AN INVESTIGATION OF SOCIAL INTERACTION
BETWEEN SEVERELY AUTISTIC ADOLESCENTS
AND MILDLY HANDICAPPED PEERS

By

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Dissertation submitted to the Faculty of the Graduate School
of the University of Maryland in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
1990

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ABSTRACT

Title of Dissertation: An Investigation of Social
Interaction Between Severely
Autistic Adolescents and Mildly
Handicapped Peers

Robin Drew Allen, Doctor of Philosophy, 1990

Dissertation directed by: Dr. Carol Seefeldt
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The purpose of this study was to examine social interactions between severely autistic adolescents and mildly handicapped peers in a segregated special education setting. This was accomplished by determining (1) the frequency of reciprocal social interactions between severely autistic adolescents and mildly handicapped peers; (2) the types of social behaviors most frequently exhibited by severely autistic adolescents; (3) the levels of initiations and responses made by severely autistic adolescents and mildly handicapped peers; and (4) the post-intervention social behaviors of the severely autistic adolescents.

Three severely autistic adolescents were exposed to a peer social initiation intervention employed by three mildly handicapped peers over a period of three months. The peer social initiation intervention was used to increase social interaction between the autistic students and their mildly handicapped peers.

The research design was a multiple baseline across subjects evaluation. It was used to assess the effects of the peer intervention on each subjects' reciprocal social interactions and specific social behaviors.

The independent variable was exposure to a peer social initiation intervention designed to increase social interaction behaviors. The primary dependent variable was reciprocal social interaction, which was defined as one student's positive social initiation followed by another student's positive response within 3 seconds.

Results of the study were:

1. The peer social initiation intervention increased the percentage of intervals in which reciprocal interactions occurred between severely autistic students and mildly handicapped peers.

2. The peer social initiation intervention increased other vocal/verbal and other motor/gestural behaviors for the severely autistic students.

3. The levels of social responding by severely autistic adolescents increased as a result of the peer social initiation intervention.

4. Increases in reciprocal social interactions for two severely autistic adolescents generalized to a free play setting with trained and untrained peers.

ACKNOWLEDGEMENTS

I wish to thank my advisor, Dr. Carol Seefeldt, for her support and guidance in preparation of my dissertation. Her consistent feedback and overall encouragement throughout the process was invaluable. Additionally, I would like to thank the members of my committee, Dr. Robert Hardy, Dr. Charles Flatter, Dr. Stanley Bennett, and Dr. Frances Kohl, for their assistance and helpful suggestions. I would also like to thank Dr. Andrew Egel for his support and sparking my interest and exploration in the field of autism.

A special acknowledgement is due to Suzanne Taggart, a good friend and colleague, who aided me throughout the course of the study. She provided assistance in data collection, data analysis, and word processing.

I would like to thank the staff and students at St. John's Child Development Center for participating in the study. They provided support, flexibility, and a sincere interest in the area of study.

Finally, I would like to thank my family and friends, for their encouragement and cooperation during my graduate studies.

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CHAPTER 1

INTRODUCTION

The passage of Public Law 94-142, Education for All Handicapped Children's Act in 1975, has had major implications for the integration of handicapped and nonhandicapped children receiving educational services in the same setting. A primary area of interest for educators, researchers, and practitioners during the past decade has been social interaction and integration of handicapped students with their nonhandicapped peers (Shores, 1987). This phenomenon has received wide attention with the thrust towards mainstreaming handicapped students into integrated school settings.

However, little attention has been given to those handicapped students who will not be mainstreamed into integrated school settings. Rather, these individuals will be placed and/or maintained in segregated school settings where their exposure will only be to other handicapped students.

Much of the literature in the area of social interaction and integration has focused on "exceptional" children, those classified as mentally retarded, developmentally disabled, autistic, behaviorally disordered, or socially withdrawn. These children have

typically exhibited significant deficits in the realm of social behavior, thereby presenting the research and educational community with the challenge of developing strategies, techniques, or procedures designed to promote positive social development and skills (Shores, 1987). Strain and Odom (1986) suggested that educators be concerned about the social development of exceptional children because severe social deficits tend to worsen if little or no intervention is provided. Guralnik (1981) pointed out that the absence of social skills may impact on the development of intellectual, language, and adaptive skills. More importantly, severe deficits in the social realm during childhood have been shown to serve as a predictor of major adjustment problems later in life (Strain & Odom, 1986), referrals for psychiatric treatment (McEvoy & Odom, 1987), and juvenile delinquency (Schloss, Schloss, Wood, & Kiehl, 1986).

The empirical investigations of peer social interaction have focused on varying types of exceptional children. One group is children diagnosed as **autistic**. The DSM III-R criteria for the Autistic Disorder highlights severe social deficits as an integral consideration in forming the diagnosis. These individuals show qualitative impairments in reciprocal social interactions manifested by (1) marked lack of awareness of the existence or

feelings of others; (2) no or abnormal seeking of comfort at times of distress; (3) no or impaired imitation; (4) no or abnormal social play; and (5) gross impairment in ability to make peer friendships. Given these pervasive social deficits, autistic youth remain a target population to investigate social interactions.

Despite the nature and severity of social deficits in autistic individuals, the majority of studies aimed at increasing social interactions of exceptional children have involved behaviorally disordered, mentally retarded, or socially withdrawn youth.

In addition, those studies which have focused on autistic youth have primarily been limited to preschool and elementary-aged children. This is probably due to the fact that younger populations are typically drawn from university-based preschools, and that early intervention with regard to social skills may benefit the child as he grows older. With the exception of a few studies (Gaylord-Ross, Haring, Breen, & Pitts-Conway, 1984; Harris, Handleman, & Alessandri, 1990; Wacker & Berg, 1985), the examination of older autistic children and adolescents has been minimally represented in the research literature on social interaction of exceptional youth.

A review of the empirical inquiry into social interactions of exceptional youth has revealed that

various peer-training procedures have been successful in increasing social interactions. Typically, these investigations have employed nonhandicapped, socially adept peers to serve as trainers in integrated educational settings. There are presently few studies which have examined the success of peer-training procedures employing mildly handicapped peers as trainers in segregated educational settings.

The purpose of the present investigation was to examine the social interaction process between severely autistic adolescents and mildly handicapped peers in segregated special education settings.

RATIONALE

The rationale for the present investigation of the social interaction process between severely autistic adolescents and mildly handicapped peers has stemmed from a need to examine whether peer social initiation interventions can be applied to autistic adolescents in a segregated school setting. First, there have been a significant number of studies which have investigated nonautistic populations, including youth who are behaviorally disordered, mentally retarded, or socially withdrawn. This study turned the focus to the **autistic** population, a group of individuals who exhibit severe and

pervasive social deficits. Clinically and practically, the nature and severity of social skills in autistic youth have been a challenge for practitioners and educators in developing sound treatment plans. This study contributed to the understanding of the social interaction skills of autistic individuals.

Second, the present study examined autistic **adolescents**, a population in need of inquiry. Most of the research looking at social interaction processes of exceptional youth has almost exclusively focused on preschool and elementary-aged children. The researchers have found that exceptional preschoolers and elementary-aged children have increased their social interactions after being trained by socially adept nonhandicapped peers (Fox, Shores, Lindeman, & Strain, 1986; Guralnik, 1980; Hecimovic, Fox, Shores, & Strain, 1985; McEvoy & Odom, 1987; Strain, 1983A; Strain, Shores, & Timm, 1977). It is imperative that we extend the successful findings of studies on younger populations to the study of older populations. The present investigation attempted to fill the gap with respect to expanding our understanding of the developmental span to include the period of adolescence.

It is important for handicapped adolescents to develop social skills before they leave the school setting after graduation. The development of social skills can be a

critical tool for students making the transition from school to work. Given that approximately 75 percent of handicapped students have the potential for competitive employment and that around 80 percent are either unemployed or underemployed, raises speculation that these teenagers are not adequately prepared (National Information Center for Handicapped Children and Youth, 1987). This preparation should include the development of appropriate social skills for handicapped adolescents.

Third, the present investigation trained mildly handicapped peers to facilitate the social interaction skills of severely autistic adolescents. Heretofore, research studies which have used peer-training procedures to increase the social interactions of exceptional youth, have typically employed nonhandicapped peers to serve as trainers. Most of these studies have taken place in integrated educational settings where handicapped and nonhandicapped youngsters receive services in the same setting (e.g., mainstreaming). The present study took place in a segregated educational setting where all the students receiving educational services were handicapped. The study employed mildly handicapped peers to serve in a peer social initiation training procedure used to facilitate the social interactions of autistic youth.

Social Deficits in Autism

It is clear that individuals with autism present severe deficits in the social realm. Howlin (1986), in her review of social deficits in autistic children, points to abnormality in gaze patterns, vocalizations, affect, and need for predictability as contributing factors when studying social interaction with peers. The gaze patterns of autistic children are different than normal children in that they have little or no eye contact with others. It appears that the amount of eye contact and social responsiveness may be related to the complexity of the social stimuli, while the response to complex stimuli appears to be related to the individual's level of cognitive and intellectual functioning.

Normal children use eye contact as infants to regulate the amount and type of stimulation they receive, as well as to influence the intensity of caregiver interactions. These early social behaviors and the behaviors directed to them by caregivers, result in repeated social interactions which may impact the development of cognition, language, motor skills, and overall health (Ferrara & Hill, 1980). The failure to establish these early social dynamics may have detrimental consequences for the autistic child: (1) reciprocity fails to develop; (2) the impairments impact the perception and elicitation of contingent social

responses; and (3) the social deficits may impede acquisition of socially transmitted knowledge (Dawson & Galpert, 1986).

In addition to little or no eye contact, the vocalizations of autistic persons are atypical and idiosyncratic. Many have no or minimal use of expressive language with which to communicate. Their affect is often described as flat and they lack highly developed emotions such as shame, affection, or guilt. Related to affect is their inability to take the perspective of another. Most autistic individuals have a strong need for predictability and consistency in their environments, and behavior may become seriously disorganized if unable to predict a routine or sequence of events (Howlin, p. 109, 1986).

Given the pervasive nature of social dysfunction in autism, researchers have begun to study this population in an effort to employ interventions designed to enhance social interactions in exceptional youth. While most of the research in this area has been with behaviorally disordered or socially withdrawn youth, a few have focused on the autistic population (McEvoy & Odom, 1987; McHale, 1983; Odom, Hoyson, Jamieson, & Strain, 1985; Odom & Strain, 1986; Ragland, Kerr, & Strain, 1978; Strain, 1984). The present study extended the current empirical examination of autistic youth.

Study of Adolescents

The second rationale for the present study was to focus on an understudied population--autistic adolescents. While the research studies examining social interactions of exceptional youth have covered the developmental span from early childhood to young adulthood, the emphasis has been on preschool populations. Preschool youngsters exhibit severe social deficits and withdrawal early in life and have become a significant interest to researchers (e.g., Fox, et al., 1986; Guralnik, 1980; Hecimovic, et al., 1985; McEvoy & Odom, 1987; Odom, et al., 1985; Odom, Strain, Karger, & Smith, 1986; Strain, 1977; Strain, 1983a; Strain, Shores, & Timm, 1977). The empirical emphasis on the preschool population reflects the notion that early intervention and exposure to social interaction interventions will benefit the handicapped child for the duration of his life. In addition, researchers often have easy access to university-based preschools from which to draw study participants.

While the rationale for empirical inquiry into social deficits of younger children is sound, the study of older children and adolescents is presently lacking. Stainback and Stainback (1981), in their review of research on interactions between severely handicapped and nonhandicapped students, suggest that further

investigation of older children and adolescents is warranted. They assert that to generalize the empirical findings of research with younger children to older children and adolescents is precarious. Paine, Hops, Walker, Greenwood, Fleischman, and Guild (1982) outlined several weaknesses in their intervention study of children with social withdrawal, one of which was the need for replication research to verify the effectiveness of any given procedure over a much broader age range of subjects.

There are many exceptional children and youth who have not had the opportunity to receive social skills training at an early age. These youngsters develop into adolescence with relatively little emphasis placed upon social interaction skills development and maintenance. It was suggested that adolescent youth would benefit from such intervention and training to promote positive social interactions. The present study applied social interaction interventions that have been successful for younger special populations to adolescents who are autistic.

Use of Handicapped Peers as Trainers

The third rationale for the present study stemmed from the need to investigate the interplay between autistic youth and other handicapped peers. Currently, most of the

research which has utilized interventions that employ peers as the change agent, look to nonhandicapped youngsters to serve as peer trainers. This has stemmed from the movement to mainstream handicapped children into integrated educational settings where there may be an interplay of handicapped and nonhandicapped students. It has frequently been the case where autistic children were placed in categorical classrooms designed specifically for autistic or severely withdrawn youngsters, where contact with nonautistic students was quite limited (Lord & Hopkins, 1986). In addition, there are numerous autistic students who are not routinely exposed to normal peer models--those who are not placed in mainstreamed classrooms (Tyron & Keane, 1986).

While many of the studies on social interaction have successfully employed nonhandicapped peers in the interventions, some have been successful using handicapped peers to facilitate social interactions (Carden-Smith & Fowler, 1984; Shafer, Egel, & Neef, 1984; Scruggs, Mastropieri, Veit, & Osguthorpe, 1986; Tyron & Keane, 1986; Young & Kerr, 1979). The present investigation has extended the study and use of handicapped peers to serve as trainers in social interventions with autistic youth in a segregated school setting.

In summary, the purpose of the present investigation was to examine the social interaction process between severely autistic adolescents and mildly handicapped peers in a segregated school setting. The rationale for the study stemmed from the following: a need to examine autistic youth, adolescent youth, and the interplay between handicapped youth.

THEORETICAL FOUNDATIONS

The study and treatment of social deficits among exceptional children has theoretical foundations in behavioral and social learning theory. Behavioral theories of development view environmental contingencies as central to determining behavior. "The environment is seen as the source of energy directly or indirectly transmitted to, and accumulated in, a developing child... the child in turn emits observable behavior," (Strain, Cooke, & Apolloni, p. 13, 1976). The behavioral view of social development has emphasized observable manifestations of behavior that can be manipulated by environmental contingencies.

Early studies in the behavioral realm investigated the effects of adult attention contingent upon the positive social behavior among youngsters with severe social deficits (Walker, Greenwood, Hops, & Todd, 1979).

Behavioral modification research has demonstrated that social skills can be developed, maintained, and terminated by manipulating the contingency between reinforcing stimuli and social responses (Strain & Wiegerink, 1976). Specifically, by manipulating adult- and peer-mediated reinforcement, a resultant change in positive social behavior can be observed (Strain et al., 1977). Skinner has pointed out that behavioral techniques may be used to produce environments where cooperation and friendship exist, while others have posited that if educators should decide to emphasize affectional and social goals, techniques of behavior modification would be most effective (Cooke & Apolloni, 1976).

Some interventions procedures used to increase social interactions, and associated with behavior theory and practice, have utilized prompting, shaping, fading, differential attention, and reinforcement techniques. In McEvoy and Odom's (1987) review of the literature on social interaction training for exceptional children with severe social deficits, the empirical line of inquiry fell into two general categories: (1) teacher-mediated interventions and (2) peer-mediated interventions. Teacher-mediated interventions are those that employed teachers as the primary agents of change in the facilitation and/or promotion of social interaction skills

in children. There have been several investigations using teacher-mediated interventions with autistic or socially withdrawn children (Fox, Shores, Lindeman, & Strain, 1986; Odom et al., 1985; Odom, Strain, Karger, & Smith, 1986; Ragland, Kerr, & Strain, 1981; Strain, Shores, & Kerr, 1976). The most common type of teacher-mediation interventions included the use of verbal prompting and positive reinforcement to facilitate social interaction. The use of prompting and reinforcing (e.g., praising, edibles) strategies with exceptional children have been successful in increasing the frequency of social interactions and the duration of these interactions.

