ASSESSING SOCIOMETRIC STATUS AND IMPACTS OF BEHAVIOR PROBLEMS IN PRESCHOOL CHILDREN WITH AUTISM SPECTRUM DISORDERS

by

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Obtaining information regarding the social status of preschool children with Autism Spectrum Disorders (ASD) has not been a focus of any sociometric research to date. It is also unknown whether the impact of social behavior problems on the social status of children with ASD emerges before school age. This study addressed this gap by examining the social status of young children with ASD. Data were collected at an early intervention preschool program designed for children with ASD. Both students and teachers provided information on acceptance, rejection and popularity. Results indicate that students and teachers reported children with ASD to have lower overall social status, and fewer reciprocated friendships than typically developing peers. Externalizing behavior problems mediated the effects of a diagnosis of ASD on social status among children with ASD. These results expand upon the results of previous sociometric studies of school-aged children with ASD. Findings suggest that early intervention focused on decreasing behavior problems of preschool children with ASD may be needed to improve their abilities to develop positive social relationships and prevent peer rejection upon transition into elementary school.

*Keywords:* social status, acceptance, rejection, behavior problems
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ASSESSING SOCIOMETRIC STATUS AND IMPACTS OF BEHAVIOR PROBLEMS IN PRESCHOOL CHILDREN WITH AUTISM SPECTRUM DISORDERS

Children begin to form meaningful relationships with peers as early as the toddler years (Dunn, 2004; Furman, 1998; Ross & Lollis, 1989). Cross-sectional data have shown that early peer relationships are related to a host of factors, including quality of social skills (Farmer & Farmer, 1996), social communication abilities (Burleson, Delia, & Applegate, 1992; Yeates, Schultz, & Selman, 1991), and social behavior problems (Phillipsen, Bridges, McLemore, & Saponaro, 1999). Longitudinal studies have additionally revealed that peer relationships can predict later behavioral psychopathology (Buhs & Ladd, 2001; Pederson, Vitaro, Barker, & Borge, 2007) and psychological adjustment (Johnson, Ironsmith, Snow, & Poteat, 2000). Children who experience difficulties in any of these areas are at greater risk for experiencing problems in peer relationships (Freeman & Kasari, 1999).

Children with Autism Spectrum Disorders (ASD) experience difficulty with exhibiting appropriate social skills and social behavior, which impacts their ability to form adequate peer relationships and integrate into social networks (Chamberlain, Kasari, & Rotheram-Fuller, 2007; Kasari & Rotheram-Fuller, 2007). While a large body of research focuses on the social relationships of elementary school-aged children with ASD, there is a lack of empirical research aimed at defining the social relationships of preschool children with ASD. Furthermore, the specific impact of behavior problems on social relationships in this population has also not been examined. This is the first to
examine the social status of preschool-aged children with ASD and evaluate the role of social behaviors in peer status.

**Social Relationships Of Preschool Children**

Researchers typically examine two different aspects of social functioning, friendships and popularity, to obtain information regarding peer relationships of young children (Bukowski & Hoza, 1989; Kerns, 2000; Lindsey, 2002). In older children (e.g., elementary school-aged children), 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, 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).

Popularity is considered a continuum concept comprised of peer acceptance (i.e., being well-liked by peers) on one end and peer rejection (i.e., being disliked by peers) at the opposite end. Popularity is frequently measured by asking children to nominate peers whom they most like and least like. A social preference score (Peery, 1979) is then obtained by subtracting the number of least liked nominations from the number of liked nominations for each child (Coie, Dodge, & Copotelli, 1982; Hartup, Glazer & Charlesworth, 1967). This strategy provides a basis for categorizing children into differing sociometric status groups (LaFontana & Cillessen, 1999). For example, children
who are rated high in acceptance (more liked nominations) and low in rejection (fewer least liked nominations) are classified as “popular,” while children who experience more rejection and less acceptance are considered “rejected” (Coie et al., 1982). It has been shown that nominations of acceptance and rejection become stable around three and a half years of age (Denham & Holt, 1993).

Children as young as three years of age begin to associate with others who are similar to them, and these similarities can determine how close relationships and friendships form (Lindsey, 2002). According to the “selective homophillic affiliation theory,” postulated by Freeman and Kasari (1998), young children choose their companions based on the similarity between them on a host of characteristics, including quality of social skills and communication abilities. It has been observed that typically developing preschool children are more likely to be friends with peers who are similar to them in other characteristics such as age (Guralnick & Groom, 1988), gender (Maccoby, 1988; Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010), and race (Singleton & Asher, 1979).

Children also seek out companions who are most likely to optimize social reinforcement and produce positive relationship (Snyder, Horsch, & Childs, 1997). In a study examining typically developing preschool friendships, Lindsey (2002) found that 74% of the sample had at least one mutual friend, regardless of sociometric status. Furthermore, the number of friendships correlated with sociometric status, suggesting that children with higher status had more friendships than those with low status. It was also found that low accepted children had fewer friends than average and highly accepted children. Low accepted children were also rated much lower on teacher ratings of social
Sociometric status and behavior in preschoolers with ASD

competence. In this study, children and their friends were similar in acceptance and behavior, providing support for the belief that behavioral similarity is essential in the formation and maintenance of friendships over time (Hartup, 1996; Lindsey, 2002).

**Behavior Problems and Social Status**

Positive and negative social behaviors of young children are important in determining acceptance and rejection, (Buysse, 1993; Guralnick & Groom, 1987; Phillipsen, Bridges, McLemore, Saponaro, 1999). For example, children who are happy, socially competent, and offer high rates of reinforcement to others are considered “accepted” or “popular” (Denham & Holt, 1993; Walker, 2009). On the other hand, children who are less socially competent and exhibit social behavior problems, such as teasing or bullying, are considered “rejected” (Hartup, Glazer, & Charlesworth, 1967; Ladd, Price, & Hart, 1988; Walker, 2009). Children classified as “isolated” exhibit behavioral patterns of nondominance and cooperation and are rated as “miserable” by their teachers (Denham & Holt, 1993).

