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Assessing Changes in Social Status and Behavior Problems in Preschool Children with Autism Spectrum Disorders (ASD) After Exposure to a Peer-Mediated Social Skills Intervention

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ASSESSING CHANGES IN SOCIAL STATUS AND BEHAVIOR PROBLEMS IN PRESCHOOL CHILDREN WITH AUTISM SPECTRUM DISORDERS (ASD) AFTER EXPOSURE TO A PEER-MEDIATED SOCIAL SKILLS INTERVENTION

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ABSTRACT

The social status and social relationships of preschool children with Autism Spectrum Disorders (ASD) were assessed as developmentally relevant outcomes of a social skills intervention with a large peer-training component. Changes in teacher-reported behavior problems were also measured and used to predict social status before, immediately after, and twelve weeks after the social skills intervention. Patterns of children's social associations were measured utilizing child- and teacher-report. Additional steps were taken to establish test-retest reliability for the sociometric measures used in this study in order to contribute to the psychometric literature focused on the social functioning of young children with ASD. Results indicate that children with ASD generally experience more internalizing and externalizing behavior problems than their typically developing peers. Children with ASD that participated in the social skills intervention did experience significant improvements in their social status, which lends support to the intervention. Teachers rated children with ASD to be lower in popularity and to have fewer reciprocal playmate relationships, even after the intervention took place. Few significant long-term effects were found. Overall, results from this study seem to suggest that the children with ASD require continued and intensive support in building appropriate social relationships and developing social competence throughout the preschool years.

Keywords: autism, social status, intervention, reciprocal

DEDICATION

I dedicate this work to the two people who have significantly changed my life since this process began. To my mother, who would have given anything to see me complete this journey, and to my son, who helped me find a new journey when I got lost.

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ASSESSING CHANGES IN SOCIAL STATUS AND BEHAVIOR PROBLEMS IN PRESCHOOL CHILDREN WITH AUTISM SPECTRUM DISORDERS (ASD) AFTER EXPOSURE TO A PEER-MEDIATED SOCIAL SKILLS INTERVENTION

Humans are social beings. We depend on social relationships to provide us with companionship, intimacy, emotional fulfillment, and affective reciprocity (Freeman & Kasari, 1998). Children begin building meaningful social relationships with others outside of the family unit as early as the toddler years when they are given opportunities to interact with peers (Dunn, 2004; Furman, 1998; Ross & Lollis, 1989). Social relationships in early childhood serve four primary functions. First, they serve as a natural support system in which children gain support in accomplishing goals, gaining entry into social groups, and establishing other, more diverse networks of social support. Second, social relationships provide a social learning context in which children learn what behavior is socially acceptable via feedback and interactions with peers. This social learning context allows children to learn positive ways of interacting with others, experiment with social roles including a sense of individualized self, and develop social cognitive and behavioral skills (Asher, 1990; Kasari & Rotheram-Fuller, 2007; Rubin & Asendorpf, 1993). Third, social relationships may serve an advocacy role. Children in meaningful and satisfying relationships are given chances to make statements or act in ways that promote self-efficacy and self-worth. Finally, social relationships give participants a sense of belonging and competence that promotes positive social behavior and leads to social success later in life (Strain & Schwartz, 2001).

Relationships built in the preschool years have a particularly important impact on children's development across the lifespan (Kupersmidt & Coie, 1990). In childhood, children who experience difficulties developing appropriate social interaction patterns often become targets for exclusion and rejection. Rejection at this stage may lead to increased feelings of loneliness and anxiety and the creation of a poor social reputation, which prevents future opportunities of being accepted by peers. Moreover, rejection from peers is often accompanied by stress that plays a role in the development of later psychological problems and limits the child's ability to seek out resources that could improve the child's social competency (Coie, 1990). Negative effects of poor early social relationships persist into adolescence and adulthood as well. Longitudinal data reveal that poor early peer relationships predict negative behavioral psychopathology (Buhs & Ladd, 2001; Pederson, Vitaro, Barker, & Borge, 2007), poor adult outcomes, including a decreased likelihood for employment, independent living, and life expectancy, an increased likelihood for severe mental health problems (Strain & Schwartz, 2001), and poorer overall psychological adjustment (Johnson, Ironsmith, Snow, & Poteat, 2000).

Children with Autism Spectrum Disorders (ASD) often experience heightened peer rejection and pronounced social relationship deficits as they age. However, little is known about the development of their peer relationships and social status in the preschool years. Moreover, little is known about what, if any, behaviors put these children at greater risk for rejection earlier in life. The purpose of this study was to examine the social status of a group of preschool-aged children with ASD. Additionally, we aimed to elucidate specific social behaviors, particularly externalizing and internalizing behaviors as well as play behaviors, which possibly play a role in establishing social status at this age. The

following theories and concepts will be reviewed to better understand the impact of early social behavior on social status and social relationships in this particular population.

Behavioral Correlates of Social Status

What factors play a role in determining children's social status? According to the *selective homophilic affiliation theory*, children in early and middle childhood choose friends and preferred companions based on the amount of similarity they share in demographic characteristics and social abilities (Farmer & Farmer, 1996; Gottman & Parker, 1986; Hartup & Sancillo, 1986). Social abilities that have received substantial attention in the literature include children's social behavior or social competency. Social behavior is a complex and dynamic construct, consisting of a child's social skills, their prosocial and antisocial acts, and his or her personal characteristics, which occurs within a greater cultural and environmental context (Strain & Schwartz, 2001). Gresham (1986) defines social behavior, particularly social skills, as "behaviors that correlate consistently with peer acceptance or significant others' judgments."

A wide body of research has focused on identifying social behaviors that have a hand in affecting children's social status. A meta-analysis conducted by Newcomb and colleagues (1993) is considered one of the most definitive reviews of the behavioral correlates of four common sociometric status categories in school-aged children: popular, rejected, neglected, and controversial. This study and others have found that popular children demonstrate high levels of sociability and low levels of aggression and withdrawal. These children exhibit greater problem-solving skills, positive social actions (e.g., sharing), and high rates of cooperative play and social conversation. They also present with less disruptive behavior and loneliness (Dodge, 1983; Newcomb, Bukowski,

& Pattee, 1993). In general, popular children's behavioral repertoire is predominantly composed of skills that lead to the maintenance of positive social relationships (Asher & Parker, 1989). A second, commonly studied group is rejected children. This social status classification is often split into two different groups: rejected-aggressive and rejected-withdrawn children. Rejected-aggressive children tend to be more aggressive in their play skills, communication skills, and physicality, and display more hyperactive behaviors (Dodge, Coie, & Lynam, 2006; Hoza et al., 2005). These children demonstrate more inappropriate play, more hostile verbalizations, active exclusion of peers, hitting of peers, and poor emotion regulation (Dodge 1983). On the other hand, rejected-withdrawn children represent a smaller subgroup, and they tend to experience more social withdrawal, specifically in terms of depression and anxiety, and are more likely to have negative expectations regarding social interactions (Troop-Gordon & Asher, 2005). A defining hallmark of rejected status is a lack in positive qualities and social traits that may "balance out" aggressive behavior (Newcomb et al., 1993).

Some children fall into two other, less impactful sociometric categories: neglected and controversial status. These categories are relatively unstable, meaning that children are unlikely to maintain their neglected or controversial status as time passes. Neglected children are usually not well known by peers. They may choose to be less involved in group activities, but still report satisfaction with peer relationships and social actions (Newcomb, Bukowski, & Pattee, 1993). Children who are considered to be withdrawn show behavior similar to neglected children in that they spend less time engaged with peers and spend more time playing alone (Cillessen, van Ijzendorn, van Lieshout, & Hartup, 1992; Ladd, 1983). Controversial children exhibit a mix of positive and negative

social behaviors. Similar to rejected children, they demonstrate increased levels of aggression, but they can use appropriate social skills to interact with peers and gain friendships (Newcomb et al., 1993).

Studies evaluating behavioral correlates of social status and peer acceptance in preschool children are mixed. Some studies suggest that behaviors that are predictive of peer rejection in older children (e.g., aggression) are similar for younger children (e.g., Denham & Holt, 1993; Johnson, Ironsmith, Snow, & Poteat, 2000; Ladd, Price, & Hart, 1988; Wood, Cowan, & Baker, 2002). However, other studies suggest that preschool children's positive behaviors, such as responding effectively to others' social initiations (Hazen & Black, 1989), are more salient discriminators of social status than negative qualities such as aggression (e.g., Dill, 2000; Walter & LaFreniere, 2000). Moreover, it may be that preschool children are more likely to reject their peers when there is an *absence* of socially appropriate behaviors, including cooperative play and engaged social conversation, as opposed to rejecting peers in the presence of aversive behaviors (Walker, 2009).

A number of other behaviors also impact social status. General prosocial behavior also clearly plays a role in preschoolers' acceptance of their peers. Children who actively seek out more positive interactions with classmates are classified as popular by their teachers (Walker, 2004) and become more liked over time (Ironsmith & Poteat, 1990). Well-liked children then become preferred playmates and share in constructive play activities with peers (Buysse, Nabors, Skinner, & Keyes, 1997). In addition to broad prosocial behavior, other behaviors that affect acceptance and social status in this age group include affective expression, externalizing behaviors (e.g., aggression), verbal

communication skills, and play behaviors. Popular children are more likely to display positive affect and score higher on ratings of teacher-rated social competence measures, whereas rejected and neglected children are more likely to display negative or neutral affect (Howes, 1990; Rubin & Clark, 1983; Walker, 2009; Walter & LaFreniere, 2000). Spinrad and colleagues (2004) suggested that children who display more anxiety and have a poorly regulated affect may develop a reputation for being antisocial, which can also lead to peer rejection.

As mentioned before, aggression is particularly negatively associated with peer acceptance in middle childhood, but this behavior is not as obviously predictive of rejection in preschool-aged children. Even in studies that purport aggression to be related to social rejection in this age group, data show that, within a short developmental period of time, perceptions of overt behavior problems change with age. For example, Johnson and colleagues (2000) demonstrated that three year-old children base their rejections of peers solely on the amount of displayed aggression from their peers. However, four year-old children show more insight into aggressive behavior and may or may not reject aggressive peers if they also exhibit some type of prosocial behavior to offset their aggressive tendencies (Johnson et al., 2000). Even though aggression may not clearly distinguish between social status groups at this age (Walker, 2004), it is relatively unmistakable that aggressive preschool children are infrequently selected as preferred playmates or labeled as “friends” by their peers (Buysse, Nabors, Skinner, & Keyes, 1997). It should be noted that the relationship between negative social behavior and social status is bidirectional, with problem behavior being both a risk factor and consequence of low popularity among peers (Buhs & Ladd, 2001; Hymel, Rubin,

Rowden, & LeMare, 1990). In one study, Kuppens and colleagues (2009) found that externalizing behaviors were more predictive of low social preference for young children, especially boys. Moreover, boys who were rejected in early childhood exhibited increases in externalizing behaviors over a two-year period. It has also been seen that submissive and nonassertive behaviors predict increased verbal victimization and social isolation of children over a 6-month period, while social exclusion concurrently predicts increased submissive and nonassertive behavior over time (Fox and Boulton, 2006).

Preschool settings are ideal places for developing verbal communication skills with others. At this age, conversational turn taking is a prerequisite for successful cooperative play and has been established as an important contributor to cohesive social interaction (Black & Hazen, 1990). Popular, well-liked children are those who are able to engage in more connected conversation with others, direct conversational initiations to others, and respond to initiations from others (Hazen & Black, 1989; Walker, 2009). Children high in acceptance also display more advanced verbal communication skills that successfully contribute to positive social interactions. For example, these children are able to provide relevant responses to initiations and, if they choose, reject initiations while also providing reasonable alternatives (Eisenberg & Garvey, 1981). Additionally, there is some evidence to suggest that highly accepted children adapt their communication styles across contexts, as evidenced by their tendency to use different qualitative statements when entering a group as opposed to when they are already a part of it (Hazen & Black, 1989).

Perhaps the behaviors that most obviously correlate with social status and peer acceptance in preschool children are play behaviors, particularly those that encourage cooperative interactions between children (Coie, Dodge, & Kupersmidt, 1990; Walker,

2009). Play is the context in which children build social relationships, and the development of appropriate play skills is paramount to children's social success at this age. In order to be included in social groups in which children are given opportunities to gain and maintain important play skills, children must demonstrate effective group entry strategies. Children who struggle with appropriate group entry strategies may be excluded from peer groups, which denies them further opportunity to develop appropriate skills and makes it more likely for them to be rejected in the future. Average status children often use passive, but mildly successful, approaches when entering group play, while rejected children are generally less likely to be successful in entering group play (Walker, 2004). Popular children are more likely to engage in cooperative play and less likely to engage in parallel play, onlooker behavior, and solitary behaviors than their rejected and neglected counterparts once they have entered a play group (Walker, 2009).

In a study examining behaviors that indicate withdrawal from play, it was found that engaged solitary play was correlated with teacher report of asocial tendencies, peer rejection, and greater levels of future internalizing behaviors (Spinrad et al., 2004). However, unengaged, aimless behavior (i.e., reticent behavior) was not associated with lower peer acceptance or more problem behaviors, even though children who exhibited this type of behavior were rated high in asocial tendencies. It was suggested that children who display reticent behaviors are close in proximity to their peers and are; therefore, at least minimally engaged in peer activity, while solitary play may represent a form of social isolation rather than a voluntary play activity.

The evidence presented demonstrates that social behavior has a clear impact on social status at all developmental stages, including the preschool years. In the preschool

years, when most children are first exposed to peers outside of the family, certain social behaviors may be more salient for discriminating amongst popular and rejected children. A general pattern has emerged across the literature examining social behavior: children who exhibit unappealing behavior or behavior that differs substantially from the peer group struggle to gain peer acceptance and develop friendships (Lindsey, 2002). Children with various intellectual and developmental disabilities (ID/D) are often identified as exhibiting problematic social behavior. Children with ID/D experience deficits in interpreting social cues and creating appropriate social strategies, and engage in greater rates of maladaptive social behaviors (Leffert & Sipperstein, 1996; Stumme, Gresham & Scott, 1982). Because of this, they experience difficulty maintaining social relationships, receive lower sociometric ratings, and are described as less liked by their peers (Buysse, Nabors, Skinner, & Keyes, 1997; Guralnick & Groom, 1987; Merrell, Merz, Johnson, & Ring, 1992; Roberts & Zubrick, 1992).