The other type of behavioral intervention used to increase social interactions in youngsters with severe social deficits was peer-mediation. Peer-mediation interventions are those that have employed socially competent peers (nonhandicapped or mildly handicapped) as the primary agent of change in the facilitation and promotion of social interaction skills in students with social deficits. By utilizing prompting and reinforcing strategies with such students, a behavioral protocol, peers have been shown to be successful in increasing the frequency and duration of social interactions of exceptional children with severe social deficits (Hecimovic, et al., 1985; Lord & Hopkins, 1986; McHale,

1983; McHale, Olley, Marcus, & Simeonson, 1981; Ragland, et al., 1978; Sasso & Rude, 1987; Strain, 1977; Strain, 1983b; Strain, 1984; Strain, et al., 1979; Strain & Odom, 1986; Strain, et al., 1977; Strain & Timm, 1974; Tremblay, Strain, Hendrickson, & Shores, 1981). In general, behavioral strategies have been incorporated into interventions utilized to increase social interactions.

In addition to behavioral theoretical foundations, social learning theory also provided a theoretical basis for the study of promoting social interaction skills. Specifically, some researchers have shown that observational learning has been an effective strategy for teaching autistic children. Ihrig and Wolchnik (1988) demonstrated that adult models have been able to elicit literal imitation or very minimal imitation with low functioning children, whereas peer models have been able to teach both low and high-functioning autistic students. Peer modeling has its roots in the social learning paradigm:

> Bandura and Walters propose a modification
> of various learning principles to natural-
> istic settings and the formulation of new
> behavioral processes necessary to explain
> the complexities of social behavior... Their
> chief contribution has been an extensive re-
> search effort to uncover the role of imitation
> and vicarious reinforcement in the acquisi-
> tion of social behaviors...many social responses
> are learned merely through observing the be-
> haviors of other persons. (Strain, Cooke, &
> Apolloni,p. 58).

Observational learning studies have been done with autistic populations. The literature suggested that using adult models has met with limited success, while studies using peer models seem to have been encouraging (Egel, Richmond, & Koegel, 1981). Tyron and Keane (1986) pointed out that many autistic youth have not been exposed to socially adept normal peer models in the educational environment. For example, children who were in segregated settings as opposed to integrated settings, may have been exposed only to other exceptional children.

In an effort to extend the work of Egel et al. (1981), researchers examined whether low-functioning autistic students could learn a discrimination task from observing peer models who were other low-functioning autistic youth (Charlop, Schreibman, Mason, & Vesey, 1983). Their results suggested that generalization of the learned task to a new but similar setting, and a new experimenter, improved after modeled observational learning has occurred than after one-to-one instruction. Charlop et al. (1983) also reported anecdotally that the target subjects increased social interactions directed towards appropriate people following training.

In another observational learning study, Tyron and Keane (1986) examined the effects of exposing autistic like children to learn appropriate toy playing skills

through observation of peers. They found that all subjects learned to imitate the peer model and play appropriately with two unfamiliar toys employed during the training session by observing the model demonstrate appropriate toy play.

To summarize, it appeared that two major theoretical foundations lay the groundwork for the study of social interactions among exceptional youth--(1) behavioral theory and (2) social learning theory. Interventions utilized to promote positive social interactions among youth with severe social deficits have used both behavioral and modeling techniques. Behavioral techniques included prompting, shaping, fading, differential attention, and reinforcement. Social learning techniques included observational learning, modeling, and vicarious reinforcement. The present study has utilized a peer intervention which included a combination of behavioral and social learning theory techniques.

RESEARCH QUESTIONS

The present study has examined the social interactions between severely autistic adolescents and mildly handicapped peers.

The central question asked: Can peer social initiation interventions increase the reciprocal social interactions of autistic students and peer trainers? Emanating from the central question, the following research questions were posed:

(1) Can mildly handicapped peers promote an increase in reciprocal social interactions of severely autistic adolescents and peer trainers?;

(2) What types of social behaviors are most frequently exhibited by autistic adolescents during a peer social initiation intervention, and did the behaviors increase as a result of the intervention?;

(3) What are the levels of initiations and responses made by autistic adolescents and peer trainers during a peer social initiation intervention, and did initiations and responses increase as a result of the intervention?;

(4) Do the post-intervention social behaviors of autistic adolescents generalize to a non-experimental setting (e.g., free time) with untrained peers?

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The review of empirical literature covers a span of two decades of work in the area of social interactions among exceptional children and youth. This review includes the following: (a) an overview of the social interaction interventions used to increase social interactions of exceptional youth; (b) studies of socially withdrawn autistic adolescent populations; and (c) studies of handicapped peer trainers who are employed to increase social interactions of exceptional youth.

Types of Interventions Used To Promote Social Interactions

There have been a number of research studies which have had as their focus the promotion of social interaction of exceptional youth. The two major types of social interaction intervention approaches include (1) teacher-mediated interventions and (2) peer-mediated interventions.

Teacher-mediated interventions. Teacher-mediated interventions have been successful in prompting the social interactions of socially withdrawn children (Day, Lindeman, Powell, Fox, Stowitschek, & Shores, 1984; Fox et al., 1986; Kohl & Beckman, 1990; Odom et al., 1986; Paine et al.,

1982; Ragland et al., 1981; Strain et al., 1976; Strain & Timm, 1974; Strain & Wiegerink, 1976). The most common type of teacher-mediation is the use of prompting and positive reinforcement (e.g., praise) for appropriate social interaction (McEvoy & Odom, 1987).

In a early study of a behaviorally disordered preschool child and her classroom peers, Strain and Timm (1974) were interested in whether social interaction would be affected by contingent adult attention. Two conditions of the adult contingency were operational: (1) adults directed verbal praise and physical contact to the target subjects' peers for appropriate interaction with the target subject, and (2) verbal praise and physical contact was directed to the target subject for appropriate interaction with classroom peers. The major findings were that adult contingent praise and physical contact directed towards both peers and the target subject increased appropriate social behaviors of both.

Strain et al. (1976) used a teacher-mediated prompt and reinforce strategy in their investigation of "spillover effects" on social interaction of behaviorally disordered preschoolers. Spillover effects are incidences of behavior change that are a result of one observing the delivery of reinforcement to others (Strain et al., 1976). Its conceptual roots are benched in Bandura's (1971) notion of

vicarious reinforcement. The investigators were interested in whether spillover effects could be effectively used in applied settings to maximize behavior change and make the intervention more powerful. The intervention procedures included teacher delivery of verbal/physical prompts and verbal praise contingent on appropriate social behaviors by the three target subjects. Results indicated that the teacher-mediated prompt and reinforcer intervention increased the target subjects' positive social behavior, and decreased their negative social behavior. In addition, the spillover effects were more significant when the teacher-mediated intervention was applied to two target children at one time, rather than individually (Strain et al., 1976).

Day et al. (1984) used a teaching package for socially withdrawn handicapped and nonhandicapped children. The instructional package was designed to enhance the skills of nine classroom teachers in training withdrawn children to use social behaviors in play situations. Results indicated that there were significant increases in the frequencies of prompts and praise as instructional tactics in most teachers.

Fox et al. (1986) studied the effects of a teacher-mediated intervention on the social initiations of three socially withdrawn preschool children. The teacher-

mediated intervention included teacher prompting and contingent praise of social initiations by target subjects towards peers. Their results indicated that the teachers prompts and praising did increase the frequency of subjects' social initiations. This study was also interested in whether a teacher response-dependent fading tactic could maintain subjects' social initiations following direct intervention. They found that the fading tactic did maintain social initiations above baseline level during a follow-up period two and a half months after the intervention.

Kohl and Beckman (1990) examined whether a teacher-mediated intervention procedure designed to facilitate reciprocal social interactions could increase the number and length of initiation and response chains of six handicapped preschool children. In this study, the teacher modeled play behaviors, prompted toy play, verbally reinforced appropriate toy play, and corrected inappropriate play behaviors. They found that the teacher-mediated procedures were effective in increasing the number and length of initiation and response chains for all three dyads in the study.

The aforementioned studies of teacher-mediated interventions have demonstrated success in increasing the frequency of social interactions of exceptional youth.

Some researchers have, however, identified potential problems with teacher-mediated interventions. First, Strain (1981) reported that the teacher-mediated approach may be disruptive to the ongoing interactions in the classroom. Second, Timm, Strain, and Eller (1979) suggested that the learning and fading processes necessary to decrease teacher prompts are lengthy and time consuming. McEvoy and Odom (1987), in their review of social interaction training for children with behavioral disorders, recommended that "attention must be focused on designing teacher-mediated procedures that can be implemented readily in the classroom setting and that do not require continuous use of teacher prompts and praise" (p. 243).

Given the concerns regarding the use of teacher-mediated interventions, other strategies which are not disruptive to on-going social interactions in the classroom need to be explored.

Peer-Mediated Interventions. Peer-mediated treatment approaches have been used successfully to promote social interactions of exceptional children. These behavioral interventions have employed children who are similar in age or functioning level of the target children, to administer

instructional treatments (Odom & Strain, 1984) to increase social responses. There are three primary typologies of which the research on peer-mediated interventions fall under. They are (1) proximity, (2) prompt/reinforce, and (3) peer-initiation interventions (Odom & Strain, 1984).

Proximity. Proximity interventions are those which have employed a socially competent peer (confederate) to engage with target children. More specifically, the confederates are instructed by teachers to play with the target children or get the target children to play with them. They are not given any training as to what to say to the target children, rather the confederate uses what comes naturally in social initiations. Odom and Strain (1984) highlight that the proximity interventions rely upon a natural transmission of social skills from one group of children to another via direct interaction with more socially competent peers.

McHale (1983) assessed nonhandicapped children's ability to socially engage six autistic children using a proximity intervention. In this study, the nonhandicapped children were given instructions to play with the autistic children, but they were not instructed how to engage. In addition, the nonhandicapped peer was not briefed about the nature or severity of autism. They were told that they were to teach these children to play and that the children may act funny

or make noises. During the 10-week study, the autistic children showed significant increases in the proportion of time spent interacting with nonhandicapped children. Increases in play, communication, and social interaction were demonstrated during the ten weeks. In this study, nonhandicapped peers were able to elicit sustained play and interaction from autistic children, despite minimal instruction from adults (McHale, 1983).

In another proximity study, conducted by Brown and Holvoet (1982), the researchers were interested in whether handicapped students could learn the other student's tasks just by being physically present in the same dyad. Results indicated that for one student incidental learning occurred with only a minimal amount of structured interaction between the students.

To reiterate, proximity interventions were those in which the peer confederate was not given any structured training to engage with target children. These interventions rely upon the natural transmission of skills from one group of children to another, rather than any direct instruction.

Prompt and reinforce. The second type of peer-mediated intervention involves training the peer to prompt and reinforce the social behavior of target subjects (Odom & Strain, 1984). "In these procedures, a prompt is an instruction (e.g., "Come play") to engage in some social

activity, and reinforcement is an event that comes after the intervention (e.g., "I like to play with you") and maintains or increases the frequency of the desired type of behavior." (Odom & Strain, p.546, 1984).

Peer initiation. The last and most well-documented intervention for promoting social interaction is the peer-initiation intervention. Peer confederates are trained and instructed to make social initiations to the target children. The social initiations include asking the target child to play, giving toys to the child, and providing physical or gestural assistance (Odom & Strain, 1984).

Many of the peer-initiation intervention studies have employed an observational system developed by Strain et al. (1976) to measure social interaction. This system codes two general classes of behavior, motor-gestural and vocal-verbal, along with their positive and negative topographic features. Observed behaviors are coded according to whether the response is motor-gestural or vocal-verbal, whether the response is positive or negative, and whether the response occurred (temporally) as an initiated or responded event in a social interaction sequence (Ragland et al., 1978).

Motor-gestural behaviors are all movements emitted which cause a child's head, arms, or feet to come into direct contact with the body of another child; which involved

waving or extending arms directly toward another child; or which involve placing of hands upon a material or toy which is being touched or manipulated by another child. Vocal-verbal behaviors are all vocalizations emitted while a child was directly facing any other child within a radius of three feet; or all vocalizations which by virtue of content and/or accompanying motor-gestural movements (e.g., waving, pointing) clearly indicate that the child was directing the utterance to another child within or beyond a three-foot radius (Strain et al.,1976).

These two general classes of behavior are further defined with regard to two sets of topographical features. The first set delineates positive and negative features:

(A) Positive

(1) Motor-Gestural: touch with hand or hands; hug; holding hands; kiss; wave; all cooperative responses involved with sharing a toy or materials.

(2) Vocal-Verbal: all vocalizations directed to another child excluding screams, shouts, cries, whines, or other utterances which are accompanied by gestures which indicate negative, rejecting behavior.

(B) Negative

(1) Motor-Gestural: hit; pinch; kick; butt with head; "non-playing" push or pull; grabbing object from child; destroying construction of another child.

(2) Vocal-Verbal: screams, shouts, cries, whines, or other utterances which are accompanied by gestures which indicate negative, rejecting behavior (Strain et al., 1976).

The second set delineated whether the social behaviors were initiated or responded:

(A) Initiated

All discrete motor-gestural and vocal-verbal behaviors meeting general class and Set I criteria which are emitted at least three seconds prior to or subsequent to another child's motor-gestural or vocal-verbal behaviors meeting the same criteria.

(B) Responded

All discrete motor-gestural and vocal-verbal behaviors meeting general class and Set I criteria which are emitted within three seconds following another child's motor-gestural or vocal-verbal behaviors meeting same criteria.

Again, the observation system has allowed social behaviors to be coded as to who emits the behavior (target subject or peer confederate), whether the behavior was motor-gestural or vocal-verbal, whether the behavior was positive or negative in type, and whether the behavior was considered initiated or responded (Ragland et al., 1978).

In a study of six behaviorally handicapped preschool boys (39-53 months), Strain et al., (1977) used a peer-initiation intervention to promote positive social behavior. Two nonhandicapped peer confederates were trained to emit positive social behaviors towards the target children. The training consisted of repeatedly telling the confederates that their goal was to get the target children to play with them. In addition, role playing with the experimenter provided the confederates with situations that were likely to occur when actually interacting with the socially withdrawn boys. The confederates were given verbal praise for the exhibition of various eliciting behaviors. During the experimental sessions in a playroom, the peer confederates made social initiations towards the target children. Results indicated that the peer-initiation intervention (1) increased the positive social behaviors of all subjects and (2) increased the frequency of initiated positive social behaviors by five of the six subjects (Strain et al., 1977).

Another study of three behaviorally disordered preschool boys (43-51 months) and a peer confederate utilized the peer-initiation intervention (Strain, 1977). Employing a withdrawal of treatment design (Baer, Wolf, & Risley, 1968), the study had four primary steps: Baseline 1, Intervention 1, Baseline 2, and Intervention 2. During the Baseline 1, the peer confederate was instructed not to initiate social play with target children. The teacher was instructed to remain isolated from the children, and not to prompt or reinforce any positive social behavior (Strain, 1977). During Intervention 1, the peer confederate was told each day during experimental sessions, to get the target children to play with him. Once again, the teacher was instructed not to prompt or reinforce any social behavior. During Baseline 2, a return to conditions during first baseline rate was employed. The peer confederate was told not to initiate social play with the target subjects. Finally, during Intervention 2, the peer-initiation procedures were re-initiated. The major findings were (1) the peer-initiation intervention procedure consisting of increased social initiations by a peer confederate increased the positive social behavior of all subjects and (2) for two of the three target children, positive social responding in the treatment setting generalized to a free play (non-treatment) setting (Strain, 1977).

Ragland et al. (1978) extended the Strain (1977) and Strain et al. (1977) research to examine whether the peer-initiation intervention could be applied to elementary-age autistic children. Three autistic children (mean age is 8.5 years) and a peer confederate (10 years), who was mildly behaviorally disordered, participated in the study. The Strain et al. (1976) observational system was used to measure social interaction. As was the case in the studies of behaviorally-disordered preschool boys, the intervention procedure increased the positive social behavior of all subjects.

Young and Kerr (1979) were interested in using a handicapped peer confederate in their use of the peer-initiation intervention. They addressed whether a retarded child could effectively serve as a peer confederate, what modifications to existing peer mediation strategies may be needed when a retarded child is used as a peer intervenor, and whether a retarded peer confederate could increase social behavior of severely retarded children. Using an observational system similar to Strain et al. (1976), they measured the continuous dyadic interactions between the peer confederate and the two target subjects. The results indicated that a retarded peer confederate could increase the positive social responding of severely retarded classmates. Additionally, the peer confederate could be

trained to elicit social behaviors in others. This investigation was significant because of its use of a handicapped peer confederate. Most studies have used nonhandicapped socially competent peers as agents of change. Young and Kerr (1979) recognized that many children and youth who have severe social deficits, are not always exposed to "normal" peer models. These youth may be placed in segregated educational settings where they are primarily exposed to other handicapped students. The empirical extension of the peer-initiation procedure to include handicapped youth as peer agents was imperative given the limitations of peer exposure.

In a study of peer-mediated social initiations and prompting/reinforcement procedures, Strain et al., (1979) examined the social behavior of four low-functioning autistic children (9-10 years old). The peer confederate was an 11-year old boy who attended the same public school as the autistic children. The Strain et al. (1976) observational system was employed to assess social behaviors, as well as prompting and social reinforcement events. This study used a withdrawal-of-treatment design which involved four conditions. During Baseline 1, the peer confederate was instructed not to initiate play with the subjects or to prompt and reinforce their play with each other. During Intervention 1, the peer confederate

was instructed to prompt and reinforce the target subjects for positive social interaction with each other. At the Baseline 2 stage, the condition involved returning to peer confederate behaviors identical to those in Baseline 1. Finally, during Intervention 2, the peer confederate was instructed to do his best to get the target children to play with him by initiating social interaction. While the results from the Strain et al. (1979) study indicated that both intervention techniques produced increases in target subjects' positive social behavior, neither social initiations nor prompting and social reinforcement techniques produced any positive behavior change in generalization sessions. While earlier studies on preschool behaviorally disordered children demonstrated generalized behavior change following a peer-initiation intervention (e.g., Strain, 1977; Strain et al., 1977), this investigation of autistic children did not obtain generalized social behavior change (Strain et al., 1979).

Strain (1981) extended his own work on peer-social initiations by examining whether peer sociometric status would change as a result of participating in such an intervention. Children were to describe how they felt about each of their classmates, three of whom were mildly mentally retarded. They had three choices - (1) "friend"; (2) "alright"; (3) "wouldn't like" - all of which were

depicted by figure drawings. The social interactions between the three target subjects and their normal classroom peers were measured via Strain and Timm's (1974) observational system. Results of the study indicated that (1) the intervention produced positive changes in the sociometric standing of the three target children; (2) the intervention resulted in an increase in positive social contacts; (3) the intervention resulted in a decrease in the number of negative social contacts; and (4) analyses of the initiated and responded features of social interaction showed that the intervention procedure resulted in a reciprocal exchange of positive social behavior (Strain, 1981).

Based on a study by Tremblay et al. (1981), the social interactions of normal preschool children were assessed to derive normative data. The Tremblay et al. (1981) study attempted to empirically select social initiations that peer intervenors would direct towards socially withdrawn children. Three types of social initiations were found to result in a reciprocal response from the interacting peer; (1) play organizers (e.g., "Let's play school," "Let's play ball"); (2) shares (e.g., basic exchange of ball, blocks, cars, and the like); and (3) assists (e.g., help child onto a play object) (Hendrickson Strain, Tremblay, and Shores, 1982).

Hendrickson et al., (1982) wanted to examine whether the social initiation behaviors (play organizers, shares, assists) would function for socially withdrawn children as they did for normal children. Three behaviorally handicapped preschool boys (4 years old) and a 4-year old female peer confederate participated in the experiment. The behavioral measures included features of the Strain et al. (1976) system to measure continuous dyadic interactions, as well as coding of play organizers, shares, and assists. The peer confederate was taught to emit these social initiation behaviors via role playing and rehearsal. During the actual peer intervention, the experimenter prompted and reinforced (praised) the peer confederate initiations to ensure a high rate on a daily basis. Results indicated that the social initiations of play organizers, shares, and assists resulted in immediate and significant increases in positive social behavior of all the subjects. The authors concluded that the social approach behaviors serve a similar function for normal and socially withdrawn preschool children (Hendrickson et al., 1982).

The empirical literature on prompting social interactions between socially withdrawn children and peer confederates has shown that the peer-initiation intervention has been successful in increasing the frequency of positive social

behaviors. However, the maintenance and generalization of modified social behavior to settings other than the experimental setting, remains problematic. Strain et al., (1977) suggested that imitation skills, verbal abilities, and the presence of effective reinforcers in the target environment may have precluded the generalization of social skills by autistic persons.

Studies of Autistic Adolescents

Most of the research on social interaction has been with preschool and elementary-aged children. All of the aforementioned literature on teacher-mediated and peer-mediated approaches involved younger children as target subjects. The reasons for the focus on younger children included the following, as outlined by Gaylord-Ross, et al. (1984). First, the differences in cognitive abilities between handicapped and nonhandicapped preschool populations were proportionately less than their counterparts at older age levels. Second, researchers at a university setting can easily access laboratory preschool populations. Finally, the notion of early intervention suggests that the introduction of interventions or training procedures early in life could benefit the youngster. The empirical emphasis on preschool and elementary-aged youngsters has left the autistic **adolescents** an understudied population.

There have been a few studies of adolescent autistic and autisticlike youth involved in social skills training. In a study of fifteen older adolescents and young adults with autism, a social skills training program was designed to provide positive peer-related experiences, improve interpersonal skills, develop a long-term peer group, and enhance self-esteem (Mesibov, 1984). The results from this study had several significant implications: (1) as autistic individuals grow older, their social interest in others appears to increase; (2) social skills training which includes role-playing may be an effective strategy for autistic youth; and (3) autistic adolescents can improve their ability to understand and express emotions, with practice (Mesibov, 1984).

Lord and Hopkins (1986) examined the social behavior of older autistic children (8-12 years) with nonhandicapped youth of two different ages. The treatment consisted of a series of 15-minute play sessions where the autistic subject played with either a younger or same-aged nonhandicapped peer. They found that same-aged peers initiated and responded to the autistic subjects' social interactions more frequently than the younger nonhandicapped peers. In addition, same aged peers were more successful at modifying the quality of their behavior to meet the cognitive and communicative needs of the

autistic subjects, whereas the younger aged peers were unable to make such qualitative modifications.

In a study of two socially isolated adolescents, Tofte-Tipps, Mendonca, and Peach (1982) were interested in whether a therapist-mediated training approach designed to increase social/interpersonal interaction would be effective. Specifically, they looked at eye contact, posture, verbal recognition of conversation, questions, compliments, and appropriate remarks emitted by the two target subjects. The social skills training package was found to be successful in increasing the interpersonal behaviors, not only in the intervention condition, but the social skills gains were also generalized to other partners in other settings.

Warrenfeltz, Salzberg, Beegle, Levy, Adams, and Crouse (1982) were also interested in the social skills training of behaviorally disordered adolescents. Four (15-16 year old) students enrolled in a vocational program in a short-term residential treatment facility served as subjects in the study. The treatment consisted of teacher-mediated role playing and self-monitoring techniques designed to increase appropriate responses to supervisor demands. Results indicated that the target subjects were able to generalize what they learned during the intervention phase to the actual work place.

In an innovative study of two socially withdrawn adolescents, Gaylord-Ross et al. (1984) conducted experiments aimed at teaching social skills to the youth. First, they taught the withdrawn students how to manipulate three age-appropriate leisure objects: Pacman, Walkman, and gum. Once trained in successful object manipulation, the researchers taught the students the necessary social skills that would allow them to initiate and engage in social interactions using the leisure objects with their nonhandicapped peers. Not only were the withdrawn students able to learn the requisite social skills, but they were able to generalize their social responses to other nonhandicapped peers in the same setting.

Studies of Handicapped Peer Trainers

Children and youth who have served as peer trainers in social interaction studies have been primarily nonhandicapped youngsters. They are typically the same age and were usually drawn from outside the target subjects' classroom (Odom & Strain, 1984). Nonhandicapped peers have been utilized as trainers in social interaction studies with exceptional youth in an effort to understand the implications of integration in mainstreamed educational settings. There have been many exceptional youth, particularly autistic youth, have not been routinely exposed to nonhandicapped peer models. These include

students who are placed in segregated educational settings that have other handicapped peers as models.

While handicapped youngsters have been used in a variety of ways to help peers, such as the delivery of reinforcement in a behavior modification study (Drabman & Spitalnik, 1973) or teaching severely handicapped peers to perform separate steps of a complex assembly line task (Wacker & Berg, 1985), there have been relatively few research studies which have employed handicapped students to serve as peer trainers in social interaction interventions. In the studies that have been done, handicapped peer trainers were successful in increasing the social interactions of exceptional youth.

Young and Kerr (1979), in their study of social interactions among exceptional youth, used a retarded child as a peer trainer in a social initiation intervention. They were interested in whether a retarded child could function effectively as a peer trainer, and what specific modifications to existing peer-mediation interventions would be needed when a retarded child was employed as a peer trainer. The results indicated that the retarded peer trainer could increase the positive social responding of two severely retarded youth. One modification to existing peer-mediation interventions was made in this investigation. Due to low rates of responding during pre-

baseline observations of children, edible reinforcers were paired with the peer trainer and delivered contingent upon positive responding by the subjects.

In a study of three low-functioning autistic children, Ragland et al. (1978) employed a behaviorally disordered age-peer in a peer social initiation intervention. The mildly handicapped peer trainer was chosen to participate in the study based on his large social repertoire and attendance regularity. He was trained to emit positive social behaviors toward the autistic subjects in an attempt to facilitate the frequency of emitting positive social behaviors. The results indicated that the peer social initiation intervention employed by a mildly handicapped peer increased the positive social behavior of all three target subjects.

In a study of four autistic children (ages 5.5 to 6.7 years), Shafer et al., (1984) trained handicapped peers to promote changes in social interaction behaviors of autistic youth. The peers had various handicaps including learning disabilities, mild mental retardation, language delays, and conduct problems. Despite their handicaps, they were able to be successful in increasing the number and duration of social interactions in autistic subjects.

Hendrickson et al. (1982) performed two experiments in an attempt to analyze the effects of peer social initiations on the social behavior of withdrawn handicapped children. In one of the experiments, the researchers were interested in whether a handicapped peer could function effectively as a confederate. The subjects were three behaviorally disordered children ranging in age from 6 to 7 years; the peer confederate from the same classroom was 7 years old and behaviorally disordered. He exhibited aggressive tantrums and his interactions with other children were typically negative initiations. The results indicated that this handicapped peer could function as an effective intervention agent.

There were some interesting findings in the above study which warrant discussion. While the peer trainer increased social interactions among withdrawn children, the maintenance and generalization of the positive social behaviors did not occur. The authors pointed to three setting factors that may have contributed to a lack of maintenance and generalization: (1) the predominance of socially unresponsive children in the setting; (2) the lack of a friendship network, and (3) a history of negative social contact between target subjects and classroom peers. Hendrickson et al. (1982) further suggested that in developmentally segregated educational settings, where

students may be socially unresponsive, it is difficult for behavior changes to maintain and generalize.

The present study has extended the existing research literature on the utilization of handicapped peers as trainers in the facilitation of social interactions of autistic adolescents. This has particular relevance for practitioners and school administrators who serve students in segregated special education settings.

Summary

The review of empirical literature covered a span of two decades of work in the area of social interactions among exceptional children and youth. First, an overview of the social interaction interventions used to increase social interactions of exceptional youth, including behaviorally disordered, mentally retarded, autistic, and socially withdrawn, was provided. Two primary types of interventions have been identified as being successful in increasing the social behaviors of youth who exhibit severe social deficits: (1) teacher-mediated interventions and (2) peer-mediated interventions.

While teacher-mediation interventions have been used to promote social interactions of handicapped students, there have been problems associated with such interventions. Included are the disruption to on-going interactions in the classroom and the lengthy and time consuming fading

procedures required to decrease or eliminate the teacher prompts frequently used in such interventions.

The present study employed a peer social initiation intervention rather than a teacher-mediated intervention because it is not as disruptive to the natural on-going flow of interactions within the classroom. In addition, observational learning can take place with peers, rather than adult models.

The majority of the studies reviewed in the literature above examined the effects of teacher-mediated and peer initiation interventions on young populations of children. There is a tacit assumption that if youngsters do not develop social skills at an early age that it "may be too late." The second section of the review of literature looked at the studies of handicapped adolescent populations, a group that had been overlooked in empirical inquiry. The studies indicated that adolescents could be successfully taught to engage in behaviors that were not learned at an earlier time. It is important for handicapped adolescents to develop appropriate social skills before they leave the school setting to enter world of work.

The third section of the review of literature covered the investigations which had used handicapped youth as peer trainers in peer-mediated interventions. Once again, since

most of the research has employed nonhandicapped youth to deliver social interventions, it is important to demonstrate whether handicapped youth could serve the same function. Once again, an examination of mildly handicapped peers as social change agents for more severely handicapped students is critical if we want to provide social skills training for students in segregated educational settings.

CHAPTER 3

METHODOLOGY

Overview

This investigation represents an experimental study of social interaction between severely autistic adolescents and mildly handicapped peers. The study addressed the central question: Can peer social initiation interventions increase the reciprocal social interactions of autistic students and peer trainers? From this central question, there were four research questions: (1) Can mildly handicapped peers promote an increase in reciprocal social interactions of severely autistic adolescents and peer trainers?; (2) What types of social behaviors are most frequently exhibited by autistic adolescents during a peer social initiation intervention, and did the behaviors increase as a result of the intervention?; (3) What are the levels of initiations and responses made by autistic adolescents and peer trainers during a peer social initiation intervention, and did initiations and responses increase as a result of the intervention?; and (4) Do the post-intervention social behaviors of autistic adolescents generalize to a non-experimental setting (e.g., free time) with untrained peers?

Three severely autistic adolescents were exposed to a peer-initiation intervention employed by mildly handicapped peers over a period of approximately three months. The peer-initiation intervention was used to increase the social behaviors of the autistic subjects on a daily basis. All sessions were videotaped and coded by trained observers.

A multiple baseline across subjects evaluation design (Baer et al., 1968) was used to assess the effects of the peer intervention on each subjects' reciprocal social interactions and specific social behaviors. The specific social behaviors included play organizing, sharing, assisting, vocal/verbal behaviors, motor/gestural behaviors, negative behaviors, initiations, and responses.

The independent variable was exposure to a peer intervention aimed at increasing social behavior. The primary dependent variable was reciprocal social interaction, which was defined as one child's positive initiation followed by another child's positive response within 3 seconds.

Prior to the beginning of the study, an 80% criterion level was established by the experimenter to designate the point at which the autistic students were considered "trained" by their respective peer trainers, as a result of the peer-initiation intervention. When the study was

completed, a 5-point Likert type scale, was administered to three graduate students to provide a measure of social validation.

Subjects

Setting

The research study took place at St. John's Child Development Center, located in the Washington D.C. metropolitan area. The educational services component of St. John's served approximately 45 children and adolescents with special education needs, ranging in age from 3 to 22 years of age. Most of the 45 students reside at home with parents and siblings in the southeast quadrant of Washington D.C.

Every student at the center had a primary handicap of Autism or Pervasive Developmental Disorder. Secondary handicaps included mental retardation, attention deficit disorder, mood disorder and behavioral disorder. Approximately 25% of the student body fell in the mild range of mental retardation; 25% in the moderate range of mental retardation; 35% in the severe range of mental retardation; and 15% in the profound range of mental retardation.

There were eight classrooms with approximately six students in each room. Each room had a primary teacher with a Masters degree in Special Education and at least one teaching assistant with a Bachelors degree in related fields. Most of the classrooms were comprised of students with comparable cognitive and social adaptive levels, as well as near aged grouping. For students who were not verbal, various communication paradigms were employed including Total Communication, Bliss Symbolics, picture cards and symbol cards.

Subject Selection

The selection of target subjects was based upon an excellent attendance record and teacher nomination that these students were socially isolated from others in the environment, avoid peers during free-play periods, or had significant deficits in peer social skills. According to independent judgments of child psychiatrists, each target subject met the DSM-IIIR criteria for Autistic Disorder. Test scores for all target subjects and peer trainers were obtained from their student files. Due to the standard intelligence tests designed to measure I.Q., the scores did not necessarily provide an accurate indicator of intellectual functioning.

The subjects were selected in conference with the director of the school and the classroom teachers. The aforementioned criteria for subject selection were discussed. Based on this discussion, the director and classroom teacher identified the three adolescents who fulfilled the criterion for subject selection and study participation. The specific dyads were matched based on student time schedules.

The subjects selected were three adolescent males who had been diagnosed, according to DSM-IIIR criteria, as having Autistic Disorder (299.0). Each target subject had an educational placement in a Level V classroom for youth with autism and mental retardation. There was an approximate 1:2 teacher to student ratio within the classroom setting. The teachers employed a total communication learning paradigm in the classrooms, which was the use of speech and sign language as a means of communication with students who are non- or minimally verbal.

Subject 1. Subject 1 (PO) was an eighteen year old verbal male who had a mental age of 36 months, as measured by the Merrill-Palmer Scale of Mental Tests. This placed him in the severe range of mental retardation. His social-adaptive age equivalent, as measured by the Vineland Adaptive Behavior Scales was 3 years. PO could

follow simple one or two step commands and could verbally label simple pictures. According to the Preschool Language Scale, he had an auditory comprehension level of 27 months and a verbal ability level of 24 months.

Behaviorally, PO exhibited "resistance and overreaction to minor changes in the environment, peculiar habits, impaired communication, inappropriate affect, fascination with movement, underresponsiveness to pain, and a lack of appreciation of danger," as indicated in a 1987 psychiatric evaluation. He was then diagnosed as having childhood onset of Pervasive Developmental Disorder.

Socially, PO interacted selectively with preferred peers in his classroom, but did not have appropriate social skills. PO's current IHP had a goal that he would demonstrate interaction turn taking in work and social activities.

Subject 2. Subject 2 (JF) was a 19 year old minimally verbal male who had a mental age of 8 years and 3 months, as measured by the Leiter International Scale. This placed him in the moderate range of mental retardation. His social-adaptive age equivalent, as measured by the Vineland Adaptive Behavior Scales was 4 years and 1 month. JF would perform two step familiar directions, but relied on visual and gestural cues for context. He could express one to two words phrases and

had an age equivalent of 4 years and 3 months, as measured by the Test of the Auditory Comprehension of Language.

Behaviorally, JF had a history of physical aggression (e.g., grabbing, striking), bending and squeezing his own hands and tantrumming behaviors. JF had a diagnosis of Early Infantile Autism. Socially, JF did not interact with peers during free time play periods. He preferred to sit alone or engage in solitary activities. JF had a current goal on his IHP to demonstrate social interaction skills in a variety of settings.

Subject 3. Subject 3 (TC) was a 19 year old minimally verbal male who had a mental age of 3 years and 9 months, as measured by the Leiter International Scale. This placed him in the severe range of mental retardation. His social-adaptive age equivalent, as measured by the Vineland Adaptive Behavior Scales was 4 years and 5 months. According to the Test for Auditory Comprehension of Language, he was functioning at the 3 year level. TC communicated in one to two word phrases with visual aids or utilized a picture communication book. He had severe articulation problems which limited his verbal communication.

Behaviorally, TC exhibited self-stimulatory behaviors (e.g., flapping hands, rubbing fingers, and rocking). TC had a diagnosis of Early Infantile Autism.

Socially, TC did not initiate social interactions, rather preferred solitary activities (e.g., playing with Legos, listening to records).

Peer Selection

The peer trainers were selected to participate in the study based on criteria outlined by Strain and Odom (1986). The criteria were (1) compliance with requests made by adults; (2) regular attendance in the school setting; (3) age-appropriate play and social skills; (4) no social history with target subjects; and (5) expressed willingness to take part in study.

Peer Trainer 1. Peer trainer 1 (MW) was a 14 year old male who had a mental age of 7 years and 3 months, as measured by the Leiter International Scale. This placed him in the moderate range of mental retardation. His social-adaptive age equivalent, as measured by the Vineland Adaptive Behavior Scales was 5 years.

Behaviorally MW had a short attention span, was highly distractible and would seek the attention of adults in the educational environment. He had a diagnosis of Pervasive Developmental Disorder.

Socially, MW frequently interacted with peers. He initiated and responded to social activities and enjoyed playing games (e.g., sports, board games) with peers in his classroom. MW was frequently asked by staff to assist

them in organizing classroom activities. He could follow multi-step directions.

Peer Trainer 2. Peer trainer 2 (RG) was a 15 year old verbal male who was functioning in the mild range of mental retardation. According to the Test of Auditory Comprehension of Language, RG had an age equivalent of 6 years and 2 months.

Behaviorally, RG had a history of pica and tantrumming behaviors, but those behaviors were at a zero rate. He had a diagnosis of Pervasive Developmental Disorder and Infantile Autism (residual state).

Socially, RG had good social interaction skills with peers in a play setting. He could initiate and respond during recreational activities, particularly during games and sports.

Peer Trainer 3. Peer trainer 3 (CW) was a 10 year old male who had a Full Scale IQ of 48 on the WISC-R. This placed him in the moderate range of mental retardation. According to the Test of Auditory Comprehension of Language CW had an age equivalent of 5 years and 7 months.

Behaviorally, CW had a history of tantrumming, throwing objects and hitting others, but at the time of the study had those behaviors under control. He had a diagnosis of Infantile Autism. Socially, CW enjoyed playing with peers in his classroom and could participate in organized games.

Consent for Participation

The consent for participation in the study took the form of a Letter of Consent (Appendix B) sent to parents or guardians of study participants. All three target subjects and the peer trainers began participation in the study when the Letter of Consent was signed, and permission was given by the parent or guardian.

Consent letters were also sent to five parents/ guardians of students (untrained peers) who would be involved in the generalization sessions following intervention sessions.

Procedures

Overview

The procedures for the present study were described to school personnel prior to the beginning of the study. A proposed time line for the study was presented and agreed upon by school officials. This time was from November 1989 to March 1990. Regardless, due to school requirements for approval of the study by the Research Committee and Human Rights Committees, the start date was pushed forward by seven weeks, from the beginning of November 1989 to the end of December 1989. This later start-up date limited the training time to 10 rather than 17 weeks for the duration of the study.

Activity Preference Assessments

In order to facilitate cooperative play and social interactions, it was important to determine what types of activity materials would be used during the intervention. Activity materials had to both encourage social play and be preferred by the autistic students. There were three ways in which the activity materials were selected. They were (1) observation of the autistic students during free time prior to the beginning of the study; (2) informal discussion with the classroom teacher regarding preferred activities of each autistic student; and (3) formal activity preference assessments.

Initially, the experimenter observed the autistic students during five free time periods during which classroom peers had the opportunity to engage in social interactions. The classroom had many toys, games, and activity materials located on shelves surrounding the room. When it was time to play, most of the students did not use the materials available to them. Rather, they sat in chairs and listened to a record player. Observations of the peer trainers indicated that they preferred sports activities and some board games.

Then the experimenter informally interviewed the classroom teacher to determine what types of activities she had observed to be preferred by each of the autistic

students in the study. From the observations and discussion with the teacher, the experimenter purchased a wide variety of activity materials geared at cooperative play in a social setting. Once the materials were purchased, Activity Preference Assessments were used to determine which materials would be used during the training and intervention.

Activity preferences were assessed individually for each autistic student prior to baseline phases. The experimenter provided several toys/games which promoted social interaction, to be used in the Activity Preference Assessment.

The materials included the following: Soccer Ball, Ring Toss, Puzzle, Basketball, Legos, Race Car Set, Paddle Ball, and Modeling clay. Each target subject was brought individually to the experimental playroom and was told by the experimenter, "Play with any of these toys." The experimenter recorded the order in which the subjects picked up and manipulated the activity materials.

Each activity preference assessment lasted until each target subject had selected five different activity materials. The mean time per activity preference assessment for each student was approximately fifteen minutes.

Table 1 represents the list of preferred activity materials, as indicated by each subject and peer trainer. After thirty consecutive seconds of manipulation of activity materials (e.g., toys or games) the student was told by the experimenter, "Go play with something else." At that time, the activity choice just picked by the target subject was removed from the remainder of available activity materials.

Table 1

Listing of Activity Preferences (In Order of Selection)

Subjects	Activity Preferences
1 (PO)	Races cars, Paddle ball, Soccer ball, Ring Toss
2 (JF)	Puzzle, Race cars, Ring Toss, Basketball
3 (TC)	Legos, Race cars, Soccer ball, Ring Toss, Puzzle

Peer-Trainers

1 (MW)	Basketball, Race cars, Soccer ball, Paddle ball, Jump rope
2 (RG)	Race cars, Basketball, Jump rope, Ring Toss, Puzzle
3 (CW)	Legos, Clay, Race cars, Puzzle, Soccer ball

Baseline Procedures. Baseline procedures involving one subject and one peer trainer were conducted 3-4 days a week for each dyad. During the baseline sessions, the experimenter brought each dyad to the playroom at separate five-minute intervals. The room was equipped with activity materials determined during the Activity Preference Assessment. Once each dyad entered the room, the experimenter instructed them to play. All free-time (baseline), peer training, and intervention sessions were conducted in a 10m X 8m room with a variety of activity materials (toys, games) placed throughout the room.

The students were asked not to talk to the experimenter while videotaping was taking place since they were instructed to focus their attention on peers only. The experimenter then activated the videocamera for 5-minute periods, during which no further interactions occurred between the experimenter and students. At the end of the 5-minute period, the experimenter turned off the camera and informed the students that play time was over and brought them to their respective classrooms. These (baseline) free-time sessions were conducted for a different number of sessions for each dyad prior to peer intervention sessions.

Peer Training Procedures

Once the peer trainers were selected, there were detailed training sessions provided to teach them how to engage in social initiations with autistic students. These sessions were conducted in the same 10m X 8m room that was used for the baseline sessions with the same activity materials. The training sessions lasted for approximately 30 minutes each day over a series of five days. During the peer training phase, only the selected peer trainer was brought to the playroom. At the end of the study, peer trainers and target subjects were rewarded for participation by having a picnic lunch with preferred foods in the park.

Modeling. During the peer training sessions, the peer trainers were instructed to try their best to get the adult (experimenter) to interact while the adult modeled a pattern of social behavior typical of socially withdrawn, autistic youth. Peer trainers were purposely ignored by the experimenter during training sessions and were prompted and praised to persist in social initiations.

Role-playing. In addition to modeling, role-playing of social interaction vignettes took place between the experimenter and the peer trainers. These role-playing vignettes included situations that set the occasion for

social behaviors that were targeted for intervention, including play organizing, sharing, assisting, initiating, and responding.

The criterion for determining whether a peer trainer was sufficiently "trained" to be able to carry out the peer-initiation intervention was exhibition of social behaviors during 80% of intervals.

Peer training lasted for approximately 30 minutes for each of five days. During this time, the experimenter worked with the peer trainers to get them to understand the task of promoting social interactions. Role-playing, prompting, and reinforcement techniques constituted the training sessions with the peer trainers. A script (Appendix D) was used for each peer training session for trainers. Social reinforcers (praise, pats on back, high five) were used by the experimenter as incentives to persist in attempts at social engagement during peer training.

General Procedures

On approximately 3-4 days of each school week, the peer trainer and autistic student were brought to the playroom for a 5-minute intervention session. During successive 5-minute intervals, one autistic student at a time was the focus of the peer social initiation intervention after the baseline phases for each subject were completed. The

ordering of target subject focus was fixed due to community employment schedule restraints of the study participants.

All sessions were videotaped by the experimenter on each day of the investigation. The experimenter remained at least 10 feet away from the interaction to ensure a degree of unobtrusiveness. The videotapes were coded by two trained mental health professionals when the study was completed.

Behavioral Measures

The behavioral coding system employed a combination of the Strain et al. (1976) observational system to measure continuous dyadic social interactions, and the three most effective social initiation behaviors identified by Hendrickson et al. (1982). The three social behaviors were (1) play organizer (2) share, and 3) assistance. Play organizer was defined as any verbalization wherein the student specified an activity, role, or other play for peers and maintained a play activity. The student directs a peer in play behaviors. "Let's play ball." Share was defined as when the target student offered or exchanged an object with a peer, or the target student and peer mutually used an object. Assistance was defined as when the student provided help to the peer; this included

assisting another to fix something. The student helped the peer complete a task or desired action.

Three additional classes of behavior were coded which included other vocal-verbal, other motor-gestural, and negative behavior. The six-category, continuous event recording system was used to code social behaviors directed to the autistic students by the peer trainers and emitted by the autistic students to the peer trainer. The social behaviors with operational definitions are presented in Table 2.

In addition to recording the type of social behavior, the behaviors were coded as to whether they were an initiation or a response. An _initiation_ was defined as social behaviors which started an interaction with a peer that had not been preceded by a social behavior from that peer in the previous three seconds. A _response_ was defined as any social behavior toward a peer that had been preceded by a social behavior from the peer in the previous three seconds. The response had to be related functionally to the initiation in order to be accurately coded as reciprocal social interactions. Reciprocal social interactions were defined as one child's positive initiation followed by another child's positive initiation followed by another child's positive response within 3 seconds.

Table 2

Codes Used for Social Behaviors

Social Behaviors	Code	Operational Definition
Play Organizer	PO	Any verbalization wherein the student specifies an activity, role, or other play for peers and maintains a play activity. The student directs a peer in play behaviors. "Let's play ball."
Share	SH	The target student offers or exchanges an object with a peer, or the target student and peer mutually use an object.
Assistance	AS	The student provides help to the peer; this includes assisting another to fix something. The student helps the peer complete a task or desired action.
Vocal/Verbal	VV	All other vocal/verbal behavior, e.g., statements, commands, questions, vocal attention, and verbal imitation.
Motor/Gestural	MG	All other motor/gestural behaviors, e.g., attention-seeking, imitation, affection, rough and tumble play, compliance to commands and suggestions.

Negative Behavior	NB	Any incident of physical aggression (hitting, pushing, grabbing, harming others), verbal aggression (yelling, cursing, name-calling), property destruction, or self-injurious behaviors.
Initiated	I	Any student's social behaviors (above) that were emitted 3 seconds following another student's response.
Responded	R	Any student's social behaviors that were emitted within 3 seconds following another student's response.

Observational Procedures

All of the sessions were videotaped by a VHS camcorder, which was held and activated by the experimenter in the corner of the room. The videotapes contained all data that were coded by trained observers at the end of the study. Trained observers marked appropriate codes in interval blocks (Table 3) on prepared data sheets (see Appendix C). Each behavioral recording sheet represented five minutes of continuous observation for each dyad.

Prior to the recording of data, the two observers had an opportunity to practice using the observational data sheets over a period of four sessions. Once they were trained in the use of the data sheet, the trained observers recorded behaviors continuously within consecutive blocks of 10-second intervals. This preserved absolute frequency data on all social behaviors, as well as whether the behavior was initiated or responded. Total numbers of each of the following social behaviors were calculated for each peer trainer and autistic student in each phase: (1) play organizer; (2) share; (3) assistance; (4) other vocal/verbal; (5) other motor gestural; and (6) negative behavior.

Interobserver Reliability

Interobserver reliability was calculated by using the following formula (Tawney & Gast, 1984):

$$(O + N) / T \times 100 = \% \text{ score}$$

This formula accounts for both agreement that a behavior did occur and agreement that a behavior did not occur. The number of intervals that showed observers' agreement that a behavior occurred was counted. In addition, the number of intervals that showed observers' agreement that a behavior did not occur was counted. The number of occurrences (O) and nonoccurrences (N) agreements were added together, and divided by the total (T) number of intervals observed. The total was then multiplied by 100 to obtain a percent score.

Table 3

Sample Observation Record

Interval	PO	SH	AS	VV	MG	NB
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Subject's Initials: _____
Date: _____
Phase:_____
Primary Rater:_____
Reliability Rater:_____

KEY
Subjects
A - Autistic Target
 P - Peer Trainer
 Behaviors
PO - Play Organizer
SH - Sharing
AS - Assistance
VV - Vocal/Verbal
MG - Motor/Gestural
NB - Negative Behavior
I - Initiated
R - Responded

Experimental Design

A multiple baseline across subjects evaluation design (Baer, et al.,1968) was used to assess the effects of the peer training intervention in increasing social interaction between autistic students and mildly handicapped peers. In addition, generalization was assessed in a setting with untrained, handicapped peers.

A multiple baseline across subjects design involves the sequential application of an intervention across at least three subjects who exhibit the same target behavior(s) under similar environmental conditions (Tawney & Gast, 1984). Initially, the experimenter measures the frequency of the target behavior(s) exhibited by each subject under baseline conditions. Once the target behavior of the first subject attains criterion level, the intervention is introduced to the second subject, while continuing to monitor the target behavior(s) exhibited by the other subjects under baseline conditions. The systematic and sequential introduction of the independent variable (intervention) continues until each subject has been exposed to the same intervention.

The multiple baseline design demonstrates the effect of an intervention when behavior change occurs as a result of the intervention (Kazdin, 1982). The treatment variable is effective when a change in rate appears following its

application while the rate of "untreated" behaviors remains constant (Barlow & Hersen, 1984). In the present study, a firm relationship between peer training and social interaction would exist if social interaction between autistic students and peers increased as the independent variable was successively applied to the three study dyads.

The main independent variable was exposure to a peer intervention aimed at increasing social behaviors. The primary dependent variable was reciprocal interactions, which was defined as one child's positive social initiation followed by another child's positive response within 3 seconds. Other dependent variables included the frequency of specific social behaviors. Specifically, the social behaviors were (1) play organizer; (2) share; (3) assistance; (4) vocal/verbal (other); (5) motor/gestural; and (6) negative behavior. In addition to recording categorical interactions, observers recorded whether the behavior was an initiation or a response.

Measures were taken during baseline, intervention, and generalization phases of the number and type of social behaviors emitted or responded to by the target subjects and the peer trainers.

Baseline. The target subjects and the peer trainers were observed during free-time sessions in the playroom without any experimenter-manipulated changes in the routine. At the beginning of the free-time sessions, the experimenter instructed the peer trainer and target subjects to play together. Measures of target behaviors emitted by each subject under baseline conditions were taken for 5-minute intervals. When the target behaviors of Subject 1 attained criterion level, the intervention was introduced, while continuing to monitor the behaviors emitted by Subject 2 and Subject 3 under baseline conditions.

The criterion level was determined by level and trend stability of the data. Level stability refers to the amount of variability or range in data point values. If the range of values was small (low variability), the data were considered stable; when 80-90% of the data points of the baseline condition fell within a 15% range of the mean level of all data points. The trend stability refers to the steepness of the data path over time. It was evaluated by determining how many data points of the baseline condition fell within a predetermined range. When 80-90% of the data points fell within a 15% range, the trend was considered stable (Tawney & Gast, 1984).

Intervention. The peer trainer(s) were instructed prior to each intervention session to try his best to get a certain student (AS 1, AS 2, AS 3) to play or interact with him. He was reminded of the procedures practiced during the peer training sessions. The systematic and sequential introduction of the intervention (independent variable) continued until all three target subjects were introduced to the peer-initiation intervention.

Generalization probes. Generalization data were taken on all three target subjects immediately following intervention sessions for two weeks. The generalization sessions lasted for 5-minute intervals in a different setting from the intervention sessions. Generalization sessions took place in the target subjects' classroom during free time. These sessions included the three target subjects, five of the subjects' classmates, and the three peer trainers.

In the generalization probes, the activity materials used in the peer training sessions were similarly used in the generalization setting. Since parental consent for permission to videotape the untrained peers was not available until one month into the study, baseline data were not collected.

Social Validation

After the study was completed, a 5-point Likert type scale (Appendix E) ranging from 1 (very little) to 5 (very much) was administered to three graduate students, each unfamiliar with the purpose of the study. The raters viewed videotapes of baseline and training sessions and answered questions about the extent to which social interactions were displayed.

CHAPTER 4

RESULTS

Overview

This chapter reports the interobserver reliability for agreement of occurrence and nonoccurrence of behaviors, as well as reliability on individual dependent measures; the percentages of intervals of reciprocal social interactions during baseline and training sessions; types and frequencies of social behaviors; the percentages of intervals in which initiations and responses occurred; and generalization data.

Interobserver reliability. Interobserver reliability was calculated by using the formula $(O + N)/T \times 100 = \%$ score (Tawney & Gast, 1984). The number of intervals that observers showed agreement that a behavior occurred and did not occur, was counted. The occurrences and nonoccurrences were added together and divided by the total. This outcome was multiplied by 100 to obtain a percent score. Table 4 presents the reliability scores obtained for each play dyad, for occurrence, nonoccurrence, and totals.

Reliability checks were conducted on 72% of the baseline sessions, 70% of the training sessions, and 72% of the follow-up sessions. The reliability checks yielded mean percentages of agreements of 90.3 for occurrence, 93.1 for nonoccurrence, and 96.8 for total occurrence and nonoccurrence.

Table 4

Mean Percentages for Inter-Observer Reliability
Coefficients

Student	Occurrence	Nonoccurrence	Total
1	89.0	93.4	96.6
2	91.2	92.1	96.8
3	90.8	93.7	97.1
TOTAL	90.3	93.1	96.8

Reliability checks were also conducted on individual dependent measures. Table 5 presents the range and mean percentage of observer agreement for individual dependent measures which were play organizer (97%), share (92%), assistance (94%), other vocal/verbal (96%), other motor-gestural (93%), initiated (91%), and responded (89%).

Table 5

Range and Mean Percentage of Observer Agreement for Each

Behavior Category

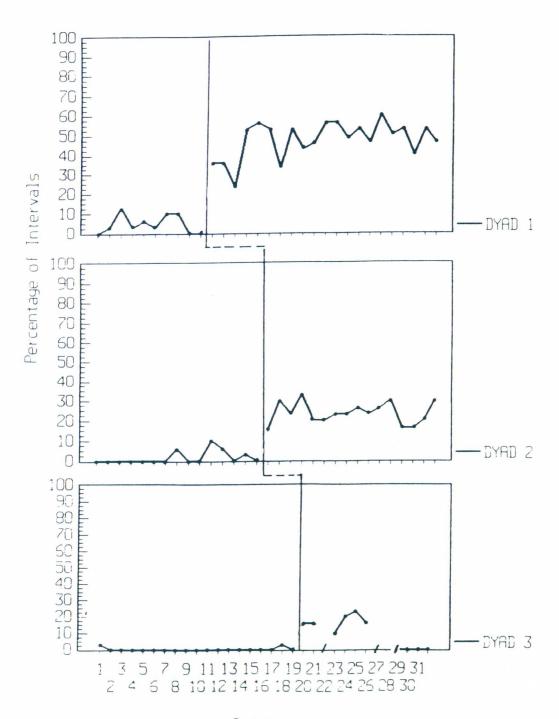| Behaviors	Range of Agreement Percentage	Mean
Play Organizer	79-100	97
Share	75-100	92
Assistance	73-100	94
Vocal/Verbal		
(Other)	79-100	96
Motor-Gestural		
(Other)	75-100	93
Initiated	73-100	91
Responded	79-100	89

<u>Autistic students' and peer trainers' reciprocal interactions</u>. The research question, "Can mildly handicapped peers promote an increase in reciprocal social interactions of severely autistic adolescents and peer trainers?," was answered through observations of behaviors of peer trainers and autistic students. Reciprocal social interactions were defined as one child's positive social initiation followed by another child's positive social response within 3 seconds. In addition, reciprocal social interactions had to be functionally related. That is, the responses had to be functionally related to the initiations. They were compiled by dividing the total number of observation intervals into the number of intervals in which reciprocal interactions were scored. Figure 1 shows the percentage of intervals of positive social reciprocal social interactions between autistic students and peer trainers during baseline and intervention sessions.

The multiple baseline analysis shows sessions plotted along the abscissa, and percent of intervals in which reciprocal interactions occurred plotted on the ordinate.

The data indicate that all three dyads displayed extremely low levels of reciprocal interactions during baseline sessions. The mean percentage for Dyad 1 was 4.8%

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Figure 1.

Percentage of Intervals of Reciprocal
Interactions Beween Autistic Students
and Peer Trainers

(range 2.1% - 7.0%); Dyad 2 was 1.6% (range 0 - 3.1%); and Dyad 3 was 1% (range 0 - 1.8%). The mean percentage of intervals of reciprocal social interactions by autistic students and peer trainers is indicated in Table 6.

For each training dyad, peer training sessions produced increases in reciprocal social interactions. While dyads did not reach the 80% criterion level for successful training, each dyad showed increases in reciprocal interactions during training sessions. The mean percentages of intervals of reciprocal social interactions for Dyads 1, 2, and 3 were 49.5%, 23.4%, and 15.8 %, respectively.

Table 6

Mean Percentage of Intervals of Reciprocal Social Interaction by Autistic Students and Peer Trainers

	Baseline	Training
DYAD 1	4.8	49.5
DYAD 2	1.6	23.4
DYAD 3	1.0	15.8

Social behaviors of autistic students. The second research question, "What types of social behaviors are most frequently exhibited by autistic adolescents during a peer social initiation intervention, and did the behaviors increase as a result of the intervention?," was answered through observation of the individual dependent measures. Social behaviors included play organizers, assistance, sharing, other vocal/verbal,and other motor/gestural behaviors. The specific social behaviors occurring in each phase of the study for each autistic student are found in Table 7. During the baseline sessions, displays of specific social behaviors were minimal for all three subjects.

Other vocal/verbal behaviors included statements, commands, questions, vocal attention, and verbal imitation. For AS 1, other vocal/verbal behaviors were prevalent. He made statements, asked appropriate questions (e.g., "Was that good?," after throwing the basketball), and displayed verbal imitation. For example, when PT 1 made a basket during the basketball activity, he would frequently yell ,"Yes!" AS 1 was observed to also yell "Yes" in the same tone of voice when he himself made a basket. Other vocal/verbal behaviors were not observed in AS 3. This may have been due to the fact that AS 3 had the lowest verbal abilities of the three target subjects.

Other motor/gestural behaviors included attention-seeking, imitation, affection, rough and tumble play, and compliance to commands and suggestions. These types of behaviors were observed frequently in all three autistic students. Examples of imitation behaviors included tossing the basketball in the hoop, kicking the soccer ball across the line, using the jump rope, and setting up the race cars on the appropriate slots in the track.

Affection behaviors were also observed on behalf of AS 1 during the study. He patted the back, shook hands, and gave "high fives" to his peer trainer at appropriate times during the activities (e.g., after a basket was made).

For AS 1 and AS 2, there were also increases over baseline sessions for the sharing behaviors. During the intervention sessions, AS 1 and AS 2 displayed the following types of sharing behaviors: (a) turn-taking when playing basketball (after one individual would shoot a basket, he would then get the ball and give it or throw it to the next individual); (b) while using the race car set, each individual held a power source lever which made the cars move around the track when pressed; (c) in some cases when the race car would not move on the track, the autistic students would give their car to the peer to use for a period of time; and (d) with both the modeling clay and block set, AS 1 and AS 2 shared the materials after

the peer trainers initiated the activity. An interesting aspect of the sharing behaviors is that in very few cases did the peer trainer have to verbally or gesturally prompt the autistic student to share (e.g., "Now it is my turn, give me the ball."). Rather, the students appeared to understand the cooperative, turn-taking nature of certain activities.

Assisting behaviors on behalf of AS 1 and AS 2 included the following: (a) when the peer trainers' race cars would go off the track, the autistic students would pick them up and place them back on the track; and (b) when the basketball net was not aligned correctly, the students would help the peer trainers adjust the net.

Play organizing behaviors were not displayed by any of the autistic students during baseline or intervention sessions. For all three autistic students, as well as the three peer trainers, negative behaviors were not displayed throughout the duration of the study.

Table 7

<u>Mean Frequency Per Session of Each Behavioral Category</u>
<u>for Baseline and Training Sessions</u>

		Baseline	Training
AS 1	Play Organizer	—	0.13
	Share	—	7.50
	Assistance	—	3.10
	Vocal/Verbal	0.14	12.67
	Motor/Gestural	0.43	9.53
AS 2	Play Organizer	—	—
	Share	—	3.00
	Assistance	—	1.60
	Vocal Verbal	0.07	4.67
	Motor/Gestural	0.33	7.50
AS 3	Play Organizer	—	0.09
	Share	—	—
	Assistance	—	—
	Vocal/Verbal	—	0.33
	Motor/Gestural	—	7.50

<u>Negative Behavior was omitted due to nonoccurrence.</u>

As was the case with reciprocal social interactions between autistic students and peer trainers, during baseline sessions, autistic students' social behaviors were minimal. Peer training produced increases in social behaviors for all three autistic students.

Autistic students' and peer trainers' initiations and responses. Research question 3 asks, "What are the levels of initiations and responses during a peer social initiation interaction?" Presented in Table 8 are the mean percentage of intervals in which initiations and responses occurred during reciprocal interactions. The data indicate that during baseline sessions, the trained peers seldom exhibited initiations toward the autistic student in their respective dyads. Specifically, the mean percentages of intervals for PT 1, PT 2, and PT 3 were 8.1%, 4%, and 2%, respectively. In addition, the levels of baseline responses by peer trainers was very low (9.8%, 0%, and 0% for PT 1, PT 2, and PT 3, respectively). These low levels may have been a function of minimal opportunity to respond (e.g., in the cases where there were no initiations from the autistic student). A further breakdown of the autistic students' and peer trainers' interactions during baseline and training sessions is shown in Table 8.

The autistic students also exhibited low levels of initiations and responses during the baseline sessions. During baseline, the autistic students showed no initiations towards their respective peer trainers, while they responded to initiations at low levels (4.7%, 1.6%, and 0.0% for AS 1, AS 2, and AS 3, respectively).

Table 8 shows that the peer training procedure increased the peer trainers' initiations towards the autistic students. The level of initiations for PT 1, 2, and 3 increased to 48.2%, 41.3%, and 36.5%, respectively. PT 1 showed and increase in responses to 9.8%, while PT 2 and 3 remained at a zero rate.

Table 8 also reveals that the peer training intervention resulted in increases in the autistic students' levels of initiations and responses. For AS 1, there was an increase in his level of initiations to 14.2%; AS 2 remained at a zero rate, and AS 3 increased slightly to 1%. These data are congruent with low levels of play organizing behaviors shown in Table 7, which are typically the initiation behaviors. Levels of responding dramatically increased for all three autistic students (39.2%, 26.2 %, and 15.9%, respectively for AS 1, AS 2, and AS 3.

