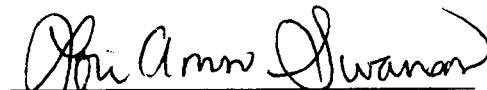


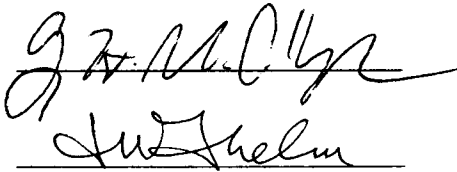
To the Graduate Council:

I am submitting herewith a thesis written by Misty Ann Vetter entitled "Using Adult Redirects to Increase the Social Interactions Among Children with Autism and Their Normally Developing Peers." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Speech Pathology.



Lori Ann Swanson, Major Professor

We have read this thesis and
recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor and
Dean of The Graduate School

USING ADULT REDIRECTS AND PROMPTS TO INCREASE
INTERACTIONS AMONG CHILDREN WITH AUTISM AND
THEIR NORMALLY DEVELOPING PEERS

A Thesis
Presented for the
Master of Arts Degree
The University of Tennessee, Knoxville

Misty Ann Vetter

August 1998

Dedication

This thesis is dedicated to the precious children I have worked with for a year and a half, Ryan and Savannah. You have both been my inspiration for continuing the research that is so important to me. Also to the other children with autism with whom I may come in contact with in the future, I hope that this project has provided me with a little bit of the knowledge that I will need to best serve each one of you.

Acknowledgments

First and foremost, I would like to acknowledge my faculty advisor, Dr. Lori Swanson, for the endless hours she gave for the completion of this project. Her enthusiasm and encouragement has kept me going each day. To my other committee members, Dr. Jim Thelin, who stretched beyond his scope of practice to understand this topic, to Dr. Gary McCullough, who provided much insight and positive feedback, and to Vicki Barnes who inspired me with her knowledge of autism, I thank you all. Also, I will always be indebted to my research assistants, Laura Wilkins, who assisted me with the data collection, and Kimberly Maguire who spent hours on the reliability. I could not have completed this project without them.

I would also like to thank the numerous friends and faculty in the department of Audiology and Speech Pathology who greeted me each day with words of encouragement. A special thank you to Heather Sonner who would drop anything to help me out in the middle of a crisis, to the rest of the "thesis gang" who provided much needed support on days that I just needed to gripe, to Brenda Beverly who provided unlimited professional and personal advice, to my first year buddies for their constant prayers, hugs, and notes of encouragement, and to Chantelle Carroll who always made sure I was taking care of myself.

To the families that I work for, thank you for your unending patience and understanding as I constantly changed my work schedule. To my family, who struggled to understand what I was going through, but provided constant support, I thank you for your love and patience.

Lastly and most importantly, I would like to thank God who provided me with the strength to continue each day. I know that I could not have achieved this goal without His guiding hand.

Abstract

Recent research has investigated the successfulness of using adult redirects and prompts to increase the social interactions of children with specific language impairment (SLI) and their normally developing peers (Schuele, Rice, & Wilcox, 1995). Given the limited child-peer interactions among children with autism, it was hypothesized that they would also benefit from this same form of treatment. Thus, this study sought to investigate the effect of the use of adult redirects and prompts on the interactions of children with autism and their normally developing peers. Specifically analyzed were the number of initiations, the successfulness of those initiations, and the mean length of the interactions (MLI).

Twelve subjects with autism and 12 normally developing children in pre-kindergarten through second grade grouped into dyads were randomly assigned to experimental and control groups. Each dyad participated in a 30 minute play session. In the experimental group, the principal investigator (PI) provided redirects and prompts during the first half of the play session to encourage the children to interact, but withdrew them during the second half. In the control group, the PI never provided redirects or prompts.

Based on the data, the intervention did not appear to have an effect on the subjects with autism for number of initiations or number of successful initiations, however there was a slight increase in the length of the MLI for these subjects from first to second halves of the play sessions. The intervention may have influenced the normally developing subjects as indicated by their higher numbers of initiations and successful

initiations compared to their control counterparts. The descriptive data that were gained from this study were also important such as the limited use of nonverbal initiations and the effects of appropriate peer matching. Future investigations would be beneficial to analyze the efficacy of different methods of delivering redirects and prompts. Also evaluating the different types of initiations and responses (verbal versus nonverbal) used by the children would be helpful for planning intervention.

TABLE OF CONTENTS

I. INTRODUCTION AND REVIEW OF THE LITERATURE.....	1
Introduction.....	1
Autism	1
Definition	1
Prevalence and etiology	2
Range of expression	3
Social impairments	3
Communication and language impairments	5
Stereotypic behaviors	6
Implications for Research	7
Review of the Literature	8
Pragmatic Deficits of Children with Autism	8
Communication behaviors	8
Social skills	10
Negative Social Spiral	12
Peer-Mediated Approaches to Social Interaction	13
Training of Normally Developing Peers	15
Intervention Studies	17
Proximity	17
Peer-initiated	21
Prompt and reinforce	23
Use of adults in prompt/reinforce intervention	24
Redirects	26
Summary of the Review of the Literature	28
Purpose of the Study and Research Questions	30
II. METHOD	31
Subjects.....	31
Informed Consent	31
Selected Schools	32
Subject Selection	32
Dyad Formation	34
Subject Data	34
Obtaining Subject Assent	35
Procedure	36
Play sessions	36
Treatment group	36
Control group	38

Recording Procedures	38
Data analysis	39
Initiations	39
Responses	40
Mean length of interaction	40
Intra- and Inter-Judge Reliability	41
III. RESULTS	44
Statistical Analysis of Data	44
Initiations	48
Successful Initiations	51
Mean Length of Interaction	54
Summary of Results	61
IV. DISCUSSION	63
Purpose of Study	63
Initiations	63
Factors Influencing Initiations	64
Successful Initiations	67
Types of Responses	68
Mean Length of Interaction	69
Redirects and Prompts	71
Successful versus unsuccessful prompts	74
Toy Play	74
Clinical Implications	76
The importance of an IQ score	76
Negative social spiral	76
Mainstreaming	77
Teacher and parent expectations	78
Limitations of the Study	79
Future Research	81
Summary	82
REFERENCES	86
APPENDICES	95
Appendix A	96
Appendix B	97
Appendix C	100
Appendix D	102
VITA	103

LIST OF TABLES

TABLE	PAGE
1. Descriptive Information on Subjects.....	33
2. Multivariate Analysis of Variance for the Interactions Between the Type of Children, the Time, and the Group for the Number of Initiations.....	45
3. Multivariate Analysis of Variance for the Interactions Between the Type of Children, the Time, and the Group for the Number of Successful Initiations.....	46
4. Multivariate Analysis of Variance for the Interactions Between the Type of Children, the Time, and the Group for the Mean Length of the Interactions.....	47
5. Number of Initiations For Subjects with Autism and Normally Developing Subjects Within Both Treatment and Control Groups.....	49
6. Number of Successful Initiations For Subjects with Autism and Normally Developing Subjects Within Both Treatment and Control Groups.....	52
7. Mean Length of Interaction For Subjects with Autism and Normally Developing Subjects Within Both Treatment and Control Groups.....	58
8. Examples of Elaborate Verbal Responses.....	70

LIST OF FIGURES

FIGURE	PAGE
1. Number of Initiations Based on Group Medians For Both Treatment and Control Groups Combining First and Second Halves of the Play Sessions	50
2. Number of Successful Initiations Based on Group Medians For Both Treatment and Control Groups Combining First and Second Halves of the Play Sessions	53
3. Percentages of Successful Initiations For Both Treatment and Control Groups Comparing First and Second Halves of the Play Sessions	55
4. Mean Numbers of Initiations and Successful Initiations for Subjects with Autism in Both Treatment and Control Groups Comparing First and Second Halves of the Play Sessions	56
5. Mean Numbers of Initiations and Successful Initiations For Normally Developing Subjects in Both Treatment and Control Groups Comparing First and Second Halves of the Play Sessions	57
6. Mean Length of Interaction For All Subjects In Both Treatment and Control Groups Comparing First and Second Halves of the Play Sessions	59
7. Mean Length of Interaction Based on Group Medians For All Subjects In Both Treatment and Control Groups Combining First and Second Halves of the Play Sessions	60

CHAPTER I

Introduction and Review of the Literature

Introduction

Autism

The role of the speech-language pathologist in the diagnosis and treatment of autism has greatly increased in recent years. As researchers continue to uncover the basic nature of Autistic Disorder (Diagnostic and Statistical Manual of Mental Disorders-IV [DSM-IV], American Psychiatric Association, 1994) and as parents of children with autism continue to turn to speech-language pathologists for assistance, the communication deficits of individuals with autism become more apparent. The need for effective intervention with this population continues to rise. As Prizant (1982) describes, the ability to communicate is "the foundation of social, cognitive, and emotional growth. It is also the key to independence and personal productivity, for without a means to communicate, one cannot learn from others and ultimately develop a sense of self-integrity and self-differentiation" (p. 531). For individuals with autism, the inability to communicate is an integral part of a social disorder that inhibits their growth in the social, cognitive, and emotional areas and limits their daily interactions.

Definition.

Autism has been a subject of disagreement by investigators on specific diagnosis criteria and characteristics. According to the DSM-IV (1994), "the essential features of Autistic Disorder are the presence of markedly abnormal or impaired development in

social interaction and communication and a markedly restricted repertoire of activity and interests" (p. 66), and it is included in the category of Pervasive Developmental Disorders. The disorder is typically diagnosed after the second year of life and often is accompanied by one or more of the following associated features: mental retardation, unevenness in cognitive skills, receptive language skills poorer than expressive language skills, hyperactivity, decreased attention span, impulsiveness, aggressive or self-injurious behaviors, temper tantrums, deficits in the sensory system, and abnormalities in eating, sleeping, moods, and response to fear (DSM-IV, 1994). It is also important to note that children diagnosed with autism must have an onset prior to 3 years of age.

Prevalence and etiology.

The DSM-IV (1994) reports that autism is typically present in males 4:1 over females, however females tend to have a more severe involvement. The prevalence of autism is 2 to 5 in every 10,000 births, and there may be an increased risk among siblings. Unfortunately, the number of children diagnosed with autism may be lower than the predicted incidence figures because some children may escape diagnosis or be misdiagnosed. Because autism is a developmental disorder, it is difficult for professionals to agree on the exact cause of autism. Many professionals, including psychologists, educators, investigators, etc., have different viewpoints of explaining the behaviors associated with autism. Possible causes may include medical complications such as Fragile X, tuberous sclerosis, and rubella. However, there are a small number of cases reported from medical conditions compared to the total population. Other possible causes could include genetic factors, behavioral features, familial history, or chemical

imbalances (Rutter & Schopler, 1988). There has also been research done on the brains of individuals with autism that show abnormalities or differences from the brains of people without deficits such as enlargement in the cerebral hemisphere cavities, atypical patterns of cerebral asymmetry, reduced development in cerebellar tissue, high levels of cell activity, and reduced blood flow in the frontal and right temporal lobes (Courchesne, 1989; Trevarthen, Aitken, Popoudi, & Robarts, 1996).

Range of expression.

One of the most intriguing aspects of autism is the variability in each individual diagnosed. For example, "some gentle wraith-like 7-year-old might be observed as would be some screeching adolescent who banged his head to the point of skull fracture" (Volkmar & Cohen, 1988, p. 71). Three-fourths of the individuals may have some degree of mental retardation while some may have above average intelligence (Rutter, 1978). Some may have seizure activity or other medical conditions while others appear perfectly healthy. This diverse range of expression creates a challenge for professionals who diagnose as well as treat children with autism.

Social impairments.

In attempts to apprehend the social impairments of children with autism, investigators have described these children as unable to relate to others (Kanner, 1943); failing to develop social relations (Rutter, 1978), and socially aloof (Wing, 1988). According to Wing (1988), the impairment of social interaction in individuals with autism can be divided into three areas: social recognition, social communication and social imagination and understanding. Social recognition is defined as "the ability to

recognize that other human beings are the most interesting and potentially rewarding features of the environment" (Wing, p. 92). This impairment of social recognition is seen in individuals with autism in their indifference to others as well as in their inappropriate and/or passive interaction behaviors. This passive behavior would have a major impact on their initiations to their peers. The impairment of social communication "affects the giving and receiving of nonverbal, preverbal, and verbal social signals" (Wing, p. 93), as well as conversation and the discussion of feelings and ideas. This communication impairment is also seen in their communication of needs only, lack of desire to communicate with others, and lack of appropriate or reciprocal speech. The responses of the children with autism to their peers would be affected by this communication impairment. Social imagination and understanding involves pretend and imaginary play as well as imitation skills. Impairment in this area of social interaction may result in limited or lack of pretend play and imitation, or imitation of play and speech without an understanding of it, and an inability to share emotions with other people (Wing, 1988). This part of the social interaction deficit of children with autism would limit the content or quality of their initiations, and thus limit the responses from the peers.

Rutter and Schopler (1988) point out that it is important to consider not only the social skills that the child with autism lacks, but also how the skills that the child does have deviate from the norm for his/her mental age. They also describe the social deficits in children with autism as "a basic deficit in the capacity to form relationships" (Rutter & Schopler, 1988, p. 19). This deficit appears in the following characteristics:

(1) a failure to use eye-to-eye gaze, facial expression, body posture, and gesture to regulate social interaction; (2) rarely seeking others for comfort or affection; (3) rarely initiating interactive play with others; (4) rarely offering comfort to others or responding to other people's distress or happiness; (5) rarely greeting others; and (6) no peer friendships in terms of a mutual sharing of interests, activities, and emotions-despite ample opportunities (Rutter & Schopler, 1988, p. 19).

These social impairments may also cause a failure to develop peer relationships or a lack of interest in developing friendships (DSM-IV, 1994).

Communication and language impairments.

Creak (1972) stated that children with autism "appeared not only to have nothing to communicate and nothing to communicate with, but also seemed to have no urge or direction toward acquiring these elemental human attributes" (p. 6). Rutter and Schopler (1988) pointed out that not only speech, but many other aspects of the communication process as well are affected in a child with autism. They have a basic deficit in the capacity to use language for social communication as observed in their lack of reciprocal conversations, inappropriate responses or failure to respond, word reversals (i.e., pronouns and prepositions), echolalia, and idiosyncratic word use (Rutter & Schopler, 1988; Wing, 1988). Other aspects of speech affected by autism are the individual's intonation, volume, pitch, rate, and rhythm (DSM-IV, 1994).

Tager-Flusberg (1989) interlinked communication and language of a child with autism when she stated:

From the earliest stages in communication development, autistic children show profound problems with key aspects of intentional communication, especially those that are exclusively social-interactive, such as establishing joint attention, informing, and initiating. This deficit continues to pervade the autistic child's communicative behavior once language begins to be established. The grammatical structures used, the lexicon that develops, and the meanings conveyed in the child's language all reflect this fundamental communicative deficit (p. 106).

The communication deficit in children with autism affects all aspects of communication and is characterized by a break down between the form and function of language that clearly affects pragmatic development.

Stereotypic behaviors.

Stereotypic behaviors are the repetitive and restricted activities or patterns which include inflexible routines, repetitive motor movements, or preoccupation with one interest or object (DSM-IV, 1994). Some examples of these behaviors noted in the DSM-IV include lining up toys, showing resistance to change, talking about the same topic over and over, fascination with parts of objects, abnormal attachment to inanimate objects, and body movements such as hand clapping, spinning, flapping, rocking, or toe walking. These stereotypic behaviors are often seen as inappropriate play behaviors that once suppressed may increase appropriate play skills (Koegel, Firestone, Kramme, & Dunlap, 1974). Explanations for such behaviors often lead to the need for sensory input (Durand & Carr, 1987). One researcher suggested that these stereotypic behaviors are the

ways a child with autism infringes order on a disorganized social environment (Cairnes, 1986). Whatever the cause of these behaviors, it is important to note that they may interfere with education or interactions with others.

Implications for Research

There is a need for investigating new intervention techniques to assist individuals with autism with their communication deficits. Investigators in the past have studied different types of intervention such as peer initiated interaction (Lee & Odom, 1996, Ragland, Kerr, & Strain, 1978; Sainato, Goldstein, & Strain, 1992) and prompt/reinforce interaction (Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Strain, Kerr, & Ragland, 1979) techniques. There has been little research on the use of adults in the social intervention of children with autism and their peers.

Lord (1984) pointed out that children with autism often reach out to adults for interaction rather than to another child. In turn, it is thought that adults might have a positive impact on these children with autism during their interactions with normally developing children. Research is warranted to determine whether children with autism increase their social interactions based on adult intervention and reinforcement.

Schuele, Rice and Wilcox (1995) found that when an adult provided redirects to specific language impaired (SLI) children, their interactions with other children increased. This form of treatment has not been studied with children with autism. Similar to children with autism, children with SLI may have difficulty with initiating interactions with their peers and may prefer to interact with an adult rather than a peer. Based on these similarities between children with SLI and children with autism, it is hypothesized

that using adult redirects, along with prompts to encourage children who are not interacting, might be useful with this population as well.

Review of the Literature

Pragmatic Deficits of Children with Autism

Pragmatics, the study of language in context, includes aspects of language such as cognitive-social skills, communicative functions, conversational rules, narrative abilities, problem solving, and play (Wetherby, 1986). It is easy to deduce based on the characteristic impairments of children with autism that they would have a great difficulty with each of these aspects of pragmatics. Watson (1987) concluded that pragmatic deficits in children with autism are thought to be primarily related to deficits in nonverbal cognitive and social skills.