Social Behavior of Children with Autism Spectrum Disorders (ASD)

Autism Spectrum Disorders (ASD) are a class of complex neurodevelopmental disorders that are characterized by deficits in social interaction and communication, as well as the presence of restricted and repetitive behaviors (APA, 2013). The current national prevalence of ASD is 1 in 68 children, although the prevalence in the state of Alabama is slightly slower at 1 in 175 children (CDC, 2014). Across the lifespan, children with ASD report difficulties with peer relationships (Kasari & Rotheram-Fuller, 2007). Marked social skills deficits are considered a defining hallmark of this diagnosis (Carter, Davis, Klin, & Volkmar, 2005; Kanner, 1943; Williams, White, Koenig, & Scahill, 2007), and a lack of appropriate social behavior is a critical component of these

disorders (Stella, Mundy, & Tuchman, 1999). Because of their social deficits, children with ASD, unfortunately, appear disinterested in interacting with peers, which can isolate them from peer groups and prevent them from developing friendships (Kasari & Bauminger, 1998). Moreover, children with ASD often fail to use language appropriately during social interactions, which leads them to be frequently misunderstood by their peers (Kasari & Rotheram-Fuller, 2007).

Studies examining social behavior in this population reveal that children with ASD infrequently initiate interactions with peers, are less proximal and engaged with peers, show more nonsocial behaviors, and are less responsive to peers' social bids (Koegel, Koegel, Frea, & Fredeen, 2001; McConnell, 2002; Sigman & Ruskin, 1999). Additionally, children with ASD actively engage in negative behaviors that decrease their opportunities for social learning. These negative behaviors include high rates of stereotypic behavior and self-injurious behavior and lack of respect for other's personal space, (Ingram, Mayes, Truxell, & Calhoun, 2007; McConnell, 2002). They also exhibit greater levels of internalizing and externalizing behaviors such as withdrawal, attention problems, aggression (Hartley, Sikora, & McCoy, 2008), and oppositional behaviors (Gadow, DeVincent, Pomeroy, Azizan, 2004).

The social deficits in young children with ASD are possibly most apparent during structured and unstructured play activities. Generally, they spend more time in solitary play, isolated play, and on-looking play, and this preference persists into the elementary school years (McConnell, 2002; Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). Even though preschool children with ASD do not prefer to participate in social interactions, they are more motivated to engage with peers if the interactions occur during

a preferred activity (e.g., playing with blocks versus drawing; Koegel, Dyer, & Bell, 1987), or when the activities and materials are predictable (Ferrara & Hill, 1980).

A common skill that preschool children with ASD struggle with is demonstrating appropriate symbolic play (i.e., pretend play). Developmentally, play in the preschool years progresses from functional play (i.e., using an object as it is intended) to symbolic play. In early symbolic play, children may often be required to take on the perspective of a fictional character and act out that character's actions and beliefs in conjunction with a peer. This type of play requires that a child be able to communicate effectively, be more understanding of others' perspectives, and become less egocentric. By doing this, a child becomes more empathetic and becomes a more desired companion by his or her peers (Freeman & Kasari, 1998).

In order to successfully engage in the social-cognitive aspects of symbolic play and develop subsequent friendships (Baron-Cohen, 1989), children must possess a well-developed theory of mind, which is defined as one's ability to understand another person's perspective, including his or her thoughts, desires, and beliefs, as separate from one's own perspective (Baron-Cohen, 2000). Theory of mind is often developed during the preschool years, and is built on the basis of early social-communication skills, including joint attention, social referencing, and deferred imitation (Meltzoff & Gopnick, 1993). Most young children with ASD possess a poorly developed theory of mind, which contributes to their delays in the development of symbolic play (Jarrold, Boucher, & Smith, 1993; Baron-Cohen, 1987). Poorly developed early social communication skills, such as poor joint and shared attention skills (Mundy, 2011), are likely culprits behind theory of mind deficits in children with ASD. Results from a study examining joint

attention skills of children with ASD in a special education preschool setting demonstrate that these children responded to and initiated fewer joint attention bids with their peers than children in a comparison mixed disability group. Children with ASD in this sample also spent 37% of their unstructured free-play time in an object-focused state, which was significantly lower than the time they spent engaged in play with others (Wong & Kasari, 2012).

Deficits in the play skills of children with ASD become apparent at an early age. The above research highlights that even initiating joint attention, a fundamental aspect of play, is impaired in these children. As noted before, play behaviors are arguably the most critical element of social interaction in preschool children. When children, such as those with ASD, demonstrate improper play and social skills, they become isolated from peer groups. This isolation can then lead to a reduction in opportunities to improve their already deficient skills, resulting in a more marked delay of these skills and a higher probability of social exclusion over time (Farmer & Farmer, 1996). It is reasonable to assume that children with ASD are more likely to suffer from this cyclical pattern because of their early ineffective social behaviors that do not promote cooperative and productive interactions. When social interactions are not promoted, we begin to see noticeable differences between children with ASD and their peers in terms of acceptance and social status.

Social Relationships and Peer Acceptance of Children with ASD

Kasari and Rotheram-Fuller (2007) suggested that children with ASD also struggle with building appropriate peer relationships due to a lack of understanding of the nuances of social interactions. Furthermore, they suggest that this lack of understanding results

directly from the social skills deficits and behavioral problems described above. There exists a common belief that placing children with ASD in inclusive classroom settings will allow them to build rewarding social relationships that they would not receive otherwise in special education settings (Gallagher et al., 2000). However, it has been shown that placing children with ASD in inclusive educational settings does not necessarily guarantee that they will develop friendships and be accepted by their peers (Howlin, Goode, Hutton, & Rutter, 2004). In fact, children with ASD are at greater risk for being rejected by typically developing peers because of their social behavior, even when peers are given an explanation of their social behavioral differences (Kasari & Rotheram-Fuller, 2007).

In a study conducted by Rotheram-Fuller and colleagues (2010), it was found that children with ASD in the first through fifth grades were lower than their typically developing classmates in terms of number of reciprocated friendships, peer acceptance, number of social connections, and social network centrality. However, children with ASD were more socially included in kindergarten through first and second through third grades than in the fourth and fifth grades. Typically developing children were no different from children with ASD in terms of peer rejection, but they did experience greater peer acceptance and a larger number of reciprocated friendships (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010).

In another study evaluating social network centrality (SNC), or the child's social group's connectedness to the center of a given social structure, it was found that school-aged children with ASD scored lower in overall SNC and were more likely to fall into peripheral social groups than typically developing peers. Moreover, even when children

with ASD were involved in social groups, they reported doing fewer activities with and spending less time with their nominated “best friends” in the classroom. While they experienced lower overall peer acceptance than their peers, children ASD did not report greater feelings of loneliness, nor was any child with ASD considered completely isolated from a social group (Chamberlain, Kasari, & Rotheram-Fuller, 2007). These results have been supported in other studies, which additionally show that children with ASD are more likely to have smaller social networks, experience poorer friendship quality (Bauminger & Kasari, 2000; Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011), experience lower social prominence (Dean et al., 2014), experience greater neglect or peer rejection (Ochs, Kremer-Sadlik, Solomon, & Sirota, 2001), and overestimate their positions within social structures (Chamberlain, et al., 2007).

The concept of friendship may be qualitatively different for children with ASD; nonetheless, friends and peer associations provide important developmental opportunities for children with ASD to prepare for more mature relationships (Chamberlain, Kasari, & Rotheram-Fuller, 2007) and experience greater social involvement and peer acceptance (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). Peers are important mediators of behavioral change for children with ASD. Parents have reported that peers, especially girls who demonstrate more nurturing and care giving behaviors toward children with ASD, play important roles in the social successes of their child with ASD (Chamberlain et al., 2007).

It is very difficult to measure some aspects of friendships, such as affection & intimacy, in young children (Howes, 1996; Howes & Matheson, 1992), but it may be easier to measure other aspects of friendships, including companionship and stability,

when one simplifies the definitions of those aspects considerably (Freeman & Kasari, 1998). Children's friendships in the preschool years are often based more on physical proximity to each other rather than the emotional and psychological aspects that characterize friendships in older children (Freeman & Kasari, 1998; Lindsey, 2002). Studies show that older, high-functioning children with ASD are not able to provide a complete definition of friendship describing three major dimensions of shared affect, intimacy, and companionship (Bauminger & Kasari, 2000). Because children with ASD tend to overestimate the reciprocity of their friendships (Kasari & Rotheram-Fuller, 2007) and parental reports of their child with ASD's friendships more often describe *desired* relationships rather than actual relationships (Bauminger & Kasari, 2000), considering a peer association to be a "friend" may be an inaccurate view of social relationships in children with ASD, particularly in young children. It may be more appropriate to consider a reciprocated peer association in preschool children with ASD as a "preferred playmate" rather than a true friend.

It is evident that children with ASD encounter difficulties across all aspects of social relationships. Their tendencies to be less engaged in central social structures and have fewer high quality relationships in the school-aged years place them in poor positions to develop quality relationships once they enter adolescence and adulthood. It can be argued that improving the social relationships of children, particularly those with ASD, begins with improving the skills those social relationships are based upon. The previous sections have highlighted how social status and social behavior have a bidirectional effect on each other, but it is important to further examine how programs

and interventions designed to improve these areas have generated changes in the lives of children with ASD.

Importance of Social Skills Interventions

Sufficient evidence exists to support the idea that improving a child's social abilities will result in improvements in his or her social relationships. Comprehensive social skills interventions aimed at improving social behaviors using peer models, direct behavioral coaching, and rehearsal strategies have shown promising effects on increasing peer acceptance and social status for both typically developing and at-risk children (e.g., Gresham & Nagle, 1980). For children with ASD, improving peer interactions may increase the number and quality of their friendships, the amount of acceptance they receive from peers, and possibly improve later adaptive behavior (Kasari & Rotheram-Fuller, 2007; McGovern & Sigman, 2005). Specific skills that have been targeted in previous interventions with preschool children with ASD include greeting other children and responding appropriately to other's social interaction bids (Kasari & Rotheram-Fuller, 2007). The need for social behavioral and social skills interventions in this population is apparent. It has been shown that children's social abilities are directly predictive of their social competence (Howlin et al., 2004), which plays a large role in the formation of appropriate social relationships and social status.

The effects of social skills interventions in both typically developing children and children with ASD have been demonstrated across a wide body of literature. In rejected school-aged children without ASD, a short-term (i.e., 9-week) social skills intervention was successful for improving social status in terms of reducing rejection for students, but it did not result in any improvements in popular or neglected status groups (Zappatero,

1995). In another 8-week intervention program, rejected school-aged students became more likeable, and teachers reported moderate improvements in social skills for these children. However, follow-up data revealed that rejected children returned to their original rejected status at six weeks post-intervention, indicating that generalization of improvements in social skills and the associated rise in social status did not occur in the classroom (Dill, 2000).

Unlike the studies with rejected children cited above, social skills interventions for children with ASD have produced immediate and long-term positive effects (Kasari & Rotheram-Fuller, 2007). Kasari and colleagues (2012) demonstrated that school-aged children with ASD showed increases in social network salience after participating in a combination of child-directed and peer-mediated social skills interventions. Children in the peer-mediated intervention also showed decreased isolation on the playground and more active engagement in group play activities and conversations with peers. Moreover, children with ASD who participated in the peer-mediated intervention received greater friendship nominations from their peers and were rated as more socially competent by their teachers. The most promising results of this study were seen after the 3-month follow-up period, where children with ASD maintained gains in their social network salience, friendship nominations, and social skills (Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012). In another study with six and seven year-old children with ASD, a peer-network intervention targeting social skills and language skills resulted in immediate increases in peer interaction and peer acceptance. Some generalization of social interaction skills was also seen in environmental contexts not originally addressed in the intervention (e.g., recess time; Kamps et al., 2007). While some studies have

demonstrated long-term improvements in social behavior and social status, generalization and maintenance effects are inconsistently reported across studies for both older and younger children with ASD (Bierman & Furman, 1984; Kasari & Rotheram-Fuller, 2007; Ladd, 1981; Strain & Scwartz, 2001; Radley, Jenson, Clark, & O'Neill, 2014).

The above literature provides support for the effectiveness of social skills interventions in producing positive changes in the skills on which early social relationships and social status are based. Utilizing these interventions for children with ASD can put them in an optimal position to develop a healthier social standing and more friendships later in life. It has been established that prosocial behavior, effective communication skills, and well-developed social-cognitive play skills are associated with greater peer acceptance and higher social status in typically developing children. It has also been established that children with ASD experience difficulty with these behaviors and with integrating into social structures, but examining the impacts of behaviors on social status in the preschool years has not been explicitly examined. Because, early childhood social status and relationships play a key developmental role throughout the lifespan (Kupersmidt & Coie, 1990), it is important that we focus on what specific aspects of social behavior affect social status for children with ASD and how social skills interventions designed for this population may play a role in improving social status and associated behavior.

Rationale for Current Study/Statement of the Problem

Aim 1. Social relationships in early childhood have well-demonstrated impacts on later social, adaptive, and psychological functioning. It is imperative that sufficient effort is taken to enrich these early childhood relationships as much as possible. For children

with ASD, enriching social relationships is especially important because of the compounding effects these relationships will have on the already inherent social abilities deficits these children face. Identifying areas in which children with ASD experience social difficulties in early childhood is the first step to helping children with ASD overcome social deficits. Therefore, the first aim of this study is to examine differences between children with ASD and typically developing peers in internalizing behavior problems, externalizing behavior problems, peer-rated social status, number of peer- and teacher-rated reciprocal social relationships, and teacher-rated popularity prior to the start of the social skills intervention.

Hypothesis 1.1. It is hypothesized that preschool children with ASD will exhibit greater behavioral problems than typically developing peers prior to the implementation of a social skills intervention. Previous research has established that school-aged children with ASD exhibit significantly greater levels of both externalizing and internalizing psychopathology than typically developing children (Bauminger, Solomon, & Rogers, 2010; Hartley, Sikora, & McCoy, 2008).

Hypothesis 1.2. Additionally, it hypothesized that preschool children with ASD will experience more negative social status (e.g., rejection or neglect) prior to the implementation of a social skills intervention.

Hypothesis 1.3. Moreover, it is hypothesized that children with ASD will receive fewer reciprocal social relationships as reported by peers and teachers and experience lower teacher-rated popularity before undergoing a social skills intervention.

Previous research examining school-aged children with ASD has shown that children with ASD experience a host of problems interacting with peers and developing

satisfying peer relationships (see Rotheram-Fuller et al., 2010; Lock et al., 2013; Dean et al., 2014). It is reasonable to assume that the social functioning and behavioral profiles commonly seen in older children with ASD would be evidenced at the preschool stage, where children with ASD are becoming increasingly exposed to peers and given chances to interact with others outside of the family unit.

Aim 2. This study also sought to determine if a peer-mediated social skills intervention package utilizing video modeling, peer training, and applied behavior analysis (ABA) strategies produces immediate improvements in social behaviors, social status, number of reciprocal relationships, and popularity of preschool children with ASD. Prior research has shown that as children's social abilities are improved, so does their social competence, which lays the foundation for social status and social relationships (Howlin et al., 2004). Social skills interventions have been shown to be useful tools for engaging children with ASD in their classroom social structures, but consistent long-lasting effects of these interventions has yet to be seen. This study will add to the current literature on the effects of social skills interventions, but will be unique in that it will examine changes in associated aspects of social functioning (i.e., social status and behavioral problems), rather than explicitly examining changes in social skills.

