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An Exploration of Joint Attention and Friendship

in Preschool Children with Autism

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy in Education

by

Ya-Chih Chang

2012

ABSTRACT OF THE DISSERTATION

An Exploration of Joint Attention and Friendship

in Preschool Children with Autism

by

Ya-Chih Chang

Doctor of Philosophy in Education

University of California, Los Angeles, 2012

Professor Connie Kasari, Chair

Children begin to show preferences for specific playmates as early as the first two years of life. Children with autism spectrum disorder (ASD) have difficulty making friends, even in elementary and middle school. However, very little is known about earlier friendships in children with autism such as preschool friendships. The current study examined friendships in preschool children with autism and explored how joint attention contributes to these friendships in mainstreamed settings. The participants were 31 mainstreamed preschool children (ages 2-5) with ASD. Two 15-minute school observations were conducted for each participant to capture participants' interactions with peers and adults during free play. Friendship was defined by three criteria: the children must have 1) at least 50% of their social initiation attempts responded to, 2)

at least one interval of joint engagement, and 3) at least one positive affective exchange (adapted from Howes, 1983). Using this definition for friendship, the results indicated that 20% of the sample had friendships at school. Children with friends were more likely than children without friends to be jointly engaged with their peers during free play, and they used higher joint attention skills. Additionally, the study also found that adults were using far more behavioral management skills than any other strategies within the classrooms. Future studies may want to examine the effects of early interventions and/or teacher training on the development of friendships in preschool children with ASD within the school setting.

The dissertation of Ya-Chih Chang is approved.

Sandra Graham

Carollee Howes

Fred Frankel

Connie Kasari, Committee Chair

University of California, Los Angeles

2012

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Curriculum Vitae

Ya-Chih (Jilly) Chang, M.A.

EDUCATION
2005   B.A., Psychology, University of California, Los Angeles
2009   M.A., Education, University of California, Los Angeles

HONORS AND AWARDS
2009   UCLA Summer Mentorship Award
2008   UCLA Summer Mentorship Award
2007-2008   UCLA University Fellowship

RESEARCH EXPERIENCE
Project Coordinator   **2011- Present**
Research Project: Deployment Focused Model of JASPER for Preschoolers
UCLA Semel Institute for Neuroscience & Human Behavior
Supervisor: Connie Kasari, Ph.D.
The goal of the project is to work collaboratively with school personnel from LAUSD to implement Joint Attention Symbolic Play Engagement Regulation (JASPER), an evidence-based early intervention within preschool settings. Responsible for coordinating all aspects of research study including submissions and correspondence with UCLA IRB.

Project Interventionist   **2008- Present**
UCLA Semel Institute for Neuroscience & Human Behavior
Supervisor: Connie Kasari, Ph.D.
JASPER interventionist for multiple research projects. Deliver intervention to children with autism (ages 2-8) and their families to improve the child's joint attention, play, and language skills. Provide feedback to training interventionists on the implementation of JASPER. Administer assessments for diagnosis (Autism Diagnostic Observation Schedule), language, communication, and play. Assist with grant writing. Train and run reliability analysis for graduate and undergraduates in coding projects.

Child Group Leader   **2011- Present**
UCLA Parenting & Children's Friendship Program
UCLA Semel Institute for Neuroscience & Human Behavior
Supervisor: Frederick Frankel, Ph.D., Cynthia Whitham, L.C.S.W., and Robert Myatt, Ph.D.
Deliver social skills group intervention to children (ages 6-12) with various diagnoses including, ADHD, ODD, social anxiety, and autism. Provide performance feedback to children through coaching during real play activities. Implement behavior management strategies (i.e., reward system, timeouts). Provide clinical feedback to graduate student in leading the group.

TEACHING EXPERIENCE
Lecturer   **2012- Present**
Course EDSP 587: Teaching Functional Communication
California State University, Los Angeles (CSULA)
Taught Credential and Master's Level Students. This course provides students with methods for assessing communication needs for students with severe cognitive disabilities. It also provides approaches for teaching communication skills using verbal and alternative strategies.

CLINICAL EXPERIENCE
Autism Behavioral Consultant   **2012-Present**
Saturday Learning Center, CSULA
Supervisor: Andrea Zetlin, Ed.D.
Provide recommendations to teachers in training to accommodate children with autism in classroom settings. Present behavioral strategies to work more effectively with children with autism.

Suicide Prevention Crisis Counselor   **2006-2009**
Didi Hirsh Community Mental Health Center
Supervisor: Lyn Morris, M.F.T.
Completed 65-hour training program and attended weekly 4-hour volunteer shift for Suicide Prevention Center's national 24-hour suicide crisis hotline (1-800-SUICIDE). Provided paraprofessional counseling to individuals in suicidal crisis through a short-term crisis intervention model.

PUBLICATIONS
Chang, Y.C., Quan, J., & Wood, J. (2012). Effects of anxiety disorder severity on social functioning in children with autism spectrum disorders. *Journal of Developmental and Physical Disabilities, 24*(1).

Frankel, F., Gorospe, C., **Chang, Y.C**., & Sugar, C. (2011). Mothers' reports of play dates and observation of school playground behavior of children having high-functioning autism spectrum disorders. *Journal of Child Psychology and Psychiatry, 52*(5), 571-579.

PRESENTATIONS
Chang, Y.C., McCracken, C., Goods, K., & Kasari, C. (2012, May). Improving play skills in nonverbal children with autism. Poster presented at the 11th Annual International Meeting for Autism Research (IMFAR), Toronto, Canada.

Kasari, C., **Chang, Y.C**., Fuller, A. (2012, May). JASPER Training. Oral presentation at the Florida International University, Miami, FL.

Kasari, C., **Chang, Y.C.,** Kretzmann, M. (2012, April). Evidence-based intervention for children with autism. In-service presentation at the Los Angeles Unified School District (LAUSD) Headquarters, Los Angeles, CA.

Introduction

Friendship plays a significant role throughout the lifespan of an individual. It is associated with later social and emotional development in young children (Hartup, 1996). It also provides social support and buffers against stress and adversity. Children who have high-quality friendships are less likely to be victimized and bullied, and have better social adjustment later in life (Bollmer, Milich, Harris, & Maras, 2005; Hartup, 1996).

Friendships can emerge in children as early as the first two years of life (Vandell & Mueller, 1980). Even as infants and toddlers, children begin to show preference for specific playmates, and will exhibit positive affect toward them. Unfortunately, children with autism have difficulties establishing these friendships. Children with autism have deficits in social interactions and communication (APA, 1994). Impairments in these domains can make it especially challenging for children with autism to develop meaningful friendships. At the earliest ages, children with autism may not pay much attention to peers and be self-absorbed in their own object focused play. Later, children continue to have difficulty reading social cues. For example, children with autism have difficulties recognizing social faux pas (Baron-Cohen et al., 1999). Their weakness in reading social cues and understanding social situations may alienate them from other children, which may lead to loss of opportunities in developing friendships.

There are some research data examining friendships in children with autism, particularly children in elementary and middle school. Studies have found that children with autism have fewer friendships and lower friendship quality than typically-developing children (Bauminger & Kasari, 2000; Bauminger et al., 2008a; Bauminger et al., 2008b). However, less is known about earlier friendships in children with autism, such as preschool friendships.

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The current study will examine friendships in preschool children with autism and explore how joint attention contributes to these friendships. Joint attention is one of the earliest emerging social communication skills that predict later social development, such as peer interactions (Sigman & Ruskin, 1999; Travis, Sigman, & Ruskin, 2001). This suggests that joint attention may also facilitate other social development, such as friendships. This study hypothesizes that preschool children with autism with better joint attention will have more friendships and better friendship quality. The findings of this study may have implications for developing early intervention for young children with autism in school settings to enhance their quality of friendships, and may subsequently help children with autism with friendship development.

Friendship

Importance of Friendship

Friendship has a significant impact on young children's social and emotional development (Hartup, 1996). Young children with friends are more likely to have better fundamental social and interpersonal skills, such as being able to share, cooperate, and resolve conflicts. These skill sets are foundational skills for future relationships (Hartup, 1996).

Children with friends exhibit better communication skills. Agreements and disagreements are both just as likely to occur for children with friends. However, compared to children without friends, children with friends are more able to compromise with one another. They are more open to discussions and exchanging ideas when differences occur (Gottman, 1983; Hartup, 1996). Disagreements between children and their friends are also less intense and are more quickly resolved. Unlike children without friends, children with friends are able to socialize and interact

after their disagreements (Hartup, Laursen, Stewart, & Eastenson, 1988).

Children with friends also show higher quality social interactions with their peers than children without friends. They exhibit more positive engagement and more prosocial behaviors (Sebanc, 2003). They are more likely to be accepted and less likely to be rejected by their peers (Howes, 1988; Sebanc, 2003; Vaughn et al., 2001). Children with reciprocated friendships also have higher play level, higher language level, better conflict resolution, and more positive affect (Fujisawa, Kutsukake, & Hasegawa, 2008; Gottman, 1983; Howes, 1988; Vaughn et al., 2001).

