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Self-Perceptions of Friendship Quality and Loneliness

Predicting Social Adaptivity

of Children with HFASD

A thesis submitted in partial satisfaction of the

Requirements for the degree Master of Arts

in Education

by

Elizabeth Peal Pak

2019

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ABSTRACT OF THE THESIS

Self-Perceptions of Friendship Quality and Loneliness

Predicting Social Adaptivity

Of children with HFASD

by

Elizabeth Peal Pak

Master of Arts in Education

University of California, Los Angeles, 2019

Professor Connie L Kasari, Chair

Peer relationships are integral to foster a student's continued academic engagement and their sense of belonging within their community (for review see Juvonen, 2006). Studies have shown that there are adverse academic consequences (Wentzel et al., 2004; Baumister & DeWall, 2005) when students do not have strong peer relations as well as increased vulnerability to stressors such as peer victimization (Junoven & Gross, 2005) or financial adversity (Becker & Luthar, 2002). Students with Autism Spectrum Disorder (ASD) experience particular social difficulties because of their symptomatology: social communication deficits and restrictive and repetitive behavior (American Psychiatric Association, 2013). Although these core deficits constitute the general population of those with ASD, the population is extremely heterogeneous, especially when considering individual

developmental trajectories. For example, some children with ASD maintain sustainable social networks and are highly involved with their peers (Kasari, Locke, Gulsrud & Rotherham-Fuller, 2010). Despite increased enrollment in regular classrooms, there is insufficient research analyzing the heterogeneity of peer relations or social networks for students with ASD. The present study explored differences of self-perceptions of friendship quality and loneliness between students with high functioning autism spectrum disorder (HFASD) and those with typical development (TD) and whether these perceptions differentiate students with HFASD who have higher social involvement and are more engaged from those who do not. Results indicate that those with HFASD are consistently reporting poorer friendship quality and fewer friends. However, students with HFASD also are reporting less loneliness compared to peers with TD. Self-perceptions did not significantly predict peer network involvement or engagement. Current findings prompt future research into students with HFASD and their conceptions of friendship and loneliness.

The thesis of Elizabeth Peal Pak is approved.

Sandra H Graham

Jeffrey J Wood

Connie L Kasari, Committee Chair

University of California, Los Angeles

2019

DEDICATION PAGE

I would like to dedicate this thesis to all individuals on the spectrum whom I have had the opportunity to work and learn with through various capacities. I would also like to thank my faculty advisor Dr. Connie Kasari for her continued support, research, advocacy for all individuals with ASD.

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Self-Perceptions of Friendship Quality and Loneliness Predicting Social Adaptivity

Peer relationships are integral to foster a student's continued academic engagement and their sense of belonging within their community (for review see Juvonen, 2006). Studies have shown that there are adverse academic and behavioral consequences (Wentzel, Barry & Caldwell, 2004; Baumeister et al., 2005) when students do not have strong peer relations as well as increased vulnerability to stressors such as peer victimization (Junoven & Gross, 2005) or financial adversity (Becker & Luthar, 2002). Students with Autism Spectrum Disorder (ASD) experience particular social difficulties because of their symptomatology: social communication deficits and restrictive and repetitive behavior (American Psychiatric Association, 2013). Although these core deficits constitute the general population of those with ASD, the population is extremely heterogeneous, especially when considering individual developmental trajectories. For example, whereas most children with ASD present symptoms as adults, there are some who no longer fulfill diagnostic criteria (Fein et al., 2013; Gillberg, Helles, Billstedt, & Gillberg, 2016). Those who no longer meet diagnostic criteria do not significantly exhibit symptoms of ASD and namely have increased levels of social adaptivity than those who still meet diagnostic criteria. However, research showing that a small percentage of school aged children with HFASD enjoy sustainable and "socially successful" peer relations (Kasari, Locke, Gulsrud & Rotherham-Fuller, 2010) suggests developmental predictors of late social adaptivity. Despite increased enrollment in regular classrooms, there is insufficient research analyzing the heterogeneity of peer relations or social networks for students with ASD. Analyzing loneliness and friendship quality and the unique correlation to peer relationships and engagement of high functioning students with ASD (HFASD) will contribute to current research in contributors of divergent ASD social developments.