Hypothesis 2.1. It is hypothesized that improvements in social behaviors of children with ASD that participated in the social skills intervention will be seen immediately after the intervention and at the twelve-week follow-up period.

Hypothesis 2.2. It is hypothesized that improvements in social status of children with ASD that participated in the social skills intervention will be seen immediately after the intervention and at the twelve-week follow-up period.

Hypothesis 2.3. It is hypothesized that improvements in number of teacher- and peer-rated reciprocal relationships and popularity of children with ASD that participated in the social skills intervention will be seen immediately after the intervention and at the twelve-week follow-up period.

Recent intervention-based studies have demonstrated that interventions utilizing an array of techniques are effective in producing improvements in social skills for young children with ASD (Zhang & Wheeler, 2011). In addition, intervention packages that have produced improvements in social skills have also been shown to improve social status and reduce negative behaviors in school-aged children with ASD (see Kamps et al., 2007; Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012), and have demonstrated lasting effects in these areas across a similar time period with children who have ASD (Kasari et al., 2012).

Aim 3. The third aim of this study is to examine specific behavioral correlates with positive and negative social status in preschool children with ASD. At this time, no empirical research has been conducted on classifying social status and identifying its behavioral correlates in preschool children with ASD. While typically developing preschool children have yielded reliable and stable scores on sociometric measures assessing aspects of social status and peer acceptance (Asher, Singleton, Tinsley, & Hymel, 1979; Peery & Toney, 1979), preschool children with ASD are often overlooked for studies of this nature. Most research examining this population has focused on school-aged children with ASD (see Chamberlain et al., 2007; Kasari et al., 2011), and gathering similar data in preschool children will be a unique aspect of this study.

Hypothesis 3.1. It is hypothesized that children with ASD that possess negative social status will exhibit more deficient play skills.

Method

Participants

Participants were 38 preschool children (61% male) between the ages of 28 and 71 months (M = 51.66, SD = 11.50). Nineteen children (50%) were previously diagnosed with an Autism Spectrum Disorder. Participants were recruited from the Early Learning Program (ELP) at Mitchell's Place, a comprehensive service center for individuals with ASD and their families located in Irondale, Alabama. The ELP is an early intervention academic program designed for preschool children aged two to six years. It is housed in four separate classrooms with approximately ten children in each classroom (mean = 9.5, range = 7-11 children/class), where approximately 50% of the children have ASD. All students with ASD are eligible to receive intervention services including speech/language therapy, occupational therapy, feeding therapy, and/or ABA therapy as part of their enrollment in the ELP, as deemed necessary by individualized education plans (IEPs). These services are administered in private pull-out sessions at various times during the day and are offered several times per week. Only children with ASD are eligible for these services, which affects their day-to-day routine. It was found that the administration of these crucial intervention services frequently coincided with the administration of the social skills intervention that was a part of the current study. During the course of the current study, no other social skills intervention or behavioral intervention package was being administered concurrently.

The majority of Mitchell's Place attendees are Caucasian and from upper middle-class families. Participants were identified as those students who were scheduled to begin

participating in a peer-mediated social skills intervention conducted by another graduate student from the University of Alabama at Birmingham. All participants possessed at least some spoken language (i.e., greater than 5 words). For children with ASD, a diagnosis must have been made using the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000), and diagnoses were confirmed via file review prior to data collection. The four ELP classrooms were randomly assigned to either the intervention or the waitlist control group, effectively splitting the subset of children with ASD. Two classrooms were assigned to the treatment group, which consisted of children with ASD (n =11) who participated in the social skills intervention. The other two classrooms were assigned to the waitlist control group, which consisted of children with ASD (n = 8) who did not participate in the intervention. One typically developing participant unenrolled from Mitchell's Place before the twelve-week follow-up period, which resulted in a sample of thirty-seven participants at follow-up.

Procedure

Data collection occurred during the fall of 2012; the time period in which the social skills intervention was conducted. Child participants and teachers completed measures immediately before the intervention, immediately after the intervention, and at a twelve-week follow-up period. Children provided their nomination and rating data as part of short sociometric "interviews" in a private room. Each interview lasted approximately ten to fifteen minutes. Conducting the interviews in a private room protected the confidentiality of each child's nominations and ratings and prevented the undue influence of other children's nominations and ratings. Before beginning the interview, a graduate student researcher explained that the children would be asked to name peers they do and

do not like to play with. Children were given the opportunity to receive a small reward at the end of the session (i.e., a sticker). Each primary classroom teacher was given a packet including each teacher sociometric measure, a copy of the behavioral measure for each of the students in their classrooms, and written instructions on how to complete each measure. Teachers were allowed to consult their in-class teacher aides for input. Only teachers that had direct and daily contact with students in their respective classrooms were asked to complete the packets. The completion time of the teacher packet took approximately twenty to thirty minutes.

Overview of the Intervention

M. Kate McCalla, a UAB graduate student at the time of the study, designed a multi-modal social skills intervention integrating strategies that have been shown to improve the social skills of children with ASD (e.g., applied behavior analysis, peer training, and video modeling). Dr. McCalla and two trained graduate students delivered the intervention to eleven students in two ELP classrooms. Eight students in the other two ELP classrooms were randomly assigned to a waitlist control group. The eight week intervention consisted of fifteen sessions that were categorized as either *training* sessions or *generalization* sessions. Five 30-minute training sessions were administered at the beginning of the intervention, and ten 15-minute generalization sessions were then administered in the playground or classroom. Throughout all sessions, children were given verbal praise and tangible reinforcers (i.e., stickers) for correctly demonstrating target skills.

During training sessions, one or two students with ASD and one or two typically developing matched peer trainers were taught nine distinct target skills: 1) play close, 2)

get attention, 3) ask to play, 4) give choices, 5) say what you play, 6) show different play, 7) say nice things, 8) take turns, and 9) play his (her) way. Instructors used a combination of verbal and visual instruction, modeling, and role-play to teach the skills to all children. In the classroom generalization session, small groups consisting of two to four children participated in each session. Each group had at least one child with ASD and several peer trainers. On the playground generalization sessions, the intervention was delivered to dyads consisting of one child with ASD and one peer trainer. At the onset of each generalization session, children were reminded of the target skills and the reward system. Fidelity data was collected for 20% of the intervention sessions using pre-established checklists. Across three therapists, mean fidelity was 87% (see McCalla, 2014). Due to the intensive nature of the intervention, the teachers of the four ELP classrooms were not blind to group assignment (i.e. each teacher was aware if their students were participating in the social skills intervention).

Measures

Child Measures

Peer Picture Nominations Task (McCandless & Marshall, 1957; Hartup, Glazer, & Charlesworth, 1967). The Peer Picture Nominations Task is a sociometric measure designed to elicit positive and negative nominations of a child's peers in order to assess children's peer acceptance, peer rejection, social preference, social impact, and number of reciprocated playmate nominations. During this task, each child was asked to identify three children from his/her class whom he/she *most likes* to play with (i.e., positive nominations) and three children from his or her class whom he/she *most dislikes* playing with (i.e., negative nominations). Each child was seated in front of a tri-fold poster board

on which each of their classmates' photos were attached, and participants were allowed to remove pictures from the board after making a nomination. After all three positive nominations were made all photos were replaced on the board in a randomized fashion before negative nominations were made. This measure is considered the gold standard of producing sociometric nominations from preschool-aged children, and has produced reliable data across different settings and studies (Coie, Dodge, & Coppotelli, 1982; Mikami, Griggs, Reuland, & Gregory, 2012; Parker & Asher, 1987). It has varying test-retest reliability across age and gender groups, with correlations ranging between .46 to .88 (Coie, Dodge, & Coppotelli, 1982).

Peer Play Rating Scale (Asher & Dodge, 1986; Singleton & Asher, 1977). The Peer Play Rating Scale is a sociometric measure that requires children to rate how much they like to play with each of their peers within the classroom on a Likert-type rating scale. This measure produces a play rating score for each participant. Each child was given a picture of each individual peer in his/her classroom and instructed to place the picture into one of three boxes with the corresponding smiley faces: a happy face representing "I *really like* to play with this person," a neutral face representing "I *kind of like* to play with this person," and a sad face representing "I *do not like* to play with this person at all." A child received a score of 2 if his/her photo was placed in the happy face box, a score of 1 for placement in the neutral face box, and a score of 0 for placement in the sad face box. An overall play rating score for each child was computed as the average of all the scores received from that child's classmates. Higher rating scores indicated that a child was more liked by friends. This instrument has yielded acceptable test-retest reliability across a diverse sample of preschool children, r = .74 to .81 (Asher, Singleton,

Tinsely & Hyme, 1979). Its overall reliability for use in a sample of preschoolers is also appropriate, Cronbach's alpha = .86 (Denham & McKinley, 1993). It has been argued that peer ratings in preschool children should be restricted to same-gender peers (Asher & Hymel, 1981). However, to ensure the greatest reliability of ratings and to retain as much variability as possible (Hayden-Thomas, Rubin, & Hymel, 1987), ratings were not gender-restricted for the purposes of this study.

Because the Peer Picture Nominations Task and Peer Play Rating Scale have not been used to assess sociometric data specifically in preschool children with Autism Spectrum Disorders, it was necessary to establish test-retest reliability for these measures for the purpose of this study. A separate, smaller sample of children from Mitchell's Place (N = 17; 76% male) was recruited to complete the child-rated measures. Four to five students from each classroom were recruited to participate. Of the seventeen participants, at least fifty percent had a diagnosis of ASD as confirmed by an independent chart review. Participants in this smaller sample ranged in age from 29 to 83 months (M = 51.89, SD = 13.25). The group of seventeen participants provided information on a total of 45 children enrolled in the ELP. The sociometric interviews were completed in the spring of 2015, and each participant completed two interviews over a two week time span.

Pearson's product-moment correlations were used to assess test-retest reliability for the number of liked nominations a child received (L score) as part of the Peer Picture Nominations Task and each child's play rating score (PR score) obtained from the Peer Play Rating Scale. Appropriate test-retest reliability is considered to be achieved when the correlation coefficient is $\geq .70$, as a coefficient of that magnitude is believed to

indicate that more than 50% of the variance between time points is shared. Test-retest reliability was not able to be established for the number of reciprocated playmate nominations because not every child in the ELP was given the opportunity to participate in the interviews. Correlation coefficients for child-rated measures are displayed in Table 1. Appropriate test-retest reliability was not found for typically developing children in terms of the number of liked nominations they received from Time 1 to Time 2 (r = .64) nor in their play rating score from Time 1 to Time 2 (r = .67). On the other hand, appropriate test-retest reliability was found for the play rating score of children with ASD from Time 1 to Time 2 (r = .70), but not for their number of liked nominations (r = .11). Social status for typically developing children as reported by their peers from Time 1 to Time 2 did not meet appropriate test-retest standards (r = .44). Moreover, the social status of children with ASD as reported by their peers from Time 1 to Time 2 was also relatively unstable and did not meet appropriate test-retest criteria (r = .28).

Teacher Measures

Teacher Sociometric Nominations Task and **Teacher Rating Scale** (Wu, Hart, Draper, & Olsen, 2001). Similar to the Peer Picture Nominations Task, the Teacher Sociometric Nominations Task asked each teacher to nominate three most liked and three most disliked peers for each child in their classroom. Reciprocated playmate nominations were obtained from this measure using the same procedures as in the Peer Picture Nominations Task. The Teacher Rating Scale instructed teachers to rate each child in their classrooms on a 5-point Likert scale ranging from 1 (Never wanted as a playmate) to 5 (Frequently wanted as a playmate). This rating scale provides a single measure of teacher-rated popularity for each child participant. Assessment of teacher-rated

sociometric outcomes obtained from these two techniques has moderate concordance with assessment of student-rated popularity obtained from similar student report techniques (r = .66). When taken together, the nominations and ratings tasks have high cross-time stability (r = .96) over an eight-week period (Wu et al., 2001).

The four Mitchell's Place teachers were also recruited to complete the teacher-rated measures as part of this study's independent examination of test-retest reliability. Teachers completed each teacher-rated measure at two separate time points over a two week time span. Test-retest reliability was assessed for teacher-rated reciprocated playmate nominations and teacher-rated popularity. Teacher-rated popularity had high test-retest reliability from Time 1 to Time 2 (r = .92). However, teacher-rated reciprocal nominations did not meet appropriate test-retest reliability criteria (r = .63), even though this measure was acceptably correlated with teacher-rated popularity at both time points (r = .70 to r = .74). Correlation coefficients for teacher-rated measures can be found in Table 2.

Child Behavior Checklist—Ages 1.5-5, Caregiver/Teacher Report Form (CBCL 1.5-5—TRF; Achenbach & Rescorla, 2004). The CBCL 1.5-5—TRF is a standardized form that assesses teacher-rated behavior problems in children 1½ to 5 years. This 100-item checklist allows teachers to rate students' behaviors on a scale from 0 ("Not true") to 2 ("Very True/Often True"). Example items include "Cruelty, bullying, or meanness to others," and "Cries or whines often." The clinical scales of the CBCL consist of a Total Problems score (Cronbach's alpha = .93), two broadband dimensions (Internalizing and Externalizing problems) and seven subscales. *T* scores (mean = 50, standard deviation = 10) were obtained for the internalizing problems dimension,

externalizing problems dimension, and total problems scale. The internalizing behavior *T* score (Cronbach's alpha = .89) is composed of scores obtained on the emotionally reactive, somatic complaints, withdrawn, and anxious/depressed subscales. The externalizing behavior *T* score (Cronbach's alpha = .92) is composed of scores obtained on the attention problems and aggressive behavior subscales.

Observations of Social Behavior

Videos of social behavior were collected for each child with ASD in the intervention and waitlist control groups (N =19). For each subject, 20 minutes of free play behaviors were recorded in the classroom and 20 minutes of free play behaviors were recorded on the playground at baseline, post-intervention, and at the 3-month follow up. The research team, including the primary researcher and three graduate students, was not able to collect 2.6% of the anticipated 40 hours of footage due unanticipated child absences, resulting in a total of 38 hours of obtained video footage. Due to instances when the target child could not be seen in the shot, 1.1% of the collected video could not be coded accurately.