In addition to facilitating social and emotional development, friendship also serves as a protection from social isolation, adjustment problems, and peer victimizations. Children with friends are less likely to develop internalizing (i.e., depression and anxiety) and externalizing behaviors (antisocial behaviors and interpersonal difficulties) than children without friends (Bollmer et al., 2005; Laursen, Bukowski, Aunola, & Nurmi, 2007). Children with friends are also less likely to become socially isolated and victimized (Bollmer et al., 2005; Laursen et al., 2007; Hodges et al., 1999). This suggests that friendships buffer against adverse consequences and mitigate the effects of peer victimization, such as social isolation and adjustment difficulties.

Preschool Friendships in Typical Development

Friendship in young children is defined as an affective relationship consisting of three components: mutual preference, mutual enjoyment, and the ability to engage in skillful interactions (Howes, 1983). Mutual preference is the high probability for a dyadic interaction to ensue after a social initiation by a child. Mutual enjoyment is the ability to engage in positive exchanges, meaning that when dyads are engaged in a prosocial activity, both children are

expressing positive emotions such as smiling and laughing. Lastly, interaction skill is the ability to engage in complementary and reciprocal peer play (Howes, 1983).

Friendships in typically-developing preschool children can either be stable or short-termed (Howes, 1983). However, it is within the stable friendships that children develop important social skills. Preschool children in reciprocated friendships are more likely to increase the complexity of their play and interactions. There are also more likely to display more verbal exchanges, suggesting that these children are also increasing their abilities to manipulate symbols (Howes, 1983). This, in turn, also explains the emergence of pretend and fantasy play.

Not only do preschool friendships help children develop social skills, but it also helps them gain access to play with other children. Preschool children with no reciprocal friendships have more difficulties entering play groups, engaging in skillful interaction, and receive lower social skills rating from their teachers than children with reciprocal friendships (Howes, 1988). Furthermore, even if some children are classified as rejected, they are more likely to gain access to peer groups if they already have a friend. They are also less likely to be rebuffed by friends than by acquaintances when they attempt to enter a play group (Howes, 1988). These findings suggest that in addition to social skills development, reciprocal friendships may also facilitate experiences of entering play for children who are less competent in peer interactions.

Friendships in preschool children have also been linked to prosocial behaviors. Friendship support was positively correlated with prosocial behaviors and negatively correlated with peer rejection (Sebanc, 2003). Children in reciprocated friendships received more attention from peers and initiated more positive and neutral interactions than children in non-reciprocated friendships. In addition, they also were more accepted by peers (Howes, 1988; Sebanc, 2003).

Preschool Friendships in Children with Disabilities

Children with disabilities struggle with making and keeping friends. Mothers of children with disabilities have reported a difficult time in identifying their children's friends. Many times, these mothers were unable to identify even one friend in their child's life (Guralnick, Neville, Hammond, & Connor, 2007). For children with disabilities who have identified friendships, their friendships are often times fleeting and unstable (Guralnick et al., 2007; Howes, 1983).

Although preschool children with disabilities develop friendships, they are mainly friendships with other children with special needs. Studies have found that children with disabilities were considered a less preferred playmate than typically-developing children (Guralnick & Groom, 1988). In a mainstreamed play group setting, where three-year-old children with mild developmental disabilities were placed with three- and four-year-old typically-developing children, children with mild developmental disabilities were selected significantly less as a friend than their typically-developing counterparts (Gulranick, & Groom, 1988). To be considered a friend, the target child must have directed at least 33% of his interactions to a specific child. To have a reciprocated friendship, the other child must also have directed at least 33% of his interactions to the target child. The findings from this study revealed that although children with mild developmental disability preferred typically-developing children, they were the least preferred group of children for the typically-developing children.

Similar findings were also found in another study examining friendship formations in 333 preschool children with and without disabilities in different inclusive classroom settings (Buysse, Goldman, & Skinner, 2002). Two different inclusive settings were compared: an inclusive specialized program and inclusive childcare program. The inclusive specialized program was

comprised mainly of children with disabilities, whereas the inclusive child care program comprised mainly of children who were typically-developing. The study found that there were no significant differences between the two groups of children in friendship formation in the inclusive child care program setting. However, in the specialized program setting, preschool children with disabilities were less likely to have friends than typically-developing preschool children.

Not only have studies shown that preschool children with disabilities are less likely to have a reciprocated friendship than typically-developing children, but studies have also shown that preschool children with disabilities have poorer friendship quality compared to their typically-developing peers. In a two-year longitudinal study examining friendships of children with disabilities, Gulranick et al. (2007) reported qualitative differences between friendships of children with and without disabilities. Children with disabilities had no changes in their play or quality of interaction with their friends. Their interaction with their friends was no different than their interaction with unfamiliar peers. Moreover, children with disabilities who originally displayed higher quality social interactions at the beginning of the study experienced deteriorating social interactions over the two years. Those children with disabilities who did show improvement over the two years displayed an insignificant increase in their quality of interaction.

These studies suggest that although children with disabilities can have quality friendships, it occurs less frequently than in typically-developing children. In addition, these friendship formations oftentimes are affected by the environment such as classroom settings (i.e., specialized vs. general child care programs).

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Friendships in Children with Autism

Elementary and middle school children with high-functioning autism (HFA) have been found to develop friendships. Similar to children with disabilities, many of these friendships were established and maintained by the support of their social environment, including parents and teachers. Bauminger and Shulman (2003) found that children with HFA rarely develop friendships on their own. Mothers of children with HFA felt that without their help, their children's friendships may not be maintained, whereas a majority of the mothers of typically-developing children felt that they did not need to play a huge role in the maintenance of their children's friendship. In this study, all mothers of children with HFA reported their critical role in maintenance of their child's friendship, whereas only half of the mothers with typically-developing children had to play a crucial role. This suggests that while parents may support friendship formation in children with HFA, friendships continue to be a struggle for these children.

Children with autism have few friends and poor friendship quality. Compared to typically-developing children, they had fewer friendships and the friendships were more unstable (Bauminger & Kasari, 2000; Bauminger & Shulman, 2003; Wainscot et al., 2008). Furthermore, these friendships did not buffer against feelings of loneliness for these children. Although children with HFA reported having one friendship on average, they reported greater feelings of loneliness than their typically-developing peers. Bauminger and Kasari (2000) suggested the feelings of loneliness may be due to the poor quality of friendships. Unlike friendships in typically-developing children, children with HFA reported their friendships to be lower in quality in the domains of companionship, intimacy/trust, and helpfulness (Bauminger & Kasari, 2000).

These same qualitative differences in friendship dyads were also reported by Bauminger et al. (2008b). Again, compared to typically-developing dyads, children with HFA and their close friends both perceived their friendship to be lower in quality in the domains of closeness, intimacy, and helpfulness. This poor friendship qualitative difference was also reflected in their play. Typically-developing dyads were engaged in more coordinated play, whereas HFA dyads were engaged in more parallel play, where the interactions were less reciprocal and had less joint planning and execution. In addition, children with HFA also had less positive affect during their interactions. However, there seems to be a difference in friendship dynamics for different age groups. Younger children perceived their friendships to be higher in companionship and help but lower in conflict. Older children, on the other hand, engaged in less parallel play and more coordinated play. Older children were also observed to possess higher levels of conversation flow, cohesiveness, and affective closeness in their friendships than younger children. Higher qualitative differences were also observed for children with HFA with higher receptive language capabilities, which is consistent with the literature on typically developing children (Howes, 1983).

Children with HFA also seemed to have more non-mixed friendships, which are friendships between two children with autism (Bauminger et al., 2008a). However, it was found that mixed friendships seem to be higher in quality in terms of comparing to friendships in typical development. Mixed friendships are friendships between children with autism and typically-developing children. These friendships were more durable and stable. They had higher levels of positive social orientation and cohesion. They were more complex in play (coordinated play), and overall they seem to have more positive affect and closeness than non-mixed

friendships. Even though these children are capable of complex play, children with HFA are more often engaged in more structured activities such as board games with explicit rules, whereas typically developing children engaged in more socially engaging activities such as hanging out and ball games (Bauminger & Shulman, 2003).

Gap in Literature in Friendship in Children with Autism

Prior studies, therefore, suggest that children with HFA have poor friendship quality. Compared to typically-developing children, children with HFA perceived their friendships to be less close, intimate, and helpful. Parent reports are also consistent with these children's self-reports. Parents of children with HFA reported that their children had difficulty developing friendships, and of the friendships they have, the parents had to heavily support them to maintain them. Lastly, it is interesting to note, that although most children with HFA are in non-mixed friendships, it is those children who are involved in mixed-friendships that have higher receptive verbal abilities than children in non-mixed friendship. This finding suggests that children with HFA may engage with typically-developing children due to their higher cognitive level, or it could be that the interaction with typical children helped children with HFA develop more complex social-emotion skills by acting as models for normative social behaviors. Either way, it is promising to note that children with HFA can establish and maintain friendships, and for some, these friendships demonstrate high quality friendship qualitative characteristics such as prosocial behaviors between dyads and greater positive affect, especially for children with HFA with higher verbal language abilities in mixed friendships.

Despite these promising results from friendships studies in children with autism, there is

very little that is known about friendship in younger children with autism, particularly preschool children with autism. To date, there has been no study that has examined the friendships in preschool children with autism.

