the performance of students with autism in their educational environments.

The performance of each of the subjects in this study was compared across two settings, a model that eliminated the problems associated with matching subjects. All of the subjects in the school district who met the criteria were included in the study.

The findings of this study will add to the existing body of knowledge about the functional language skills of students with autism and the ways in which they use those skills in classroom settings. In describing how these students use language, the study will also contribute to the understanding of the communication difficulties, including the barriers to communicative interaction, which these students experience.
Limitations of the Study

Generalizations based upon the findings of this study will be limited by the following:

1. Students with autism are a heterogeneous group of individuals who display a wide variety of skills and deficit areas. Aside from the very general characteristics, such as communication and social deficits, which all persons with autism share, individuals with autism may present unique patterns of characteristics and may respond to similar situations in very different ways.

2. Students with autism represent a very small percentage of the population of individuals with disabilities and an even smaller percentage of the human population as a whole. It is difficult to sample a large enough group of students with autism in any area to be able to generalize the results of this study. Numerous replications of this study would be necessary before one could generalize the results.

Implications for Further Research

During the course of this study, several other questions not part of the original proposal arose. The investigation of these additional questions could provide valuable data for the decision-making process involved in how and where to best educate students with autism and so they are included here.

What effect would a directional research question have had on the findings of this investigation?

The subjects in this study demonstrated the great heterogeneity
that is characteristic of the population of individuals with autism. Two of the students were able to use their verbal ability to interact, at least on a limited basis, with adults and peers. They participated in general education experiences with minimal prompting from adults and generally engaged in grade-level academic tasks. The other two students also used language, but their utterances tended to be grammatically simple and used more for egocentric purposes than for interacting with others.

This heterogeneity precluded the drawing of statistically relevant conclusions when data were analyzed for the subjects as a group. However, there were significant differences in quantitative and qualitative language patterns across situations for individual students. All of the students produced a greater number of utterances in special education classes than in general education settings. Given the strong trends shown in this study, there is a basis for hypothesizing a direction in the next study.

2. What effect does the classroom environment have on the use of language by students with autism?

One of the major arguments for including students with autism in general education classrooms is to provide them with normal role models of social and communication skills. Because this study found a greater number of utterances were produced in the special education classrooms and there seemed to be little difference overall in the purposes of the utterances produced across settings, it is important to examine a number of elements in the environments to determine what influence, if any, those environments may have had, or have, on language use by the autistic population. Among the questions that should be answered are
the effects of class size, different teaching methods, and the amount and type of training offered to teachers and nondisabled students before students with autism become members of the group. Also of interest would be the type of classroom activities which seem most likely to facilitate the use of communicative skills.

3. Are there prerequisite skills needed by students with autism to ensure their success in a general education classroom?

The students in this study were included because they were verbal and they divided their educational day between special education and general education classrooms. The investigator did not attempt to examine or compare their skill levels in cognitive, motor, or other academic areas. It would be of interest and perhaps helpful to determine if there were relationships between skill levels in other areas and the use of functional language skills in educational settings. Are there prerequisite skills needed by students with autism to enable them to participate successfully in general education classrooms?

A related question is whether it is, in fact, possible to identify and then to teach the specific skills which will lead to an improvement in and an increase in language use.

Future research projects in this area should also focus on directionality and examine specific behaviors of subjects in each setting.
APPENDICES
Appendix A