Each video was coded twice, once to determine the duration of positive and negative social interactions and once to determine which social behaviors occurred at a specified 15-second interval. Two trained graduate students conducted the observational coding of social behavior in the videos. Coders were blind to group assignment and had previous experience working with children with ASD. Coders must have met reliability on both duration-based codes and interval-based codes with a trainer. On duration-based codes, coders obtained Pearson correlations with trainer data ranging from 0.70 to 0.98. On the interval-based codes, coders obtained an average kappa coefficient of 0.82 across

thirteen behavioral categories. These thirteen behavioral categories included: *1) positive physical initiation, 2) positive verbal initiation, 3) positive physical response, 4) positive verbal response, 5) parallel play, 6) negative physical initiation, 7) negative verbal initiation, 8) negative physical response, 9) negative verbal response, 10) avoids/ignores, 11) solitary engagement, 12) adult engagement, and 13) not codable.* Coders wore a MotivAider that vibrated every 15 seconds as they watched the videos. When coders felt the vibration, they immediately assigned one of the 13 codes to the child's current behavior and continued watching the video. Five hours of video (15%) were randomly selected for interrater reliability coding. Pearson correlations were used to evaluate reliability on duration-based codes, and were acceptable for both positive social interactions ($r = 0.97$) and negative social interactions ($r = 0.73$). Cohen's kappa was used to calculate reliability on interval-based codes, and was acceptable (>.70) for ten behavioral categories. Two of the behavioral category codes (i.e., negative verbal initiation, negative physical response) were not observed on any of the reliability videos; therefore kappas could not be calculated. Interrater reliability was acceptable (e.g., kappa > .70) for all of the remaining social behavior codes except avoids/ignores, which had a kappa of .67.

Due to constraints on coding and amount of video collected, proportion scores were calculated for duration-based codes and interval-based codes. For the duration-based codes, proportion scores were created by dividing the amount of time a child engaged in either a positive or negative social interaction by the total amount of time coded. For the interval-based codes, the frequency of each social behavior was calculated and then divided by the total number of intervals that were coded. Five interval-based

summary codes were obtained: 1) positive social engagement (consisting of positive physical initiation, positive verbal initiation, positive physical response, and positive verbal response), 2) negative social engagement (consisting of negative physical initiation, negative verbal initiation, negative physical response, negative verbal response, and avoids/ignores), 3) parallel play, 4) solitary engagement, and 5) interaction with an adult. See Appendix A for the detailed coding procedure and the operational definition of each category of social behavior.

Classifying Social Status

The best method for classifying preschool children into social status categories based on child-report data has been greatly debated since the early 80s. Coie and colleagues (1982) created the first social status stratification criteria using the frequencies of positive and negative nominations obtained from the Peer Picture Nominations Task. Asher and Dodge (1986) suggested an alternative method using the positive nominations score from the Peer Picture Nominations Task, but substituting a play rating (PR) score from the Peer Play Rating Scale for the negative nominations score. This modified method has been demonstrated to be more accurate in identifying children who are rejected (Asher & Dodge, 1986). This study used the modified method as proposed by Asher and Dodge (1986). Because no defined method exists for classifying social status using teacher sociometric data, social status was classified using child-rated data only.

For each participant, a number of positive nominations (L) score and a play rating (PR) score was computed from the Peer Picture Nominations Task and the Peer Play Rating Scale, respectively. A social preference (SP) score was computed by subtracting the PR score from the L score, and a social impact (SI) score was computed by adding the

PR and L scores. Social preference has been defined as a measure of likeability, or the extent to which a child is liked or disliked by his/her peers. Social impact is a measure of salience, or the degree to which a child is noticed by his/her peers (Newcomb, Bukowski, & Pattee, 1993). To account for varying class size differences, all scores were standardized within each classroom. The following criteria was used to classify children into social status groups: Popular children have a SP score greater than 1.0, an L score greater than 0, and a PR score less than 0. Rejected children have a SP score less than -1.0, an L score less than 0, and a PR score greater than 0. Neglected children have a SI score less than -1.0, an L score less than 0, and a PR score less than 0. Controversial children have a SI score greater than 1.0, an L score greater than 0, and a PR score greater than 0. All remaining children fell into an "average" status group.

Analysis Plan

In order to determine if the children with ASD in the intervention treatment group, children with ASD in the waitlist control group, and typically developing children differed on the demographic variables of race and gender, Fisher's Exact tests were conducted. Differences between the three groups in terms of age were analyzed using a one-way analysis of variance (ANOVA). Additionally, univariate distributions and bivariate associations among all dependent variables were examined. Differences in age, verbal and nonverbal cognitive abilities, receptive and expressive language abilities, social development, and overall development between the treatment group and waitlist control group were previously examined using independent samples t-tests and Fisher's exact tests (McCalla, 2014).

The main goal of the primary analyses was to examine group differences on social behavior and measures of social status and social standing across time: before the social skills intervention was administered, immediately after the intervention was administered, and at a twelve-week follow-up period. The dependent variables fell into three categories: behavior problems, peer-reported social status, and additional measures of social standing. Behavior problems included the Internalizing Problems scale and Externalizing Problems scale from the CBCL 1.5 – 5 that was completed by teachers. Peer-reported social status is a single variable, obtained using the method proposed by Asher and Dodge (1956). Peer-reported status is based on child-report only. Additional measures of social standing included peer-rated reciprocated playmate nominations obtained from the Peer Picture Nominations Task, teacher-rated reciprocated playmate nominations obtained from the Teacher Sociometric Nominations Task, and teacher-rated popularity obtained from the Teacher Rating Scale. These additional measures of social standing are based on both child and teacher report.

In order to satisfy the objectives of **Aim 1** (i.e., examining differences in behavior problems, social status, and additional measures of social standing between groups at baseline), several one-way ANOVAs and nonparametric tests were used. To examine ***Hypothesis 1.1*** stating that children with ASD will exhibit greater behavioral problems than typically developing peers at baseline, differences in both types of behavior problems between children with ASD in the treatment group, children with ASD in the waitlist control group, and typically developing peers were examined using separate one-way ANOVAs for each type of behavior problem. To examine ***Hypothesis 1.2*** stating that children with ASD will experience more negative social status (e.g., rejection or

neglect) at baseline, differences in social status between groups were examined using Fisher's Exact test. Due to the small sample size, less than the expected number of cells have the minimum expected count of 5 cases, so the Fisher's Exact test significance value is reported for this test. To examine ***Hypothesis 1.3*** stating that children with ASD will receive fewer reciprocal social relationships as reported by peers and teachers and experience lower teacher-rated popularity at baseline, separate one-way ANOVAs for each additional measure of social standing were conducted. In other words, a one-way ANOVA was conducted to examine differences between groups in terms of teacher-rated reciprocated playmate nominations. A second one-way ANOVA was conducted to examine differences between groups in terms of peer-rated reciprocated playmate nominations. A third one-way ANOVA was conducted to examine differences between groups in terms of teacher-rated popularity. Because multiple ANOVAs were conducted to examine these hypotheses, the probability of increasing Type 1 error was inflated. To control for the inflation of Type 1 error, a Holm-Bonferroni correction was applied. Post-hoc power analyses were conducted for the set of one-way ANOVAs using the program *G*Power* (Faul, Erdfelder, Lang, & Buchner, 2007), and it was determined that there was moderate power, $f = .52$, to detect large differences between groups at baseline.

Assumptions were examined for each one-way ANOVA conducted. Outliers were detected by determining if there were cases with standardized residuals greater than ± 3 standard deviations. Based on this method, no outliers were detected in any dependent variable. The assumption of normality was tested using a visual inspection of the Q-Q plots of the standardized residuals. No significant violations of normality were detected for any dependent variable. Levene's Test of Equality of Error Variances was conducted

to check the assumption of homogeneity of variances. No violations of this assumption were found for any dependent variable.

In order to satisfy the objectives of **Aim 2** (i.e., examining differences in behavior problems, social status, and additional measures of social standing between groups immediately after the intervention and at the twelve-week follow-up period), several mixed 3 (Group) X 3 (Time) analyses of variance (ANOVAs) were conducted. To examine ***Hypothesis 2.1*** stating that that improvements in social behaviors of children with ASD in the treatment group will be seen immediately after the intervention and at the twelve-week follow-up period, treatment effects on internalizing and externalizing behavior problems were investigated using separate mixed 3 (group) X 3 (time) ANOVAs for each type of behavior problem. To examine ***Hypothesis 2.2*** stating that improvements in social status of children with ASD that participated in the social skills intervention will be seen immediately after the intervention and at the twelve-week follow-up period, treatment effects on social status were also investigated using a mixed 3 (group) X 3 (time) ANOVA. To examine ***Hypothesis 2.3*** stating that improvements in number of reciprocal relationships and popularity of children with ASD that participated in the social skills intervention will be seen immediately after the intervention and at the twelve-week follow-up period, treatment effects on each additional measure of social standing were also investigated using separate mixed 3 (group) X 3 (time) ANOVAs. One mixed 3 X 3 model was conducted for teacher-rated reciprocated playmate nominations. A second mixed 3 X 3 model was conducted for peer-rated reciprocated playmate nominations. A third mixed 3 X 3 model was conducted for teacher-rated popularity. Because multiple mixed ANOVAs were conducted, a Holm-Bonferroni

correction was applied. Post-hoc power analyses were conducted for the set of mixed 3 X 3 ANOVAs using *G*Power* (Faul, Erdfelder, Lang, & Buchner, 2007), and it was determined that there was relatively strong power, $f = .61$, to detect medium interaction effects based on a conservative estimate of sample size.

Assumptions were examined for each mixed 3 X 3 ANOVA conducted. Outliers were detected by determining if there were cases with standardized residuals greater than $\pm$ 3 standard deviations. Based on this method, no outliers were detected in any dependent variable. The assumption of normality was tested using a visual inspection of the Q-Q plots of the standardized residuals. No significant violations of normality were detected for any dependent variable. The Box Test was conducted to check for the assumption of homogeneity of covariances, and each dependent variable analysis met this assumption. Levene's Test of Equality of Error Variances was conducted to check the assumption of homogeneity of variances. Minor violations of this assumption were found for the following analyses: teacher-rated reciprocated nominations, peer-rated reciprocated nominations, teacher-rated popularity, and social status. Because these variables had very few levels, they were not transformed to address the violation of homogeneity of variances. Finally, Mauchly's test was conducted to check the assumption of sphericity. This assumption was violated for analyses examining internalizing behavior problems, externalizing behavior problems, and teacher-rated reciprocated nominations. In these cases, the Greenhouse-Geisser statistic is reported to correct for this violation.

Although the groups differed in respect to age (see below), this demographic variable was not included as a covariate in the ANOVA analyses because the assumption

of the homogeneity of regressions was violated, and it is thought that analyses of covariances (ANCOVAs) are not robust to violations of this assumption. The groups also differed in respect to gender (see below), but this variable was also not included as a covariate because it is not a continuous variable and therefore, not appropriate for use as a covariate.

The main goal of **Aim 3** of this study was to examine behavioral correlates with social status, but only for children with ASD. This aim was not concerned with changes in play behaviors over time, but on determining what play behaviors appeared to correlate with social status at each time point during the intervention. To examine ***Hypothesis 3.1*** stating that children with negative social status will exhibit more deficient play skills, a total of twenty-one independent samples t-tests were used to examine social status classification differences in observed social behaviors at all three time points. It is important to note that these analyses were only conducted for children with ASD because no video data was collected on typically developing peers. Differences between the positive social status group and negative social status group on gender and race were examined using Fisher's Exact tests. Additional differences between groups on age were examined using independent samples t-tests. Assumptions were examined for each independent samples t-test conducted. The Shapiro-Wilk test was conducted on each play behavior at each time point to test for violations of normality. The interval-based codes of positive social engagement at baseline, interaction with an adult at baseline, and interaction with an adult post-intervention significantly violated the assumption of normality and were transformed using a logarithmic plus one function. The positive interaction duration-based code at follow-up was also transformed using a logarithmic

plus one function due to significant violations of normality. Levene's Test of Equality of Error Variances was conducted to check the assumption of homogeneity of variances. No violations of this assumption were found for any play behavior variable at any time point. Post-hoc power analyses were conducted for the set of the independent samples t-tests using *G*Power* (Faul, Erdfelder, Lang, & Buchner, 2007), and it was determined that there was very weak power, $d = .36$, to detect even large differences between the two groups.

Results

Sample Descriptives

Descriptive statistics for the baseline characteristics of the treatment and waitlist control groups and typically developing peers are provided in Table 3. Children with ASD in the intervention group (91%) and Children with ASD in the waitlist control group (86%) were mostly male, while the majority of children in the typically developing (TD) group were mostly female (87%). Children in the treatment group had a mean age of approximately 58 months ($SD = 8.93$ months), children in the waitlist control group had a mean age of approximately 55 months ($SD = 12.86$ months), and TD peers had a mean age of approximately 46 months ($SD = 9.99$ months). All three groups were similar in terms of race, where approximately 73% of the treatment group, 100% of the waitlist control group, and approximately 95% of TD peers were classified as Caucasian.

Significant differences were found between the three groups in terms of gender ($p < .001$), and age $F(2, 35) = 5.31$, $p < .01$, partial $\eta^2 = .23$. However, there were no significant differences found between the three groups in terms of race ($p = .11$). Follow-up testing using Pearson's chi-square analyses revealed that the waitlist control group and

TD peers significantly differed in gender, χ^2 (1) = 4.99, $p < .05$. The treatment group and TD peers also significantly differed in gender, χ^2 (1) = 7.61, $p < .01$. Additional follow-up testing for age using Tukey's HSD test revealed that TD peers were significantly younger than the treatment group ($p = .01$), but were not significantly younger than the waitlist control group ($p = .16$). Differences between children with ASD in the treatment and waitlist control groups have previously been examined, and no differences were found on gender, age, race, language abilities, cognitive abilities, or developmental abilities (see Table 3; McCalla, 2014) Differences in language, cognitive, and developmental abilities between children with ASD and typically developing (TD) peers were unable to be compared because this data was not collected for TD peers.

Bivariate associations between behavior problems, social status, and additional measures of social standing at baseline are displayed in Table 4. For children with ASD, internalizing behavior problems were moderately negatively correlated with teacher-rated reciprocated playmate nominations, $r = -.55$, while externalizing behavior problems were moderately negatively correlated with peer-rated reciprocated playmate nominations, $r = -.47$. Internalizing and externalizing problems had weak negative correlations with many other dependent variables at baseline for children with ASD, including social status and teacher-rated popularity ($r = .01$ to $r = .38$). Each measure of teacher-rated social standing (i.e., reciprocated nominations and popularity) were moderately positively correlated for children with ASD at baseline ($r = .57$). It is notable, however that similar measures of teacher- and peer-rated social standing did not correlate strongly for this diagnostic group at baseline ($r = -.03$ to $r = .36$).

For typically developing children, only one significant correlation was found between social status and peer-rated reciprocal nominations at baseline (r = .66). All other dependent variables for this diagnostic group at baseline were weakly correlated with each other (r = .02 to r = .42). For typically developing children, there were no clear negative or positive associations between behavior problems and measures of social status or social standing. Moreover, measures of teacher-rated social standing and peer-rated social standing were not significantly correlated with each for either diagnostic group.