Peer Relations or Social Networks

Friendships play an important role in later healthy social, cognitive and emotional development (Hartup & Stevens, 1999; Reis & Collins, 2004). However extant literature shows that children and adolescents with ASD have difficulties initiating, developing and maintaining friendships compared to peers with typical development (TD) (for review see Kasari & Sterling, 2013). Paralleling social outcomes of adults with ASD (for review see Magiati, Tay & Howlin, 2014), children with ASD have consistently demonstrated comparatively poor social outcomes as well (Bauminger & Kasari 2003; Kasari et al., 2010). Previously posited impediments to positive social adjustment are that students with ASD typically engage less with peers outside of school (Bauminger and Shulman, 2003; Bauminger et al., 2008) and encounter more barriers when creating meaningful relationships with peers due to unique social cognitive interpretations of friendships (Bauminger et al., 2008). Furthermore, students with ASD are also more likely to be victims of bullying and often have limited social networks that act as buffers against peer victimization which can lead to further isolation from their peers.

Despite this group's vulnerability to poor social networks and adverse social outcomes, some children are able to achieve sustainable social "success". One study noted significant gender differences in social peer relationships at school where boys were more centrally integrated and involved in play with peers rather than girls who exhibited marginal interactions (Dean et al., 2014). Locke and colleagues (2017) compared and identified malleable traits such as joint engagement and play (characteristics which could be influenced through interventions) and fixed characteristics (inherent traits) like gender to be significantly correlated to higher levels of social adaptation. Another study found that caregivers of children with ASD, who actively communicated with teachers to ensure that classroom belongingness and awareness of

ASD needs, were linked to better children's peer relations and higher social adaptability (Chamberlain, Kasari & Rotherham-Fuller, 2007). Kasari and her colleagues (2011) noted that a triangulation of indicators were necessary to determine a child with ASD's overall integration into their classroom. Yet, current studies primarily focus on evaluations by others (parent or teacher report), and on observable behaviors in natural environments. Children with ASD are rarely asked about their own perceptions, due to their wishful expectations seemingly convoluting their self-reports (Bauminger & Kasari 2003). However, the complexities presented in self-reports should not prompt complete dismissal of their validities but elicit a more involved analysis. Older adolescents invariably report greater feelings of loneliness and poorer friendship quality (Chamberlain et al, 2007; Kasari et al., 2011) and these factors can contribute to varying levels of social development of students with ASD. Therefore, this research aimed to further explore the validity of self-reports of children with HFASD by synthesizing prior literature on unique social cognitive ideation of friendship and loneliness and varying social adaptivities of children with HFASD.

Those who exhibit higher levels of social adaptability likely have sustainable peer relationships where children with ASD can demonstrate strengths such as original ideas, disregard for preexisting social hierarchy, and lack of attachment to material objects cultivating creative play and unique engagement (Brownlow, 2010). Therefore, this research defined greater social adaptivity for children with HFASD that is consistent with TD and ASD literature as: fulfilling multiple aspects of friendship quality (i.e., companionship, closeness, helpfulness and security), having the same inverse relationships to typically negative emotions (i.e., loneliness and conflict) and sustaining peer relationships through developmentally appropriate behavior (higher levels of engagement behavior).

Self-perceptions

Some may argue that children with autism are more inclined to being alone; their deficits in social communication skills inhibit their motivation for relationships with peers (Kanner, 1943; as cited in Bauminger & Kasari, 2003). Due to such social difficulties, students with ASD typically occupy peripheral spaces in their peer network groups or social isolation (Chamberlain et al., 2007; Rotheram-Fuller et al., 2010). Nonetheless, there is a distinct separation between being alone and loneliness.

Perlman and Peplau's (1981) cognitive discrepancy model of loneliness suggests that when individuals compare their expectations or perceptions of relationships to the realities of them and find large dissonance from these two states, individuals experience loneliness (as cited in Kasari & Sterling, 2013). Therefore, it is assumed that children with ASD who report greater feelings of loneliness and poorer friendship qualities compared to children with TD (Chamberlain et al., 2007; Kasari et al., 2011) must also possess this awareness. As noted by Kasari and Sterling (2013), individuals must be self-aware of a discrepancy between what is expected of a friend and the actual reality of their friendship to recognize loneliness (Lee & Hobson, 1998), which is contrary to assumptions that this population prefers to be alone. Thus, this research also draws upon Piagetian notions of "active learning" in cognitive development stage of assimilation; individuals with ASD who are socially isolated are aware of this cognitive discrepancy and are generally dissatisfied with peer relationships when reporting greater feelings of loneliness.

