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Effects of Systematic Social Skill Training on the Social-Communication Behaviors of Young Children with Autism During Play Activities

Laura L. Maddox

Univerity of Nebraska-Lincoln, lmaddox2@unl.edu

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EFFECTS OF SYSTEMATIC SOCIAL SKILL TRAINING ON THE
SOCIAL-COMMUNICATION BEHAVIORS
OF YOUNG CHILDREN WITH AUTISM DURING PLAY ACTIVITIES

by

Laura L. Maddox

A DISSERTATION

Presented to the Faculty of
the Graduate College at the University of Nebraska
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Major: Educational Studies

Under the Supervision of Professor Ellin B. Siegel

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EFFECTS OF SYSTEMATIC SOCIAL SKILL TRAINING ON THE
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OF YOUNG CHILDREN WITH AUTISM DURING PLAY ACTIVITIES

Laura L. Maddox, Ph.D.
University of Nebraska, 2010

Advisor: Ellin B. Siegel

A systematic social skills training intervention to teach reciprocal sharing was designed and implemented with triads of preschool-age children, including one child with an autism spectrum disorder (ASD) and two untrained classroom peers who had no delays or disabilities. A multiple-baseline research design was used to evaluate effects of the social skills training intervention on social-communication and sharing behaviors exhibited by the participants with ASD during interactive play activities with peers. Social-communication behaviors measured included contact and distal gestures, touching peers and speaking. Four sharing behaviors were also measured, including sharing toys and objects, receiving toys and objects, asking others to share, and giving requested items.

Results indicated considerable gains in overall social-communication behaviors. The greatest improvements were observed in the participants’ use of contact gestures and speaking. Slightly increasing trends were noted and suggested that participants with ASD made modest gains in learning the sharing skills taught during social skills training lessons. Social validity data indicate that participants with ASD and peer participants found the intervention appropriate and acceptable, and staff perception ratings indicated
significant changes in the social skills of participants with ASD. Study outcomes have practical implications for educational practitioners related to enhancing social-communication and social interactions of young children with ASD. Study limitations and future directions for research are discussed.
ACKNOWLEDGEMENTS

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DEDICATION

This dissertation is dedicated to my children, Emileigh, Christian, Isabella and Gianna, who willingly and wholeheartedly supported me as I worked to reach this goal.

Setting an example is not the main means of influencing another,

it is the only means. –Albert Einstein
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CHAPTER 1

Introduction

Autism spectrum disorders (ASD) are a group of disabilities that are generally evident during the first three years of life and characterized by delays in communication and socialization, and the presence of restricted interests and patterns of behavior. Individuals with ASD are a heterogeneous group, who demonstrate a spectrum of skills and abilities and share similarities in the pervasive nature of their delays and deficits in developing critical communication and social interaction skills. Referred to as a social-communication disorder, the impact on young children’s development of crucial early learning skills is significant and extensive.

Often, the earliest concerns for a child who may have an ASD arise around deficits in communication and social skills. Wetherby, Prizant, and Hutchison (1998) identify joint attention and symbol use as critical areas that are affected in young children with ASD. Joint attention involves “the tendency to use eye contact, affect, and gestures for the singularly social purpose of sharing experiences with others” (Mundy & Stella, 2000). Often, the communicative intent of gestures, such as pointing to show things to other children or adults, and facial expressions to share enjoyment, fear or other emotions and affect are lacking or nonexistent in young children with ASD. Children with ASD, while limited in the use of varied communicative functions and means, may interact fairly typically with others in order to have their wants and needs fulfilled, such as obtaining desired foods, objects or activities. The purpose of these communication acts, however, differs significantly from typical communication development in that the intent of the child is to regulate the adult’s behavior rather than also to share information or affect.
Early Language and Communication in ASD

The impacts and extent of communication deficits vary widely between individuals across the autism spectrum (Johnson, Myers, & the Council on Children with Disabilities, 2007). Individuals with ASD display diverse profiles of communication skills and abilities, from significant impairments in receptive and expressive language to more qualitative impairments in their understanding of conventional and symbolic language, and pragmatic use of language. Expressively, some children with ASD may show significant impairments and may use few or no words or symbols to communicate. Children with ASD may exhibit echolalia, or imitation of words and phrases, or may develop verbal language skills in a typical range quantitatively, but show significant impairments in the qualitative, social use of language. For example, they may possess large vocabularies, but may not demonstrate the ability to creatively combine words to reference specific activities and events (Prizant, Wetherby, Rubin, Laurent, & Rydell, 2006). Participating in and sustaining conversations poses difficulties, as individuals with ASD often lack the ability to understand and utilize essential conversation rules and nonverbal communication (Bellini & Peters, 2008). Often interactions are stifled by one-sided or tangential speech related to an individual’s special interests and an inability to change topics during conversations. It is estimated that approximately 50% of individuals with autism acquire some functional speech and language skills, however, 1/3 to 1/2 of individuals with autism will not develop speech that is adequate to meet simple daily needs (National Research Council [NRC], 2001). Many individuals who develop adequate speech continue to experience pervasive difficulties with the reciprocal nature of communicative experiences.
Individuals with ASD also experience a wide array of receptive language skills and deficits. Potential difficulties include understanding spoken language, orienting to the focus of others, and understanding and interpreting abstract concepts. Evidence of these difficulties may include a diminished ability to follow auditory instructions and attend to relevant stimuli and actions of others. Individuals with ASD may experience difficulty understanding the scope and sequence of activities. Abstract concepts, figures of speech and rhetorical questions may be extremely puzzling and may cause confusion or misinterpretation.

**Early Social Interaction and Play Skills in ASD**

Deficits in the use of reciprocal social interaction and symbolic play skills have been identified as early indicators of ASD (Mundy, Sigman, & Kasari, 1990; Wetherby et al., 2004). Young children with ASD may not respond to attempts to get their attention and they may appear indifferent to or unaware of other children or adults taking part in activities with or near them. Young children with ASD may display limited abilities to share attention and experiences with others (Dawson et al., 2004). Children may show a lack of or inconsistent use of non-verbal behaviors and experience difficulty understanding the rules and intrinsic, abstract factors involved in interactions with others.

Early play may be ritualistic and perseverative and may lack imaginative and creative elements. Children with ASD may focus on objects or parts of objects rather than the social aspects of play experiences and may adhere to specific routines when engaged with play materials, regardless of the available materials or other people involved with the materials. Individuals with ASD encounter significant difficulties in the development of social-communicative abilities and social relationships. Studies have found that these social-communication impairments in ASD are, in part, related to a lack
of intrinsic motivation to attend to social stimuli and interactions with others. Young children with ASD are “less likely to engage in joint attention and other communicative acts purely for the sake of shared experience” (Dawson et al., 2004). Characteristic social skill deficits limit the abilities of young children with ASD to orient, attend to and engage in social experiences. Longitudinal studies of early language and social behaviors show that individuals who possess more sophisticated interactions with others are more likely to possess more complex communication abilities (Prizant et al., 2006). Deficits in social interaction skills persist across time (Njardvik, Matson, & Cherry, 1999) and affect many areas of an individual’s life, including language and communication development (Wetherby et al., 2004), academic success (Sheldon, Sherman, Schumaker, & Hazel, 1983) participation in recreation and leisure experiences, and vocational outcomes (Hillier, Fish, Cloppert, & Beversdorf, 2007).

Learning Characteristics and Behavior

In addition to the significant impact of communication and social deficits on the learning of children with ASD, other unique learning characteristics exist. Individuals with ASD may experience uneven progress in early cognitive and developmental skills and often demonstrate significant deficits in information processing, especially related to temporal and abstract concepts. Additional areas that often impact the learning of children with ASD include identifying and interpreting relevant stimuli, organizing information, and generalizing skills learned in one context to another. Children with ASD may engage in challenging behaviors that impact their participation and interactions with others. These behaviors often serve a communicative function in the absence of more conventional methods of communication and interfere with the acquisition of new skills and the opportunity for social interaction.
Statement of the Problem

Deficits in processing social information and learning from the social actions of others limit the ability of children with ASD to develop key social and communication skills (Garfinkle & Schwartz, 2002; Koegel, Koegel, Frea, & Smith, 1995). Delays in early social and communication skills, such as sharing an attentional focus with others, participating in social exchanges, and attending to the actions of others, significantly influence communication development as well as learning from interactions with others. (Dawson & Adams, 1984; Mundy, Sigman, Ungerer, & Sherman, 1987; Wetherby, Watt, Morgan, & Shumway, 2007). It is well-documented that young children with ASD demonstrate extremely limited social skills and that participating in social interactions and play are key elements in the acquisition of language and communication skills. (Paul, 2008).

Early communication, social interaction and learning characteristics inherent to ASD affect opportunities for interaction with peers. Young children with ASD often participate in solitary, repetitive and more concrete experiences, such as putting together puzzles, naming objects and recounting facts. In integrated settings where peers and children with ASD participate in early development programming together, if left to their own devices, children with ASD often play in isolation, due to a lack of necessary social understanding and skills. In addition, individuals with ASD often develop unconventional or inappropriate behaviors to compensate for delays in communication and social development that lead to exclusion. Systematic, thoughtful planning is necessary to facilitate and develop adequate opportunities for successful interactions between children with ASD and their peers.
Early intervention for young children with ASD is diverse in quality, intensity, and setting. Recent literature supports intervention programs that provide at least 25 hours per week of engagement (NRC, 2001) and, due to substantial research support for behaviorally-based programs, many families opt for private therapy in lieu of integrated early development programs. Therefore, young children with ASD may have early intervention that targets critical early skills delivered in isolated sessions that may not provide opportunities for interaction with other children their age. Other children may participate in inclusionary settings and require additional supports in order to develop, implement, and maintain interventions that target social skill use and interaction with appropriate intensity and efficiency. Given the variability in early intervention for young children with ASD, there is limited knowledge related to effective and efficient social skills intervention that provides appropriate intensity and opportunities for practice and generalization. In order to better understand the effects of social skills training, an examination of the training’s effect on the child’s social-communication behaviors is necessary.

The goal of social skills intervention is to enhance the interactions and development of critical social-communication skills of young children with ASD. Systematically teaching social skills and having children participate in social skills groups with their peers are two common methods for teaching social skills to children with ASD. Several research studies have focused on the impact of social skills interventions for individuals with ASD. Much of the research has focused on training adults or peers in the child’s environment to interact with the children with ASD and, until recently, relatively little directly taught the children with ASD. In recent years, a variety of social skill training programs have been developed and used to teach social
skills to children with ASD (e.g. Baker, 2003; Bellini, 2006; Wolfberg, 2003) however, the focus has been on providing practical strategies to teachers and, thus, the body of literature supporting the effectiveness of these approaches is limited.

Additionally, much social skills training research has focused on elementary-through high school-aged children. With early intervention being a key predictor of outcomes for young children with ASD, there is a need to examine these interventions with preschool-aged children. Also, the existing research generally has measured increases in interactions of peers with children with ASD, but has not sufficiently considered the impact of intervention on the communication repertoire of the children with ASD. Finally, common social skills interventions may not include a focus on the reciprocal nature of social interactions, and instead focus on teaching children with ASD either to initiate or respond to social overtures. Considering the intrinsic difficulties with generalization and understanding of social exchanges, there is a need to examine the effects of an intervention that teaches the dual roles of communication partners in social exchanges during typical play activities with peers.

**Purpose of the Study**

The relationship between the complexity of an individual’s social interaction skills and their level of communication development is well established. Social skills intervention studies, however, have not adequately explored the effects of social skills intervention on the social-communication behaviors of young children with ASD. Research support exists for teaching social skills to children with ASD, and many interventions to-date include systematic approaches, such as scripting, role-playing and using visuals to support instruction (Bellini, 2006). Previous studies have found that peers and adults can be effective agents in enhancing social interactions of children with
ASD (Weiss & Harris, 2001). There have been a limited number of studies, however, focused on teaching the children with ASD themselves, as well as teaching children with ASD the reciprocal roles involved in interactions.

The primary purpose of this study is to examine the effects of a systematic process of teaching reciprocal sharing social skills on the social-communication behaviors of young children with ASD. Specifically, this study evaluates the impact of giving systematic instructions related to the reciprocal sharing skills and opportunities for practice on the social-communication behaviors of young children with ASD toward their peers during natural play activities that typically occur in early childhood settings. The target skill, sharing, is a basic and fundamental early play skill that is typically emerging between two and four years of age, and is often delayed or absent in social interactions of young children with ASD. The strategies used in this study include scripted, systematic procedures for teaching the skills and provides opportunities for role-play and practice with peers, which are common approaches used in teaching social skills. One criticism of using scripted procedures to teach social skills is the possibility of dependence on a rote behavior, inhibiting the ability for children with ASD to engage in spontaneous social interactions. Therefore, this study will teach multiple exemplars of skill procedures that provide the child with ASD options for giving and asking when sharing toys and materials with their peers.

**Research Questions**

This study attempted to answer the following questions:

**Question 1.** How does a systematic social skills training procedure to teach reciprocal sharing effect the overall use of social-communication and sharing behaviors by children with ASD during play activities with peers?
**Question 2.** How does a systematic social skills training procedure to teach reciprocal sharing effect the use of each type of social-communication behavior measured (gesturing, social touching, giving, and speaking) by children with ASD directed toward peers during play activities?

**Question 3.** How does a systematic social skills training procedure to teach reciprocal sharing effect the overall use of sharing behaviors by children with ASD during play activities with peers?

**Question 4.** How does a systematic social skills training procedure to teach reciprocal sharing effect the use of each type of sharing behavior (share-give, share-receive, ask-request, ask-give) by children with ASD during play activities with peers?

**Definition of Terms**

Errorless Teaching—an instructional strategy that ensures that children always respond correctly. As each skill is taught, a prompt is provided immediately following the instruction so that the children are unable to respond incorrectly. Prompts are systematically removed to promote independent responding.

Interactive Play Activity—an activity that is designed to promote the interaction of young children through play.

Prompting—a technique used to assist children to respond correctly. There are three prompts that will be used in this study: physical (assisting by fully- or partially-physically guiding children to perform the skill), model/gestural (showing children how to perform the skill or pointing to or using another non-verbal behavior to show the child how to perform the skill), verbal (using words to tell children how to perform the skill).

Reciprocal Social Skills—the dual roles involved in social exchanges between communication partners during interactions.
Role Playing—an instructional technique in which participants assume and act out roles to practice appropriate behaviors.

Share-Initiate—an exchange in which one person initiates giving a toy or object to another person for the purpose of distributing or imparting to the other person.

Share-Receive—an exchange in which a person takes an item or object or acknowledges, through a verbal statement or gesture, that another person has shared something.

Ask-Request—an exchange in which one person requests that another person give them an item or object.

Ask-Give—an exchange in which a person locates an item or object and hands it to another person who has asked for it, or allows another person to take an item or object who has, through a verbal statement or gesture, requested the item or object.

Social-Communication Behaviors—observable verbal and nonverbal acts that children exhibit when they are interacting with others.

Social Reciprocity—a mutual exchange between at least two communication partners.

Social Skills Lesson—a systematic procedure of teaching young children to interact with their peers.

Visual Support—tools that are used to increase the understanding of language and better understand structure and expectations.

Assumptions

The following are assumptions that have been made in implementing this study:

1. Demonstration of social skills impacts children’s use of social-communication behaviors.

2. Play with peers is critical to solicit social-communication behaviors with peers.
3. Interventionist behaviors, including unintentional cues, will be consistent.

4. Peer behaviors, including unintentional cues, will be consistent.

Delimitations

1. This study includes only children who exhibit spoken language and who participate in a preschool program with same-age peers.

2. The interventionist conducting the study sessions is not the participants’ classroom teacher.

3. While matched on a variety of language and behavioral features, children with ASD participating in this study are representative of a diverse, heterogeneous group of individuals who share a diagnosis of a disorder with a wide-range of social-communication abilities and needs.

4. Data will be collected during play sessions that include the child with ASD and two same-age peers.

5. Developmentally-appropriate variations in the words and statements used by the young participants will exist.

6. The activity and materials, while exemplars of common early childhood play activities, will be contrived by the researcher.

Limitations

1. Selection of children with ASD for participation in this study will not be random.

2. A limited ability to generalize the results and outcomes beyond the participants in this study exists, as is inherent in all single subject research studies.

3. Inadvertent actions and behaviors of interventionists and peers may influence the social-communication behaviors of the children with ASD.
Significance of the Study

Deficits in social skills and social-communication are defining features of ASD. Further understanding the effectiveness and efficiency of social skills interventions with young children with ASD is critical to addressing the significant social deficits that define the disorder. Due to the pervasive and severe limitations in social-communication behaviors exhibited by young children with ASD, developing a greater understanding of how social skills training affects their use of verbal and non-verbal social-communication behaviors is critical to enhancing social skills intervention.

Findings from this study will provide valuable information regarding the impact of social skills training on the social-communication behaviors of young children with ASD. In turn, it will provide important information for educators to enhance learning opportunities for young children with ASD and their peers, better plan intervention related to social skills, and use strategies that take place during natural classroom activities.
CHAPTER 2

Review of the Literature

Human beings are often referred to as “social beings” because of our adept systems of using communication to express ourselves to others, exchange ideas and develop complex societal structures. At a very basic level, being social means that we are able to communicate and share focus, affect, ideas, and relationships with other people. Humans are motivated by and intrinsically interested in the actions of others and how our actions may affect others. From early childhood to adulthood, social skills are critical for success in communicating our needs and desires, succeeding in school, acquiring and maintaining employment, and participating in recreational and leisure activities (Hillier, Fish, Cloppert, & Beversdorf, 2007; Njardvik, Matson, & Cherry, 1999).

ASDs are distinguished by abnormalities in the development of critical social and communication skills and the presence of restricted and repetitive interests and activities. By definition, disorders that fall within the autism spectrum lead to significant limitations in the ability to orient to, attend to, and engage in social experiences (Dawson et al., 2004). Individuals with ASD experience delays in the development of social reciprocity, which impacts their use of words, gestures and actions to share (i.e. give and receive) information and experiences with others (Wetherby et al., 2004). Social impairments may affect a child’s understanding and use of speech and gestures, other conventions of language, and interpersonal communication. These deficits are apparent, to varying degrees, in all young children diagnosed with ASD, and embody a defining feature of ASD (White, Koenig, & Scahill, 2007).
The early years of life provide fundamental experiences for young children to develop and refine social and communication skills through imaginative play and interactions and cooperation with peers. Everyday experiences are effective in fostering social-communication development because of the innate social curiosities of young children, in which much of their learning is derived from observing and imitating the actions of others (McDuffie et al., 2007). Between the ages of two to five, children experience extraordinary growth in their social and communication skills. While there is some variation in social development among preschool age children, children are at a stage in which they are playing and cooperating with peers with increasing sophistication.

The earliest deficits in social interaction skills have been observed in children with ASD during infancy, and include a lack of seeking attention from and responding to others for social purposes (Stone, Ousley, Yoder, Hogan, & Hepburn, 1997) During the toddler years, children with ASD demonstrate delays in imitation and joint attention that effect the development of symbolic understanding and use of symbolic behaviors (Wetherby et al., 2004). The underlying deficits in social skills in ASD continue to impair further development of social-communication skills and are factors in collateral effects on the academic, behavioral and adaptive skills of young children with ASD, thus having long-term implications for the child’s development and achievement. In order to build the early foundations of social development that critically affect communication, interaction and a wide array of developmental outcomes, children with ASD should receive social skills instructions as early as possible, and prior to age five (Krantz, 2000).

**Social Skills Interventions for Children with ASD**

Several authors have analyzed the literature related to social skills interventions for individuals with ASD in recent years, with varying approaches to their examination
and conclusions. Through a review of literature related to interventions designed to facilitate social interactions of children with ASD under age 9, McConnell (2002) identifies social skills that have been responsive to intervention and identifies several limitations in the current knowledge base and needs to improve educational practice. A review of social skills intervention for individuals with autism conducted by Weiss and Harris (2001) examined a range of useful procedures and provided a theme-based discussion of findings related to social skills treatments. A behavioral approach to examining the effects of social skills intervention provided the basis of a literature review conducted by Matson, Matson, and Rivet (2007). They found that while the number of social skills treatment studies has increased substantially over the last couple of decades, there is great variability in procedures and behaviors examined, identified modeling and reinforcement as the “most popular intervention strategy in the published research”. A review of social skills training literature for children with Asperger’s Disorder or high functioning autism found considerable variety in researchers’ definitions of social skills, the level of intensity and duration of treatment, and the theoretical basis of intervention (Rao, Beidel, & Murray, 2008), while another study of group based social skill development in children with ASD found that “only preliminary evidence is available regarding the efficacy of structured curricula and specific [social skills] treatment strategies.” (White, Koenig, & Seahill, 2007). Wang and Spillane (2009) undertook a synthesis of research studies designed to “increase social skills for children and adolescents with ASD” and gave particular attention to the percentage of nonoverlapping data points to determine if they met criteria for evidence-based practice. They identified video modeling as the sole social skills intervention that met criteria to be deemed evidence-based.
Given the pervasive nature and impact of social deficits in ASD, research in the area of social skills intervention for individuals with ASD has increased in recent years (Matson et al., 2007) and led to the identification of some benefits and positive effects. As described in the various literature reviews and meta-analyses relayed previously, inconsistencies and gaps exist in the literature related to social skills intervention. These disparities exist due to many factors. Social skills interventions are designed to enhance the interactions of individuals with others. There is extensive variation in the social constructs examined, inconsistencies in definitions of target social skills or social behaviors, and methodological differences in research designs. These differences do not necessarily infer inaccuracies, rather are the product of an area of study that includes a population with great heterogeneity that is being studied by researchers representing diverse professional backgrounds. To date, many questions exist regarding the efficacy of social skills intervention (Spence, 2003; Wang & Spillane, 2009).

A variety of intervention approaches have identified and examined a continuum of skills that are social in nature, from making eye contact, to establishing joint attention, imitating the actions of others, developing conversational language, and participating in social interactions. Social skills interventions target a variety of discrete social behaviors (e.g. eye contact, greeting, specific gestures, saying “please” and “thank you, etc”), aspects of language (e.g. # of words spoken, intonation) and interactional skills (e.g. conversational speech, affect or demeanor, number of interactions, number of exchanges). The majority of social skills intervention studies were conducted in schools, while studies have also taken place in clinical settings (Matson et al., 2007).