Differences in Dependent Variables at Baseline

Differences in Internalizing and Externalizing Behavior Problems – Hypothesis 1.1

Results from the one-way ANOVA examining differences in internalizing problems between groups at baseline revealed a significant difference in these behavior problems between groups, F (2, 35) = 17.96, p < .01, partial η^2 = .11. Post-hoc testing using Tukey's HSD test revealed that the treatment group exhibited significantly greater internalizing problems (M = 63.91, SD = 4.64) than the waitlist control group (M = 53.00, SD = 10.82, p < .05) and TD peers (M = 46.16, SD = 7.83, p < .001). The waitlist control group did not exhibit significantly more internalizing behavior problems than TD peers (p = .11). There was also a significant difference in amount of externalizing problems between groups at baseline, F (2, 35) = 12.43, p < .01, partial η^2 = .41. Post-hoc testing using Tukey's HSD test revealed that children with ASD in the treatment group (M = 66.00, SD = 6.25) exhibited significantly more externalizing behaviors than the waitlist control group (M = 56.38, SD = 6.41, p <.05) and TD peers (M = 50.42, SD = 9.73, p < .001). However, there were no significant differences in the amount externalizing

problems between the waitlist control group and TD peers at baseline (p = .215). Figure 1a – 1b displays means of internalizing and externalizing behavior problems for each group at all three baseline and the other two time points.

Differences in Social Status – Hypothesis 1.2

Figure 2a – 2c displays the percentages of children in each group that were classified into the five unique social status classifications based on the method proposed by Asher and Dodge (1986) at all three time points. With the exception of the Average status class, four social status classes contained very few or no children. Due to this, the social status variable was reduced from five levels and dichotomized into "Positive" and "Negative" social status. Children who were classified as Popular or Average were recoded as having Positive social status, while children classified as Rejected, Neglected, or Controversial were recoded as having Negative social status. Results from the Fisher's Exact test analyzing differences in social status between groups at baseline revealed no significant differences in social status classification between groups, p = .52. At baseline, approximately 36% of the treatment group, 63% of the waitlist control group, and 58% of TD peers held a positive status (see Figure 3).

Differences in Additional Measures of Social Standing – Hypothesis 1.3

Results from the one-way ANOVA examining differences in teacher-rated reciprocated playmate nominations between groups at baseline revealed no significant differences between groups in number of playmate nominations received from teachers, F (2, 35) = 3.72, p = .10, partial η^2 = .18. Results from the one-way ANOVAs examining differences in peer-rated reciprocated playmate nominations and teacher-rated popularity at baseline were similar. The groups did not significantly differ in terms of peer-rated

reciprocated nominations, F (2, 35) = 2.41, p = .11, partial η^2 = .12, or in terms of teacher-rated popularity at baseline, F (2, 35) = 3.60, p = .10, partial η^2 = .42. Figure 4a – 4c displays the means for each additional measure of social standing at each time point in the intervention.

Changes in Dependent Variables over Time

Changes in Internalizing and Externalizing Behavior Problems – Hypothesis 2.1

Results from the mixed 3 (group) x 3 (time) ANOVA examining treatment effects on internalizing problems revealed a significant interaction between time and group, F (3.419, 58.121) = 5.27, p < .01, partial η^2 = .24, indicating that differences in internalizing problems between time points were dependent on group assignment, and that differences between the groups were dependent upon the time point of the intervention (see Figure 1a). To explore the nature of the interaction, tests of the simple main effects were performed. To control for Type 1 error rate across the simple effects, a Holm-Bonferroni correction was applied.

The simple main effect of group was first examined, that is, differences between the treatment and waitlist control groups and TD peers at each time point. As mentioned above, there were significant differences between groups at baseline, F (2, 35) = 17.96, p < .01, partial η^2 = .11. Significant differences between groups were also found immediately following the intervention, F (2, 35) = 18.59, p < .01, partial η^2 = .52. At this time point, both the treatment (M = 59.91, SD = 6.18, p < .001) and waitlist control groups (M = 62.13, SD = 9.67, p < .001) exhibited significantly more internalizing behavior problems than TD peers (M = 42.74, SD = 10.11). However, the children with ASD in the treatment and control groups did not differ from each other in internalizing

problems (p = .86). Significant differences in internalizing problems between groups persisted to the twelve-week follow-up, F (2, 34) = 19.42, p < .01, partial η^2 = .53. Again, the treatment (M = 61.82, SD = 7.80, p < .001) and waitlist control groups (M = 62.50, SD = 8.90, p < .001) exhibited significantly more internalizing behavior problems than TD peers (M = 44.56, SD = 8.85). Children with ASD in the treatment and control groups did not differ from each other in internalizing problems at follow-up (p = .98). The simple main effect of time within groups was not significant, indicating that there were no significant changes in internalizing problems over time for the treatment group, F (2, 16) = .85, p > .05, partial η^2 = .10, waitlist control group, F (2, 10) = .52, p > .05, partial η^2 = .10, or TD peers, F (2, 30) = .64, p > .05, partial η^2 = .04.

The same series of analyses was conducted to examine treatment effects on externalizing behavior problems over time. Results from the 3 (group) x 3 (time) ANOVA revealed a significant interaction between time and group, F (3.112, 52.900) = 5.13, p < .01, partial η^2 = .23, indicating that differences in externalizing problems between time points were dependent on group assignment, and that differences between the groups were dependent upon the time point of the intervention (see Figure 1b). To explore the nature of this interaction, tests of the simple main effects were performed. To control for Type 1 error rate across the simple effects, a Holm-Bonferroni correction was applied.

The simple main effect of group was first examined. Results show that, as previously mentioned, there were significant differences in externalizing problems between groups at baseline, F (2, 35) = 12.43, p < .01. Significant differences were also found immediately following the intervention, F (2, 35) = 13.44, p < .01, partial η^2 = .43.

At this time point, both the treatment (M = 60.45, SD = 7.48, $p < .001$) and control groups (M = 62.13, SD = 5.79, $p < .001$) exhibited significantly more externalizing problems than TD peers (M = 48.56, SD = 8.09). However, the two groups of children with ASD did not differ from each other in amount of externalizing problems (p = .88). This pattern of heightened behavior problems in the ASD groups was also reported at the follow-up period, F (2, 34) = 11.94, $p < .01$, partial η^2 = .41. Children in the treatment (M = 61.36, SD = 6.81, $p < .001$) and waitlist control groups (M = 62.63, SD = 5.01, $p < .001$) exhibited significantly more externalizing problems than TD peers (M = 49.22, SD = 9.34). Again, the treatment and waitlist control groups did not differ in amount of externalizing problems at follow-up (p = .94). The simple main effect of time within groups was not significant, indicating that there were no significant changes in externalizing problems over time for the F (1.017, 8.139) = 1.23, $p > .05$, partial η^2 = .20, waitlist control group, F (2, 10) = 2.66, $p > .05$, partial η^2 = .12, or typically developing children, F (2, 30) = 2.16, $p > .05$, partial η^2 = .13.

Changes in Social Status over Time – Hypothesis 2.2

A 3 (group) x 3 (time) ANOVA examining treatment effects on social status over time was conducted. Results from this test revealed a significant interaction between group and time on social status, F (4, 70) = 2.63, $p < .05$, partial η^2 = .13, indicating that differences in social status between time points were dependent on group assignment, and that differences between the groups were dependent upon the time point of the intervention (see Figure 3). To explore the nature of the interaction, tests of the simple main effects were performed. The simple main effect of group was examined first, that is, differences between groups for each time point of the intervention. The only significant

difference between groups was found at the twelve-week follow-up time point, F (2, 35) = 5.75, $p < .05$, partial $\eta^2 = .24$. At follow-up, significantly more children with ASD in the treatment group ($M = .91$, $SD = .30$) had positive social status than children with ASD in the waitlist control group ($M = .25$, $SD = .46$, $p = .006$). However, there were no differences in social status between the treatment group and TD peers ($M = .68$, $SD = .48$, $p = .11$). Children in the waitlist control group and typically developing peers also did not significantly differ in social status at follow-up ($p = .36$). The simple main effect of time within groups was only significant for the treatment group, F (2, 20) = 6.92, $p < .01$, partial $\eta^2 = .24$. More children in this group had positive social status at post ($M = .91$, $p = .01$) and follow-up ($M = .91$, $p = .01$) than they did at baseline ($M = .36$).

Changes in Additional Measures of Social Standing over Time – Hypothesis 2.3

Results from the (group) by 3 (time) mixed ANOVA examining treatment effects on teacher-rated reciprocated playmate nominations did not reveal a significant interaction between group and time, F (3.390, 57.634) = 1.99, $p = .12$, partial $\eta^2 = .11$. However, a main effect of group was found, F (2, 34) = 8.970, $p < .001$, partial $\eta^2 = .35$, indicating that teacher-rated reciprocated nominations differed between the three groups of children regardless of time. Follow-up testing using the Games-Howell post-hoc test revealed that the typically developing peers generally received more reciprocal nominations from peers than children with ASD in the treatment group ($p < .001$), but not the waitlist control group ($p = .19$). For teacher-rated reciprocated nominations, there was an additional main effect of time, F (1.695, 57.634) = 4.10, $p < .05$, partial $\eta^2 = .11$, indicating that there was change in teacher-rated nominations across the course of the study without regard to group (see Figure 4a). Finding a significant main effect for time,

but not a significant interaction between time and group, would suggest that the measure producing this variable is unstable over time; therefore, this main effect will not be interpreted.

Similar results were found from the mixed 3 (group) X 3 (time) ANOVAs examining treatment effects on the two additional measures of social standing. No significant interaction between time and group was found for peer-rated reciprocated nominations, F (4, 68) = .691, p = .60, partial η^2 = .04, or teacher-rated popularity, F (4, 68) = 1.15, p = .34, partial η^2 = .06. However, a main effect for group was found for peer-rated reciprocated nominations, F (2, 34) = 6.19, p < .01, partial η^2 = .27, indicating that there was change in peer-rated nominations across the course of the study without regard to group (see Figure 4b). Games-Howell post-hoc tests indicate that children with ASD in the treatment group generally received fewer reciprocal nominations from peers than typically developing children (p = .002), but not children with ASD in the waitlist control group (p = .157), regardless of time point. A main effect for group was also found for teacher-rated popularity, F (2, 34) = 9.30, p < .001, partial η^2 = .35, indicating that there was change in teacher-rated popularity across the course of the study without regard to group (see Figure 4c). Games-Howell post-hoc tests suggested that children with ASD in the treatment group experienced significantly lower teacher-rated popularity than typically developing peers (p < .01), but not children with ASD in the waitlist control group (p = .54).

Play Behavior Correlates of Social Status – Hypothesis 3.1

Twenty-one independent samples t-tests were used to examine social status classification differences in observed social behaviors at all three time points. These

analyses were only conducted for children with ASD in both the treatment and waitlist control groups because no video data was collected on typically developing peers. To correct for inflation of Type 1 error rate, a Holm-Bonferroni correction was applied. There were no differences in gender between the positive and negative social status groups at baseline (p = 1.00), post (p =.39), or follow-up (p = .51). There were no differences in race between the positive and negative social status groups at baseline (p = 1.00), post (p =1.00), or follow-up (p = .26). Finally, there were no differences in age between the positive and negative social status groups at baseline, (p = .82), post (p =.53), or follow-up (p = .29). Results revealed no significant differences between positive and negative social status on any of the duration-based or interval-based codes at any time point (all p > .05). The means of each play behavior for the positive and negative social status groups are displayed in Table 5.

Discussion

A primary outcome of this study was examining differences between children with ASD and typically developing peers in regards to behavioral problems, and to examine any potential changes in behavior problems as a result of the social skills intervention. Partial support was provided for Hypothesis 1.1. At the outset of the study, children with ASD in the treatment group did exhibit more of both types of behavior problems than typically developing peers, but children with ASD in the waitlist control group did not. However, as time progressed, children in the waitlist control group began to exhibit significantly more internalizing and externalizing behaviors than typically developing peers and were similar to their peers with ASD in the treatment group in amount of behavior problems. The results from the post and follow-up periods are also consistent

with previous literature stating that children with ASD generally exhibit more behavior problems (Brereton, Tonge, & Einfeld, 2006; Buysse, Nabors, Skinner, & Keyes, 1997; Georgiades et al., 2011).

The intervention did not appear to have an effect on improving behavior problems for children with ASD, which does not support Hypotheses 2.1. It is very likely that the intervention did not have an effect on decreasing internalizing or externalizing problems because it was not designed to target these types of behaviors. Early intensive behavioral interventions (EIBI) designed to improve challenging behaviors in this population typically include a large behavioral training component based upon principles of B. F. Skinner's learning theory (Skinner, 1953) and utilization of operant training approaches, such as those used in applied behavior analysis or Pivotal Response Training (Howlin, Magiati, & Charman, 2011). While this intervention adapted some applied behavioral techniques to improve social behaviors, it did not include other vital components designed to make it a more-regulated behavioral training program.

Another primary outcome of this study was examining social status between groups and changes in social status within groups after the social skills intervention was administered. It was found that children with ASD in the treatment group and typically developing peers did not differ in social status prior to or immediately following the intervention, which does not provide support for Hypotheses 1.2. However, between the two groups of children with ASD, there were noticeable differences in social status classifications at the follow-up period, but children in the treatment group did not significantly differ from typically developing peers, providing partial support for Hypothesis 2.2. At this time point, children with ASD who received the intervention were

more likely to hold a positive social status than children with ASD who did not receive the intervention. Moreover, children with ASD that participated in the intervention experienced significant positive change in social status over time. Prior to the intervention, only 36 percent of children with ASD in this group held a positive status. However, after the intervention, nearly 91 percent of children in the treatment group held at least an Average status, and this effect was maintained up to the twelve-week follow-up period.

In addition to social status, reciprocated playmate nominations from peers were assessed as an additional measure of social standing. In general, children with ASD in the treatment group made more unilateral (i.e., unreciprocated) playmate nominations than did typically developing peers. This difference between groups supports previous literature that demonstrated a lower number of reciprocal relationships for high-functioning preschool children with ASD (Church, Alinsanski, & Amanullah, 2000) and school-aged children with ASD (e.g., Chamberlain, Kasari, & Rotheram-Fuller, 2007; Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012). This pattern of nominations from children with ASD also supports the idea that this population often overestimates their position within social structures (Kasari & Rotheram-Fuller, 2007).

A strong aspect of this study was the inclusion of teacher-rated measures of children's social standing in the classroom. According to their teachers, children with ASD in the treatment group generally received fewer reciprocated playmate nominations from teachers than typically developing peers. Children in the treatment group were also generally rated as less popular than typically developing peers. Children with ASD in the waitlist control group did not significantly differ from children in the treatment group in

terms of teacher-rated nominations or popularity. Overall, these findings do not support Hypothesis 1.3 or Hypothesis 2.3, stating that these measures of social standing would improve as the intervention was administered.