Table 8

Mean Percentage of Intervals in Which Initiations and

Responses Occurred During Reciprocal Interaction

| | Toward AS | | Toward PT | |
	Baseline	Training	Baseline	Training
PT 1				
Initiations	8.1	48.2	–	–
Responses	0.0	9.8	–	–
PT 2				
Initiations	4.0	41.3	–	–
Responses	0.0	0.0	–	–
PT 3				
Initiations	2.0	36.5	–	–
Responses	0.0	0.0	–	–
A 1				
Initiations	–	–	0.0	14.2
Responses	–	–	4.7	39.2
A 2				
Initiations	–	–	0.0	0.0
Responses	–	–	1.6	26.2
A 3				
Initiations	–	–	0.0	1.0
Responses	–	–	0.0	15.9

Generalization sessions. The last research question,
"Do the post-intervention social behaviors of autistic
adolescents generalize to a non-experimental setting
(e.g., free time) with untrained peers?," was answered by
observation of the three target subjects immediately
following intervention sessions for two weeks. These
sessions took place in the autistic students' classroom
during their regularly scheduled "free time" periods with
five untrained classmates and the three peer trainers.
During these sessions, the activity materials used during
intervention, as well as other activity materials already
present in the classroom, were available to all students.
Levels of reciprocal social interactions for AS 1 and AS
2 did generalize during the free time sessions with both
untrained peers and trained peers. The mean percentage of
intervals of reciprocal social interactions for AS 1 and
untrained peers was 11.8%. The mean percentage of
intervals of reciprocal social interactions for AS 1 and
trained peers was 33.5%. For AS 2, the mean percentage of
reciprocal social interactions during the generalization
sessions with untrained peers was 7.3% and with trained
peers was 18.%. These rates are lower than during
training sessions, but well above initial baseline levels.
AS 3 showed no reciprocal social interactions with

untrained or trained peers during the generalization sessions.

Social validation. After the study was completed, further validity was assessed. Three graduate students, each unfamiliar with the purpose of the study, rated three randomly presented baseline and training sessions for each dyad (18 sessions total). The raters watched videotapes of baseline and training sessions one at a time for each training dyad.

A 5-point Likert-type scale (Appendix E) ranging from 1 (very little) to 5 (very much) was used to respond to the following: (1) To what extent do autistic students play with peer trainers?; (2) To what extent do peer trainers play with autistic students?; (3) To what extent do autistic students initiate social interactions?; (4) To what extent do peer trainers initiate social interactions?; (5) To what extent to autistic students respond to social initiations?; and (6) To what extent do peer trainers respond to social initiations?

All of the graduate students rated both autistic students and peer trainers as engaging in increased play during peer training sessions (M=4.0; range 3-5). The raters also indicated that the autistic students were more responsive (M=4.33; range 4-5). Ratings on peer trainers indicate that their levels of initiations and responses

also increased as a function of peer training procedures (M=4.67 and 4.0; range, 3-5 for both, respectively.)

CHAPTER V

SUMMARY

The purpose of the study was to examine the social interactions between severely autistic adolescents and mildly handicapped peers in a segregated special education program. In order to accomplish this task, the present study attempted to answer the following research questions:

(1) Can mildly handicapped peers promote an increase in reciprocal social interactions between severely autistic adolescents and peer trainers?;

(2) What types of social behaviors are most frequently exhibited by autistic adolescents during a peer social initiation intervention, and did the behaviors increase as a result of the intervention?;

(3) What are the levels of initiations and responses made by autistic adolescents and mildly handicapped peers during a peer social initiation intervention?;

(4) Do the post-intervention social behaviors of autistic adolescents generalize to a non-experimental setting with untrained peers?

REVIEW OF PROCEDURES

Three severely autistic adolescents were exposed to a peer social initiation intervention employed by three mildly handicapped peers over a period of approximately three months. The peer social initiation intervention was used to increase social interaction between the autistic students and their mildly handicapped peers.

The research design was a multiple baseline across subjects evaluation (Baer, et al.,1968). It was used to assess the effects of the peer intervention on each subjects' reciprocal social interactions and specific social behaviors.

The independent variable was exposure to a peer social initiation intervention designed to increase social interaction behaviors. The primary dependent variable was reciprocal social interactions, which was defined as one student's positive social initiation followed by another student's positive response within 3 seconds. The responses had to be functionally related to the initiations to be scored as a reciprocal social interaction. Reciprocal social interactions were compiled by dividing the total number of observation intervals into the number of intervals in which reciprocal social interactions were scored. A criterion was set prior to the onset of the study to indicate when autistic students

had been successfully trained by their mildly handicapped peers. The criterion was 80% of intervals in which reciprocal social interactions occurred.

CONCLUSIONS AND DISCUSSION

It can be concluded, based on the results of the research study, that (1) modeling and role playing of social interactions between mildly handicapped peer trainers and severely autistic adolescents was an effective strategy for increasing reciprocal social interactions; (2) the peer social initiation intervention increased the percentage of intervals in which reciprocal social interactions occurred; (3) the peer social initiation intervention increased other vocal/verbal and other motor/gestural behaviors for the autistic students; (4) the levels of social responding by severely autistic adolescents increased as a result of the peer social initiation intervention; and (5) increases in reciprocal social interactions for two severely autistic adolescents generalized to a free play setting with trained and untrained peers.

Reciprocal Social Interactions

Research question 1 was designed to answer, "Can mildly handicapped peers promote an increase in reciprocal social interactions between severely autistic adolescents and

mildly handicapped peers?" The findings from the data analysis showed that all three dyads displayed extremely low levels of reciprocal social interactions during baseline sessions. The peer initiation intervention produced noticeable increases in reciprocal social interactions for all three dyads.

While the DSM III-R criteria for autistic disorder includes a marked lack of awareness of others, no or impaired imitation, no or abnormal social play, and gross impairment in the ability to make friendships, the severely autistic adolescents in the present study demonstrated an awareness of peers, imitation skills, and appropriate social play.

The fact that the autistic adolescents were able to increase their reciprocal social interaction skills is important since the development of social skills can be a critical tool for students making the transition from a school to work setting. Reports indicate that between 50 and 80 percent of handicapped populations are either unemployed or underemployed, despite the fact that approximately 75 percent have the potential for competitive employment (National Information Center for Handicapped Children and Youth, 1987). This suggests that a barrier to employability upon graduation from school may

be the lack of appropriate social skills needed to get or maintain a job.

The findings of the present study replicate a number of previous research attempts to employ peer social initiation interventions in a therapeutic context (Ragland, et al., 1978; Strain, 1977; Strain, et al., 1979; Strain et al., 1977, Strain, 1983b). These studies have demonstrated that nonhandicapped peers can be effective in increasing the social interactions of autistic schoolmates, and that the effects of the peer social initiation intervention can be immediate and enduring throughout the intervention.

The present study also supports the existing literature on the effective use of handicapped youth as potential peer trainers in peer social initiation interventions. Other studies have found that mildly handicapped peers can be used to increase the social interactions of their more severely handicapped peers (Hendrickson et al., 1982; Ragland et al., 1978; Young & Kerr, 1979).

Even though reciprocal social interactions did increase for all three dyads, the 80% criterion level which was set prior to the onset of the study, was not met by any of the dyads. The fact that no dyads met criterion may have been due to constraints of reality that arise when conducting research in naturalistic settings such as the school.

When doing such research, one may not be able to control for naturally occurring variables. In the present study the constraints of reality included (1) school closings; (2) student scheduling conflicts; (3) peer trainer illness; and (4) time limitations.

The first constraint involved inclement weather during the months of January and February 1990, which resulted in school closings. Six entire study days (three during baseline sessions; three during training sessions) had to be postponed due to school closings. While most of the schools in the Washington DC metropolitan area did not close on these days, there was no transportation of handicapped students due to inclement weather.

The second constraint involved school/community employment scheduling for all students at St. Johns Child Development Center. Each study session was to last for approximately 15 minutes (including time to escort students to study setting). Since all participants in the study were on strict community work schedules which necessitated their departure from the school setting at specified times, five additional sessions for each dyad had to be postponed to accommodate the student work schedules.

A third constraint was illness of the part of one of the peer trainers. While PT 3 typically had excellent

attendance in school, he did become quite ill during the course of the study. Peer trainer illness resulted in nine sessions cancelled (five during intervention; four during generalization) for AS 3. Data indicated that AS 3 showed the fewest gains as a result of the peer initiation training. The illness and subsequent absence of the peer trainer may have been disruptive to AS 3, who had become accustomed to the routine of being picked up at a certain time every morning for training sessions.

Finally, the aforementioned constraints impacted the total time duration for the study. While the initial study time line allowed for enough sessions to run baseline, training, and generalization sessions, this was not possible due to the loss of several study days. Furthermore, it was not possible to use "booster sessions" during the study. Other research studies (James & Egel, 1986) have used booster sessions when low levels of social interactions have been observed after intervention sessions have begun. These peer trainer booster sessions may have increased reciprocal social interactions for the study dyads. Given a prior commitment to complete the entire study by mid March 1990, lost study sessions could not be added. Had the scheduled number of study sessions taken place, dyads may have reached the preestablished criterion level set to indicate successful peer training.

The fact that the autistic students did not reach criterion may have been a result of the aforementioned constraints of reality which can occur when research is conducted in a naturalistic setting such as the school.

Social Behaviors

Research question 2 asked, "What types of social behaviors are most frequently exhibited by autistic adolescents during a peer social initiation intervention, and did the behaviors increase as a result of the intervention?

The types of social behaviors that were most frequently exhibited by all three autistic adolescents during the intervention were other vocal/verbal and other motor/gestural behaviors. There were also increases over baseline sessions for sharing and assisting behaviors for AS 1 and AS 2, while play organizing behaviors did not occur during the intervention.

Other vocal/verbal behaviors included statements, commands, questions, vocal attention, and verbal imitation. While the autistic students did not engage in play organizing behaviors, which are primarily verbal in nature, they did make verbalizations unrelated to play organization. While playing with the activity materials, they engaged in verbal discourse with their peer trainers.

For the most part, however, the verbal discourse took the form of responding to verbal initiations made by peer trainers.

Other motor/gestural behaviors included attention-seeking, imitation, affection, rough and tumble play, and compliance to commands and suggestions. These types of behaviors were observed frequently in all three autistic students. Imitation behaviors with regard to how to throw the basket ball, how to kick the soccer ball, and how to set up the race car set were observed. While some research suggests that youth with autism have poor imitation skills (Varni, et al., 1979), others have pointed out that nature of the intervention may impact imitation skills. That is, in studies which have used interventions that position a single peer model in close proximity to the observer under very structured conditions, imitation skills can be enhanced (Carr & Darcy, 1990).

During the duration of the study, AS 1 demonstrated affection behaviors towards his peer trainer. He patted his back, shook his hand, and gave him "high fives" at appropriate times during the social activities. This was interesting because his peer trainer (PT 1) did not model such affection behaviors throughout the study. It may be

that AS 1 was demonstrating a desire to continue social interactions that were enjoyable to him.

Assisting behaviors on behalf of AS 1 and AS 2 included the following: (a) when the peer trainers' race cars would go off the track, the autistic students would pick them up and place them back on the track; and (b) when the basketball net was not aligned correctly, the students would help the peer trainers adjust the net.

Play organizing behaviors were not displayed by any of the autistic students during baseline or intervention sessions. For the most part, play organizing behaviors require some level and sophistication of verbal ability. Perhaps the autistic students did not possess the verbal abilities needed to verbally initiate social interactions. The peer trainers displayed all of the play organizing behaviors during the course of the study. This may have been due to the fact that peer social initiation interventions directly instruct the peer trainers how to initiate play organizing behaviors, while the students receiving the training must rely on imitation to initiate play organizing behaviors.

For all three autistic students, as well as the three peer trainers, negative behaviors were not displayed, which was interesting since each student had a history of various behavior problems. It may be the case that when

peers are actively engaged in structured social settings that the exhibition of maladaptive behaviors is greatly decreased.

The data indicated that the social behaviors of the autistic students also increased as a result of the peer social initiation intervention. The social behaviors included play organizers, assistance, sharing, other vocal/verbal, other motor gestural, initiations, and responses. During baseline sessions, all autistic students exhibited very low levels of social behaviors. As a result of the intervention, sharing, assisting, other vocal/verbal and other motor/gestural behaviors increased over baseline levels.

Initiations and Responses

Research question 3 was designed to answer, "What are the levels of initiations and responses made by autistic adolescents and mildly handicapped peers during a peer social initiation intervention?"

Initiations. With respect to levels of initiations, data indicated that during baseline sessions, peer trainers (mildly handicapped peers) infrequently exhibited social initiations towards the autistic students. The peer social initiation intervention increased the peer trainers' initiations towards the autistic students. This is not surprising since this intervention was designed to

teach the mildly handicapped peers how to solicit social interactions.

The three autistic students showed no initiation behaviors during baseline sessions. The peer initiation intervention increased levels of initiations for AS 1 (14.2%), but remained at a near zero rate for AS 2 and AS 3. This may have been due to the fact that AS 1 had the most sophisticated verbal repertoire of the three autistic students. Therefore, he was able to utilize his verbal skills to initiate interactions with his peer trainer.

Responding. Social responding of autistic students to peer trainers' initiations is a critical social skill to learn and maintain. In the present study, all three autistic students dramatically increased social responding to peer trainer initiations. Levels of social responding during baseline sessions was low for all three autistic students. Levels of social responding increased as a result of the peer initiation intervention.

The peer trainers' levels of responding during baseline sessions was also extremely low. The low levels of peer trainer responding was probably a function of minimal or no opportunity to respond since the autistic students did not initiate social interactions during the baseline sessions. In addition, some researchers who have studied the social interactions of severely withdrawn preschoolers

have found that social responding to peer initiations was positively related to measure of social acceptance by nonhandicapped peers in mainstreamed classrooms (Strain, 1983).

The present research study supports previous studies which have demonstrated that peer social initiation approaches primarily increase social responding of autistic students (Odom, et al., 1985; Odom et al., 1986; Odom & Strain, 1986), rather than social initiation behaviors. While AS 1 did increase social initiations from a zero rate during baseline to 14.2% during training, AS 2 and AS 3 did not initiate social interactions during any phase of the intervention. This finding is consistent with other studies which have found the skill of initiating social interactions more difficult for individuals with autism. In addition, peer social initiation approaches are designed to have the peers initiate while the autistic students respond, rather than directly teaching the autistic youth to initiate.

Post-intervention Social Behaviors

Research question 4 asked, "Do the post-intervention social behaviors of autistic adolescents generalize to a non-experimental setting (e.g., free time period) with untrained peers?" For the two weeks following intervention, generalization sessions were assessed in the

autistic students' classroom during free play periods with five untrained peers and the three peer trainers. Levels of reciprocal social interactions for AS 1 and AS 2 did generalize during the free play sessions with both untrained and trained peers.

AS 3 demonstrated no reciprocal social interactions during the generalization sessions. Generalization of social behaviors to the free play setting with untrained peers did not occur for AS 3. AS 3 was the student who also showed minimal gains in increased social behaviors during the peer training intervention. His peer trainer (PT 3) was the student who had developed illness during the course of the study and participated in less intervention sessions. PT 3's lessened participation may have impacted the overall effectiveness of the training, therefore decreasing the likelihood of generalized responding in the free play setting. Odom et al. (1985) has noted that there may be high expectations for enduring changes in social behavior across setting when brief (e.g., five minute training sessions) interventions are used.