But this self-awareness is not conceptualized similarly to peers with TD; students with ASD do not define friends the same way that their peers with TD do nor do they report similar concepts of loneliness and friendship quality (Bauminger & Kasari, 2000). These initial

differences in self perceptions in relation to social adaptability between students with ASD and those with TD can further indicate variance specifically within students with ASD themselves. Specifically, differences in self-cognition can explain why individuals with ASD, who despite the general populations' proclivity to such social trajectories, have sustaining peer relations and even observed to have prosocially blend in with peers with TD (Humphrey & Lewis, 2008; Livingston et al., 2018; Kasari et al., 2011).

Loneliness and Friendship Quality

In adherence to Perlman and Peplau's (1982) loneliness model of cognitive discrepancy, school aged children with HFASD were more socio-cognitively aware of their loneliness than their peers with TD; more specifically, they noted instances of peer exclusion and marginalization rather than indicating feelings of sadness as definitions of loneliness (Bauminger & Kasari, 2003). And despite evidence that at least one friend serves as a protective factor for those children with ASD (Ladd, Kochenderfer & Coleman, 1996 as cited in Kasari & Sterling, 2013) and children with ASD can successfully identify a best friend (for review see Kasari & Sterling, 2013), children are consistently reporting more negative self-perceptions of loneliness and friendship quality. (Chamberlain et al, 2007; Kasari et al., 2011). Additionally, children with ASD are reporting these negative self-perceptions uniquely; they do not indicate the same inverse relationship between loneliness and friendship quality like that of their peers with TD. (Bauminger & Kasari, 2003).

Such negative self-perceptions can be exacerbated when placing children with ASD in inclusive classrooms; they face more chances for social rejection when initiating interactions with their peers with TD and therefore can note more feelings of loneliness (Bauminger, Shulman & Agam, 2003). These negative self-perceptions contribute to self-stigmatizing

behavior as children with HFASD are more aware of their social differences compared to those with TD (Humphrey & Lewis, 2008); as well as lack of confidence in self-assessment of social skills (Knott, Dunlop and McKay, 2006) which can perpetuate further self-isolation, anxiety and depression, and poorer social outcomes.

Not only is poor social adjustment a negative consequence of loneliness and poor friendship quality, but also mental health disorders such as anxiety and depression may be potential outcomes of childhood negative self-perceptions. Qualter, Brown, Munn and Rotenberg (2010) found that parent and peer reports of loneliness at age 8 predicted depressive symptoms at age 13. And youth with ASD who have clinical levels of anxiety are found to be at higher risk of greater impairments in social responsiveness and social functioning (Bellini, 2004; Chang, Quan & Wood, 2012; Green, Gilchrist, Burton & Cox, 2000). These negative self-perceptions and associated risks of psychopathology can add to this population's particular vulnerability to peer victimization in school (Sterzing, Shattuck & Narendorf, 2012). Given the unique associations between loneliness, friendship quality, and social adaptivity within this population of HFASD, the field will benefit from developmental, comparative and contextual examination of self-perceptions of loneliness and friendship quality on peer networks and engagement.

Aims

Extant literature cannot explain the variance in social outcomes (e.g., improved social skills) for individuals with Autism Spectrum Disorder (ASD), (for review, see Howlin & Magiati, 2017). A possible explanation has been differing levels of theory of mind (ToM; the ability to perceive the emotional states of others) determining social cognitive development for those with ASD (Hadjikhani, Joseph, Snyder & Tager-Flusberg, 2007; Hadjikhani, Joseph, Snyder, Tager-Flusberg, 2006; Dapretto et al., 2006). Alternatively, a more comprehensive and

contextualized analysis of socially successful characteristics of children with HFASD was an examination of different malleable (class size, autism severity and peer connections) and stable characteristics (age) correlating to social adaptivity (Locke, Williams, Shih & Kasari, 2017). However, the literature has not solely focused on self-perceptions of loneliness and friendship quality as determinants of social outcomes. Individuals with ASD have self-reported more feelings of loneliness and poorer friendship qualities. And such self-perceptions contribute to poorer social outcomes, psychopathology, psychiatric conditions like depression and anxiety, and self-isolation (Capps, Sigman, Yirmiya, 1995; Butzer & Konstantareas, 2003; as cited in Kasari & Sterling, 2013) it is integral to measure whether those with differing levels of social adaptation have higher or lower propensities for particular self-perceptions.