With the myriad of methodological approaches and variables examined, research has provided some insight into effective elements of social skills interventions. In the
following sections, several important strategies and elements of interventions are discussed by converging the main outcomes of social skills intervention identified in the literature. These research findings are divided into two primary categories for discussion: effective intervention procedures and training agents of intervention.

**Effective Intervention Procedures.** The use of antecedent-based strategies, such as social skills scripts, priming and social stories, include the pre-teaching of particular skills. Social skills scripts are used during activities to augment demonstration of the skill. One challenge, however, with the use of scripts includes a reliance on the script in order to demonstrate the target behaviors. Krantz and McClannahan (1998) demonstrated positive outcomes related to using a script-fading procedure to teach three young children with ASD to interact with teachers. In a study investigating the impact of priming on spontaneous initiations toward peers, children with ASD increased their initiations toward peers in their preschool classrooms (Zanolli, Daggett, & Adams, 1996). Social stories have been used in several studies to teach social and behavioral skills with reported positive effects related to reduction of problem behaviors and increases in the use of social behaviors (Kuo-ch & Mirenda, 2003; Sansosti, Powell-Smith, & Kincaid, 2004).

Video modeling and video self-modeling procedures have been identified as efficacious in increasing social-communication skills in individuals with ASD (Bellini, Akullian, & Hopf, 2007; Kroeger, Schultz, & Newsom, 2007). Video self-modeling has been used to increase the social engagement of young children with ASD (Bellini et al., 2007). During play, teachers provided prompts and cues to interact to children with ASD. Those prompts and cues were edited out and children viewed the videos each day for four weeks. Results indicated increases and maintenance of the social behaviors
examined. In a recent (2009) meta-analysis of evidence-based social skills intervention, video modeling was identified as the sole social skills intervention that demonstrated Percentage of Nonoverlapping Data (PDN) scores indicative of an evidence-based intervention (Wang & Spillane, 2009).

Prompting procedures have been established as highly effective social skills interventions and are utilized in many social skills intervention studies in which prompting is not the primary focus. Prompting may be provided to agents of intervention (i.e. teachers or peers) or to individuals with ASD (Garfunkle & Schwartz, 2002; Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Krantz & McClannahan, 1998; Odom & Strain, 1986). While prompting may be a valuable element of social skills intervention, a plan to fade prompts is necessary in order to demonstrate the acquisition, generalization and maintenance of skills. Limited research has emerged examining the long-term effects of interventions that involve prompt fading, nor have studies compared the effects of different types and levels of prompting on the acquisition of social skills.

Reinforcement procedures are employed as part of many social skills interventions and have been identified as contributing elements of treatments (McConnell, 2002; Spence, 2003; White et al., 2007; Zanolli et al., 1996). The use of reinforcement needs to be further examined in order to understand how it impacts intervention effectiveness, generalization and maintenance. While reinforcement procedures are often included in social skills studies, there is limited knowledge about the level of impact reinforcement has on the effectiveness of the intervention.

Training Agents of Intervention. Social skills research has included a somewhat extensive investigation of the impact provided by the individuals who receive training and lead the social skills intervention. Several studies have examined the effects of using
an adult as the leader or mediator, to provide instruction in and prompting of targeted
social skills. These studies documented increases in the initiations and responses of
children with autism (e.g. Odom & Strain, 1986). Limitations of the approach, including
over-reliance on adult prompting and the intrusiveness of adults on interactions between
individuals and their peers, have influenced a shift in focus from adult-directed
interventions to identifying more natural approaches to teaching social skills to
individuals with disabilities (Weiss & Harris, 2001).

Researchers began to consider the role of peers in teaching social skills to young
children with ASD. Studies demonstrated that teaching peers to use specific social skills
procedures positively influenced the nature of the children with ASD interaction
(Goldstein, Kaczmarek, Pennington, & Shafer, 1992; R.L. Koegel & Koegel, 1995;
McGee, Almeida, Sulzer-Azaroff, & Feldman, 1992). There is strong evidence that
having children with ASD take part in social skills instruction and play opportunities in
natural settings with their peers is critical to the generalization and maintenance of social
interaction skills of young children with ASD (McConnell, 2002).

Several studies in the 1980s and 1990s were conducted by Odom, Strain and
colleagues related to peer-mediated interventions with preschoolers who exhibited
socially withdrawn behaviors, some of whom were children with ASD. As part of their
research, they developed and examined the effects of systematic, scripted procedures to
be used by peers to enhance social interactions with young children with ASD (Odom &
Strain, 1984; Strain & Odom, 1986; Strain, Storey, & Smith, 1991). Their social skills
intervention included teaching peers a series of social skills to use with the identified
children. Examinations conducted evaluated the use of target skills by peers, compared
the effects of peer-initiated and teacher-antecedent interventions, and effects of prompt-
fading procedures (Odom, Strain, Karger, & Smith, 1986; Odom & Strain, 1986; Odom, Chandler, & Ostrosky, 1992). Subsequent studies found that classroom assistants could effectively implement the intervention procedures with peers and children with disabilities (Storey, Smith, & Strain, 1993). Also, positive effects were found when young children with ASD were taught to self-monitor interactions with peers and siblings in home and school environments using an intervention package that included prompting and reinforcement (Strain, Kohler, Storey, & Danko, 1994). The LEAP program (Hoyson, Jamieson, & Strain, 2000) is an inclusive preschool model focusing on early social interactions between children with and without disabilities derived from this line of research. Through this program, practical materials and information have emerged based on early research, including a manual with procedures to teach five early social skills: getting attention, sharing, share-requesting, giving compliments and organizing play (LEAP Outreach Project, 2003).

A more recent focus of research has been on directly teaching social skills to young children with ASD. Given the characteristic delays in social interaction, researchers have focused on how to impact the lack of implicit motivation of young children with ASD to demonstrate social interest and reciprocity. Positive results were demonstrated in studies in which children with ASD received direct social instruction. For example, studies have examined the impact of directly teaching joint attention skills (Kasari et al., 2008), imitation of play and social behaviors of peers (Garfinkle & Schwartz, 2002) and specific social skills immediately prior to interactions with peers (i.e. priming) on the social interactions of young children with ASD (Zanolli et al., 1996). Evidence exists to support the collateral effects of targeting specific social-communication skills. Koegel, Koegel, Hurley, and Frea (1992) reported that by teaching
children with ASD to respond to verbal initiations, disruptive behaviors decreased. There is evidence that interventions that include teaching joint attention and symbolic play increase social interaction skills (Gulsrud, Kasari, Freeman, & Paparella, 2007; Zercher, Hunt, Schuler, & Webster, 2001). Targeting self-monitoring of social skill use has also been demonstrated as effective in increasing the spontaneous use and generalization of social skills in young children with ASD (Koegel et al., 1992; Stahmer, 1995; Strain et al., 1994). These studies have demonstrated that young children with ASD, given information and opportunities to practice social skills, do increase interactions with others. Research is necessary to better understand the relationship between structured social skills interventions and the acquisition of social-communication skills by young children with ASD.

Social Skills Intervention and Social-Communication

During social interactions, individuals use a variety of communication forms to serve many functions, including but not limited to sharing objects, ideas and experiences, expressing feelings, and asking questions. Communication forms may include gestures, body language, facial expressions, and verbal language. Delays and deficits in early communication development have been identified as a central feature of ASD (American Psychological Association, 2000). The earliest indicators of ASD are related to deficits in communication forms and functions, and the use of communication in order to convey or elicit social interactions. By definition, ASD are social-communication disorders because of the inter-related nature of the social and communication deficits that characterize them. For the purposes of differentiating the constructs, social-communication will be defined herein as behaviors used to convey or receive a social message, or how information can be perceived, transmitted and understood, and social-
communication behaviors will include the forms in which messages are conveyed or acknowledged when received. Social skills will be defined as behaviors used to facilitate an interaction with others.

A variety of approaches have been beneficial in teaching communication skills to young children with ASD. Some approaches focus on increasing speech using behavioral methods didactically and systematically and others focus on the functional and pragmatic use of communication. Verbal behavior approaches provide strategies to teach fundamental early expressive and receptive communication skills through a continuum of small, discrete instructional targets (Partington & Bailey, 1993). Specific programs that focus on teaching communication skills through relationship-based strategies have also emerged (Greenspan & Wieder, 1997; Gutstein, Girolametto, Sussman, & Weitzman, 2007). Programs like FloorTime and Relationship Development Intervention require specialized training for parents and professionals. These comprehensive relationship-based programs are implemented through the use of a variety of specific techniques to create opportunities for sharing experiences and interactions. These programs, while using very different instructional techniques and approaches, focus on developing the social-communication of young children with ASD; that is, increasing the interest in and ability to use communication to convey or receive messages. They do not include strategies, however, to explicitly teach social skills through interactions with peers.

It has been recommended in the literature that, prior to beginning social skills intervention, skill deficits should be identified and then specific intervention targets should be put into place (Bellini, 2006). Several targets for social skills training programs have been identified based upon typical early social development. Sharing with peers is one skill that is a common focus for children during the preschool years. As
mentioned previously, key deficits for young children with ASD include sharing experiences and playing with others. Young children with ASD often demonstrate low levels of interactions with peers in general, including limited sharing toys and engaging in joint activities. Therefore, the handful of social skills training programs for use with young children with ASD include practical strategies that guide instruction related to these early social skills (Baker, 2003; LEAP Outreach Project, 2003). One case study specifically addressed teaching a child with autism to share with classmates (Sawyer, Luiselli, Ricciardi, & Gower, 2005). In this study, practice, priming, prompting and reinforcement strategies were implemented with a child with autism and positive effects on the child’s verbal and physical sharing were observed as long as the full intervention was employed.

Limited attention has been given in the literature to examining the effects of social skills interventions on social-communication behaviors of children with ASD, particularly as part of studies in which group social skills training was implemented. Social skills intervention studies have primarily examined changes in social engagement or interactions, including initiations and responses and acquisition of specific social skills (Wang & Spillane, 2009). Studies have employed general topographical measures of social-communication behaviors, measuring motor/gestural and vocal/verbal variables (McGee et al., 1992; Shafer et al., 1984). Using PECS training, Charlop-Christy et al. (2002) measured changes in speech and imitation during social skill sessions. Social skills intervention has the potential to provide an avenue for addressing deficits in social-communication behaviors of young children with ASD.
Limitations in Knowledge

Social skills intervention research is impacted by an array of variables including different targets of intervention, methodology, and the dependent variables examined. Social skills interventions have targeted teaching discrete behaviors, like looking at others or emitting specific social responses, and more global behaviors, such as participating in social exchanges and engaging in interactive play. The variability in constructs examined and dependent measures utilized has culminated in a body of literature that, while relatively robust, lacks a large-scale message about the efficacy of specific social skills interventions and does not provide adequate direction for practice (Bellini & Peters, 2008; Wang & Spillane, 2009; Weiss & Harris, 2001). While social skill deficits define a core feature of ASD, there is minimal evidence of the practical effectiveness of social skills interventions (Wang & Spillane, 2009). In other words, while a primary priority for intervention is to address social skills of young children with ASD (NRC, 2001), there continues to be insufficient information and evidence about effective and efficient social skills interventions.

Many social skills intervention studies with individuals with ASD have employed group intervention in schools and community settings. These studies have identified a variety of factors that support the group structure, including the involvement of peers, the ability to teach specific social skills and behaviors, and the provision of social experiences in typical contexts. Limitations exist, however, in understanding the impact and critical elements of directly providing social skills instruction to children with ASD. Examinations of the effects of specific components of social skills intervention for children with ASD, the duration of training necessary to show effects, and particular
strategies for teaching the “bidirectionality of the social interchange” (McGee et al., 1992) are critical to furthering knowledge and practice.

Additionally, the early social and communication deficits that define ASD are greatly interrelated. In fact, proposed diagnostic criteria for Autism Spectrum Disorders merge the social and communication deficits into one domain defined by “Clinically significant, persistent deficits in social communication and interactions…and includes, “Marked deficits in nonverbal and verbal communication used for social interaction” and other social and communication characteristics (American Psychological Association, Retrieved 5/3/2010). Considering the strong overlap between the social and communication impairments in ASD; it is interesting to note that limited research has investigated how the use of social-communication behaviors by children with ASD is impacted by social skills training. Interventions, such as the social skills curriculum developed by Strain and colleagues (LEAP Outreach Project, 2003), teach a variety of social-communication behaviors for initiating social interactions such as sharing toys and objects, organizing play activities and giving compliments (e.g. tapping peers on the shoulder, verbally addressing peers, giving items to peers). Investigations are necessary to explore the impact that such social skills training may have on communication, especially social-communication, or those communication behaviors that are used while engaging in social interactions. Future investigation may provide a mechanism to individualize social skills intervention and specifically target deficit areas of social-communication, thereby addressing both the improvement of social skills and providing targeted opportunities to practice social-communication behaviors.
Summary

The understanding in the field of evidence-based practices for teaching social interaction skills to young children with ASD has evolved. Several effective elements of social skills intervention have been identified and there is evidence to support the use of peer-mediated and direct teaching procedures for teaching social interaction skills to young children with ASD when trained peers are available. Much of the research related to social skills instruction with peers has evaluated the initiations of peers toward children with ASD and the responding of young children with ASD to their peers or their ability to monitor their use of social behaviors. Additionally, there is little research-based knowledge related to the effects of systematically teaching the reciprocal roles involved in social interactions and how directly teaching reciprocal social interactions may effect the social-communication repertoires of young children with ASD. This study addressed several limitations in the current literature base through the exploration of the effects of systematic procedures to teach early social skills on the social-communication behaviors and use of the targeted social skills by young children with ASD.
CHAPTER 3
Methodology

Participants

The participants in this study were nine preschool age children who attended public preschool programs for 3½ hours per day. Three of the participants were children with an educational verification and/or medical diagnosis of an autism spectrum disorder (ASD). Two peers without disabilities from each of the classrooms of the children with ASD, for a total of six peers were also participants, forming a triad at each preschool site. All participants were between four and five years of age. Participants with ASD were selected because of their diagnosis/verification of an ASD or autism, communication and language abilities, and deficits in social interaction skills. Peer participants were selected because they participated in the same preschool program as the children with ASD and exhibited typical language and learning skills. All participants used English as a primary language. None had been in previous intervention studies similar to the current one. Selected assessment results are used to describe children below. A summary of complete assessment results is provided in Table 3-1.

Description of Participant 1: Nick. Nick was a 4-year, 11-month-old male with a school verification and medical diagnosis of autism. His teacher reported that he used over 100 spoken words and that his language consisted of creative combinations as well as repetitive utterances. Nick expressed spontaneous phrases longer than five words. Receptively, Nick followed familiar two-step directions given directly to him and, with prompting, followed group directions and responded to greetings. Nick’s communication skills were formally assessed using the Preschool Language Scale-Fourth Edition (PLS-4; Zimmerman, Steiner, & Pond, 2002). His standard score on the expressive
communication domain was 63 (1st percentile) and on the auditory comprehension domain was 73 (4th percentile) with a total language standard score of 69 (1st percentile).

Similarly, Nick’s standard score in the communication domain of the Vineland Adaptive Behavior Scales, Second Edition (Vineland-II; Sparrow, Cicchetti, & Balla, 2005) was 69 (2nd percentile).

Socially, Nick showed little interest in peers and infrequently observed their actions or chose to sit or play near them. He demonstrated little to no interaction with them during play, inconsistently responded to initiations from peers, and very rarely engaged in play with them. Nick’s teacher reported that Nick did participate in activities with peers for short periods of time when prompted. No interactions with peers were observed during a 15-minute observation of a small group play activity. Nick’s standard score in the socialization domain on the Vineland-II was 63 (1st percentile).

Nick demonstrated the use of some repetitive language and sounds as well as stereotypic behaviors, including frequently tapping his front teeth with his finger. He generally followed verbal or physical instructions/guidance to return to an activity if he left the area. Nick demonstrated low levels of escape/non-compliance behaviors by running away or falling on the floor when given an instruction. He also demonstrated some crying when he became upset at school. During the course of the study, Nick used some verbal communication to request escape from activities and demonstrated some non-compliance behaviors, but was typically easily redirected to the groups and the behaviors did not interfere with his participation. Nick demonstrated more frequent negative behaviors during the final study sessions that were reported by the teacher to have recently emerged due to medical issues, including hitting his head and crying.

The Preschool Behavioral and Emotional Rating Scale (Pre-BERS, Epstein &
Synhorst, 2009) was used to evaluate the Nick’s behavioral and emotional skills. This instrument provides norms for preschool, head start, and early childhood special education. The PreBERS was selected primarily as a tool to provide descriptive information about the participants as compared to peers their age, the preschool norms were used to score all study participants. Nick scored in the below average range in emotional regulation, and in the poor range for school readiness and social confidence. Nick’s score in family involvement was in the average range and his overall strength index standard score was 35 (32nd percentile).

Description of Participant 2: Joshua. Joshua was a 4-year, 10-month-old male with an educational verification of autism. Joshua’s teacher reported that he spoke more than 100 words and used spontaneous three-word phrases that were creative combinations related to specific events and activities. Joshua’s teacher reported that he demonstrated the ability to follow two-step, simple directions independently and more complex directions with prompting. On the PLS-4, Joshua received a standard score of 69 (2nd percentile) on the expressive communication domain and 76 (5th percentile) on the auditory comprehension domain, with a total language standard score of 70 (2nd percentile). Joshua’s standard score in the communication domain of the Vineland-II was a 78 (7th percentile).

Joshua’s teacher reported that he often played beside peers and would remain in the area throughout group activities, but demonstrated little interaction. During a 15-minute observation of a small group play activity, Joshua remained a part of the group and played with the toys but only interacted with a peer during one 30-second interval. He was observed several times getting in between and in front of peers in order to play with the toys; however, he did not attempt to interact with them. Joshua’s teacher
indicated that he did not take turns in conversations and did not demonstrate the ability to ask questions of his peers. Additionally, he did not initiate greetings and sometimes responded to greetings from his peers and teachers. Joshua’s standard score in the socialization domain of the Vineland-II was a 61, which placed him below the first percentile rank.

Teacher report indicated that Joshua demonstrated mild non-compliance behaviors and temper tantrums on a weekly basis; however, these behaviors were not observed during his participation in the study. Joshua did not demonstrate repetitive utterances or echolalia, however some ritualistic sounds and language were observed during play, including using a high-pitched voice with exaggerated intonation and humming sounds as he moved toys and objects around. For example, he might say the name of the item or object with which he was playing repeatedly in a high-pitched voice followed by making sounds in different pitches.

Scores obtained from the Pre-BERS indicated that Joshua’s emotional regulation, school readiness and social confidence were in the poor range and his family involvement was in the average range. Joshua’s strength index standard score was 75 (5th percentile).

Description of Participant 3: Luke. Luke was a 5-year, 5-month-old male with a school verification of developmental delay and a medical diagnosis of Asperger’s Disorder. Luke’s teacher reported that he used more than 100 spoken words and generally used phrases longer than three words in length. She reported that he used repetitive and ritualistic language as well as spontaneous utterances that included creative combinations of words that were referentially related to specific activities and events. His repetitive language was often related to topics in which he had restricted interests. Receptively, Luke demonstrated the ability to follow two-step directions and his teacher
reported that he typically followed group directions. Luke received a standard score of 66 (1st percentile) on the expressive communication domain of the PLS and a 70 (2nd percentile) on the auditory comprehension domain, with a total language standard score of 65 (1st percentile). Luke’s standard score in the communication domain of the Vineland-II was a 78 (7th percentile).

Teacher report indicated that Luke rarely participated in activities with his peers and did not initiate interactions with them. Luke exhibited an interest in one child in the room and often moved physically close, poked, and imitated the sounds made by the other child. Otherwise, he engaged in parallel play and often left the area if a peer tried to join him in a play activity. During a 15-minute observation in which he was part of a small group activity, Luke interacted with a peer during one 30-second interval. During most of the observation, he chose to turn away from the group and did not engage in play with the toys provided. In the socialization domain of the Vineland-II, Luke’s standard score was 74 (4th percentile).

Luke demonstrated minor non-compliance behaviors on a daily basis. His teacher also reported that he hit or yelled at others infrequently (i.e. weekly or less than weekly). These behaviors were not observed during Luke’s participation in the study sessions. Ratings on the PreBERS placed Luke in the average range in all four of the domains measured with a strength index standard score of 37 (39th percentile).
Table 3-1

*Description of the Participants with ASD*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Vineland-II</th>
<th>Preschool Language Scale, Fourth Edition (PLS-4)</th>
<th>Preschool Behavioral and Emotional Rating Scale (PreBERS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domain</td>
<td>Domain</td>
<td>Descriptor</td>
</tr>
<tr>
<td>Nick</td>
<td>Communication 69 (2)</td>
<td>Expressive communication 63 (1)</td>
<td>Emotional regulation 6 (9)</td>
</tr>
<tr>
<td></td>
<td>Daily living skills 62 (1)</td>
<td>Auditory comprehension 73 (4)</td>
<td>School readiness 5 (5)</td>
</tr>
<tr>
<td></td>
<td>Socialization 63 (1)</td>
<td></td>
<td>Social confidence 5 (5)</td>
</tr>
<tr>
<td></td>
<td>Motor skills 70 (2)</td>
<td></td>
<td>Family involvement 9 (37)</td>
</tr>
<tr>
<td></td>
<td>Composite 63 (1)</td>
<td>Total language 65 (1)</td>
<td>Strength index 80 (9)</td>
</tr>
<tr>
<td>Joshua</td>
<td>Communication 78 (7)</td>
<td>Expressive communication 69 (2)</td>
<td>Emotional regulation 5 (5)</td>
</tr>
<tr>
<td></td>
<td>Daily living skills 77 (6)</td>
<td>Auditory comprehension 76 (5)</td>
<td>School readiness 4 (2)</td>
</tr>
<tr>
<td></td>
<td>Socialization 61 (&gt;1)</td>
<td></td>
<td>Social confidence 5 (5)</td>
</tr>
<tr>
<td></td>
<td>Motor skills 81 (10)</td>
<td></td>
<td>Family involvement 8 (25)</td>
</tr>
<tr>
<td></td>
<td>Composite 71 (3)</td>
<td>Total language 70 (2)</td>
<td>Strength index 75 (5)</td>
</tr>
<tr>
<td>Luke</td>
<td>Communication 78 (7)</td>
<td>Expressive communication 66 (1)</td>
<td>Emotional regulation 10 (50)</td>
</tr>
<tr>
<td></td>
<td>Daily living skills 87 (19)</td>
<td>Auditory comprehension 70 (2)</td>
<td>School readiness 9 (37)</td>
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<td>Socialization 74 (4)</td>
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<td>Social confidence 9 (37)</td>
</tr>
<tr>
<td></td>
<td>Motor skills 81 (10)</td>
<td></td>
<td>Family involvement 9 (37)</td>
</tr>
<tr>
<td></td>
<td>Composite 77 (6)</td>
<td>Total language 65 (1)</td>
<td>Strength index 96 (39)</td>
</tr>
</tbody>
</table>
Description of Peer Participants. Two peer participants from each of the classrooms of the participants with ASD were selected to take part in the study, for a total of six peer participants. All of the children demonstrated social, communication and early learning skills that were at an average or above-average level for children their ages. The selected children were identified by their teacher as considerably interactive with peers, but not extremely interactive. Standard scores on the PLS-4 for the peer participants were 100 or above (55th percentile and above), except for one peer with a standard score of 89 (23rd percentile), which is considered to be within normal limits (Zimmerman, Steiner, & Pond, 2002). Scores on the Vineland-II for all of the peers were within an average or above average range and scores on the Pre-BERS indicate that the peer participants all demonstrated average or above average behavioral and emotional skills.