Joint Attention

Definition of Joint Attention

For typically-developing children, joint attention emerges between the ages of 9 to15 months (Bakeman & Adamson, 1984). By the end of their first year in life, typically-developing children begin to point out objects to share with others. They also begin to respond to their social partners' gestures and gaze. Young children use nonverbal communication, such as gestures, for two main reasons: to share (joint attention) and to request (behavior regulation). Joint attention is the ability to coordinate attention between a person and an object for the purpose of sharing (Adamson & Bakeman, 1982). Examples of joint attention skills include gestures such as pointing, showing, giving, and coordinated joint looks for the purpose of sharing (Adamson & Bakeman, 1982). Behaviors related to joint attention direct someone's attention to an object for the sole purpose of sharing the object with that person. For example, when a child points at a dog and says, "Mommy. It's a puppy!" the child is not requesting the dog but is directing the mom's attention to share the event of the 'dog'. On the other hand, a behavior related to behavior regulation, or requesting, is for the purpose of getting a desired object or outcome. For example, when a child points to a cookie that is out of reach and says, "Cookie, please" the child is not sharing the object with his mom, but rather directing his mom's attention to the desired object in hopes of assistance or obtaining the object. In both examples, the child had the same gesture of

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pointing, but the intent was different. In the first example, the child is sharing an interesting object with his mom, while in the second example, the child is directing his mom's attention to the object that he wants.

Joint Attention in Children with Autism

Joint attention is a core deficit that may not develop or is diminished in frequency and quality for young children with autism. Studies have found that initiation of joint attention is one of the core deficits that distinguish children with autism from their peers (Loveland & Landry, 1986; Sigman, Mundy, Sherman, & Ungerer, 1986). Compared to typically-developing children, children with mental retardation, and children with language delays, children with autism have fewer joint attention initiations and fewer responses to joint attention bids (Dawson et al., 2004; Loveland & Landry, 1986; Sigman et al., 1986). Compared to children with other developmental disabilities, children with autism are more likely to request and less likely to comment on objects (Mundy, Sigman, & Kasari, 1990; Sigman et al., 1986; Stone, Ousley, Yoder, Hogan, & Hepburn, 1997). Even when children with autism do comment on interesting objects to their social partner, they have a lower level of nonverbal communication (Stone et al., 1997). Additionally, children with autism are more likely to use a lower form of nonverbal communication. Unlike typical children or other children with developmental disabilities who pair their communicative gestures with either an eye gaze and/or vocalization, children with autism are more likely to use only gestures to communicate instead (Stone et al., 1997).

Joint Attention, Joint Engagement, and Social Development

Joint attention may facilitate later social development. One of the earliest ways that children learn joint attention skills is through the context of joint engagement, where the mother and child dyad is observed playing together with a set of toys (Adamson & Bakeman, 1984; Bakeman & Adamson, 1984). Joint attention usually occurs during high levels of joint engagement, where the child is actively engaged with an object or event that another person is also engaged with (Bakeman & Adamson, 1984). Typically-developing children can usually develop joint engagement between 9-15 months of age, and can sustain these periods of engagement by 18 months of age (Bakeman & Adamson, 1984). Mothers will usually "scaffold" their children's joint attention abilities if their children are not spontaneously initiating joint attention skills during these interactions (Adamson & Bakeman, 1984; Bakeman & Adamson, 1984). For example, mothers can model joint attention skills by following the focus of their children's attention and providing new information about the shared focus of attention. For instance, if the dyad was playing with a toy bus, the mom can point at it and say, "bus". This act of joint attention by the mother just gave the child the label of the object they are engaged with. Therefore, mom is constantly embedding joint attention skills during the interaction and providing labels to all the different objects and activities the dyad is engaged with.

During these periods of joint engagement, children are aware of both the shared object and their social partner (Bakeman & Adamson, 1984). By using joint attention during these engagement states, children are also at some level recognizing that their social partners are recognizing and responding to their attempts at communicating (Mundy & Sigman, 2006; Mundy & Willoughby, 1996). For example, through an alternate gaze, where the child first looks

at a toy, then at the social partner, the child is recognizing that the social partner is there to share this interesting toy with and that the social partner may find the toy interesting as well. This level of social awareness may lead to later development of social cognition in children. There has been one study that supports this notion. In a longitudinal study, which was based on a false belief task that tests the understanding of others' intentions, Charman et al. (2000) found that joint attention may be a precursor to later social cognition. Thirteen typically-developing infants were followed from 22-40 months of age. At 20 months, the infants were given (an alternative gaze measure) a task to measure alternating gaze for joint attention, and this measure was a significant predictor of infant's social cognitive ability at 44 months, which was based on false belief paradigms.

Lastly, during joint engagement, children are also demonstrating that they are, at some level, socially motivated to interact with their mothers (Sigman et al., 1986; van Hecke, Mundy, & Acra et al., 2007). Not only is the act of sharing a toy or object social, but when children engage in joint attention, they are also more likely to share positive affect with their social partner (Kasari, Sigman, Mundy, &Yirmiya, 1990; Mundy, Kasari, & Sigman, 1992). This suggests that children may be intrinsically motivated to socially engage their mothers in joint engagement.

Thus, joint attention may facilitate later social development in children. First, these skills usually occur within a social context, where children are sharing an object with a social partner. Second, for children to be displaying joint attention, they have to be, at some level, socially aware that their social partners are interested in interacting with them. Lastly, children themselves also need to be socially motivated at some level to interact with a social partner when they share a toy or object.

Joint Attention and Longitudinal Social Outcomes

Although responding to joint attention is important, initiation of joint attention has been found to have a stronger link to social competence in children with autism. Travis, Sigman, and Ruskin (2001) found initiation of joint attention to be a significant predictor of the level of peer engagement and prosocial behavior in high functioning children with autism between the ages of 8 to 15 years old. Children who had initiated more joint attention engaged in higher level of social play, including simple social play and organized games. They also exhibited more prosocial behaviors such as being helpful and sharing.

Studies have also found that deficits in both initiating and responding to joint attention can have a negative impact on children's social development even later in life. In a longitudinal study, Van Hecke et al. (2007) followed 52 infants from 12-30 months of age. At 12 months, infants were given a joint attention assessment, and at 30 months, a measure of social competence was completed by the parents. Infants' joint attention was found to be a significant predictor of reported social competence, which included five domains: compliance, empathy, imitation/ pretend play, sustained attention, and prosocial peer interactions. Children with more joint attention as an infant had better social competence at 30 months.

Additionally, deficits in joint attention continue to negatively impact the social development of children even when they enter middle school and adolescence. Joint attention has been found to be associated with children's peer engagement and social interaction even as they got older. In another longitudinal study, Sigman and Ruskin (1999) followed 51 children with autism for 6 to 8 years. At the beginning of the study, the children were 3 to 6 years old. Results indicated that initiation of joint attention in both the typically-developing children and children with autism

was a significant predictor of individual differences in social engagement 6 to 8 years later. Children who exhibited more joint attention skills at the beginning of the study were more socially engaged at the follow up. They were engaged in higher level play including simple social play (i.e., conversing, turn-taking) and games with rules (i.e., organized sports/games such as hopscotch or basketball, and less in lower level plays where children are mutually aware of each others' presence, but are not necessarily playing together (i.e., parallel play).

These studies suggest that deficits in joint attention can negatively impact the social competence of children with autism throughout their lives. They are less likely to engage in more helpful and prosocial behaviors. They are also less likely to initiate play with other children when they enter preschool, and the difficulty extends to middle school. This lack of social interaction with others can significantly impact the quality of social development in these children.

Gaps in Literature in Joint Attention and Social Development

The literature on joint attention in children with autism suggests that joint attention significantly impacts social development in children with autism. The function of joint attention is inherently social—it is the idea of sharing an object with a social partner by coordinating the social partner's attention to the object. This coordination can be achieved through eye contact (i.e, alternate gazes, and coordinated joint looks) or through gestures, such as pointing, showing, or giving. Without the social motivation to share an object or activity with a social partner, children may not be using these nonverbal communication skills. In addition, children with autism must also be aware, to some extent, that these nonverbal social communications are affecting their

social partner's behaviors; otherwise, they would not be using these communication skills.

Most interestingly, joint attention has been linked to social development in children with autism in longitudinal studies. These studies provide support that joint attention is predictive of later social development. Children with autism who had more joint attention at a young age were more likely to engage with their peers and display more prosocial behaviors later in life. Although there are some studies that link joint attention to social development, there is still more to be learned about joint attention and its relation to social development. In particular, no studies, to date, have examined joint attention and its effect on friendships.

Inclusion

Preschool Children with Disabilities and Inclusion

With the rising number of children with disabilities who are fully-included in preschools (Office of Special Education Programs, 2003, 2005), there has been much debate about whether the practice of full inclusion is beneficial for children or not. Studies have presented mixed beliefs about inclusion for preschool children with disabilities. Some studies have suggested that not only does full inclusion provide satisfactory educational services for children with autism, but it also allows these children to learn appropriate social skills modeled by their typically-developing peers (Kasari, Freeman, Bauminger, Alkin, 1999; Mesibov & Shea, 1996). Other studies, on the other hand, have argued that children with autism have fewer social interactions and more bullying incidents when placed in inclusive school settings (Montes & Halterman, 2007; Wainscot et al., 2008).