Internalizing behaviors, (i.e., covert behaviors), and externalizing behaviors (i.e., overt behaviors) are types of behavior problems that predict lower peer acceptance and increased social difficulties in typically developing children (Bauminger, Solomon, & Rogers, 2010; Deater-Deckard, 2001). As children age, a developmental change occurs in what type of behavior problem predicts peer acceptance. During the preschool years, externalizing behaviors, such as aggression, are most strongly associated with problems in peer relationships (Phillipsen, Bridges, McLemore, & Saponaro, 1999). However, as children progress through school, internalizing behaviors play a greater role in popularity.
For example, elementary school-aged children are less accepted if they are shy and withdrawn from social groups (Phillipsen, Bridges, McLemore, Saponaro, 1999; Rubin, Bukowski, & Parker, 1998).

Even within a short developmental time period, perceptions of overt behavior problems change with age. Johnson, Ironsmith, Snow, and Poteat (2000) demonstrated that three-year-old children seem to base their opinions of liking or disliking their peers exclusively on the amount of overt behaviors displayed by those peers. Children at this age tended to cite aggression as the sole reason for rejecting peers. However, children around age four were less likely to reject an aggressive child if that child also attempted to positively interact with peers (Johnson et al., 2000).

It should be noted that the relationship between 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 also showed an increase in externalizing behaviors over a two-year period. In another study, submissive/nonassertive behavior predicted increased verbal victimization and social isolation after 6 months. At the same time, social exclusion predicted increased submissive/nonassertive behavior over time (Fox & Boulton, 2006).
Social Relationships of Elementary School-Aged Children with ASD

Autism Spectrum Disorders 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). Marked social skills deficits are considered a defining hallmark of an autism spectrum diagnosis (Carter, Davis, Klin, & Volkmar, 2005; Kanner, 1943; Williams, White, Koenig, & Scahill, 2007), and lack of appropriate social behavior is arguably the most critical component of this diagnosis (Stella, Mundy, & Tuchman, 1999). Due to the significant social deficits that children with ASD face, the quality of their social relationships is often negatively impacted.

Compared to children with other types of developmental disabilities, children with ASD possess a unique set of social difficulties that place them at risk for developing poor peer relationships. More specifically, these children possess limited or inappropriate social skills, which often results in poor social behavior. For example, they struggle with processing multiple social cues (e.g., body language and tone of voice) and appropriately integrating them to provide a suitable social response (Loddo, Stokes, & Newton, 2004).

According to Kasari and Rotheram-Fuller (2007), children with ASD face three unique social challenges. The first challenge lies is their underdeveloped understanding of the nuances of social interactions, resulting from their social communication deficits. A second challenge is their lack of ability to understand the perspective of others as individuals separate from themselves; a problem related to poor early joint and shared attention skills (Mundy, 2011). The last challenge involves their ability to accurately describe their relationships with others. Children with ASD usually overestimate their positions within social structures. They often report that they are connected to the center
of various social groups and have more rewarding friendships. In actuality, they are more likely to be classified as peripheral to social groups, and the majority of their friendship nominations go unreciprocated (Bauminger & Kasari, 2000; Chamberlain, Kasari, & Rotheram-Fuller, 2007). While the majority of younger children with ASD demonstrate this misperception of their social standing, older, high-functioning children with ASD are able to perceive aspects of their exclusion from peer groups and have expressed a desire to be involved in those groups (Bauminger & Kasari, 2000; Macintosh & Dissanayake, 2006).

In general, children with ASD are less likely to be involved in rewarding social relationships than their typically developing peers. On measures of group involvement, children with ASD exhibit patterns of fewer reciprocal friendships, lower social network centrality, and less companionship (Chamberlain, Kasari, & Rotheram-Fuller, 2007; Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011). Children with ASD also experience difficulties with gaining and maintaining adequate, rewarding friendships (Kasari & Rotheram-Fuller, 2007), and are more likely to be bullied (Cappadocia, Weiss, & Pepler, 2012).

Similar to the social development of typically developing children (Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005), the social relationships of children with ASD change as they progress through school (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). In a study investigating the social involvement of children with ASD in elementary school, children in the fourth and fifth grades were more peripheral in their connection to a group and experienced lower acceptance than their Kindergarten through third grade counterparts. When compared to typically developing peers, children with
ASD at all grade levels experienced less peer acceptance and lower network centrality and had fewer reciprocated friendships (Rotheram-Fuller et al., 2010).

**Behavior Problems in Children with ASD**

Children with ASD typically exhibit greater behavioral psychopathology, including higher frequencies of both internalizing and externalizing behaviors, than their typically developing peers (Bauminger, Solomon, & Rogers, 2010; Bölte, Dickhut, & Poutska, 1999). The unique behavioral psychopathology of older children with ASD has been evaluated against diverse samples of peers. For example, when compared to a sample of youth with intellectual disabilities, youth with ASD between the ages of four and twenty-four years exhibited more total behavior problems and were more disruptive, self-absorbed, anxious, and depressed than peers with intellectual disabilities. Both externalizing behavior, such as hyperactivity and impulsivity, and internalizing behavior, including anxiety and irritability, were prominent in this sample of youth with ASD (Brereton, Tonge, & Einfeld, 2006).

Preschool-aged children with ASD (i.e., around three to four years of age) also exhibit more behavior problems, including greater levels of withdrawal, attention problems, aggression (Hartley, Sikora, & McCoy, 2008;), and oppositional behaviors (Gadow, DeVinecent, Pomeroy, Azizan, 2004) than their peers. Similar to their school-aged counterparts, preschool children with ASD experience age-related changes in regards to behavior problems, even within a small period of time. Between the ages of three and five years, children with ASD show a decrease in externalizing behaviors and a
trending increase in internalizing behaviors (Eisenhower, Baker, & Blacher, 2005; Hartley et al., 2008).

It is important to consider the relationship between gender and behavioral psychopathology when examining behavior problems in children. In typically developing children, there is a clear relationship between externalizing and internalizing behavioral psychopathology and gender, even in young children. Typically developing males generally exhibit more problems with externalizing behaviors, such as hyperactivity, impulsivity, (Rutter, Caspi, & Moffitt, 2003), and physical aggression (Tiet et al., 2001; Zoccolillo, Tremblay, & Vitaro, 1996), whereas females generally experience more internalizing behaviors, including depression (Rutter et al., 2003). Females also tend to exhibit more anxiety than males in the school-aged and adolescent years, but there is no demonstrated gender difference in anxiety presentation in preschool children (Rutter et al., 2003).