This study sought to answer two central research question:

Research Question 1: How do students with HFASD and students with TD differentiate on measures of friendship quality and loneliness?

Research Question 2a: Does loneliness and friendship quality differentiate elementary-aged children with HFASD on social network centrality (peer network involvement) and peer engagement?

Research Question 2b: Does loneliness and friendship quality differentiate elementary-aged children with TD on social network centrality (peer network involvement) and peer engagement?

Using secondary data analysis of existing dataset HRSA 1 Protocol 2 (Kasari et al., 2016), the study analyzed relationships between social adaptivity (social networks and peer engagement) and self-perceptions of loneliness and friendship qualities of elementary age children with HFASD and TD. I hypothesized that ANOVA would yield significant differences

between students with HFASD and students with TD; specifically, students with HFASD would report higher rates of loneliness and poorer friendship quality. Multiple linear regression analysis of the dataset would indicate significant differences in self perceptions of loneliness and friendship quality between those with higher and lower social adaptation for those with HFASD.

Method

This proposed study was based on a secondary analysis of a larger randomized trial study. More specifically, it was an exploratory data analysis of the relationship between continuous variables of loneliness, friendship quality and social network salience and playground engagement.

Participants

The sample for this proposed analysis will be from a larger randomized trial study that contrasted intervention approaches (didactic SKILLS intervention versus ENGAGE activity-based group intervention) and group composition (mixed groups of participants with TD and children with ASD versus groups of only children with ASD or social difficulties) to analyze social skills outcomes of children with ASD in Kindergarten through fifth grade (Kasari et al, 2016). Participants were recruited from 4 school sites (Los Angeles, Baltimore, Seattle, and Ann Arbor) over the course of two years. Participants for this study were prescreened for participation in this study. The inclusion criteria for the study were: 1) have diagnoses of ASD and confirmation through the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000) and Social Communication Questionnaire (SCQ; Rutter, Bailey & Lord, 2003); 2) have IQ equal to or greater than 65 (confirmed by the abbreviated Stanford Binet (SB-5)); 3) were between the ages of 6–11 years old and in grades 1–5; 4) more than half of the participants were from ethnic/racial minority backgrounds; 5) were fully included in a regular education classroom (at least 80% of the school day).

Upon entry into this study there was a total of 150 children whose parents gave written consent. Two children were excluded as they did not meet pre-screening inclusionary criteria. Of the 148 children with ASD who signed consent, 82 of the participants were randomized into the ENGAGE intervention group and 66 received the SKILLS intervention. Group sizes were due to randomization and designed to prevent contamination of the intervention. Randomization was conducted separately within site and stratified by grades (Grades 1-2; grades 3-5) to control for classroom and treatment group differences. After randomization, 11 participants dropped out of the study for reasons attributing to: their schools or instructors, were unwilling to participate; were no longer interested, or their instructors changed during the school year. Thus there was a final total of 137 study participants for the current study.

Analysis of the demographic information to be included in the final proposed study is as follows: 46.7% Caucasian, 5% African American, 21.7% Latino, 16.7% Asian, and 10% Other and were predominantly male (80%). All were fully included in regular education classrooms for 80% or more of the school day and were an average of 8.14 ± 1.56 years old, with an average IQ of 90.97 ± 16.33 . Comprehensive demographic details are noted in the table below (Table 1).

Table 1	
<i>Demographic characteristics of children with autism spectrum disorder.</i>	
Demographics	ASD
Male: <i>n</i> (%)	109 (61%)
Age: Mean (SD)	8.14 (1.56)
Race: <i>n</i> (%)	
African American	10 (8%)

Caucasian	62 (45%)
Hispanic	20 (14%)
Asian	28 (20%)
Other	7 (5%)
Did not disclose	10 (8%)
Language at Home <i>n</i> (%)	
English	102 (75%)
Spanish	9 (5%)
Other	13 (10%)
Did not disclose	13 (10%)
Stanford Binet 5: Mean (SD)	
Nonverbal	10.02 (3.52)
Verbal	7.8 (3.97)
IQ	90.97 (16.33)
ADOS Classification: <i>n</i> (%)	
0 (No ASD)	0
1 (Autism)	97 (71%)
2 (Autism Spectrum)	40 (29%)

Procedures

The present study was a secondary data analysis of a subsample on elementary-aged children included in the original Social Networks and Friendship at School study. This study involved self, peer and teacher survey instruments as well as observation of playground behavior by research personnel. The current study only implemented self-reported measures of loneliness and friendship quality as main predictors.