There are several important questions that need to be answered in regards to the findings from social status and additional measures of social standing Firstly, why would children with ASD in the treatment group experience noticeable gains in social status after the intervention and maintain these gains, while children with ASD in the waitlist control group experience such significant decreases in social status over time? It is possible that the intervention itself lead to increases in social status for children with ASD that participated. It has been argued that children who possess appropriate social skills will be perceived as more liked and be more accepted by peers (Walker, 2009). Based on this theory, improving social skills will result in increases in peer acceptance and popularity. However, the intervention did not have many significant effects on improving social skills for the children with ASD (see McCalla, 2014), so it is probable that another element of the intervention affected children's perceptions of their peers' social status, and this may be why social status was improved upon for the children in the treatment group.

Social status is a complex construct that encompasses how liked a child is with how visible that child is to others. Prior to the intervention, a large percentage of children with ASD in the treatment group were classified as Neglected; a classification characterized primarily by low social impact or social visibility. It is possible that the administration of the intervention, by its design, improved the social visibility of these children, and because children in the waitlist control group did not undergo the

intervention, their social visibility was not improved over time. As part of the administration, children undergoing the intervention were pulled out of the classroom and monitored on the playground several times within one school day. They were also given visible rewards for participating, and the videotaping of these children occurred in front of their classmates and peers. It is possible that other children simply began noticing the children in the intervention group more as the intervention progressed because of these administration details, which elevated their social visibility to their peers and, in turn, elevated their status to Average. Unfortunately, no child with ASD in the treatment group obtained Popular status, suggesting that improving social visibility is not enough to improve social status entirely. Future interventions designed to improve social status in this population should focus on other factors that are known to correlate with status in the preschool years. As mentioned previously, some of these factors could include self-regulation, affective expression, and social communication (Howes, 1990; Spinrad et al., 2004; Black & Hazen, 1990).

The above explanation for why social status increased is brought into question when additional measures of social standing are examined. In general, children with ASD in the treatment group received fewer reciprocated nominations from peers, even after they participated in a social skills intervention. Why would children in the treatment group experience such significant increases in social status, but not possess more reciprocated friendships at similar time points? There are two possible explanations for these findings. Firstly, it may be that social status and reciprocated relationships (i.e., "friendships") represent two separate constructs. Friendships are defined as dyadic social relationships based in reciprocal and stable interactions that fulfill the needs of intimacy,

companionship, emotional support, and affection of the people involved (Freeman & Kasari, 1998; Lindsey, 2002). While friendship is defined on the dyadic level, social status, which could also be thought of as peer-rated popularity, is defined at the group level. Popularity reflects the valence of group members' opinions (i.e., liking or disliking) of other individuals in the peer group, and measures of popularity are interpreted as how well liked versus disliked a child is within his or her specific group (Buhs & Ladd, 2001). In the method chosen to classify social status for this study, the number of *reciprocated* nominations has no impact on social status. It is possible that children in the intervention group saw an increase in received "liked" nominations from their peers, which would contribute to increased social status, but these nominations may not necessarily have been reciprocal. Thus, it is possible for a child to experience increases in average social status, but not reciprocated playmates. Future research should focus on elucidating the longitudinal patterns of associations between preschool children with varying social status classifications in order to dispute or confirm this explanation.

The second, and perhaps, more likely explanation, for the disparity between the social status and peer-rated reciprocated findings relates back to the reliability of the testing measures used to obtain this data. The test-retest reliability for the number of liked nominations and play rating scores when children with ASD were providing those ratings was generally poor. When typically developing children were reporting, the reliability of these measures tended to be better, but in general, their report still reflected an element of instability. Furthermore, when teachers were asked to report on children's reciprocal relationships in the classroom, test-retest reliability for this measure was also very low. Teacher-rated popularity was stable over time, but this is likely due to the fact that

teachers' reports of popularity were based on their personal opinion, and their reports of reciprocated playmates were based on their observations of interactions in the classroom. Friendships at the preschool age are historically thought to be highly unstable and "fluid," and based largely on proximity and availability of peers (Bee, 1981; Cooney & Selman, 1978; Selman & Selman, 1979). This study's examination of test-retest reliability does support the theory that preschool friendships are dynamic and constantly changing over time. Moreover, it is known that children with ASD of all ages struggle to understand the complex emotional and mutual aspects of friendship and that friendships of preschool children is based more upon proximity and amount of exposure (Freeman & Kasari 1998; Lindsey, 2002), which further complicates our understanding of the reciprocated playmate nomination data that children with ASD provided for this study.

Some research would suggest that reciprocal relationships are more stable than unilateral relationships at the preschool age (Gershman & Hayes, 1983), and this unique distinction between different types of friendships is important in considering the stability of relationships at the preschool age. This study was not able to obtain test-retest reliability on reciprocal playmate nominations. Future work examining the social relationships and social functioning of preschool children with ASD should aim to evaluate this measure. Because evaluating "friendships" was not a primary focus of this study, it would also be beneficial to further examine how friendships are defined at this age, such as determining if there are qualitatively different types of friendships for preschool children with ASD. Additionally, it would be beneficial to the psychometric literature base to clearly determine how social status and friendships relate to each other in preschool children with disabilities, particularly children with ASD.

The inclusion of teacher-rated information in this study led to several insights into the importance of teachers in how successful preschool children are socially. Teachers are integral to fostering children's social competence in preschool settings (Howes, Phillipsen, & Peisner-Feinberg, 2000), especially if their relationships with students are characterized by closeness (Birch & Ladd, 1997; Howes et al, 2000). This social skills intervention did not include a structured teacher component, and future intervention studies should examine additional strategies teachers could use to promote cross-diagnostic playmate dyads as part of intervention packages. It is hypothesized that including a teacher component to the intervention would have produced increases in the amount of reciprocated relationships of children with ASD undergoing the intervention; however, future research is needed to support this hypothesis.

While teachers were reporting on their perceptions of children's interactions with each other, their reports could have potentially been affected by their personal relationships with their students. Some research has shown that students with disabilities do not form an attachment to their teachers as close and as rewarding as students without disabilities do (Murray & Greenberg, 2001). In one study looking at multiple factors influencing teachers' perceptions of the teacher-child relationship, it was found that teachers rated their relationships with children with disabilities as having more conflict and less closeness (Murray & Murray, 2004). Moreover, children who are perceived by teachers as being more prosocial tend to have closer, less-conflicted teacher-child relationships (Howes, Phillipsen, & Peisner-Feinberg, 2000). On the other hand, children with internalizing and externalizing behaviors are more likely to have more conflictual teacher-child relationships (Birch & Ladd, 1998; Murray & Murray, 2004). As stated

before, the teacher-child relationship is especially important for young children because it has important implications on children's social and classroom adjustment (Hamre & Pianta, 2001; Howes, Matheson, & Hamilton, 1994). This study did not include a measure of how teachers perceived their teacher-child relationships. Future work should aim to evaluate how the teacher-child relationship affects how teachers perceive aspects of their students' functioning in the classroom environment in relation to their relationships with their students.

Unfortunately, no play behaviors were associated with social status, which does not support Hypothesis 3.1.The ability to find significant relationships between behavior and social status was negatively impacted in two ways. First, there was limited variability in social status classification among all the participants. A majority of the children were classified as having Average status, and few children were classified at the extreme ends of the status spectrum (e.g., Popular or Rejected). Secondly, play behavior data was collected on children with ASD only. The overall sample was relatively small, and restricting this data to an even smaller sample limits the power to detect relevant associations between behavior and status. Future research should aim to collect more comprehensive video data in a larger sample of children with ASD and typically developing children.

Prior research has shown very clear indications of how play and prosocial behaviors affect preschool children's opinions of their peers (e.g., Walker, 2004; Walker, 2009). In fact, anecdotal data collected at different points in the study do indicate that children's nominations and play ratings were affected by other's behaviors. During the interviews collected at post and follow-up, the research team asked children why they

nominated peers as liked and disliked. A common theme emerged: children that demonstrated obvious disruptive or aggressive behavior were often nominated as disliked peers. For example, a girl reported that she disliked a male classmate because "he always knocks me over." The same participant reported that another male classmate was disliked because he screams in her ear. Another girl reported that a male classmate hit her, and a male student said that he nominated several male and female classmates as disliked because they did not have "nice hands." On the other hand, less descriptive comments were made about why children were nominated as preferred playmates. In one instance, a male participant told the examiner that his classmate was a "nice friend," and, in another interview, a female participant said that a classmate was her "best friend." The overall theme that emerged from this anecdotal evidence is that children's perceptions of their peers are based more on overt negative behavior than prosocial behavior. However, no substantial claims can be based on this anecdotal data because it was not collected rigorously nor was it collected on every participant. Further work in this area should aim to replicate these types of interviews and collect more structured qualitative data.

Strengths and Limitations

The setting of the study, Mitchell's Place, was the primary strength of this study. This setting is very conducive for research focusing on children with ASD because of the research-focused and inclusive school climate it offers. The Mitchell's Place mission statement clearly states that they aim to "provide comprehensive, research-based, educational, social and therapeutic services for children, adolescents, and families affected by Autism Spectrum Disorders…in a deeply caring environment" (Mitchell's Place, 2015). Mitchell's Place is also unique because of its inclusive setting. In this

environment, children with and without disabilities are exposed to a variety of levels of cognitive and social functioning, which allows children to form diverse social groups, and thus develop a wide variety of social preferences.

It has been argued across the educational and pedagogical literature that children with disabilities should be placed into inclusive school settings because of the social advantages described above (Guralnick, 1990; Kasari, Freeman, Bauminger, & Alkin, 1990). However, a number of other studies have opposed this idea, stating that inclusive settings can place children with disabilities at a disadvantage socially (Anderson, Moore, Godfrey, & Fletcher-Flinn, 2004; McConnell, 2002). These studies suggests that children with disabilities struggle in inclusive school settings because they do not possess appropriate social competence and are not properly supported by the trained teaching and professional staff provided by a segregated school setting (Anderson et al., 2004). Mitchell's Place defies this thinking by providing the social benefits of an inclusive setting, but also offering a large number of therapy specialists, child education-trained teachers, and highly skilled assistants and other professionals to support the academic, emotional, and social needs of its students with ASD. Additionally, Mitchell's Place maintains a low student-to-teacher ratio, which increases the number of instructional social opportunities for children, especially those with ASD, and keeps all children from being uncared for (Wolery, Sigalove Brashers, & Neitzel, 2002). Mitchell's Place's inclusive setting also resembles other high quality educational programs for school-aged children with ASD, making the results of this study developmentally relevant for researchers, parents, teachers, and other educators who aim to transition children with ASD successfully from preschool to elementary school settings.

This study has a number of important limitations to address. First, classifying social status was based solely on child report. Children at this age can have limited verbal skills or lack understanding of friendships and/or social relationships (Bauminger-Zviely & Agam-Ben-Artzi, 2014). The test-retest data from this study also support the theory that preschool children, especially preschool children with ASD, are not accurate reporters of their own social relationships. In previous research, the most accurate identification of toddler and preschool children's social relationships is obtained through a combination of teacher and parent report and direct behavioral observation (Berndt & McCandless, 2009). Because teachers and parents appear to be more accurate reporters of social relationships of preschool children, perhaps a method for classifying social status in this population should be explored that relies on teacher and parent report.

Because of the historical arguments surrounding preschool friendships and social relationships and the almost complete lack of psychometric data on the measures used in this study to examine children with ASD's social standing and social status, it was necessary to establish test-retest reliability of the utilized measures. While this represents a methodological strength of the study and contributes to the psychometric literature for this population, the use of these measures to was a limitation. These measures yielded low test-retest correlations for essential variables that contributed to this study's conceptualization of social status and social standing. Because of this issue, the findings of this study should be interpreted with extreme caution. This study is the first of its kind to examine sociometric data in children with ASD, and future research is clearly needed to confirm or dispute this study's findings.

The sample makeup of this study is also a limitation. The groups of children with ASD and typically developing peers were significantly different in terms of several key demographic variables (i.e., gender and age), but because of the very small sample size and statistical analyses that were able to be used, differences between groups on gender and age were unable to be accounted for. Moreover, this study was limited in terms of its developmental conclusions because the age difference could not be accounted for and could have potentially confounded the findings of this study. Findings of this study should be cautiously generalized to male children with typical development and female children with ASD due to the small number of each in this sample.

The unbalanced design of this study also led to some generalization issues regarding behavioral problems in children with ASD. Because of the method used to assign participants with ASD to groups (i.e. using random assignment based on cluster sampling), this created a significant difference between the waitlist control group and treatment group in terms of behavioral problems prior to the intervention. This difference at baseline directly confounds hypotheses examining changes in these behaviors across the groups. Future work aimed at replicating these results should utilize an alternative method for group assignment, such as assigning children to groups based on behavior problems and not on classroom cluster sampling alone.

The relatively small sample size also represents an important limitation of this study. The sample size restricted the type of analyses that could be conducted to examine group differences without inflating Type 1 error. To counteract the possibility of encountering Type 1 error, Holm-Bonferonni corrections were applied, which are considered to be overly conservative in very small samples. Relatively few significant

effects were found utilizing these analyses. It is likely that increasing the sample size in future studies could lead to more significant effects. Finally, cognitive and language skills and play behaviors were not examined in typically developing children. The absence of play behavior data on typically developing children limits the ability to make generalized statements about what type of behaviors potentially correlate with social status at this age.

Conclusions

In general, children with ASD in the treatment group did not possess as many reciprocated friendships as reported by peers and teachers and were rated as less popular than typically developing peers. The promising news is that children with ASD that received the social skills intervention did experience noticeable improvements in their social status. Unfortunately the social skills intervention did not appear to have a noticeable effect on improving reciprocal friendships or popularity for children with ASD. In the future, including teachers as more active participants in a social skills or relationship-building intervention could have more positive long-lasting effects on children's social functioning due to the unique importance of the teacher-child relationship. Aspects of this study provide support for prior research in school-aged children with ASD and shed new light on the social functioning of children with disabilities in a preschool setting.