Studies have shown that children with disabilities can learn socially appropriate skills from

their peers and be accepted in inclusive settings. Odom et al. (2006) examined social acceptance and rejection of 80 preschool children with disabilities in inclusive early childhood settings. The study found that more than a quarter of the children (28%) were socially accepted by their peers; however, just as many preschool children with disabilities were rejected by their peers. Similar findings were also found in other studies. In a review of inclusive and specialized early childhood programs, 22 studies comparing preschool children with disabilities in integrated and specialized early childhood settings were analyzed (Buysse & Bailey, 1993). The review revealed that half of the studies found that preschool children with disabilities reported positive social outcomes in integrated classroom settings. Children with disabilities were less object-focused and were more likely to initiate and engage with their peers. They also had more positive interactions with peers which increased in frequency over time.

Even though studies have found benefits for preschool children with disabilities in inclusive settings, other studies have found minimal differences between segregated and inclusive settings. A few studies have found that preschool children with disabilities displayed higher social competence in inclusive settings but were still more isolated and less sophisticated in their play compared to their typically-developing peers (Buysse & Bailey, 2003). Other studies found that preschool children with disabilities are more likely to interact with adults than typically-developing peers in inclusive settings, while their typically-developing counterparts were more engaged with their peers and less so with the adults. The typically-developing children were also more likely to receive social bids from other children (Brown, Odom, Li, & Zercher, 1999).

These findings suggest that although preschool children with disabilities may have more

opportunities to engage with more socially competent social partners in inclusive preschool settings, they may still experience social rejection and separation from their peers. For some children with disabilities, their engagement with peers continues to be a struggle in inclusive settings (Brown et al., 1999; Buysse & Bailey, 1993; Guralnick, 1999).

Preschool Children with Autism and Inclusion

Similar to the children with disabilities, there have been mixed results regarding inclusion for children with autism. Although most of these studies have examined inclusion within elementary school-age children, there are a few that have focused on preschool aged children. Preschool children with autism in inclusive settings are more likely to engage with their peers compared to preschool children in segregated settings (Kishida & Kemp, 2009). Also, overall, parents of preschool children with autism have reported satisfaction with their children's educational services, including the school programs and teachers (Bitterman, Daley, Misra, Carlson, & Markowitz, 2008; Kasari, Freeman, Bauminger, & Alkin, 1999). However, compared to parents of children with other disabilities, parents of children with autism generally are more dissatisfied with their child's services. Parents of children with autism report that their children need to spend more time with typically-developing peers and in therapy. It has been reported that children with autism spend three times more of their total hours per week in special education settings than in general education, whereas children with other disabilities divide their time between general and special education settings more equally (Bitterman et al., 2008).

Compared to typically-developing children, children with autism who are fully-included have been found to engage in fewer social interactions and spent more time in solitary play.

Wainscot et al. (2008) found that children with autism spent a majority of their lunch time alone and had a small social network. In addition, children with autism may also be rejected by their peers because of their idiosyncratic behaviors (Ochs, Kremer-Sadlik, Soloman, & Sirota, 2001).

From these studies, it is difficult to determine whether inclusive or segregated preschool settings are best for children with autism. Furthermore, other factors can also play a role in the determination of preschool children's placement in inclusive settings. Studies have identified at least three variables that can influence parents' decision in placing their children with autism in inclusive settings: diagnosis, age, and current educational placement (Bitterman et al., 2008; Kasari et al., 1999). Depending on the child's needs, parents may be more supportive of more structured and specialized classrooms than inclusive settings (Mesibov & Shea, 1996).

Friendship Development in Inclusive Settings

Teachers also play an important role in the social development of preschool children with disabilities, particularly in promoting friendships in inclusive settings. Studies have found that teachers use various strategies to promote friendship in their classrooms (Buysse, Goldman, West, & Hollingsworth, 2008; Hollingsworth & Buysse, 2009). More passive strategies include setting up the environment. This strategy can include supervising the interaction of the dyad to suggesting a specific friend to the target child. More active strategies that teachers utilize ranged from inserting themselves into the dyad's interaction (i.e., taking a role in the children's play) to facilitating the dyad's interaction (i.e., suggesting a specific activity, redirecting inappropriate behaviors). Some other strategies include placing friends in the same activity, using friendship stories and puppets to role-play activities, and modeling appropriate social skills for the children

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(Buysse, Goldman, West, & Hollingsworth, 2008; Hollingsworth & Buysse, 2009).

However, adults can sometimes impede social interaction or even friendship development in inclusive settings. Studies have found that children with disabilities are more likely to interact with adults than their peers in inclusive settings (Anderson, Moore, Godfrey, & Fletcher-Flinn, 2004; Brown et al., 1999; Kishida & Kemp, 2009). Anderson et al. (2004) speculated that typically-developing children may be more hesitant to play with children with autism when there is an adult "shadowing" them because other children either want to be away from the adults, or they may find the adult stigmatizing.

Gaps in Literature in Autism and Inclusion

Most of the studies in inclusion for preschool children with disabilities have mainly examined the social interactions between children with and without disabilities. Studies have focused on whether children with disabilities are more engaged with other children in inclusive or segregated classroom settings (Brown et al., 1999; Odom et al., 2006). There is less literature examining social interaction for only preschool children with autism. The one study that examined social interaction in preschool children with autism reported similar findings as the literature for preschool children with disabilities. Like preschool children with disabilities, children with autism had more social engagement in an inclusive setting (Kishida & Kemp, 2009).

Although social engagement is an important construct to examine for preschool children with autism, it is also important to examine friendship development in school settings. *To date, there have been no studies that specifically examine friendship development in preschool*

children with autism in inclusive classroom settings.

Current Study

Preschool children with autism display core deficits in joint attention skills and these deficits may be detrimental to their social development. Studies have found early joint attention skills are associated with later social engagement in longitudinal studies. However, little is known about these children's friendship development and quality. This study will address the following questions, specifically for preschool children with autism and their friendships:

Research Aim 1: To identify and describe the friendship quality in preschool children with autism as defined by three criteria: 1) at least 50% of their social initiation attempts were responded to, 2) at least one unit of joint engagement or games during the interaction; and 3) at least one positive affective exchange (adapted from Howes, 1983).

Hypothesis 1: I predict few preschool children with autism will have friendships as defined by these three criteria: 1) at least 50% of their social initiation attempts were responded to, 2) at least one unit of joint engagement or games during the interaction; and 3) at least one positive affective exchange (adapted from Howes, 1983).

Research Aim 2: To examine how social communication and play skills influence friendship quality in preschool children with autism, as defined by the behavioral observation measure and friendship quality questionnaires.

Hypothesis 2A: I predict that preschool children with autism, who display more social

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communication skills and higher play skills, will have better friendship quality as measured by the behavioral observation measure and the friendship quality questionnaires.

Hypothesis 2B: I predict that children with friends as defined by the observation criteria will have better social communication and play skills than children without friends.

Research Aim 3: To examine how different adult strategies impact friendships in preschool children with autism.

Hypothesis 3: I predict that adults who use strategies, such as environmental arrangement and use of joint attention skills, will facilitate friendships in preschool children with autism.

Method

Participants

The sample included 31 preschool children (26 males, 5 females) with autism spectrum disorders and their parents and teachers. The children's age ranged from 31 to 60 months (M= 46.16, SD=7.00). Children were recruited from inclusive preschool classrooms in the Greater Los Angeles area.

All participants met criteria for an autism spectrum disorder based on the Autism Diagnostic Observation Schedule: Autism (n =18) and Autism Spectrum Disorder (n =13). The sample was ethnically heterogeneous, comprising of Caucasians (25.8%), Asians (29%), Hispanics (25.8%), African Americans (9.7%), and other ethnic groups (9.7%). Child characteristics are presented in Table 1.

Child Measures

    Diagnostic Assessment. The Autism Diagnostic Observation Schedule (ADOS) (Lord, Rutter, DiLavore, & Risi, 2001) was used to assess whether children met criteria for autism. The assessment was administered at entry to the study by the research team. The ADOS is a semi-structured, standardized assessment of communication, social interaction and play, and imaginative use of materials. It is designed to assess for a clinical presentation of autism or other pervasive developmental disorders. The ADOS consists of four modules designed for use with children at specific developmental and language levels. We will select the module (either module 1 or 2) most appropriate for each child. The ADOS yields two domains (language/ communication, and reciprocal social interaction), which provide thresholds for diagnostic classifications. It also yields two other domains (play and imagination/creativity, stereotyped behaviors and restricted interests), which are used to inform a diagnosis but are not included in the diagnostic algorithm.

    Joint attention assessment. The Early Social-Communication Scales (ESCS; Mundy et al, 1986; Seibert, Hogan, & Mundy, 1982) was used to assess joint attention skills. In this semi-structured interaction, the child and tester sat facing each other at a table with a set of toys in view but out of reach of the child. These toys included several small wind-up and hand-operated mechanical toys, a hat, a comb, glasses, a ball, a car, a balloon, a small plastic jar, and a book. The tester individually presented the child with each of the different toys making sure that the child received 3 trials of the mechanical toy, 3 trials of the hand-operated toys and 2 trials of a social interaction game (i.e., singing a song with a tickle). Studies have shown good reliability and validity for this measure (Mundy et al., 1986; Sigman & Kasari, 1994). See

Appendix A Table 1 for definition. The ESCS was videotaped and later coded for frequencies of both initiating and responding to joint attention and behavior regulation (requesting). Coders were trained to reliability criteria of 80% for each category. Two observers coded twenty percent of all videotapes to maintain reliability. The overall intraclass coefficient between 2 independent coders was 0.91, range 0.87-0.98.