Communicative Functions
## Definitions of Functions

### Original List

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requests action (RA)</strong></td>
<td>Student verbally indicates that s/he wants another person to perform, or not perform, an action, e.g. giving an object to the student, performing a service, etc. (&quot;come here&quot;, &quot;give me a drink&quot;, &quot;stop it&quot;).</td>
</tr>
<tr>
<td><strong>Requests attention (RAT)</strong></td>
<td>Student verbalizes to attract the attention of another person. (&quot;hey, Mrs. Smith&quot;, &quot;look at me&quot;).</td>
</tr>
<tr>
<td><strong>Requests permission (RPM)</strong></td>
<td>Student verbally seeks consent from another before s/he acts. (&quot;go walk?&quot;, &quot;may I do that&quot;).</td>
</tr>
<tr>
<td><strong>Request for clarification (C)</strong></td>
<td>Student seeks to understand the previous action or utterance. (&quot;huh?&quot;, &quot;what did you say&quot;).</td>
</tr>
<tr>
<td><strong>Checks comprehension (CC)</strong></td>
<td>Student tries to determine if the conversational partner understood the message. (&quot;did you get it&quot;).</td>
</tr>
<tr>
<td><strong>Comments on self (COS)</strong></td>
<td>Student makes comments about him/herself which are obvious to others. (&quot;I'm playing this game&quot;).</td>
</tr>
<tr>
<td><strong>Comments on others (COO)</strong></td>
<td>Student makes comments about others which are either obvious or of a personal nature. (&quot;he's washing his hands&quot;, &quot;his name is John&quot;).</td>
</tr>
<tr>
<td><strong>Comments on an object (COB)</strong> or a topic</td>
<td>Student provides information, which is either known or obvious to others, about an object in the immediate environment. (&quot;car&quot;, looking at a car; &quot;that box is red&quot;).</td>
</tr>
<tr>
<td><strong>Seeks information (SI)</strong></td>
<td>Student verbally seeks an answer to something s/he does not know. (&quot;what's that?, &quot;what's your name&quot;).</td>
</tr>
<tr>
<td><strong>Gives information (GI)</strong></td>
<td>Student verbally tells another person something s/he did not know or was not aware that the student knew. (&quot;my grandma came to visit&quot;).</td>
</tr>
<tr>
<td><strong>Responds to questions (RQ)</strong></td>
<td>Student verbally responds to a direct question or command with a simple &quot;yes&quot; or &quot;no&quot;.</td>
</tr>
<tr>
<td><strong>Responds to questions (RQI)</strong></td>
<td>Student responds to a question and adds substantive or original information. (&quot;yes, my new book is about animals&quot;)</td>
</tr>
<tr>
<td><strong>Protests (P)</strong></td>
<td>Student verbally indicates that s/he does not want to participate in an activity or does not agree with another's position. (&quot;I don't want to&quot;, &quot;that's not right&quot;).</td>
</tr>
<tr>
<td><strong>Expresses feelings (EF)</strong></td>
<td>Student verbalizes physical or emotional states, preferences, likes or dislikes. (&quot;yuck&quot;, &quot;I want that one&quot;).</td>
</tr>
<tr>
<td><strong>Social routines (SR)</strong></td>
<td>Student verbalizes overlearned, automatic, social responses</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Self-talk (ST)</td>
<td>Student verbalizes to direct his/her own behavior and not to communicate with others. (&quot;sit down&quot;, as the student sits; &quot;don't touch those buttons&quot;).</td>
</tr>
<tr>
<td>Echolalia (E)</td>
<td>Student repeats all or part of the utterance of another individual. This may occur immediately or after a time delay.</td>
</tr>
<tr>
<td>Noninteractive Comment (NC)</td>
<td>Student produces verbal combinations of sounds, syllables, or words which appear to have neither self-regulatory functions nor communicative intent. (&quot;ah, ah, ah&quot;; &quot;two cheeseburgers&quot;, repeated as the student slides down a slide).</td>
</tr>
<tr>
<td>Perseverative topics (PT)</td>
<td>Student produces utterances on a topic about which s/he frequently talks, but which have little relevance to the immediate situation. (&quot;I have a Hoover vacuum cleaner at my house&quot;, spoken during math class).</td>
</tr>
<tr>
<td>Uncodable (X)</td>
<td>The utterance does not contain enough information to be coded, even though some of the words may be intelligible.</td>
</tr>
<tr>
<td>Language play (LP)</td>
<td>Nonmeaningful or inappropriate utterance produced in a social interaction. (&quot;you're a hammerhead&quot;; &quot;throw him in the fireplace&quot; (without intending to)).</td>
</tr>
</tbody>
</table>
Appendix B

Communicative Functions As They Were Collapsed for Data Analysis
Communicative Functions
Compressed Categories

Requests:
- Requests action
- Requests attention
- Requests permission

Clarification:
- Request for clarification
- Checks comprehension

Comments:
- Comments on self
- Comments on others

Information:
- Seeks information
- Gives information

Responds to questions

Social:
- Expresses feelings
- Social routines

Protest

Echolalia

Noninteractive comments
- Self-talk
- Perseverative topics
- Language play

Reading
Appendix C

Research Protocol Clearance Letter From Western Michigan University Human Subjects Institutional Review Board
Date: April 15, 1992
To: Mary Peterson
From: Mary Anne Bunda, Chair
Re: HSIRB Project Number 92-03-25