Table 3-2

Description of the Peer Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Vineland-II SS (%tile)</th>
<th>PLS-4 SS (%tile)</th>
<th>Pre-BRS SS (%tile)</th>
<th>Adaptive behavior composite</th>
<th>Total language score</th>
<th>Strength index</th>
<th>Descriptor Above Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nick-peer 1</td>
<td>5y 2m</td>
<td>99 (47)</td>
<td>114 (82)</td>
<td>118 (89)</td>
<td>Above Average</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Nick-peer 2</td>
<td>4y 11m</td>
<td>86 (18)</td>
<td>89 (23)</td>
<td>102 (55)</td>
<td>Above Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joshua-peer 1</td>
<td>3y 11m</td>
<td>108 (70)</td>
<td>139 (99)</td>
<td>114 (82)</td>
<td>Above Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joshua-peer 2</td>
<td>4y 1m</td>
<td>101 (53)</td>
<td>106 (66)</td>
<td>117 (87)</td>
<td>Above Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luke-peer 1</td>
<td>5y 5m</td>
<td>105 (63)</td>
<td>122 (93)</td>
<td>118 (89)</td>
<td>Above Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luke-peer 2</td>
<td>5y 3m</td>
<td>107 (68)</td>
<td>102 (55)</td>
<td>125 (95)</td>
<td>Superior</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Screening and Selection of Participants. Candidates were recruited through public Early Childhood Special Education programs. District special education administrators were asked to make contact with schools that educated preschool students with ASD and peers without disabilities in the same classrooms to identify teachers interested in participating in the study. The district special education administrators then provided contact information for school administrators to the researcher. Contact was made with administrators at those schools to gain permission to begin the screening and acceptance process and determine if there were possible participants/classrooms that met the criteria for the study. All criterion skills of the children with ASD and peers were initially reported by the teacher and verified by the researcher during a classroom observation.

Upon receiving permission from the school administrator to make contact with classroom personnel, the researcher contacted the early childhood special education teacher and conducted a telephone interview (Appendix A: Telephone Screening Form & Social-Communication Questionnaire). During this interview, the researcher gathered initial screening information to ensure that the children with ASD met the established study criteria, and to determine if the classroom included peers who met established criteria. The telephone screening was completed using initials to identify students and without access to students’ or families’ names. For a classroom to pass the first level of screening, the teacher reported whether children had educational verification or medical diagnosis of autism or an ASD, spoke at least 50 words and used two-word, spontaneous phrases. Additionally, the teacher reported whether children followed one-step directions at least 50% of the time and could imitate simple motor actions. Finally, the teacher’s
report documented that children with ASD did not exhibit severe negative behaviors nor have intense or regularly occurring minor negative behaviors, as documented on the Behavior Rating Protocol attached as Appendix B. The researcher created the Behavior Rating Protocol considering types and levels of behaviors identified on the Sutter-Eyberg Student Behavior Inventory-Revised (Eyberg & Sutter 1999) and the barriers assessment that is part of the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP; Sundberg, 2008).

The researcher also verified that the classroom included peers without disabilities who possibly met criteria for the study. The interview with the teacher documented that there were at least two peers in the classroom who had a positive or neutral relationship with the target student with ASD, had no history of referral for special education services, and demonstrated positive social skills. If the minimum criteria were met based on teacher report, the researcher scheduled a time to visit classrooms and observe the children with ASD and peers.

**Selection of Participants with ASD.** The next step of the screening process included a brief observation of the children with ASD in their classrooms (Observation and Screening Form: Child with ASD, attached as Appendix C.) During a 10-minute observation, the researcher used partial interval recording to examine interactions of the children with ASD with their peers during a small group activity. Children selected for the study were expected to demonstrate interaction with peers in fewer than 25% of the intervals. The researcher also documented the number of two- to three- word phrases used by the children with ASD and that the children imitated five simple gross motor actions. Finally, the researcher documented the number of instructions given to the
children and the number that were followed. Overall, nine children with ASD were screened. Two children did not meet telephone-screening criteria. The researcher conducted observations of the remaining six children with ASD. Two children demonstrated higher frequency of social interaction behaviors. Four children did meet the established selection criteria and the final selection of the three participants with ASD was based upon the sites where potential peer participants and spaces to conduct the sessions were available.

Selection of Peer Participants. The public school programs serving preschool-age children were funded through state and federal early intervention fund designated for “at-risk” populations (e.g. HeadStart, Title 1). The researcher took steps to ensure that selected peer participants were representative of typically developing young children. During the observation, the researcher asked the teacher to give an overall rating of level of social interaction for all children in the preschool classroom using only initials, including the children with ASD, but not including children who had previous referral for or currently received special education or ELL services. The 4-point Likert scale included the following ratings: 1=rarely interacts with peers, 2=occasionally interacts with peers, 3=to a considerable degree interacts with peers, and 4=almost always interacts with peers. Peers were selected from those who received a rating of 3 and who met the other peer selection criteria listed above. The Interaction Rating Form is attached as Appendix D.

Once it was determined that children met screening criteria, informed consent forms were provided to the families of the children with ASD and peers. The consents described the study and asked for parents’ permission for their children to participate in
the study. All of the initially selected peers agreed to participate in the study. The classroom teacher and other classroom staff were provided with an assent form describing the study and requesting their participation through the completion of a social skills rating scale and formal assessment tools. Informed consent and assent forms are attached as Appendix E.

Assessments

After children were identified to participate in the study and consents were obtained, three pre-intervention assessments were conducted with the children with ASD and their peers. These assessments provided a measure of the children’s current level of functioning related to communication, social, emotional and behavioral skills. The assessments administered included: (a) Preschool Language Scales, Fourth Edition (Zimmerman, Steiner, & Pond, 2002), (b) Preschool Behavioral Rating Scale (Pre-BRS) (Epstein & Synhorst, 2009), and the Vineland Adaptive Behavior Scales (Vineland-II), Second Edition (Sparrow, Cicchetti, & Balla, 2005). Detailed descriptions of these tools, including information related to validity and reliability of these tools is presented in Appendix F.

- The *Preschool Language Scale, Fourth Edition (PLS-4)* is a standardized assessment of communication and language that is normed for use with young children ages birth through six years, 11 months.
- The *Vineland Adaptive Behavior Scales, Second Edition* is an adaptive behavior measure of personal and social skills for use with ages birth to 90 years. Three primary domains are evaluated: communication, daily living and socialization. Additionally, a motor skills domain and maladaptive behavior index are available.
The Preschool Behavioral and Emotional Rating Scale is a strength-based behavioral and emotional rating scale for children ages three through five years of age that measures four dimensions, emotional regulation, school readiness, social confidence, and family involvement. Separate norms for Preschool, Head Start, and Early Childhood Special Education are available. The Preschool norms were used to score the assessments of all participants.

Settings

All study sessions took place in a familiar setting in the children’s natural educational environment. Sessions took place in areas outside of the classroom in which the children with ASD participated in play activities during their school day prior to the initiation of the study (e.g. the hallway, the stage, and a treatment room). In selecting appropriate space, the researcher requested an area that was a common space for the children to play and was at least 10 feet x 10 feet. The selected settings included a small table that could seat a minimum of four children comfortably and was the appropriate height for preschool-age children. Intervention sessions always occurred with the triads of children and the interventionist seated at the table. Play activities occurred at the same table or on the floor within the predetermined study setting if the activities required movement.

Materials

Interactive Play Materials. Play materials were selected by the researcher to be representative of typical items and supplies used with young children and that facilitated opportunities for the triads of children to create and play together. Specific materials used fit into two types: “cooperative games”, such as electronic toys and games, and
“group projects”, such as arts and crafts activities that were completed by the triad of children together. The researcher selected eight cooperative games and eight group projects for use during the study sessions. Within the group projects, some variation in materials existed each time the activity was repeated. For example, the first time a triad created a collage, the materials included stickers and material scraps; the second time they created a collage, they used foam shapes and magazine pictures. Full descriptions of interactive play activity materials are provided in Appendix G. A kitchen timer was used to ensure that play activities were the appropriate duration.

Transition materials. Visual supports enhanced the routine of the study’s sessions. A small poster with three pieces of Velcro was hung in the children’s classrooms. Children received a “Super Social Star”, which was a 5-inch x 5-inch, laminated, decorated star with Velcro applied to the back. These stars remained on the small poster in the children’s classroom and were removed by the children when they left to participate in the study’s sessions.

The research hung a small poster with three pieces of Velcro within the area in which study sessions took place, but not directly by the table. The children adhered their Super Social Stars to this small poster during breaks between sessions. Three 4” x 6” picture communication symbols represented when the children could play, when they had one-minute remaining in play time, and when they were to stop playing. These symbols were laminated and Velcro was applied to the back. A large poster on foam core was hung or propped next to the table. The poster included three pieces of Velcro across the top left, one piece in the middle of the left side, and one piece in the middle on the right. The children placed their Super Social Stars on the three pieces of Velcro across the top
during the groups and the interventionist adhered the 4” x 6” picture communication symbols to the Velcro on the left middle when appropriate. The interventionist placed the social skills lesson poster on the right side during training sessions.

**Social Skills Training Materials.** Specific materials used during the social skills training lessons included two 8 ½ x 11 posters with picture communication symbols depicting the skills of *share* and *ask* (see Appendix H). The researcher randomly selected two hand puppets for each site. Puppets included birds, bugs and other animals. Three items that were similar to, but not used as interactive play materials during study sessions, were rotated and used during training practice opportunities. These included Robie, an electronic bank that “ate” money one coin at a time, markers with “magic” paper, and a Woody doll with removable arms and legs.

The researcher created scripts to guide implementation of social skill training lessons. Specifically, the researcher adapted scripts for share and share-request from the Project LEAP Staff Workbook entitled *Nurturing Social Skills in the Inclusive Classroom* for use in this study (LEAP Outreach Project, 2003) and additional scripts for the reciprocal roles, resulting in two sets of scripted procedures for a) sharing toys (*share*) and asking others to share (*ask*). Each of these scripts outlined both roles that were part of the reciprocal exchange.

**Interventionist Training Materials.** Materials used during interventionist training included written documents outlining the study plans and procedures. These documents consisted of scripts and appropriate commentary used in the study. Interventionist training materials are included as Appendix I. Additionally, interventionists used the
social skills training materials and interactive play materials during interventionist training sessions for practice and role-play.

**Equipment.** All sessions were videotaped using a Canon FS20 digital video camera using four SD video cards. The camera was held by the researcher and moved around the study setting as needed to ensure that the vocalizations and actions of the children with ASD were captured while the interventionist conducted the sessions and the children participated in interactive play activities. While trying to get the best video possible, the researcher also made every effort to be unobtrusive to the children by not interfering with their activity and remaining outside of the area in which the activity was taking place. A Canon PowerShot SD1000 was used as a back up camera and positioned on a tripod to capture a wide-screen shot of all of the children playing. Following study sessions, the researcher transferred the videos using iMovie onto an Iomega external hard drive and a back up copy was recorded onto a DVD. After tapes were successfully transferred, the SD video cards were erased and reused for future sessions.

**Dependent Measures**

To examine the effects of the systematic procedures used to teach reciprocal sharing skills, the specific communication and sharing behaviors of the participating young children with ASD were measured during interactive play using partial interval recording. Intervals were 20-seconds in length. This method of data collection involved recording the first occurrence of behaviors within each interval.

Interactive play included two activities, each exactly five minutes in duration, for a total of 10-minutes duration of play. The 10-minute play sessions were divided into thirty, 20-second recording intervals. The 10-minute length of play sessions was selected
to ensure optimal attention and participation from the young participants, and 20-second intervals were appropriate for the expected frequency of the behaviors measured. Using partial interval recording, the first occurrence of a behavior was coded if they occurred at any time during an interval.

**Communication Behaviors.** Communication behaviors included any verbal or nonverbal attempt to communicate with a peer in order to give or receive information or elicit a social response as evidenced by a look, body orientation or directionality of motor/vocal act toward peers related to the activity and were coded by the following:

**Gesture:** pointing to an object or activity or touching an object. If a *gesture* was observed in any interval, it was coded as a *distal gesture* or a *contact gesture*.

- **Distal gesture (DG):** reaching toward or pointing at the referent, without making physical contact with the referent. *Distal gesture* included body language, such as nodding or shaking the head. If a distal gesture culminated in a contact gesture, it was not coded as a distal gesture, but was coded as a contact gesture.

- **Contact gestures (CG):** physically touching the referent object. *Contact gestures* included touching materials as well as handing materials to or taking materials from peers. Contact gesture included children touching themselves when referencing themselves (e.g. “My turn”).

**Social touch (T):** making contact with a peer on the hand, arm, shoulder, back, or any body part and did not include anything that could be coded as a *contact gesture*.
Speak (S): saying words aloud while looking at or addressing a peer or peers.

Sharing Behaviors. Data related to children’s use of sharing behaviors were coded during interactive play using partial interval recording. Sharing behaviors were defined as any behavior that was used for the purpose of giving, requesting or receiving items or objects. The four specific sharing behaviors are defined below:

- **Share-Initiate (SI):** an attempt to give an item or object to another child through a physical action or verbal utterance.
- **Share-Receive (SR):** taking an item or object from another who share-initiated toward them. Share-receive was only coded if the receiver acknowledged with a contact gesture (take) or verbalization (e.g. “Thanks.”). SR did not include taking items from others that are not being given, or demanding that others gave items to them.
- **Ask-Request (AR):** attempting to gain an item from another child through the use of appropriate words or actions to let the other child know they wanted an item. AR did not include taking items from others, or demanding that others gave items to them. “My Turn” was coded as an appropriate attempt, unless it was paired with taking items with resistance or any other challenging behavior.
- **Ask-Give (AG):** handing an item to a peer, or placing an item or object in front of a peer who has requested an item.

If children with ASD exhibited challenging behaviors during a sharing behavior, the behavior was not coded. Challenging behaviors included trying to take objects, throwing objects, responding “no”, demanding objects, or any negative physical or verbal behaviors.
Research Design

A multiple baseline design across participants (Kazdin, 1982) was used to evaluate the effects of systematically teaching reciprocal *sharing* skills on the communication and sharing behaviors of young children with ASD during play activities with peers. A multiple baseline design was selected because it does not require the withdrawal of the intervention. This design involved three study phases: (a) baseline assessment, (b) social skill training, and (c) follow up. Triads of children, including one participant with ASD and two peers, participated in all of the study’s sessions. All triads began baseline within a week of the others and baseline and training phases took place over a two-month period. Follow up data were taken at least four weeks after the conclusion of the training phase.

Training sessions began with Nick when stable trends in his communication behaviors were established during baseline. To control for order effects, the first skill taught was counterbalanced across the three participating children with ASD. The skill the first triad began with was determined by a coin toss and the beginning skill was alternated thereafter. Therefore, Nick began with *share*, Joshua began with *ask* and Luke began with *share*. Table 3-3 presents the sharing skills targeted during each training session for each participant with ASD.
Table 3-3

List of Training Sessions and Targeted Sharing Skills

<table>
<thead>
<tr>
<th>Nick Session #</th>
<th>Skill</th>
<th>Joshua Session #</th>
<th>Skill</th>
<th>Luke Session #</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Share</td>
<td>9</td>
<td>Ask</td>
<td>13</td>
<td>Share</td>
</tr>
<tr>
<td>7</td>
<td>Ask</td>
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<td>Share</td>
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<td>Ask</td>
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<tr>
<td>8</td>
<td>Share</td>
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<td>Ask</td>
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<tr>
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<tr>
<td>17</td>
<td>Ask</td>
<td>20</td>
<td>Share</td>
<td>24</td>
<td>Ask</td>
</tr>
</tbody>
</table>

The other two participants remained in baseline for at least an additional three sessions after the prior participant began training and remained in baseline until stable trends in their communication behaviors were observed. During the baseline phase, each triad participated in two interactive play activities. During training, each triad participated in a structured social skills lesson followed by two interactive play activities. Follow up sessions took place approximately four weeks after the final training session.
and consisted of each triad participating in interactive play activities, just as in the baseline phase. Data were collected on the children with ASD’s communication and sharing behaviors during the interactive play portion of baseline, training and follow up sessions.

Social skill training lessons and interactive play activities were videotaped in their entirety. Digital video SD cards were used to record the sessions. Video card files were transferred into QuickTime format using iMovie, which included time codes, and then copied onto DVDs. The researcher viewed the DVDs at a later time to code each of the 20-second intervals for communication and sharing behaviors. The DVDs were also used for reliability coding. The researcher recorded treatment fidelity data during study sessions in real time. An example data collection form is available in Appendix J.

Procedures

Interventionist Training. Two interventionists who were not part of the participating preschool classrooms were trained by the researcher to conduct the study sessions. One interventionist held a master’s degree in early childhood special education and the other had a master’s degree and certification in speech-language pathology. Both interventionists had over 18 years of experience teaching preschool-age children with ASD. During the initial interventionist training session, the interventionists were provided with a written description of the study procedures, including the scripts to be used during each study phase. The researcher verbally reviewed the study procedures and answered questions related to the procedures. Following the document review, the interventionists together role-played the procedures with the researcher simulating the interactive play and training sessions. The interventionists learned to conduct all sessions
following consistent procedures, including transitioning from the classroom to the study setting and doing a brief opening song and movement activity. The researcher trained the interventionists on the routine components of the social-communication groups (transitions to and from the groups), as well as the specific procedures and scripts to use during social skills training and interactive play activities. Corrective feedback was provided throughout the interventionist training session by the researcher.

During two additional training sessions, interventionists individually conducted simulated social-communication groups with preschool-age children who were not participants in the study and attended a university-affiliated child development program. Each interventionist demonstrated independent completion of all steps of the session procedures without error, as verified by the researcher using the Intervention Fidelity Checklists, prior to study initiation.

**Selection of Activities for Interactive Play.** All of the study’s sessions included two activities: a cooperative game or activity and a group project. Interactive play activities were typical activities that might occur in preschool environments. Cooperative games and activities included simple games that could be played by young children, such as Hanging Monkeys and Junkyard Jalopy (similar to Operation). Group projects included using various materials to create art and crafts products. One set of materials from each type of activity was used during each study session, and materials were randomly selected from a total of eight activities in each of the two activity categories (cooperative games/activities and group products). Activities were selected by randomly drawing small cards, each identifying one activity, out of a box. The same procedure was used to select activities in both of the activity categories. The materials were rotated to
avoid satiation. Therefore, no materials were used more than twice consecutively, and a triad used never used any materials more than four times total during the study. During the selection process, the research returned activities to the box that were chosen for more than two consecutive sessions or four times at one site.

**All Sessions.** All study sessions began with a short opening song or movement transition activity, an interactive play activity, and a closing transition. Social skills training sessions also included an eight to 10 minute social skills lesson prior to interactive play. Figure 3-1 presents a visual depiction of sessions during all study phases. Data collection occurred during interactive play activities. Two study sessions were conducted each day in every phase of the study, not more than 10 minutes apart, following an established routine. The opening transition began when the interventionist told the three participating children to get their “Super Social Stars”. The children retrieved a small cardboard star with their name from a poster in a designated place in the classroom. The interventionist led them to the study area and the children placed their stars on a “Super Social Stars” poster. The interventionist then led them in a short song or movement activity to begin the group. The children then participated in either an interactive play activity (baseline and follow up phases) or social skills training followed by an interactive play activity (training phase). Interactive play activities during each session included two activities: one cooperative game and one group project. To ensure that interactive play activities were each exactly five-minutes in length (for a total of 10-minutes per session), the interventionist activated the kitchen timer at the beginning of play and told the children to stop playing when the timer buzzed. She then introduced the second interactive play activity and set the timer again, ending the play session when the
timer buzzed. Following the two interactive play activities, the interventionist conducted a closing transition song or movement activity. To transition from the first session, the children placed their star on a “break” board in a designated area of the study setting. They took a three to five minute break in which they went to the restroom and/or read books. The interventionist began the second session by asking the children to get their stars and bring them back to the “Super Social Stars” poster. The interventionist began the group by conducting the opening procedures. After the closing of the second session, the children gathered their stars and returned to the regular classroom activity, placing their stars on the board in the classroom when they entered.

Figure 3-1

*Visual Depiction of All Sessions*

- **Sessions**
  - Baseline & Follow up
  - Social Skill Training
    - Opening transition
    - Social skill training lesson
  - Two interactive play activities
  - Two interactive play activities
  - Closing transition
  - Closing transition

**Baseline and Follow Up Sessions.** Baseline and follow up phases were approximately 12 to 16 minutes. The interventionist led the children to the study setting where they engaged in the opening transition activity, followed by interactive play activities for two, contiguous five minute periods. The interventionist then led the children in the closing transition activity and back to the classroom. There were five baseline sessions for Nick’s triad, seven baseline sessions for Joshua’s triad, and 12 baseline sessions for Luke’s triad. All triads participated in four follow up sessions. Procedures/scripts for baseline and maintenance sessions are attached as Appendix K.
**Peer Coaching Session.** Prior to beginning social skills training with participants, the researcher held one 10-15 minute coaching session with only the participating peers. The purpose of this session was to enlist the peers to be assistants with the social skills training. The peers did not receive any instruction related to the *sharing* skills that were targeted for training sessions. During the peer coaching session, the researcher explained to the peers that they would learn some new ways to play together and that their role would be to help their friend learn the skills while they play. The researcher told them that they should help their friend learn the play skills by practicing and using the skills while they played together. The researcher explained that, if the interventionist did not see them using the skills, she would remind them by saying, “Remember, you are here to help.” or “Remember you are here to play together and help [children with ASD]”. The peers were told that, if they heard the interventionist say one of those phrases, they should use the skills they have learned during the social skills training with their peer with ASD. The researcher emphasized how important it was that they listen to the instructions and practice what they learned many times while they were playing.