Play skill assessment. The Structured Play Assessment (Ungerer & Sigman, 1981) was used to assess play skills. The assessment is designed to observe children's highest levels of spontaneous play acts and to elicit the highest level of play from the child. During the assessment, the child was presented with 4 different play sets of toys by the experimenter. The first set consisted of a puzzle, stacking cups, and a shape sorter. The second set was a tea set consisting of a doll, teapot and lid, spoon, bowl, bottle, cup and saucer, and sponge. The third set was a grooming set consisting of a doll, telephone, hairbrush and mirror. The fourth set as a sleeping set with a bed, small baby, table and chair, pillow, and napkin. The last set was a garage set consisting of a dump truck, blocks, a small doll to fit in the truck, and a garage.

The entire play interaction lasted about 15-20 minutes. The child's play behaviors were videotaped and later coded for frequencies of functional play acts, symbolic play acts and play levels. *Functional play type* refers to the number of different, child-initiated functional play acts. *Symbolic play type* refers to the number of different exemplars involving child-initiated symbolic play acts, from single schema sequences to sociodramatic play. Play level represents the highest, most frequent, and flexible level at which the child played with mastery. Play level ranges from 1 (indiscriminate play act) to 16 (thematic/fantasy play act) (as described by Lifter et al, 1993). See Appendix A, Table 2 for definitions. Coders were trained to reliability criteria of 80% for each

category. Two observers coded twenty percent of all videotapes to maintain reliability. The overall intraclass coefficient between 2 independent coders was 0.85, range 0.82-0.97.

Cognitive assessment. The Mullen Scales of Early Learning (MSEL) (Mullen, 1989) was used to assess general cognitive ability. The Mullen yields age-equivalent scores for young children from birth to six years of age. Four cognitive domains were assessed: visual reception, fine motor, receptive and expressive language. T-scores and age equivalents are available for each subscale. A developmental quotient was also calculated from the subscales.

Behavioral observation. The behavioral observation is a behavioral coding system designed to capture the target child's interactions with their peers and adults during free play. Each child was observed for two 15-minute interactions with their peers at his or her preschool. Both observations were completed within one month of enrollment in the study.

The coding system is adapted from Kasari, Rotheram- Fuller & Locke (unpublished). Data was collected using interval-coding methods (Alberto & Troutman, 2006). Each observation was divided into 50-second time intervals. After the end of each interval, the observer noted a series of skills displayed by the target child (See Appendix, Table 3). Coders were trained to reliability criteria of 80% for each category. Twenty percent of all observations were be coded by two observers to maintain reliability using intra-class correlation of .60 or above (Koch, 1982). The overall intraclass coefficient between two independent coders was 0.85, range .64-.99.

Parent Measure

 Demographic Information. The demographic form has been used in previously published intervention study of toddlers with autism (Kasari et al., 2006; Kasari et al., 2007). It included child, parent and family information.

 Friendship Questionnaire- Parent Form. The friendship questionnaire is adapted from Buysse and Goldman (2005). If applicable, parents were asked to identify three of their children's friends in class. From the three identified friends, parents were asked to rate the quality of their children's *best* friendship. The quality of the best friendship was rated on a five-point Likert scale on 19 items, including positive characteristics (i.e., share with each other, play happily together) and negative characteristics (i.e., fight verbally, grab and take things from each other).

Teacher Measure

 Friendship Questionnaire- Teacher Form. The friendship questionnaire is adapted from Buysse and Goldman (2005). If applicable, teachers were asked to identify three of the target child's friends in class. From the three identified friends, teachers were asked to rate the quality of the target child's *best* friendship. The quality of the best friendship was rated on a five-point Likert scale on 19 items, including positive characteristics (i.e., share with each other, play happily together) and negative characteristics (i.e., fight verbally, grab and take things from each other).

Results

Definition of Friendship

This study examined friendships in preschool children with autism spectrum disorders using parent reports, teacher reports, and school observations (See Table 2). Forty-two percent of the parents (n =13) in the sample reported that their child had a friend in class, and 54% (n =17) of the teachers in the sample reported that the child with autism had a friend in class. Using a more stringent criteria to define friendship, observational data revealed that approximately 20% of the sample had friendships (n = 7) as defined by three criteria: 1) at least 50% of their social initiation attempts were responded to, 2) at least one unit of joint engagement or games during the interaction; and 3) at least one positive affective exchange (adapted from Howes, 1983).

There were no significant differences in age, cognition, language, social communication, or play skills between children with and without friends as identified by the parents or the teachers. Therefore, subsequent analyses between groups with and without friends are based on the definition adapted from Howes (1983) using the observation measure. Furthermore, multiple comparisons were all adjusted using Dunn multiple-comparison test (Dunn, 1961).

Child Characteristics

A series of correlations were conducted to determine associations between child characteristics (see Table 3) and proposed outcome measures, including social communication skills (see Table 4), play skills (see Table 5), social engagement (see Table 6), and friendship quality (see Table 7). Notably, mental age was correlated with Total requesting skills ($r = 0.386$, $p < .05$), Response to joint attention ($r = 0.420$, p = 0.05), and Frequency of symbolic play acts (r

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= 0.374, p < 0.05). Both receptive and expressive language skills were correlated with Response to joint attention ($r = 0.434$, $p < .05$; $r = 0.463$, $p < .01$, respectively), Frequency of symbolic play acts ($r = 0.456$, $p < .05$; $r = 0.532$, $p < .005$, respectively), and Types of symbolic play acts ($r = 0.391$, $p < .05$; $r = 0.509$, $p < .005$, respectively).

Independent 2 sample t-tests were conducted to determine child characteristic differences between children with and without friends. There were no significant differences in age, cognitive, and language abilities between the two groups ($p > .05$). Fisher's Exact Tests were also conducted to determine differences between the two groups in gender, ethnicity, and diagnosis. Although there were no group differences in gender or ethnicity, the analysis revealed that children with friends were more likely to be diagnosed with *autism spectrum disorder* (ASD) rather than *autism* when compared to children without friends ($p = .012$). Independent sample t-tests revealed that there were no cognitive or language differences between children who were diagnosed with autism and children who were diagnosed with ASD ($p > .05$).

Social Engagement, Social Initiations, and Social Communication Outcomes

Independent 2 sample t-tests were conducted to examine differences in the percentage of time children with and without friends spent being engaged during free play. Six different engagement states were examined: solitary, proximity, onlooker, parallel, parallel aware, and joint engagement (See Graph 1). As a group, children in the sample spent the most time in solitary play ($M = 33.71$, $SD = 24.43$). There were no group differences between children with and without friends in the percentage of time they spent in solitary play. However, tests revealed that children differed in the percentage of time spent in parallel and joint engagement. Children

without friends ($M = 24.54$, $SD = 21.67$) were spending significantly more time in parallel play than children with friends ($M = 7.86$, $SD = 11.92$), $t(29) = 5.965$, $p = 0.016$, whereas children with friends ($M = 45.29$, $SD = 12.72$) were spending statistically significantly more time in joint engagement than children without friends $U = 14.00$, $p < .001$. Skewness and kurtosis were examined for the time spent in joint engagement, and the values confirmed that normality assumption was violated. Due to violation of the normality assumption, Mann-Whitney U Test was conducted to examine differences between the two groups.

Independent 2 sample t-tests were also conducted to examine differences in the frequency of social initiations and responses between children with and without friends (See Graph 2). There were no differences in initiations and responses between the two groups.

Independent 2 sample t-tests were conducted to examine differences in social communication skills between the two groups. Joint attention skills including pointing, giving, showing, alternate gaze, and coordinated joint looks were examined. There were no differences in joint attention skills between the two groups ($p > .05$). However, 86% of the children with friends (n = 6) displayed high level joint attention skills including pointing and showing, whereas only 50% of the children without friends (n = 12) displayed high level joint attention skills. Behavioral regulation skills were also examined between the two groups. Independent 2 sample t-tests revealed that, on average, children without friends ($M = 2.42$, $SD = 4.50$) were more likely to use points to request compared to children with friends ($M = 0.43$, $SD = 0.53$), $t(29) = 5.58$, $p < .05$. Children without friends ($M = 3.96$, $SD = 3.57$) were also more likely to use reaches to request compared to children with friends ($M = 1.86$, $SD = 1.35$), $t(29) = 6.86$, $p < .05$.

Play Skills Outcomes

Fisher's Exact Tests were conducted to examine differences in play skills between the two groups. Functional play, combination play, pre-symbolic play, and symbolic play were all examined. There were no significant differences between the two groups in the number of types or the frequency of play types ($p > .05$). The most common type of play act exhibited by both groups of children was combination play ($M = 11.03$, $SD = 3.58$), and the least common type of play act was symbolic play ($M = 4.13$, $SD = 6.60$).

Adult Strategies Outcomes

Independent sample t-tests were conducted to examine differences in the number of strategies that adults used with children with and without friends. Six different types of strategies were examined including using joint attention skills, using behavioral regulation skills, using environmental arrangement, recruiting other children to engage target child, prompting target child to engage with other children, and engaging with the target by him/herself. There were no significant differences between the types of strategies the adults used for the two groups ($p > .05$) (See Graph 3). The two most used strategies to engage children with autism used by both groups of teachers were behavioral regulation skills ($M = 19.68$, $SD = 15.72$) and environmental arrangement ($M = 11.58$, $SD = 12.42$), whereas the least used strategies were recruiting other children to engage the child with autism ($M = 0.61$, $SD = 1.12$) and prompting the child with autism to engage with other children in the class ($M = 0.87$, $SD = 1.82$).