Communication behaviors.

Some researchers have found that even the smallest amount of communication such as an eye gaze or gesture produced by children with autism may have intent. It is important to consider the situation and abilities of the child when analyzing his/her communication behaviors. One topic intensely studied by many researchers is echolalia in children with autism. Echolalia is the repetitive speech pattern, either immediate or delayed, often heard in verbal children with autism. Researchers have exhaustively studied the functionality (Kanner, 1943; Prizant, 1987; Prizant & Duchan, 1981; Wolff & Chess, 1965) and intent (Paccia & Curcio, 1982; Schuler, 1979) of echolalia. Prizant and Duchan (1981) found that echolalia seemed to serve a variety of functions such as turn-taking, declaration, answering yes, and requesting. Other researchers have discovered

that echolalia may indicate the child's best attempt at maintaining contact with others (Caparulo & Cohen, 1977; Fay, 1973; Shapiro, 1977). Echolalia can become an obstacle in analyzing language competence in children with autism. The echolalic utterances can cause the listener to think that the child has a higher level of language structure and comprehension than the child actually does. Though the child may use complex language, he may not understand what he is saying.

Wetherby and Prutting (1984) studied the communication behaviors of children with autism at early stages of development. The purpose of the study was to compare the use of communicative acts by children with autism and normally developing children who were all functioning at comparable language stages. The subjects were four children with autism, ages 6:11 to 11:10, and four normally developing children, ages 1:0 to 2:2. Each child was videotaped during free play and structured activities at home and at school, with the exception of the normally developing children who were videotaped at home only. The subjects were observed for the use of gestural and vocal communicative intent, gestural and vocal imitation, and combinatorial and symbolic play.

Uneven development was noted for the children with autism in the areas of communicative intent, tool use, imitation, and play (Wetherby & Prutting, 1984). However, the data indicated balanced development for the normally developing children. Wetherby and Prutting found a deviation from normal pragmatic development in the children with autism based on their limited communicative intents that were obtained outside of rather than within social interactions. Wetherby and Prutting conclude from their research that "although all pragmatic functions displayed by autistic children are

present at some point in normal development, the relative timing of emergence is disparate from the normal development process" (p. 374).

Another study concentrated on the use of language and communication of a child with autism across a variety of settings and adults (Bernard-Opitz, 1982). The subject was an 8-year-old boy with autism who was selected because of his poor language use (i.e., echolalia, perseverations, neologisms, expansions, etc.). The child was videotaped in various settings interacting with different adults. The results indicated that the subject interacted significantly more with his mother and a familiar adult than he did with a stranger suggesting that children with autism are aware of the communicative situations and partners and can make adjustments accordingly. This study also suggests that a child with autism might become slightly inhibited by the unfamiliar person thus limiting his interactions.

Social skills.

"Children with disabilities have a peer interaction deficit; that is, their degree of involvement in peer interaction falls substantially below expectations based on their developmental levels" (Guralnick, 1992, p. 56). This statement is extremely representative of the social deficits of children with autism. However, it is important to consider the development (or lack thereof) of the social skills in these children to determine where the deficits originate.

Children with autism often fail to develop an understanding of contingency, that is, the fact that one's actions affect other people (Klinger & Dawson, 1992).

Contingency contributes to a child's perception of social interactions and develops by 2 months of age. Children who fail to develop a sense of contingency may never develop a sense of social effectiveness or an understanding of the importance of social interaction.

The lack of eye contact characterized in children with autism also affects social interaction. Eye contact is a form of reciprocal interaction evident at an early age.

Children with autism typically do not use eye contact or eye gaze for social communication or affective expression (Klinger & Dawson, 1992). Affective expressions are feelings of mutual interest and pleasure apparent in the smiles and vocalizations that a child shares with the caregiver. Children with autism are less likely to share affective expressions including responsive smiling during playful interactions. Related to eye gaze and affective sharing and important to social interaction is joint attention. Klinger and Dawson (1992) define joint attention as "the use of referential looking between the object and caregiver and gestural communication, such as pointing" (p. 162). Children with autism may use eye contact or gestures, however do not frequently use them as a means of sharing or directing attention.

Another early social behavior significant to the development of social skills is imitation. Children with autism often fail to develop the skill of imitation from an early age (Klinger & Dawson, 1992). In Dawson and Adams' study (1984), half of the preschoolers with autism who participated in the project were functioning on the level of a 1- to 4-month-old in their ability to imitate actions produced by others. A lack of imitative interactions results in a delay in reciprocal interactions on a more advanced level.

The lack of the development of these early social skills may contribute to the overall inability of children with autism to succeed in social interactions. With limited social behaviors necessary for initiating and responding during social interactions, the children with autism may be unable to find "behavioral matches" (Lord, 1984, p. 169) among their peers who are capable of the adult-like social skills needed to engage the child in an interaction. The peers also may not be able to modify their behaviors to meet the needs of the children with autism. The peers may not understand the children with autism or have the patience to endure an interaction with the child who has such developmentally delayed social skills.

Negative Social Spiral

Considerable research has been rendered on peer reactions to children with specific language impairment (SLI). These children with communication impairments may be at a social disadvantage to their peers. Likewise, the children with language impairments are likely to be ignored by their peers and consequently less likely to interact with their peers (Rice, 1993). Rice referred to this as "a negative social spiral" (p. 147) in that the children with speech or language disabilities "may lack the linguistic skills needed to participate actively in social interactions with their peers. Therefore they may be less liked by their peers and experience a high rate of rejection" (Fujiki & Brinton, 1994, p. 134). When children recognize their limitations and their peers' negative reactions, they quickly develop compensatory actions such as withdrawing or relying on adults for communication.

Although little research has been done in this area concerning children with autism, based on their communication deficits, it seems safe to presume children with autism are treated in much the same way. However, it is difficult to suggest whether the children with autism withdraw because of negative consequences from their peers or because they lack the desire to participate or interact. Regardless of the reason for the withdrawal, absence of these friendships prevents the child with autism from "acquiring and enhancing significant social abilities and skills" (Hartup & Sancilio, 1986, p. 69) that are so desperately needed. With intervention, children with autism may learn the skills needed to maintain mutually enjoyable friendships with normally developing peers.

Peer-Mediated Approaches to Social Interaction

Different approaches to social intervention with children with autism have been investigated. Odom and Strain (1984) reviewed three types of peer-mediated approaches to social interaction intervention. Peer-mediated approaches consist of behavioral interventions in which an age-matched peer (henceforth, also referred to as confederates) is taught to instruct a target child. Three types of peer-mediated approaches used for increasing social interaction include proximity, prompt/reinforce, and peer initiation interventions. In proximity interventions, children with adequate social skills are grouped with target children who lack social skills and are instructed to: "1) play with the target children, 2) get the children to play with them, or 3) teach the target children to play" (p. 545). With the exception of these instructions, the confederate children are not specifically trained on ways to increase the social interactions of the target children.

Proximity interventions require a more natural occurrence of social interaction between the two groups of children than the prompt/reinforce or peer initiation interventions.

Prompt and reinforce is the second peer-mediated approach frequently used in research. This approach requires the confederate children to be trained in order to prompt and reinforce the target children during the social interaction. A prompt is defined as "an instruction (e.g., "Come play") to engage in some social activity" and a reinforcement is defined as "an event that comes after the interaction (e.g., "I like to play with you") and maintains or increases the frequency of the desired type of behavior" (Odom & Strain, 1984, p. 546). Studies that use this type of approach may use prompt and reinforcement together during the intervention or only the reinforcement portion of the approach.

Peer-initiation intervention is the third approach described by Odom and Strain (1984). This approach focuses on the social initiations of trained peers that consequently create an opportunity for a response from the target child. These social initiations include "asking a child to play, giving a toy to a child, providing physical assistance, or suggesting a play idea" (p. 547). These peer-initiated interventions have proved to be successful with children and adults in a variety of settings.

Previous research has revealed different findings concerning the best approach to promote social interaction among children with autism. Some investigators have attempted to compare the approaches within one study and have found that trained peers often facilitate social interaction more effectively than untrained peers. Based on these studies, Odom and Strain (1984) suggest that both peer-initiation and prompt/reinforce

interventions have a more positive effect on social behavior than do proximity interventions.

Training of Normally Developing Peers

The training of the normally developing peers can be a vital part of peer initiation studies, however certain researchers disagree with the importance of such training (Lord & Hopkins, 1986; McHale, 1983; Roeyers, 1996). The point made against such training is the inability of the children with autism to generalize from trained peers or adults to other peers or adults not involved in the interactions (Lord & Hopkins, 1986; Roeyers, 1996). Because of this point, many investigators have chosen to use a proximity or more naturalistic approach to social interactions. These researchers have seen benefits from these more naturalistic approaches when the peers have not received training (Roeyers, 1996) and important information has been gained about the spontaneity of interactions between children with autism and their peers (McHale, 1983). However, as Lord and Hopkins (1986) reveal, "a next step might be to see if direct teaching of developmentally appropriate initiation techniques to either the nonhandicapped or the autistic children would be more successful than these less structured interventions" (p. 261). Some researchers have taken that next step.

Many interaction studies have used training of peers as part of the method of the research (Goldstein et al., 1992; Goldstein & Wickstrom, 1986; Kamps et al., 1992; Lee & Odom, 1996; Lord, 1984; Sainato et al., 1992; Strain et al., 1979). Typical training sessions consist of strategies that are taught to the peers in a series of lessons that may continue for a few days or a few weeks. These sessions utilize adult modeling, colorful

posters, and role playing to reinforce the new skills. The strategies taught include things such as attention getting techniques, commenting, responding, and redirecting that will encourage the children with autism to interact with their peers. It is suggested that a peer initiation program works best with appropriately chosen peers. Some of the criteria suggested for choosing appropriate peers include children who regularly attend school, follow directions well, pay attention, have appropriate social and play skills, and express interest or willingness to participate (Odom & Strain, 1984; Strain & Odom, 1986).

Lord (1984) conducted a study that compared the interactions between children with autism and their trained versus untrained peers. Four white males with autism between the ages of 9 and 11 participated in the study along with 12 nonhandicapped boys ages 9:6 to 10:11. Each child with autism played with a trained peer, and two untrained peers (one for baseline and one for generalization). The individual training sessions encouraged requests and gestures that would prompt interactions with the children with autism.

Overall results indicated that the trained peers initiated more interactions with the children with autism than did the untrained peers, and the trained peers were observed to be more "active and intrusive" (Lord, 1984, p. 210) in their approaches. There were significantly fewer interactions and initiations by the children with autism during the sessions with the untrained peers. Lord also coded the effectiveness of specific strategies taught to the peers. The most effective being a "verbal statement either specifying a desired action or commenting on a previous action accompanied by the use or offer of a toy" (p. 213) and the least effective being a verbal initiation only. Lord also outlined the

benefits of using trained peers rather than untrained peers. The children with autism were able to be prompted at the start of the treatment session with the trained peers because the peers did not have to spontaneously learn the strategies as the untrained peers did. The children with autism also responded better to the verbal requests of the trained peers because these were the specific statements that had been taught by professionals who were familiar with what children with autism would respond to.

Intervention Studies

Proximity.

McHale (1983) used proximity intervention in her study that observed free play sessions involving ten groups of autistic and nonhandicapped children. The purpose of her investigation was to evaluate the ability of untrained nonhandicapped peers to interact with children with autism during free play. She predicted increases in the play, communication, and social skills of children with autism over time as they interacted with the nonhandicapped peers.

The subjects included six children with autism ranging in age from six to eight who "displayed mild/moderate to severe disorders of social, affective, cognitive, and perceptual functioning" (McHale, 1983, p. 83) and 28 nonhandicapped second and third grade children. The children were placed into play groups which included the six children with autism and six nonhandicapped children from the same class in school. The play sessions were 30 minutes in length for five days a week for 10 weeks. The same six children with autism participated in the play sessions each week. The nonhandicapped children were told that they were to help these children who may "make funny noises or

act in funny ways" (McHale, 1983, p. 85) to learn how to play, however the nonhandicapped children were not given any specific instruction on ways to get the children with autism to interact.

The results of this project showed that the children with autism increased their interaction time between the beginning of the study (week one) and the end of the study (week 10) from 43% to 74%. In association to this, they also decreased their solitary play from 42% to 24%. Based on the results, McHale (1983) determined that the nonhandicapped children were able to evoke social interactions from the children with autism during a free play session using appropriate play skills, persistence, and repetition.

Roeyers (1996) used a proximity intervention in his study because of his belief that "children with autism do not spontaneously transfer social skills acquired with adults to peer interactions" nor do they "generalize beyond the peer therapist" (p. 305). The subjects in his study included 85 handicapped children who were previously diagnosed with Autistic Disorder or Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) and 48 nonhandicapped children; all subjects were between 5 and 13 years old. The children were placed into groups of two or three by age and sex and were randomly assigned as treatment or control subjects. The nonhandicapped children were given an overview of autism and participated in role-playing situations to help them learn how to react to aggressive behavior, how to remain on the same level as the child with autism, and ways to get the attention of the child with autism. No formal training was given on specific techniques to get the children to interact. The nonhandicapped children

were simply informed, motivated, and told to "help these children to learn to play together with you" (p. 308).

The 10 play sessions were each 30 minutes in length and the following behaviors were observed: beginning initiation, response, continuing initiation, non-interaction, and distance (Roeyers, 1996). The results indicated a significant increase in the amount of time spent in social and pre-social behavior as well as an increase in the initiations made by the handicapped children in the treatment group. Consequently, it was observed that the stereotypic or self-stimulatory behaviors decreased during play. Based on this study, Roeyers concludes that children with autism and PDD can benefit from interactions with untrained peers and, with social goals, do have the ability to develop appropriate social behaviors.

A third proximity study analyzed six 8- to 12-year-old children with autism (Lord & Hopkins, 1986). Not only did the researchers investigate the interactions of the children with autism with nonhandicapped children, but they also focused on the ages of the nonhandicapped peers. Each child with autism was matched to a nonhandicapped kindergartner and same-age peer. The children with autism played with only one nonhandicapped peer at a time for ten 15-minute play sessions each. Three of the children with autism were first paired with the younger peers while the remaining three were first paired with the same-age peers. The children with autism were also observed playing with their own classmates with autism. As in the previous study, the nonhandicapped peers were only instructed to show the children with autism how to play. No specific instructions for social interactions were given.

Measures used to evaluate the play sessions included: initiations, number of feet apart (for proximity), self-stimulatory behavior, solitary play, responsiveness, number of interactions, and mean length of uninterrupted interactions. Initiations and responses were also characterized by positive/negative, vocal-verbal/ motor-gestural/object-oriented, imitative/non-imitative, and beginning/continuing dimensions. Pretreatment observations made of the children with autism in their classroom indicated very little social interaction with only one initiation and two responses observed in one child, as well as a frequent use of self-stimulatory behaviors observed in all the children. Inappropriate object use was also noted during the observation.

Results indicated that overall interaction increased for 8 of the 12 dyads. Responsiveness by children with autism to their nonhandicapped peers' initiations increased from 29% on the first day to 91% on the last day (day 20). Self-stimulatory behavior decreased and the proximity reached an average distance of less than three feet. The age of the nonhandicapped peer did appear to make a difference in the social behavior of the child with autism who made more initiations, responses, and interactions with their same-age peers rather than with their younger peers.

Lord and Hopkins (1986) found that children with autism benefit greatly from interaction with nonhandicapped peers. It was also suggested that the children with autism are capable of learning naturalistically from an untrained same-age peer. However, they do suggest that the teaching of "developmentally appropriate" techniques to aid the nonhandicapped children during the initiations with the children with autism might be beneficial.

Peer-initiated.

An early study that used peer-initiated intervention was conducted by Ragland et al. (1978). The purpose of their investigation was to determine if children who were not under direct peer intervention would increase social interactions when another child in the room was receiving direct peer intervention. The subjects included three children with autism (ages 8 and 9) and a peer trainer, age 10. The peer trainer was trained on techniques that he could use to "get the children to play with him" (p. 571). This study used a withdrawal-of-treatment design and consisted of 4 total sessions. The results indicated that social interactions among the children with autism only significantly increased during direct peer initiation. Social interactions did not increase during indirect peer initiations or when another child in the room was receiving the direct intervention.

Sainato et al. (1992) used a different concept in their research on peer-initiated intervention. They used a self-evaluation system to encourage the peer confederates to recognize their effective interaction skills. They also noted the ability of untrained peers to use the facilitative strategies after observing the trained peers. Eight preschool children who participated in the investigation comprised three triads consisting of one child with autism, one trained peer, and one untrained peer. The peers were trained to use facilitative strategies such as attention getters, play organizers, shares, and responses (p. 129). They were also trained to evaluate themselves after each interaction session. Results of the study indicated that the trained peers increased their use of strategies when using the self-evaluating system. Also, the interactions of the untrained peers remained low throughout the sessions.

A recent study on social interaction that utilized peer-initiation intervention was completed by Lee and Odom (1996). The purpose of this investigation was to compare the relationship between stereotypic behavior and social interaction. Two children with autism, ages 7 and 8, and four children without disabilities, all age 8, participated in this peer-initiated intervention study. Each child participated in four play sessions lasting 6-10 minutes each.

The first baseline session was set up as a proximity intervention; the confederate children were given no specific instructions other than that they could play with toys and the target child if he initiated the play. The first intervention session was preceded by a training session that taught specific strategies that would encourage social interaction in the target children. It was noted that strategies to decrease the target children's stereotypic behaviors were not taught. During the intervention session, if the confederate child had not used a strategy within 30 seconds, the teacher verbally prompted him or her. The second baseline and intervention sessions were exactly like the first two, however the confederate children were only reminded of the strategies. The training session was not repeated.

By the end of the second intervention session, the interactions of the two target children had increased to an average of 62% and 61%, respectively. This was an increase of interactions from 0% in the baseline and 49% and 38% during the first intervention session. The stereotypic behaviors had decreased from 61% to 13% in one child and from 93% to 27% in the other child. As expected, compared to the first intervention session, the frequency of the interactions and stereotypic behaviors, decreased and increased

respectively, during the second baseline session. This investigation indicated that the interaction attempts of a peer affected the stereotypic behaviors and overall interactions of the child with autism.

Prompt and reinforce.

Prompt and reinforce intervention allows the normally developing children to prompt the child with autism to interact as well as reinforce the child for his/her good interaction or good play skills. Goldstein and his colleagues (1992) completed an investigation using prompt and reinforce intervention. The purpose of their study was to determine if normally developing children could be taught strategies to encourage the children with autism to interact and to determine if the children with autism did indeed respond to those interactions. The peers were taught facilitative techniques to elicit interactions with the children with autism that included mutual attention, commenting, and responding. The adults used in the study provided the reinforcement to both the normally developing peers and the children with autism. The subjects consisted of 10 normally developing preschoolers and 5 children with autism all ranging in age from 35 to 82 months.

The results of Goldstein et al.'s study (1992) showed a significant increase in the frequency of the interactions of the children with autism when the peers prompted them. The children with autism who were nonverbal and/or cognitively impaired also showed improvement. The results also showed that using commenting as a facilitative strategy greatly increases the interaction with and responses from the children with autism.

Research completed by Strain and his colleagues (1979) compared prompt/reinforce intervention with peer-initiated intervention. The subjects included four low-functioning children with autism, two 9-year-olds and two 10-year-olds, and one 11-year-old peer trainer. The peer was trained on techniques to initiate social interactions (i.e., "Let's play blocks" or "Come play", p. 45) as well as prompting and reinforcing techniques that were used to get two children to play together. Sample prompting statements included "Roll the ball to ____" and "Say hello to ____" (p. 46). Sample reinforcing statements included "That's the way to play" and "Very nice ____" (p. 46). The techniques were also acted out during role-play to intensify the desired behaviors.

The four sessions contained a withdrawal-of-treatment design in which there was a baseline with no peer initiations, followed by the prompt/reinforce session, then a second baseline session, and ending with the social initiation session. The results of the study (Strain et al., 1979) indicated that "both intervention techniques produced an immediate and dramatic increase in each subject's positive social behavior" (p. 52). Strain and his colleagues also pointed out that the results suggest that trained peers do have an impact on the social interactions of children with autism.

Use of adults in prompt/reinforce intervention.

Few researchers (Goldstein et al., 1992; Goldstein & Wickstrom, 1986; Lee & Odom, 1996; Strain & Kohler, 1995) have included adults in their investigations of using prompts or reinforcement with children with autism in their interactions with normally developing children. These studies used adult prompts primarily to encourage or remind

the children to play together and to praise them for good interactions. Token systems, posters, whispers, or praise statements are a few of the prompt and reinforce methods used by the adults.

Although rarely utilized, adults can play a key role in facilitating peer interactions. During efficacy studies, adults can be very beneficial by simply keeping the children on task and engaged in the interaction. Adults can also "play a crucial role in facilitating peer interaction by helping children with communication limitations play together in a verbally interactive way" (Hadley & Schuele, 1995, p. 107). In a project using a withdrawal of treatment design, adults are also more capable of adequately withdrawing the treatment during the second baseline session. For these reasons, it is believed that children with autism as well as normally developing children can benefit from adult prompts and reinforcement.

Odom and Strain (1986) compared peer initiation and teacher prompt interventions with preschoolers with autism. Three children with autism, all age four, served as subjects in their investigation. Four normally developing children, ages 4 and 5, were the confederates. The confederates were trained to interact with the peers on their own as well as to respond to the teacher's prompts. A token reinforcement system was also used to praise the confederates during the sessions. During the peer-initiated condition, the teacher simply introduced the children and reminded the confederates of their job to get the children with autism to play with them. She only verbally intervened if necessary. During the teacher-antecedent condition, the teacher prompted the child with autism, both physically and verbally, to play with the confederate.

As expected, the results of Odom and Strain's study (1986) indicated that the social initiations by the children with autism and the mean length of interaction were both significantly higher during the teacher-antecedent conditions. The social responses, however, were higher during the peer-initiated conditions. Odom and Strain concluded that teacher-antecedent intervention may encourage a greater length and quality of social reciprocity between children with autism and their normally developing peers.

Redirects.

Schuele et al. (1995) also saw the benefits of adult intervention in their study in which they describe children with specific language impairment (SLI) as "more likely to direct their initiations toward teachers than toward peers" (p. 1320) during peer interactions. Based on their tendency, a procedure called the Redirect Strategy was employed. Used to direct a child's initiation toward another child, this strategy can occur in a natural setting to eliminate the need for generalization in the classroom. It also encourages the children at the moment they are ready to interact. The "chain of events" of the redirect strategy is detailed by Schuele et al. as follows:

The chain of events begins when a child initiates a verbal interaction with the teacher. The teacher may simply respond to the child's initiation and keep the conversational interaction localized between the teacher and the child. An alternative is for the teacher to redirect, by providing a verbal prompt suggesting the child initiate to a peer. After the teacher's redirect, the desired response is for the child to initiate to a peer (p. 1321).

The redirect strategy uses the child's motivation to set the chain of events into motion rather than attempting to promote peer interactions during times when there is no motivation by the child. The teacher, in return, can use a hint, suggestion, or model to facilitate that child's desire to interact. Subsequently, any further interaction will be a direct result of the child's initial desire to communicate. Opportunities for the adult to redirect might occur when the child asks to play, requests toys or help, or comments on things around them (Hadley & Schuele, 1995). This study focused on teacher training, responses to redirects by both children with SLI and their peers, and changes in spontaneous peer initiations.

The investigation (Schuele et al., 1995) was conducted in a special language preschool over a period of two semesters using four boys with SLI from ages 3:10 to 5:3. The redirect strategy was implemented during a 40-minute center time by a trained teacher. The redirects and responses to the initiations were coded using the Redirect Coding System which coded the children's responses according to uptake, override, termination, or no response to the redirect from the teacher. The peer responses were coded as an acknowledgment, rejection, neutral, or no response. The teacher's redirects were coded as a providing words redirect, a direct redirect, or an indirect redirect, as well as an appropriate response without redirect, or no response.

Overall results indicated that the teacher could be adequately trained to redirect the children's initiations. The target children were very likely to initiate to a peer after a redirect from the teacher and subsequently the peers responded to about two thirds of the initiations. There is also evidence from the research that indicated that the redirect

strategy provided positive interactions with peers that led to an increase in the target child's spontaneous initiations. Schuele et al. (1995) conclude that the "redirect strategy appears promising for facilitating peer interactions in preschool classrooms" (p. 1331) and can be used throughout the day involving all children. It is presently suggested that children with autism may also respond well to adult redirects and increase their peer interactions as a result of the treatment.

Summary of the Review of the Literature

The DSM-IV (1994) clearly defines autism according to three main features: an impairment in social interaction, an impairment in communication, and a restricted repertoire of activities and interests. Researchers agree that the pragmatic deficits in children with autism are linked to both communication and social skills. Wetherby and Prutting (1984) discussed the need to consider the communicative intent of these children's communication behaviors including gestures and play. Recent attention has been given to the intent and functionality of echolalia in children with autism.

Social skills, closely related to communication skills, begin developing at a young age. Failure of children with autism to develop these essential skills such as contingency, eye contact, affective sharing, joint attention, and imitation hinders their development of social interaction skills (Klinger & Dawson, 1992). The lack of the skills may inhibit the growth of peer relationships as the children grow older. This absence of skills also may create a negative social spiral (Rice, 1993) in which the children with autism may not be well liked by their peers because of their inability to communicate or interact as normally developing children do.

Odom and Strain (1984) discussed the three types of peer-mediated interventions utilized to increase social interactions between children with autism and their normally developing peers. Researchers utilizing the proximity approach found that nonhandicapped peers were capable of engaging children with autism in interactions with this more natural approach to peer interactions (McHale, 1983; Roeyers, 1996). Peer-initiated studies required a formal training session to teach the peers specific strategies to use while interacting with the children with autism. Findings from these studies (Lee & Odom, 1996; Ragland et al., 1978; Sainato et al., 1992) were parallel in concluding that children with autism typically responded well to the trained peers. Prompt and reinforce intervention allows the peer to prompt the child with autism to interact while reinforcing the child's good interactions. Strain et al. (1979) compared prompt/reinforce and peer-initiated interventions to find that both approaches were beneficial to promoting peer interactions.

Throughout the research concerning peer interaction, few investigators (Goldstein et al., 1992; Goldstein & Wickstrom, 1986; Lee & Odom, 1996; Strain & Kohler, 1995) have included adults to prompt the interactions. However, adults can be very useful in prompting and reinforcing the children as well as keeping them engaged in the interaction. When Odom and Strain (1986) compared peer initiation and teacher prompt interventions, they discovered that social initiations as well as the mean length of interaction were significantly higher during the sessions that included teacher prompts.

Schuele et al. (1995) in their work with children with SLI used adults to redirect the children and promote peer interactions. The target children responded well to the

redirects and were even able to increase their spontaneous initiations as a result of the redirect intervention from the teacher. Using adult redirects along with prompts and reinforcement has not been investigated with children with autism. Similar to children with autism, children with SLI often prefer interacting with an adult rather than a peer, withdraw following a negative interaction, and have difficulty initiating interactions to their peers. Based on these similarities, it is presently hypothesized that children with autism may also respond well to adult redirects and prompts and increase their peer interactions.

Purpose of the Study and Research Questions

The purpose of this study was to investigate the use of adult redirects and prompts as a possible intervention approach for child with autism by increasing their interactions with normally developing peers. I will seek to determine the following:

- (1) Does the use of adult redirects and prompts influence the number of initiations between the normally developing children and the children with autism?
- (2) Does the use of adult redirects and prompts influence the successfulness of the initiations between the normally developing children and the children with autism?
- (3) Does the use of adult redirects and prompts influence the mean length of the interactions between the normally developing children and the children with autism?

CHAPTER II

Method

Subjects

Informed Consent

This project and the use of human subjects was approved by The University of Tennessee Office of Research and a local county School System Coordinator of Research and Evaluation. The schools selected for this study were chosen based on the availability of subjects. A meeting was held with the principal of each school to obtain permission to conduct research in his/her school. The principal investigator then met with the special education teachers to identify possible children with autism who would qualify to participate in the study. Once the children with autism were identified, the principal and the regular education teachers at the school selected grade and gender-matched normally developing peers who were likely to participate in the project.

Each teacher of the students who were identified to participate in the study signed a teacher consent form (see Appendix A) and sent home a Fact Sheet describing the project and an Informed Consent Form for the parents of the normally developing (ND) children (see Appendices B and C, respectively). The special education teachers also sent home the Fact Sheet and an Informed Consent Form especially for the parents of the children with autism (see Appendices B and D, respectively). Once the forms were returned to the principal investigator, the dyads were formed and the play sessions were scheduled.

Selected Schools

Eight schools were selected for this study. Six of the schools accommodated children with autism in both special education and mainstream programs. In one of the schools the child with autism was placed in the regular classroom and was provided no special education. Another school was a preschool for normally developing children; the child with autism had a full-time aide who accompanied him to school. All of the children with autism, with the exception of the three preschoolers, were mainstreamed into a regular education classroom for at least part of the school day. Each child with autism also received speech-language therapy on a weekly basis either at the school or at a private clinic as specified on the child's individual education plan (see Table 1 for the number of hours per week of therapy for each subject.)

Subject Selection

Table 1 presents descriptive data on each subject. The 12 children with autism were selected based on the consent forms signed and returned by the parent(s) that adhered to the following criteria: (1) they had received a diagnosis of Autistic Disorder from a school or outside psychologist, (2) if available, they had an IQ score >50 based on scores obtained from school records, (3) they had no extreme behaviors such as self injury that would disrupt the study, (4) they used appropriate verbal or nonverbal behaviors for communication, and (5) they had no identified hearing loss. The ND children adhered to the following criteria: (1) they had regular attendance at school, (2) they had an absence of any suspected speech or language disorder, (3) they had at least an average IQ >100 based on scores obtained from school records, (4) they did not receive

Table 1

Descriptive Information on Subjects

	<u>ND</u>		<u>Children with Autism</u>			
	Grade	Age	Grade	Age	IQ	TX
Treatment						
Dyad						
1	K	82	K	80	106	2
2	2	97	2	105	88	1.5
3	K	75	K	69	88	1
4	2	103	2	96	NA	3
5	K	73	PK	56	NA	NA
6	K	66	PK	79	NA	1
Control						
7	2	107	2	107	65	2
8	K	70	K	81	88	1
9	K	68	K	83	85	1
10	K	70	K	86	NA	1
11	PK	62	PK	65	NA	3
12	K	72	K	77	NA	0.5

Note: ND = Normally developing children. Chronological age is reported in months. NA indicates that the information was not available. The TX column provides the number of hours per week of speech-language therapy.

any remedial services (e.g., hearing, resource), and (5) they had no identified hearing loss. The subjects were in grades pre-kindergarten to second grade and ranged in age from 4 years, 6 months to 8 years, 9 months. All of the subjects were male. Each ND child was matched by grade to a child with autism with the exception of two of the children with autism who were in pre-kindergarten. They were matched with ND children in kindergarten because there were not ND preschool classes at the schools they attended.

Dyad Formation

All children participating in the study served as subjects and included 12 children with autism and 12 ND children. Groups of two, or dyads, consisting of one ND child and one child with autism were formed to set up the play sessions. As previously mentioned, each dyad consisted of children from the same grade (with the exception of two of the three pre-kindergarten children with autism) and of the same gender. The dyads were also formed according to time available during nonacademic periods of the day. Data were collected from both subjects in each dyad. In one case the session had to be aborted due to the noncompliance of the child with autism and another session was dropped after it was completed also due to noncompliance of the child with autism. The data from those sessions were not included in the study. No makeup sessions were scheduled. Total participation in the study was 24 Subjects (12 children with autism and 12 ND).

Subject Data

The means for the subject ages and IQ scores were calculated. In the experimental group, the mean age for the children with autism was 78.66 months (range = 56 to 105 months). Also in the experimental group, the mean age for the normally developing children was 84.83 (range = 73 to 103 months). In the control group, the mean age for the children with autism was 83.16 months (range = 65 to 107 months). Also in the control group, the mean age for the normally developing children was 74.83 months (range = 62 to 107 months). The IQ scores were obtained for six of the 12 subjects with autism. Three of the subjects were in the experimental group and three were in the control group. The IQ range for the experimental group was 65 to 88 with a mean IQ of 79.33. The range in the control group was 73 to 103 with a mean IQ of 84.83. The remaining six subjects with autism did not have a recorded IQ score. See Table 1 for specific ages and IQ scores.

Obtaining Subject Assent

Within one week prior to the play session, a 5 minute interview was held with each subject during which their verbal assent to participate was audio- and video-recorded. In the case that verbal assent could not be taken, compliance with the task during the play session was accepted as assent. Arrangements were made to observe each dyad during one session in a private room designated by the school during nonacademic activities during the months of February, March, and April 1998.

Procedure

Play sessions

All dyads participated in one 30 minute session. The principal investigator (PI) went to pick up the normally developing child and said to him, "It's time to come and play with some toys in our special room." At this time, the specific instructions described in the Treatment section were also given. A Research Assistant (RA) who was a master's student in speech-language pathology and had experience working with children with autism as well as more than 100 hours of clinical experience in child language, went to pick up the child with autism. She said, "Let's go play with some toys." The children were brought to a room designated by the school which contained toys (racetrack/cars, playdough, and legos). When both of the children were in the room, they were introduced to each other and to the toys in the room. The play session began when the PI said "You can start playing now" at which point a timer was set for 15 minutes. At the end of the first 15 minutes, the PI moved to the corner of the room and the timer was set for an additional 15 minutes. At the conclusion of the play session, the PI said "Thank you very much for helping me." She gave each of the children a small prize and returned them to their classrooms.

Treatment group

Twelve (or 6 dyads) of the children (6 ND and 6 with autism) were randomly placed in the treatment group. In this group, the children received redirects, prompts, and reinforcement from the PI throughout the first 15 minutes of the play session. As in Odom and Strain (1986), when each ND child was picked up from his/her classroom to

go to the room designated for the play session, the subject was told, " 'Today I would like for you to play with (name of child with autism). If he asks you for something or wants to play with you, then you should be quick to play with him' (p. 63). If you have any questions, you can ask me." The RA said to each child with autism, "Today I would like for you to play with (name of ND child)." Once the children were in the room, the PI introduced the children to each other and then showed them the toys and suggested play ideas such as playing with cars or building with the legos. The PI then sat on the floor within five feet of the play area so that she was available to the children for the first 15 minutes of the session. After 15 minutes, the PI said, "I have to go over here to do some work now, but you can continue playing." At this point, she went into the corner of the room and pretended to be busy.