The researcher then conducted a 2-3 minute lesson to teach the peers to *give compliments* to each other. Following the lesson, she asked the children to practice the skill with her as they drew a picture. She told them that if she did not see them using the *giving compliments* skill, she would say, “Remember, you are here to help.” and that they should remind them to give a compliment to the person drawing the picture. During a 3-minute play activity, the researcher implemented similar procedures that were used during training to prompt the peers. As the two children and researcher drew, the
researcher tallied how many times each peer gave compliments. Each peer demonstrated at least two examples of giving compliments.

Social Skill Training Lessons. Social skill training sessions were approximately 22-27 minutes in total length and included a social skill training lesson prior to the interactive play activities. The 8- to 10-minute lesson consisted of skill introduction, demonstration, and role-playing (see Appendix L: Social Skills Lesson scripts). Each triad received a total of 12 social skills training sessions during the training phase of the study. This number of sessions was based on a review of social skills training literature.

The interventionist followed a systematic process of teaching two aspects of reciprocal sharing: a) sharing (hereafter “share”) and b) asking others to share (hereafter “ask”). These skills were alternated each training session. Sessions targeting the same sharing skill never followed each other.

Children with ASD and peers took part in the social skills training together, and the social skills training began with the interventionist introducing the skill with a short introductory statement about why sharing was a good thing to do with friends. The interventionist then took out the 8 ½ x 11 poster and pointed to the picture as she described the actions. The interventionist stated, “Let’s watch the puppets do it.” With a puppet on each hand she used the scripted procedures to demonstrate the process used by each partner in the exchange. The interventionist had the children with ASD practice each role in the skill with her, followed by practice with each of the peers. This was done using an errorless learning approach in which the children and the interventionist practiced the steps, with the interventionist providing prompts as needed for the children with ASD to successfully demonstrate the share and ask skills. The children with an
ASD were always a part of the interaction during the role playing, receiving from one peer, and then initiating with the other and vice versa. The children with ASD had a total of three opportunities to practice both roles during each training session, for a total of six opportunities. During practice, the interventionist used a least-most prompting strategy, ensuring that the children with ASD completed each step of the share and ask skills with the greatest level of independence.

Specifically, the share lesson taught the two roles of initiator and receiver and was introduced using the 8 1/2 x 11 poster. The interventionist pointed to the poster as she talked about the steps taken by the initiator and the receiver separately. She then drew the children’s attention to the puppets. She had the children observe the puppets initiating the sharing as she demonstrated the steps. She then had the children observe the puppet receiving and demonstrated the steps.

During the ask lesson the interventionist taught the two roles of requester and giver in the same format. The interventionist pointed to the poster as she talked about the steps taken by the requester and the giver separately. She then drew the children’s attention to the puppets and had them observe the puppets requesting and giving as she demonstrated the steps. Finally, the interventionist provided role-playing practice to the participant with ASD, first with her and then with their peers.

Interactive Play Activities. Session during all study phases included two, five-minute play activities, presented in the same order during each session. The activities that occurred throughout the study came from the same array of activities in an effort to keep all variables constant. The first activity that took place during each session was a cooperative game and the second was a group project, in which the children prepared a
product together. The interventionist’s role during interactive play was limited to providing directions for the activities, managing materials, ensuring that the children stayed within the study area and supervising the group using the specific directive or commentary phrases (see Appendix M).

The interventionist briefly introduced the activities and described the materials. Following the introduction, the interventionist removed herself from the table and facilitated the interactive nature of play by limiting materials that were available to the children by intermittently introducing or removing materials from the table. The interventionist stated, “I like the way you are playing together.” when positive interactions between any of the children were observed. This was done to mirror a natural rate of reinforcement and should not have impacted study outcomes, as this study is investigating the effects of the social skills training, not reinforcement. The same statement was used throughout all phases of the study.

Inter-observer Reliability

Inter-observer reliability examines the consistency or agreement between two independent raters evaluating the same behaviors. Inter-observer reliability was assessed on a random selection of 30% of all sessions and was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Reliability was expected to meet or exceed 80% agreement in order for data to be used for analysis.

Reliability Observer Training. A graduate-level student was trained on the procedures for coding communication behaviors and sharing behaviors. A copy of the Reliability Training Procedures and Instructions for Coding is provided in Appendix N.
Training consisted of three steps, including a review of procedures and definitions, sample coding with feedback and two exams. During the first training step, the trainee was provided with Instructions for Coding Social-Communication Tapes, which included definitions of observable behaviors to be coded, together with a list of coding instructions. After reviewing the information independently, the researcher orally-reviewed the coding procedures with the trainee and gave specific examples. At the end of the review, the researcher asked the trainee questions that required the trainee to recall fact-based information, coding procedures, and appropriate codes for specific case-examples. The trainee then was given an opportunity to ask questions and review her notes and information.

The second training step included the review of a two-minute videotaped sample session that was not one selected for reliability coding. During the review, the researcher demonstrated coding procedures and provided visual examples. For example, the researcher demonstrated how to find the time code to begin coding, how to mark the data sheet with the 20-second intervals, and how to properly code the communication and sharing behaviors. The researcher explained the codes she selected and the rationale for why the behaviors met or did not meet the behavioral definitions. The trainee then independently practiced coding a different two-minute sample for each of the participants (again, not from a session selected for reliability coding). The researcher and trainee then reviewed the coding samples together, discussing the coding procedures. The trainee was given the opportunity to discuss coding procedures, differences that existed between her coding and that of the researcher, and to ask questions about coding procedures.
During the third training step, the trainee took two tests. A written exam evaluated the trainee’s knowledge of the coding system, including definitions, coding procedures, and examples and non-examples. The written test included specific coding scenarios and asked the trainee to determine how to code those items, demonstrating her ability to follow the coding procedures. The trainee was expected to achieve a score of 90% or better on the written exam before taking the video exam. A video exam demonstrated the trainee’s proficiency coding three, two-minute sample videos (one of each participant). To address coding errors on the video coding exam, the researcher watched the videos with the trainee and discussed how to correctly code the items. Training was completed when the trainee established 80% agreement with the researcher on occurrences of behaviors in simulated video practice. Inter-observer reliability training took approximately six weeks. The reliability observer scored 100% on the written exam and demonstrated 92% agreement on occurrences of communication behaviors. For the types of communication behaviors, agreement was 100% for social touch and gesture and 91% for speak. Agreement on overall occurrences of sharing behaviors and the four specific types of sharing behaviors was 100%.

Reliability Data. Overall, inter-observer reliability on intervals with social communication behaviors was 90%, and agreement on intervals with sharing behaviors was 92%. Agreement on the individual types of communication and sharing behaviors was calculated in two ways. First, agreement on occurrences only was calculated as described above for overall behaviors. Because many of these behaviors were infrequently occurring behaviors (e.g. only eight occurrences of social touch were observed during the 22 sessions that were coded by the reliability observer) reliability
was calculated on all intervals (occurrences and non-occurrences) of behaviors. Inter-observer reliability results for each behavior are presented in Table 3-4.

Table 3-4

*Inter-Observer Reliability on Occurrences and Occurrences & Non-Occurrences*

<table>
<thead>
<tr>
<th></th>
<th>Agreement (%)</th>
<th>Occurrence</th>
<th>Occurrence + Non-occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social communication</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>behaviors</td>
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<td>97</td>
<td></td>
</tr>
<tr>
<td>Gesture</td>
<td>89</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>Distal</td>
<td>66</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>84</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Social touch</td>
<td>63</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Speak</td>
<td>89</td>
<td>97</td>
<td></td>
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<tr>
<td>Share Behaviors</td>
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<td>Share-initiate</td>
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<tr>
<td>Share-respond</td>
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<td></td>
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<tr>
<td>Ask-request</td>
<td>94</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ask-give</td>
<td>74</td>
<td>99</td>
<td></td>
</tr>
</tbody>
</table>

**Procedural Fidelity**

The researcher developed and trained interventionists to follow systematic procedures for transitioning to and from all study sessions, conducting play activities and implementing the social skill training lessons. Therefore, fidelity data were collected on implementation of these procedures across all phases of the study. The researcher
randomly selected 10% of sessions during each of the three study phases, for a total of 30% of the study’s sessions, and evaluated the interventionists’ procedural fidelity administration using Fidelity Checklists (Appendix O). Specifically, the researcher examined how the interventionist followed the study procedures by accurately conducting the opening and closing transitions, following the interventionist script, and following the procedures for interactive play activities. Additionally, the researcher randomly selected 30% of the training sessions and analyzed only the fidelity of implementation of the social skills training lessons, without considering the transition and play procedures. Fidelity was obtained by determining the percentage of correctly implemented procedures. This percentage was calculated by dividing the total number of session components that were followed accurately during the session by the overall total number of session components.

**Participant Satisfaction**

To assess the acceptability and importance of the effects of the intervention, children with ASD and their peers were asked to answer questions related to their enjoyment of the social-communication groups and perceived learning during intervention. After the final training session, the researcher individually met with the children and asked them to rate their responses to five statements using a *Participant Satisfaction Questionnaire*. The children’s responses were prompted with pictures of three faces: a sad face indicated that their answer was negative or they disagreed, a neutral face indicated that they neither agreed or disagreed, and a happy face indicated that their answer was positive or they agreed. To ensure that they understood the response system, the researcher first gave them some example statements related to foods
they liked, disliked or were indifferent about, and asked them to select the face that represented their answer. If the children did not demonstrate understanding of the rating system, the researcher then asked fact-based questions about themselves and familiar people and items. For example, the researcher might have said, “You are wearing a pretty dress!” First providing a correct statement and then the incorrect statement. To exemplify the indifferent response, the researcher made a fact-based statement about vegetables (i.e., “Some vegetables are green. Does that make you feel happy or sad? You don’t really feel good about it or bad about it, so which one would you point to?”). If children were not able to independently provide answers using the picture response system, the researcher did not continue. The Participant Satisfaction Questionnaire is attached as Appendix P.

Staff Perception of Social Skill Use by Participants with ASD

To examine any perceived changes in children’s social skills in the classroom teachers, paraeducators, speech-language pathologists, and other staff members who worked regularly with the children with ASD completed a 13-item Social Skills Rating Profile. The Profile was developed by the researcher to include questions about the child’s use of general social initiations and responses as well as the specific dependent variables measured as part of the study. Staff members selected their responses from a Likert-scale that included the following ratings: 1-never, 2-rarely, 3-sometimes, 4-frequently and 5-almost always. The classroom personnel completed the questionnaire prior to the study’s initiation (hereafter “initial”), at a mid-point of intervention (hereafter “mid”) and following the study’s conclusion (hereafter “final”). Six classroom staff members completed the Profile for Nick, five completed the Profile for Joshua, and four
individuals completed the *Profile* for Luke. The *Social Skills Rating Profile* is attached as Appendix Q.

**Data Analysis**

Visual inspection and descriptive statistics and were the primary means used to examine changes in the dependent variables. Visual displays were constructed to represent impacts of the social skills training on the use of communication and sharing behaviors. Percentage of intervals with observed behaviors per session were calculated. The overall use of communication and sharing behaviors of the three participants with ASD were graphed on separate multiple baseline representations and trend lines were used to display and compare trends in the data. Additional line graphs were constructed to display changes in each of the types of communication behaviors measured and each of the four sharing behaviors. After visual displays were analyzed, descriptive statistics were used to examine the impact of the intervention on the level of communication and sharing behaviors used overall and by type.

The percentage of all non-overlapping data (PAND) was calculated to determine effect size of the intervention (Parker, Hagan-Burke, & Vannest, 2007). The PAND was used to examine how overall communication and sharing data differed for children with ASD between phases, by removing data points from either the baseline or training phase to eliminate all overlap and calculating a percentage of all of the remaining non-overlapping data points. A higher percentage of non-overlap indicates a greater impact of the intervention. This approach to data analysis has been identified as an effective method of evaluating the effect size of an intervention in single subject studies (Parker et al., 2007); however, no parameters are available to guide judgment of effect size using
PAND. In fact, researchers caution that Cohen’s guidelines do not apply to PAND, as larger effect sizes are often found in single subject experimental designs (Schneider, Goldstein, & Parker, 2008). The PAND approach was developed as an improvement to the percentage of non-overlapping data (PND). Guidelines exist for interpretation of effect sizes obtained through PND (Scruggs & Mastropieri, 1998). PND guidelines for interpreting the effect sizes were used to evaluate the PAND results for the three participants.

Data from the Participant Satisfaction Questionnaires were analyzed by computing descriptive statistics and gathering qualitative feedback provided by the children with ASD and peer participants. To quantify responses, the smiley faces were given numerical values, with the happy face (Agree) given a value of 3, the indifferent (Neither agree or disagree) face given a value of 2 and the sad face (Disagree) given a value of 1.

A mixed-factorial ANOVA was used to study changes within and across the initial, mid, and final Social Skills Rating Profiles completed by the classroom staff. The within-subjects factor included the three times the profile was completed. Between-factors included the three participants with ASD. Descriptive statistics were calculated to summarize the data for the three individual participants. Qualitative feedback was reviewed to examine themes and for discussion of staff perceptions related to potential intervention effects.
CHAPTER 4

Results

The primary purpose of this study was to evaluate the effects of a systematic process of teaching reciprocal sharing skills on the communication and sharing behaviors of young children with ASD. Specifically, the study examined the use of communication behaviors and sharing by participants with ASD prior to, during and after receiving systematic instruction related to two reciprocal sharing skills.

In this chapter, the results of the study are presented based on visual inspection as they relate to the four research questions addressed in this study. The first two research questions examined changes in communication behaviors of participants with ASD and the second two research questions examined changes in sharing behaviors of participants with ASD. Data related to overall social communication behaviors are presented first, including Percentage of All Non-overlapping Data (PAND) results. It is important to note that one participant’s data include three fewer data points than the minimum of 20 suggested by Parker et al. (2007). Following overall results, results by type of communication behaviors used are presented. Likewise, overall results related to sharing behaviors are presented, followed by results related to each type of sharing behavior examined.

Data were also examined through the use of descriptive statistics. The mean, range and standard deviation were calculated for the percentage of intervals in which each behavior occurred. Some of these descriptives are relayed as part of the narrative results in this chapter and complete descriptive statistics for communication behaviors are presented in Table 4-1 and for sharing behaviors are presented in Table 4-2.
Treatment fidelity, inter-observer reliability and participant satisfaction results are presented following results related to the dependent variables examined in this study. Additionally, results related to the staff perceptions of social skill use are presented.

**Effects of Social Skill Training on Communication Behaviors**

**Overall results.** Data related to communication behaviors were examined by calculating the percentage of intervals in which the communication behaviors were observed. Figure 4-1 presents a graphic representation of the overall results related to the use of communication behaviors by the three participants with ASD.

Joshua and Luke demonstrated similar baseline levels for communication behaviors exhibited in interactive play with peers ($M = 25\%$ and 28\%), while Nick had a lower level ($M = 4\%$). All three participants demonstrated increasing trends in their use of communication behaviors during the training phase, with mean use of communication behaviors increasing to 19\% for Nick, 62\% for Joshua and 46\% for Luke. Results obtained from follow up sessions indicated that the positive change in use of communication behaviors were maintained for all three participants four weeks after completion of social skills training sessions.

Three communication behaviors were evaluated as part of this study including gesturing, social touching, and speaking or using language to share information or elicit a social response (see Table 4-1). Two types, distal and contact, further differentiated gesturing. All three participants demonstrated positive changes in their use of speaking and gesturing and little or no change in their use of social touching. Participants demonstrated little use of distal gestures, and positive changes in gesture use were mainly attributed to increases in contact gestures. Follow up data indicate that these outcomes
remained consistent for the three participants four weeks after completion of social skills training sessions.

Figure 4-1. Percentage of intervals with communication behaviors.
Table 4-1

*Means, Ranges, and Standard Deviations of Communication Behaviors*

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th></th>
<th></th>
<th>Interv</th>
<th>Range</th>
<th>SD</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td>Range (%)</td>
<td>SD (%)</td>
<td>Mean (%)</td>
<td>Range (%)</td>
<td>SD (%)</td>
</tr>
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<td>Nick</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gesture</td>
<td>3</td>
<td>0 - 7</td>
<td>4</td>
<td>11</td>
<td>0 - 47</td>
<td>9</td>
</tr>
<tr>
<td>Distal</td>
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<td>0 - 3</td>
<td>1</td>
<td>1</td>
<td>0 - 7</td>
<td>2</td>
</tr>
<tr>
<td>Contact</td>
<td>2</td>
<td>0 - 7</td>
<td>3</td>
<td>12</td>
<td>0 - 47</td>
<td>8</td>
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<tr>
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<td>0</td>
<td>1</td>
<td>0 - 10</td>
<td>3</td>
</tr>
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<td>0 - 7</td>
<td>3</td>
<td>12</td>
<td>0 - 27</td>
<td>10</td>
</tr>
<tr>
<td>Joshua</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Gesture</td>
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<td>50</td>
<td>20 - 73</td>
<td>18</td>
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<td>13</td>
<td>7 - 27</td>
<td>6</td>
</tr>
<tr>
<td>Contact</td>
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<td>8</td>
<td>42</td>
<td>13 - 63</td>
<td>18</td>
</tr>
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<td>0 - 7</td>
<td>3</td>
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<tr>
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<td>0 - 37</td>
<td>10</td>
<td>58</td>
<td>33 - 90</td>
<td>17</td>
</tr>
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<td>Luke</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gesture</td>
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<td>3 - 37</td>
<td>9</td>
<td>26</td>
<td>7 - 47</td>
<td>12</td>
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<td>0 - 17</td>
<td>5</td>
</tr>
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<td>3 - 27</td>
<td>9</td>
<td>27</td>
<td>7 - 47</td>
<td>16</td>
</tr>
<tr>
<td>Social touch</td>
<td>1</td>
<td>0 - 3</td>
<td>1</td>
<td>1</td>
<td>0 - 3</td>
<td>2</td>
</tr>
<tr>
<td>Speak</td>
<td>22</td>
<td>7 - 47</td>
<td>13</td>
<td>44</td>
<td>7 - 63</td>
<td>16</td>
</tr>
</tbody>
</table>
Participant 1: Nick

Overall communication behaviors. Nick demonstrated little to no use of the communication behaviors during baseline ($M = 4\%$; range = $0\% - 7\%$). A modest increasing trend was evident in Nick’s use of communication behaviors following the introduction of the social skills training ($M = 19\%$, range = $0\% - 47\%$). Nick’s increased use of communication behaviors was not observed during the first sessions of social skills training, indicating a delayed effect of the social skills training on his communication. Nick demonstrated the lowest levels of communication behaviors of the three participants with ASD following training sessions. The increasing trend in Nick’s overall use of communication behaviors during the training phase was noteworthy, however, considered that Nick used very few communication behaviors of all three participants during baseline.

The percentage of all non-overlapping data (PAND) was calculated to determine effect size of the impact of the intervention. For Nick, PAND between the baseline phase and training phase was $82\%$ indicating a moderate intervention effect. The effect size should be interpreted with caution, as Nick received 17 sessions of baseline and training, falling three sessions short of the suggested data points for calculating PAND (Parker, Hagan-Burke & Vannest, 2007). Data indicated that Nick’s communication behaviors during follow up sessions four weeks after the conclusion of training sessions remained at a level higher than those observed during baseline and at a level equal to or greater than observed during training.

Communication Behaviors by Social Skill Taught. Further analysis of the indicates that Nick’s use of communication behaviors increased during interactive play
activities following both share and ask training sessions. Nick’s mean percentage of communication behaviors increased from a baseline of 4% (range = 0% - 7%) to 19% (range = 0% – 47%) during play that followed share training. During play that followed ask training, Nick’s mean percentage of communication behaviors increased from 4% to 18% (range = 3% - 23%). Therefore, there is no evidence that training on either sharing skill had a greater impact on changes in communication behaviors. Figures 4-2 and 4-3 present the percentage of intervals Nick displayed communication behaviors in relation to the social skill taught during all of the study’s sessions.

Figure 4-2. Nick’s percentage of intervals with communication behaviors by social skill taught.

Types of Communication Behaviors. During the baseline phase, Nick demonstrated few communication behaviors, primarily gesturing ($M = 3\%, \ range = 0\% - 7\%$) and speaking behaviors ($M = 3\%, \ range = 0\% – 7\%). Nick demonstrated no social touching behaviors during baseline. An increasing trend in Nick’s use of gesturing was observed during training ($M = 11\%, \ range = 0\% – 47\%) and follow up ($M = 32\%, \ range = 23\% – 47\%) phases. This increasing trend in gesturing can be attributed to contact
gestures during the training phase, with no change in the use of distal gestures between baseline and training phases. Nick demonstrated an increasing trend in his use of speaking during the training phase ($M = 12\%, \text{ range } = 0\% - 27\%$). His use of speaking during the follow up phase decreased ($M = 7\%, \text{ range } = 3\% - 13\%$), however, from that observed during the training phase.

**Participant 2: Joshua**

**Overall communication behaviors.** Joshua’s communication behaviors were relatively stable during baseline ($M = 25\%, \text{ range } = 7\% - 53\%$), with one session in which he demonstrated increased use of communication behaviors. When training was implemented, an immediate effect and an increasing trend in communication behavior use was evident ($M = 62\%, \text{ range } = 33\% - 90\%$). The percentage of all non-overlapping data (PAND) for Joshua was 95\%, indicating a strong intervention effect. Joshua’s use of communication behaviors during follow up sessions remained at the same level as that observed during the training phase. Visual inspection and descriptive data indicated that Joshua’s use of communication behaviors remained at a higher level following the introduction of training than was observed during baseline sessions.

**Communication Behaviors by Social Skill Taught.** Further analysis of the data indicated an increasing trend in Joshua’s use of communication behaviors during sessions following both *share* and *ask* throughout the course of social skills training. The change in level between baseline and training sessions was larger during *share* sessions as compared to *ask* sessions. Baseline use of communication behaviors was 24\% (range = 0\% = 53\%). Joshua showed an increase in his use of communication behaviors following *ask* training sessions, with a mean percentage of intervals with communication behaviors
of 50%. Mean percentage of intervals with communication behaviors following *share* lessons was 69%, which may indicate a greater effect during sessions that followed *share* lessons.