The rate of the number of strategies being used per minute by the teachers was also examined (see Graph 4). There were no significant differences between the two groups. The

teachers on average are using 0.66 requesting skills per minute. This strategy is much more used than the other five strategies that were examined. The second most frequent strategy was environmental arrangement, and the rate of use was 0.37 per minute, which was half as frequent as requesting skills.

Subgroup Analysis

Friendship Quality Outcomes

Independent 2 sample t-tests were conducted to examine differences in friendship quality based on parent and teacher reports between children with and without friends. Approximately 50% of both parents and teachers were able to rate the quality of the friendships for both groups. Of the parents (n = 17) and teachers (n =12) who were able to rate friendship qualities, there were no significant differences between the two groups ($p > .05$). In addition, out of the 19-item friendship quality questionnaire, parents were, on average, only able to rate 7 of the items to be either positive or negative. On average, 12 of the items were rated as "Haven't seen." Similarly, teachers were only able to rate 10 of the items on the questionnaire as either positive or negative with the rest of the items rated as "Haven't seen." Examples of behaviors that were not seen include ignore each other's suggestion, settle arguments peacefully, and say they like each other or are friends.

Parents also identified other settings besides school as sources for playmates. Other settings include family friends, outside activities, and neighborhood. The most identified setting for a "friend" was through family friends (n = 13), followed by outside activities (n = 6) and the neighborhood (n = 6).

Discussion

This study explored friendships in high-functioning preschool children (ages 2-4) with autism in mainstreamed classrooms. In particular, the study examined whether children with autism develop friendships at an early school age and explored characteristic differences between the groups of children that did and did not have friends. It also examined the types of strategies that were used in the classrooms to support these friendships. The findings from this study provide developmental, clinical, and educational implications in addressing friendships in young children with autism.

Developmental Implications

The primary goal of the study was to determine whether preschool children with autism develop friendships in mainstreamed school settings. Despite the efforts of mainstreamed classrooms to socially integrate children with autism (Boutot & Bryant, 2005), the study revealed that only a fifth of the children from the sample had friends in the classrooms. This finding regarding friendships is in line with the literature for children with other developmental disabilities (Gulranick et al., 2007) where friendship formations have been a challenge.

Parents and teachers seem to have a more positive perception of the children's friendships than blind observers. Twice as many parents and teachers than blind observers were able to identify a "friend" in class. Given the longer term relationships that teachers and parents have with the child, their perceptions of friendships may be viewed as more accurate. However, even though parents and teachers were able to identify a "friend" in class for the child with autism, they were unable to accurately rate the friendship quality between the friend and the target child.

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For example, when asked to rate the quality of specific social interactions between the dyad such as whether the pair shared toys or argued verbally, many parents and teachers reported that they have never seen these behaviors to rate them. Furthermore, parents and teachers did not necessarily report the same "friend" at school for the same child even when they did identify a "friend" for a target child. These findings raise issues as to the "reliability" of parent and teacher report of friendships, or alternatively suggest that our definitions of friendships may need to be re-considered.

A secondary goal of the study was to examine differences between children with and without friends. It was hypothesized that children with friends would show more joint attention and play skills consistent with earlier longitudinal studies. The study did not find any statistically significant differences between joint attention and play skills between the two groups. However, children with friends were using higher levels of joint attention skills such as pointing and showing compared to children without friends. Interestingly, children without friends displayed significantly more requesting skills, pointing and reaching, than children with friends. One explanation for this finding could be that children with friends gradually replace requesting skills through the acquisition of joint attention skills. Research has shown that children with autism develop requesting skills before they start using joint attention skills and joint attention skills are inherently more social than requesting (Mundy, Sigman, & Kasari, 1994). It is possible that children without friends may lack the joint attention skills necessary to maintain their friendships.

Research has shown that symbolic play starts to emerge in preschool years for neurotypical children (Howes, 1983). However, very few children in the sample displayed symbolic play

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skills, yet most of the children in this study were playing comfortably at a functional level despite their placement in a preschool classroom. For example, many children in the sample were often observed stacking blocks and building train tracks during free play. The difference in play skills between preschool children with autism and their neurotypical peers may preclude them from playing together and fostering meaningful relationships. Another distinct difference between the two groups is how friends engage with other children during free play. Although a large proportion of both groups spent their time in solitary play, children with friends spent significantly more time in joint engagement whereas children without friends spent more of their time in parallel play. Children with friends may be more aware of their environment and their proximity to other children thus increasing the likelihood of engaging other children in play, and/or greater awareness of the possibility of other children as 'friends'. Lastly, the study examined six different strategies that were used to support friendships in the classroom. The most common strategy was behavioral regulation. Despite the fact that many children in the sample spent the majority of the time in solitary play, very few adults in the classrooms tried to intervene and have these children engage with their peers. Consequently, these children spent a majority of their free play wandering around the classroom or playing by themselves. The adults usually interfered when the child was behaving inappropriately (e.g., throwing toys) or when it was time to clean up. This suggests that the adults in the classroom were mainly engaging the children for classroom management purposes and were rarely interacting with the children to promote social interaction with their peers. Adults may not recognize the importance of free play as a time to develop peer relationships.

Clinical Implications

The findings from the current study suggest that children may need more support from both parents and teachers to foster friendships with their peers at school. Even though these children may be considered "high functioning" and "mainstreamed," there are already social skill deficits that are apparent in school settings. This suggests that early intervention is critical for this population of children. For instance, these children may need early intervention that specifically targets core deficits such as joint attention and communication skills to help foster meaningful relationships (Kasari, Gulsrud, Wong, Kwon, & Locke, 2010; Lawton & Kasari, 2012).

Educational Implications

Additionally, with the increase of autism (Centers for Disease Control and Prevention [CDC], 2012), many teachers will face the possibility of receiving more children with autism in their classrooms. Parents are finding inclusion as a better alternative for their children with autism (de Boer, Piji, & Minnaert, 2010), particularly if their child is "high-functioning." However, teachers may not feel well-equipped to work with this population (Robertson, Chamberlain, & Kasari, 2003). Therefore, additional training and specific strategies may be needed for both special education and general education teachers to better meet the needs of young children with autism. In addition to standard behavioral management trainings, specific strategies to facilitate and foster friendship between children with autism and their peers should also be included. For example, peer-mediated interventions can be implemented in these classrooms to increase social initiations and interactions of the children in the classroom (Chan et al., 2009, for review), particularly if one of the benefits of an inclusion classroom is the neurotypical peer models that

are available (Mesibov & Shea, 1996).

Parents should also be more involved in their children's friendship development at this early age. One of the findings from this study indicated that parents and teachers could not identify the same friend for a target child. Better communication between teachers and parents would help foster friendships between young children with autism and their peers. For example, if a teacher recognizes a potential friendship developing between a child with autism and a peer in class, the teacher could communicate this to the parents so that they can arrange outside activities (i.e., playdates) to further develop the friendship.

Strength of Study

This study is one of the very first studies to examine friendships in children with autism in preschool settings. Although only a fraction of the sample met criteria for having a "friend," this small sample size was still able to provide valuable information about the challenges in friendship formation for this population. In addition, some parents were unable to identify a peer at school that their child played with but were able to identify playmates outside of school including family and neighborhood children. Future studies examining friendships in preschool children with autism may want to expand the research by investigating friendships in different settings, including both school and home.

Limitation of study

A limitation of the study was its moderate sample size of 31 preschool children. There was minimal variability to capture the differences between children who had friends and those who

did not with only a very small sample of children with friends as identified by stringent criteria

used for neurotypical children. In the future, a larger sample of children should be used to further

examine the characteristics of preschool children who are developing friendships. Additionally,

the current study conducted only two observations within a month. Future studies may want to

conduct more observations throughout the year to capture the varying dynamics of friendship

formation at different times of the school year (e.g., beginning vs. end of the school year).