Table 1

Test-Retest Pearson Product-Moment Correlation Coefficients for Selected Measures of Child-Rated Social Standing

	1	2	3	4
1. L Score (Time 1)	1	.31	.64**	.15
2. PR Score (Time 1)	.46*	1	.42*	.67**
3. L Score (Time 2)	.11	.31	1	.40
4. PR Score (Time 2)	.27	.70**	.47*	1

Note. Coefficients for typically developing children are represented above the diagonal. Coefficients for children with ASD are represented below the diagonal. L Score = number of liked nominations a child receives from the Peer Picture Nominations Task. PR Score = play rating score obtained from the Peer Play Rating Scale.
* = $p < .05$, ** = $p < .01$

Table 2

Test-Retest Pearson Product-Moment Correlation Coefficients for Measures of Teacher-Rated Social Standing

	1	2	3	4
1. Popularity (Time 1)	1			
2. Reciprocated Nominations (Time 1)	.70**	1		
3. Popularity (Time 2)	.92**	.74**	1	
4. Reciprocated Nominations (Time 2)	.67**	.63**	.60**	1

Note. ** = $p < .01$

Table 3

Baseline Characteristics for Treatment Group (N = 11), Waitlist Control Group (N = 8), and Typically Developing Peers (N = 19)

	Treatment Group	Control Group	TD Peers
	n (%)	n (%)	n (%)
Gender (male)	10 (90.9)	7 (85.7)	6 (31.6)
Race (Caucasian)	8 (72.7)	8 (100)	18 (94.7)
	M (SD)	M (SD)	M (SD)
Age (months)	58.64 (8.93)	54.63 (12.86)	46.37 (9.99)
			p
Cognitive Abilities – Verbal	77.73 (21.62)	86.38 (20.33)	.390
Cognitive Abilities – Nonverbal	87.27 (15.86)	89.00 (10.30)	.790
Language Abilities – Receptive	77.64 (16.83)	83.13 (23.42)	.559
Language Abilities – Expressive	75.36 (15.38)	84.50 (20.79)	.285
Developmental Abilities – Social-Personal	70.78 (12.74)	68.29 (9.69)	.675
Developmental Abilities – Total	67.67 (14.41)	74.14 (12.64)	.363

Note. Verbal and Nonverbal cognitive abilities were obtained from the Differential Abilities Scales, Second Edition (DAS-II). Receptive and Expressive language abilities were obtained from the Preschool Language Scale, Fourth Edition (PLS-4). Social-Personal and Total developmental abilities were obtained from the Battelle Developmental Inventory, Second Edition (BDI-2). Means and standard deviations for cognitive, language, and developmental abilities are based on standard scores. There were no differences between the treatment and waitlist control groups on these measures (all $p > .05$). These data were not collected on typically developing (TD) peers.

Table 4

Bivariate Associations between Dependent Variables at Baseline

Variable	1	2	3	4	5	6
1. Social Status	1	.01	-.02	-.02	.15	.05
2. Internalizing Problems	.28	1	.38	-.55*	-.38	-.35
3. Externalizing Problems	.31	.35	1	-.04	-.17	-.47*
4. Teacher-Rated Reciprocated Nominations	-.30	.27	-.21	1	.57*	.05
5. Teacher-Rated Popularity	-.02	.07	.04	.04	1	.36
6. Peer-Rated Reciprocated Nominations	.66**	.43	.03	-.2	.27	1

Note: Correlations for children with ASD ($n = 19$) are represented on the top half of diagonal. Correlations for typically developing peers (n = *19)* are represented on the bottom half of diagonal.
* = $p < .05$, ** = $p < .01$

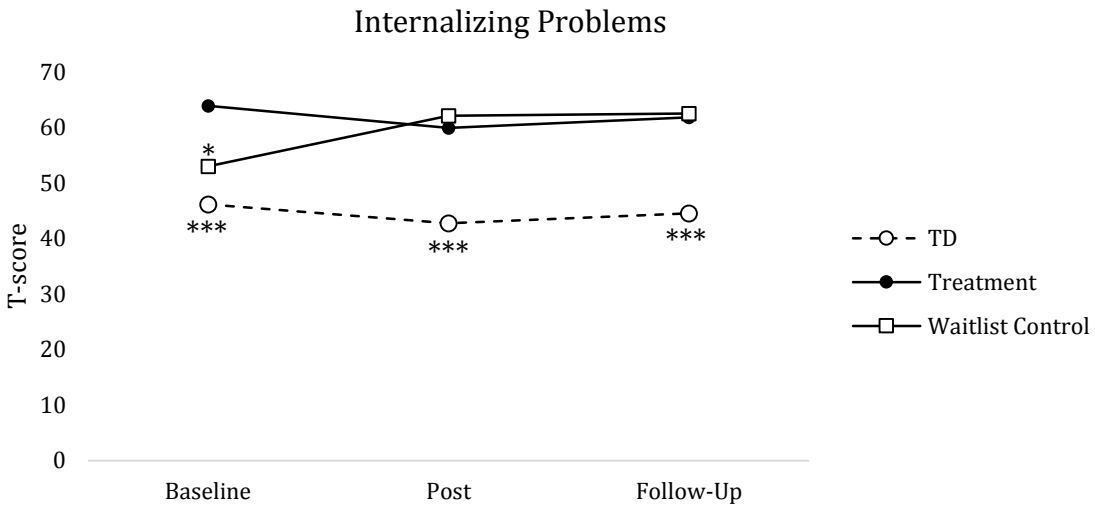
Table 5

Play Behavior Means for Positive and Negative Social Status Groups

Behavior	Baseline *M (SD)*		Post-Intervention *M (SD)*		Follow-Up *M (SD)*	
	Positive	Negative	Positive	Negative	Positive	Negative
Duration of Positive Interactions[a]	5.43 (6.16)	5.27 (7.28)	11.67 (12.83)	8.63 (10.94)	0.60 (0.54)[b]	0.74 (0.46)[b]
Duration of Negative Interactions[a]	0.94 (1.26)	0.42 (0.71)	0.57 (0.97)	0.97 (1.65)	0.23 (0.45)	0.68 (0.76)
Positive Social Engagement[a]	0.66 (0.46)[b]	0.67 (0.56)[b]	13.66 (10.66)	8.34 (6.99)	7.93 (8.04)	12.38 (9.43)
Parallel Play[a]	49.47 (13.62)	52.16 (9.13)	46.85 (11.01)	41.35 (11.06)	49.92 (12.37)	55.70 (12.62)
Negative Social Engagement[a]	1.89 (1.84)	1.25 (1.67)	1.18 (1.42)	1.48 (1.48)	0.68 (1.03)	1.26 (2.02)
Solitary Engagement[a]	36.01 (19.29)	31.72 (15.81)	33.81 (17.47)	45.73 (19.59)	34.49 (17.32)	25.67 (7.82)
Adult Engagement[a]	0.73 (0.36)[b]	0.77 (0.34)[b]	0.64 (0.29)[b]	0.51 (0.37)[b]	6.97 (3.64)	4.98 (2.33)

Note. [a]Means and standard deviations are based on proportion scores.
[b]Logarithmic plus 1 transformations were performed on these variables due to violations of normality.

1a



1b

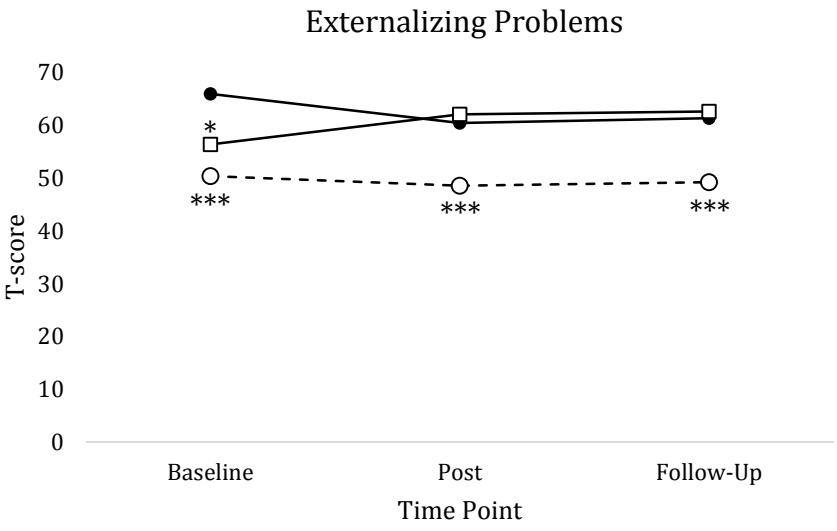
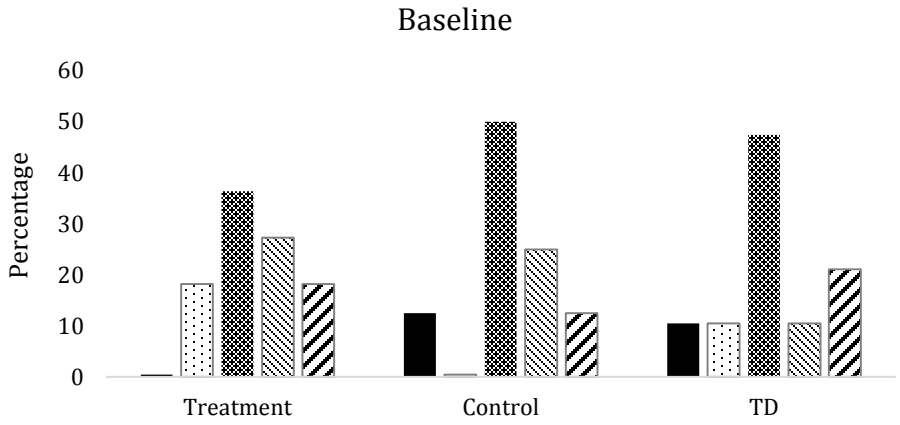


Figure 1. Differences in internalizing and externalizing behavior problems between children with ASD in the treatment and waitlist control groups and typically developing peers at each time point during the intervention. At baseline, the waitlist control group and typically developing peers significantly differed from the treatment group for both types of behavior problems. At post and follow-up, only the typically developing group significantly differed from the treatment group for both types of behavior problems. At post and follow-up, the waitlist control group did not significantly differ from the treatment group for either type of behavior problem.
Note. * = $p < .05$, *** = $p < .001$

2a



2b

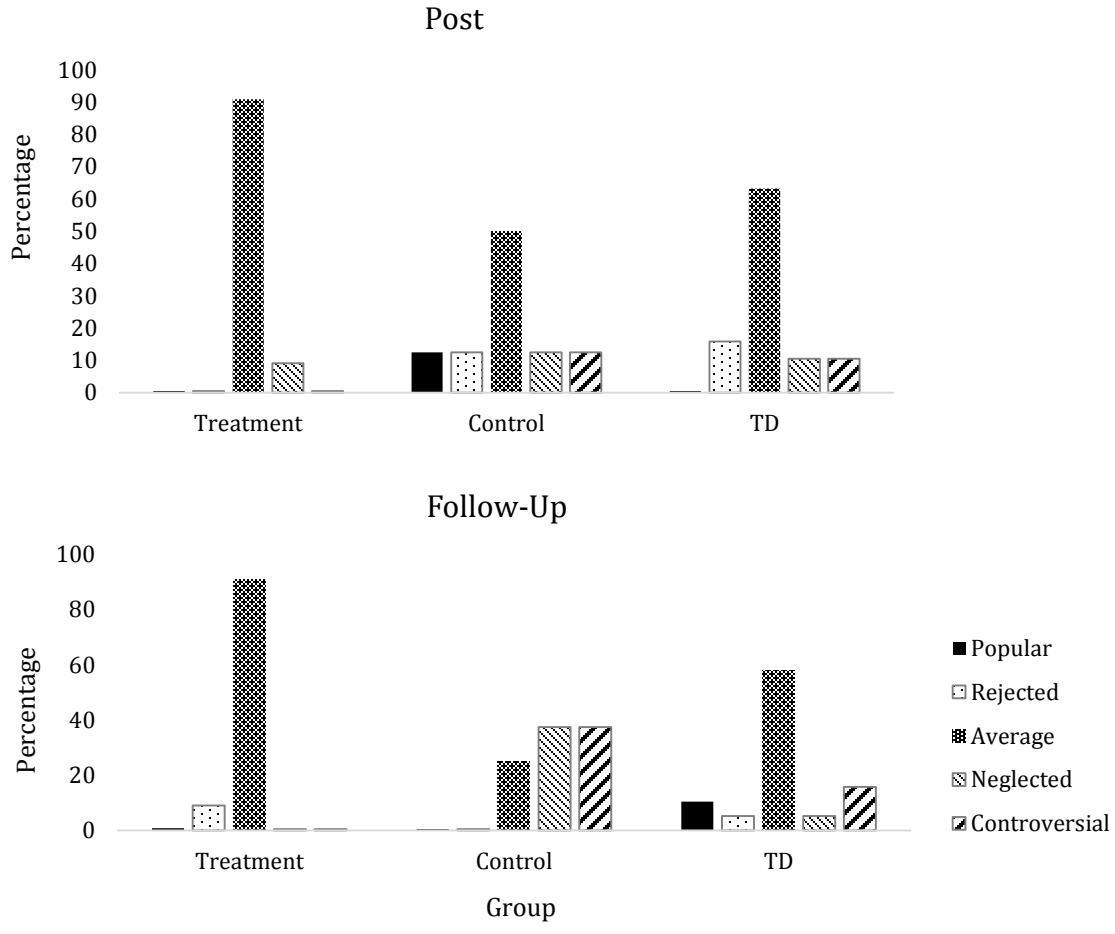


Figure 2. Percentage of children within each group classified into the five social status classifications according to Asher and Dodge's (1956) method. Several groups contained very few children; therefore, social status was dichotomized into "Positive" and "Negative" status.