In contrast to typically developing children, gender in children with ASD has not been consistently associated with behavior problems across studies. Some studies demonstrate that, similar to typically developing peers, females with ASD exhibit greater levels of internalizing behaviors, such as social withdrawal and thought problems, and males with ASD exhibit greater levels of externalizing behaviors, including hyperactivity, inattention, and aggression (Mandy et al., 2012). However, other studies suggest that high-functioning females with ASD exhibit both types of behavior more than males (Holtmann, Bölte, & Poustka, 2007), while others have found that gender is largely unrelated to behavior problems (Brereton, Tonge, & Einfeld, 2006; Hartley, Sikora, & McCoy, 2008).
Statement of the Problem

What influences the sociometric status of preschool children with ASD? The peer relationships of children with ASD have commonly been examined in elementary school-aged children, where children with ASD are often enrolled in inclusive classrooms alongside typically developing peers (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010; Kasari, Lock, Gulsrud, & Rotheram-Fuller, 2011). However, preschool children with ASD are completely overlooked in the sociometric literature, and it is unclear why this sociometric research in this population has not been conducted to date. Nevertheless, it is important to evaluate sociometric status and the social networks of children this young because of the implications early sociometric status has for later developmental outcomes and adjustment (see Buhs & Ladd, 2001; Deater-Deckard, 2001). Therefore, the first aim of this study was to gather sociometric data on preschool-aged children, and specifically examine the differences between children with ASD and their peers. It was hypothesized that children with ASD would have lower overall sociometric status than peers, given the evidence that children with ASD experience significant social skills deficits and are behaviorally dissimilar to their typically developing peers (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011; Rotheram-Fuller et al., 2010). Several measures of social status were examined, including peer acceptance and peer rejection, reciprocated friendships, and ratings of popularity and social preference.

It is believed that children with ASD experience significant social difficulty because of their considerable social skills deficits and associated behavioral psychopathology (Freeman & Kasari, 1998; Kasari & Rotheram-Fuller, 2007; Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010).
developing children that lack of appropriate social behavior and greater frequencies of behavior problems are associated with poorer peer relationships and lower acceptance. However, the specific impact that behavioral psychopathology has on the sociometric status of young children with ASD has not been clearly established, particularly among preschool-aged children. The second aim of this study was to evaluate the difference between children with ASD and their peers on measures of behavior problems. Based on previous research (Bauminger, Solomon, & Rogers, 2010), it was hypothesized that children with ASD will have greater levels of both internalizing and externalizing behaviors as rated by their classroom teachers. Furthermore, it was hypothesized that gender will be related to greater levels of problem behavior, with girls displaying greater levels of internalizing and boys exhibiting greater levels of externalizing behavior. The third aim of this study was to evaluate how behavior problems mediate the relationship between a diagnosis of ASD and social status. It is expected that both internalizing and externalizing behavior problems will mediate the relationship between a diagnosis of ASD and overall sociometric status.

Method

Participants

Participants were thirty-eight preschool children (61% male) between the ages of three and six years. 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 50% of the children have ASD. 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 receiving or 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 the 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 the beginning of the study.

**Procedure**

Every student and primary teacher from each classroom completed all measures before social skills intervention began. Students 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 against 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., sticker).

Teachers were given a packet including every teacher sociometric measure and a copy of the behavioral measure for each of the students in their classrooms. Packets also
included written instructions on how to complete each measure. Teachers were asked to complete packets without help from other classroom teachers, but were allowed to consult their in-class teacher aides for input. Only teachers and aides that had direct and daily contact with students in their own classrooms were asked to complete the packets. Teacher packet completion took approximately twenty to thirty minutes.

**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 peer acceptance, peer rejection, social preference, and number of reciprocated friendships. 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 nominated pictures from the board. After all positive nominations were made, all photos were replaced on the board before negative nominations were made.

The total number of positive and negative nominations received was summed for every child. To adjust for varying class sizes, peer acceptance for each child was calculated as a $z$ score of the total number of liked nominations received within each classroom. Peer rejection was also calculated as a $z$ score of the total number of disliked nominations received by children within each class. The number of reciprocated
friendships for each child was considered as the number of positive nominations the child made that were reciprocated by other peers in their class.

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 moderate reliability (Chronbach’s alpha = ~.65), and test-retest 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 liking rating 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 frowning 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 frowning face box. An overall liking rating for each child was computed as the average of all the scores received from that child’s classmates. Higher liking ratings indicated that a child better 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, Chronbach’s alpha = .86 (Denham & McKinley, 1993).

**Teacher Sociometric Nominations Task** and **Teacher Rating Scale** (Wu, Hart, Draper, & Olsen, 2001). Similar to the Peer Picture Nominations Task, the Teacher Sociometric Nominations Tasks asked each teacher to nominate three most liked and three most disliked peers for each child in their classroom. Reciprocated friendships as well as measures of teacher-rated peer acceptance and teacher-rated peer rejection 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). Assessment of teacher-rated popularity 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 very high cross-time stability ($r = .96$) over an eight-week period (Wu et al., 2001).

**Child Behavior Checklist—Ages 1.5-5, Caregiver/Teacher Report Form** (CBCL 1.5-5—TRF; Achenbach & Rescorla, 2004). Each participant’s behavior was assessed using the CBCL 1.5-5—TRF. This 100-item checklist allowed teachers to rate each of their students’ behaviors on a scale from 0 (“Not true”) to 2 (“Very True/Often
True”). Examples of items include “Cruelty, bullying, or meanness to others,” and “Cries or whines often.” $T$ scores (mean = 50, standard deviation= 10) were obtained for measures of internalizing and externalizing behaviors. The internalizing behavior $T$ score (Chronbach’s alpha = .89) is composed of scores obtained on several subscales including the emotionally reactive, somatic complaints, withdrawn, and anxious/depressed subscales. The externalizing behavior $T$ score (Chronbach’s alpha = .92) is composed of scores obtained on the attention problems and aggressive behavior subscales. Subscales of this measure, including internalizing and externalizing behaviors, have been deemed internally consistent in a subpopulation of children with ASD, and are appropriate for measuring emotional and behavioral disorders in children with ASD (Pandolfi, Magyar, & Dill, 2009).

**Data Analysis**

Bivariate relationships among variables were examined with Pearson’s correlations using the statistical package SPSS version 20. To answer the question if diagnostic and gender groups differ on measures of sociometric status, multiple one-way ANCOVAs were utilized. Because there were not enough females in the ASD group, the ANCOVAs included only diagnosis as a predictor and age as a covariate. As a result, no specific gender comparisons were made on measures of social status. In each of these analyses, the dependent variable was a single measure of social status (e.g., peer- and teacher-rated acceptance, peer- and teacher-rated rejection, teacher-rated popularity, liking ratings, number of reciprocated friendships). To compare diagnostic and gender groups on differences in behavior problems, several 2 (diagnosis) X 2 (gender) factor
ANCOVAs were used. The internalizing, externalizing, and total behavior problems \(T\) scores obtained from the CBCL served as dependent variables and age was a covariate.

The effects of an autism spectrum disorder diagnosis and gender on social status and the mediating effects of both internalizing and externalizing behaviors were analyzed using Structural Equation Modeling (SEM). Data were analyzed with SEM using Mplus version 5.2. A model is considered to have good fit to the data if it has a comparative fit index (CFI) and a Tucker Lewis index (TLI) greater than .95, as well as a root mean square error of approximation (RMSEA) of .06 or below and a standardized root mean square residual (SRMR) below .08 (Hu & Bentler, 1999). Separate models were constructed to analyze relationships with peer-rated sociometric data and with teacher-rated sociometric data. Peer-rated social status was modeled as a latent factor based on peer acceptance and peer rejection data obtained from Peer Picture Nominations Tasks. Liking ratings obtained from the Peer Play Rating Scale did not correlate with other measures of peer-rated social status, likely reflecting low validity of these ratings; and therefore, were not included in the model. Teacher-rated social status was modeled as a latent factor based on teacher-rated peer acceptance, peer rejection and popularity. The first set of models tested the direct links between diagnosis, gender and social status. The second set of models added internalizing and externalizing behavior problems as mediators of these effects. For both the peer and teacher report models, a bootstrapping technique was employed when evaluating the indirect (or mediating) effects (Cheung & Lau, 2008). All direct effects, indirect effects and full models were adjusted for age.

Assumptions of ANCOVA and SEM and the presence of outliers were assessed using the statistical package SPSS version 20. No outliers, missing data, or significant
violations assumptions were detected. Deviations from normality were generally small (skewness = -.51 to .44) and distributions of variables tended to be platykurtic (kurtosis =-.59 to -1.47).

**Results**

**Preliminary Analyses**

The means and standard deviations for continuous variables and percentages for categorical variables are listed in Table 1. Correlations among all variables are shown in Table 2. A diagnosis of ASD, older age, and male gender were associated with higher levels of internalizing and externalizing behavior problems (all \( p < .01 \)). Higher internalizing psychopathology was associated with greater peer- and teacher-rated peer rejection, as well as lower peer- and teacher-rated peer acceptance and teacher-rated popularity (all \( p < .05 \)). Similarly, externalizing psychopathology was related to lower peer- and teacher-rated peer acceptance and higher peer- and teacher-rated peer rejection (all \( p < .05 \)). However, externalizing problems were not significantly associated with liking ratings or teacher-rated popularity.

**Gender and ASD Differences in Peer Status**

Results from the ANCOVAs assessing showed that diagnostic and gender groups did not differ on measures of peer-rated rejection, liking ratings, or teacher-rated popularity. However, results did indicate that teachers nominated typically developing children as more accepted (\( M = .48 \)) than children with ASD (\( M = -.49 \)), \( F(1,35)=12.13, p < .01, d = -1.17 \). Conversely, teachers nominated children with ASD as more rejected (\( M = .58 \)) than their peers (\( M = -.58 \)), \( F(1, 35)= 17.39, \ p < .001, \ d=1.52 \). Teachers also
reported a somewhat number of reciprocated friendships for typically developing children (M = 2.21) than children with ASD (M = 1.58), F(1, 35)= 4.01, p=.053, d=-.67. Student report of social status revealed that students rated children with ASD lower in peer acceptance (M = -.34) than typically developing peers (M=.34), F(1, 35)= 4.47, p<.05, d=-.74. Students also reported that children with ASD had fewer reciprocated friendships (M = 0.84) than typically developing peers (M = 1.32), F(1, 35)=6.07 , p<.05, d=-.58.

**Gender and ASD Differences in Behavior Problems**

Results from the ANCOVAs assessing both the diagnostic and gender effects showed that males and females in both diagnostic groups did not significantly differ in respect to internalizing, externalizing, and total behavior problems. Children with ASD, regardless of gender, exhibited higher internalizing, F(1, 33)= 11.70, p<.01 d=1.52, and total behavior problems, F(1, 33)= 7.96, p<.01, d=1.61. They also tended to exhibit more externalizing behavior problems than typically developing peers, although this relationship did not meet statistical significance, F(1, 33)= 3.90, p=.057, d=1.31.

**Behavioral Mediation Between Diagnosis and Social Status**

A direct-effects model was run first to analyze the links between diagnosis, gender, and peer-rated social status. In this model, the latent variable of peer-rated social status was comprised of child-rated acceptance, child-rated rejection. This model had good fit to the data ( χ²(2)=1.96, p=.38; CFI=1.00; TLI = 1.03; RMSEA=.00, SRMR=.03). Lower peer-rated social status was not significantly related to gender ( β = .02, p=.93). However, the relationship between lower peer-rated status and diagnosis was
trending towards significance, ($\beta = -.43, p=.09$). The full model including internalizing and externalizing problems as mediators (see Figure 1) had acceptable fit to the data ($\chi^2(4)=2.0, p = .74; CFI=1.00; TLI=1.16; RMSEA=.00, SRMR=.02$). When behavior and age effects were taken into account, ASD diagnosis was not a significant predictor of peer-rated social status on its own ($\beta = -.14, p=.57$). In this model, gender did not predict internalizing ($\beta = .06, p=.71$) or externalizing behavior problems ($\beta = -.23, p=.15$).

However, ASD diagnosis was related to greater levels of externalizing behavior ($\beta = .34, p<.05$) and internalizing behavior ($\beta = .48, p<.01$), but only externalizing behavior predicted lower levels of peer-rated social status ($\beta = -.61, p<.01$). The indirect effect of diagnosis to peer-rated social status via externalizing trended towards significance ($\beta = -.21, p=.079$), but the relationship between diagnosis and peer-rated social status was not mediated by internalizing behavior ($\beta = -.07, p=.54$).

An additional model assessing the direct links between diagnosis, gender and teacher-rated social status had good fit to the data ($\chi^2(6)=6.8, p=.34; CFI=0.99; TLI=0.97; RMSEA=.06, SRMR=.05$). The latent variable of teacher-rated social status was comprised of teacher-rated peer acceptance, teacher-rated peer rejection and popularity. Lower teacher-rated social status was associated with an ASD diagnosis ($\beta = -.54, p< .01$). Being female was marginally related to higher teacher-rated social status ($\beta = .33, p=.052$). A full model including the mediating effects of internalizing and externalizing behavior problems on teacher-rated social status (see Figure 2) also had good fit to the data ($\chi^2(10)= 9.52 p=.48; CFI=1.00; TLI=1.01; RMSEA=.00, SRMR=.05$). After taking behavioral problem effects into account, diagnosis no longer
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significantly predicted teacher-rated social status ($\beta = -.22, p=.16$). However, being female still predicted higher social-status ($\beta = .29, p<.05$), even after adjusting for social behavior. ASD was associated with greater levels of internalizing and externalizing problems ($\beta = .48, p<.01$ and $\beta = .34, p<.05$, respectively), but gender was not associated with either externalizing or internalizing behavior ($\beta = -.24, p=.15$ and $\beta = .06, p=.71$, respectively). Externalizing problems significantly predicted lower teacher-rated social status ($\beta = -.33, p<.05$), as did internalizing problems ($\beta = -.37, p<.05$). Indirect effects from diagnosis to teacher-rated status through externalizing were not significant ($\beta = -.11, p=.11$) but indirect effects via internalizing problems approached significance ($\beta = -.18, p=.052$).

**Discussion**

School-aged children with Autism Spectrum Disorders (ASD) experience less social inclusion than their typically developing peers, but our understanding of this phenomenon in very young children with ASD is limited. Even less is known about how factors such as behavior problems play a role in influencing social status in preschool children with ASD. This is the first study to evaluate social status and its relation to behavior problems in preschool children with ASD. Specifically, we examined the differences between children with ASD on measures of social status and further evaluated whether behavior problems mediated the relationship between ASD and social status.

The results showed that children with ASD experienced greater levels of internalizing and externalizing behaviors problems. This result is consistent with previous research examining behavior problems in preschool and school-aged children with ASD.
(Bauminger, Solomon, & Rogers, 2010; Bölte, Dickhut, & Poutska, 1999). This increase in behavior problems in children with ASD is concerning because it places children with ASD at a greater disadvantage for developing appropriate relationships with their teachers and peers, both of whom play important roles in the social development of young children with ASD (Robertson, Chamberlain, & Kasari, 2003; Kuppens et al., 2009). Early deficits in social interaction and communication prevent children with ASD to build positive social relationships (Kasari & Rotheram-Fuller, 2007), and behavior problems can compound these deficits by further complicating interactions with peers.

It was found that females and males were similar in behavior problem presentation across the entire sample of children. This finding is contradictory with the general belief that there are clear differences in what types of behavior problems young males and females exhibit (Rutter, Caspi, & Moffit, 2003; Eme, 1979). It is important to note that we were unable to elucidate differences between genders within each diagnostic group because of the small number of females with ASD included in the sample. Future research should focus on recruiting equivalent numbers of males and females with and without ASD in order to truly examine these gender differences in young children. It has been demonstrated that gender differences can be found among children with ASD. For example, previous research conducted by Solomon and colleagues (2012) suggests that females with ASD exhibit more problematic behaviors than males with ASD and typically developing females, especially in regards to internalizing behaviors that manifest in late childhood and early adolescence.

Another major finding of this study was that children with ASD experienced lower overall teacher-rated and peer-rated social status as evidenced by fewer numbers of
peer and teacher-reported reciprocal friendships, lower peer- and teacher-rated peer 
acceptance, and greater teacher-rated peer rejection. This finding provides support for the 
conclusion that children with ASD and other disabilities experience lower social status 
than their typically developing peers and extends it to preschool-aged children with ASD 
(Buysse, 1993; Buysse, Nabors, Skinner, & Keyes, 1997; Chamberlain, Kasari, & 
Rotheram-Fuller, 2006; Guralnick & Groom, 1987; Rotheram-Fuller, Kasari, 
Chamberlain, & Locke, 2010). The implications of possessing lower social status early in 
life for children with ASD seem dire. Early childhood peer rejection has been 
longitudinally linked to poorer adjustment in adolescence (Pedersen, Vitaro, Barker, & 
Borge, 2007). Furthermore, children with fewer friendships are more isolated from social 
groups and are more likely to develop more behavior problems as a result of this isolation 
(Laursen, Bukowski, Aunola, & Nurmi, 2007). The cycle between lacking friends or 
close peer associates, being isolated, and developing further behavior problems is 
difficult to break (Laursen et al., 2007), and it may unfortunately be the cycle that 
children with ASD experience because their peers are unwilling to associate with them 
due to their increased behavior problems or significant deficits in social interactions.

Lower teacher-rated social status was predicted by greater externalizing and 
internalizing behavior problems, but only internalizing behaviors approached significance 
in mediating the relationship between diagnosis and teacher-rated social status. These 
results suggest that teachers’ perceptions of a student’s likability may be influenced by 
the behavior problems that the student displays. In typically developing children, teachers 
are more likely to have less positive and more conflicting relationships with children who 
exhibit increased behavior problems (Birch & Ladd, 1998). In particular, teachers report
being more “bothered” by kindergarteners’ externalizing problems than they are by students’ internalizing problems (Birch & Ladd, 1998; Liljequist & Renk, 2007). Teachers of school-aged children with ASD also report less intimate relationships with students with ASD who exhibit more externalizing behaviors, including inattention, hyperactivity, impulsivity, oppositionality, and defiance (Robertson, Chamberlain, & Kasari, 2003).

The results of the current study do not suggest a distinct difference in what type of behavior problem is more “bothersome” to teachers, but do show that teachers tended to rate children with ASD lower in terms of social status if they also had greater internalizing behavior problems. This is an interesting finding because it was not expected to see internalizing behaviors playing such a large role in determining teacher-rated social status (Rutter, Caspi, Moffitt, 2003). Young children, particularly young children with ASD, are known for having increased externalizing behavior problems (Hartley, Sikora, & McCoy, 2008), but this study demonstrates that it is more internalizing problems that mediate how children with ASD are rated by their teachers. It is possible that teachers of children with ASD at the study site are so well trained in how to handle a child with ASD who has more externalizing behaviors (e.g., aggression), but are less prepared to deal with a child with ASD who is more emotionally dysregulated or exhibits more internalizing behaviors. Less preparation for these types of behaviors can possibly lead to decreased teacher-perceived social status of the children who display them. This result is important because it highlights the practical need for teachers to be aware of how covert behavioral problems may affect their relationships with students, especially those with ASD, and ultimately their ratings of these students’ social status.
In the teacher-rated social status model, it was also seen that being female significantly predicted greater social status. This is interesting because gender was not significantly related to either type of behavior problem, which indicates that being female, in and of itself, is related to teacher-rated social status. It may have been that the teachers in this study are closer to their female students, which would lead them to rate female students higher in terms of social status. It is also possible that because there were so few girls with ASD in the sample, it appeared that, overall, females were more socially competent than males, and were; therefore, rated higher in terms of teacher-rated social status. Prior work has shown that having closer relationships with female students is relatively common for teachers in the preschool setting (Birch & Ladd, 1997; Howes, Phillipsen, & Peisner-Feinberg, 2000; Murray & Murray, 2004). It is possible that girls are generally rated by teachers to be more liked because they exhibit more positive social skills, including cooperation and self-control, while males tend to exhibit more behavior problems (Abdi, 2008). However, other factors, beside social competency, can come into play when comparing boys and girls in terms of peer acceptance. For example, Vaughn & Langlois (1983) noted that the physical attractiveness of a preschool female leads teachers and other adults to rate them higher in social status. Future research should consider that these factors might play a role in how teachers are rating their female students.

Another major finding of this study was that children with ASD tended to experience lower overall peer-rated social status, which resulted in a moderate effect size ($\beta = -.43$). Even though this effect was marginal, it supported by the fact that children with ASD were nominated by their peers to have fewer reciprocated friendships ($d = -.58$).
and lower peer-rated acceptance \((d=-.74)\) than typically developing children. Upon further exploration, it is seen that children’s rating of lower social status was mediated by externalizing behavior problems and greater disliked nominations were given to children who exhibited more externalizing behaviors \((\beta = -.61)\). These results would suggest that externalizing behavior is a more important predictor of peer dislike than ASD status per se. This finding is consistent with previous work demonstrating that typically developing children in inclusive preschool settings do not negatively nominate children with special needs based on their disability status alone. Instead, they provide more rejected nominations for children who are more destructive and aggressive, which usually includes children with special needs (Nabors, 1997). Indeed, children in this study often spontaneously reported overt negative behaviors (e.g., aggression) as reasons for a reason to nominate a peer as disliked, and it is notable the children’s comments did not seem to focused an “autism-specific” reason to negatively nominate someone. This finding is also consistent with previous research showing that children’s social behavior is most important in determining their acceptance into social groups (Lindsey, 2002; Phillipsen, Bridges, McLemore, & Saponaro, 1999). Previous work has shown that preschool children are likely to prefer peers who are “nicer” and more prosocial (Snyder, Horsch, & Childs, 1997), and reject peers who exhibit greater externalizing behavior problems (Denham & Holt, 1993; Ironsmith & Poteat, 1990).

It is notable that internalizing behaviors did not predict levels of social status in the peer-rated social status model and were only moderately correlated with measures of peer acceptance and peer rejection. These results suggest that very young children do not consider internalizing behaviors to be a very salient factor in rating others’ popularity and
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acceptance (Eisenhower, Baker, & Blacher, 2005). This is consistent with previous research that has shown that very young children’s view of others is primarily influenced by more overt behaviors (Ironsmith & Poteat, 1990; Johnson, Ironsmith, Snow, & Poteat, 2000). Because it is known that children with ASD exhibit more externalizing problems when they are young and more internalizing and total behavior problems as they age, it would be interesting to examine how internalizing behavioral problems relate to ratings of social status as preschool children with ASD age and transition into elementary school.

In the current study, correlational data revealed that the pattern of students’ and teachers’ report of aspects of social status were internally consistent. For example, greater measures of peer-rated social status (i.e., acceptance and number of peer-reported reciprocated friendships) were related to lower peer-rated rejection. In regards to teacher report, it was also seen that greater measures of teacher-rated social status (i.e., teacher-rated peer acceptance, popularity, and reported friendships) were associated with less teacher-rated peer rejection.

It was also found that teacher report of students’ social status was concordant with children’s report of social status. Teacher-rated peer acceptance and peer rejection were moderately associated with peer-rated acceptance and rejection, respectively. Moreover, teacher-rated popularity was strongly related to peer-rated acceptance. Student reported number of reciprocated friendships was not associated with teacher reported number of friendships, suggesting that this is an aspect of social status that students and teachers interpret differently. The consistency of student and teacher reports across reporters provides support for the conclusion that teachers can be reliable informants of children’s social status (Nabuzoka, 2003; Wu, Hart, Draper, & Olsen, 2001). Few sociometric
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studies, to date, have included a teacher report component, usually because teachers are thought of as “outsiders” in students’ social relationships. However, teachers are able to provide objective interpretations of a student’s behavior and acknowledge that negative social behaviors have an observable impact on children’s social status (Wu et al., 2001). For example, when teachers from the current study were asked to explain why some students appeared less preferred than others, they often reported that this usually occurred because those students were physically aggressive towards others, which is consistent with the findings of this study.

Some have questioned whether teachers would serve as better reporters of young students’ social status because young children seem to lack the insight to appropriately report on their social status and peer relationships. Wu and colleagues (2001) addressed this question by examining the cross-informant concordance of teachers’ and preschoolers’ report of peer acceptance and rejection. They found that student and teacher report assessed both shared and unique aspects of preschoolers’ acceptance and rejection. They argued that because of the unique differences among student and teacher report, teacher report was not superior to student report in assessing preschoolers’ social status, but instead, provided an additional, valuable perspective of students’ social status. Further research should continue to examine the concordance, cross-time stability and predictive validity of teacher and students report of preschoolers’ social status, especially in children with disabilities.
Clinical Implications

The results of this study emphasize the impacts of behavior problems on children and teacher ratings of social status, as seen by the mediating effects of externalizing and internalizing behaviors between a diagnosis of ASD and social status. Children with ASD experience more behavior problems than their peers. These behavioral difficulties place them at a significant disadvantage for interacting positively with peers in order to develop positive social relationships. Specific behavioral interventions, targeted toward decreasing negative behaviors, such as aggression and oppositionality, and increasing positive behaviors may help students with ASD improve their abilities to develop friendships and prevent peer rejection and isolation upon entry to elementary school. Another benefit of behavioral remediation for children with ASD is that it may allow them to build more positive relationships with their teachers, who are responsible for providing a positive and conducive learning environment for these students.

It is known that problems in peer relationships and behavior problems share a reciprocal relationship. On one hand, increased behavior problems in children with and without ASD have been associated with lower social status and less rewarding social relationships (Phillipsen, Bridges, McLemore, & Saponaro, 1999), and lower social status has been shown to be associated with increasing negative behaviors (see Kuppens et al., 2009). This bidirectional relationship between social status and behavior supports the belief that peer rejection is not a random phenomenon. Improving early childhood behavior of children with ASD may allow them to develop more positive social status early in life to prevent against the development of further behavior problems as they age.

Conducting sociometric research in preschool children would also be beneficial
due to its potential usefulness in enhancing social skills interventions for children with ASD. Preschoolers with ASD lack a range of appropriate social skills (e.g., initiation of social interaction, lack of joint attention), and conducting early intervention efforts to improve these deficits during the preschool period can lead to lasting outcomes (Howard, Sparkman, Cohen, Green, & Stainslaw, 2005). It is known that social skills interventions derive their effectiveness based on the sociometric dynamics of the children involved (McConnell, 2002). Sasso, Mundschenk, Melloy, and Casey (1998) found that higher sociometric status of children with ASD was associated with increased rates of social interaction, which contributes to the success of a social skills intervention. Previous research has also shown that children with ASD experience significant improvements in their social relationships if typically developing peers are included in the intervention process (Kasari & Rotheram-Fuller, 2007; Kasari et al., 2012). If sociometric research specifically aimed at identifying peer relationships and friendships is conducted prior to the beginning of an intervention, it may reveal which children would be able to interact with the participants with ASD to achieve the best results from the intervention.

**Limitations**

This study has several limitations. One limitation already discussed was the size and makeup of the sample. The small number of females in the sample limited the generalizability of the results to larger populations of females with autism, and reduced power to detect differences between diagnostic and gender groups on measures of social status and behavior problems. There was limited power to detect existing gender differences on measures of social status, as evidenced by small to moderate effects sizes.
ranging from -0.06 to 0.60. Because of this, diagnostic groups were compared on measures of social status using one-way ANCOVAs that did not include the gender effects. Results from these analyses supported the overall SEM models, but were unable to provide clear gender distinctions within diagnostic groups on individual measures of social status.

Having only two females with ASD in the sample also restricted the types of statistical analyses that could be used. Using multivariate analysis of variance (MANOVA) would have been preferred for analyzing a large group of dependent variables in a single analysis. However, because the number of females with ASD was less than the number of dependent variables used in the analysis, the only alternative for examining group differences on sociometric variables was to use univariate ANOVAs. This is an issue because the use of multiple univariate analyses could have resulted in an inflation of committing Type 1 error.

Because this study took place in a service center specifically designed to serve children with ASD, the results may not be applicable to educational settings that are less inclusive. This study sample is also primarily comprised of students that come from upper middle class families, and results obtained from these children may not be comparable to children from lower SES backgrounds. To address these problems, it would be beneficial to conduct further sociometric studies focusing on children with ASD and their peers in other inclusive settings, such as Head Start programs.

Use of the Peer Play Rating Scale may have been another limitation of the proposed study. While this measure has provided valid and stable assessments of preschool children’s sociometric status in previous studies (see Cillessen, 2000), it was unclear if lower-functioning participants with ASD in this study understood the rating
system employed by this measure. It was sometimes unclear if the ratings obtained from lower-functioning children with ASD were accurate in describing their ratings of their peers. It was also seen that liking ratings obtained from this measure were associated with older age, indicating that older children in the study may have understood this task better than younger participants. On the other hand, liking ratings were not correlated with other measures of peer social status (i.e., peer acceptance, peer rejection), but were correlated with peer-reported reciprocated friendships. These conflicting associations may suggest that the liking ratings may not be a reliable or valid measure of peer status in preschoolers with disabilities. To combat the issues seen with the rating scale task, the Peer Picture Nominations Task was also administered. In addition to being the gold standard for obtaining sociometric data from preschoolers, the nomination task relies upon fewer higher-order thinking strategies while still providing valid measurements of preschool children’s sociometric data, even with those children who are lower functioning.

A fourth limitation of this study was its use of standardized z-scores to adjust for different class sizes when comparing acceptance and rejection between groups. Using standardized z-scores limits the interpretability of the findings and eliminates valuable differences between groups. Future research using sociometric data should consider adjusting for varying group sizes using a modified regression technique that accounts for these problems (Velasquez, Bukowski, & Saldarriaga, 2013).