This letter will serve as confirmation that your research protocol, "A Comparison of the Spontaneous Utterances of Children with Autism in Mainstream and Special Education Settings" has been approved after full review by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any change in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

xc: Nicolaou, Special Education

Approval Termination: April 15, 1992
Appendix D

Parental Permission Letter
Dear Parent or Guardian:

I am asking permission for your child to participate in a research project involving the interactions of students with autism in both general education and special education classrooms. This research will be part of my doctoral dissertation at Western Michigan University. Information for this study will be gathered during April or May, depending upon the school schedule. Your child will be observed and his speech will be recorded in both his general education and his special education classrooms for approximately four to six hours in each setting. These observations will be spaced over a period of several days. The recordings will be made by using a personal-size tape recorder. I will also be in the classroom to make notes on the interactions which occur. This non-intrusive method of collecting information will ensure that your child will not miss any classroom instruction time. Although there will be no immediate benefit to your child for his participation in this study, it is hoped that the results will impact mainstreaming practices, curriculum planning, and teacher training programs.

After the recordings have been made, they will be transcribed by myself and coded by myself and a graduate student in the area of speech pathology. All observational data will be safely stored; they will be shared only with other professionals involved in the research process. At no time will any recording or transcription be identified by your child's name. If the results of this study are published or shared in a professional meeting, no identifying information will be used.

If you have any questions, please call me at (616) 842-5567. You may also call my faculty advisor, Dr. George Hans, at (616) 387-5946. Thank you for your help in this research.

Sincerely,

Mary E. Peterson
Department of Special Education
Western Michigan University

Please detach and return the information below to your child's teacher.

I give permission for ___________________ to participate in this study and for his/her spontaneous communications to be tape recorded. I also give permission for this information, without my child's name, to be shared with the dissertation committee.

Signature: ___________________________ Date: ____________________
Appendix E

Diagnostic Criteria for the Autistic Syndrome


Rule 15.(1) "Autism" means a lifelong developmental disability which is typically manifested before 30 months of age. "Autism" is characterized by disturbances in the rates and sequences of cognitive, affective, psychomotor, language, and speech development.

(2) The manifestation of the characteristics specified in subrule (1) of this rule and all of the following characteristics shall determine if a person is autistic:
   (a) Disturbances in the capacity to relate appropriately to people, events, and objects.
   (b) Absence, disorder, or delay of language, speech, or meaningful communication.
   (c) Unusual, or inconsistent response to sensory stimuli in 1 or more of the following:
      (i) Sight.
      (ii) Hearing.
      (iii) Touch.
      (iv) Pain.
      (v) Balance.
      (vi) Smell.
      (vii) Taste.
      (viii) The way a child holds his or her body.
   (d) Insistence on sameness as shown by stereotyped play patterns, repetitive movements, abnormal preoccupation, or resistance to change.

(3) To be ineligible under this rule, there shall be an absence of the characteristics associated with schizophrenia, such as delusions, hallucinations, loosening of associations, and incoherence.

(4) A determination of impairment shall be based upon a comprehensive evaluation by a multidisciplinary evaluation team. The team shall include, at a minimum, a psychologist or psychiatrist, a teacher of speech and language impaired, and a school social worker.

(5) A determination of impairment shall not be based solely on behaviors relating to environmental, cultural, or economic differences.
Diagnostic criteria for 299.00 Autistic Disorder

A. A total of six (or more) items from (1), (2), and (3). with at least two from (1), and one each from (2) and (3):

(1) qualitative impairment in social interaction, as manifested by at least two of the following:

(a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.
(b) failure to develop peer relationships appropriate to developmental level.
(c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest).
(d) lack of social or emotional reciprocity.

(2) qualitative impairments in communication as manifested by at least one of the following:

(a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gestures).
(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.
(d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.
(3) restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

(a) encompassing preoccupation with one or more stereotyped and restricted 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).
(d) persistent preoccupation with parts of objects.