Tables

Table 1

Child Characteristics (N = 31)

Variables	M	SD	Range	Ratio	%
Chronological Age (months)	46.16	7.00	31-60		
Mental Age (months)	32.83	5.89	24-51		
Developmental Quotient	72.64	16.38	50-116		
Receptive Language (Mullen)	30.97	7.71	16-55		
Expressive Language (Mullen)	28.39	7.93	12-55		
Gender (Male: Female)				26:5	
Ethnicity					
Caucasian					25.8
Asian					29.0
Hispanic					25.8
African American					9.7
Other					9.7

Table 2

Number of Friendships Based on Parent Report, Teacher Report, and Observations (N = 31)

Measure	Friend	No Friend
Parent Report	13	18
Teacher Report	17	14
Both Parent and Teacher Report	10	21
School Observation		
1 criteria: Engagement	14	17
2 criteria: Engagement and Initiations	10	21
3 criteria: Engagement, Initiations, and Positive Affect	7	24

Table 3

Bivariate Correlations of Child Characteristics (N = 31)

		Chronological Age	Mental Age	Gender	Receptive Language	Expressive Language
Chronological Age	Pearson Correlation	1	.082	-.163	-.233	-.086
	Sig. (2 tailed)		.663	.381	.207	.644
Mental Age	Pearson Correlation	.082	1	.028	.846**	.683**
	Sig. (2 tailed)	.663		.881	.000	.000
Gender	Pearson Correlation	-.163	.028	1	.175	.147
	Sig. (2 tailed)	.381	.881		.346	.431
Receptive Language	Pearson Correlation	-.233	.846**	.175	1	.625**
	Sig. (2 tailed)	.207	.000	.346		.000
Expressive Language	Pearson Correlation	-.086	.683**	.147	.625**	1
	Sig. (2 tailed)	.644	.000	.431	.000	

**$p \leq .01$

Table 4

Bivariate Correlations of Child Characteristics and Social Communication Skills (N = 31)

		Joint Attention Skills (Total)	Behavioral Regulation Skills (Total)	Response to Joint Attention
Chronological Age	Pearson Correlation	-.246	-.018	-.087
	Sig. (2 tailed)	.181	.924	.642
Mental Age	Pearson Correlation	.325	.386*	.420*
	Sig. (2 tailed)	.075	.032	.019
Gender	Pearson Correlation	.020	-.190	-.244
	Sig. (2 tailed)	.916	.305	.186
Receptive Language	Pearson Correlation	.251	.255	.434*
	Sig. (2 tailed)	.173	.166	.015
Expressive Language	Pearson Correlation	.515**	.339	.463**
	Sig. (2 tailed)	.003	.063	.009

*$p \leq .05$
**$p \leq .01$

Table 5

Bivariate Correlations of Child Characteristics and Play Skills (N = 31)

		Simple Play (T)	Simple Play (F)	Combination Play (T)	Combination Play (F)	Pre-Symbolic Play (T)	Pre-Symbolic Play (F)	Symbolic Play (T)	Symbolic Play (F)
Chronological Age	Pearson Correlation	-.209	-.102	.230	.319	-.123	-.177	-.172	-.162
	Sig. (2 tailed)	.260	.584	.214	.081	.511	.341	.354	.383
Mental Age	Pearson Correlation	.134	.074	.056	.051	-.040	-.032	.337	.374*
	Sig. (2 tailed)	.473	.692	.765	.785	.831	.863	.063	.038
Gender	Pearson Correlation	.021	.460**	.071	.311	.363*	.404*	.289	.368*
	Sig. (2 tailed)	.911	.009	.706	.089	.045	.024	.115	.042
Receptive Language	Pearson Correlation	.212	.146	.049	.113	.004	.062	.391*	.456**
	Sig. (2 tailed)	.253	.432	.791	.546	.983	.739	.030	.010
Expressive Language	Pearson Correlation	.151	.172	-.067	.001	.027	.065	.509**	.532**
	Sig. (2 tailed)	.418	.355	.719	.994	.885	.730	.003	.002

*$p \leq .05$

Table 6

Bivariate Correlations of Child Characteristics and Engagement States (N = 31)

		Solitary	Proximity	Onlooker	Parallel	Parallel Aware	Joint Engagement
Chronological Age	Pearson Correlation	-.080	.177	-.143	.230	-.176	-.030
	Sig. (2 tailed)	.668	.341	.442	.214	.344	.872
Mental Age	Pearson Correlation	.250	-.106	-.139	-.328	.009	.155
	Sig. (2 tailed)	.176	.571	.457	.072	.963	.404
Gender	Pearson Correlation	-.020	.021	.258	-.246	.251	-.120
	Sig. (2 tailed)	.914	.909	.161	.182	.173	.521
Receptive Language	Pearson Correlation	.251	-.059	-.068	-.397*	.023	.155
	Sig. (2 tailed)	.173	.754	.716	.027	.902	.406
Expressive Language	Pearson Correlation	.055	.056	.056	-.319	.056	.153
	Sig. (2 tailed)	.173	.765	.766	.080	.765	.410

*p ≤ .05

Table 7

Bivariate Correlations of Child Characteristics and Friendship Quality

|		Positive (P)	Negative (P)	Never Observed (P)	Positive (T)	Negative (T)	Never Observed (T)
Chronological Age	Pearson Correlation	.531	.028	-.475	.208	-.006	-.221
	Sig. (2 tailed)	.062	.928	.101	.424	.981	.394
Mental Age	Pearson Correlation	.148	.503	-.300	.231	.108	-.292
	Sig. (2 tailed)	.629	.080	.320	.372	.679	.256
Gender	Pearson Correlation	.154	.810**	-.408	-.127	-.218	.325
	Sig. (2 tailed)	.616	.001	.166	.627	.400	.203
Receptive Language	Pearson Correlation	.107	.408	-.231	-.037	.102	-.038
	Sig. (2 tailed)	.729	.166	.447	.887	.696	.885
Expressive Language	Pearson Correlation	.001	.484	-.164	.042	.275	-.283
	Sig. (2 tailed)	.999	.094	.593	.872	.285	.271

*p ≤ .05

Note: P= parent (n =13), T = teacher (n =17)

Graph 1

Percentage of Time in Engagement States
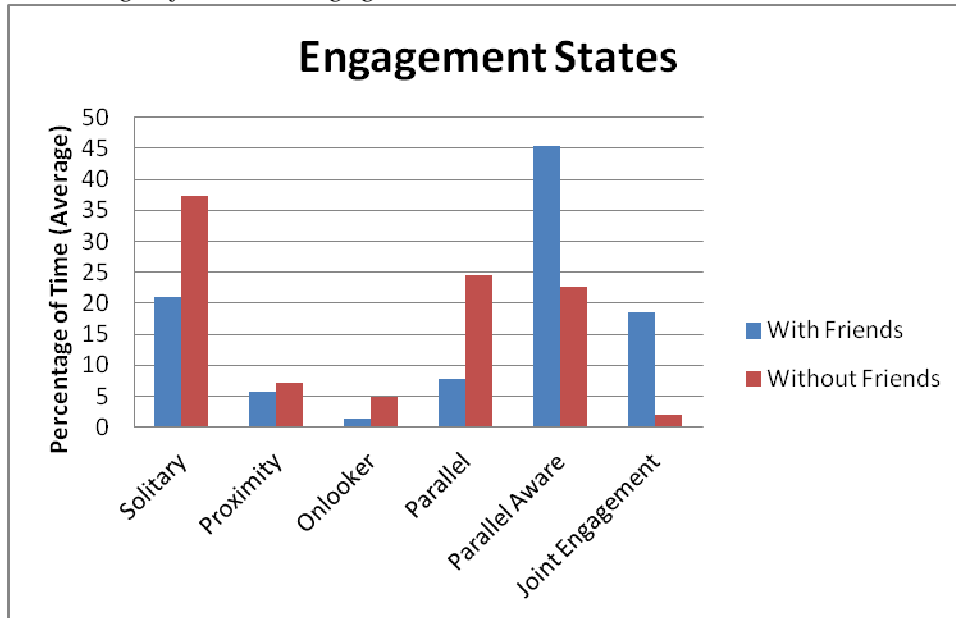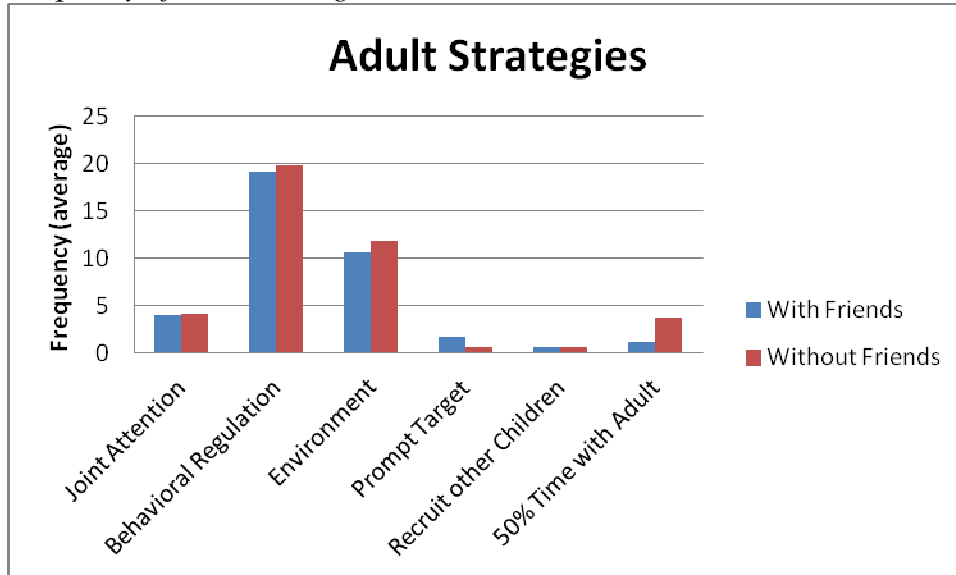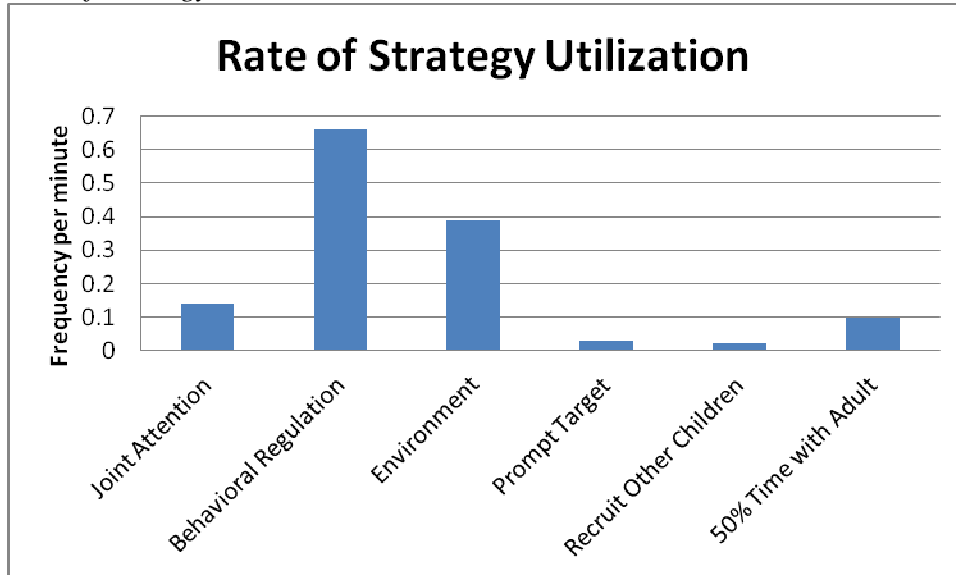
Graph 2
Percentage of Social initiations