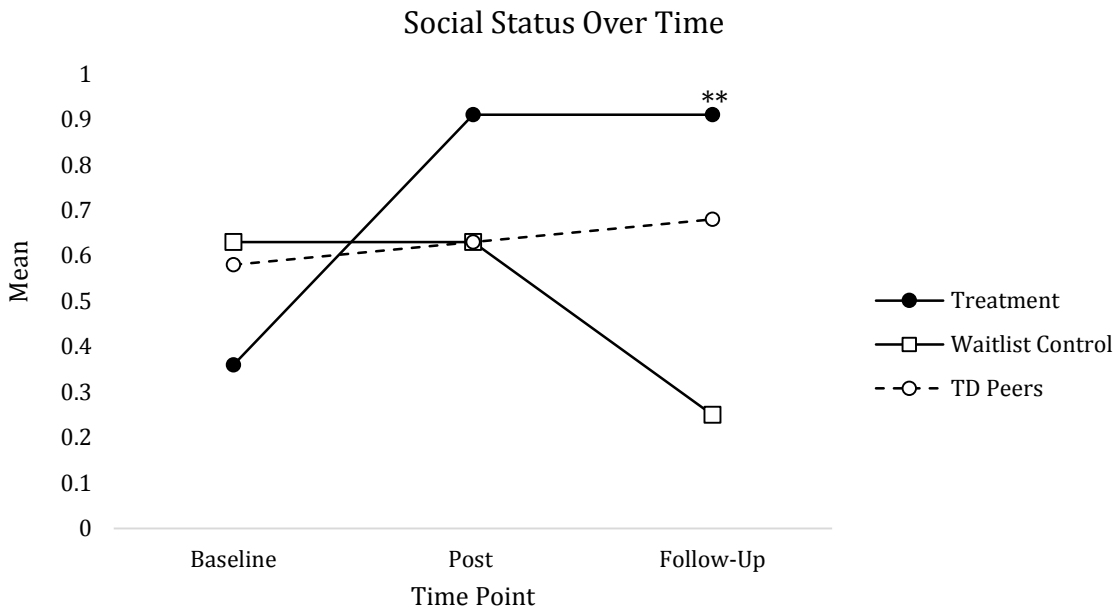
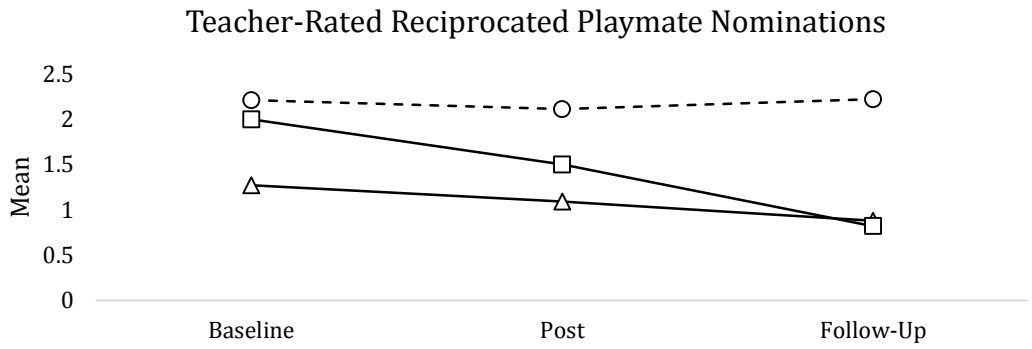
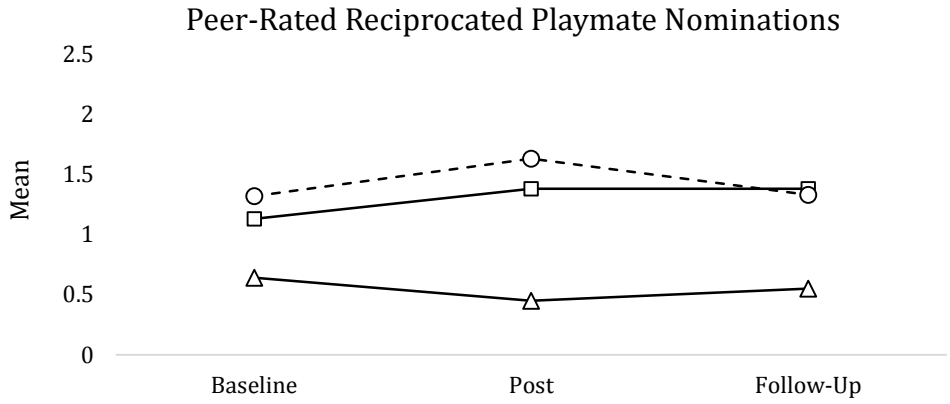


Figure 3. Changes in social status over time. Significant differences in status were found between the treatment and waitlist control group at follow-up, and between typically developing peers and the waitlist control group at follow up.
Note. ** = $p < .01$.

4a



4b



4c

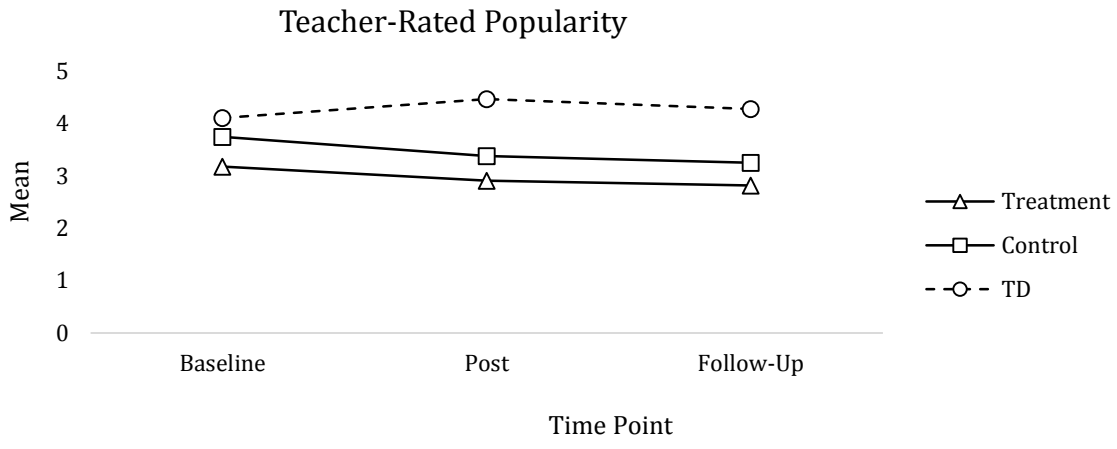


Figure 4. Means for additional measures of social standing for the treatment and waitlist control groups and typically developing peers across time. No interactions between time and group were found for any additional measure of social standing.

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APPENDIX A

CODING MANUAL FOR OBSERVED SOCIAL BEHAVIORS

CODING MANUAL FOR OBSERVED SOCIAL BEHAVIORS
(McCalla, 2014)

General Guidelines:

- Each video is viewed at least twice, once to complete the duration-based coding and once to complete the interval-based coding. Coders may review a video as many times as necessary in order to obtain the appropriate code.
- Coders should complete the coding sheet at the end of this manual for each video.

DURATION-BASED CODING

Duration based coding is collected for two behaviors, positive social interaction and negative social interaction. The durations of these behaviors are recorded using stop watches and a 5-on, 5-off procedure.

5-on, 5-off Procedure

In order to implement the 5-on, 5-off procedure the coders constantly observe the child's behavior throughout the 20 minute videos. As soon as the target child initiates a social interaction or responds to a peer's initiation (see detailed descriptions of these behaviors below) the coders begin to count 5 seconds in their heads. If the child is already engaged in an interaction at the beginning of the video, coders begin to count to 5 immediately. If the child is still engaged in the interaction on the 5th second then the coder should immediately start the timer. When the coders perceive that the child has stopped interacting (e.g., turns away from the peer, walks away from the peer, stops speaking to the peer, stops playing with the same toy as the peer) they immediately begin to count to 5 in their heads. If by the end of the 5th second the child has not reengaged the peer, then the coder stops the timer. However, if the target child reengages the peer during the 5 seconds, then the timer should remain on.

1. **Positive Social Interaction**
   - The target child is engaged in an activity with at least one peer for at least 5 seconds.
   - None of the children show signs of aggression (e.g., hitting, pushing, throwing objects, pinching) or distress (e.g., crying, calling for a teacher) or avoidance (e.g., running away, ignoring).
   - Examples include:
     a. Talk to a peer
     b. Share toys
     c. Give help

2. **Negative Social Interaction**
   - The target child is engaged in an activity with at least one peer for at least 5 seconds.
   - At least one child shows signs of aggression (e.g., hitting, pushing, throwing objects), distress (e.g., crying, calling for a teacher) or avoidance.

- Examples include:
    a. Arguing
    b. Whining
    c. Physical aggression

INTERVAL-BASED CODING

One code is assigned every 15 seconds during 20 minute behavioral observations. Coders wear MotivAiders that vibrate on the 15th second. The code is immediately assigned for the second after the buzz is felt. If the target child is 1) simultaneously engaging in a verbal and physical initiation (e.g., holding up a toy while saying "want to play?") or 2) simultaneously engaging in a verbal and physical response (e.g., hand a child a shovel while saying "yeah, let's make a big castle!") or 3) simultaneously avoiding and verbally responding (e.g., moving his body away while saying "stop!") only the verbal behavior was coded. To assign a code of physical initiation, verbal initiation, physical response, and verbal response, either a + of a – should be written on the coding sheet, depending upon whether the behavior was positive or negative. For all other codes, a tally should be marked for the assigned code.

1. **Physical Initiation: Show/Point/Give (POSITIVE OR NEGATIVE)**
    - The target child begins a new social exchange/*social interaction*, which is distinct from a previous exchange (e.g., new activity, new peer). Specifically, the child has not been interacting for at least 5 seconds prior to the initiation. A code of "initiates" is only assigned at the beginning of a social interaction.
    - Behavior is directed towards a peer in order to get a response.
    - Behaviors assigned to this code are physical (e.g., gesturing, reaching, holding an object up to show, and pointing at an item of interest).
    - Social initiations are coded as either positive or negative. Negative physical initiations include aggression, teasing (e.g., poking) or actions that would typically or have previously elicited distress or avoidance from the peer. Behaviors that are not clearly negative (i.e., questionable or neutral) should be coded as positive. See examples below:
        i. **POSITIVE →**
            a. Hold up a toy
            b. Point to an object
            c. Give peer a toy
            d. Put a toy in a peer's space
            e. Push a peer in a wagon
            f. Hold hands with a peer
            g. Smiling at a peer who is looking at the target child
            h. Immediately following a positive verbal initiation the target child is waiting for a response and looking at the peer
        ii. **NEGATIVE →**
            a. Push a peer
            b. Throw an object

c. Hit a peer
d. Pinch a peer

2. **Verbal Initiation: (POSITIVE OR NEGATIVE)**
   - The target child begins a new social exchange/*social interaction*, which is distinct from a previous exchange (e.g., new activity, new peer). Specifically, the child has not been interacting for at least 5 seconds prior to the initiation. A code of "initiates" is only assigned at the beginning of a social interaction.
   - Behavior is directed towards a peer in order to get a response and includes both greetings and invitations to play.
   - Behaviors assigned to this code are verbal.
   - Social initiations are coded as either positive or negative. Negative verbal initiations include verbal aggression, teasing or statements that would typically or have previously elicited distress or avoidance from the peer. Behaviors that are not clearly negative (i.e., questionable or neutral) should be coded as positive. See examples below:
     i. **POSITIVE →**
        a. "Hello!"
        b. "Watch me"
        c. "Let's play"
        d. "Wanna chase me?"
        e. "Let's be dinosaurs!"
     ii. **NEGATIVE →**
        a. "Go away!"
        b. "Give me that toy!"

3. **Physical Response: (POSITIVE OR NEGATIVE)**
   - The target child responds to a peer's social action within 5 seconds.
   - The response is physical in nature (e.g., handing the peer a requested toy, pushing a peer on a swing)
   - Social responses are coded as either positive or negative. Negative physical responses include aggression, teasing (e.g., poking) or actions that would typically or have previously elicited distress or avoidance from the peer. Behaviors that are not clearly negative (i.e., questionable or neutral) should be coded as positive. See examples below:
     i. **POSITIVE →**
        a. Accept offered toy
        b. Hand peer requested toy
        c. Push peer in a wagon following request
        d. Put block on tower
        e. Look and/or smile at peer during *social interaction* (without the look = parallel play)
     ii. **NEGATIVE →**
        a. Push a peer
        b. Throw an object
        c. Hit or pinch a peer

d. Covering toys
e. Blocking out a peer
f. Taking toys

4. **Verbal Response: (POSITIVE OR NEGATIVE)**
   - The target child responds to a peer's social action within 5 seconds.
   - The response consists of a verbal statement (e.g., "Sure, let's go!") that indicates agreeing to play/join.
   - Social responses are coded as either positive or negative. Negative verbal responses include verbal aggression, teasing or statements that would typically or has previously elicited distress or avoidance from the peer. Behaviors that are not clearly negative (i.e., questionable or neutral) should be coded as positive. See examples below:
     i. **POSITIVE →**
        a. "Ok!"
        b. "Sure, let's go"
        c. "Yeah, let's build a castle!"
        d. "I'm coming with you"
     ii. **NEGATIVE →**
        a. "No!"
        b. "Uh, I don't want to"
        c. "Go away!"
        d. Crying

5. **Parallel Play**
   - The target child is engaged in play within close proximity of a peer.
   - The two children are not engaged with each other.
   - The target child and the peer do not have to be playing with the same toy.
   - Distances that are considered "close proximity" vary based on the environment. On the playground, children should be less than 5 feet apart without large objects or adults blocking the space between them. In the classroom, children should be in the same designated classroom area (e.g., kitchen area, art table, book area, circle), without large objects or adults blocking the space between them.
   - Examples include:
     a. Sit in the sandbox and fill separate buckets
     b. In kitchen area, one plays with the oven, the other with the food
     c. Two kids in the tunnel

6. **Avoids/Ignores**
   - Avoiding is observed when the target child either physically moves away from or turns away from a peer.
   - Ignoring is observed when the target child fails to respond when he or she can obviously hear or see a peer's social attempt.
   - Examples include:
     a. Walk away from initiating peer
     b. Turn away from peer offering toy

c. No response when peer directs statement "Johnny, let's play"

7. <u>Solitary Engagement</u>

- The target child is engaged in an activity by himself. This could include appropriate play, scripting, restricted or repetitive behaviors, or staring blankly into space.
- Peers are not in close proximity (exception: if a peer walks or runs behind the target child, even though he or she is technically in proximity, this should still be coded at solitary engagement)
- The target child watches a peer's activities, but does not attempt to join in.
- The target child is not engaged in a *social interaction*.
- Examples include:
    a. Swing alone
    b. Play with toys alone
    c. Use an iPad alone
    d. Self-stimulatory or repetitive behavior
    e. Stare into space
    f. Watch a peer swing on the swing set
    g. Listen to peers' conversation without trying to engage with them

8. <u>Adult Engagement</u>

- The target child attempts to interact with or responds to a teacher, aide or member of the research team.
- Behavior that was immediately preceded by a teacher prompt should be coded as "Adult Engagement". Behavior that occurs after the initial response to teacher should be coded elsewhere.
- Examples include:
    a. Talk to a teacher
    b. Try to get a teacher's attention by calling her name
    c. Ask a teacher a question
    d. Hold a teacher's hand
    e. Show her an object
    f. Respond to a teacher's command
    g. Answer a teacher's question

9. <u>Not Codable</u>

- The target child moves out of view of the camera.
- This should only be assigned if the child cannot be seen at the moment he or she should receive a code.

APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The Assurance number is FWA00005960 and it expires on January 24, 2017. The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56.

Principal Investigator:	EDWARDS, SARAH
Co-Investigator(s):	
Protocol Number:	**X120824003**
Protocol Title:	*Assessing Change in Preschooler's Sociometric Status After Exposure to a Peer – Mediated Social Skills Intervention*

The IRB reviewed and approved the above named project on 8-22-14. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 8-22-14

Date IRB Approval Issued: 8-22-14

IRB Approval No Longer Valid On: 8-22-15

Marilyn Doss

Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

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