Figures 4-3. Joshua’s percentage of intervals with communication behaviors by social skill taught.

![Graph showing communication behaviors](image)

**Types of Communication Behaviors.** Joshua initially demonstrated no use of social touching and some behavioral variability in trend in his use of speaking during baseline ($M = 21\%$, range = 0\% - 37\%). His baseline mean use of gestures was 13\% (range = 0\% - 27\%). Joshua demonstrated considerable increasing trends in his use of gesturing ($M = 50\%$, range = 20\% - 73\%) and speaking ($M = 62\%$, range = 33\% - 90\%) during the training phase. The increasing trends continued in the follow up phase in Joshua’s use of gesturing ($M = 68\%$, range = 60\% - 80\%) and speaking ($M = 79\%$, range = 70\% - 90\%). Little or no evidence of change in Joshua’s use of social touching was found during training or follow up phases and he continued to demonstrate the use of social touching during very few intervals.
When examined by gesture type, Joshua showed more use of contact gestures ($M = 12\%$, range $= 0\% - 23\%$) than distal gestures ($M = 2\%$, range $= 0\% - 3\%$) during baseline and increasing trends in both contact gestures ($M = 42\%$, range $= 13\% - 63\%$) and distal gestures ($M = 13\%$, range $= 7\% - 27\%$) during training. A notable increasing trend with variability in contact gestures continued during the follow up phase ($M = 67\%$, range $= 57\% - 77\%$); however, the increase in distal gestures was not retained during the follow up phase ($M = 4\%$, range $= 0\% - 10\%$).

**Participant 3: Luke**

*Overall communication behaviors.* Luke demonstrated high levels of variability in his use of communication behaviors during all phases of the study. During baseline, Luke demonstrated the highest level of communication behavior use of the three study participants ($M = 28\%$, range $= 7\% - 47\%$). An increasing trend, albeit with noteworthy variability, was observed in his use of communication behaviors during the training phase ($M = 46\%$, range $= 7\% - 77\%$), which was maintained during follow up sessions ($M = 53\%$, range $= 37\% - 47\%$). PAND for Luke’s overall communication behaviors was 75%, indicating a moderate effect.

*Communication Behaviors by Social Skill Taught.* Data showed increasing trends in Luke’s use of communication behaviors, with some variability following both *share* and *ask* social skills lessons. During play that followed *share* training, Luke’s mean percentage of communication behaviors increased from a baseline of 26% to 38%. During play that followed *ask* training, Luke’s mean percentage of communication behaviors increased to 52% (range $= 37\% - 63\%$). It does not appear that training on either skill had a greater impact on changes in communication behaviors.
Figures 4-4. Luke’s percentage of intervals with communication behaviors by social skill taught.

**Types of Communication Behaviors.** Luke’s use of communication behaviors was quite variable throughout the study; however, Luke’s mean gesturing and speaking behaviors increased during training. Specifically, Luke’s mean use of gesture during baseline was 19% (range = 3% - 37%) and speaking was 23% (range = 3% - 47%). He demonstrated a slightly increasing trend in his use of gesturing, with variability observed during the training phase ($M = 26\%$, range = 7% - 47%). Luke’s use of speaking also increased during training ($M = 43\%$, range = 3% = 47%). Gesture use remained at a higher level than baseline during follow up sessions ($M = 42\%$, range = 30% - 50%), as did speaking ($M = 48\%$, range = 33% - 63%). Moderate, variable baseline levels of contact gesture use ($M = 9\%$, range = 7% - 33%) were observed. Contact gesture use remained variable during training sessions ($M = 27\%$, range = 7% - 60%), with an increasing trend that remained during follow up sessions ($M = 53\%$, range = 37% - 70). Little use of distal gestures was observed during all study phases. Luke also demonstrated little or no use of social touching during baseline and training phases ($M = 1\%$ during both phases), with a slight increase observed during follow up sessions ($M = 6\%$).
Effects of Social Skills Training on Sharing Behaviors

Overall results

Data related to sharing behaviors were examined by calculating the percentage of intervals in which the sharing behaviors were observed. Figure 4-8 presents a graphic depiction of the overall results related to sharing behaviors exhibited by the three study participants. Visual inspection of the data permitted comparisons of the data across phases. Slightly increasing trends in percentage of intervals with sharing behaviors were observed for all three participants following the introduction of the social skill training and continued to be observed during follow up.

Sharing behaviors were further examined by type of sharing behavior observed. These behaviors were operationally defined by the four elements of the two reciprocal sharing skills taught during the intervention. Therefore, a looser contingency for demonstration of each behavior was used. In other words, children did not have to use the exact multi-step behaviors taught as part of the social skill lessons in order for coding of the behavior. Rather, any part of the sharing or asking skill could be observed in order to meet the definition of the individual types of sharing behaviors (see dependent variables, chapter 3). No single type of sharing behavior was responsible for the increasing trend in Nick’s data, and the greatest increases in percentage of intervals with sharing behaviors was observed in ask-requesting for both Joshua and Luke. Table 4-2 presents means, ranges and standard deviations for sharing behaviors.
Figure 4-5. Percentage of intervals with sharing behaviors.

![Graph showing percentage of intervals with sharing behaviors for different individuals over sessions.]

- Baseline
- Social Skills Training
- Follow-up

Individuals: Nick, Joshua, Luke

Sessions: 1 to 28
Table 4-2

*Means, Ranges, and Standard Deviations of Sharing Behaviors*

<table>
<thead>
<tr>
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<th>Baseline</th>
<th></th>
<th>Intervention</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td>SD (%)</td>
<td>( % )</td>
<td>SD (%)</td>
<td>( % )</td>
</tr>
<tr>
<td>Nick</td>
<td></td>
<td></td>
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<td></td>
</tr>
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<td>Share-initiate</td>
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<td>1</td>
<td>0 - 3</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>Share-receive</td>
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<td>0 - 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Ask-request</td>
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<td>0 – 3</td>
<td>3</td>
<td>0 - 7</td>
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<tr>
<td></td>
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<tr>
<td>Ask-give</td>
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<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>Joshua</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share-initiate</td>
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<td>0 – 10</td>
<td>2</td>
<td>0 - 10</td>
</tr>
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<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Share-receive</td>
<td>3</td>
<td>0 – 10</td>
<td>5</td>
<td>0 - 13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Ask-request</td>
<td>3</td>
<td>0 – 13</td>
<td>15</td>
<td>3 – 33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Ask-give</td>
<td>3</td>
<td>0 – 10</td>
<td>6</td>
<td>0 - 20</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>6</td>
<td>6</td>
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<tr>
<td>Luke</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Share-initiate</td>
<td>4</td>
<td>0 – 10</td>
<td>6</td>
<td>0 - 23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Share-receive</td>
<td>4</td>
<td>0 – 7</td>
<td>1</td>
<td>0 - 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ask-request</td>
<td>5</td>
<td>0 – 17</td>
<td>19</td>
<td>0 - 37</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>Ask-give</td>
<td>4</td>
<td>0 – 7</td>
<td>2</td>
<td>0 - 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Participant 1. Nick

Low, stable baseline data indicate that Nick demonstrated little or no use of sharing behaviors ($M = 1\%$, range = $0\% - 3\%$) prior to initiating social skills training. During the initial sessions of the training phase, Nick continued to demonstrate low levels of sharing behaviors, and began to exhibit an increasing trend in his use of sharing behaviors following the first few training sessions ($M = 8\%$, range = $0\% - 17\%$). Additional increases in Nick’s use of sharing behaviors were evident during follow up sessions ($M = 25\%$, range = $10\% - 43\%$). PAND for Nick’s use of sharing behaviors was 76%, indicating that the intervention was moderately effective.

No single type of sharing behavior was responsible for increases in Nick use of sharing behaviors. Rather, the slight increase in his sharing behaviors was a result of the collective, small gains across the sharing behaviors taught. Nick demonstrated each of the four sharing behaviors in 10% or fewer of the intervals throughout social skills training. Increases observed in the use of *ask-give* during the follow up phase are the result of a peer’s increased requesting from Nick. However, it is noteworthy that he demonstrated the *ask-give* behavior, whereas previously he rarely acknowledged requests from peers.

Participant 2: Joshua

Some variability in Joshua’s mean use of sharing behaviors was evident during the first sessions of baseline and stabilized prior to initiation of the training phase ($M = 25\%$, range = $0\% - 33\%$). Through visual inspection, evidence of a slightly increasing, yet variable trend in Joshua’s use of sharing behaviors was evident during the training phase ($M = 62\%$, range = $7\% - 47\%$) and sustained during follow up ($M = 28\%$, range = $7\% - 47\%$).
17% - 40%). PAND analysis of Joshua’s overall sharing behavior data of 90% indicates that the intervention was highly effective.

The greatest increase in Joshua’s use of sharing behaviors was in *ask-requesting*, with a baseline mean of 2%, which increased to 14% during the training phase. Joshua demonstrated very low rates of *share-initiate* and *share-respond* during baseline ($M = 1\%$ & 3%, respectively) and training ($M = 2\%$ & 4%, respectively) phases and slightly higher rates of *ask-give*, with 4% during baseline and 8% in the training phase.

**Participant 3: Luke**

Luke demonstrated variability in his use of sharing behaviors throughout all phases of the study, however data indicate a slightly increasing trend in his percentage of intervals with sharing behaviors following the initiation of training. During the baseline phase, Luke’s mean percentage of intervals with sharing behaviors was 15% (range = 3% - 30%), increasing to 26% (range = 0% - 40%) during the training phase. The increasing trend in Luke’s use of sharing behaviors was retained during follow up sessions. PAND of 71% in Luke’s data for overall sharing behaviors indicated that the social skill training was mildly to moderately effective in changing Luke’s use of the sharing behaviors.

Examining Luke’s use of sharing behaviors by type, increases in *ask-requesting* are responsible for the majority of change, with a mean percentage of intervals in which the behavior occurred during baseline of 3%, increasing to 18% during the training phase. Data indicated a slight increase in Luke’s use of *share-initiate*, and a slight decrease in his use of the two behaviors that are dependent on initiations by peers, *share-respond* and *ask-give*. Increases and decreases in the use of these behaviors may be related to increases and decreases in peer initiations.
Procedural Fidelity

One interventionist conducted all of the sessions for Nick and Luke’s triads and the second interventionist conducted all sessions for Joshua’s triad. When overall procedures across all study phases were analyzed, both interventionists demonstrated high fidelity of implementation, with overall accuracy of 98.5%. Treatment fidelity was stable across interventionists. Mean fidelity ratings ranged from 97.9%-98.7% across the three participants.

Fidelity was also examined considering only the procedures for implementing social skill training lessons during the training phase. When fidelity of implementation of social skill training lessons was examined in isolation, overall accuracy of 98.5% (range = 83.3% - 100%) also indicated high fidelity.

Participant Satisfaction

Eight of the nine participants in the study completed the Participant Satisfaction Questionnaire. Nick was unable to understand and provide answers to the example questions so the researcher did not continue with the questionnaire. Overall, participants responded in agreement to the questions, with means ranging from 2.6-3.0. The children generally agreed that the groups were fun (M = 2.9). While one peer selected the indifferent response to the statement, his comment when asked if he had anything else to say about the groups was, “It was fun”. All of the participants agreed that they currently played more with the children with ASD in their classroom, with the exception of one peer in Luke’s triad who disagreed with the statement. All of the participants agreed that other friends in their class would like to participate in the groups. The two peers in Joshua’s triad responded indifferently to the statement about their own learning of new
ways to play, while the other participants all agreed that they had learned new ways to play with their friends. One peer in Nick’s triad responded with disagreement to the statement that children with ASD had learned new ways to play and one child in Luke’s triad selected the indifferent response. Both children with ASD responded that they agreed that their peers had learned new ways to play.

Staff Perception of Social Skill Use

Fourteen staff members serving three participants with ASD completed the Social Skills Rating Profile. Mean ratings on the initial, midpoint and final Profiles were calculated. Using a mixed-factorial ANOVA significant differences between initial and final ratings were noted on the Profile. The interaction of time and child was not significant, $F(3.76, 18.82) = 1.62, p = .211, \eta^2 = .265$, suggesting no difference across the mean ratings for each child. The main effect of time was significant, $F(1.88, 18.82) = 4.1, p = .036, \eta^2 = .289$, indicating a difference between mean ratings across times in which the profile was completed. A post-hoc test was conducted to follow up on the significant time main effect. With least significant difference (LSD) adjustment, the initial mean ratings on the Profile were significantly lower than the final mean ratings, $p = .016$ ($M_{\text{initial}} = 2.8, SE_{\text{initial}} = .14; M_{\text{final}} = 3.2, SE_{\text{final}} = .09$). Means and standard deviations of the Social Skills Rating Profile are provided in Table 4-3.
Table 4-3

*Social Skills Rating Profile Mean Ratings*

<table>
<thead>
<tr>
<th>Participants</th>
<th>Initial (SD)</th>
<th>Midpoint (SD)</th>
<th>Final (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nick (6)</td>
<td>1.9 (.4)</td>
<td>2.1 (.4)</td>
<td>2.6 (.2)</td>
</tr>
<tr>
<td>Joshua (5)</td>
<td>3.0 (.6)</td>
<td>3.5 (.4)</td>
<td>3.6 (.3)</td>
</tr>
<tr>
<td>Luke (4)</td>
<td>3.5 (.3)</td>
<td>3.0 (.3)</td>
<td>3.5 (.5)</td>
</tr>
<tr>
<td>Overall (15)</td>
<td>2.8 (.8)</td>
<td>3.0 (.8)</td>
<td>3.2 (.6)</td>
</tr>
</tbody>
</table>

Ratings scale: 1-never, 2-rarely, 3-sometimes, 4-frequently and 5-almost always
CHAPTER 5

Discussion

This study examined the impact of systematic social skill training on the communication and sharing behaviors of young children with ASD during play activities with peers. Findings and practical implications relative to each research question will be discussed. Limitations of the study and interpretation of results will be presented with suggestions for future research. It is important to preface this discussion with a caution that findings from single subject studies may not generalize to a larger population.

Effects of Social Skill Training on Communication Behaviors

Deficits in the use of social-communication behaviors are defining features of ASDs (American Psychiatric Association, 2000). All three participants with ASD exhibited relatively low levels of social interaction with their peers and met specific minimum language and communication criteria for participation in the study as established by the researcher. The children with ASD exhibited differing initial levels of use of communication behaviors however, with one participant exhibiting little or no interaction with peers and the other two engaging in some communication behaviors on a limited basis when the study began. All three children demonstrated some similarities in increases in their use of communication behaviors as a result of the social skill training. Of the communication behaviors measured, all three children demonstrated the most notable increases in their use of the speaking and gesturing. The behavioral definitions used in this study required that only behaviors that were related to the play context be coded (i.e. interactions with the interventionist were not coded, nor were echolalia or behaviors irrelevant to the play activity). Therefore, it may be deducted that the
considerable increases in speaking and gestures indicate more engagement of the participants with ASD in the play activities with their peers.

One of the behaviors that increased most notably for the three participants was gesturing, with contact gestures on objects being most responsible for the positive changes. Research has identified quantity and quality of gesture use as a distinguishing early deficit of ASD (Wetherby et al., 2004), especially the use of a point or other distal gestures to interact with others. The intervention implemented in this study did teach children to touch materials to hand them to or receive them from each other; therefore, an increase in contact gestures as a result of intervention is not surprising. The intervention did not specifically teach the use of a distal point or gesture; however, this could be a component of the intervention in the future (e.g. children could be taught to point to the item they were requesting).

This study taught systematic procedures for reciprocal sharing during interactive play activities in which the interventionist allowed the children the opportunity to interact without her participation or involvement in the play activities. The children’s communication behaviors included many behaviors besides those to initiate or respond to sharing. At times, other behaviors observed included challenging behaviors, such as grabbing toys and objects from others or arguing about toys. Developmentally, this is appropriate for preschool-age children. Furthermore, children without disabilities are generally competent communicators, which enhances their ongoing social skills development. Young children learn a variety of social skills as they develop and increase their interactions with peers. The social-communication limitations experienced by young children with ASD significantly impact social skill development (Kroeger et al.,
This study demonstrates an initial step toward impacting the communication skills of young children with ASD utilizing natural play activities. The resulting increases in communication behaviors may indicate the advantages of using similar systematic procedures to teach an array of social skills in addition to sharing, such as asking others to play, commenting on the actions of others, and simple conflict resolution in order to improve the communication repertoires of young children with ASD. Social skills training similar to the sharing training used in the current study may be beneficial as an early strategy to decrease the gap in social-communication skills that has been identified in the literature as a primary feature of ASD in that it provides exemplars of several communication behaviors to use within the context of systematically teaching reciprocal social interactions.

Prior to implementing the study, Nick used two- to three-word phrases and possessed a vocabulary of more than 100 words. He demonstrated frequent echolalia, and also used spontaneous speech. Nick did not use these language skills to interact with his peers throughout the study. While the frequency of his use of speaking to peers increased during intervention, it generally consisted of one- to two-word utterances that were somewhat rote in nature (e.g. “have it”, saying the name of a peer or “Josh” (the name used during social skills training for the child on the poster) while gesturing to an item he wanted), rather than the longer phrases and variety of words in his repertoire of spoken language. This finding suggests that social skill training improved Nick’s engagement in social interactions and play with peers by improving the social nature of his communication, but not necessarily his overall communication abilities. In other words, he did not necessarily learn the variety of phrases taught during the social skill
lessons, but did begin to demonstrate more directed communication behaviors toward his peers.

Luke, on the other hand, used phrases consisting of more than five words, with high levels of spontaneous language prior to the study and demonstrated the highest use of speaking during the baseline phase. Changes observed in his speaking during the training and follow up phases included more frequent use of peers’ names during interactions and, when requesting items from others, his words were very close approximations to those taught during ask training sessions (e.g. “May I have ____ ____?”), suggesting that the social skill training led to shaping of more appropriate communication behaviors.

These examples illustrate a range of language and communication abilities and that the social skills training implemented did provide communication benefits to the young children with ASD. Given that changes in behaviors were different in nature, further exploration of using systematic social skills training to enhance different communication repertoires of children who demonstrate a range of communication and language abilities and deficits may be warranted. That is, while social skills training itself provided opportunities to learn important social skills, the benefits related to increasing social-communication with peers may be of equal importance.

Little discussion or guidance exists in the literature related to pre-requisite or minimum skills necessary for successful group social skills training. While participant selection criteria were developed for this study, several considerations emerged related to participants who may benefit from social skills training similar to that used in this study.
Additionally, further consideration of pre-requisite skills, as well as skills that might be included as part of an intervention, is necessary.

One example of varying developmental levels of the participants is related to play. Play skills were not identified as pre-requisite skills in this study and were not considered during participant selection. Other researchers have identified play skills as pre-requisites to teaching structured social skills (e.g. Wolfberg & Schuler, 2006) for somewhat obvious reasons, including ensuring that the children with ASD have knowledge about expectations for participation. During the current study, the interventionist briefly described what the children were to do and demonstrated what play was expected. It was very apparent that Nick did not know how to appropriately play with many of the toys and objects used during the interactive play activities. As training was implemented, Nick became more engaged in what his peers were doing and made more attempts to “try out” the activities and materials. Therefore, play skills might not be pre-requisites but rather skills that could be targeted along with social skills for some children, through a short period of modeling and practice prior to peer interactive play sessions. Including play instruction with social skills training may be a beneficial strategy for practitioners who teach preschool age children who are on the cusp of developing interactive, or cooperative, play skills (those who have surpassed a developmental stage of parallel play) and also have children with ASD in their classrooms who are still acquiring simple parallel play skills. Additionally, this type of intervention may enhance the generalization of skills that are being intensively addressed using more isolated instructional practices.
Study findings related to communication behaviors suggest that further exploration of the benefits of social skills training may be beneficial. Specifically, outcomes from social skills training may vary depending on the communication, language and learning skills of children with ASD, and it may be important to consider specific communication or collateral targets or outcomes from social skills training, rather than solely focusing on acquisition of the particular social skill being taught. While the ultimate goal of social skill training may be acquisition of the target social skills, that goal may in fact be a longer-term goal that is enhanced by the development of collateral communication, language and learning skills.

The current study included a total of twelve social skills intervention sessions for each of the three participants over a three to four week period. This number of sessions was pre-determined in order to identify changes in communication and sharing behaviors over a relatively short and consistent period of intervention per participant. Previous studies of social skills training have variable lengths in which intervention was provided (Bellini, Peters, Benner, & Hopf, 2007). While the twelve sessions used in this study were not outside of the range of sessions provided in previous studies, the data indicate that all three participating children with ASD made gains in their use of communication behaviors toward peers in this time period. This may have important implications for clinical practice, as it demonstrates that children with ASD can make progress in their communication with peers in a time span that, depending of the frequency of intervention (i.e. daily), could represent only a few of weeks duration.

Additionally, the use of two interventionists had the potential to impact the qualitative aspects of the implementation of study sessions. Differences in
interventionists’ teaching and interaction behaviors may affect children’s performance. Data indicate, however, that the interventionists were able to implement study procedures accurately and there is no evidence that children’s behaviors were negatively or positively impacted by individual interventionists, suggesting that successful implementation of the procedures may be possible by professionals with adequate training. The limited duration of the social skill training and the ability of two interventionists to carry out study procedures with high-levels of fidelity indicate that implementing a simple social skills training intervention with children with ASD and their peers utilizing typical play materials and activities found in early intervention settings may be feasible and effective for many early intervention teams.

Effects of Social Skill Training on Sharing Behaviors

The outcomes of this study suggest that children with ASD can make considerable gains in communication skills with peers through the use of a relatively short, straightforward intervention; however, the children did not exhibit remarkable changes in their use of sharing behaviors. The social skills lessons that took place during the training phase of this study were specifically designed to teach the children reciprocal sharing skills. The participants with ASD demonstrated some positive changes in sharing, however, there was no evidence that the children became skillful at, nor routinely practiced, sharing with their friends. Several factors may have contributed to this finding. The sharing skills taught during training included several steps. The 12 sessions of training may have been enough to substantially impact the children’s communication behaviors; however, they may not have provided enough opportunities to learn all aspects of the multi-step sharing skill. Learning abstract skills, such as social
behaviors and expectations, is a key difficulty for children with ASD. Systematic, multi-step procedures may be an effective method of teaching these skills; however, longer-term training may be necessary to lead to specific skill acquisition for sharing.