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.
Appendix F

Examples of Student Language Samples
S #1 was called to sit in a small reading group with ten other students in a general education classroom. As soon as the teacher opened her book, S went into the bathroom. When he came out, he played with his pencil. The rest of the students were holding up 1, 2, or 3 fingers to indicate which sentence was correct).

a = S, which sentence is it?
s = I don't know [RQ] [app]
a = OK, come up here and read them.
(S read all but the last word, which the teacher supplied)
a = OK, now read this one.
s = I need help [RA] [app]
a = (skipped a sentence, then said) and this one?
s = the one that says xxx to see the duck [RQ] [inapp]
a = who thinks that's right?
s = no, I don't know [Gl] [app]
a = no, that's not right.
a = did you read this story with (an aide) or (a teacher)?
(no response from S to that question, but he read another sentence)
a = was that what the story was about everyone?
peers = no
a = what was the story about?
a = let's tell S.
(group read the sentence).
(S made an unintelligible response and began to play with his markers).
a = S, I'd like your markers right here.
a = and your pencil, too.
a = thank you.
a = I'd like you to sit in front of K, please.
a = S? (after S did not respond)
s = yeah [RQ] [app]
a = sit right here and we'll work hard today, OK?
s = yeah [RQ] [app]
(Class continued to discuss topic sentences. S looked at the calendar).
s = today's Saturday [Gl] [inapp]
a = I know.
a = we haven't done calendar yet.
a = S, which one is the answer?
(S read a sentence, the correct answer to the teacher's question).
Subject #1: The special education teacher was talking to him about going to a general education classroom for reading.

(S picked up his written schedule and studied it).
s = cross off math [ST] [app]
(S left the room for reading. When he returned, he brought his behavior chart to the teacher).
s = hey, guess what, put "x" on "does good work" [RA] [app]
s = I have to look for my new card [GI] [app]
s = it's gone [GI] [app]
s = I'm looking for it [GI] [app]
a = do we have enough or not enough marks to get a star?
s = not enough [RQ] [app]
a = not enough for what?
s = a star [RQ] [app]
a = a star, yeah, but you do get a star because you did what?
a = read the words with the kids <right>?
s = <yeah> [RQ] [app]
a = OK, I'll get you a star.
(Another observer arrived and the teacher introduced him).
a = OK, you need that star, right?
s = yeah [RQ] [app]
(Teacher reviewed the procedure for earning stars).
a = and so how many is this?
s = x
a = all right, let's count them.
s = 1, 2, 3, 4, 5. [GI] [app]
a = five! all right, five more to go!
a = M, it's time to put those away and come over here.
s = I got dirty teeth [GI] [inapp]
a = S, it's time to do spelling - come on over here.
(As two adults discussed how a workbook page should be done, S got up and walked away).
s = I'm not gonna do these [P] [inapp]
a = S, where are you going?
s = go find something [RQ] [app]
a = OK, what's your job right now, to get up and walk away or to stay in your desk?
s = don't know [RQ] [inapp]
Subject #2: Sitting in a general education classroom, waiting for the teacher to finish some morning organizational activities. He was paging through a reading book, talking to no one.

s = problems, problems? [NC] [inapp]
a = OK, boys and girls, let's put everything away, please.
a = we're going <to start>
s = <problems, problems> [NC] [inapp]
a = put all your books away.
s = problems, problems.
a = let's put our toys away, too.
a = you think you can leave that there and <be OK with it>?(talking to a student who had a toy)
s = <problems, problems> [PC] [inapp]
a = or do you think you should put it under your table?
a = that might be better.
s = problems, problems [PC] [inapp]
a = S, S, let's be real quiet now (whispered to him).
a = all books put away for now please.
s = no, no x away (said to himself) [ST] [inapp]
s = no, you put it away, no, you put it away [ST] [inapp]
(teacher took attendance and attended to more paper work for several minutes; S hummed, tapped his feet, and played with two pencils. Teacher then began to pass out papers and explain how the students should complete them.)
a = S, do you have more <than one pencil>?
s = <bad time> [RQ] [inapp]
a = I want you to put both pencils back and have one in your hand and get ready for class. OK?
s = OK [RQ] [app]
(S produced some unintelligible statements and then began to draw lines on his papers).
s = now start xx dealers near you [NC] [inapp]
s = but you don't x pictures [ST] [app]
s = ah, come on, play this game (working independently) [ST] [app]
s = oh, man (trying to figure out a word phonetically) [EF] [app]
s = all right, S, all right, S, all right, S [ST] [app]
s = what goes with vowel? [SI] [app]
s = Miss A, what goes with vowel? [SI] [app]
a = just a minute, honey, we're going to talk about it, OK?
S #2 had just returned to the special education room. There were two other students in the room and they were shooting basketballs into a hoop. It was almost lunch time, but S wanted popcorn.