Upon parent and school consent, children completed brief demographic surveys, social network measures, Friendship Qualities and Loneliness Surveys. During administration of instruments, and additional assistance was provided when necessary. In addition, teachers were asked to complete the Teacher Perceptions Scale for target child with ASD during this visit but this data will not be included in the current proposed study. However, this data was also not analyzed for the purposes of this study. Within the same week of distributing classroom measures, research personnel gathered behavioral observations on the playground during two separate recess periods.

Eligibility Measures

Autism Diagnostic Observation Scale (ADOS; Lord, Rutter, DiLavore, & Risi, 2000). The ADOS is a semi-structured play based assessment of sociocognitive and communication skills for those with ASD. The ADOS was administered and scored by reliably trained assessors.

Social Communication Questionnaire (SCQ; Rutter, Bailey & Lord, 2003). The SCQ is a 40 item parent survey developmental history of the child screening ASD characteristics and symptomology.

Stanford Binet Intelligence Scale: Fifth Edition (SB-5). SB-5 is a measure for IQ and cognition of children and adults; the data drawn from the previous study has two composite scores of SB-5: nonverbal and verbal IQ scores.

Primary Outcome Measures

Children's Loneliness and Social Dissatisfaction Scale (Asher, Hymal & Renshaw, 1984). The survey is a 24 item questionnaire used to measure elementary-aged children's feelings of loneliness and social dissatisfaction. In addition to the previous measure, children were also asked to define loneliness in relation to two dimensions: 1) affective 2) social cognitive; this

yielded a score ranging from 0 (neither dimension applied) to 2 (both dimensions applied). Both measures have been previously used in the field of autism and typical development research.

Friendship Qualities Scale (FQS; Bukowski et al. 1994). The FQS is a 23-item questionnaire that examined five aspects of friendship quality: (a) companionship (time spent together), (b) help (aid and protection against peer victimization), (c) security (trust and mutual assurance that conflicts can be resolved), (d) closeness (feelings towards the partner and their own perceptions of partner's feelings), and (e) conflict (disagreements in the friendship). Using a 5-point Likert scale (1 = never to 5 = always), children indicated how relevant the statement was pertaining to their relationship. Previous studies have used this measure for children with ASD (Bauminger and Kasari 2000; Bauminger et al. 2004; Chamberlain et al. 2007).

Social Networks and Friendship Survey. Children were asked to generate a list of students they like to hang out with. From this list they were then asked to identify three of their "top friends" and indicate their best friend within this group by drawing a star. They were also asked to identify groups of children who liked to hang out with each other and encouraged to include themselves within the groups and instructed to disregard gender differences. Various studies have used this method as a way to identify social networks of those with typical and atypical development (Cairns and Cairns 1994; Farmer and Farmer 1996; Chamberlain et al. 2007; Locke et al. 2010).

Coding Indegrees, Outdegrees, Connects, and Rejects. Variables were coded from the Friendship Survey. Indegrees were coded as the total number of children that listed the child as "someone they like to hang out with". Whereas outdegrees were coded as the total number of outward friends the child identified as children they like to hang out with. Social network Saliency (SNS)

scores were calculated as a ratio of indegree over outdegree indicating the child's prominence within his or her social network.

Playground Observation of Peer Engagement (POPE; Kasari, Rotheram-Fuller, & Locke, 2005)

The POPE is a timed-interval behavior coding system that captures varying engagement states (solitary to jointly engaged) of individuals with ASD and their peers. Blind and reliability trained independent observers rated children with ASD and coded for 40 consecutive seconds on the playground and 20 seconds during recess or lunch for an average of 15 minutes per observation period. Scores were percentage of intervals spent in different engagement states: engaged, game play, parallel aware, parallel play, solitary, onlooker and proximity.