Results related to gains that were observed in sharing behaviors indicated that three of the participants with ASD slightly increased their demonstration of all behaviors involved in sharing skills, that is the reciprocal components of the sharing behaviors (initiation of the behavior and responding to peer initiations). These minor increases in sharing behaviors contributed to an overall increase in sharing. Previous studies have generally focused on teaching peers to initiate toward children with ASD or teaching children with ASD strategies to initiate or respond, rather than take part in both roles of the interaction. Clearly, teaching both roles can effect the interactive play skills of children with ASD. There is a need to further examine and compare the effects of teaching reciprocal social skills as opposed to teaching individual social behaviors more explicitly.

Additionally, social skills lessons in the current study were provided during a systematic training process that included a visual review of the skills, observation of puppets demonstrating the skill, and then opportunities for practice through role-play with peers. Data were then collected during interactive play in which no feedback, prompting or other strategies were used to elicit demonstration of the sharing behaviors taught during the social skills lessons. These procedures minimized confounding variables and allowed for examination of the effects of the intervention. It was established that the intervention did lead to positive outcomes related to interactions with peers. With the understanding that generalization of the skills provides many challenges
for children with ASD, further exploration of these social skills training procedures may be beneficial. Specifically, including an additional intervention phase that combines the social skills lesson with a subsequent period of interactive play in which the teacher provides (with systematic fading procedures) prompting and/or reinforcement of the use of sharing behaviors may provide additional information regarding its utility in teaching the targeted skills, and the impact that including prompting and/or reinforcement may have on the acquisition of the sharing behaviors.

**Participation of Peers**

It is important to consider the implications of the peers’ involvement and prior training in relation to the outcomes related to communication and sharing behaviors exhibited by children with ASD. Peer participants in this study were selected because their teacher identified them as children who “to a considerable degree” interacted with peers, but they were not the students who were regarded as the most interactive in the class. These children did not receive training on the sharing skills prior to participating in the study, but rather learned the procedures for the skills along with the children with ASD. They did take part in a brief session prior to the training phase in which the researcher explained that they were there to help and practice the sharing skills with the children with ASD. The interventionist provided general reminders to the peers if they were not interacting with the children with ASD during interactive play. Two of the sharing behaviors measured in the participants with ASD, *share-receive* and *ask-give*, were dependent upon an initiation by a peer in order for the children with ASD to exhibit the behavior. Through both observation and examination of the data for those two behaviors, there is little evidence that the peers changed their sharing behavior toward the
children with ASD to a considerable degree. Two primary considerations emerge from this finding. First, the study outcomes suggest that the participants with ASD did make considerable progress in communication behaviors through systematic interactions with untrained peers. While the optimal environment might include peers skilled in eliciting and responding to social interactions with children with ASD, this is not always possible considering the range of developmental skills of preschool-age children and diversity of classrooms. This study shows that the systematic procedures for inclusion of untrained peers can have noteworthy outcomes.

A second consideration pertains to what trained peers may add to the intervention. Peers trained to serve as coaches, who are equipped with the skills to provide many opportunities for practicing the reciprocal roles of sharing and understand how to initiate, respond to, and persist with interactions may provide a necessary “boost” to the acquisition of sharing or other targeted social skills for children with ASD. However, most preschool-age children are at a developmental stage in which their attention and focus are egocentric. Further investigation involving peers with prior training as mediators in comparison to those without prior training would contribute to understanding of the effectiveness and efficiency of the group social skills lessons utilized in this study.

Social Skill Training Procedures

The sharing skills that were taught during social skills training (sharing items with others and asking others for items) provided participants with multiple exemplars of communication modes they could use to initiate and respond within the intervention. For example, participants were taught that they could call a peer’s name, tap them on the
shoulder, or do both to gain the attention of a peer when they want to share or request an item or object. Therefore, the intervention itself provided strategies (or means) for demonstrating different communication behaviors, including speaking, gesturing and social touching. In fact, social touching was a strategy option presented during social skills training in both sharing and asking sessions to get the attention of the communicative partner. The inclusion of this strategy to get attention was based upon the procedures utilized by the LEAP Outreach Project (2001), who have identified “Getting Attention” as an initial social skill to address, and developed a process that includes both saying the name of the peer and tapping them on the shoulder. The adapted procedures for the sharing skills targeted in this study included a step for getting attention but provided options related to how the children got their peer’s attention. All three children exhibited little or no use of social touching, which was defined as making physical contact with peers (in contrast to contact gestures, which were defined as making contact with objects or toys) at the start of the study. The percentage of social touching changed little following training of the three participants. This leads to further questions regarding whether or not social touching specifically should be a targeted communication skill utilized in social skills training and, if so, how to effectively teach and reinforce use of the behavior.

Limitations

The results of this study should be interpreted with caution. Many factors limit the interpretation and generalization of single subject experimental designs to the population at-large. Additionally, it is necessary to discuss aspects of the study that may provide further limitations or confounds to the study findings.
It is important to discuss limitations related to data collection in this study. Coding communication behaviors of young children in general can present difficulty, as communication skills are still developing. A lack of intelligibility may increase the complexity of interpreting messages for coding. Young children with ASD present additional difficulties as they may demonstrate little eye contact or change of attention toward a communication partner. Additionally, children with ASD may demonstrate idiosyncratic behaviors that blur the line between, for instance, the use of ritualistic language and language meant to share information with others. Additionally, individual children with ASD demonstrate very unique communicative and behavioral profiles. Communication and sharing behaviors in this study were behaviorally defined, with details that attempted to provide concrete rules for coding. While overall inter-observer reliability results were within an acceptable range, lower reliability was found for specific types of behaviors that occurred with low frequency. Future studies may need to include a pre-assessment of individual communicative and behavioral characteristics of participants with ASD when measuring changes, especially related to those behaviors that occur infrequently in order to enhance inter-observer reliability. Pre-assessment of communicative and behavioral characteristics may also provide the ability for practitioners to monitor subtle changes that are unique to individual children that may have been overlooked otherwise.

Sharing behaviors were coded using partial interval recording; however, two of the behaviors depended upon the actions of peers. This data collection method posed limitations. If the peers’ behavior toward children with ASD occurred in a prior 20-second interval, the response behavior of the children with ASD was not coded as a
response (share-receive or ask-give) to the peer, but rather as an initiation (share-initiate or ask-request) in the subsequent interval. For example, if a peer asked a child with ASD for an item or object, the interval ended, and the child with ASD gave the object (ask-give) in the next interval, this behavior was coded as share-initiate because interval coding requires that coding begins at the start of the interval. Because sharing behaviors were infrequently observed in this study, this flaw in study design had a minor influence on study outcomes. Overall examination of sharing behaviors provides an acceptable indication of change because these behaviors occurred infrequently during this study; however, future studies should include more appropriate data collection methods for coding reciprocal sharing behaviors across intervals.

The study was designed to examine the effects of the social skills training during interactive play activities that typically occur in preschool settings; however, to maintain experimental control, data were not collected during naturally-occurring activities. Staff perception data indicate that significant changes were observed in the social skills behavior of the children with ASD in classrooms; however, further examination is necessary to investigate the impact of the social skill training to a natural context and understand how the training generalizes to other setting and peers.

**Directions for Future Research**

Certain aspects of the procedures used in the study during social skills training and interactive play may be worthy of further investigation and consideration for practice. First, the social skills training included three different elements of teaching the target social skill (observation, demonstration and role play), which may impact the motivation and learning of the children with ASD and the peers. Future studies of the
role of the individual elements of the intervention may provide more information about essential or most effective components of intervention. For example, future investigation may replace the method in which the three components were used (i.e. replacing puppets with videotaped examples) or systematically deleting one component (i.e. picture poster or puppet demonstration).

Video modeling and video self-modeling have been identified in the literature as evidence-based interventions for teaching social skills to individuals with ASD (Weiss & Harris, 2001; Wang & Spillane, 2009), with the majority of research studies including school-age participants. Therefore, future studies that incorporate video modeling strategies into the current systematic social skills intervention may be beneficial in the development of efficacious interventions.

Second, the teacher’s role during interactive play sessions may have prompted changes in the behaviors of all of the participating children. Upon initiation of the study, all of the children, including the children with ASD looked to the interventionist when they had a question or need. However, the interventionist was given strict parameters related to removing herself from the play activity as well as limiting the commentary and assistance she was able to provide. Additionally, the interventionist limited materials available to the children by only having one of the items and unobtrusively adding items to and removing items from the table. This is believed to have enhanced the children’s social interaction with each other. Educational practitioners often provide ongoing, intentional instruction throughout a child’s daily activities. Their involvement may, however, actually impede social interactions and the use of communication skills between children with ASD and their peers at times. This observation is similar to that
made by McGee et al. (1992), who suggest that high levels of teacher participation may actually be counterproductive to independent engagement of children with ASD with their peers. Therefore, it may be beneficial for practitioners to intentionally select times in which they systematically teach social skills and times/activities in which they make a concerted effort to set up opportunities for social interaction and limit their participation during those activities.

Comparing the effects of the current study procedures with procedures that include the use of prompting and or reinforcement during interactive play activities may be beneficial in understanding how these components might impact the effectiveness of the intervention. Two of the three participants with ASD demonstrated low to moderate increases in their use of the sharing behaviors that were taught during social skills training. The current study included only social reinforcement of general social interactions. During interactive play activities in all study phases, procedures limited the interventionists’ commentary to, “I like the way you are playing together.” when she observed any of the children sharing materials with each other. Otherwise, no prompting, modeling, or reinforcement of skill use was included within interactive play sessions. However, “modeling and reinforcement has been and continues to be the most popular [social skills] intervention strategy in the published research” (Matson et al., 2007, p. 699). It is notable that gains were observed in the absence of additional prompting, modeling and reinforcement, but use of these strategies may have positively influenced both peers and children with ASD to interact more often.

Many previous social skills training studies included peers who received training and demonstrated mastery of targeted social skills prior to beginning the groups with
children with disabilities (e.g. Odom & Strain, 1986). Additionally, in many of these studies, peer participants/mediators continued to receive prompting to use the skills during interactions and play with children with ASD. Sharing data from the current study indicate that some increases in sharing were observed for the participants with ASD in lieu of notable changes in peers’ initiations toward participants with ASD. Therefore, the use or absence of prompting, modeling and reinforcement potentially have direct implications related to the outcomes of social skills training. Future studies are needed to examine the impact of each of these strategies and to identify procedures that lead to increased acquisition and generalization of target social skills while providing an appropriate level of independence.

Some notable collateral effects were observed during coding of the interactive play sessions. All three children demonstrated considerable use of stereotypy, repetitive language, and/or long periods in which they were not engaged in the activities during the baseline phase. While these variables were not behaviors identified as dependent measures in this study, future investigation measuring these behaviors may provide additional insight into the impact of the systematic social skills lessons teaching sharing and other early social skills.

Data indicated stable, increasing trends related to communication and sharing behaviors for Nick and Joshua. Luke demonstrated considerable behavioral variability throughout the study and intervention effects were in the mild to moderate range in both communication and sharing. Many questions emerge related to what characteristics impacted Luke’s performance of the target behaviors. Assessment results show that Luke’s behavioral, communication and social skills were greater than those of the other
two participants. Luke may have possessed a repertoire of communication and/or sharing behaviors prior to the initiation of social skills training that were not demonstrated prior to the study because of lack of exposure to systematic social skills training. The current study did not examine impacts on quality aspects of the communication and sharing behaviors observed, but these more subtle changes may be more indicative of the changes observed in Luke’s behaviors. For example, further review of videos across study phases may indicate that Luke’s communication and sharing behaviors became more appropriate or contained more exact approximations of the sharing behaviors. Bellini (2006) suggests assessing social skills deficits and the factors that are impeding performance prior to initiating social skills training, which may help individualize training to meet the needs of individual children. Additionally, Luke’s teacher reported that he regularly demonstrated inconsistencies in performance of skills within the classroom environment. Further study is necessary to examine the factors that may influence the effects of this systematic social skills training, and identify components of intervention that may lead to more consistent performance of targeted behaviors.
References


Appendix A

Telephone Screening Checklist & Social-Communication Questionnaire

Child initials: Teacher: School:

______Classroom serving children ages 3-6 with documented autism/ASD verification or diagnosis.

How many other children in the classroom? _______

How many peers do NOT have documented disabilities? _______

**GO THROUGH SOCIAL-COMM. QUESTIONAIRRE**

_____Are there at least 2 peers who have a positive/neutral relationship with the target child with ASD?

_____Do you think that the family of the child with ASD is likely to give permission for him/her to participate?

If all of these screening questions have appropriate answers:

_____Describe study. Explain that if their child is selected, there will be assessment forms to be completed by the teacher that will take approximately an hour to complete and I will complete another that will require her to answer some questions.

_____Ask for verbal consent from teacher.

What are the hours of your program? ____________________________

Would you be willing have the children participate in social skills groups that would last approximately 60 minutes total time? _________

What are some options for times that would work best for these groups to be conducted? ____________________________

(remind that I’m going to have to match with schedules of our staff)

_____Establish time to visit classroom for approximately 30 min. observation. Ask for time when children will having opportunities to interact (free play, art projects, etc.)
Explain that during my visit I will need:

- _____ to spend a few minutes with her to ask some questions and gather some information.
- _____ to see documentation of diagnosis/verification. Can not collect copies—they can cover names, etc., I just need to document myself that there is a record of diagnosis or verification.
- _____ to observe the child with ASD in an activity with 2 peers for approximately 10 minutes away from the rest of the class.
Social Communication Questionnaire

1. About how many words does the child use?
   - 0-49
   - 50-99
   - 100+

2. Does the child use phrases? 2-3 words; more than 3 words
   How often (% of utterances): ______
   Do phrases used generally represent:
   - ___creative combinations, referentially related to specific events/activities?
   - ___repetitive utterances, routine or ritualistic language.

3. Does the child follow 1-step 2-step 3+-step directions?

4. Does the child imitate at least 5 simple gross motor actions with or without objects of peers or adults? With or without prompting?

5. Does the child exhibit aggressive behaviors toward self or others? Yes No
   Describe any challenging behaviors exhibited by the child.
   How often Couple times/week Once-twice/day Several times/day

6. How long does the child remain part of a group activity?

7. Explain the child's response to group directions.

8. Describe the child's amount and type of participation during activities with peers when:
   - --there is no adult prompting or assistance given to the child.
   - --he/she is prompted or provided other assistance (explain assistance provided).

9. Does the child: (If you answer yes to any of the following, please describe.)
   - demonstrate the ability to take turns during conversation? yes/no
   - ask questions? yes/no respond to greetings of others? yes/no
   - initiate greetings? yes/no
## Social-Communication Groups

### Behavior Rating Form

<table>
<thead>
<tr>
<th>Initials</th>
<th>School</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Does the child exhibit physical aggression toward self or others?**

<table>
<thead>
<tr>
<th>Behaviors</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temper tantrums (e.g. falling to floor, yelling, hitting things or others)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hits others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yells or screams</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-compliance (does not follow through, talks back)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Appendix B**

Behavior Rating Form
Appendix C

Observation & Screening Forms

Social-Communication Groups
Observation/Screening Form: Child with ASD

Initials_____________________ School_________________ Date ____________

Teacher Report

_____ Child age _____________ (between 3-6 years old).

_____ Uses at least 50 words; primary language is English

_____ Uses at least 5 2-3-word phrases independently or in response to teacher.

_____ Interacts with peers less than 25% of time during interactive activities.

_____ Remains in group activities for at least 10 minutes.

_____ Follows 1-step directions at least 50% of time

_____ Imitates 5 simple gross motor actions.

_____ Regular attendance

_____ Does not exhibit exclusionary behaviors:
  a) Any level of physical aggression towards others
  b) More than level 2 of: temper tantrums, verbal aggression, hitting others (non-aggressive), yelling or screaming, non-compliance

Observation

_____ Documentation of educational verification or medical diagnosis of an ASD

_____ Uses at least 5 2-3-word phrases independently or in response to teacher.

_____ Interacts with peers less than 25% of time during interactive activity.
  Teacher rating of 1 or 2 on peer interaction scale.

_____ Follows 1-step directions at least 50% of time

_____ Imitates 5 simple gross motor actions.

      Meets criteria                  Does not meet criteria
# Social-Communication Groups

## Observation Data

<table>
<thead>
<tr>
<th>Initials</th>
<th>School</th>
<th>Date</th>
</tr>
</thead>
</table>

### Total Observation Time Equals 15 Minutes

<table>
<thead>
<tr>
<th>30 Seconds</th>
<th>30 Seconds</th>
<th>30 Seconds</th>
<th>30 Seconds</th>
<th>30 Seconds</th>
<th>30 Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Minutes</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9 Minutes</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12 Minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percentage of intervals engaging with peers_____%

### Tally the following:

**Two- or three-word phrases (list—mark “S” if spontaneous; “E” if echolalic):**

<table>
<thead>
<tr>
<th>Total:</th>
</tr>
</thead>
</table>

1-step directions given: Followed:

Percentage of 1-step directions followed: ____%

Imitates 5 simple actions (list actions)
Appendix D

Interaction Rating Form

Social-Communication Groups
Interaction Rating Form for Peer Selection

Teacher________________________ School________________________ Date __________

Please write the initials of all of the students in your classroom who have not been referred to special education services and who use English as a primary language, including the child with ASD. Rate each child’s level of interaction using the following scale:

4=Almost always interacts with peers
3=To a considerable degree interacts with peers
2=Occasionally interacts with peers
1=Seldom interacts with peers

<table>
<thead>
<tr>
<th>Child Initials</th>
<th>Social Interaction Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seldom ↔ ↔ ↔ Almost Always</td>
</tr>
<tr>
<td>1.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>2.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>3.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>4.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>5.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>6.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>7.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>8.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>9.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>10.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>11.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>12.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>13.</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>14.</td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>
Identification of Project: Social and Communication Skills for Children with ASD

Purpose of the Research:
You and your child are invited to participate in a research study of effective practices with children who are diagnosed with an Autism Spectrum Disorder (ASD) being conducted by Ellin Siegel of the University of Nebraska-Lincoln. The reason for this study is to test strategies to help young children with autism play and interact with other children. It will test the use of different social interaction strategies during play activities and different ways for the child with autism to communicate using pictures or photos to see how easy it is to improve how children can play and communicate in a variety of activities. Your child/legal ward qualifies to be in this study because

(1) because he/she is in a school program that educates children with and without disabilities and is willing to participate in small-play groups and
(2) he/she has a diagnosis or verification of autism or developmental delay.

Procedures:
If you choose for your child to participate, your child will participate in special play group activities with children who have autism and children without disabilities from their class in Lincoln Public Schools. The play groups will be led by a certified teacher and/or speech-language pathologist. Group activities with 3-5 children will occur 2-3 times per week for approximately 30-60 minutes during their regular classroom time as arranged with your child’s teacher. There may be 10-20 small group sessions that will occur during 2009-2010 school year. The children will be learning-important social skill strategies, such as how to share toys, take turns and give compliments. Research will be conducted to document the effectiveness of specialized educational strategies used to improve the learning of the children with autism and interactions between children with autism and peers. Specialized strategies for the children with autism will be common special education techniques such as using photographs or graphic symbols to display activities, using systematic instruction, and enhancing communication via assistive technology speaking devices or low-technology input (pictures, objects, photos). Project staff and research assistants will collect observational data from your child (anecdotal notes, initials).
observing skills, video/audio taped observations) in order to assess the effectiveness of specific educational strategies.

Four assessments will be conducted with your child. Three will be rating scales that your child’s classroom teacher will use to assess social skills, autism characteristics and adaptive behavior and one will be done by the lead researcher to assess language and communication. A list of the assessments and the person who will administer each one is provided at the end of this consent form.

**Risks and/or Discomforts:**
We do not anticipate that you or your child will experience any risks as a result of participating in this research.

**Benefits:**
As a benefit of participating, your child will have an enriching educational experience at their Lincoln Public Schools class. However, they may not have a personal benefit from being in this study. What we may learn from this study may help children with autism because it may give other options for teaching social and communication skills.

**Alternatives:**
Your child/legal ward does not have to participate in this research study.

**Confidentiality:**
Any information obtained during this study that could identify you or your child will be kept strictly confidential. The data will be stored in a locked cabinet in the investigators’ office and will only be seen by the research team during the study and for three years after the study is completed. An identification number will be used instead of your name or your child’s name on all research assessments. The information obtained in this study may be published in scientific journals or presented at scientific meetings but the data will be reported as group data. We will never identify individual children or parents in any of our reports.

**Compensation:**
Your child/legal ward will receive no compensation for their participation in this project.

**Opportunity to Ask Questions:**
You may ask questions concerning this research and have those questions answered before agreeing to participate or during the study. If you have questions, you may contact the investigator, Ellin Siegel (402) 472-9867. If ___________initials
Informed consent page 3

you have questions concerning your rights as a research participant that have not been answered by the investigator, you may contact the University of Nebraska-Lincoln Institutional Review Board (402) 472-6965.

**Freedom to Withdraw:**
You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigators or the University of Nebraska. Your decision will not result in any loss of benefits to which you are otherwise entitled.

**Consent, Right to Receive a Copy:**
You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep. If you want to be in this research study, complete the statements below and sign your name.

**Name and Phone number of investigator**
Ellin Siegel, Ph.D., Principal Investigator (402) 472-9867

---

**Informed Consent**

__Yes, I agree for my child to participate in this study. I understand the purpose of this study and how it will be conducted. All of my questions about the study have been answered. I also understand that I should keep the second copy of this consent letter for my records.__

Signature of legal guardian: ________________________ Today’s Date: __________

Your Name (please print):

__________________________________________________________

If you choose to have your child participate please complete the following information:

Your Child’s Name:

_________________________ ___________________________ __________________________

First Name Middle Initial Last Name

Your Child’s Birthdate: __ __/ __ __/ __ __ __ __
List of Assessments done by your Child’s Classroom Teacher

Childhood Autism Rating Scale
Vineland II Adaptive Behavior Scale
Preschool Behavioral and Emotional Rating Scale

Assessment conducted by Research Staff

Preschool Language Scale-4
Informed Consent Form (Legal Guardian: Peer Participant)

**Identification of Project:** Social and Communication Skills for Children with Autism Spectrum Disorders

**Purpose of the Research:**
You and your child are invited to participate in a research study of effective practices with children who are diagnosed with an Autism Spectrum Disorder (ASD) being conducted by Ellin Siegel of the University of Nebraska-Lincoln. The reason for this study is to test strategies to help young children with autism play and interact with other children. It will test the use of different social interaction strategies during play activities and different ways for the child with autism to communicate using pictures or photos to see how easy it is to improve how children can play and communicate in a variety of activities. Your child/legal ward qualifies to be in this study because he/she is in a school program that educates children with and without disabilities and is willing to participate in small-play groups.