During the first 15 minutes of the treatment groups, the PI used redirects, and prompts if necessary, to encourage the children to play together. Two types of redirects were used (Hadley & Schuele, 1995). A redirect with a model gave the child the actual words to say to the peer such as "Tell John, I want to play." An explicit redirect suggested that the child initiate to the peer, but he had to provide his own words, such as "Ask John to help you" or "Show John the truck." A prompt, such as "Go ask John to play," was used if the children were not interacting with one another within 2 minutes of the beginning of the play session and every 2 minutes following if there was still no interaction. The prompts were not dependent on a child's desire to interact but rather were used to encourage children who were not interacting. Each redirect and prompt was accompanied with a visible pointing gesture in the direction of the play area or the other

child. The PI also reinforced the children after each attempted initiation, for example, by saying "Good playing" or "I like how you talked to your friend" or "Thank you for sharing your toy with him." At the end of the first 15 minutes, all redirects and prompts were withdrawn. If a child approached the PI during the last 15 minute period, she said "I'm sorry. I can't play right now."

Control group

The other 12 children (6 ND and 6 with autism) were placed in a no treatment (or control) group. These dyads did not receive any redirects, prompts, or reinforcement from the PI during the first half of the session. They were simply told to play together. The PI sat on the floor within five feet of the play area. If a child approached the PI during the first 15 minutes, she did not respond to that child. After the first 15 minutes, she said, "I have to go over here to do some work now, but you can continue playing." At this point, she went into the corner of the room and pretended to be busy. If a child approached the PI during the last 15 minute period, she told the child, "I'm sorry. I can't play right now."

Recording Procedures

All sessions were audio- and video-recorded for later analysis of the children's verbal and nonverbal interactions. The equipment that was used to record the sessions included a Panasonic AG-195MUP video camera that was positioned in one corner of the room directed toward the area where the children were playing, a Sony TC-RX606ES stereo cassette deck, and two Sony ECM-T150 tie-pin microphones that were clipped to

metal stands and placed at the end of a table or on the floor near the children. High bias Type II audio cassettes and professional industrial video cassettes were used.

Data analysis

All of the children were observed during the first and last 15 minutes of the play session to compare the following: (1) the number of initiations to the other child, (2) the successfulness of the initiation, whether or not it is responded to in a positive or negative manner, and (3) the length of each ongoing interaction. The children were compared according to group, treatment versus no treatment, as well as according to classification, normally developing versus children with autism. These observations were necessitated by the following research questions: (1) Does the use of adult redirects and prompts influence the number of initiations between normally developing children and children with autism? (2) Does the use of adult redirects and prompts influence the successfulness of the initiations between normally developing children and children with autism? (3) Does the use of adult redirects and prompts influence the mean length of the interactions between normally developing children and children with autism?

Initiations.

The initiations were controlled by time according to the definition in previous research by Lee and Odom (1996). They stated that initiations are "any verbal or gestural behavior the target child directed to the peer or the peer directed to the target child that had not been preceded by another social behavior from the same 'partner' within the previous 5 seconds" (p. 90). Specific initiations were considered (but not coded or analyzed) according to the behaviors defined by Sainato et al. (1992). These include, but

are not limited to, attention getters which include verbal or nonverbal behaviors used to gain the child's attention; play organizers which are verbal directions or requests for play; shares which use verbal or nonverbal behaviors along with an organizer; responses which involve repeating or requesting clarification as well as any verbal or nonverbal reaction to an initiation; other initiations include commands or nonsocial utterances; negative behaviors or inappropriate social behaviors; and nonsocial verbalizations. These initiations by both ND subjects and subjects with autism were observed and recorded to determine the total number of initiations by each subject.

Responses.

Responses were coded according to the definition by Lee and Odom (1996) which states, a response is "any verbal or gestural behavior directed toward an initiating peer or target child occurring within 5 seconds after the initiation" (p. 90). A successful initiation was coded as so if it produced an acknowledgment by the other child. The acknowledgment could be verbal or nonverbal as well as positive or negative. The number of unsuccessful initiations where there was no response were also considered. Consistently following each successful redirect or prompt, the PI provided positive reinforcement to the children, however specific data on the effect of the reinforcement were not obtained.

Mean length of interaction.

The mean length of the social interaction is defined as the initiation plus all of the responses that follow it with no two responses from the same child in a row (Odom & Strain, 1986, p. 64). This was measured in units beginning with the first initiation. For

example, an initiation from a peer followed by a response by the child with autism and then another response from the peer was counted as three units. It is important to note that if a child had a response with two or more utterances that were related, it was coded as only one unit. For example the following exchange would be coded as four units: Child 1- "Look at my truck." Child 2- "I like it. Can I play with it?" Child 1- "Sure. Here you go." Child 2- "Thanks. You can play too." Each child could have more than one utterance in a single unit as long as it related to the previous response. An initiation that did not receive a response from the other child was coded as one unit. The MLI was computed by "adding the lengths (units) of each interaction in a session and dividing by the total number of interactions" (Odom & Strain, 1986, p. 64) in that session. When more than five seconds had past, the next behavior was coded as a new initiation and thus a new interaction.

Intra- and Inter-Judge Reliability

The PI transcribed all of the tapes to aid in coding the verbal behaviors of the subjects. Transcription reliability was established when the PI re-transcribed two treatment dyads and two control dyads after two weeks. The PI compared the transcriptions line by line, assuring that all statements by the children were accounted for, to determine the accuracy level. Reliability of transcription was achieved at an average accuracy level of 92% with specific percentages for each of the four subjects being 89%, 91%, 93% and 94%. Intra-judge reliability was established when the PI re-scored one half of the videotapes (three treatment dyads and three control dyads, chosen randomly) after a period of two weeks without access to her original scores. Intra-judge

reliability was achieved at a level of 89% accuracy for the number of initiations with the following specific percentages for each dyad: 75% (21/28), 85% (33/39), 86% (12/14), 88% (29/33), 100% (4/4), 100% (9/9). An accuracy level of 85% was achieved for the number of successful initiations with the following specific percentages for each dyad: 67% (2/3), 71% (17/24), 76% (26/34), 96% (24/25), 100% (0/0), and 100% (5/5). Lastly, an accuracy level of 95% was achieved for the mean length of the interactions with the following specific percentages for each dyad: 87% (10.65/12.28), 94% (2.35/2.5), 95% (10.08/10.62), 96% (10.57/11.05), 100% (1/1), and 100% (6.6/6.6). It is important to point out that the lower percentages were on dyads that had a lower number of behaviors to code. For example, a dyad that was re-scored as having 6/7 total initiations would have a lower reliability percentage compared to a dyad that was re-scored as having 29/30 initiations .

Inter-judge reliability for recording the initiations, responses, and mean length of interactions was established by a Research Assistant. The judge had more than 100 hours of clinical experience in child language. The judge underwent a brief one hour training process prior to analysis of the tapes. Training focused on identifying types of initiations and responses, which were used to determine the successfulness of the initiations, as well as counting units of interaction for coding the mean length of interaction. She was also provided with transcriptions of the tapes that contained no markings to aid in understanding what the children said. Prior to training, one-half of the tapes (3 treatment/3 control, chosen randomly) were set aside to be used for reliability while the other half were used for training. During training, the reliability judge analyzed the dyads

and then discussed them with the PI to review any disagreements. The judge then independently viewed one-half of the videotapes chosen randomly.

Inter-judge reliability was achieved at 83% on the number of initiations with the following specific percentages for each dyad: 50% (7/14), 81% (51/63), 85% (33/39), 92% (33/36), 93% (26/28), and 97% (36/37). An accuracy level of 79% was achieved for the number of successful initiations with the following specific percentages for each dyad: 66% (2/3), 75% (18/24), 81% (21/26), 81% (25/31), 82% (41/50), and 88% (21/24). For the mean length of the interaction, an accuracy level of 88% was achieved with the following specific percentages for each dyad: 79% (5.64/7.1), 84% (7.72/9.15), 89% (9.35/10.55), 90% (10.62/11.79), 90% (2.35/2.6), and 93% (9.9/10.65). As previously stated for the intra-judge reliability, the lower percentages were achieved on the dyads that had a lower number of total initiations. It is also important to note that the dyad that received the lowest score (50%) for the number of initiations on the inter-judge reliability received an adequate score (86%) on the intra-judge reliability. This dyad was an atypical one in that the child with autism was the only child who talked at all during the play session. The child used delayed and immediate echolalia (repeating himself many times). This made it difficult to tell if the child with autism was actually initiating to the peer or only talking to alleviate the quietness in the room. The differences in the scores can be attributed to the fact that the intra-judge counted the echolalic utterances as functional whereas the inter-judge did not.

CHAPTER III

Results

Statistical Analysis of Data

A repeated measures multivariate analysis of variance (MANOVA) was performed to determine the effect of the redirects and prompts on the initiations, the successfulness of the initiations, and the mean length of the interaction (MLI). The between-subjects factor was the different groups (treatment versus no treatment, henceforth also referred to as experimental and control). The repeated measure was the classification of the children (normally developing or with autism) within pairs. Normality of the data was tested using a Shapiro-Wilks test of normality and a histogram. The data for the MLI were determined normally distributed. However, the log of the numbers was used for two variables, the number of initiations and successful initiations, in order to create data that were normally distributed. A Bonferroni adjustment was used to control for a Type I error by dividing the total number of tests run into the alpha level of 0.05. The adjusted alpha level used was 0.12. The MANOVA values are presented in Tables 2, 3, and 4. There were no significant differences found for any of the variables: number of initiations, number of successful initiations, or mean length of interaction.

Table 2

Multivariate Analysis of Variance for the Interactions Between the Type of Children, the Time, and the Group for the Number of Initiations

Effect	Degrees of Freedom	F value	Significance Level
Within Subjects			
Type	1,10	0.045	0.837
Type and Group	1,10	2.071	0.181
Time	1,10	0.268	0.616
Time and Group	1,10	3.103	0.109
Type and Time	1,10	3.103	0.109
Type, Time, Grp.	1,10	0.361	0.561
Between Subjects			
Group	1,10	0.063	0.807

Note. Type indicates children with autism versus normally developing children. Group indicates experimental versus control. Time indicates the first half of the session versus the second half of the session. There were no significant statistical differences found for the number of initiations.

Table 3

Multivariate Analysis of Variance for the Interactions Between the Type of Children, the Time, and the Group for the Number of Successful Initiations

Effect	Degrees of Freedom	F value	Significance Level
Within Subjects			
Type	1,10	0.024	0.879
Type and Group	1,10	3.553	0.089
Time	1,10	0.207	0.659
Time and Group	1,10	2.841	0.123
Type and Time	1,10	0.905	0.364
Type, Time, Grp.	1,10	0.989	0.343
Between Subjects			
Group	1,10	0.003	0.961

Note. Type indicates children with autism versus normally developing children. Group indicates experimental versus control. Time indicates the first half of the session versus the second half of the session. There were no significant statistical differences found for the number of successful initiations.

Table 4

Multivariate Analysis of Variance for the Interactions Between the Type of Children, the Time, and the Group for the Mean Length of the Interaction

Effect	Degrees of Freedom	F value	Significance Level
Within Subjects			
Type	1,10	1.842	0.205
Type and Group	1,10	1.967	0.191
Time	1,10	0.142	0.714
Time and Group	1,10	0.016	0.903
Type and Time	1,10	0.407	0.538
Type, Time, Grp.	1,10	2.859	0.122
Between Subjects			
Group	1,10	0.169	0.690

Note. Type indicates children with autism versus normally developing children. Group indicates experimental versus control. Time indicates the first half of the session versus the second half of the session. There were no significant statistical differences found for the mean length of the interaction.

Initiations

The number of initiations for the children with autism and the ND children in both the treatment and control groups are presented in Table 5. The mean number of initiations for the subjects with autism in the experimental group was 4.0 ($SD = 3.52$) for the first half of the play sessions and 1.8 ($SD = 1.83$) for the second half of the sessions. The mean number of initiations for the ND subjects in the experimental group was 7.5 ($SD = 8.17$) for the first half of the play sessions and 4.7 ($SD = 4.50$) for the second half. The means for the subjects with autism in the control group were 8.2 ($SD = 10.83$) and 8.7 ($SD = 8.76$) for the first and second halves of the play sessions, respectively. For the ND subjects in the control group, the mean number of initiations was 4.0 ($SD = 5.06$) for the first half of the session and 4.8 ($SD = 3.71$) for the second half. Figure 1 represents the number of initiations for all the subjects based on the group medians for the first and second halves of the sessions combined. Those median scores were as follows: in the treatment group, 5 for the subjects with autism and 9 for the ND subjects, and in the control group, 15.5 for the subjects with autism and 8.5 for the ND subjects. The figure displays higher numbers of initiations for the subjects with autism in the control group and for the normally developing subjects in the treatment group.

As indicated in the numbers on Table 5, dyads 5 and 7 were the outliers in terms of number of initiations. The ND subject had a large number of initiations in the first half of the session in group 5, an experimental group, and the subject with autism had an excessive amount of initiations in both halves of the play session in group 7, a control group. Excluding these dyads changes the data slightly. The medians and means are

Table 5

Number of Initiations For Subjects with Autism and Normally Developing SubjectsWithin Both Treatment and Control Groups

Dyad	<u>Subjects with Autism</u>		<u>ND Subjects</u>	
	Time 1	Time 2	Time 1	Time 2
Treatment				
1	10	5	4	9
2	4	1	4	1
3	5	0	1	0
4	0	1	10	11
5	4	1	23	5
6	1	3	3	2
Control				
7	29	21	8	5
8	10	4	0	0
9	6	11	12	8
10	3	16	4	10
11	0	0	0	4
12	1	0	0	2

Note. Time 1 and time 2 indicate first and second 15-minute periods of the 30-minute play session. This table displays the number of initiations for each subject during the first and second halves of the play sessions.

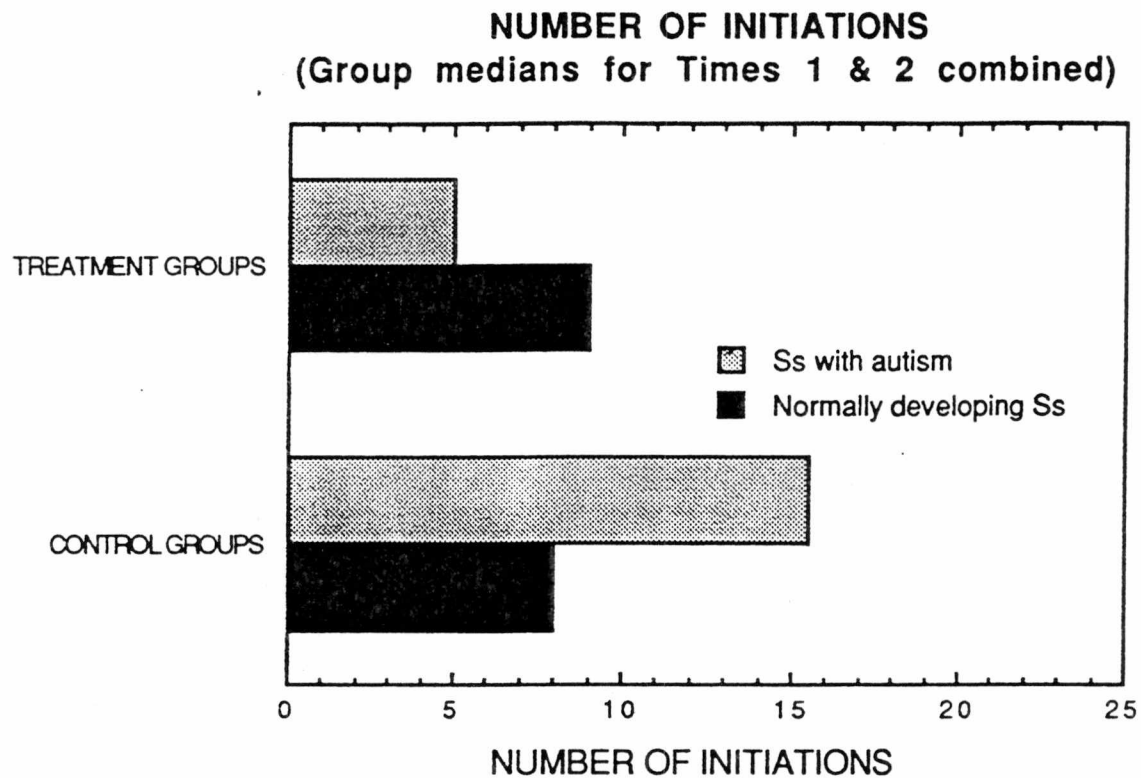


Figure 1

Number of Initiations Based on Group Medians For Both Treatment and Control

Groups Combining First and Second Halves of the Play Sessions

respectively reported for first and second halves of the play sessions. The figured medians for the experimental group were 4 and 1 for the children with autism and 4 and 2 for the normally developing children. The medians for the control group were 3 and 4 for the children with autism and 0 and 4 for the ND children. The new means with the outlying dyads excluded are 4 and 2 for the children with autism and 4.4 and 4.6 for the ND children in the experimental group. In the control group, the means are 4 and 6.2 for the children with autism and 3.2 and 4.8 for the ND children.

Successful Initiations

The results for the number of successful initiations for all of the subjects in both the treatment and control groups are presented in Table 6. The successful initiations were coded based on whether or not there was a response to that initiation. Figure 2 represents the number of successful initiations based on the group medians for all subjects. The group medians for the treatment group are 2.5 for the subjects with autism and 7 for the ND subjects. The group medians for the control group are 9 for the subjects with autism and 3.5 for the ND subjects. The figure indicates that the number of successful initiations were higher for control subjects with autism and experimental normally developing subjects which is parallel to the number of initiations presented in Figure 1. A ratio of the number of successful initiations to the number of total initiations per subject was also calculated. The mean percentages for the subjects with autism in the experimental group showed an increase from .44 ($\underline{SD} = .40$) in the first half to .66 ($\underline{SD} = .52$) in the second half of the play sessions. For the normally developing subjects in the experimental group, the mean percentages were .64 ($\underline{SD} = .37$) for the first half of the sessions and .55 ($\underline{SD} =$

Table 6

Number of Successful Initiations For Subjects with Autism and Normally Developing Subjects Within Both Treatment and Control Groups

Dyad	<u>Subjects with Autism</u>		<u>ND Subjects</u>	
	Time 1	Time 2	Time 1	Time 2
Treatment				
1	10	5	4	5
2	3	1	2	0
3	2	0	0	0
4	0	1	6	8
5	2	1	17	5
6	0	0	3	2
Control				
7	21	19	7	3
8	1	1	0	0
9	6	10	3	4
10	2	14	4	6
11	0	0	0	0
12	1	0	0	0

Note. Time 1 and time 2 indicate first and second 15-minute periods of the 30-minute play session. This table presents the number of successful initiations for each subject for both first and second halves of the play sessions.

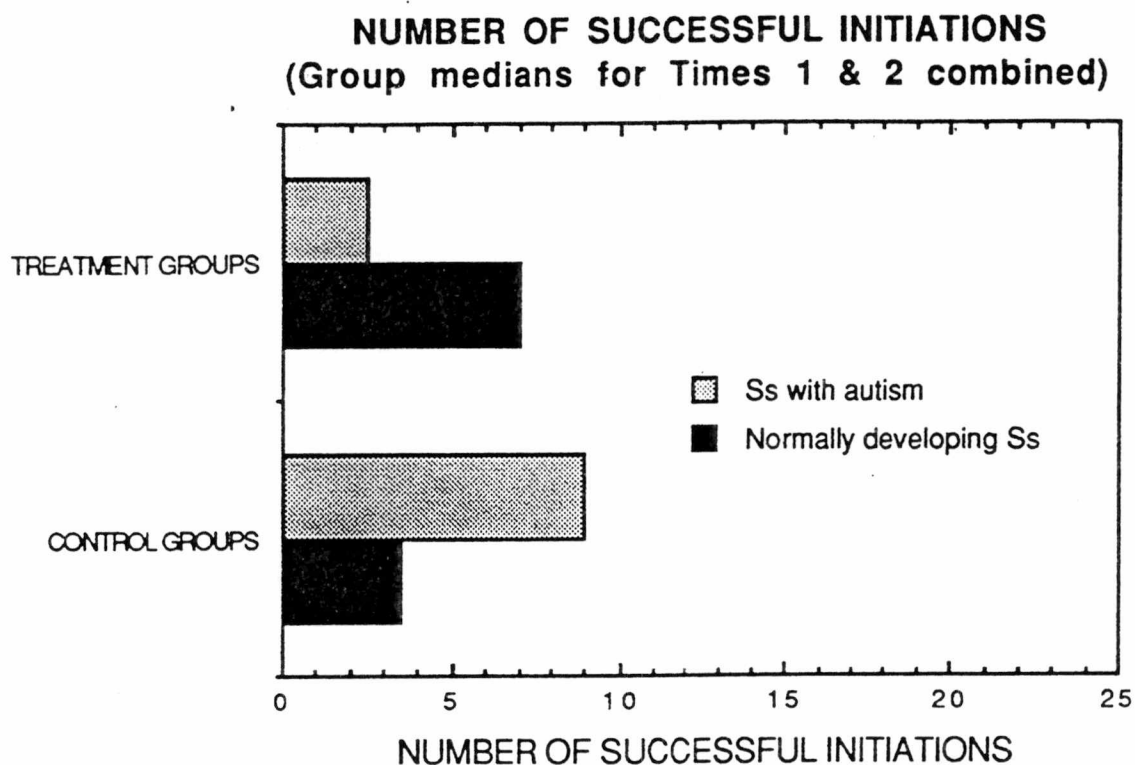


Figure 2

Number of Successful Initiations Based on Group Medians For Both Treatment and Control Groups Combining First and Second Halves of the Play Sessions

.46) for the second half of the sessions. The mean percentages for the subjects with autism in the control group were .44 ($SD = .41$) for the first half and .49 ($SD = .45$) for the second half. For the ND subjects in the control group, the mean percentages were .35 ($SD = .46$) and .28 ($SD = .31$) for the first and second halves of the play session, respectively. Figure 3 represents a comparison of the number of successful initiations to total initiations based on the mean percentages for all the subjects and clearly indicates the increase in the number of successful initiations from first halves to second halves of the play sessions for the subjects with autism in the treatment dyads. Figures 4 and 5 represent a comparison of the mean number of initiations and the successful initiations for both subjects with autism and normally developing subjects, respectively, in both treatment and control groups. Figure 4 shows that the subjects with autism in the treatment group started out with fewer initiations in the first half of the play sessions than the control subjects while Figure 5 indicates the opposite for the ND subjects. In their case, the subjects in the treatment group started out with more initiations than their control counterparts. These figures support the finding that the ND subjects may have been positively influenced by the treatment whereas the subjects with autism were affected negatively.

Mean Length of Interaction

The results for the mean length of interaction (MLI) are presented in Table 7. Each unit or response was coded and divided by the total number of interactions (initiations) to obtain the MLI. The means for the MLI were also calculated. All means

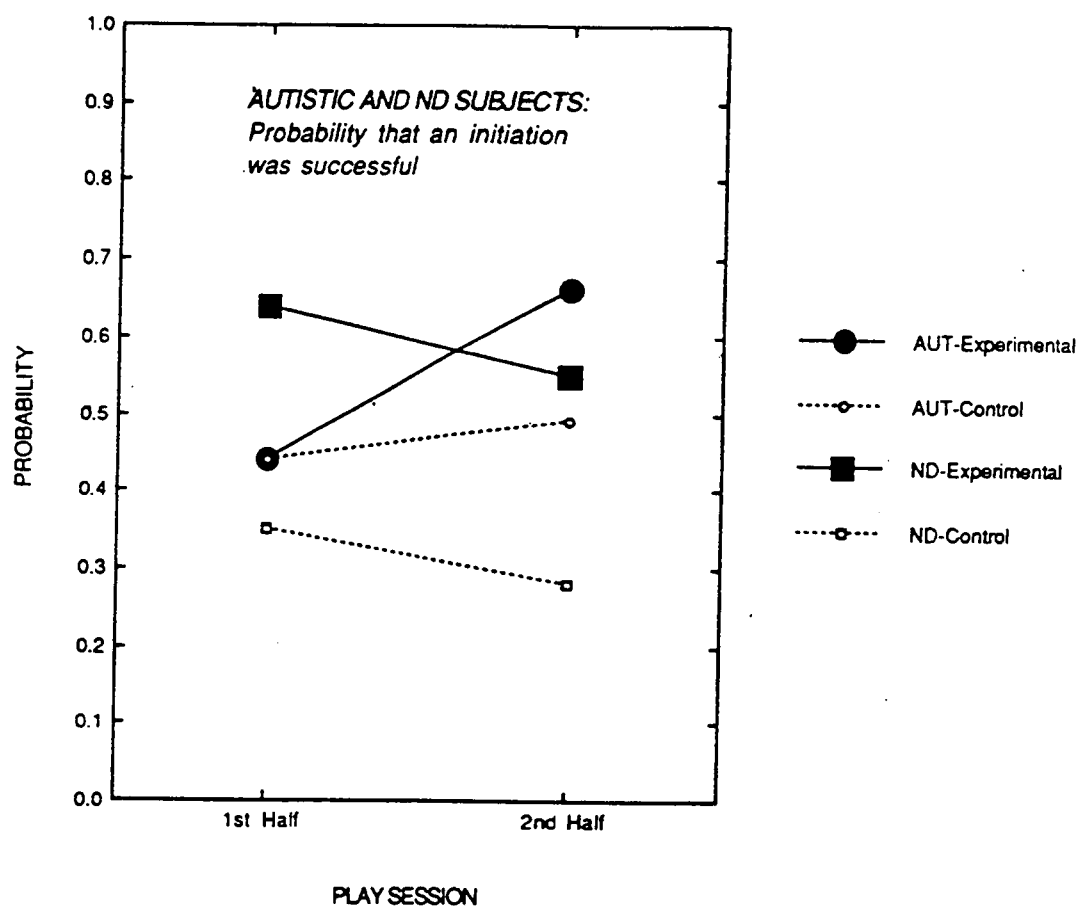


Figure 3

Percentages of Successful Initiations For Both Treatment and Control Groups Comparing First and Second Halves of the Play Sessions

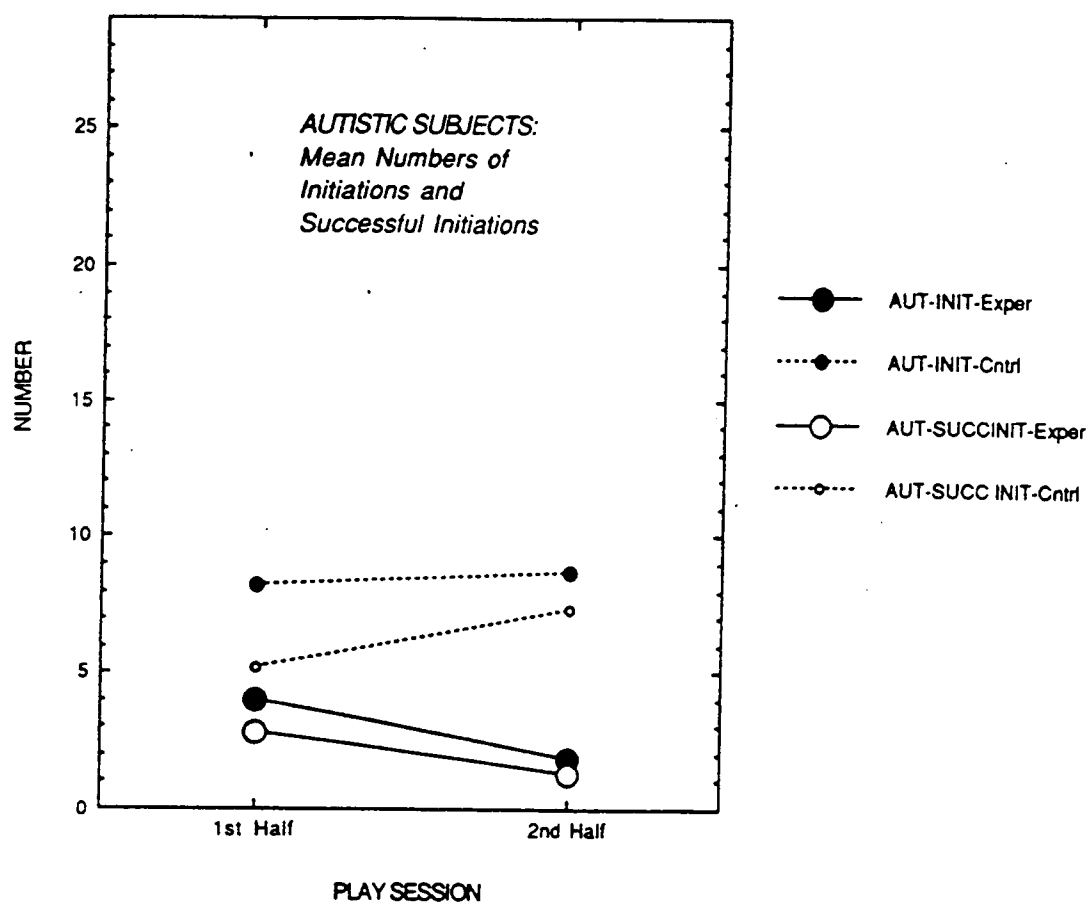


Figure 4

Mean Numbers of Initiations and Successful Initiations for Subjects with Autism in Both Treatment and Control Groups Comparing First and Second Halves of the Play Sessions

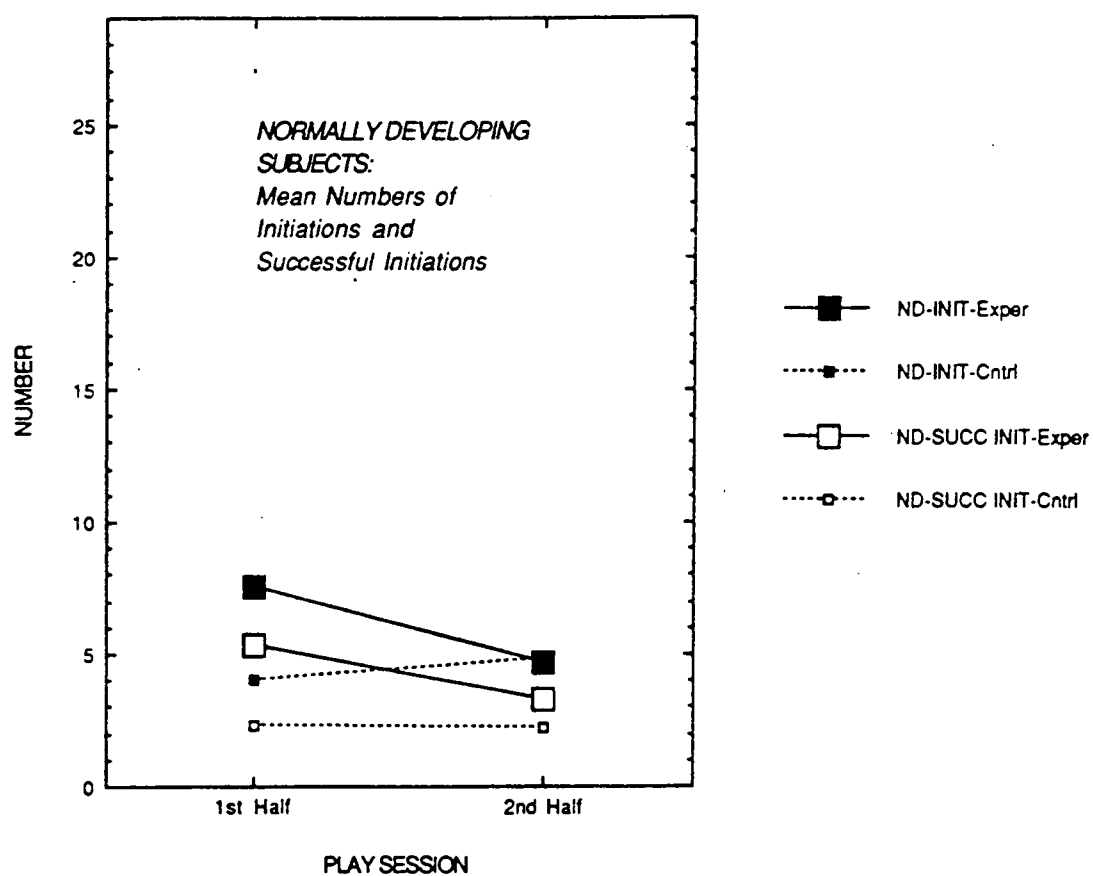


Figure 5

Mean Numbers of Initiations and Successful Initiations For Normally Developing Subjects in Both Treatment and Control Groups Comparing First and Second Halves of the Play Sessions

Table 7

Mean Length of Interaction For Subjects with Autism and Normally Developing SubjectsWithin Both Treatment and Control Groups

Dyad	<u>Subjects with Autism</u>		<u>ND Subjects</u>	
	Time 1	Time 2	Time 1	Time 2
Treatment				
1	2.5	3.6	2.7	1.8
2	1.7	2.0	1.5	1.0
3	1.4	0	1.0	0
4	0	2.0	1.5	1.66
5	1.5	4.0	2.5	2.6
6	1.0	1.0	2.6	2.0
Control				
7	2.1	2.6	2.1	2.4
8	1.1	1.2	0	0
9	1.3	2.9	1.4	2.1
10	3.0	3.5	2.7	1.8
11	0	0	0	1.0
12	4.0	0	0	1.0

Note. Time 1 and time 2 indicate first and second 15-minute periods of the 30-minute play session. This table presents the mean length of the interaction for each subject for first and second halves of the play sessions.

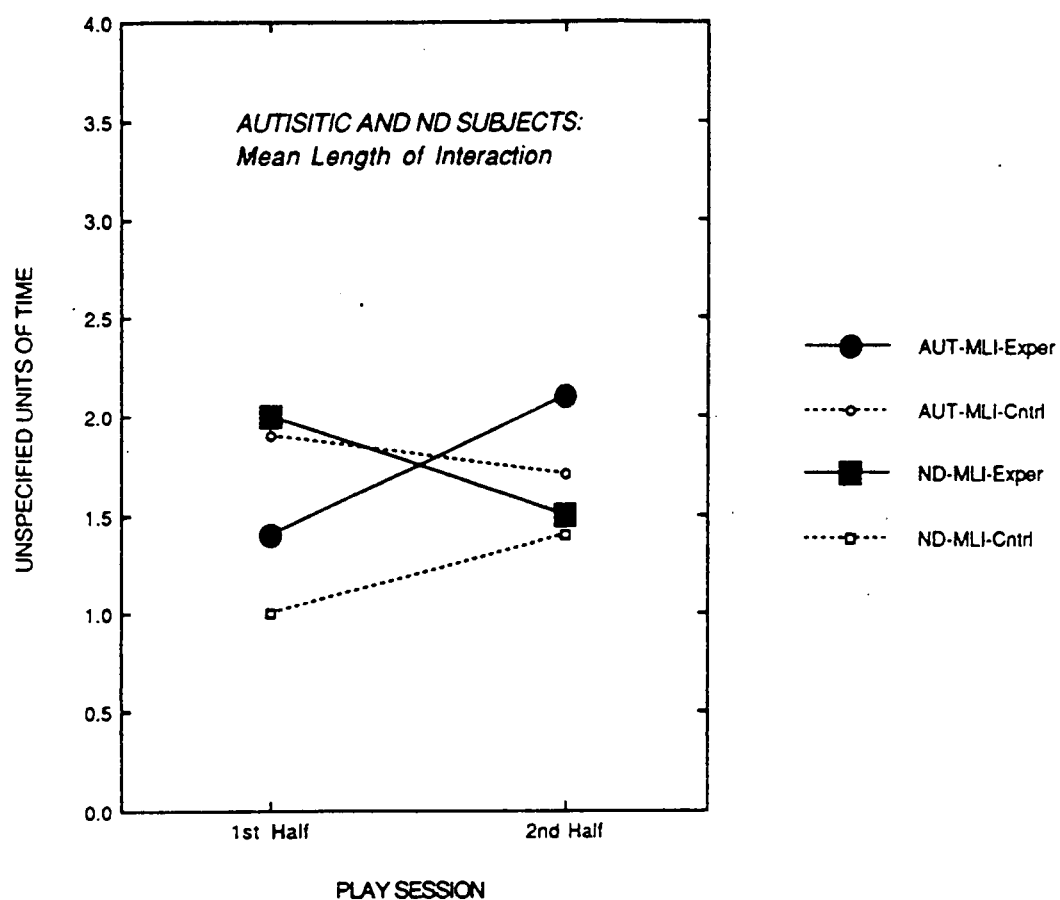


Figure 6

Mean Length of Interaction For All Subjects In Both Treatment and Control Groups

Comparing First and Second Halves of the Play Sessions

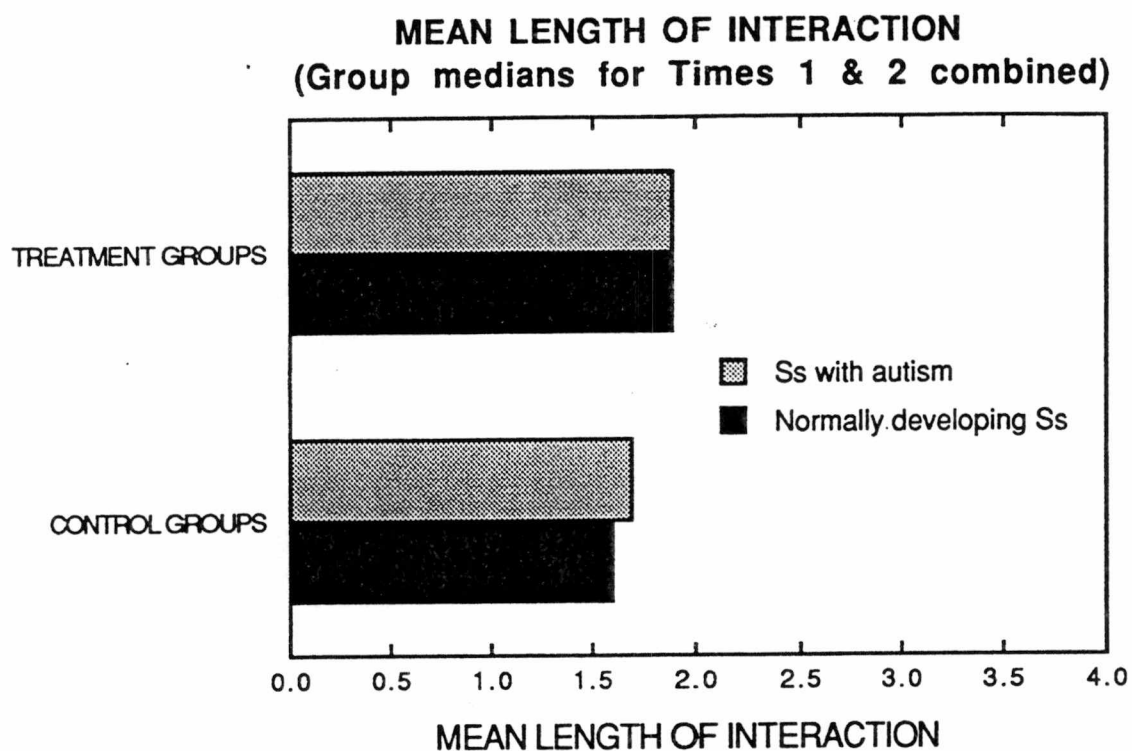


Figure 7

Mean Length of Interaction Based on Group Medians For All Subjects In Both Treatment and Control Groups Combining First and Second Halves of the Play Sessions

are respectively reported for the first and second halves of the sessions. Figure 6 compares the means for all the subjects for the first and second halves of the play sessions. For the children with autism in the experimental group, the means indicated an increase from 1.4 ($SD = .83$) to 2.1 ($SD = 1.5$). The means for the normally developing children were 2.0 ($SD = .73$) and 1.5 ($SD = .90$). In the control group, the means were 1.9 ($SD = 1.4$) and 1.7 ($SD = 1.5$) for the subjects with autism and 1.0 ($SD = 1.2$) and 1.4 ($SD = .89$) for the ND subjects. Figure 7 represents the group medians for all the subjects combining the first and second halves of the play session. Interestingly, both figures 6 and 7 show that the MLI of the subjects with autism in the treatment group was slightly longer than the subjects with autism in the control group. Figure 7 also shows that the median of the MLI for the ND subjects in the treatment group was also slightly longer in than their counterparts in the control group. The median in Figure 7 was calculated across both halves of the play sessions. Figure 6 shows similar findings for the first but not the second halves of the play sessions.

Summary of Results

Using a repeated measures MANOVA, it was determined that there were no significant differences found for the variables: number of initiations, number of successful initiations, or mean length of interaction. However, the percentages of the successful initiations to total initiations indicated that the children with autism in the experimental group had a higher percentage of successful initiations in the second half of the play session (increased from .44 to .66) compared to those in the control group (increased from .44 to .49). It is also important to point out that the MLI for the subjects

with autism in the experimental group also increased during the second half of the play sessions.

CHAPTER IV

Discussion

Purpose of Study

The purpose of this study was to examine the effect of adult redirects and prompts on the interaction skills observed in 12 dyads consisting of a child with autism and a normally developing child. Three components were measured to study this effect: the number of initiations, the number of successful initiations, and the mean length of the interaction. The variability of the measures of the communication was so great that no significant treatment effects were found. However, on the basis of these findings, it is inappropriate to conclude that the method of treatment (redirects and prompts) is ineffective. There is evidence to suggest that the performance of the children with autism depended on their comfort with the experimental situation and that some may have reacted by withdrawing while others reacted by becoming excessively verbal (but echolalic). If these suppositions are true, then it is possible that the appropriate environment was not established to evaluate the intervention. A secondary purpose was to gain descriptive data in order to compare the differences of the interaction skills of the children with autism to their normally developing peers and to determine future clinical implications based on the use of adult redirects and prompts.

Initiations

Based on the data, the redirect and prompt intervention did not appear to influence the initiations of the subjects with autism, but may have had an effect on the

initiations of the normally developing subjects. Also, in both treatment and control groups, there was a decrease of initiations in 13 of the 24 subjects during the second half of the 30 minute play session. Eight of the 13 subjects were in the experimental group. The remaining five were in the control group. This decrease could be related to the presence of the PI. The children seemed more comfortable playing when the adult was sitting near by and, in the case of the treatment dyads, was interacting frequently. Once the PI moved farther away from the play area to "work", the children became more quiet and less interactive. Especially during the experimental groups when the PI was interactive during the first half, her absence during the second half was probably more noticeable and may have effected the interactions of the children. The significance of the finding related to the withdrawal of the adult is that children in a unfamiliar classroom with a lower teacher-child ratio may be less likely to interact without the assistance of an adult. However, it is interesting to note that despite the decrease in initiations, there was an increase in the MLI which will be discussed later. Without further study, it is unknown whether the decrease in initiations or the increase in MLI is a more important finding.

Factors Influencing Initiations

The number of initiations produced by a subject was dependent on certain factors such as personality, verbosity, peer compatibility, and subject matching. First of all, in the case of the normally developing (ND) subjects, some of them appeared encumbered by the subjects with autism which affected their interactions. This was observed especially in two of the second grade ND subjects (dyads 2 and 7) who did not interact frequently with their peers with autism and responded only on a limited basis. Two of the

ND subjects (dyads 3 and 8) appeared timid and simply did not talk at all. This reserved demeanor seen in the two second graders and two kindergartners may have been related to the behaviors of the subjects with autism with whom they were paired. It was also possibly a result of each child's personality since social assertiveness was not considered when selecting normally developing subjects. Only one ND subject (dyad 10) seemed particularly disturbed by the presence of the child with autism and at one point said, "Get away from here" when the child approached him to play with the same toy. There was no apparent reason for this negative reaction. Fortunately, the rest of the ND subjects did not seem concerned with differences that may have been evident in their play partners.

Second, the initiations produced by the subjects were closely associated with the number of verbal behaviors that the child had. Of the total number of initiations for all the children, only 4% (11/262) were nonverbal initiations. Nine of the 11 were preceded with a redirect or prompt from the PI. These infrequent nonverbal initiations were composed of showing a toy or handing a toy to the other child for help.

In the case of the four subjects with autism (all control subjects) who had the highest numbers of total initiations for both segments of the play sessions, it is important to point out that many of the verbal initiations were inappropriate. For example, one subject repeatedly asked the ND subject, "What's your name?" in order to initiate conversation. Once the ND subject responded with his name, the subject with autism asked a more appropriate question or made an appropriate comment. Although this led to successful initiations for the child with autism, it is not a phrase that is used repeatedly by ND children to begin an interaction. As Lord (1984) stated, it is important to analyze the

by ND children to begin an interaction. As Lord (1984) stated, it is important to analyze the quality of the interactions along with the quantity. Even though the quantity of the interactions by a child with autism may increase as a result of a particular treatment, the quality may not change and may continue to be inappropriate or ineffective. The elevated number of initiations in 4 of the 6 children with autism in the control group may have been affected by the presence of echolalia. Unfamiliar situations or difficult tasks often contribute to the increase of echolalia in children with autism (Charlop, 1986; Olley, 1987). Charlop (1986) found that the highest percentage of echolalia for the six children with autism who participated in the study occurred during the setting in which an unfamiliar person presented unfamiliar stimuli. This may have been the case in some of the children in this investigation. The unfamiliar people (PI and peer) combined with an unfamiliar room and possibly new toys may have caused an increase in the anxiety of the children with autism, and in the case of the more verbal children, consequently caused an increase in the echolalia. Also, in the case of the subjects in the control dyads, the unfamiliar adult present in the room remained silent and did not interact with the children. This was not a normal situation and may have actually resulted in more anxiety and increased echolalia. This possible anxiety-produced echolalia increased the number of initiations among the subjects with autism in the control group which in comparison to the subjects with autism in the treatment group incorrectly suggests that the intervention was not effective.

Peer compatibility also affected the number of initiations produced within the play session. Within about half of the dyads, there appeared to be a lack of bonding while

the other dyads adjusted to each other quite well. The children in the groups who bonded had an increase in interactions while the other children ended up at separate toys with little or no interaction. It is important for children to be appropriately matched to have more successful interactions.

This last factor of subject matching had a major influence on the number of initiations between control and treatment groups. Though children were randomly placed into treatment and control groups, it seemed that the more verbal (and more echolalic) children were in the control groups. Four of the six children with autism in the control group who displayed echolalia had as many as 40 more initiations during the play session. This factor had an enormous impact on the results of the study.

The children were also matched for grade and not chronological age with the exception of two of the subjects with autism who were in pre-kindergarten but were matched with ND subjects in kindergarten. Because of this, some of the normally developing subjects were younger and physically smaller than the children with autism. These factors could also have affected the number of initiations assuming that the younger and smaller children would be somewhat inhibited by the older and larger children. A study by Lord and Hopkins (1986) found that same-age normally developing peers were better able to initiate and respond in an appropriate way to the children with autism than the younger normally developing children were. It is assumed that this was the case with the younger children who participated in this project.

Successful Initiations

The successfulness of the initiations, which was based on whether or not there was a response to the initiation, did not appear to be affected by the intervention for the children with autism. However, similar to the findings for the overall initiations, the normally developing children could have been influenced by the intervention. A successful initiation by the subject with autism was dependent on a response by the ND subject. The subjects with autism responded less overall to the initiations by the ND subjects resulting in a lower number of successful initiations for the ND subjects. Comparing the first and second halves of the play sessions, there was a greater increase in the percentage of successful initiations to total initiations for the subjects with autism in the experimental group than those in the control group. These children (in the experimental group) were encouraged to interact by the presence of the adult and therefore continued the interaction with a response. The ND subjects seemed to become better responders or more comfortable with responding to the children with autism.

Types of Responses

There were many different types of responses observed in the subjects. Even with some of the more verbal children with autism, the ND subjects simply nodded or said "yeah" to about half of the initiations. However, it is important to point out that these short responses often did not result in a continued interaction. Other nonverbal responses depended on the initiations and included: handing a toy, smiling, looking, coming over, and pushing the button on the racetrack. Nonverbal responses accounted for only 20% (36/179) of the total successful responses by all children. Verbal responses, ranging from

autism. A few examples of elaborate verbal responses are listed in Table 8.

Wetherby (1986) points out that children with autism often respond in ways that are considered “noncommunicative” or “noninteractive” (p. 295). The subjects with autism in this investigation also responded in these ways. However, similar to Wetherby’s analysis, the intent of the interaction was considered. Seven (4 control, 3 treatment) of the subjects with autism displayed some echolalia. For example, one ND subject showed his play partner something he made with playdough and said “Look, it’s a biscuit.” The subject with autism said, “Biscuit.” This response, though echolalic, was considered a confirmation of what the child with autism heard; therefore it was coded as an appropriate response. Echolalic statements such as this one served important communication functions and were considered responses. Delayed echolalic phrases such as words to songs or TV shows were not coded as initiations or responses.

Mean Length of Interaction

The mean length of interaction (MLI) was coded by counting the number of interaction units per initiation and dividing by the total number of initiations. An initiation that was unsuccessful was counted as one unit. Nonverbal responses were also counted as a unit. Interestingly, nonverbal responses were often not followed by continued interactions. It is unknown whether the peer did not notice the nonverbal response, did not know how to respond to the nonverbal response, or even did not feel obligated to respond.

Table 8

Examples of Elaborate Verbal Responses

Initiation	Response
ND- "I'm building a car."	AC- "I'm building a race car."
AC- "See what you did."	ND- "I'll fix it."
AC- "I'm going to crash you."	ND- "Hey, I don't want to crash."
ND- "Want some pizza?"	AC- "Sure, I want pizza."
ND- "Whoa, that did like a 360°."	AC- "Did it do it by itself?"
ND- "Almost worked."	AC- "You keep saying that every time."
ND- "Hey, let's have a race."	AC- "No, it's my cars."
ND- "Look what I made."	AC- "Ice cream? Yuck!"
AC- "I'm hungry."	ND- "You just ate lunch, Zachary. You ate lunch a few minutes ago."
ND- "Chad, what are you building?"	AC- "I'm building a house."

Note. ND = Normally Developing Subject; AC = Subject with Autism.

Based on the data, the intervention may have influenced the MLI of the subjects with autism and ND subjects. Specifically, in the experimental dyads, the mean length of the interactions initiated by the children with autism increased during the second 15 minute segment. One possible reason could be that the children with autism as well as the ND children became more comfortable in the play setting and were able to continue the interactions for a longer period of time. This is similar to the findings of Roeyers (1996) in which the children became familiar with each other which could have led to an increase in the length of the interaction. Though it seems contradictory, the MLI could still increase with a decrease in initiations. The increased length of the interactions resulted in fewer opportunities for new initiations. As stated earlier, it is believed that the children had a decrease in the number of initiations due to the withdrawal of the PI, however once the initiation occurred they still felt more comfortable continuing the interaction.

Redirects and Prompts

During the treatment dyads, redirects and prompts were used to increase interactions. A redirect is a technique used when a child approaches an adult for interaction and the adult encourages the child to interact with another child. For example when a child approaches an adult to show a toy, the adult may say, "Show the toy to John." Redirects are dependent on the child's desire to interact which means the child must first initiate to the adult in order to receive a redirect. The majority of the redirects used in this study were explicit redirects which only suggested that the child initiate to a

peer using his own words (Hadley & Schuele, 1995). These were used when it was assumed that the child had the linguistic ability to make an initiation to his peer using the PI's suggestion. In the case that the child needed more assistance with a verbal initiation, the PI used a redirect with a model which provided the exact words for the child to repeat. These redirects provided the children with the language necessary to convey their message and to increase the possibility of successful interactions.