Analysis

To evaluate the first primary research question, group (ASD versus TD) and group by age interaction term were added as predictors of loneliness and friendship quality subdomains as well as peer nominations in 2 by 2 factorial ANOVA. Age was stratified by grade levels (grades 1-3 received a 0 and grades 4-6 received a 1). All other variables were excluded to maintain parsimony of the model

To study the second primary research question, mean scores of loneliness questionnaire and subscores for 5 domains measured within the friendship quality scale were included in a multiple linear regression to predict social network centrality scores and overall proportion of play time in engaged (proportion of time spent in engaged and game play) and overall proportion of time in isolation (proportion of time spent in solitary, onlooker and proximal behavior). For students with ASD, IQ and age were entered into the first block as covariates, and loneliness and friendship quality subdomains entered the second block of the regression. For students with TD, age was entered into the first block as a covariate and loneliness and friendship quality

subdomains were entered second. A bonferroni adjusted alpha of .006 was used to measure significance for both the models of TD and ASD.

Results

Self-perceptions

A 2 x 2 (Age X Group) factorial ANOVA was used to identify group differences (disaggregated by age) on self perceptions of loneliness and friendship quality. Age had two levels (grades 1-3 and 4-6) and group had two as well (ASD and TD). Exploratory descriptives in Table 2 indicate that those with ASD have less reports of loneliness and poorer friendship quality compared to their matched peers with TD.

Table 2						
<i>Descriptive Statistics: Mean scores and standard deviations of Loneliness and Friendship Quality Subdomains (FQS) variables disaggregated by age (grades 1-3 and grades 4-6).</i>						
	Loneliness	FQS: Companion ship	FQS: Closeness	FQS: Helpfulness	FQS: Security	FQS: Conflict
Grades 1-3						
TD	3.24 (.35)	14.49 (3.11)	21.96 (3.22)	18.61 (4.98)	16.47 (4.14)	6.87 (2.71)
ASD	2.94 (.40)	13.39 (3.88)	18.72 (4.31)	15.96 (4.90)	14.23 (4.78)	7.38 (3.66)
Total	3.09 (.41)	13.93 (3.56)	20.30 (4.14)	17.32 (5.10)	15.33 (4.60)	7.13 (3.24)
Grades (4-6)						
TD	3.38 (.15)	16.08 (2.19)	22.0 (3.19)	21.18 (2.18)	18.33 (2.39)	9.0 (3.02)

ASD	2.89 (.41)	12.26 (3.62)	16.26 (4.78)	12.22 (5.23)	12.26 (4.48)	7.32 (3.22)
Total	3.08 (.41)	13.74 (3.63)	18.48 (5.05)	15.62 (6.16)	14.61 (4.81)	7.97 (3.20)
Total						
TD	3.26 (.34)	14.70 (3.05)	21.97 (3.20)	18.92 (4.80)	16.71 (3.99)	7.16 (2.82)
ASD	2.93 (.40)	13.18 (3.84)	18.26 (4.48)	15.24 (5.16)	13.86 (4.77)	7.37 (3.57)
Total	3.09 (.41)	13.90 (3.56)	20.01 (4.34)	17.05 (5.30)	15.21 (4.63)	7.27 (3.24)

Results indicated a main effect of group for loneliness scores, $F(1, 197) = 28.38, p < .001$ with students with ASD reporting lower ratings of loneliness than students with TD (ASD $\mu = 2.92, SD = .05$; TD $\mu = 3.32, SD = .07$). Age, $F(1, 197) = .372, p = .54$ and the interaction of age and group, $F(1, 197) = 1.61, p = .21$, were not significant.

Similarly, on the FQS, there was a main effect of group for the companionship, $F(1, 189) = 12.50, p = .001$, and closeness subscales, $F(1, 189) = 33.17, p < .001$. Neither age nor the interactions of age by group was significant for companionship and closeness subscales. Students with ASD reported lower ratings of companionship than students with TD (ASD $\mu = 12.83, SD = .44$; TD $\mu = 15.29, SD = .54$). They also reported lower ratings of closeness than students with TD (ASD $\mu = 17.49, SD = .49$; TD $\mu = 21.98, SD = .60$).

However, the subscale of helpfulness yielded both a main effect of group, $F(1, 181) = 33.17, p < .001$ that is qualified by the interaction of age by group $F(1, 181) = 9.79, p = .002$. Younger students with ASD (grades 1-3: ASD $\mu = 15.96, SD = .56$; TD $\mu = 18.61, SD = .54$) reported lower ratings of helpfulness than students who were older, and TD (grades 4-6: ASD μ

=12.22, SD = 1.15; TD μ = 21.18, SD= 1.47). Mean scores indicated that not only students with ASD comparatively rated their friendships lower on helpfulness across grades but also unlike their peers with TD, they experienced decreases in helpfulness perceptions as they got older.