**Procedures:**
If you choose for your child to participate, your child will participate in special play group activities with children who have autism and children without disabilities from their class in Lincoln Public Schools. The play groups will be led by a certified teacher and/or speech-language pathologist. Group activities with 3-5 children will occur 2-3 times per week for approximately 30-60 minutes during their regular classroom time as arranged with your child’s teacher. There may be 10-20 small group sessions that will occur during the 2009-10 school year. The children will be learning-important social skill strategies, such as how to share toys, take turns and give compliments. Research will be conducted to document the effectiveness of specialized educational strategies used to improve the learning of the children with autism and interactions between children with autism and peers. Specialized strategies for the children with autism will be common special education techniques such as using photographs or graphic symbols to display activities, using systematic instruction, and enhancing communication via assistive technology speaking devices or low-technology input (pictures, objects, photos). Project staff and research assistants will collect observational data from your child (anecdotal notes, observing skills, video/audio taped observations) in order to assess the effectiveness of specific educational strategies.

______________initials
Three assessments will be conducted with your child. Two will be rating scales that your child’s classroom teacher will use to assess social skills and adaptive behavior and one will be done by the lead researcher to assess language and communication. A list of the assessments and the person who will administer each one is provided at the end of this consent form.

**Risks and/or Discomforts:**
We do not anticipate that you or your child will experience any risks as a result of participating in this research.

**Benefits:**
As a benefit of participating, your child will have an enriching educational experience at their Lincoln Public Schools class. However, they may not have a personal benefit from being in this study. What we may learn from this study may help children with autism because it may give other options for teaching social and communication skills.

**Alternatives:**
Your child/legal ward does not have to participate in this research study.

**Confidentiality:**
Any information obtained during this study that could identify you or your child will be kept strictly confidential. The data will be stored in a locked cabinet in the investigators’ office and will only be seen by the research team during the study and for three years after the study is completed. An identification number will be used instead of your name or your child’s name on all research assessments. The information obtained in this study may be published in scientific journals or presented at scientific meetings but the data will be reported as group data. We will never identify individual children or parents in any of our reports.

**Compensation:**
Your child/legal ward will receive no compensation for their participation in this project.

**Opportunity to Ask Questions:**
You may ask questions concerning this research and have those questions answered before agreeing to participate or during the study. If you have questions, you may contact the investigator, Ellin Siegel (402) 472-9867. If you have questions concerning your rights as a research participant that have not been answered by the investigator, you may contact the University of Nebraska-Lincoln Institutional Review Board (402) 472-6965.

________________initials
Freedom to Withdraw:
You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigators or the University of Nebraska. Your decision will not result in any loss of benefits to which you are otherwise entitled.

Consent, Right to Receive a Copy:
You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep. If you want to be in this research study, complete the statements below and sign your name.

Name and Phone number of investigator
Ellin Siegel, Ph.D., Principal Investigator (402) 472-9867

Informed Consent

Yes, I agree for my child to participate in this study. I understand the purpose of this study and how it will be conducted. All of my questions about the study have been answered. I also understand that I should keep the second copy of this consent letter for my records.

Signature of legal guardian: __________________________ Today’s Date: ___________

Your Name (please print):
______________________________________________________________________

If you choose to have your child participate please complete the following information:
Your Child’s Name:
______________________________________________________________________

First Name ____________ Middle Initial ____________ Last Name

Your Child’s Birthdate: __ __/ __/ __ __ __ __
List of Assessments done by your Child’s Classroom Teacher

Vineland II Adaptive Behavior Scale
Preschool Behavioral and Emotional Rating Scale

Assessment conducted by Research Staff

Preschool Language Scale-4
Informed Consent Form (School Personnel)

**Identification of Project:** Social and Communication Skills for Children with Autism Spectrum Disorders

**Purpose of the Research:**
You are invited to participate in a research study of effective practices with children who are diagnosed with an Autism Spectrum Disorder (ASD) being conducted by Ellin Siegel of the University of Nebraska-Lincoln. The reason for this study is to test strategies to help young children with autism play and interact with other children. You qualify to be in this study because (1) you are a teacher of a child with autism, (2) you are a paraeducator of a child with autism, or (3) you are a speech pathologist or assistive technology specialist.

**Procedures:**
In this study, you will be asked to provide your input regarding the techniques used in this study and assist the researcher in setting up the play groups in your classroom. Prior to initiation of the study, your assistance will be requested in identifying how a child with autism who you work with communicates and his/her skills in interacting with peers without disabilities. You may be asked to assist in identifying play activities that are rewarding and motivating for the children and current communication symbols that are used. You will also be asked about the peers without disabilities who you work with and how they interact with the child with autism. In the middle and at the end of the study you will be asked similar questions with the addition of your input regarding the potential benefit, the acceptance and the fit of the activities and symbols used in the study. A total of 3 fifteen-minutes sessions will be asked of your time. As the classroom teacher, you will be asked to complete 3 rating scales for the children with autism and 2 rating scales for the peers without disabilities. These scales assess the social skills, adaptive behavior, and autism characteristics for participating children. A list of these assessments is at the end of the consent form. A total of 1-2 hours will be asked of your time.

**Risks and/or Discomforts:**
There are no risks or discomforts associated with this project.

**Benefits:**
This study may be important to individuals with autism and their peers because it allows them to new ways to interact and communicate. However, the children and yourself may not get any benefit from being in this research study.

_____________Initials
Alternatives:
You do not have to participate in this research study.

Confidentiality:
Any information obtained during this study that could identify you or the children will be kept strictly confidential. The data will be stored in a locked cabinet in the investigators’ office and will only be seen by the research team during the study and for three years after the study is completed. An identification number will be used instead of your name or your child’s name on all research assessments. The information obtained in this study may be published in scientific journals or presented at scientific meetings but the data will be reported as group data. We will never identify individual children, parents or staff in any of our reports.

Compensation:
You will receive no compensation for your participation in this project.

Opportunity to Ask Questions:
You may ask questions concerning this research and have those questions answered before agreeing to participate or during the study. If you have questions, you may contact the investigator, Ellin Siegel (402) 472-9867. If you have questions concerning your rights as a research participant that have not been answered by the investigator, you may contact the University of Nebraska-Lincoln Institutional Review Board (402) 472-6965.

Freedom to Withdraw:
You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigators or the University of Nebraska. Your decision will not result in any loss of benefits to which you are otherwise entitled.

Consent, Right to Receive a Copy:
You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep.

_______________ Initials
Signature of Participant

Signature of Research Participant

Date

Name and Phone number of investigator
Ellin Siegel, Ph.D., Principal Investigator (402) 472-9867

List of Assessments for Classroom Teacher

Childhood Autism Rating Scale (Child with disabilities only)
Vineland II Adaptive Behavior Scale (Peers and child with disabilities)
Preschool Behavioral and Emotional Rating Scale (Peers and child with disabilities)
Appendix F

Formal Assessment Instrument Descriptions

DESCRIPTION OF THE VINELAND ADAPTIVE BEHAVIOR SCALES, SECOND EDITION (VINELAND-II)

The Vineland Adaptive Behavior Scales, Second Edition (Vineland-II) is a standardized assessment tool designed to examine “the performance of daily activities required for personal and social sufficiency” designed for ages 0-90 (Sparrow, Cicchetti & Balla, 2005). The adaptive behavior domain includes four broad constructs including Communication, Daily Living Skills, Socialization and Motor skills. There are several forms of the Vineland-II available, including a Survey Interview Form that can be completed in interview or survey format, the Parent/Caregiver Rating Form, the Teacher Rating Form, and an Expanded Interview Form.

The Vineland-II Survey Interview was nationally standardized on a large sample (N = 3,695) between the ages of 0-90 years that represented key dimension of the U.S. population, such as sex, race and ethnicity. Internal consistency reliability coefficients within the Communication, Socialization and Daily Living domains ranged from .84-.93), with standard errors of measurements around 4.5 to 5 point. Test-retest correlations averaged in the mid- to upper .80s.

Validity was documented in a variety of ways. Group difference comparisons demonstrated a difference in performance between samples in which cognitive impairments were expected and groups with individuals without diagnosed disabilities. Moderately strong correlations, averaging around .70, with comparable instruments were found.
DESCRIPTION OF THE PRESCHOOL LANGUAGE SCALE, FOURTH EDITION

(PLS-4)

The *Preschool Language Scale, Fourth Edition (PLS-4)* is an individually administered test that uses direct interactions and caregiver report to identify children who have language disorders or delays (Zimmerman, Steiner, & Pond, 2002). The PLS-4 is a norm-referenced instrument consisting of Auditory Comprehension and Expressive Communication subscales.

The standardization sample for the PLS-4 took into account a shift in the population noted in 2000 Census data with an increase in minorities in the standardization sample (from 31% for the PLS-3 to 37% for the PLS-4) as well as an increase in the number of children with language disabilities or delays in the standardization sample (13.2%).

Test-retest reliability at an average of 5.9 days between administrations to 218 randomly selected children from the standardization sample indicated stability coefficients between .82 and .95 on the subscales. Cronbach’s alpha for the total language scale ranged from .81 to .97.

Evidence of validity has been extensively scrutinized and appears to demonstrate that the PLS-4 English version is a sound instrument. Convergent validity is demonstrated in similar responses, scoring and interpretation as the Denver II. The PLS-3 and PLS-4 scores correlated at .65 on the auditory comprehension and .79 on the expressive communication subscales.
DESCRIPTION OF THE PRESCHOOL BEHAVIORAL AND EMOTIONAL RATING SCALE (Pre-BERS)

The *Preschool Behavioral and Emotional Rating Scale (Pre-BERS)* was designed for use in early childhood settings to measure the “emotional and behavioral strengths of children” (Epstein & Synhorst, 2009) in order to identify children with limited strengths, identify strength and need areas, identify goals for intervention and document progress. The Pre-BERS is a normed rating scale that includes four dimensions, including emotional regulation, school readiness, social confidence and family involvement.

Internal consistency reliability were examined through content sampling error by applying Cronbach’s alpha. The average coefficients for sub-scales equaled or exceeded .94 and for the composite equaled or exceeded .97. Test-retest correlations were in the Very Large range, equaling or exceeding .72. Inter-rater reliability studies indicate a high degree of reliability as well.

Validity studies assessed convergent and discriminant validity of the PreBERS and indicate that it is a valid measure of behavioral and emotional strength in preschool age children.
Appendix G

Descriptions of Interactive Play Activities and Materials

During all activities, children should “need” to interact. This can be achieved by:

- having only 1 of the main objects needed for play (e.g. Operation has only 1 tweezer, use only 1 golf club for the Golf Game)
- limiting supplies (e.g. 1 paint brush, only a couple of markers, etc.)
- giving materials/parts to one child (3-4 stickers to one child, marbles for planting to one child.)
- **However, do not make the children aware that you are “in control of” extra materials.** For instance, do not give one ring to toss on Sonny Seal to the kids and hold the rest yourself. That will cause the kids to continue to interact with you… For product preparation, deliver materials as unobtrusively as possible.

**Activity #1: Cooperative Games** will all be common games or interactive activities for young children. The selected games do not require ongoing adult direction. The interventionist will show the children the game, possibly demonstrate one or two times how they play, and then remove themselves from the activity.

Cooperative games include:
- cash register—children can play however
- gears
- Buckaroo—children hang things on the bucking bronco. May require some assistance with setting the horse back up after it bucks.
- Sonny Seal
- Gator Golf
- Frogs in a Tree
- Hanging Monkeys
- Operation-type game

**Activity #2: Preparation of a Product** will include very simple arts and crafts activities in which the children make or create something **together**.

**Group painting**
Each time you do this, we will provide some different materials to make the activity more novel. The purpose is for the kids to create a painting together by sharing the materials they have.
- 1-paint brushes on wood
- 2-sponges on paper
- 3-marbles on paper
Packing Peanut sculpture
Kids will create a sculpture together in any shape or form they want. Instruct them to build on the placemat in the middle to facilitate their working together.
--paper towel, cup/water, bag of peanuts

Play-dough decorating
Kids should decorate something together. The interventionist should create the initial object. For example, use the plastic container upside down and cover it with play dough as you tell the kids that it is a cake. Tell them to decorate it using the playdough tool, candles, etc.
1-cake
2-present
3-pizza

Decorate foam shapes
Kids will decorate different shaped Styrofoam objects with a variety of materials.
1-heart—paint and stickers
2-star—foam shapes and pompoms
3-square—markers and ribbons

Spin art
Kids will draw on paper by sharing the pen/paint to create a picture together.
1-spiral draw
2-spirogyro
3-spin paint

Create a collage
Use different media and one large sheet of paper to create a collage.
1—stickers, material
2—magazine pictures, foam shapes
3—pom-poms, markers

Fill a bottle
Kids should create a search & find or a water globe using the different materials included.
1-rice-beads, Lady bug, feathers, pom poms, glitter, marble
2-water—beads, marble, glitter, paper clip
3-sand—beads, glitter, rubber bands, material, foam shapes

Plant
Kids should work together to get a pot ready and plant flowers using different types of planting materials.
1-marbles/wooden container
2- Spanish moss/plastic pot
3- sand/pot
Appendix H

PCS drawings for *Share* and *Ask*

**Share**

Here.  

Thanks!
Ask

Sure.

May I have one?
Appendix I

Interventionist Training Materials

Interventionist Training Checklist

1. Review of written procedures.
   ______ Interventionists read.
   ______ Researcher verbal review.

2. Role play procedures
   ______ Baseline sessions
   ______ Training sessions

3. Documentation of accurate implementation
   ______ Interventionist #1
   ______ Interventionist #2
Social-Communication Groups

Interventionist Procedures

Study Sessions

All sessions will take place in an area of the school that is familiar to the children, and ideally, a location in which the children play. Sessions will be approximately 12-20 minutes in total length, depending on whether the session includes the social skills training, and will include a short opening transition, play activity and closing transition. Two sessions will be conducted each day following an established routine (NOTE: Session is not equivalent to day, as 2 sessions will be conducted each day). It is critical that exactly the same procedures are followed throughout the course of the study. No additional prompting, reinforcement, commentary or other interactions can be done by the interventionist outside of the study procedures.

Opening Transition

Initially, the interventionist will tell the three participating children to go and get their “Super Social Stars”. The children will retrieve a small cardboard star with their name from a poster in a designated place in the classroom. The interventionist will lead them to a small area or separate room where the study sessions will take place. The children will place their stars on a “Super Social Stars” poster.

The interventionist will conduct a short song and movement activity to begin the group. [The children will then participate in either an interactive play activity (baseline and maintenance phases) or social skills lesson followed by the interactive play (training phase).

Closing Transition

Following interactive play, the interventionist will conduct a short closing
transition process with a song/movement activity.

To transition from the first session, the children will put their star on a poster board in the small room. They will take a 3-5 minute break in which they will go to the restroom and/or read books or play independently. Children should not be allowed access to any of the study toys or materials! The interventionist will begin the second session by asking the children to get their stars and bring them back to the “Super Social Stars” poster and again conduct the opening procedures.

---OR---

To transition from the second session, the children will gather their stars, take them to the classroom poster and return to the regular classroom activity.

<table>
<thead>
<tr>
<th>Overview of Social-Communication Group Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Sessions (approximately 12 minutes per session)</strong></td>
</tr>
<tr>
<td>1. Opening procedures</td>
</tr>
<tr>
<td>2. Interactive Play Activities (exactly 10 minutes/session)</td>
</tr>
<tr>
<td>3. Closing Procedures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Training Sessions (approximately 22 minutes per session)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Opening procedures</td>
</tr>
<tr>
<td>2. Social Skills Lesson (6-8 minutes)/Priming (3-4 minutes)</td>
</tr>
<tr>
<td>3. Interactive Play Activities (exactly 10 minutes/session)</td>
</tr>
<tr>
<td>4. Closing Procedures</td>
</tr>
</tbody>
</table>

*Interactive Play Activities*

During all study sessions, children will participate in two play activities typical of those that occur in preschool environments. Two activities will take place during each session:

1) a cooperative game or activity, followed by
2) preparation of a product.

The same array of activities will be used throughout all sessions and there will be a list letting you know when activities to use each day. It is important that you strictly
adhere to the schedule in order to keep all variables constant other than the one being manipulated in the study. The interventionist’s role will be limited to supervising the group using the same specific commentary phrases.

<table>
<thead>
<tr>
<th>Guidelines for Conducting Play Activities:</th>
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</thead>
<tbody>
<tr>
<td>1. The interventionist will briefly introduce the activities and describe the materials.</td>
</tr>
<tr>
<td>2. The interventionist will facilitate the interactive nature of play by limiting materials that are available to the children.</td>
</tr>
<tr>
<td>3. The interventionist’s role during play will be limited to supervising the group and to using specific commentary phrases provided in the Teacher Scripts.</td>
</tr>
<tr>
<td>4. The interventionist will not coach interactions during play activities, and specifically will not at any time coach the children to share with each other.</td>
</tr>
</tbody>
</table>

(Training) Social Skills Lessons. During training sessions, a social skills lesson will be conducted each session prior to the interactive play activities. The interventionist will follow a systematic process of teaching the target skills that are part of reciprocal sharing, specifically sharing (sharing) with others and requesting that others share (ask). The interventionist will alternate teaching the two target skills (share and ask) prior to each session, for a total of 12 sessions.

Overview of Social Skills

Lesson #1: Share—Initiator & Receiver

The sharing lesson will teach the two roles of initiator and receiver will be introduced using the 8 1/2 x 11 poster. The interventionist will point to the poster as she talks about the steps taken by the initiator and the receiver separately and ask the children to help her identify what they are doing to share. She will then draw the
children’s attention to the puppets. She will have the children observe the puppets initiating sharing as she demonstrates the steps. She will then have them observe the puppet receiving and demonstrate the steps.

Lesson #2: Ask—Requester & Giver

During the ask lesson she will teach the two roles of requester and giver in the same format. The interventionist will point to the poster as she talks about the steps taken by the requester and the giver separately and ask the children to help her identify what they are doing to share. She will then draw the children’s attention to the puppets. She will have the children observe the puppets requesting and demonstrate the steps, followed by giving.

Following the interventionist’s demonstration of the target skill, the interventionist will provide the child with an ASD with opportunities to practice with the interventionist and then with each of his peers. This will be done using an errorless learning approach in which the children, in dyads, practice the steps and the interventionist prompts, beginning with a physical prompt and systematically fading the prompts using time delay and most-least prompting. The child with ASD will always a part of the interaction during the role playing, receiving from one peer, and then initiating with the other and vice versa. The child with ASD will have a total of two opportunities to practice initiating or requesting and two opportunities to practice receiving or giving toys during each social skills lesson.
Guidelines for Conducting Social Skills Training Lessons:

1. The interventionist will follow introduce the skill using the poster.

2. The interventionist will use 2 puppets and role play toy to demonstrate both roles of the social skill being taught.

3. The interventionist will systematically have the child with ASD practice the two roles of the target social skill with herself and each peer.

4. The interventionist will provide appropriate prompting and reinforcement during the training. See Teacher Script for full procedures.

NOTE: I will have a schedule each day to let you know what “type” of sessions you will be conducting—“baseline” or “training”, and the materials you will use.
Appendix J

Data Collection Form

Social-Communication Group Data Sheet:
Social-Communication Behaviors

Circle any social-communication behavior you observe during each 20-second interval. Each box is one 20-second interval (total of 2 minutes across each row, and 10-min. total observation time).

Session #____: Act. 1 Begin/End time: _____ Act. 2 Begin/End time: _________

<table>
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<tr>
<th>20 sec</th>
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<th>20 sec</th>
<th>20 sec</th>
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<tbody>
<tr>
<td>DG</td>
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<td>10 min</td>
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</table>

GD=Distal  ____________ Intervals with GC=Contact  ____________ Communication Behaviors:__________
T=Touch     ____________ SR=Share Responder  ____________ Intervals with S=Speak     ____________ AR=Requester  ____________ Sharing Behaviors:__________ AG=Giver     ____________
Appendix K

Interactive Play (Baseline & Maintenance) Scripts

Beginning Transition

- Lead children to gather “Social Stars” from designated area in classroom and take to social-communication group area
- Place Stars on board
- Lead children in silly song or movement activity
- Move children to where activity will take place, if necessary.

- Game Play (5 minutes): Describe activity and any directions necessary for playing (NO COACHING HOW TO INTERACT, ONLY DIRECTIONS FOR THE GAME/ACTIVITY). Say, “Now I am going to let you all play. Remember that you are playing/working together.”
  - Remove yourself from the activity as much as possible (only intervene if challenging behaviors or other problems occur) Provide a 1 min. warning that the activity will change.
  - Hand out a few materials/items to only one child at a time, giving them each a chance to share & request.

- Product Prep (5 min.) Describe activity and any directions necessary for playing (NO COACHING HOW TO INTERACT, ONLY DIRECTIONS FOR THE GAME/ACTIVITY). Say, “Now I am going to let you all play. Remember that you are playing/working together.”
  - Remove yourself from the activity as much as possible (only intervene if challenging behaviors or other problems occur) Provide a 1 min. warning that the activity will end.
  - Hand out a few materials/items to only one child at a time, giving them each a chance to share & request.

Closing

- From play, direct children back to instructional position
- Sing closing song after EACH session
- End Transition
  (Session #1: Teacher will have children take 5-minute break (go to restroom), quiet time with NO play with study materials!!! OR Session #2: Teacher will escort kids back to designated area in classroom to put Social Stars away and into classroom activity)
Appendix L

Social Skill Lesson (Training) Scripts

**Social-Communication Groups**

**Teacher Script: Share**

**Beginning Transition**
1. Lead children together “Social Stars” from designated area in classroom and take to social-communication group area
2. Place Stars on board

**Opening**
3. Lead children in silly song or movement activity

**STEP #1: Establish instructional control:** Be sure children are directing attention to you as you begin to introduce the skill.