Although the principal investigator (PI) was within 5 feet of the play area, only half of the ND subjects (3 treatment, 3 control) approached or looked at her for interaction during the entire play session. Similarly, only 42% (5/12) of the children with autism (2 treatment, 3 control) approached the PI, however along with those, three other children with autism used eye contact to interact with the PI. Lack of familiarity could have been the reason why the subjects did not approach the PI. The PI was a new person whom they had just met recently during the time when assent was recorded. Bernard-Optiz (1982) found that a child with autism interacted less appropriately with an unfamiliar adult. It is also important to point out than in the study by Schuele et al. (1995), the person who delivered the redirects was the teacher in the classroom and thus a familiar adult. It is therefore suggested that if a familiar adult is present in the room during the play session, the children may be more likely to approach that adult and more opportunities to receive redirects would be available. This was the case in the pilot study run in August of 1997. The normally developing child was familiar with the PI and frequently approached her to play.

There were a few initiations to the PI that were not appropriate to redirect. In these cases, as suggested by Hadley and Schuele (1995), the PI simply responded to the question. For example, one subject with autism asked the PI several questions about the toys and where they were purchased. The PI simply provided the answers rather than redirecting to the normally developing child who would not have known the answer.

When the children did not interact within the first two minutes, the PI used prompts to encourage the children to play together. The PI continued to use a prompt approximately every two minutes if the children continued to play alone. These prompts were not dependent on the child's desire to interact. All of the children that received a redirect or prompt from the PI responded positively most of the time. There were not any children who did not respond at all to the treatment. The PI also consistently provided positive reinforcement to the children who followed through on the redirects or prompts or who had a good spontaneous interaction. Reinforcement included statements of praise such as "I like the way you are talking to your friend" or "That is nice playing together." No data were analyzed concerning this reinforcement, however it was observed that the children were overall responsive to the reinforcement and would often look or smile at the PI following the reinforcement.

Although the data did not show a significant difference between the control and treatment groups, the follow through on most prompts and redirects shows the capability of the treatment if continued for a longer period of time. It is likely that adult redirects and prompts are an appropriate treatment for some children with autism. Previous research has shown that children with autism typically prefer interactions with adults

(Lord, 1984). In those cases, redirects would be useful in encouraging the children to interact with their peers rather than with the adult.

Successful versus unsuccessful prompts

The majority of the prompts used by the PI were play directions such as "Ask ____ for help", "Show ____ the car", or "Watch what ____ is doing." The successfulness of the prompt depended on which child (with autism or ND) the prompt was given to and whether or not the child was paying attention. Every one of the subjects responded at least once either verbally or nonverbally to the prompts given by the PI. The normally developing subjects responded every time while the subjects with autism responded approximately 50% of the time. When the children with autism were not maintaining eye contact or were participating in a self stimulatory behavior, it was less likely that they responded to the prompt. The PI typically used the child's name in order to get the child's attention before giving a prompt. Getting the child's attention is an important factor in ensuring successful prompts. There were also several occasions when the normally developing child responded to a prompt given to a child with autism. For example when the PI told a subject with autism to ask for help, the ND subject reached over and helped without waiting for an initiation from the subject with autism. These were not counted as successful initiations or prompts.

Toy Play

It was clear from the observations that of the three toys: playdough, racetrack, and legos, the racetrack with cars was the most popular choice. Every dyad played with it at least 15 of the 30 minutes, and several of the dyads played with it the entire 30 minutes.

The playdough was the second most desirable activity while the legos were played with the least. Since all of the toys provided the children with an opportunity to interact with each other, it is unknown why most of the children preferred the racetrack. However, the racetrack probably provided more natural and comfortable play interactions with less emphasis placed on verbal interactions. For example, in many of the dyads, the children had an inferred interaction where each child had a role. One child would place the car on the track and the other child would push the button to launch the car. The children seemed to never tire of this same activity. They also would have races or contests; one dyad even kept points to see who was winning.

One factor that could have contributed to the success of the racetrack was that the children did not need to generate a play idea in order to play with it. The legos and playdough both required more creativity to build or make something. Children with autism often lack this ability to generate play ideas without the presence of play cues or instructions (Lewis & Boucher, 1995). The racetrack allowed the children with autism to imitate the play of the ND children without having to develop a play scheme on their own. The legos and playdough also require more symbolic and imaginary play which is also difficult for children with autism (Wing, 1988). There was not a model for them to imitate or instructions for them to follow to appropriately play with these two toys (legos, playdough) as compared to the racetrack.

Despite research that suggests that children with autism have difficulty with toy play (Wetherby & Prutting, 1984), the subjects in this investigation had appropriate toy play as a whole. There were some instances of self stimulatory behaviors (i.e., repetitious

actions, arranging toys in a certain order) that were not very appropriate. However, the ND children did not appear troubled by the occasional inappropriate toy play of the children with autism, and it did not seem to have any correlation with the outcome of the study.

Clinical Implications

The importance of an IQ score

An IQ score was achieved from school records for six of the 12 subjects with autism. The range of IQ scores was 65-106. The other six children had either not been tested or were unable to be tested. Interestingly, the child with the score of 65 was just as interactive as the child with the score of 106. These children were in second grade and kindergarten, respectively. Schatz and Hamdan-Allen (1995) found that there is a minimal relationship between IQ scores and social skills in children with autism. They compared performance IQ scores to scores on the Vineland Adaptive Behavior Scale for 72 children with autism and 37 children with mental retardation (non-autistic). Specifically, they found that "with increasing IQ, children with autism showed smaller increases in social functioning than children with mental retardation" (p. 51). Although IQ scores are commonly used to compare the social skills of children with autism, a rating scale specifically designed for these children would be more appropriate when analyzing their social skills.

Negative social spiral

Rice (1993) discussed the concept of a negative social spiral with SLI children that can also relate to children with autism. As observed in the play sessions, the ND

children often decreased their attempts to interact with their peers with autism when they discovered how difficult the interactions were. This may have caused the children with autism to interact less and thus limited the social interactions within the dyads. However it is unknown whether the children with autism interacted less due to the negative reactions from the peers or due to a lack of desire to interact. Using adult prompts or redirects over several consecutive sessions may increase the successfulness of the interactions within the dyads and prevent any negative interactions that may occur. It would also be beneficial to provide other play sessions for the children with autism to assess the generalization of the redirects when playing with an unfamiliar child. A successful play session with an unfamiliar child may decrease the effects of a negative social spiral and encourage the child with autism to continue positive interactions.

Mainstreaming

Eight of the 12 subjects with autism are mainstreamed into a regular education class at least part of the day. One of the children attends a regular education class only accompanied by the SLP; it is unknown whether or not the three pre-kindergarten children will be mainstreamed once they enter kindergarten. As many researchers have found (Egel, Richman, & Koegel, 1981; Kamps, Barbetta, Leonard, & Delquadri, 1994; Lord, 1984; Strain & Odom, 1986), in order for children with autism to have the opportunities to practice social skills, they must be integrated with normally developing children. Mainstreaming provides this opportunity. Guralnick and Groom (1988) compared peer interactions in mainstreamed and specialized classrooms. They found that mildly developmentally delayed children had a much higher rate of social interactions

with their peers as well as much more constructive play in the mainstreamed than in the specialized classrooms.

Mainstreaming would also be an ideal time to incorporate adult redirects or prompts to increase the social interactions between these children. The children with autism often go to non-academic classes such as physical education, music, and library with the regular class and then obtain academic guidance within the special education classroom. The nonacademic time spent with the regular education class allows the child to have some time to observe the social interactions among normally developing children and then practice these skills they are learning. The result of using the treatment would require the peers to take on a more active role in the interactions while the teacher or adult could assume a less involved role.

Teacher and parent expectations

Interestingly, the teachers and parents who allowed their children to participate in this project differed in their expectations of the children's performance ability. The teachers of the children with autism seemed to have negative views about the outcomes of the play sessions. Several of them made comments like "He probably won't interact at all" or "I wouldn't expect much interaction out of him." At the conclusion of the interaction, they seemed surprised when the positive quality of the interaction was reported. The attitude of the teachers was unexpected and indicates a need for teacher awareness with regard to the social potential of these children.

On the other hand, the parents who allowed their children to participate in the study were extremely supportive. The PI had the opportunity to talk with more than half

of the parents many of whom expressed thoughts of appreciation at the completion of such a project. Overall, the parents were not initially openly pessimistic about their child's performance like the teachers were, but rather were very interested in learning the results of the research and the potential intervention strategies that might ensue from it. This may be a typical response of parents with special needs children who look for every opportunity to help their children. Teachers and SLPs, as well as parents, have the direct responsibility to provide social opportunities for the children with autism with their normally developing peers. Because of this, it is important for teachers to observe these social interactions so they are aware of the potential of their students with autism.

Limitations of the Study

One major limitation of this study was the matching of the subjects (normally developing and those with autism). The subjects were matched according to grade rather than age because it was assumed that some of the children with autism might be in lower grades than their normally developing peers. Matching for grades would allow the data to be grade specific rather than age specific which would be beneficial for school purposes. However, this was not true for all subjects with autism. Nine of the 12 children with autism were in the appropriate grade for their chronological age. Two of the pre-kindergarten subjects with autism were matched with ND kindergarten subjects because there were not ND preschool programs in those schools. Consequently, the mean age for the ND subjects was slightly lower than the mean age for the subjects with autism in the control group (75 and 83 months, respectively) and higher than the mean age for the subjects with autism in the experimental group (83 and 81 months, respectively).

Also, the normally developing children were selected by their teachers based on willingness to participate, but were not screened for appropriate social skills using a social skills rating scale. The teachers and principals were provided with a list of the subject selection criteria to consider when choosing potential subjects. The criteria included regular school attendance, absence of a suspected speech or language disorder, average IQ (i.e., >100), no remedial services, and no identified hearing loss. The criteria did not place any stipulations on the social skills of the ND children chosen. Consequently, some of the normally developing children may have been reserved, quiet students who were more inhibited by the new situation and possibly by the presence of the child with autism than other more outgoing ND children. This could have affected the quality of the interactions observed. This could have also resulted in inappropriate subject matching which consequently caused the lack of bonding in some groups as discussed earlier. It is important for children to be appropriately matched to have more successful interactions. Weiss and Nakamura (1992) found that "demonstration of language competencies that are within normal limits is no guarantee of either uniformity in language performance in the classroom or even a willingness to interact with language-impaired classmates" (p. 69). Similarly, the ND subjects in this study, although they did not receive any remedial services and did not have any apparent language deficits, were not necessarily the best social matches for this project.

The lack of background information gained about the subjects with autism was also a limitation of this study. A parental questionnaire would have been helpful to provide knowledge about each subject with autism in order to compare the children to

one another. Because of the wide range of characteristics seen in children with autism, it is difficult to make generalizations about the children based on only one 30 minute session. Also, a parental questionnaire could have provided information about the child's past social behaviors and interactions with peers as well as medication the child might be taking. It would also be interesting to know the effects of the medication and therapies (speech, occupational, etc.) on social interactions and behaviors.

Future Research

This study brings forth several possibilities for future research. It would be beneficial to increase the number of subjects and the length and number of the play sessions to determine the effects of redirects and prompts administered over a longer period of time. It is difficult to generalize such child specific data, but a study that included more children with more similar characteristics could find more specific results. The longer and/or increased number of play sessions would allow the children to become familiar with each other which should increase interactions as well. Also using a familiar adult to deliver the redirects and prompts may increase the overall successfulness and appropriateness of the interactions as well as decrease the probability of echolalia.

Investigating the effect of specific redirects on initiations and responses would also be worthwhile. Hadley and Schuele (1995) discussed several types of redirects that could be used. Two of the redirects are used in this study, but the third one, hints, is a more subtle redirect that requires the child to have more advanced social and linguistic skills. It would also be beneficial to examine which types of initiations, both verbal and nonverbal, are most successful. In addition, the researcher could explore the different

responses, both negative and positive, and how those responses affect the ongoing interaction.

Combining the use of adult redirects with peer training could eliminate the inhibition that some of peers displayed in this study. It was surprising that some of the normally developing peers seemed quite intimidated by the children with autism even though there was an adult in the room. Peer training could provide the children with information about the child with autism and specific strategies that could be used to engage that child in interaction. The redirects could serve the same purpose as assistance to the child with autism to direct his interaction toward the other child while the prompts could encourage him to continue the initiations from the normally developing child.

A final suggestion for future research would be to investigate the possibility of using adult redirects and prompts to decrease the use of stereotypic verbal behaviors (self stimms or echolalia) and inappropriate initiations by the child with autism. Both of these entities were observed quite frequently in all of the children with autism who were verbal. The normally developing children did not always appear to know how to respond to these irrelevant comments or questions. The behaviors of the children with autism also affected the interactions. With prompts from an adult and appropriate modeling from peers, these behaviors might decrease resulting in more successful interactions.

Summary

In summary, this investigation revealed important factors for determining success in the interactions of children with autism and their normally developing peers. Twelve

children with autism and 12 normally developing children in pre-kindergarten through second grade participated in the study to form 12 dyads (6 experimental/6 control). The experimental dyads received treatment (redirects and prompts) during the first half of the session. The variables measured were the number of initiations, the number of successful initiations, and the mean length of the interaction.

No significant statistical differences were found between the two classifications of children (ND or with autism) in the experimental or control conditions. Based on the numbers, the intervention was not effective in increasing the number of initiations or the success of the initiations for the subjects with autism, however the normally developing subjects could have been influenced by the intervention based on the higher number of initiations and successful initiations achieved in the experimental group. Important descriptive data about the interactions were gained. One important finding was the increase in the number of successful initiations and the mean length of the interaction initiated by the children with autism during the second half of the experimental sessions. This implies that the normally developing children may have become more accustomed to interacting with the children with autism and that both children may have become more comfortable in the interaction. Another important finding is that the number of interactions was higher in the groups that appeared to bond. This indicates the importance of appropriate peer matching as suggested in research by Weiss (1992).

The results imply that with control of the confounding variables: age of the matched peers, familiarity of the adult, and use of echolalia in the children with autism, there would possibly be a difference between the experimental and control groups. It is

proposed that the initiations of the children with autism and the ND peers would increase as well as would be more successful than those of the children in the control group. It is also proposed that the mean length of the interactions between these children would also increase and that the interactions would be more appropriate.

The implications for the implementation of the treatment provided in this study should be considered. Based on research that children with autism prefer and are more successful in interactions with adults, the treatment, composed of adult redirects and prompts, was deemed appropriate. The redirects required that the child initiate first to the adult, but the prompts were adult-initiated. Though the effectiveness of the treatment appeared somewhat hindered by the lack of familiarity of the adult, the children still looked at and spoke to the adult frequently. Therefore, the use of redirects and prompts by a familiar adult would probably increase the number of peer interactions between the ND children and the children with autism.

The significance of these findings could be carried over to the school setting in which many children with autism are mainstreamed. The adults in the school environment could take full advantage of an intervention program such as this one to increase the social interactions of the children with autism when they are included with their normally developing peers throughout the school day.

Future research in this area should consider increasing the length of the treatment time as well as incorporating other redirecting and prompting strategies. Determining the generalization effects of treatment such as this should be a focus of future research as well. Gaining descriptive information on the use of adults in intervention strategies can

be beneficial to speech-language pathologists who are implementing pragmatic intervention with children with autism.

REFERENCES

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: Author.

Bernard-Optiz, V. (1982). Pragmatic analysis of the communicative behavior of an autistic child. Journal of Speech and Hearing Disorders, 47, 99-109.

Cairnes, R. (1986). Social development: Recent theoretical trends and relevance for autism. In E. Schopler & G. Mesibov (Eds.), Social behavior in autism (pp. 15-33). New York: Plenum Press.

Caparulo, B., & Cohen, D. (1977). Cognitive structures, language, and emerging social competence in autistic and aphasic children. Journal of the American Academy of Child Psychiatry, 15, 620-644.

Charlop, M.H. (1986). Setting effects on the occurrence of autistic children's immediate echolalia. Journal of Autism and Developmental Disorders, 16 (4), 473-483.

Courchesne, E. (1989). Neuroanatomical systems involved in infantile autism: The implications of cerebellar abnormalities. In G. Dawson (Ed.), Autism: Nature, diagnosis, and treatment (pp. 119-143). New York: Guilford Press.

Creak, M. (1972). Reflections on communication and autistic children. Journal of Autism and Childhood Schizophrenia, 2, 1-8.

Dawson, G., & Adams, A. (1984). Imitation and social responsiveness in autistic children. Journal of Abnormal Child Psychology, 12, 209-226.

Durand, V.M., & Carr, E.G. (1987). Social influences on "self-stimulatory" behavior: Analysis and treatment application. Journal of Applied Behavior Analysis, 20, 119-132.

Egel, A.L., Richman, G.S., & Koegel, R.L. (1981). Normal peer models and autistic children's learning. Journal of Applied Behavior Analysis, 14 (1), 3-12.

Fay, W. (1973). On the echolalia of the blind and of the autistic child. Journal of Speech and Hearing Disorders, 38, 478-489.

Fujiki, M., & Brinton, B. (1994). Social competence and language impairment in children. In R. V. Watkins & M.L. Rice (Eds.), Specific language impairment in children (pp. 123-143). Baltimore: Brookes.

Goldstein, H., Kaczmarek, L., Pennington, R., & Shafer, K. (1992). Peer-mediated intervention: Attending to, commenting on, and acknowledging the behavior of preschoolers with autism. Journal of Applied Behavior Analysis, 25, 289-307.

Goldstein, H., & Wickstrom, S. (1986). Peer intervention effects on communicative interaction among handicapped and nonhandicapped preschoolers. Journal of Applied Behavior Analysis, 19, 209-214.

Guralnick, M.J. (1992). A hierarchical model for understanding children's peer-related social competence. In S.L. Odom, S.R. McConnell, & M.A. McEvoy (Eds.), Social competence of young children with disabilities (pp. 37-64). Baltimore: Paul H. Brookes Publishing Co.

Guralnick, M.J., & Groom, J.M. (1988). Peer interactions in mainstreamed and specialized classrooms: A comparative analysis. Exceptional Children, 54 (5), 415-425.

Hadley, P.A., & Schuele, C.M. (1995). Come buddy, help, help me! Verbal interactions with peers in a preschool language intervention classroom. In M.L. Rice & K.A. Wilcox (Eds.), Building a language-focused curriculum for the preschool classroom: Vol. 1. A foundation for lifelong communication (pp. 105-125). Baltimore: Paul H. Brookes Publishing Co.

Hartup, W., & Sancilio, M. (1986). The development of social skills in children. In E. Schopler & G. Mesibov (Eds.), Social behavior in autism (pp. 35-60). New York: Plenum Press.

Kamps, D.M., Barbetta, P.M., Leonard, B.R., & Delquadri, J. (1994). Classwide peer tutoring: An integration strategy to improve reading skills and promote peer interactions among students with autism and general education peers. Journal of Applied Behavior Analysis, 27 (1), 49-61.

Kamps, D.M., Leonard, B.R., Vernon, S., Dugan, E.P., Delquadri, J.C., Gershon, B., Wade, L., & Folk, L. (1992). Teaching social skills to students with autism to increase peer interactions in an integrated first-grade classroom. Journal of Applied Behavioral Analysis, 25 (2), 281-288.

Kanner, L. (1943). Autistic disturbance of affective contact. Nervous Child, 2, 217-250.

Klinger, L.G., & Dawson, G. (1992). Facilitating early social and communicative development in children with autism. In S.F. Warren & J. Reichle (Eds.), Causes and effects in communication and language intervention (pp. 157-186). Baltimore: Brookes.

Koegel, R.L., Firestone, P.B., Kramme, K.W., & Dunlap, G. (1974). Increasing spontaneous play by suppressing self-stimulation in autistic children. Journal of Applied Behavioral Analysis, 7, 521-528.

Lee, S., & Odom, S.L. (1996). The relationship between stereotypic behavior and peer social interaction for children with severe disabilities. Journal of the Association for the Severely Handicapped, 21 (2), 88-95.

Lewis, V., & Boucher, J. (1995). Generativity in the play of young people with autism. Journal of Autism and Developmental Disorders, 25 (2), 105-121.

Lord, C. (1984). The development of peer relations in children with autism. In F.J. Morrison, C. Lord, & D.P. Keating (Eds.), Advances in applied developmental psychology (pp. 165-229). New York: Academic Press.

Lord, C., & Hopkins, J.M. (1986). The social behavior of autistic children with younger and same-age nonhandicapped peers. Journal of Autism and Developmental Disorders, 16 (3), 249-262.

McHale, S. (1983). Social interactions of autistic and nonhandicapped children during free play. American Journal of Orthopsychiatry, 53 (1), 81-91.

Odom, S.L., & Strain, P.S. (1986). A comparison of peer-initiation and teacher-antecedent interventions for promoting reciprocal social interaction of autistic preschoolers. Journal of Applied Behavior Analysis, 19, 59-71.

Odom, S.L., & Strain, P.S. (1984). Peer-mediated approaches to promoting children's social interaction: A review. American Journal of Orthopsychiatry, 54 (4), 544-557.

Olley, J.G. (1987). Classroom structure and autism. In D.J. Cohen, A.M. Donnellan, & R. Paul (Eds.), Handbook of autism and pervasive developmental disorders (pp. 411-417). Silver Spring, MA: John Wiley & Sons.

Paccia, J.M., & Curcio, F. (1982). Language processing and forms of immediate echolalia in autistic children. Journal of Speech and Hearing Research, 25, 42-47.

Prizant, B.M. (1982). Speech-language pathologists and autistic children: What is our role? ASHA, 531-537.

Prizant, B.M. (1987). Theoretical and clinical implications of echolalia behavior in autism. In T. Layton (Ed.), Language and treatment of autistic and developmentally disordered children (pp. 65-88). Springfield, IL: Charles C. Thomas.

Prizant, B.M., & Duchan, J.F. (1981). The functions of immediate echolalia in autistic children. Journal of Speech and Hearing Disorder, 46, 241-249.

Ragland, E.U., Kerr, M.M., & Strain, P.S. (1978). Behavior of withdrawn autistic children. Behavior Modification, 2 (4), 565-578.

Rice, M.L. (1993). "Don't talk to him, he's weird": A social consequences account of language and social interactions. In A.P. Kaiser & D.B. Gray (Eds.), Enhancing children's communication: Research foundations for early language intervention: Vol.2. Communication and language intervention series (pp. 139-158). Baltimore: Paul H. Brookes Publishing Co.

Roeyers, H. (1996). The influence of nonhandicapped peers on the social interactions of children with a pervasive developmental disorder. Journal of Autism and Developmental Disorders, 26 (3), 303-320.

Rutter, M. (1978). Diagnosis and definition of childhood autism. Journal of Autism and Childhood Schizophrenia, 2, 315-337.

Rutter, M., & Schopler, E. (1988). Autism and pervasive developmental disorders: Concepts and diagnostic issues. In E. Schopler & G. Mesibov (Eds.), Diagnosis and assessment in autism (pp. 15-36). New York: Plenum Press.

Sainato, D.M., Goldstein, H., & Strain, P.S. (1992). Effects of self-evaluation on preschool children's use of social interaction strategies with their classmates with autism. Journal of Applied Behavior Analysis, 25, 127-141.

Schatz, J., & Hamden-Allen, G. (1995). Effects of age and IQ on adaptive behavior domains for children with autism. Journal of Autism and Developmental Disorders, 25, (1), 51-59.

Schuele, C.M., Rice, M.L., & Wilcox, K.A. (1995). Redirects: A strategy to increase peer initiations. Journal of Speech and Hearing Research, 38, 1319-1333.

Schuler, A.L. (1979). Echolalia: Issues and clinical applications. Journal of Speech and Hearing Disorders, 44, 411-434.

Shapiro, T. (1977). The quest for a linguistic model to study the speech of autistic children. Journal of American Academy of Child Psychiatry, 16, 608-619.

Strain, P.S., Kerr, M.M., & Ragland, E.U. (1979). Effects of peer-mediated social initiations and prompting/reinforcement procedures on the social behavior of autistic children. Journal of Autism and Developmental Disorders, 9 (1), 41-54.

Strain P.S., & Kohler F.W. (1995). Analyzing predictors of daily social skill performance. Behavioral Disorders, 21 (1), 79-88.

Strain, P.S., & Odom, S.L. (1986). Peer social initiations: Effective intervention for social skills development of exceptional children. Exceptional Children, 52 (6), 543-551.

Tager-Flusberg, H. (1989). A psycholinguistic perspective on language development in the autistic child. In G. Dawson (Ed.), Autism: Nature, diagnosis, and treatment (pp. 92-115). New York: Guilford Press.

Trevarthen, C., Aitken, K., Popoudi, D., & Robarts, J. (1996.) Children with autism: Diagnosis and interventions to meet their needs. London: Jessica Kingsley Publishers.

Volkmar, F., & Cohen, D. (1988). Classification and diagnosis of childhood autism. In E. Schopler & G. Mesibov (Eds.), Diagnosis and assessment in autism (pp. 71-89). New York: Plenum Press.

Watson, L.R. (1987). Pragmatic abilities and disabilities of autistic children. In T. Layton (Ed.), Language and treatment of autistic and developmentally disordered children (pp. 89-128). Springfield, IL: Charles C. Thomas.

Weiss, A.L., & Nakamura, M. (1992). Children with normal language skills in preschool classrooms for children with language impairments: Differences in modeling styles. Language, Speech, and Hearing Services in Schools, 23, 64-70.

Wetherby, A.M. (1986). Ontogeny of communicative functions in autism. Journal of Autism and Developmental Disorders, 16 (3), 295-316.

Wetherby, A., & Prutting, C. (1984). Profiles of communicative and cognitive-social abilities in autistic children. Journal of Speech and Hearing Research, 27, 364-377.

Wing, L. (1988). The continuum of autistic characteristics. In E. Schopler & G. Mesibov (Eds.), Diagnosis and assessment in autism (pp. 91-110). New York: Plenum Press.

Wolff, S., & Chess, S. (1965). An analysis of the language of fourteen schizophrenic children. Journal of Child Psychology and Psychiatry, 6, 29-41.

APPENDICES

Appendix A
Teacher Consent Form

Classroom Teacher's Consent to Participate in a Language Research Project
Misty Vetter, Graduate Student at the University of Tennessee
Dr. Lori Swanson, Assistant Professor, Dept. of Audiology and Speech Pathology

We have received permission from your school system to conduct a study of child language development at your school. We are interested in how children with autism interact with their normally developing peers. We would like permission to allow the students in your classroom to participate in this project. Your students would be videotaped playing with one other student who has autism. Each student in your class selected to participate will be observed for 30 minutes on one chosen day. Each of the observations will be completed at your school at times agreed upon by you and the child during which nonacademic activities are conducted. If at any time during the session the child would like to stop participating, he or she will be allowed to do so. There are no risks in participating other than those encountered daily in the school setting. There are no penalties for not participating.

The observations will be audiotaped and videotaped in order to assure accurate record keeping. All audio- and video tapes and forms will be kept in a locked cabinet in the private office of Dr. Lori Swanson, the faculty advisor for this project. Only Misty Vetter, Dr. Swanson, and a research assistant will have access to these materials during the project to ensure confidentiality. Neither the parents' names nor the child's name will be used at any time for presentation or publication purposes.

The information from this project will be included in a thesis written by Misty Vetter to partially fulfill the requirements of a master's degree from the University of Tennessee. This information may also be used to help speech-language pathologists improve their knowledge of how children with autism interact with their normally developing peers.

If you agree to participate in this project, you will be asked to assist in distributing and collecting consent forms and identifying children who do not meet the criteria for participation (a process that will take no more than 30 minutes).

I have read this informed consent and have agreed to participate in this study. I understand that my participation in this project is completely voluntary. I am also aware that I may withdraw from this study at any time without penalty to me or my students. I may also call to request more information or a general summary of the findings of the study from Dr. Swanson or Misty Vetter (phone 974-1794). I understand that individual results will not be disclosed.

Teacher's Name _____ Grade _____

Signature _____ Date _____

Appendix B

Fact Sheet

Dear Parents:

Please consider allowing your child to participate in this research project. Your child's help would be appreciated.

Misty Vetter

Fact Sheet

Interactions between Children with Autism and Their Normally Developing Peers

Conducted by Misty Vetter, Graduate Student
Directed by Lori A. Swanson, Assistant Professor
Department of Audiology and Speech Pathology
The University of Tennessee

Site of observation:	Name of school
Time of observation:	April 1998
Task:	There will be one session for 30 minutes. During each session, one normally developing child and one child with autism will play together.
Observer:	Misty Vetter, a graduate student studying child language at the University of Tennessee.
Number of students participating:	12 children with autism and 12 normally developing children
Results:	Overall results of the study will be made available to parents upon request at the end of the study.
Approval for Study Obtained From:	The University of Tennessee Dr. Samuel Bratton, Coordinator of Research and Evaluation for Knox County Schools School Principals Classroom Teachers
Benefit of Project:	Information obtained from this study will be used to determine how children with autism interact with their normally developing peers and how the normally developing peers react to those interactions. These findings may assist speech-language pathologists in helping children with autism cope with social situations in the future.

Appendix C

Parental Informed Consent Form

For Normally Developing Children

Parental Informed Consent for Language Research Project

Misty Vetter, Graduate Student
Directed by Dr. Lori A. Swanson, Assistant Professor
Department of Audiology and Speech Pathology, The University of Tennessee

We have received permission from your school system to conduct a study of child language development at your child's school. We are interested in how children with autism interact with their normally developing peers. Children with autism often have deficits in social skills and have a difficulty interacting with other children. We would like permission for your child to participate in the study by being involved in play session with a child with autism. Your child's classroom teacher will assist in selecting children who are eligible to participate. The decision for your child's participation is yours and will not affect his/her status with the school. If you give permission for your child to be included in this project and your child is selected, your child will be asked if he/she agrees to participate, and his/her verbal assent will be recorded. Your child will be observed playing with a child with autism his/her age during a 30 minute session. Misty Vetter will remain in the room during the session.

Total participation time will be no more than 35 minutes. The session will be completed at your child's school at times agreed upon by your child and his/her teacher during which nonacademic activities are conducted. If at any time during the session your child would like to stop playing, he/she will be allowed to do so, and a make-up session will be scheduled. There are no risks in participation other than those encountered daily in the school setting.

The observations will be audiotaped and videotaped in order to assure accurate record keeping. All audio- and videotapes and forms will be kept in a locked cabinet in the private office of Dr. Lori Swanson, the faculty advisor for this project. Only Misty Vetter, Dr. Swanson, and a research assistant will have access to these materials during the project to ensure confidentiality. Neither your names nor your child's name will be used at any time for presentation or publication purposes. These tapes will be stored for one year, then they will be erased.

The information from this project will be included in a thesis written by Misty Vetter to partially fulfill the requirements for a Master's degree from The University of Tennessee. This information will also be used to help speech-language pathologists improve their knowledge of how children with autism interact with their normally developing peers. There are no penalties for not participating in this study.

Permission Form

Name of Child _____ Child's Teacher _____

Name of Parent or Legal Guardian _____

I have read this informed consent and have agreed to allow my child to participate in this study. I understand that my child's participation in this project is completely voluntary. I am also aware that I may withdraw my child from this study at any time without penalty to me or my child. I may also call to request more information or a general summary of the findings from Dr. Swanson or Misty Vetter (phone 974-1794). I understand that individual results will not be disclosed.

Signature of Parent or Legal Guardian _____ Date _____

Appendix D

Informed Consent Form for Children with Autism

Parental Informed Consent for Language Research Project

Misty Vetter, Graduate Student

Directed by Dr. Lori A. Swanson, Assistant Professor

Department of Audiology and Speech Pathology, The University of Tennessee

We have received permission from your school system to conduct a study of child language development at your child's school. We are interested in how children with autism interact with their normally developing peers. We will be observing the following behaviors for this study: (1) Does your child approach a peer to play on his/her own? (2) Does your child talk with peers during play? (3) Does your child respond positively when peers attempt to play with him/her? (4) Does your child respond to adult suggestions to play with peer? We would like permission for your child to participate in the study by being involved in unstructured play with one normally developing child. The decision for your child's participation is yours and will not affect his/her status with the school. If you give permission for your child to be included in this project and your child is selected, your child will be asked if he/she agrees to participate, and his/her verbal assent will be recorded. In the case that verbal assent is not obtained, your child's cooperation to the task will be taken as assent. Your child will be observed playing with one normally developing child on one day for 30 minutes. Total participation time will be no more than 35 minutes. Misty Vetter, who has experience working with children with autism, will be in the room during all play sessions. Each of the sessions will be completed at your child's school at times agreed upon by your child and his/her teacher during which nonacademic activities are conducted. If at any time during the session your child would like to stop playing, he/she will be allowed to do so, and a make-up session will be scheduled at a later time. There are no risks in participation other than those encountered daily in the school setting.

The observations will be audiotaped and videotaped in order to assure accurate record keeping. All audio- and videotapes and forms will be kept in a locked cabinet in the private office of Dr. Lori Swanson, the faculty advisor for this project. Only Misty Vetter, Dr. Swanson, and a research assistant will have access to these materials during the project to ensure confidentiality. These tapes will be stored for one year, then erased. We also need your permission to view your child's school speech records to gain more information about your child (i.e., medical and diagnostic history). This information may be used to describe the group of children with autism who participate in this study, however neither your names nor your child's name will be used at any time for presentation or publication purposes.

The information from this project will be included in a thesis written by Misty Vetter to partially fulfill the requirements for a Master's degree from The University of Tennessee. This information will also be used to help speech-language pathologists improve their knowledge of how children with autism interact with their normally developing peers in order to plan specific treatment strategies. There are no penalties for not participating in this study.

Permission Form

Name of Child _____ Child's Teacher _____

Name of Parent or Legal Guardian _____

I have read this informed consent and have agreed to allow my child to participate in this study. I understand that my child's participation in this project is completely voluntary. I also give my permission for Misty Vetter and Dr. Swanson to view the school speech records for information on my child that might help with their study. I am also aware that I may withdraw my child from this study at any time without penalty to me or my child. I may also call to request more information or a general summary of the findings from Dr. Swanson or Misty Vetter (phone 974-1794). I understand that individual results will not be disclosed.

Signature of Parent or Legal Guardian _____ Date _____

VITA

Misty Vetter, originally from Nashville, Tennessee, graduated with Magna Cum Laude honors from Abilene Christian University in Abilene, Texas in May 1996 with a Bachelor of Arts in Communication Disorders. She was chosen as the Communication Sciences and Disorders Division Outstanding Student of the Year in 1996. She was also secretary for the Speech Pathology Club on campus. She gained clinical experience at the university clinic and at an elementary school.

Presently, Misty is working towards a masters degree in Speech Pathology from the University of Tennessee, Knoxville. Her main interests lie in the areas of child language and autism. She has completed practicum experience at the university clinic, a birth to three language program, a children's rehabilitation center, a high school, and a nursing home. She also served as the secretary for the National Student Speech-Language and Hearing Association Chapter at the University of Tennessee, Knoxville in 1997 and has been very active in departmental activities. Following the completion of her degree, she will pursue a job in her hometown in the area of autism or preschool language.