Similarly, security was significantly also predicted by group, $F(1, 188) = 22.33, p < .001$ and interaction of age by group $F(1, 188) = 4.76, p = .03$. Age alone $F(1, 188) = .003, p = .95$, was not significant. Students with ASD reported lower ratings of security than students with TD (ASD μ = 13.25, SD = .56; TD μ = 17.40, SD= .68). Furthermore, students with ASD in grades 1-3 reported lower ratings of security compared to students with TD (ASD μ = 12.23, SD = .48; TD μ = 16.47, SD= .49) and were similar in grades 4-6 (ASD μ = 12.26, SD = 1.01; TD μ = 18.33, SD= 1.27). However, as students with ASD get older, their ratings of security slightly increased similarly to peers with TD. Mean scores indicated that not only students with ASD comparatively rated their friendships lower on security across grades but also that students with ASD experienced increases in security like students with TD as they get older.

Conflict ratings were reported at very low rates, and were not significantly predicted by age $F(1, 184) = 2.55, p = .112$, group $F(1, 184) = .82, p = .37$ or the interaction of age by group $F(1, 184) = 2.89, p = .09$.

Peer Nominations

A 2x2 Factorial ANOVA was used to identify group differences (disaggregated by age or grade levels) on peer nominations. Descriptive statistics (Table 3) indicate group differences; those with ASD overall receive and nominate their peers less than matched peers with TD.

Table 3		
<i>Descriptive statistics: Mean scores and standard deviations of peer nominations disaggregated by age (grades 1-3 and grades 4-6).</i>		
	Nominations Received (In)	Nominations Given (Out)

Grades 1-3		
TD	4.22 (2.78)	4.88 (2.71)
ASD	1.73 (1.72)	3.49 (2.63)
Total	2.94 (2.61)	4.16 (2.75)
Grades 4-6		
TD	6.14 (3.61)	7.14 (3.04)
ASD	1.30 (1.96)	3.48 (2.29)
Total	3.14 (3.57)	4.86 (3.13)
Total		
TD	4.48 (2.96)	5.18 (2.85)
ASD	1.65 (1.77)	3.49 (2.56)
Total	2.97 (2.78)	4.28 (2.82)

Results in Table 3 indicated peer nominations received was significantly differentiated by group, $F(1, 221) = 70.39, p < .001$ and interaction of age by group $F(1, 221) = 7.25, p = .01$. However age alone $F(1, 221) = 2.93, p = .09$, was not significant. Students with ASD received fewer peer nominations compare to peers with TD (ASD $\mu = 1.52, SD = .27$; TD $\mu = 5.18, SD = .34$). Furthermore, students with ASD in grades 1-3 received fewer peer nominations compared to students with TD (ASD $\mu = 1.73, SD = .24$; TD $\mu = 4.22, SD = .25$) and were similar in grades

4-6 (ASD $\mu = 1.30$, $SD = .49$; TD $\mu = 6.14$, $SD = .63$). Whereas students with TD received significantly more nominations as they became older, students with ASD received less.

Results showed that nominations given were significantly predicted by all predictors grade $F(1, 221) = 5.26$, $p = .02$, group $F(1, 221) = 26.56$, $p < .001$ and interaction of grade by group $F(1, 221) = 5.42$, $p = .02$. Peer nominations increased as students became older (Grades 1-3 $\mu = 4.19$, $SD = .19$; Grades 4-6 $\mu = 5.31$, $SD = .45$). Students with ASD also nominated peers less than students with TD (ASD $\mu = 3.48$, $SD = .31$; TD $\mu = 6.01$, $SD = .38$). Furthermore, students with ASD in grades 1-3 gave fewer peer nominations compared to students with TD (ASD $\mu = 3.50$, $SD = .27$; TD $\mu = 4.88$, $SD = .28$) and were similar in grades 4-6 (ASD $\mu = 3.48$, $SD = .55$; TD $\mu = 7.14$, $SD = .71$). Older students with ASD nominated fewer peers compared to their peers with TD who nominated more.