A limitation which significantly impacted the generalization results was the tardiness in receiving consent forms from parents of untrained peer participants. Since consent forms for untrained peers did not come in

timely fashion, no baseline sessions could be operationalized for the generalization sessions. Generalization of reciprocal social interactions for two of the three autistic students did occur in the free play settings with untrained handicapped peers. It is possible, since baseline sessions with the same peers could not be run, that the generalization findings may have been the result of factors others than peer training.

IMPLICATIONS

The findings from the present research study have implications for practitioners, school administrators working in segregated special education settings serving autistic and/or socially withdrawn youth, and researchers.

Implications for Practitioners

One implication for practitioners is that peer social initiation interventions can be readily implemented by classroom teachers in the natural classroom environment. Teachers can train mildly handicapped students in peer social initiation procedures. Once trained, the socially adept peers can be utilized as agents of change in the naturally occurring free play setting.

A second implication for practitioners involves the use of activity materials to promote social interaction. It was noted during informal observations of classrooms

serving severely autistic students that activity materials available during social and recreational periods were not geared towards cooperative and social play. Many of the materials were geared towards solitary play, encouraging minimal or no social interaction with peers.

In addition, the activity materials that were geared towards cooperative play (e.g., games) were not manipulated by the severely autistic students during free time. This may have been a function of not knowing how to appropriately manipulate the cooperative play materials. Hence, training in objects manipulation for cooperative (social) play by peers who are adept with such items is crucial. The Gaylord-Ross et al. (1984) study demonstrated that objects manipulation can be taught directly to the autistic students themselves and that once they were trained to use the materials competently, they were more apt to engage others in cooperative play.

Many have pointed out the importance of the activity materials used in increasing social interaction (McEvoy, Shores, Wehby, Johnson, & Fox, 1990). Environmental manipulation in the form of making available activity materials that promote cooperative or social play has been shown to increase the likelihood of social engagement (Hendrickson, et al., 1981; Tremblay, et al., 1981). Beckman and Kohl (1984) increased social interactions of

handicapped and nonhandicapped children by providing toys that were rated as social rather than isolate. Practitioners must set the occasion for the students to learn how to manipulate the activity materials. This can be achieved through direct instruction or peer initiation interventions.

Implications for School Administrators

There are also implications from the present study for school administrators. This study suggests that there may be a need to integrate severely handicapped and mildly handicapped (more socially competent) peers within the segregated special education school setting. Typically, classrooms in segregated special education settings are segregated themselves, in that students are placed together based primarily on similar cognitive levels. That is, mildly handicapped youth tend to be in classrooms with other mildly handicapped youth, while the severely and profoundly handicapped students are grouped with one another. While this type of placement may be efficacious from an educational standpoint, homogeneous groupings by handicap may have a detrimental effect on the development of social interaction skills.

There may be many benefits to socially withdrawn children and adolescents if they are exposed routinely to more socially adept youngsters. Researchers have proposed

that there may be developmental, as well as educational benefits to placement of handicapped students with nonhandicapped students. The literature on mainstreaming and integrating handicapped youth into nonhandicapped educational environments has demonstrated that nonhandicapped peers function as significant therapeutic agents for their handicapped counterparts. Guralnik (1986) has suggested that nonhandicapped children have been able to increase handicapped children's language skills, promote frequency of social initiations, establish initiative repertoires, and improve discriminative learning. Such increases were the result of carefully planned and highly structured interventions or curricula with the nonhandicapped peers fulfilling a specific role (peer initiator, tutor, etc.)

It would also be the case that handicapped youngsters could receive similar benefits if placed with lesser handicapped youngsters. Perhaps there is a parallel to be drawn between the potential effects of mainstreaming handicapped youngsters into traditionally nonhandicapped educational environments and mainstreaming severely handicapped youngsters into mildly handicapped educational environments.

Odom and McEvoy (1988) suggest that the handicapped students may model appropriate social behaviors and that

the handicapped student, through observational learning, would imitate such behaviors. In addition, by providing a more advanced intellectual and communicative environment, the handicapped students may rise to the occasion by acquiring more advanced skills (Odom & McEvoy, 1988).

Bandura and Walters (1963) have suggested that people learn from both direct experience and vicarious learning by observing modeled behaviors and the consequences for the modeled behaviors. This observational learning occurs just from the observation of the modeled behavior without extrinsic reinforcement (Varni, Lovaas, Koegel, & Everett, 1979). The opportunity for exposure to more socially competent models in a segregated special education setting can be achieved during free play periods, physical education, intramural activities, school clubs, and special events (e.g., Special Olympics).

Strain (1982) has pointed out that untreated social withdrawal, frequently seen in youth with autism, can result in severe lifelong problems. He suggests that if these youth not exposed to more socially adept peers during childhood, the following may result: (1) by not engaging in behaviors that are reinforcing to peers (e.g., following rules, offering to share toys), withdrawn youngsters may become increasingly ignored and rejected by

peers; (2) by not responding to peers' positive social initiations, these socially withdrawn youngsters may extinguish further attempts by peers to play and develop friendships; and (3) by not being in close physical proximity to social peers, withdrawn youth have limited access to appropriate behavior models. Therefore, it is critical that severely handicapped students be exposed to lesser handicapped, more adept peer models.

In addition, there also may be potential benefits for the mildly handicapped peer models. They may have the opportunities to offer assistance and/or teach their more handicapped peers. It was noted during the present study that the peer trainers, particularly PT 1 and PT 2, appeared to enjoy showing the autistic students how to play with the various activity materials. In fact, they demonstrated extreme patience and persistence when it took several trials to demonstrate the proper use of some materials.

As a result of the findings from the research study, St. John's Child Development Center has implemented a "peer club" in which a room has been designated to promote social interactions between severely handicapped students and mildly handicapped students. The room contains activity materials which set the occasion for social interchange (e.g., games, sports activities).

During various periods of time during the week, students from different classrooms (both severely handicapped and mildly handicapped students), are brought together to engage in social interaction time. Informal reports from classroom teachers suggest that both the severely and mildly handicapped students have been interacting at a greater frequency as a result of the creation of the "peer club."

Implications for Researchers

One implication of the present study for future researchers involves conducting research in a naturalistic setting such as the school. While there are benefits to using a "real life", as opposed to contrived setting in which to conduct research, examiners must design studies to allow for possible constraints that may impact their results (e.g., time allowance for duration of study).

A second implication involves the generalization of training effects to a nonexperimental setting. In the present study, the generalization of social behaviors was seen for AS 1 and AS 2. However, this cannot be attributed solely to the intervention since baseline probes with untrained peers could not be implemented in timely fashion. Researchers should make a strong effort to gain necessary consent from all potential study participants prior to the onset of the study so that

proper generalization probes can be conducted for target subjects and their untrained peers. A related notion is that while the generalization sessions in the present study took place in a nonexperimental setting, trained peers were also present in the setting to set the occasion for social interactions. True generalization of findings may have been shown if the trained peers were not present in the post-intervention free play setting.

RECOMMENDATIONS

1. The findings of the present investigation indicate the need for school administrators that serve autistic youth in segregated school settings to integrate more socially adept youth (mildly handicapped peers) with socially withdrawn youngsters. The integration may take the form of closer proximity within the school setting to promote observational learning of appropriate social models for the autistic students. This can be achieved by integrating mildly and severely handicapped students during nonacademic periods (e.g., physical education, lunch periods, community work scheduling).

2. There should be a greater emphasis on systematically providing training in social interaction skills for autistic adolescents in segregated educational settings. Social skills training curricula in settings

that serve handicapped students only, are not common or systematic, despite the need. In order to better prepare adolescents for possible employability after school, practitioners working in such settings may want to provide social skills training as part of the regular school curricula.

3. Based on the findings of the present study, it is recommended that researchers focus on teaching autistic youth how to initiate social interactions. While peer social initiation strategies are effective in increasing responding behaviors, the skill of learning how to initiate is an area in need of further inquiry.

4. The findings of the present investigation point to the importance of the role of activity materials in increasing social interactions. It is recommended that educators both provide activity materials that facilitate cooperative and social play and provide instruction in how to manipulate such materials.

APPENDIX A

DSM-IIIR CRITERION FOR AUTISTIC DISORDER

APPENDIX A

DSM III-R Criteria for Autistic Disorder (299.00)

At least eight of the following sixteen items are present, these to include at least two items from A, one from B, and one from C.

A. Qualitative impairment in reciprocal social interaction as manifested by the following: (The examples within parentheses are arranged so that those first mentioned are more likely to apply to younger or more handicapped, and the later ones, to older or less handicapped persons with the disorder.)

   (1) marked lack of awareness of the existence or feelings of others (e.g., treats a person as if he or she were a piece of furniture; does not notice another person's distress; apparently has no concept of the need of others for privacy

   (2) no or abnormal seeking of comfort at times of distress (e.g., does not come for comfort even when ill, hurt, or tired; seeks comfort in a stereotypical way)

   (3) No or impaired imitation (e.g., does not wave bye-bye; does not copy mother's domestic activities,

mechanical imitation of other's actions out of context)

(4) no or abnormal social play (e.g., does not actively participate in simple games, prefers solitary play activities; involves other children in play as "mechanical aids")

(5) gross impairment in ability to make peer friendships (e.g., no interest in making peer friendships; despite interest in making friends, demonstrates lack of understanding on conventions of social interaction.

B. Qualitative impairment in verbal and nonverbal communication, and in imaginative activity, as manifested by the following:

(1) no mode of communication, such as communicative babbling, facial expression, gesture, mime, or spoken language.

(2) markedly abnormal nonverbal communication, as in the use of eye-to-eye gaze, facial expression, body posture or gestures to initiate or modulate social interaction (e.g., does not anticipate being held, stiffens when held, does not look at the person or smile when making a social approach; does not greet parents or visitors, has a fixed stare in social situations)

(3) absence of imaginative activity, such as playacting

of adult roles, fantasy characters, or animals; lack of interest in stories about imaginary events

(4) marked abnormalities in the production of speech, including volume, pitch, stress, rate, rhythm, and intonation (e.g., monotonous tone, questionlike melody, or high pitch)

(5) marked abnormalities in the form or content of speech, including stereotypes and repetitive use of speech (e.g., immediate echolalia or mechanical repetition of television commercial); use of "you" when "I" is meant; idiosyncratic use of words or phrases; or frequent irrelevant remarks

C. Marked restricted repertoire of activities and interests, as manifested by the following:

(1) stereotyped body movements (e.g., hand-flicked or -twisting, spinning, head-banging, complex whole body movements)

(2) Persistent occupation with parts of objects (e.g., sniffing or smelling objects, repetitive feeling of texture of materials, spinning wheels of toy cars) or attachment to unusual objects (e.g., insists on carrying around a piece of string)

(3) marked distress over changes in trivial aspects of environment

(4) unreasonable insistence on following routines in precise detail, (e.g., insisting that exactly the same route be followed)

(5) marked restricted range of interests and a preoccupation with one narrow interest

D. Onset during infancy or childhood.

APPENDIX B

LETTER OF CONSENT

APPENDIX B

Letter of Consent

June 1, 1989

Dear Parent/Guardian,

Your child has been selected to participate in a research study that I am conducting as part of my Doctoral degree at the University of Maryland. The study is designed to examine the social interaction skills of handicapped adolescents in special education classrooms. Of particular interest is the lack of social behavior demonstrated by autistic adolescents.

Recently, there have been training procedures developed to increase the social interactions of autistic children. This study will apply these procedures to your adolescent child in the classroom setting. More specifically, your child will participate in a two month study during the regular school hours at the National Children's Center. He will spend approximately 20 minutes per day in the classroom during which the social skills training procedures will take place. While the training is in effect, videotapes will be made of all sessions. The videotapes will later be coded and analyzed to see if the training procedures were successful.

At no time will your child be identified by name during the course of the study. Your child will be identified by the first initial of his name to assure anonymity. When the study is complete, I will make the results available to you both in written and spoken form.

If you have any questions regarding the study, please contact me at 871-9240 during the evening.

Sincerely,

Robin D. Allen, M.A.

_____I give consent for my child to participate in the study about social interaction.

_____I do not give consent for my child to participate in the study about social interaction.

_____   _____
Signature of Parent/Guardian   Date

APPENDIX C

BEHAVIORAL RECORDING SHEET

APPENDIX C

Behavioral Recording Sheet

Interval	PO	SH	AS	VV	MG	NB
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Subject's Initials: _____
Date: _____
Phase: _____
Primary Rater: _____
Reliability Rater: _____

KEY
Subjects
A - Autistic Target
P - Peer Trainer
 Behaviors
PO - Play Organizer
SH - Sharing
AS - Assistance
VV - Vocal/Verbal
MG - Motor/Gestural
NB - Negative Behavior
I - Initiated
R - Responded

APPENDIX D

PEER TRAINER SCRIPTS

APPENDIX D

PEER TRAINER SCRIPTS

Session I: Introduction to Study - Play Organizing

EXPERIMENTER (E): "This morning you are going to learn how to be a good teacher. Sometimes there are students who do not know how to play with other students during free time. Today, you are going to learn how to teach them to play. What are you going to do?"

PEER TRAINER (PT): "Teach them how to play."

E: "One way you can get your friend to play with you is to **ask** him to play. How can you get your friend to play with you?"

PT: "Ask them to play with me."

E: "That's right! You can ask them to play with you. You can say, 'Do you want to play?' How can you get them to play with you?"

PT: "I can ask, 'Do you want to play with me?'"

E: "That's right! You can also say, 'Come play with me,' 'Let's play ball,' or 'Come play with the ball.' How else can you get your friend to play with you?"

PT: "I can say, 'Come play with me,' (etc.)."

(The experimenter then models appropriate examples of play organizing behaviors and asks the peer trainer to try to get her to play. Sequence of 10 repeats.)

E: "Sometimes your friend will not want to play at first,

but you need to keep asking them to play. What do you need to do if your friend does not want to play at first?"

PT: "Keep asking them to play."

E: "Right! You can keep asking them."

(The experimenter then asks the peer trainer to try to get her to play. The experimenter ignores the play organizing initiations every other time. The peer trainer is to persist in play organizing behaviors under the ignoring condition. Sequence of 10 repeats).

Session II: Sharing

E: "Another way to get your friend to play with you is to **share**. How else can you get your friend to play with you?"

PT: "Share."

E: "That's right! You can share. When you share you look at your friend and say, 'Here,' and put a toy in his hand. What do you do?"

PT: "Look at him and say, 'Here,' and put a toy in his hand."

(The experimenter then models appropriate examples of sharing behaviors and asks the peer trainer to try to get her to play. Sequence of 10 repeats.)

E: "Sometimes your friend will not play, even when you ask nicely and give them something to play with, but you will

need to try very hard to get them to play. You may have to keep asking and giving them toys to play with. What do you do if your friend does not want to play?"

PT: "Keep asking them and giving them toys to play with."

E: "That's right! You keep asking them and give them toys to play with."

(The experimenter then asks the peer trainer to get her to play. The experimenter ignores sharing initiations every other time. The peer trainer is to persist in sharing and/or play organizing behaviors under the ignoring condition. Sequence of 10 repeats.

Session III: Assistance

E: "There is one more way you can get your friend to play with you. That is to **help** him. How else can you get your friend to play with you?"

PT: "I can help him."

E: "Right! You can help him. Some ways you can help him are with setting up games, fixing toys, or helping him if he falls. How can you help your friend?"

PT: "I can set up games," (etc.)

(The experimenter then models appropriate examples of assisting behaviors and asks the peer trainer to help her. Sequence of 10 repeats).

APPENDIX E

SOCIAL VALIDATION RATING FORM

APPENDIX E

SOCIAL VALIDATION RATING FORM

Circle the number that best answers the questions using the following codes:

CODE: 1 = very little

2 = a little

3 = sometimes

4 = much

5 = very much

(1)   To what extent to autistic students play with peer trainers?   1   2   3   4   5

(2)   To what extent do peer trainers play with autistic students?   1   2   3   4   5

(3)   To what extent to autistic students initiate social interactions?   1   2   3   4   5

(4)   To what extent do peer trainers initiate social interactions? 1   2   3   4   5

(5)   To what extent to autistic students respond to social initiations? 1   2   3   4   5

(6)   To what extent to peer trainers respond to social initiations?   1   2   3   4   5

GLOSSARY

<u>Assistance</u>: the student provides help to the peer; this includes assisting another to fix something. The student helps the peer complete a task or desired action.