**STEP #2: Introduce steps of the skill:**

“Sharing with our friends is a good thing to do when we are at school. Sometimes, you might want to share with your friends. Sometimes, your friends might want to share with you. Let’s look at this picture. Suzie and Josh are sharing. [Pointing to Suzie] See, Suzie is sharing a toy with Josh. Suzie got Josh’s attention, looked at him and said, “Here, Josh”. [Pointing to Josh] Josh turned toward Suzie, held out his hand, took the toy and said, “Thanks”. “Let’s watch the puppets do it.”

**STEP #3: Demonstrate with Puppets:**

Initiator: “Watch what [Puppet #1] does: (Demonstrate and talk through the steps):

1. [Puppet #1] needs to get [Puppet #2]’s attention.
   - He could tap him on the shoulder. (TAP)
   - He could call his name. (Say, “[Puppet #2].”)
   - He could do both. (TAP and say, “[Puppet #2].”)

2. [Puppet #1] looks at him and says “Here.” And puts the toy in [Puppet #2]’s hand.

3. Then [Puppet #1] waits for his friend to take the toy.

Receiver: “Let’s watch what [Puppet #2] does. [Puppet #1] gets his attention and:

1. [Puppet #2] looks at [Puppet #1].
2. He holds out his hand and takes the [toy/item].
3. [Puppet #2] might:
   • look at [Puppet #1] and smile.
   • or he could say, “Thank you!”
   • or he could do both. (show LOOK and SMILE with “Thank you!”)

STEP #4: Child with autism role play (total 5 opps)
“Now let’s practice” [have Child follow the sequence with teacher first and then each peer].
1) (Child with ASD has materials) “You might have the ___________. You can share them with [peer] like we learned.”
   “You (prompt through process verbally and physically, fading over time):
   • get [my/peer]’s attention (at least one of these).
     • Tap [me/peer] on the shoulder.
     • Call [my/peer’s] name. (“Say…..”)
     • TAP and say, ....”
   • Looks at [me/your friend] and say “Here.” and put the toy/item in [my/peer]’s hand.
   • wait for friend to take the toy.

2) (teacher/peer has materials). “Maybe ___[I/peer] want(s) to share with you.”
   “I would get your attention and you would … (prompt through process verbally and physically, fading over time):
   • look at [me/peer]
   • holds out your hand and takes the [toy/item].
   • Then you might (at least one of these):
     • Look at [me/peer] and smile.
     • Say, “Thank you!”
     • Smile and say “Thank you!”.

NOTE: Role Playing will be errorless, teacher will prompt kids through the skill sequence! Provide wait time and least restrictive prompting strategy. Use differential social reinforcement based on child’s level of prompting.
   ______ requesting from teacher
STEP #5: Transition to play activity

- Move children to where first activity will take place.

- Game Play (5 minutes): Describe activity and any directions necessary for playing (NO COACHING HOW TO INTERACT, ONLY DIRECTIONS FOR THE GAME/ACTIVITY). Say, “Now I am going to let you all play. Remember that you are playing/working together.”
  - Remove yourself from the activity as much as possible (only intervene if challenging behaviors or other problems occur) **Provide a 1 min. warning that the activity will change.**
  - Hand out a few materials/items to only one child at a time, giving them each a chance to share & request.

- Product Prep (5 min.) Describe activity and any directions necessary for playing (NO COACHING HOW TO INTERACT, ONLY DIRECTIONS FOR THE GAME/ACTIVITY). Say, “Now I am going to let you all play. Remember that you are playing/working together.”
  - Remove yourself from the activity as much as possible (only intervene if challenging behaviors or other problems occur) **Provide a 1 min. warning that the activity will end.**
  - Hand out a few materials/items to only one child at a time, giving them each a chance to share & request.

Closing

- From play, direct children back to instructional position
- Sing closing song after EACH session
- End Transition
  - (Session #1: Teacher will have children take 5-minute break (go to restroom), quiet time with NO play with study materials!!! OR Session #2: Teacher will escort kids back to designated area in classroom to put Social Stars away and into classroom activity)
Social-Communication Groups
Teacher Script: *Ask*

Beginning Transition
1. Lead children to gather “Social Stars” from designated area in classroom and take to social-communication group area
2. Place Stars on board

Opening
3. Lead children in silly song or movement activity

**STEP #1: Establish instructional control:** Be sure children are directing attention to you as you begin to introduce the skill.

**STEP #2: Introduce steps of the skill:**
“What if you want a toy or something that your friend has? (Wait briefly for the kids to respond “Ask for it”—if not say, “You could ask for it!”.) Let’s look at this picture.

- Pointing] Josh gets Davy’s attention, looks at him and asks, “May I have that toy?”
  - Davy looks at Josh and says, “Sure” and hands it to him. Josh says, “Thanks!”

“Now let’s watch the puppets do it.” (Demonstrate and talk through the steps)

**STEP #3: Demonstrate with Puppets:**
Initiator: “Watch what [Puppet #1] does: (Demonstrate and talk through the steps):

1. [Puppet #1] needs to get [Puppet #2]’s attention.
   - He could tap him on the shoulder. (TAP)
   - He could call his name. (Say, “[Puppet #2].”)
   - He could do both. (TAP and say, “[Puppet #2].”)

2. [Puppet #1] looks at him and says, “[Puppet #2], may I have the/a ....”


4. [Puppet #1] holds out his hand to take the toy/item.

5. and [Puppet #1] might:
   - look at [Puppet #2] and smile.
   - or he could say, “Thank you!”
   - or he could do both. (show LOOK and SMILE with “Thank you!”)
Giver: “Let’s watch what [Puppet #2] does. [Puppet #1] gets his attention and
1. [Puppet #2] looks at and listens to [Puppet #1].
2. [Puppet #2] finds the (toy/item requested).
3. [Puppet #2] look at his friend and says, “Sure” or “Here you go.”
4. He puts the toy/item requested in [Puppet #1]’s hand.

STEP #4: Child with autism role play (total 5 opps)
“Now let’s practice” [have Child follow the sequence with the teacher and each peer].
1) (Teacher/Peer has materials) “Look, [peer] has the ______________. You can ask him to share like we learned.” (prompt through process verbally and physically, fading prompts over time). Talk through the peer process.
   1. Get [my/peer’s] attention (at least one of these).
      • Tap [me/peer] on the shoulder.
      • Call [my/peer’s] name. (“Say…...”)
      • TAP and say, ....”
   2. Look at [me/peer] and say, “[name] may I have the/a ....”
   3. Wait for [me/peer] to respond. [I/Peer] might say, “Sure” or “Here you go”.
   4. Hold out your hand to take the toy/item.
   5. Then you (at least one of these):
      • look at [me/your friend] and smile.
      • Say, “Thank you!”
      • LOOK and SMILE and say “Thank you!”
2) (Child with ASD has materials). “Maybe [you] have the ___________ and [I/peer] would like it/some. [I/peer] might ask you to share with us. We might say, “[Child name], may I have the/a (toy/item). “You would (prompt through process verbally and physically, fading over time):
   1. Look at [me/your friend].
   2. Listen to [me/your friend] and find the (toy/item requested).
   3. Look at [me/your friend] and say, “Sure” or “Here you go.”
   4. Put the (toy/item requested) in [my/peer’s] hand.
NOTE: Role Playing will be errorless. teacher will prompt kids through the skill sequence! Provide wait time and least restrictive prompting strategy. Use differential social reinforcement based on child’s level of prompting.

_____ requesting from teacher
_____ giving to teacher
_____ requesting from Peer #1
_____ requesting from Peer #2
_____ giving to Peer #1
_____ giving to Peer #2

STEP #5: Transition to play activity

• Move children to where first activity will take place.

• Game Play (5 minutes): Describe activity and any directions necessary for playing (NO COACHING HOW TO INTERACT, ONLY DIRECTIONS FOR THE GAME/ACTIVITY). Say, “Now I am going to let you all play. Remember that you are playing/working together.”
  o Remove yourself from the activity as much as possible (only intervene if challenging behaviors or other problems occur) Provide a 1 min. warning that the activity will change.
  o Hand out a few materials/items to only one child at a time, giving them each a chance to share & request.

• Product Prep (5 min.) Describe activity and any directions necessary for playing (NO COACHING HOW TO INTERACT, ONLY DIRECTIONS FOR THE GAME/ACTIVITY). Say, “Now I am going to let you all play. Remember that you are playing/working together.”
  o Remove yourself from the activity as much as possible (only intervene if challenging behaviors or other problems occur) Provide a 1 min. warning that the activity will end.
  o Hand out a few materials/items to only one child at a time, giving them each a chance to share & request.

Closing
• From play, direct children back to instructional position
• Sing closing song after EACH session
• End Transition
  (Session #1: Teacher will have children take 5-minute break (go to restroom), quiet time with NO play with study materials!!! OR Session #2: Teacher will escort kids back to designated area in classroom to put Social Stars away and into classroom activity)
Appendix M

Interventionist Commentary

Commentary

The following teacher comments will be permitted toward all children during the interactive play activity:

- **ABSOLUTE NO COACHING CHILDREN TO INTERACT**

**To guide peers to interact with child with ASD:**

- If neither peer has interacted with the child with ASD for **one minute**, you can remind the peers to interact with the child with ASD by saying:
  - “Remember you are here to help and play together.” or “Remember you are here to help [CHILD].”

**General:**

You are able to use these comments, no more than one per minute:

- “You are all getting along well today!”
- “Playing with friends is so fun!”
- “You’re doing a great job!”*
- “It is fun to play with friends.”

**When handing out materials:**

- “____________, I’m giving you the ____________________.”

**To direct back to activity:**

- “We’re here to play today.”
- “____________ has the ______ [toy/item] _______. ”
- Rephrase what the child says, i.e. “Yeah, I know it doesn’t look like [child] is sharing.”

If, at any time during play, a child shares or asks, you may say, “____________ great job playing with your friends!”
Appendix N
Reliability Training Procedures and Instructions for Coding

Reliability Coder Training Procedures

1. Read *Instructions for Coding Tapes*, which will include definitions of observable behaviors to be coded and a list of coding instructions. After reviewing the information, the researcher will orally-review the coding procedures with the trainee and give specific examples. At the end of the review, the researcher will ask the trainee to answer questions that require the trainee to recall fact-based information, coding procedures, and appropriate codes for specific case-examples. The trainee will then be given an opportunity to ask questions and review her notes and information.

2. The trainee and researcher will review a 2-minute videotaped sample session not related to this study. The researcher will demonstrate coding procedures and provide visual examples. For example, the researcher will demonstrate how to review the tapes to properly code the communication behavior components. The trainee will practice coding a different 2-minute sample. Immediately following the practice, the researcher and trainee will review the coding together, discussing coding procedures and resolving disagreements by discussing the specific coding procedures that direct the coding used.

3. A written exam will evaluate the trainee’s knowledge of the coding system, including definitions, coding procedures, and examples and non-examples. The written test will include specific coding scenarios and ask the trainee to determine how to code those items, demonstrating accuracy in the coding procedures. The trainee will be expected to achieve a score of 90% or above on the written exam before taking the video exam.

4. Video reliability will demonstrate the trainee’s proficiency in coding a 2-minute sample video. The trainee and the researcher will independently code and the researcher will score the samples. To address coding errors during the video coding exam, the researcher will watch the videos with the trainee and discuss how to correctly code the missed items. If 80% reliability with the researcher is not met during the first video reliability attempt, additional video reliability will be conducted. Training will be completed when 80% agreement with the researcher is met in simulated practice.
Instructions for Coding Study Tapes
Overview

In this study, we are looking at the interactions of children with autism with their peers. Specifically, I am looking at communication and sharing behaviors of children with autism during play activities.

GOAL: As you are watching the tape, listen/watch for a communication behavior of the target child toward peers ONLY. See the next page for detailed descriptions.

Coding Process (definitions and detailed explanations of the terms used below follow the Coding Process):

1. Set the video to begin at the time indicated on the list of sessions. You will only record the first occurrence of any communication or sharing behavior observed during each interval.
2. Begin at the time indicated as the beginning of the activity. Watch ONLY the target child until he displays a communication behavior. Determine if that behavior is intended to give or receive information or elicit a social response as evidenced by the child with ASD's look, body orientation or directionality of motor/vocal act toward peers and/or the activity and related to the activity.
   • If the behavior is echolalic, do not code it!
   • If the behavior is NOT related to the activity at hand, do not code it!
   • If the behavior is directed only toward an adult, do not code it!
   • If the behavior does not meet any of the behavioral definitions, do not code it!
3. Once you determine that the behavior is a communication behavior, note the time code so you code it during the correct interval.
4. Determine which behavior or behaviors the child demonstrated and circle the correct letter(s) in the correct interval box.
5. Determine if the observed communication behaviors meet the definitions of any of the sharing behaviors. (Did the child give or receive something? Did the child request anything or did anyone request anything from him?) If so, and it meets the definition for any of the 4 sharing behaviors, circle the correct letter in the same interval box.
6. Continue running the DVD until you see another communication behavior.
Instructions for Coding Study Tapes  
Definitions, Detailed Descriptions & Examples  

Communication Behaviors  

Communication behaviors will include any verbal or nonverbal attempt to communicate with another person in order to give or receive information or elicit a social response as evidenced by a look, body orientation or directionality of motor/vocal act toward peers and/or the activity and related to the activity and will be coded by the following:

1. *Gesture* will be defined as pointing to an object or activity or touching an object. If a *gesture* is observed in any interval, it will be coded as *distal* or *contact*.

   - **Distal gesture (DG):** reaching toward or pointing at the referent, but no physical contact is made with the referent. *Distal gesture* will include body language, such as nodding or shaking the head. If a distal gesture culminates in a contact gesture, only code the contact gesture.

   - **Contact gestures (CG):** physically touching the referent object. *Contact gestures* will include touching materials as well as handing materials to or taking materials from peers. *CG* may also include children touching themselves when referencing themselves (e.g. “My turn”). (Remember, there must be intent to give or receive information or elicit a social response—“grabbing” materials on the table or near another child without communicative intent toward the
child is NOT a CG. One way to differentiate is if the action includes contact with the peer (i.e. touching peers hand as they try to take an object the peer has) it will be coded as a CG.

2. **Touch (T)** will be defined as making contact with a peer on the hand, arm, shoulder, or back, or any body part and will not include contact gestures. The purpose of a T must be to make contact with the peer, **not** with an object/toy.

3. **Speak (S)** will be defined as saying words aloud while looking at or addressing a peer or peers.

NOTES:

- Unintelligible vocalizations should be coded as speak (S) as long as they meet the criteria.

- Challenging behaviors may be coded as social-communication behaviors, if they meet the criteria above.

**REMEMBER, TO CODE ANY BEHAVIOR, IT MUST MEET THE INITIAL CRITERIA***

**FOR A COMMUNICATION BEHAVIOR!!!**
Sharing Behaviors

When a child’s behavior has been identified as communication, the child’s use of sharing behaviors will be coded and evaluated. *Sharing* will involve four specific behaviors:

1. **Share Initiate (SI)** will involve a child attempting to give an item or object to another child, without a preceding ask-request (AR). (Expected behaviors: G, G+S, G+T, S--“You can take one.”)

2. **Share Receive (SR)** will involve a child taking an item or object from another who has share initiated toward them. *SR* will be coded only if the receiver acknowledges with a contact gesture (take), verbalization (e.g. “Thanks.”). Does not include taking items (with resistance from peer) from others that are not being given, or demanding that others give them items. (Expected behaviors: G, G+S, G+T)

3. **Ask-Request (AR)** involves a child attempting to gain an item from another child through using appropriate words or actions to let another child know they want an item. Does not include taking (“grabbing”) items from others, or demanding that others give them items. “My Turn” is appropriate unless it is paired with taking items (with resistance from peer) or any other challenging behavior. Touching the items while in a peers hand will be coded as AR if not paired with “grabbing” the item or demanding that they give it. (Expected behaviors: G, G+T, G+S, S)

4. **Ask-Give (AG)** involves a child handing or placing an item or object in front of another child who has requested the item, acknowledging by a look or
stopping an action with the item and allowing the peer to take the item, or verbally giving permission for the requester to take the item. (Expected behaviors: G, S+G, S--“Yep.” or “Take it”)

NOTES:

• These behaviors are only coded if they are attempts to share things…Bids to participate should not be coded (e.g. “Come play with us”, “Do you want to do it?” (without a gesture or some other indication that something is being shared).)

• Sharing behaviors can be coded, even if the full exchange does not take place—only the behavior of the child with ASD needs to be completed (e.g. Child with ASD: “Can I have it” (AR), peer does not respond).

• If challenging behaviors occur during sharing, the behavior will not be coded. Challenging behaviors will include trying to take objects, throwing objects, responding “no”, demanding objects, or any negative physical or verbal behaviors.

• If a challenging behavior or a “grab” occurs when the child with ASD is trying to gain access to an item, but then a peer shares an item immediately following the challenging behavior, it will be coded if the behavior of the child with ASD does meet the criteria (example: Child with ASD tries to grab an item from a child while saying, “I want the blue one.”—not coded as AR because accompanied by the behavior. Behavior ends. Peer hands the same or different item requested by the child with ASD to the child to share. Child with ASD meets criteria for SR on that interaction.)
Appendix O

Fidelity Checklists

Social-Communication Groups
Fidelity—Play Sessions only
(Baseline and Maintenance)

SESSION #_________  DATE:__________________

Beginning Transition
____ Children led to gather “Social Stars” from designated area in classroom and take to social-communication group area

Opening
____ Teacher leads children in silly song or movement activity
____ Transitions to play activity

Interactive Play Activity—Coop. activity
____ Instructs children on how to participate in the play activity.
____ Does not COACH children to engage in specific interaction.
____ Uses commentary appropriately  # of comments (tally) ___________
____ Provides transition warnings

Interactive Play Activity—Prep. of Product
____ Instructs children on how to participate in the play activity.
____ Does not COACH children to engage in specific interaction.
____ Uses commentary appropriately  # of comments (tally) ___________
____ Provides transition warnings

Closing
____ From play, directs children back to instructional position (facing her)
____ Sing closing song after EACH session
____ End Transition

Session #1: Children take 5-minute break (go to restroom), quiet time with NO play with study materials!!!  OR  Session #2: Teacher will escort kids back to designated area in classroom to put Social Stars away and into classroom activity

Total Correct = ___________  Percentage correct: ________
Social-Communication Groups

Intervention Fidelity--Share

SESSION #_________ DATE:____________________

Beginning Transition
_____ Children led to gather “Social Stars” from designated area in classroom and take to social-communication group area

Opening
_____ Teacher leads children in silly song or movement activity

Intervention
_____ Establishes instructional control
_____ Introduces skill using poster
_____ Demonstrates with puppets (Initiator & Receiver)
_____ Provides role playing opportunities (1 initiator/receiver with teacher; 2 initiator and 2 receiver peers=5 total)
_____ Provides appropriate prompting and reinforcement during role playing
_____ Transitions to play activity

Interactive Play Activity—Coop. activity
_____ Instructs children on how to participate in the play activity.
_____ Does not COACH children to engage in specific interaction.
_____ Uses commentary appropriately # of comments (tally) ___________
_____ Provides transition warnings

Interactive Play Activity—Prep. of Product
_____ Instructs children on how to participate in the play activity.
_____ Does not COACH children to engage in specific interaction.
_____ Uses commentary appropriately # of comments (tally) ___________
_____ Provides transition warnings

Closing
_____ From play, directs children back to instructional position (facing her)
_____ Sing closing song after EACH session
_____ End Transition
   Session #1: Children will take 5-minute break (go to restroom), quiet time with
   NO play with study materials!!! OR Session #2: Teacher will escort kids back to
   designated area in classroom to put Social Stars away and into classroom activity

Total Correct = ___________ Percentage correct: ________
Social-Communication Groups

Intervention Fidelity—Ask

SESSION #_________ DATE:________________________

Beginning Transition
_____ Children led to gather “Social Stars” from designated area in classroom and take to social-communication group area

Opening
_____ Teacher leads children in silly song or movement activity

Intervention
_____ Establishes instructional control
_____ Introduces skill appropriately
_____ Demonstrates with puppets (Initiator & Receiver)
_____ Provides role playing opportunities (1 initiator/receiver with teacher; 2 initiator and 2 receiver peers=5 total)
_____ Provides appropriate prompting and reinforcement during role playing
_____ Transitions to play activity

Interactive Play Activity—Coop. activity
_____ Instructs children on how to participate in the play activity.
_____ Does not COACH children to engage in specific interaction.
_____ Uses commentary appropriately # of comments (tally) ____________

Interactive Play Activity—Prep. of Product
_____ Instructs children on how to participate in the play activity.
_____ Does not COACH children to engage in specific interaction.
_____ Uses commentary appropriately # of comments (tally) ____________
_____ Provides transition warnings

Closing
_____ From play, direct children back to instructional position (facing her)
_____ Sing closing song after EACH session
_____ End Transition

Session #1: Teacher will have children take 5-minute break (go to restroom), quiet time with NO play with study materials!!! OR Session #2: Teacher will escort kids back to designated area in classroom to put Social Stars away and into classroom activity

Total Correct = ___________ Percentage correct: ___________

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Appendix P

Participant Satisfaction Questionnaire

Child’s Name: ____________________  School: ____________________  Date: ____________

1. The “Super Social Stars” groups were fun.

[Smiley faces indicating different levels of agreement]

2. I learned new ways to play with my friends in the “Super Social Stars” groups.

[Smiley faces indicating different levels of agreement]

3. [Child with ASD/My friends] learned new ways to play with me.

[Smiley faces indicating different levels of agreement]

4. Now I play more with [child with ASD/my friends] in my class.

[Smiley faces indicating different levels of agreement]
5. I think other friends in my class would like to learn to play together like we did in the Super Social Stars groups.

Is there anything else you would like to tell me about the Super Social Stars groups and why you liked or didn’t like them?
Appendix Q

Social Skills Rating Profile

<table>
<thead>
<tr>
<th>Child’s name: ____________________________</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Frequently</th>
<th>Almost</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child with autism initiates interactions with peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism gives toy/object to peers when peer asks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism accepts toy/object given by peer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism turns head when peer says his/her name</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism accepts peer’s help to show how to play/use toy</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism uses words to interact with his peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism uses gestures, like pointing to toys or activities, to interact with his peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism <strong>touches items or activities</strong> to interact with his peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Child with autism <strong>touches peers</strong> to interact with them</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Peer #1 (__________) initiates interactions with child with autism</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Peer #1 responds to initiations of child with autism</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Peer #2 (__________) initiates interactions with child with autism</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<tr>
<td>Peer #2 responds to initiations of child with autism</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Please list any notes or comments below: