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Girls with autism: Do they fit in?

A thesis submitted in partial satisfaction of the requirements for the degree

Master of Arts in Education

By

Michelle Carol Dean

2013

ABSTRACT OF THE THESIS

Girls with autism: Do they fit in?

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Master of Education

University of California, Los Angeles, 2013

Professor Connie Kasari, Chair

Children with ASD are reported to have fewer friends than their typically developing classmates (Chamberlain, Kasari, & Rotherman-Fuller, 2007). Since girls with ASD have been under represented in past research, less is known about their experiences. The purpose of this study was to examine the influence of gender on the social experiences of girls and boys with ASD. A secondary analysis of peer nomination data (Cairns & Cairns, 1994) was used to examine social relationships (Kasari et al., 2010, Kasari et al., in preparation). The children with ASD were fully included in the general education setting. Same-gender classmates were randomly selected for the control group. Within and between-group differences were explored, controlling IQ, age, and city of residence. Gender was a salient organizer of social relationships in children with ASD. Between and within group differences suggest that girls and boys with ASD have unique social experiences.

The thesis of Michelle Carol Dean is approved.

Sandra Graham

Carollee Howes

Connie Kasari, Committee Chair

University of California, Los Angeles

2013

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Girls with ASD: Do they Fit In?

We know a great deal about gender differences in friendship preferences and social status of typically developing boys and girls, yet current findings rarely consider how gender differences effect the social experiences of children with high functioning autism or Asperger's syndrome (ASD; defined in this study as having and IQ > 70). To date, the social experience of school-age girls with ASD is overlooked, yet generalizations about social acceptance are applied to both sexes. Like typical elementary school children, students with and without ASD in general education-inclusion classrooms prefer same gender friendships (Kasari, Locke, Gulsrud & Rotherman-Fuller, 2010; Chamberlain, Kasari, Rotherman-Fuller, 2007; Bauminger & Shulman, 2003) Therefore, to be considered socially competent, a girl with ASD must adhere to the gender expectations within her school culture. Boys with ASD report social difficulties and fewer friendships (Chamberlain, Kasari, & Rotherman-Fuller, 2007; Chamberlain et al., 2007), yet the under representation of girls with ASD underscores the need for more attention to their experiences. The purpose of this study was to prioritize gender when looking at the social status and reciprocal friendships of children with ASD. We sought to highlight the unique experiences of girls with ASD who are included in general education classrooms with typical classmates. By identifying the social relationships and groups within each classroom, we were able to compare the friendship preference, group affiliation and rejection of the girls with ASD to boys with ASD and to typical boys and girls. Finally, by investigating the preferred games and activities of children in 14 elementary school classrooms, we were able to contextualize the social experiences of boys and girls with ASD.

Social Environment

Schools provide rich opportunities for socialization into peer culture as children develop social skills through shared experiences and everyday interactions (Goodwin, 2006). In elementary school classrooms, having a reciprocal friend is associated with positive psychological development and school perception (Ladd, Kochendorfer & Coleman, 1996). Along the same lines, group acceptance and affiliation provide a supportive environment and has been shown to help children to adjust to new experiences, feel good about themselves, and develop social skills (Hart, 1989; Parker & Asher, 1993). On the contrary, students who are rejected experience loneliness and have fewer opportunities to practice social engagement. As a result, rejected children are more likely to have negative perceptions about school, a greater risk for victimization, and academic difficulties (Ladd et al, 1996).

Because some children with ASD have grade-level academic proficiency, they are often placed in general education classrooms. This setting is intended to uphold high academic rigor while allowing an integrated context for social development. Consequently, typical children are implicitly expected to model appropriate social behaviors and interactions (Mesibov & Shea, 1996). Being included in a general education classroom places great social processing demands on children with ASD as they are expected to navigate and interpret typical social norms by interacting with the typical students. Typical classmates also experience challenges, as they are implicitly expected to facilitate play and social engagement and to include atypical classmates (Ochs, Kremer-Sadlik, Solomon, & Sirota, 2001). In addition to classroom activities, social relationships are developed on the playground through participation in games and activities (Blatchford, Baines & Pellegrini, 2003). Unfortunately, it is difficult for typical and atypical

children to socialize and form friendships without adult facilitation. Consequently, children with ASD often remain at the periphery of social groups and are isolated during play (Bauminger & Shulman, 2003; Chamberlain, Kasari & Rotherman-Fuller, 2007).

In light of these challenges, it is not surprising that several studies have documented differences in friendship patterns and social status of atypical and typical students in inclusion classrooms. On average, children with ASD have fewer reciprocal friendships and weaker ties to social groups compared to their typical classmates, and older students with ASD were less socially connected than younger students on the spectrum (Chamberlain, Kasari, & Rotherman-Fuller, 2007). Previous findings that looked at social status of children with ASD identified a discrepancy between children on the spectrum and their classmates. The students with ASD had a tendency to misinterpret the strength of perfunctory relationships and to overrate their own social competence (Kasari, Lock, Gulsrud & Rotherman-Fuller, 2010; Rotherman-Fuller et al., 2010; Kasari, et al., 2010).

Because conclusions were derived from predominantly male autistic samples, the social preference, acceptance, and status of girls with ASD is unclear. On one hand, girls and boys with ASD do share the same core social deficits of ASD that interfere with making friends (Rivett, 2010). So, in prioritizing the construct of disability despite girls' underrepresentation in the samples, it is well documented that having autistic characteristics, greatly impacts one's ability to have friends and belong to social groups. Yet, to think about school age social groups without considering the strong influence gender is nearly impossible. In school age populations, the construct of gender greatly influences friend selection, social expectations and behaviors (Rose & Asher, 2004; Maccoby, 1988). Recently, Rotherman-Fuller (2010) identified gender preferences in inclusion classrooms and found that children with ASD, like their typical peers,

tend to nominate same-sex friends (Rotherman-Fuller, 2010). By considering gender preferences in friendship selection in inclusion classrooms, this research seeks to understand how salient the construct of gender and the construct of disability impact the social experience of girls with ASD

Social Information Processing – ASD

When faced with a social opportunity, children need to identify and interpret social cues and execute a response they see as appropriate for the current social context. To do this, children must be able to evaluate contextual cues and ascertain the objective of others (Crick & Dodge, 1996). This can be challenging for a person with ASD because of their tendency to fixate on individual details without understanding the big picture. Likewise, rigid behaviors and difficulties with problem solving (Ozonoff et al, 2001; Happe & Frith, 2006) and perspective taking make it difficult to relate to others (Barron-Cohen, 1989; Frith, 2004). In social interactions, difficulties with active listening, "checking in" with their communication partners, and inappropriately assuming shared background knowledge causes children with ASD to overlook social cues and misinterpret the context (Paul et al., 2009)

Social encounters are embedded within a contextual framework and interactions contain rapid verbal and non-verbal cues that require continuous interpretation. People with ASD have difficulty distinguishing the essential components of an interaction, and consequently, their social responses appear awkward and inappropriate (Klin et al. 2000). Moreover, since children with autism have fewer friendships (Chamberlain et al, 2007), they also have less opportunity to practice socializing (Bauminger & Kasari, 1999). Consequently, peers misunderstand and negatively perceive autistic characteristics, and children with ASD are frequently alienated from social groups (Ochs et al., 2001; Sale & Carey, 1995).

Female Friendships: Challenges for Girls with Autism

The context of school on social relationships in typical populations suggests possible differences in the social experiences of girls and boys with ASD. For example, during recess and unstructured play periods, elementary school girls tend to engage in conversation and less structured activities like jump rope, while boys prefer ball games with formal rules. Also, boys tend to play one game throughout the entire duration of recess, while girls shift among activities (Blatchford, Baines & Pellegrini, 2003). Girls with ASD might experience gender-related challenges that are as important, but different from the challenges boys with ASD. Such challenges include the social characteristics and dynamics of female friendships and peer groups, the collaborative process of social inclusion and exclusion, and the language demands that characterize female social language.

Female relationships require more implicit social nuances, self-awareness, and intimacy than male friendships (Maccoby, 1988). Autistic characteristics conflict with the dominant features observed in female bonding. Girls engage in reciprocal conversations about their thoughts and feelings, and use self-disclosure to deepen relationships (Maccoby, 1988). As such, stable reciprocal female friendships have the additional responsibility to protect secrets and groups of girls are less likely to initiate new friendships (Rose & Asher, 2004). Boys, on the other hand, are more inclined to welcome unknown members into their peer group and their conversations are typically not about feelings (Colarossi, 2001). Hence, the subtle nuances and exclusivity that characterize reciprocal female relationships present formidable challenges for autistic girls.

Goodwin (2009) examined the dynamics of social behaviors by comparing school-aged girls in various parts of the country and across multiple socioeconomic classes. Her work highlights the social hierarchy within social groupings and the importance of fitting in and being

accepted. Girls are more likely to promote their individual interests before considering the group (Rose & Asher, 1999), are more concerned with peer evaluation and more easily embarrassed than boys. With a heavy priority on social interdependence and inclusion, conversations frequently address and exclude girls that are different or "weird" (Goodwin, 2009). Considering her potential for social mistakes, a girl with ASD may be at a greater risk for rejection than her typical classmates (Crick & Dodge, 1996).

Chamberlain, Kasari & Rotherman-Fuller (2007), identified one second-grade girl with ASD that had a high social status, and was socially connected to every girl in her classroom. A qualitative investigation identified the positive effect of adult facilitation. According to the mother's report, her child was completely isolated and overlooked during lunch and recess at the beginning of the school year. A successful collaboration between the school providers and the parents increased social connections. Nevertheless, the mother reported social differences between her daughter and the typical girlfriends. As early as second grade, these girls were already engaging in social behaviors, like "chit chat," that characterize female relationships. Unfortunately, her daughter would perseverate and make inappropriate communicative attempts, but was not able to engage in *girl talk*. Despite her daughter's improved social status, the mother's concern about the long-term social outcomes for her daughter poses a relevant question. To what extent does an inability to engage in reciprocal conversation hinder the development of meaningful female relationships?

In a cross sectional study of gender differences in relationships, Adler, Kless and Adler (1998), found strong relations between "precocity" and popularity starting in early elementary school and continuing through the secondary level. Girls who had strong communication skills were more likely to belong to high status peer groups and would exclude undesired relationships.

These girls were able to interpret the emotional state of others and use this information to get their needs met. Such social nuances can be particularly vexing for a girl on the spectrum! People with ASD have difficulty engaging in reciprocal conversation because of challenges with the pragmatic use of language (Landa, 2000), and making relevant contributions to the conversation (Capps, Kehres & Sigman, 1998). Also, children with ASD have difficulty perceiving emotions and interpreting expressions (Hobson, 1986; Celani, Battacchi, & Arcidiacono, 1999; Ozonoff, Pennington, & Rogers, 1999), which is a salient feature in female discourse. Klin et al, (2002) used eye tracking to identify how people visually track social encounters to interpret meaning from unspoken cues. People with autism were less likely to track non-verbal responses and reactions in non-speaking communication partners, unlike the matched comparison group who used the facial expressions to garner a deeper meaning of the social context. Typical populations heavily rely on non-verbal cues to interpret point of view, subtext and intentionality throughout communication. Therefore, the interaction between the primary components of female relationships and the social processing challenges of ASD make having a reciprocal best girlfriend difficult.

In conclusion, girls with ASD are underrepresented in current research, and little is known about their social experiences in general education classrooms at school. Prior studies suggest that elementary aged girls and boys with and without ASD prefer same gender friends (Kasari, Locke, Gulsrud & Rotherman-Fuller, 2010; Chamberlain, Kasari, Rotherman-Fuller, 2007; Bauminger & Shulman, 2003), and that there are clear differences in the way typical boys and girls socialize (Rose & Asher, 2004; Maccoby, 1988). However, it is unclear if there are differences in the way that girls and boys with ASD are socially included in their classroom, or if girls with ASD have more difficulty developing same-gender friendships than boys with ASD.

The influence that gender has on social contexts and dynamics calls attention to potential differences in the social experiences of girls and boys with ASD.

The current study focused on elementary school girls with ASD and compared their friendship nominations and social connections to boys with ASD and typical girls and boys of the same age. The following research questions were examined 1.) What are the gender patterns of children with ASD, and do girls with ASD prefer same gender peers? 2.) How socially connected are girls with ASD? Are they nominated as friends and perceived as belonging to social groups? Do girls with ASD receive friend nominations from same-gender classmates? 3.) To what extent are the social affiliations of girls with ASD the same or different from typical girls or boys with ASD.

Method

Participants

This sample was selected from two large randomized control trials (Kasari in preparation, Kasari et al., 2010). The prior studies focused on interventions for children with autism who were educated in general education classrooms in southern California (grades 1-5). The current study performed a secondary analysis of baseline data that were collected in the general education classrooms prior to the implementation of school interventions. Therefore, the participants in this study were selected because they completed peer nomination data in their classroom at baseline. In all cases, the data were only collected from children who gave their written assent and whose parents signed written consents for participation.

Peer nomination data from 28 elementary school general education classrooms were used to examine the social relationships and friend preference in the elementary school populations. Classrooms were eligible for participation in the study because they contained at

least one student with ASD. To qualify for the current study, the children with ASD had to be educated in the general education classroom for a minimum of 80 percent of the school day, have their diagnosis confirmed by the Autism Diagnostic Observation Schedule (ADOS), and have average or above average intelligence (IQ>70; confirmed by the Stanford Binet-5). Typical students were selected because they were classmates of the child with ASD. As shown in table 1, approximately one half of the students in each class had parent consent to participate.

To examine the gender differences between children with ASD and their typical peers, a total of 60 participants were selected from the consented population. First, nine girls with ASD from sample 1 (Kasari, in preparation) and six girls with ASD were selected from sample 2 (Kasari et al., 2010). Next, each girl was matched by age and IQ to a boy with ASD (15; 9 from sample 1, and 6 from sample 2). Then, one typical classmate was matched by age and classroom to each child with ASD yielding a total of thirty typical boys and girls (9 girls and 9 boys from sample 1; 6 boys and 6 girls from sample 2).

Measures

The Friendship Survey (Cairns&Cairns, 1994). The Friendships Survey is a two-page questionnaire that was administered in the classroom to assess children's friendships and social connections in the classroom. Students were asked to use free recall and to list the classmates who they "like to hang out with." The number of friends nominated creates the "buddies out" variable, and the number of received nominations was termed "buddies in." Next, the students are asked to identify and circle their three best friends ("Top 3 Best Friend") and then to put a star by the name of their one best friend ("Top 1 Best Friend"). Then, the students were asked to write down the names of children that they do not like to hang out with. The nomination variables were disaggregated into gender categories, yielding six additional gender variables

(Girl/Boy Buddies in and out, Girl/Boy Top 3 Buddies in and out, and Girl/Boy rejections in). For example, Boy and Girl "out" variables were created by identifying the gender of each classmate listed as someone they "liked to hang out with." The gender of each child that contributed to a "nomination received" variable was identified and used to create Boy and Girl "in" variables.

Chamberlain et al, (2007) used The Friendship Survey to report significant findings in friendship nominations between students (N=34) with ASD ($\mu = .34$, $\sigma=.34$) and their typical matched peers ($\mu = .60$, $\sigma = .43$). These results were used to estimate power for the current study following the protocol of Cohen (1992). With a total sample size of 60 (15 participants per group), a two-sample t-test ($\alpha = .05$) will have 85% power to detect a moderate effect ($d = .67$).

Social Networks. Based on the Cairns' (1994) method, students were asked to write down the names of the students in their class that like to hang out together. In addition to writing their own group of friends, children were encouraged to think about boys and girls outside of their play circle, and list other groups of children who play together. The children were asked to use free recall, instead of being provided a list of names. This method is used because stronger or more prominent relationships are reported more often than less salient friendships. These data were used to identify social connections ("Diagonal Score"), group affiliation and the strength of association ("Cluster centrality ") and social prominence within the classroom ("Social network centrality"). The "Diagonal Score" was the total number of times a child's name was listed as being in a group. The more times the child was listed as a member of a group yielded higher diagonal scores. The "Cluster centrality" score used diagonal scores to measure the strength of the group connection. First, the social groups are delineated using Pearson's correlation to identify significant relationships. Next, group scores were found by taking the average of the

highest and the lowest diagonal score from each group. Then, to create the "Cluster Centrality" variable, the group scores were standardized at the classroom level. The "Social Network Centrality" variable used the individual and group scores and looked at a child's social salience in comparison to their classmates. The diagonal score was standardized at the classroom level to create and individual score. The individual score and the cluster score were compared, and the lowest of the two scores became the social network centrality score. Therefore, a child with a low diagonal score could achieve a higher group status by hanging out and being significantly correlated with a popular kid. On the contrary, another child could be associated with many groups, but have no significant connections. Therefore, that child would have a high diagonal score, but a low cluster score. The social network centrality score accounts for both variables and accounts for the individual's overall social status.

Finally, all of the consented children (n=141; girls 70, boys 71) in the second study (Kasari et al., in preparation) were asked to write their "favorite game to play at school". This information was used to provide contextual information about school-age group dynamics and social experiences through activities. First, we counted the frequency each game or activity was listed. Next, games and activities listed five or more times were considered "most popular" and were selected for the analysis. Then, the characteristics of the games and activities were identified and used to create four different game and activity categories: "Competitive Games with rules-Teams (CGR-T)," "Competitive Games with rules– Individual (CGR-I)," "Non-Competitive Activities with rules," "Non-Competitive Activities – Semi Structured (NCA-S)." Finally, the popular games were sorted by gender nomination into the four categories.

Results

Gender Trends in Friend Preference

The "Buddies Out" and "Buddies In" variables were used to examine gender preferences and trends within the sample. Descriptive data found evidence of gender preference in friend selection samples among typical and atypical populations. As reflected in Table 2, girls and boys with and without autism were much more likely to nominate same sex classmates as their "Buddies" and "Top 3" best friends. The "Buddies Out" variables were disaggregated into "Girls out" and "Boys out" variables, which were used to create the "Same Sex Out" variable. Between group comparisons found no significant differences between boys and girls in the number of same-sex "buddies out," F (1,56)= .004, p < .951, $\eta_p^{2=}$.000, or children with and without ASD, F (1, 56) = 1.086, p < .302, $\eta_p^{2=}$.019.

Gender trends were also identified in the same sex "Buddies in" nominations. As shown in Table 3, girls and boys with and without ASD were more likely to receive buddy and best friend nominations from children of the same gender. The "Buddies in" variable that was disaggregated by gender was used to create the "Same-sex In" variable. A 2x2 (gender x ASD status) factorial ANOVA compared differences in "Same-sex in" nominations and found no significant differences between boys and girls, F (1,56)= .522, p < .473, $\eta_p^{2=}$.009. However, the children with ASD received significantly fewer same-sex friendship nominations than their typical classmates F (1,56)= 10.01, p < .003, $\eta_p^{2=}$.163. There was no significant interaction effect of autism and gender, F (1,56)= .335, p < .565, $\eta_p^{2=}$.006, yet planned contrasts identified a significant difference in "Same-sex In" mean scores between typical girls (μ = 3.07, SE = .392) and girls with ASD (μ = 1.47, SE = .392). Conversely, there was not a significant difference in

the mean "Same-sex In" scores between typical boys (μ = 2.47, SE = .395) and boys with ASD (μ = 1.47, SE = .395).

Peer Perspective: Do children with ASD belong to a group?

Several variables were used to report group affiliation and saliency. The first variable, the diagonal score, was the total number of times students were identified as "hanging out together." If multiple classmates list the same names as friends that "hang out together," that group would receive a higher rating and be considered more salient. Outliers were removed in order to meet the assumptions of ANOVA. A 2x2 factorial ANOVA compared differences in diagonal scores. Between group differences demonstrated that girls and boys with ASD have significantly lower diagonal scores than typical students, F (1, 46) = 8.12, $p < .007$, $\eta_p^2 = .150$. Adding to this, the significant autism x gender interaction, F (1,46) = 4.13, $p < .048$, $\eta_p^2 = .082$, thus indicating that classmates perceived girls with ASD to affiliate with groups differently than boys with ASD. Planned contrasts revealed that boys with ASD had significantly lower diagonal scores than typical girls and boys (μ = 4.36, SE = .565; μ = 4.75, SE = .541) and girls with ASD (μ = 3.92, SE = .501), suggesting that boys are less likely to be reported as belonging to a group.

Cluster centrality data compared the saliency of group status using a 2x2 factorial ANOVA. There was a significant negative main effect of autism on cluster centrality scores F (1, 56)= 4.77, $p < .033$, $\eta_p^2 = .078$. Findings did not show significant between group differences for gender, F (1, 56) = .27, $p < .587$, $\eta_p^2 = .005$. However, the cluster centrality scores of the typical boys in this sample (μ = 2.93, SE = .244) were larger than typical girls (μ = 2.67, SE = .244) and girls and boys with ASD (μ = 2.27, SE = .244; μ = 2.27, SE = .244), thus showing a possible trend in typical boys towards stronger group affiliation than typical girls and girls and boys with ASD. So, the girl with ASD may have more opportunities to "hang out" with other girls, but

because of her low friend nominations received scores, it is possible that she is perceived as being more socially included than she actually is. The higher mean cluster centrality score indicated that typical boys in this sample belonged to more salient peer groups. For boys with ASD, the increased stability in such relationships may decrease the anxiety produced by novel experiences. Boys with ASD, on the other hand, were at a great social disadvantage if they didn't like competitive games (Blatchford, Baines & Pellegrini, 2003).

Social network centrality scores were used to compare individual classroom status between girls and boys with and without ASD. A 2x2 ANOVA found significant differences in the mean social network centrality scores between typical children and children with ASD, F (1, 56)= 4.77, $p < .033$, $\eta_p^2 = .078$. Like the cluster centrality scores, the mean social network centrality scores identified possible patterns in this sample. The typical boys' scores ($\mu = 2.40$, SE = .193) were higher than typical girls ($\mu = 2.20$, SE = .193), and children with ASD ($\mu = 1.40$, SE = .193; $\mu = 1.40$, SE = .193).

Games and Activities

The popular games were sorted based on whether or not they were competitive, the rule structure, and whether it was a team or individual player format. Games that have a clear goal of winning or losing were categorized as competitive, and activities that required two or more opposing sides with multiple players were labeled as a "team." The competitive Games with rules were soccer, basketball, dodge ball and volleyball, and the competitive games with rules that used individual players were handball and tetherball. The non-competitive activities with rules were different from games because they did not have a goal of winning or losing, however the rules were structured so that a child could be "it" one or several times throughout the game. These activities were hide-&-seek and tag. Finally, non-competitive activities had rules that were

inconsistent or unnecessary, and children could play in a group or alone. These activities included hula-hoop, jump rope, and pretend play.

As shown in Table 4, frequency counts presented gender differences in game and activity preference. Chi square tests identified a significant association between the type of playground game or activity and gender χ^2 (3) = 35.75, $p < .000$, with Cramer's statistic as .460 thus representing a medium association between game or activity selection and gender. Thus, these results supporting previous findings that identified boys as being significantly more likely to be involved in ball games and girls in less structured play (Blatchford, Baines & Pellegrini, 2003).

Rejection

Rejection scores were derived from the total number of times a student was listed as someone a child "doesn't like to hang out with." The rejection variable was disaggregated into gender categories. As shown in table 4, the gender variables identified gender trends in rejection patterns. In general, boys with and without ASD had higher mean rejection scores than girls with and without ASD. Within a gender category, children with ASD had higher mean rejection scores than the mean rejection scores of the typical same-sex control group. Because the majority of rejection scores were 0 or 1, the assumptions of ANOVA could not be met. Therefore, a Mann Whitney non-parametric test was used to examine differences in total rejection between girls and boys with and without autism. Rejection scores did not differ significantly for boys and girls with autism (*Mdn* =1.0, *Mdn* =1.0), or for boys and girls without autism (*Mdn* =1.0, *Mdn* =1.0), $U = 424.00$, $z = -.401$, $p < .688$.).

Discussion

For children with ASD, social identity is multifaceted. Gender had a strong influence in the social relationships of children with ASD in this study. Following typical developmental

trends, the children with ASD tended to nominate same-gender friends and receive same-gender friend nominations. The saliency of disability was also evident because they received significantly fewer friend nominations, had less salient social groups and lower social status than the typical group. Moreover, within their own gender, children with ASD received more rejections than the typical children. By giving girls with ASD equal representation in our data set, we were able to parse out some similarities and differences in the friendships and social status of girls and boys with ASD and typical populations.

Gender Patterns: Do Girls with ASD Prefer Same-Sex Peers

The trends in friendship nominations identified similarities and differences between boys and girls with ASD. Our findings demonstrated that the typical population aligned with previous literature, which described school-age children as segregating by gender when they socialize (Rose & Asher, 2004; Maccoby, 1998). This contribution to the research by provides further evidence that children with ASD are similar to typical populations when selecting friends because of their same-gender friend preference. The girls and boys with ASD in this sample were approximately five times more likely to nominate a same-sex classmate as one of their top three best friends. Considering how important the construct of gender is in typical relationships, these findings call attention to the influence of gender in the friendships of children with ASD. Gender emphasizes one major difference between children with ASD in this sample. Like typical children, girls with ASD want to be friends with girls and boys with ASD want to be friends with boys. As such, the set of skills expected to maintain female social relationships is different than the set of skills expected in male friendships (Colarossi, 2001).

The saliency of gender and disability was evident in the friend nominations that children with ASD received. Similar to the same-sex out variables, girls and boys with ASD followed

typical gender trends and were more likely to receive friend nominations from same-sex classmates. Even so, children with ASD received significantly fewer friend nominations than their typical peers. There was a greater difference in friendship nominations received between girls with and without ASD than boys with and without ASD. The typical girls in this sample displayed two noteworthy characteristics. First, they nominated more friends that "they like to hang out with" than typical boys or girls and boys with ASD. Second, typical girls received more friendship nominations. For girls with ASD, being simultaneously affiliated with two sometimes-competing groups created a chasm. Girls received the most friend nominations, but children with autism received the least friend nominations. Girls with ASD, being girls, were positioned to receive more friend nominations than boys with ASD, yet the lack of significant interaction indicated that boys and girls with ASD received equally low levels of received nominations.

Peer Groups: Are Girls with ASD in Social Groups?

To visualize the social dynamic of elementary school-aged inclusion classrooms we created social maps that delineated the salient social groupings in each classroom. First, the children with ASD in our sample were significantly less likely to be identified as hanging out with other children in their class. One noteworthy gender difference between children with ASD was that the boys with ASD were listed significantly fewer times than girls with ASD or typical children. On the contrary, girls and boys with ASD looked similar when they belonged to a group. Their groups were less salient compared to the typical control groups, and both boys and girls with ASD had an overall lower social status than their typical classmates. These results support previous findings that describe children with ASD as having fewer friendships and social connections than their typical peers (Chamberlain, Kasari, & Rotherman-Fuller, 2007; Chamberlain et al., 2007).

In our sample, the social network centrality scores indicated that typical children were significantly more socially prominent than children with ASD. Similar to the previous studies, the typical boys in this sample were more likely to hold primary or secondary social status positions while children with ASD were more likely to be at the periphery of social groups or isolated (Kasari, Lock, Gulsrud & Rotherman-Fuller, 2010). Girls' with ASD were perceived by their classmates as being more socially salient than boys with ASD. A closer inspection of the trends in typical populations demonstrated that typical girls may associate with more children, but their relationships were possibly less stable. Therefore, girls with ASD have more opportunities to appear like they are affiliated with a group. For example, typical girls received more same-sex "buddy in" nominations than typical boys or girls with ASD. However, their cluster centrality scores were lower than typical boys, suggesting less salient relationships.

Considering the context of school age relationships, our findings support previous empirical studies that have identified notable differences in the ways girls and boys socially interact through games and play activities (Blatchford, 2003). The gender differences between game and activity preferences that were identified in this study provided contextual information to our above-mentioned assertions. First, typical boys' participation in team games could make their group more prominent. Second, the activities that were most preferred by girls' were also fairly easy to stop and start and to move in between, which would increase opportunities for multiple group affiliation and friendship nominations out and received. The gender differences in social play and the low periphery status of girls and boys with ASD highlighted potential differences in their social experiences. For girls with ASD, group fluidity and instability may offer more experiences and present obstacles. The daily novelty of group fluctuation and lack of stability may be difficult for girls with ASD to socially process (Klin et al. 2000).

This study contributes to the research by framing the social experience of children with ASD within the construct of gender. Building social relationships presents challenges for both girls and boys with ASD, and a closer look at contextual data highlights potential differences these children face when socializing at school. Noticing the ways that children with ASD follow typical gender trends provides great insight into social desires, experiences, and directions for future research and intervention.

Limitations

The results of this study corroborate previous findings that indicate that children with autism have fewer friendships and lower social status than their typically developing peers. This research contributes to the previous literature by using gender to compare children with ASD to typical populations and to each other, and by having and equal number of girls and boys with ASD in the data. More research is needed to examine the group dynamics of school age populations and the social differences that are caused by gender. While the findings highlight differences in the social preference and group affiliation of girls and boys with ASD and identified favorite play activities, future research should contextualize social engagement by using observational data in the natural contexts to garner a deeper understanding of social groups and dynamics. Moreover, we know little about the extent that students with ASD participate in recess games and activities, and if they follow typical same-gender trends. The participants in this study were primarily in lower elementary grades. The nature of friendship and kinds of preferred activities change with age and therefore, future investigations should consider of age and grade level in addition to gender and their influence on the social inclusion of children with autism.

Because of the small sample size, we were unable to report the amount reciprocal friendships and to compare the total number social connections between groups. Studies that use larger sample sizes should investigate differences in reciprocal friendships and the strength of social connections. The population used in this study resides in Southern California and therefore, results may not generalize to other populations. Finally, future investigations are needed to identify the differences in the ways the girls and boys socialize in natural contexts and to describe girls and boys with ASD and their process of participating in social activities, and navigating gender related social norms.

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Table 1.
Classroom characteristics and participants

Grade	Total	Girls	Boys	Consent (percent)
1	23	14	9	18 (78%)
	22	14	8	9 (41%)
	19	7	12	11 (59%)
	20	11	9	9 (45%)
	24	14	10	18 (75%)
	20	10	10	11 (55%)
	24	11	13	12 (50%)
	20	11	9	12 (60%)
2	20	11	9	12 (60%)
	21	11	10	10 (48%)
	22	13	9	13 (59%)
	20	12	8	16 (75%)
	22	10	11	14 (67%)
	20	10	10	1 (60%)2
	25	9	16	17 (68%)
	27	13	14	13 (48%)
	17	9	8	12 (60%)
	22	11	11	14 (64%)
	27	14	13	14 (82%)
	24	5	19	15 (79%)
	17	9	8	14 (52%)
3	19	11	8	13 (54%)
	22	8	15	14 (54%)
	26	13	13	12 (55%)
	22	8	14	14 (52%)
4	29	15	14	17 (57%)
	30	13	17	15 (50%)
	30	15	15	15 (55%)
5	29	15	14	18 (78%)

Table 2.

Out Degree Friendship nominations

	Girls			Boys		
No Autism	N	Sum	Mean (SD)	N	Sum	Mean (SD)
grlout	15	63	4.2 (1.90)	15	17	1.13 (1.46)
boyout	15	9	0.6 (.99)	15	53	3.53 (1.69)
T3girlout	15	39	2.6 (.83)	15	8	0.53 (.74)
T3boyout	15	4	0.267 (.80)	15	33	2.2 (78)
Autism						
grlout	15	44	2.93 (1.67)	15	14	0.93 (1.90)
boyout	15	13	0.87 (1.60)	15	55	3.66 (2.92)
T3girlout	15	32	2.13 (.83)	15	5	0.33 (.617)
T3boyout	15	6	0.4 (.73)	15	30	2 (1.07)

Table 3.
In Degree Buddy and Top 3 Best Friend Nominations

		Girls		Boys
	N	Mean (SD)	N	Mean (SD)
No Autism				
girlin	15	3.07 (1.83)	15	0.53 (0.92)
boyin	15	0.47 (.640)	15	2.47 (1.69)
T3girlin	15	2.33 (1.68)	15	0.33 (0.62)
T3boyin	15	0.26 (0.46)	15	1.80 (1.37)
Autism				
girlin	15	1.47 (1.12)	15	0.53 (0.74)
boyin	15	0.33 0(.72)	15	1.46 (1.36)
T3girlin	15	0.73 (0.70)	15	0.06 (0.26)
T3boyin	15	0.26 (0.59)	15	0.73 (0.80)

Table 4.

Games and activities frequency and percent representation

Game/Activity	Gender	
	Female	Male
CGR-T		
n	2	32
% within Gender	3.3%	43.8%
% within Game	5.9%	94.1%
% of Total	1.5%	24.1%
CGR-I		
n	13	20
% within Gender	21.7%	27.4%
% within Game	39.4%	60.6%
% of Total	9.8%	15.0%
NCA-R		
n	28	13
% within Gender	46.7%	17.8%
% within Game	68.3%	31.7%
% of Total	21.1%	9.8%
NCA-S		
n	17	8
% within Gender	28.3%	11.0%
% within Game	68.0%	32.0%
% of Total	12.8%	6.0%

Table 5.

Descriptive statistics rejection

	Autism		No Autism	
	Girls M (SD)	Boys M (SD)	Girls M (SD)	Boys M (SD)
Reject	1.33 (1.5)	1.47 (1.5)	0.86 (.92)	1.40 (1.4)
by girl	0.53 (.74)	0.86 (.99)	0.26 (.46)	0.86 (1.1)
by boy	0.86 (1.1)	0.53 9 (.74)	0.86 (1.5)	0.20 (.41)
n	15	15	15	15