a = oh, OK, get your bag of popcorn.
s = thank you [SR] [app]
a = you're welcome.
(S sat at the table with the observer. He began to eat his popcorn and to ask questions, but much of his verbalization was unintelligible.)
a = S! Go to the other table, S.
a = you're being nosy now.
s = look! (he was looking at another student's journal and pointed to one of the pages) [RA] [app]
a = what did T do yesterday?
s = um, played volleyball game on the Sega Genesis [RQ] [app]
s = I have a Sega Genesis like him [Gl] [app]
a = do you?
s = yes [RQ] [app]
a = want to see my Sega Genesis?
s = huh? [C] [app]
a = want to see my Sega Genesis?
s = what, today? [C] [app]
a = yeah.
s = yeah! [RQ] [app]
a = I got a x (aide had a specific Sega game).
s = you got me that? [C] [app]
a = no, I got that for R (her son).
a = who'd I get it for?
s = R [RQ] [app]
a = yeah.
(S and the adult continued this discussion a bit longer and then S started to draw in his journal)
s = well, I saw a Sonic the Hedgehog comic book (to no one) [Gl] [inapp]
s = I saw a Sonic the Hedgehog comic book (to the adults) [RATT] [app]
a = do they have a cartoon on tv yet?
s = uhhuh [RQ] [app]
a = what's the name of it?
s = Sonic the Hedgehog [RQ] [app]
s = that what kind of cartoon is that [CC] [app]
s = that's what they start at [Gl] [inapp]
S #3 joined the general education students who were working at tables, reading to a partner and then coloring the picture on each page they read. He sat at a table and colored but did not read. He appeared to take no notice of the others and they did not talk to him.

s = ps, ps, ps, hey, hey, hey [NC] [inapp]
s = good job (to himself) [ST] [app]
s = m-o-o-o-m [NC] [inapp]
s = you all right? (to no one) [NC] [inapp]
a = nice picture, S, what is that?
s = (unintelligible answer)
a = what is that?
s = (unintelligible answer)
a = oh
s = ah, ice cream [NC] [inapp]
(Teacher looked around for another child and was told he had gone to speech)
s = ’peech, speech [E] [app]
a = S, you have to keep the tops on the markers
s = tops markers [E] [app]
a = yeah, keep the tops on.
(S continued to color and to make comments to himself)
s = it's that one, it's that one [ST] [app]
s = come here [ST] [inapp]
peer = we have all these journal pages
s = journal [E] [app]
a = S, you want snack?
s = you want snack? [RQ] [app]
s = uh, uh, uh, uh (jumped up, looked at the ceiling) [NC] [inapp]
a = Sh, sh, S.
peer = S!
s = S! [E] [app]
(S took a cookie)
s = thank you [SR] [app]
a = say it again
s = thank you [SR] [app]
s = xx pizza [NC] [inapp]
a = eat your cookie, S
s = I eating my cookie [COS] [app]
s = hit, hit, hit [NC] [inapp]
Student #3: Eating lunch in the special education classroom with three peers. The teacher was urging him to try potato salad.