<u>Autism or Autistic Disorder</u>: see Appendix ; DSM III-R criteria for "Autistic Disorder," 299.0.

<u>Exceptional Children</u>: term used to classify children who are mentally retarded, developmentally disabled, autistic, behaviorally disordered, or emotionally handicapped.

<u>Initiated Behaviors</u>: any student's social behaviors (above) that were emitted 3 seconds following another student's response.

<u>Motor-Gestural Behaviors</u>: all other motor/gestural behaviors, e.g., attention-seeking, imitation, affection, rough and tumble play, compliance to commands and suggestions.

<u>Negative Motor-Gestural</u>: hit; pinch; kick; butt with head; "non-playing" push or pull; grabbing object from child; destroying construction of another child.

<u>Negative Vocal-Verbal</u>: screams, shouts, cries, whines, or other utterances which are accompanied by gestures which indicate negative, rejecting behavior.

<u>Peer-Mediated Intervention</u>: type of intervention which employs peers as the primary agent of change in the facilitation and promotion of social interaction skills with students who exhibit social deficits.

<u>Play Organizer</u>: any verbalization wherein the student specifies an activity, role, or other play for peers and maintains a play activity. The student directs a peer in play behaviors. "Let's play ball."

<u>Positive Motor-Gestural</u>: touch with hand or hands; hug, holding hands; kiss; wave; all cooperative responses involved with sharing a toy or materials.

<u>Positive Vocal-Verbal</u>: all vocalizations directed to another child excluding screams, shouts, cries, whines, or other utterances which are accompanied by gestures which indicate positive, accepting behavior.

<u>Prompt and Reinforce Strategy</u>: combination of prompting (verbal specification, physical guiding, or demonstration of a desired behavior) and reinforcement (verbal praise, physical contact) used to increase the social interaction skills of students who exhibit deficits (Day et al., 1984).

<u>Prompting</u>: all physical and verbal activities by an agent designed to initiate social interaction between subjects and peers. Physical prompts include such activities as moving a child to where the other children are playing; moving a child's hands, feet, etc., in such a way that he engages in some ongoing interaction with peers. Verbal prompts include such comments as, "Let's play with your friends", "You can play this game together" (Strain, et al., 1976).

<u>Reinforcement</u>: all positive physical and verbal behaviors of the agent delivered to the target subjects contingent on positive social behavior.

<u>Responded Behaviors</u>: any student's social behaviors that were emitted within 3 seconds following another student's response.

<u>Self-stimulation</u>: a stereotyped, repetitive behavior occurring for at least three seconds and appearing to serve no other purpose than to provide sensory input. Examples include hand flapping, head rolling, body rocking, and flapping toys (Charlop, et al.,1983).

<u>Segregated</u>: educational settings in which only handicapped students are served.

<u>Share</u>: the target student offers or exchanges an object with a peer, or the target student and peer mutually use an object.

<u>Spillover effect</u>: incidences of behavior change that are a result of one observing the delivery of reinforcement to others (Strain et al., 1976).

<u>Teacher-Mediated Intervention</u>: type of intervention which employs teachers as the primary agent of change in the facilitation and promotion of social interaction skills with students who exhibit social deficits.

<u>Vocal-Verbal Behaviors</u>: all other vocal/verbal behavior, e.g., statements, commands, questions, vocal attention, and verbal imitation.

REFERENCES

REFERENCES

Alberto, P. A., & Troutman, A. C. (1986). <u>Applied behavior analysis for teachers</u>. Columbus: Merrill Publishing Company.

Baer, M., Wolf, M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. <u>Journal of Applied Behavior Analysis</u>, <u>1</u>, 91-97.

Bandura, A. (1971). <u>Principles of behavior modification</u>. New York: Holt, Rinehart, & Winston.

Barlow. D. H. & Hersen, M. (1984). <u>Single case experimental design: Strategies for studying behavior change.</u> New York: Pergamon Press.

Beckman, P. J., & Kohl, F. L. (1984). The effects of social and isolate toys on the interactions and play of integrated and nonintegrated groups of preschoolers. <u>Education and Training of the Mentally Retarded</u>, <u>19</u>, 169-174.

Brown, F., & Holvoet, J. (1982). Effect of systematic peer interaction on the incidental learning of two handicapped students. <u>Journal of the Association for Severely Handicapped</u>, <u>7</u>, 63-78.

Carden-Smith, L. K., & Fowler, S. A. (1984). Positive peer pressure: The effects of peer monitoring on children's disruptive behavior. <u>Journal of Applied Behavior Analysis</u>, <u>17</u>, 213-227.

Carr, E. G., & Darcy, M. (1990). Setting generality of peer modeling in children with autism. <u>Journal of Autism and Developmental Disorders</u>, <u>20</u>, 45-59.

Charlop, M. H., Schreibman, L., Mason, J., & Vesey, W. (1983). Behavior-setting interactions of autistic children: A behavioral mapping approach to assessing classroom behaviors. <u>Analysis and Intervention in Developmental Disabilities</u>, <u>3</u>, 359-373.

Cooke, T. P., & Apolloni, T. (1976). Developing positive social emotional behaviors: A study of training and generalization effects. <u>Journal of Applied Behavior Analysis</u>, <u>9</u>, 65-78.

Dawson, G., & Galpert, L. (1986). A Developmental model for facilitating the social behavior of autistic children. In E. Schopler and G. B. Mesibov (Eds.), Social Behavior in Autism (pp. 237-259). New York: Plenum Press.

Day, R. M., Lindeman, D. P., Powell, T. H., Fox, J. J., Stowitschek, J. J., & Shores, R. E. (1984). Empirically derived teaching package for socially withdrawn handicapped and nonhandicapped children. Teacher Education and Special Education, 7, 46-55.

Drabman, R. & Spitalnik (1973). Training a retarded child as a behavioral teaching assistant. Journal of Behavior Therapy and Experimental Psychiatry, 4, 269-272.

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

Ferrara, C., & Hill, S. D. (1980). The responsiveness of autistic children to the predictability of social and nonsocial toys. Journal of Autism and Developmental Disorders, 10, 51-57.

Fox, J., Shores, R., Lindeman, D., & Strain, P. S. (1986). Maintaining social initiations of withdrawn handicapped and nonhandicapped preschoolers through a response-dependent fading tactic. Journal of Abnormal Child Psychology, 14, 387-396.

Gaylord-Ross, R. J., Haring, T. G., Breen, S., & Pitts-Conway, V. (1984). The training and generalization of social interaction skills with autistic youth. Journal of Applied Behavior Analysis, 17, 229-247.

Guralnik, M. J. (1980). Social interactions among preschool children. Exceptional Children, 46, 248-253.

Guralnik, M. J. (1981). Programmatic factors affecting child-child social interaction in mainstreaming preschool programs. Exceptional Education Quarterly, 1, 71-91.

Harris, S. L., Handelman, J. S., & Alessandri, M. (1990). Teaching youths with autism to offer assistance. Journal of Applied Behavior Analysis, 23, 297-305.

Hecimovic, A., Fox, J. J., Shores, R. E., & Strain, P. S. (1985). An analysis of developmentally integrated and segregated free play settings and the generalization of newly acquired social behaviors of socially withdrawn preschoolers. Behavioral Assessment, 7, 367-388.

Hendrickson, J. M., Strain, P. S., Tremblay, A., & Shores, R. E. (1982). Interactions of behaviorally handicapped children: Functional effects of peer social interactions. Behavior Modification, 6, 323-353.

Howlin, P. (1986). An overview of social behavior in autism. In E. Schopler & G. Mesibov (Eds.), Social Behavior in Autism (pp. 103-131). New York: Plenum Press.

Ihrig, K., & Wolchik, S. A. (1988). Peer versus adult models and autistic children's learning: Acquisition, generalization, and maintenance. Journal of Autism and Developmental Disorders, 18, 67-79.

Kazdin, A. E. (1982). Single-case research designs. New York: Oxford University Press.

Kohl, F. L. & Beckman, P. J. (1990). The effects of directed play on the frequency and length of reciprocal interactions with preschoolers having moderate handicaps. Education and Training in Mental Retardation, 25, 258-266.

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

McEvoy, M. A., & Odom, S. L. (1987). Social interaction training for preschool children with behavior disorders. Behavioral Disorders, 12, 242-251.

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

McHale, S. M., Olley, J. G., Marcus, L. M., & Simeonsson, R. J. (1981). Nonhandicapped peers as tutors for autistic children. Exceptional Children, 47, 263-265.

Mesibov, G. B. (1984). Social skills training with verbal autistic adolescents and adults: A program model. Journal of Autism and Developmental Disorders, 14, 395-404.

National Information Center for Handicapped Children and Youth. (1987). News Digest (Publication No. 6). Washington DC.: U.S. Government Printing Office.

Odom, S. L., Hoyson, M., Jamieson, B., & Strain, P. S. (1985). Increasing handicapped preschooler's peer social interactions: Cross-setting and component analysis. Journal of Applied Behavior Analysis, 18, 3-16.

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

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., Karger, M. A., & Smith, J. (1986). Using single and multiple peers to promote social interaction of preschool children with handicaps. Journal of the Division for Early Childhood, 10, 53-64.

Paine, S. C., Hops, H., Walker, H. M., Greenwood, C. R., Fleischman, D. H., & Guild, J. J. (1982). Repeated treatment effects: A study of maintaining behavior change in socially withdrawn children. Behavior Modification, 6, 171-199.

Ragland, E. U., Kerr, M. M., & Strain, P. S. (1981). Social play of withdrawn children: A study of the effects of teacher-mediated peer feedback. Behavior Modification, 5, 347-359.

Ragland, E. U., Kerr, M. M., & Strain, P. S. (1978). Behavior of withdrawn autistic children. Behavior Modification, 2, 565-577.

Sasso, G. M., & Rude, H. A. (1987). Unprogrammed effects of training status peers to interact with severely handicapped children. Journal of Applied Behavior Analysis, 20, 35-44.

Schloss, P. J., Schloss, C. N., Wood, C. E., & Kiehl, W. S. (1986). A critical review of social skills research with behaviorally disordered students. Behavioral Disorders, 11, 1-14.

Scruggs, T. E., Mastropieri, M., Veit, D. T., & Osguthorpe, R. T. (1986). Behaviorally disordered students as tutors: Effects on social behavior. Behavioral Disorders, 11, 36-44.

Shafer, M. S., Egel, A. L., & Neef, N. A. (1984). Training mildly handicapped peers to facilitate changes in the social interaction skills of autistic children. Journal of Applied Behavior Analysis, 17, 461-476.

Shores, R. E. (1987). Overview of research on social interaction: A historical and personal perspective. Behavioral Disorders, 12, 233-241.

Stainback, W., & Stainback, S. (1981). A review of research on interactions between severely handicapped and nonhandicapped students. Journal of the Association for the Severely Handicapped, 6, 313-321.

Strain, P. S. (1977). An experimental analysis of peer social initiations on the behavior of withdrawn preschool children: Some training and generalization effects. Journal of Abnormal Child Psychology, 5, 445-455.

Strain, P. S. (1981). Modification of socioeconomic status and social interaction with mainstreamed mildly developmentally disabled children. Analysis and Intervention in Developmental Disabilities, 1, 157-169.

Strain, P. S. (1983A). Identification of social skill curriculum targets for severely handicapped children in mainstream preschools. Applied Research in Mental Retardation, 4, 369-382.

Strain, P. S. (1983B). Generalization of autistic children's social behavior change: Effects of developmentally integrated and segregated setting. <u>Analysis and Intervention in Developmental Disabilities</u>, <u>3</u>, 23-34.

Strain, P. S. (1984). Social behavior patterns of nonhandicapped and developmentally disabled friend pairs in mainstream preschools. <u>Analysis and Intervention in Developmental Disabilities</u>, <u>4</u>, 15-28.

Strain, P. S., Cooke, T. P., & Apolloni, T. (1976). <u>Teaching exceptional children: Assessing and modifying social behavior</u>. New York: Academic Press.

Strain, P. S., & Fox, J. J. (1981). Peer social initiations and the modification of social withdrawal: A review and future perspective. <u>Journal of Pediatric Psychology</u>, <u>6</u>, 417-433.

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

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

Strain, P. S., & Shores, R. E. (1977). Social reciprocity: A review of research and educational implications. <u>Exceptional Children</u>, <u>43</u>, 526-529.

Strain, P. S., & Shores, R. E. (1979). Additional comments on multiple-baseline designs in instructional research. <u>American Journal of Mental Deficiency</u>, <u>84</u>, 229-234.

Strain, P. S., Shores, R. E., & Kerr, M. M. (1976). An experimental analysis of "spillover" effects on the social interaction of behaviorally handicapped preschool children. <u>Journal of Applied Behavior Analysis</u>, <u>9</u>, 31-40.

Strain, P. S., Shores, R. E., & Timm, M. A. (1977). Effects of peer social initiations on the behavior of withdrawn preschool children. <u>Journal of Applied Behavior Analysis</u>, <u>10</u>, 289-298.

Strain, P. S., & Timm, M. A. (1974). An experimental analysis of social interaction between a behaviorally disordered preschool child and her classroom peers. Journal of Applied Behavior Analysis, 7, 583-590.

Strain, P. S., & Wiegerink, R. (1976). The effects of sociodramatic activities and social interaction among behaviorally disordered preschool children. Journal of Special Education, 10, 71-75.

Tawney, J. W., & Gast, D. L. (1984). Single subject research in special education. Columbus: Charles E. Merrill.

Timm, M. A., Strain, P. S., & Eller, P. H. (1979). Effects of systematic, response-dependent fading and thinning procedures on the maintenance of child-child interaction. Journal of Applied Behavior Analysis, 12, 308.

Tofte-Tipps, S., Merdonca, P., & Peach, R. V. (1982). Training and generalization of social skills: A study with two developmentally handicapped, socially isolated children. Behavior Modification, 6, 45-71.

Tremblay, A., Strain, P. S., Hendrickson, J. M., & Shores, R. E. (1981). Social interactions of normal preschool children: Using normative data for subject and target behavior selection. Behavior Modification, 5, 237-253.

Tyron, A. S., & Keane, S. P. (1986). Promoting imitative play through generalized observational learning in autisticlike children. Journal of Abnormal Child Psychology, 14, 537-549.

Varni, J. W., Lovaas, O. I., Koegel, R. L., & Everett, N. L. (1979). An analysis of observational learning in autistic and normal children. Journal of Abnormal Child Psychology, 7, 31-43.

Wacker, D. P., & Berg, W. K. (1985). Use of peers to train and monitor the performance of adolescents with severe handicaps. Education and Training of the Mentally Retarded, 20, 109-122.

Walker, H., Greenwood, C., Hops, H., & Todd, N. (1979).
    Differential effects of reinforcing topographic
    components of social interaction: Analysis and
    systematic replication. Behavior Modification, 3,
    291-321.

Warrenfeltz, R. B., Kelly, W. J., Salzberg, C. L., Beegle,
    C. P., Levy, S. M., Adams, T. A., and Crouse, T. R.
    (1982). Social skills training of behavior disordered
    adolescents with self-monitoring to promote
    generalization to a vocational setting. Behavioral
    Disorders, 7, 18-27.

Young, C. C., & Kerr, M. M. (1979). The effects of a
    retarded child's social initiations on the behavior
    of severely retarded school-aged peers. Education and
    Treatment of the Mentally Retarded, 14, 185-190.