Social Initiations (Target Child)
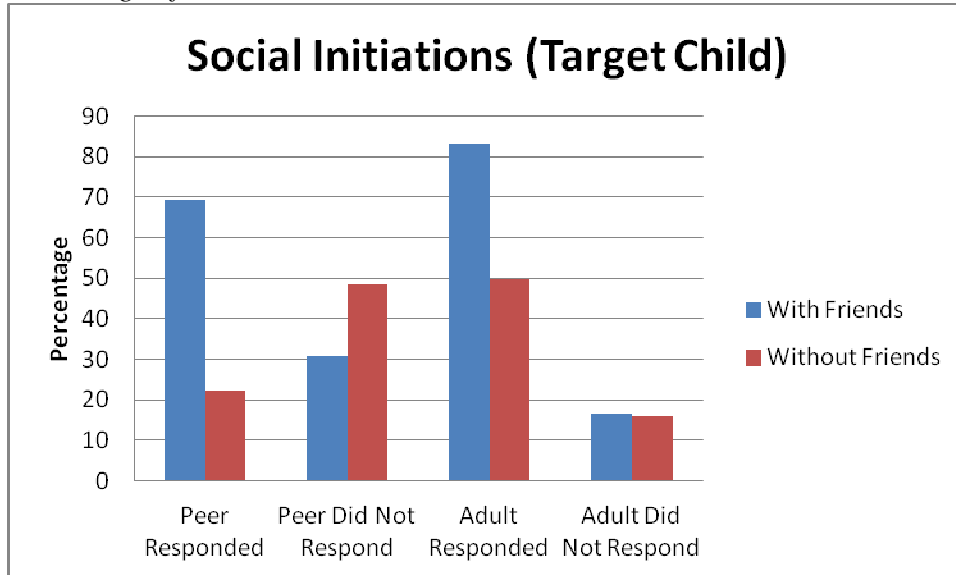
Graph 3
Frequency of Adult Strategies

Adult Strategies

Graph 4
Rate of Strategy Utilization

Rate of Strategy Utilization

Appendix

Appendix A

Early Social Communication Scale (Adapted Mundy, 1986)

Types	Definition
Initiate Joint Attention	
Coordinated Look	The child does a 3-point look for the purpose of sharing. It involves object-person-object or person-object-person.
Show	The child extends arms in the direction of the caregiver's face to show for the purpose of sharing.
Point	The child extends his/her index finger at an object to direct the caregiver's attention for the purpose of sharing.
Give	The child gives an object to caregiver for the purpose of sharing. Coded as frequency.
Behavior Regulation	
Point	The child extends his/her index finger towards a desire object.
Reach	The child extends arms to obtain a desire object.
Give	The child hands an object to request.
Response to Joint Attention	
	The child responds to attention bids from the examiner.

Appendix B
Play Levels (Adapted Lifter et al., 1993)

Functional Play Skills

Level	Categories	Definitions
1	Indiscriminate actions	All objects are treated alike (e.g., all objects are mouthed)
2	Discriminate actions on single objects	Differentiates among objects, preserving their physical conventional characteristics (e.g., rolls round beads, squeezes stuffed animal)
3	Takes apart combinations	Separates configurations of objects (e.g., takes all pieces out of puzzle)
4	Presentation combinations	Recreates combinations of objects according to their presentation configuration (e.g., puts puzzle pieces into puzzles; nests the nesting cups)
5	General combinations	Creates combinations of objects that result in simple, nonspecific configurations such as containers/contained relations (e.g., puts beads & puzzle pieces in cups)
6	Pretend self	Relates objects to self, indicating a pretend quality to the action (e.g., brings empty cup to mouth to drink)
7	Specific combinations (physical attributes)	Preserves unique physical characteristics of objects in the configuration (e.g., stacks nesting cups, strings beads)
8	Child as agent	Extends familiar actions to doll figures, with child as agent of the activity (e.g., extends cup to doll's mouth)
9	Specific combinations (conventional attributes)	Preserves unique conventional characteristics of objects in the configuration (e.g., places cup on a saucer; places string of beads on self)
10	Single scheme sequences	Extends same familiar action to two or more figures (e.g., extends cup to baby doll, to stuffed lamb)

Symbolic Play Skills

Level	Categories	Definitions
11	Substitutions	Uses one object to stand in place for another (e.g., puts bowl on head for hat)
12	Substitutions without object	Pretends to use something that is not there (e.g., shakes an imaginary salt shaker)
13	Doll as agent	Moves doll figures as if they are capable of action (e.g., moves figure to load blocks in a truck; puts mirror into doll's hand as if to see itself)
14	Multischeme sequences	Extends different actions to same figure (e.g., feeds doll with spoon, wipes it with cloth, then puts to bed)
15	Sociodramatic play	Adopts various familiar roles in play themes (e.g., plays house, assigning the various roles)
16	Thematic fantasy play	Adopts roles of fantasy characteristics (e.g., plays "Superman" or "Wonderwoman", assigning the various roles)

* Due to low level of frequency, play levels were combined. Levels 1-2 represent simple play categories; levels 3-5, 7 and 9 represent functional play categories; levels 6, 8, 10 represent pre-symbolic play categories; and level 11-16 represent symbolic play categories.

Appendix C

Friendship Observation Coding Key

STATE/ LEVELS	
(The state displayed by the target child for the majority of the 50 second observation time)	
Solitary (S)	Child plays alone, with no peers within 3 feet, and no mutual eye gaze with other children. *If the child only engages with an adult for the majority of the observation time, it is also coded as solitary.*
Proximity (X)	Child plays alone within 3 -foot range of peer
Onlooker (O)	Child has one-way awareness of child who is farther away than 3 feet
Parallel (P)	Child and peer are engaged in a similar activity but there is no social behavior
Parallel Aware (PA)	Child and peer engaged in similar activity and mutually aware of each other during activity
Joint engagement (JE)	Child and peer direct social behavior (e.g., offering objects, conversing, toy-taking, and other activities with a turn- taking structure)
Games with rules (G)	Child participates in organized game such as tag. (Code games even if the child is waiting in line, waiting for his turn or they are choosing teams.)
DISCRETE BEHAVIORS	
Social Initiations (|, +, -)	Child directs communication to peer—e.g., offers toy, greets, asks to play game. (Keep watching for a response before you code because you may miss it while you are writing.). *Indicate all initiations toward an adult with an "A".*
Response to Social Initiation (+, -)	Child responds to overture of peer with gesture, or language—response coded as accept or reject. *Indicate all responses to social initiation to an adult with an "A".*
Conversation (+)	Child carries on conversation with peer; must involve turn-taking quality. (2 turn each for a total of four exchanges that are in flow. Must begin with an initiation or response. *Indicate all conversations with an adult with an "A".*
Play Levels (F, S) *(only code for indoor play)*	Child engages in *functional play* (F) (indiscriminate acts, such as banging a drum, or combination play acts, such as building blocks) and/ or *symbolic play* (S) (substitution, such as using blocks as food, or pretend play, such as playing house). Circle both if child engages in both play acts during the coding interval.
Peer Gender	Count the number of children in the game or all the children within 3 ft of the child. Denote number of males and females (e.g., 1M, 1F).
Shared affect (l, +, -)	Child and peer smile/laugh while looking at each other or sharing same activity or child and peer engage in a negative encounter (i.e. arguing, fighting)
Nominated Friend (T, P)	Denote whether the target child is interacting with a parent-nominated friend (P) or teacher-nominated friend (T). (This information is obtained from the Friendship Questionnaire, parent

	form and teacher form).
ADULT STRATEGIES	
JA Skills	Adult initiates a joint attention act (e.g. coordinated joint look, pointing, showing for the purpose of sharing, give to share). Tally the number of joint attention acts used by the adult.
BR Skills	Adult initiates a behavior regulation act, or requesting, (e.g. pointing, giving for the purpose of requesting). Tally the number of number of behavioral regulation acts used by the adult.
Environment (+)	Adult arranges the environment to facilitate play (e.g., appropriate toy choice).
Prompts (+)	Adult prompts the child to go play with his or her peers.
Recruitment of other children (+)	Adult calls other children over to play with target child.
Engaged >50% time (+)	Adult allows target child to play with only him/her for more than 50% of the observation time interval.

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