A fifth limitation of the study is that teachers in this study were the sole raters of children’s behaviors, whereas in prior studies, parents and other students, in addition to teachers, have provided information regarding behavior problems. Other studies employing teacher ratings of behavior and social status have found redundancies between
what students teachers rate as high in behavior problems and what students are rated lower in teacher-rated peer acceptance (Andrade et al., 2005). It may be likely that both types of behavior problems influenced teacher-rated social status in this study due to the redundancy between the behavior and teacher-rated social status constructs.

**Conclusion**

Typically developing preschool children and school-aged children with ASD have been studied extensively using sociometric methods (see Denham & McKinney, 1993; Rotheram-Fuller et al., 2010; Snyder, Horsch, Childs, 1997). Prior to this study, Preschool children with ASD had not been evaluated using similar sociometric techniques. It is possible that studies of this nature have not been conducted with this population due to their underdeveloped joint attention skills (Wong & Kasari, 2012) and increased attention and behavior difficulties (Georgiades et al., 2011). However, it was observed these problems did not interfere with the accurate administration of our sociometric methods.

This study provides novel information about the social world of preschoolers with ASD, which opens the door for additional sociometric studies of preschoolers with ASD and other disabilities to take place. This study aimed to describe the social status of preschool children with ASD and to identify potential mediators between a diagnosis of ASD and social status. Results confirmed that children with ASD experience greater levels of both internalizing and externalizing behavior problems and also tend to have lower overall social status, especially when rated by teachers. This study also highlights the importance of behavior problems in impacting a young child’s standing within his/her
social group. Specifically, it appears that children’s ratings of social status are more influenced by externalizing behavior, while teacher both types of behavior problems, especially internalizing problems, influence ratings of social status equally.

Several aspects of this study are important to remember, the first being that teachers and students were able to provide concordant assessments of children’s social status, even in a small sample of children, which supports the practice of employing multi-rater assessments of young children’s social status. Secondly, this study was the first in describing social status in young children with ASD, but should be replicated in other, more diverse samples of preschool children with ASD to provide a general description of social status in this population. Finally, while behavior does seem to play a significant role in the social status of young children with ASD in this study, other factors that may influence young children’s social relationships and social status, including disability severity, classroom structure, and intimacy of teacher-child relationships, should also be examined in future research to further these descriptions of young children’s social functioning.
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Figure 1. The final mediation model of the indirect relationships between diagnosis, gender, and peer-rated social status

Note. * = p<.05, ** = p<.01, *** = p<.001
Figure 2. Final mediation model of the indirect relationships between diagnosis, gender, and teacher-rated social status

Note. * = p<.05, ** = p<.01, *** = p<.001
Table 1

**Summary of means, standard deviations, and percentages for all continuous and categorical variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>ASD Group (N = 19)</th>
<th>Non-ASD Group (N = 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Racial Minority</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Age (months)</td>
<td>56.95</td>
<td>46.37</td>
</tr>
<tr>
<td>Liking Ratings</td>
<td>.87</td>
<td>.94</td>
</tr>
<tr>
<td>Peer Acceptance</td>
<td>-.34</td>
<td>.34</td>
</tr>
<tr>
<td>Peer Rejection</td>
<td>.32</td>
<td>-.32</td>
</tr>
<tr>
<td>Peer-reported Friends</td>
<td>.84</td>
<td>1.32</td>
</tr>
<tr>
<td>Teacher-rated Peer Acceptance</td>
<td>-.49</td>
<td>.49</td>
</tr>
<tr>
<td>Teacher-rated Peer Rejection</td>
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<td>-.58</td>
</tr>
<tr>
<td>Teacher Popularity</td>
<td>3.42</td>
<td>4.05</td>
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<tr>
<td>Teacher-Reported Friends</td>
<td>1.58</td>
<td>2.21</td>
</tr>
<tr>
<td>Internalizing Problems</td>
<td>59.32</td>
<td>46.16</td>
</tr>
<tr>
<td>Externalizing Problems</td>
<td>61.95</td>
<td>50.42</td>
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</table>

*Note.* Peer acceptance, peer rejection, teacher-rated peer acceptance, and teacher-rated peer rejection were standardized into z scores (M=0, SD=1) to make comparisons between diagnostic groups.
Table 2

*Bivariate Correlations Between Demographic, Predictor, Mediator, and Outcome Variables*

<table>
<thead>
<tr>
<th>Variable</th>
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<tr>
<td>Females</td>
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<td>-0.59*</td>
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<tr>
<td>Age</td>
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<td>0.47**</td>
<td>-0.51**</td>
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<tr>
<td>Internalizing Probs</td>
<td></td>
<td></td>
<td></td>
<td>0.62**</td>
<td>-0.41**</td>
<td>0.56**</td>
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<tr>
<td>Externalizing Probs</td>
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<td></td>
<td>0.58**</td>
<td>-0.52**</td>
<td>0.45**</td>
<td>0.58**</td>
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<td>Peer Acceptance</td>
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<td>0.31</td>
<td>0.39*</td>
<td>0.53**</td>
<td>-0.47**</td>
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<td>Liking Ratings</td>
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<td>0.32*</td>
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<td>Peer Reported Friends</td>
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<td>Teach Rated Acceptance</td>
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<tr>
<td>Teacher Rated Rejection</td>
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<td></td>
<td></td>
<td></td>
<td>0.62**</td>
<td>-0.57**</td>
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<tr>
<td>Teacher Rated Popularity</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.34*</td>
</tr>
<tr>
<td>Teacher Rated Friends</td>
<td></td>
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</tr>
</tbody>
</table>

Note. Peer acceptance, peer rejection, teacher-rated acceptance, and teacher-rated rejection were transformed into standardized z-scores for comparison across classrooms.

* = $p < .05$, ** = $p < .01$. 

Sociometric status and behavior in preschoolers with ASD
APPENDIX

IRB Approval
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 8-30-13. 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: 8-30-13
Date IRB Approval Issued: 8-30-13
IRB Approval No Longer Valid On: 8-30-14

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.