a = try it.
a = if you don't like it, you can spit it out.
s = put that down! [RA] [app]
a = OK, I'll put it down.
(S continued to eat and to hum)
s = m,m,m,m,ma [NC] [inapp]
a = want some pizza?
s = uuhuh, want some pizza (teacher's name) [RQ] [app]
peer = want some pizza, S?
s = want a pizza [RQ] [app]
s = want a pizza (handing his plate to an adult) [RA] [app]
peer = it's a food.
s = it's a food [E] [app]
(S began to eat his pizza and produced a series of utterances directed at no one)
s = come here, come here, come here, let me see it (to no one) [NC] [inapp]
s = gimmee x, gimmee a two, gimmee a ah, ah, ah [NC] [inapp]
a = shut up (laughing)
s = shut up, shut up [E] [app]
s = stop it, stop it, stop it (to no one) [ST] [app]
(teacher left the room to get some pop)
a = you want some Mountain Dew?
s = want Mountain Dew [RQ] [app]
a = OK pick up that stuff and throw it away.
a = here, throw that away, S
a = now sit down and have some pop.
s = want Mountain Dew Pepsi [RA] [app]
s = I be, I be a basketball (to no one) [NC] [inapp]
a = OK, what do you want (offering two different kinds of pop).
a = what do you want, Mountain Dew or Pepsi?
s = Dew Pepsi [RQ] [app]
s = want the Pepsi [RQ] [app]
s = no, want two pop [GI] [app]
a = you get the Mountain Dew
s = no, that's, no you stay (in a high pitched voice) [ST] [inapp]
Student #4 was sitting in a group on the floor in the kindergarten room. The group was discussing a weather chart. S was sitting next to a peer from his special education room. The peer was coughing.

s = all right, M? [SR] [app]
s = quit! (the peer touched him) [RA] [app]
(Teacher and the class reviewed the story she was about to read).
s = M! (as he put his untied shoe in M's lap) [RA] [app]
s = good job (looking at his tied shoe) [SR] [app]
s = thanks, M [SR] [app]
(Class discussed whether each statement in the book was a fact or fiction)
peer = fiction
s = fiction [E] [app]
s = T, T (called a peer's name, but didn't look around for him) [COO] [app]
(After this lesson, the students chose areas of the room in which to play.
S went to the block area and began to collect as many blocks as he could).
peer = will you tell him to put those down (to the teacher)?
peer = will you tell him to give me those blocks?
a = maybe he'd like to help you (build).
peer = he doesn't know how.
peer = want to play, you guys? (to other students)
s = here, here (holding out blocks to peers) [RA] [app]
peer = S is taking all the blocks!
s = I wanna go with blocks [Gl] [app]
(Eventually, S left the block area and went to the housekeeping area)
s = I making popcorn [Gl] [app]
s = I making popcorn [Gl] [app]
(A peer entered the housekeeping area and S protested)
peer = I want a hamburger.
s = stop it, stop it (peer reached for toy food) [RA] [app]
s = that's mine [Gl] [app]
s = this hamburger (threw it at peer) [Gl] [app]
s = baby, baby (picking up a doll) [Gl] [app]
(With encouragement, S helped to clean up the play area)
a = put them in there nice, S.
peer = time to clean up
s = time to clean up [E] [app]
Student #4: Sitting at a table in the special education classroom with two peers, writing in his journal).

peer = gonna go outside and play?
s = no, you not out goside and play [RQ] [app]
(The next three lines were spoken as S looked at the wall).
s = that's cold outside [Gl] [app]
s = no, no go outside and play [Gl] [app]
s = chee, chee, chee, chee, look, look, look he pushed me [NC] [inapp]
(S picked up his pencil and alternately drew in his journal and chewed on his pencil).
s = what's the matter, M? [SI] [inapp]
s = get that out of your mouth! [ST] [app]
a = what'd you make?
peer = that's Shaq
peer = he's pulling the rim down
s = duck, duck, duck, duck, goose [NC] [inapp]
s = that's a Janet Jackson (showing his book to the observer) [Gl] [app]
a = who's that? (asked by observer)
s = huh? [C] [app]
a = that's Janet Jackson (teacher translated for the observer)
s = no, no, that's Janet [Gl] [app]
(Student started to work with a computer-like toy. The computer voice repeatedly said "insert a card")
s = here you go (trying to insert the card) [ST] [app]
a = do you want to do this, S?
s = huh? [C] [app]
a = do you want that open?
a = what do you want?
s = S [RQ] [inapp]
(S gave the computer to the teacher and looked at the teacher's activity)
s = what you doin'? [SI] [app]
a = here, S (handing him a stack of cards)
s = thank you [SR] [app]
(Peer came over to look at the cards S was sorting)
s = no, quit [RA] [app]
s = no, that's mine [P] [app]
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