Social Network Centrality Score (SNC)

For students with ASD, a multiple linear regression was performed using age, IQ, friendship quality subdomains and loneliness to predict SNC. The overall model neared significance ($p = .03$) though did not meet the Bonferroni adjustment p value = .006 which was used to gauge significance. For students with TD, a multiple linear regression was used with variables of Age, friendship quality subdomains and loneliness were used to predict SNC. Similar to the students with ASD, none of the predictors yielded significance ($p = .77$).

Peer Engagement (POPE)

Multiple linear regression models using variables of Age (stratified by grade levels indicated above), IQ, friendship quality subdomains and loneliness were used to predict students' with ASD peer engagement: proportion of time spent engaged and proportion of time spent in

isolation. Neither of the models for TD (isolated $p = .539$; engaged $p = .770$) nor ASD (isolated $p = .145$; engaged $p = .149$).

Discussion

Students with ASD consistently report poorer friendship quality compared to peers with TD (Locke, 2010) despite recent efforts to improve inclusive education. In particular, children with ASD experience less companionship, closeness and security in their relationships as they become older. Bauminger and Kasari (2000) noted that children with HFASD do not draw upon the same dimensions of companionship, affection and intimacy as their peers with typical development (Buhrmester, 1990; Gottman & Parker, 1986; Howes, 1996) when defining friendships. Thus, the data in this study is consistent with previous reports of poorer feelings of companionship and affection.

These data also highlight the differences for students by age or grade. TD children nominate more friends in the older grades, whereas ASD children in this study report fewer nominations, suggesting they may be becoming increasingly isolated in older grades. They report less helpfulness and companionship from their friends which compounds their isolation. However, they do not report greater feelings of loneliness. In fact they are less lonely than TD students. These data are interesting, since poorer friendship quality as well as less social involvement is usually cause for greater loneliness rather than less. It may be that children with ASD truly feel less loneliness despite being more isolated in their social networks (fewer nominations), or that these data reflect a lack of understanding of peer connections among children with ASD in inclusive settings. They may be just less aware of their social situations.

Results indicate that both students with TD as well as ASD may require direct intervention for social inclusion. Parent assisted interventions such as the UCLA PEERS

program can developmentally address the complex social nuances of adolescent peer relationships while equipping parents with social capital needed to navigate peer inclusion for their children with ASD. Furthermore, this intervention has been correlated to improvements in social responsiveness and peer engagement behaviors (Laugeson, Frankel, Gantman, Dillon, & Mogil, 2012). Additional evidence from this study also reveal increases in peer interaction frequency which can resolve the gradual decrease in peer nominations for students with ASD. Such interventions would not only benefit those with ASD but peers with TD who, in the present study, report higher ratings of loneliness as well. Locke, Rotherham-Fuller and Kasari (2012) found that peer role models of students with ASD reported lower feelings of loneliness and higher friendship quality compared to those who were not paired with students with ASD. Therefore, the positive benefits of mixed ability peer relationships suggest sustainable mutually beneficial connections for both students with ASD as well as TD. Educators can play a key role in fostering such inclusive peer relationships and adoption of intervention techniques is not strenuous. Remaking Recess (Kretzmann, Shih & Kasari, 2015) is a psychosocial intervention that focuses on inclusionary peer engagement of children with ASD mediated by nonspecialist paraprofessional aides during recess. Evidence reveals that training and implementation is minimally invasive, and that continued support could maintain the positive results of greater social interaction and engagement between children with ASD and with TD.

Although children with HFASD did not significantly differentiate on measures of self-perceptions of loneliness and friendship quality, the present study found that students with HFASD have comparatively distinct conceptualizations of loneliness and friendships. Yet, the current study is limited in understanding why students with ASD in comparison to those with TD report less loneliness despite limited peer inclusion and poorer friendship quality. Future studies

can explore qualitative methods to assess whether it is due to lack of social understanding or more possibly, neurodivergent conceptualizations of friendships and loneliness.

Overall implications of this research inform current understanding of social development of students with HFASD compared to those with TD. Given the contrasting developmental trends in TD and HFASD population, schools should increasingly focus on improving social development for school aged children with HFASD in general classrooms. Previously mentioned interventions are promising in providing efficacious as well as effective interventions for promotion of social development for all. Parents as well as educators can also act as advocates to further include children with HFASD in school. Contrary to the deficit-oriented perspective that individuals with HFASD all have a propinquity for isolation, school aged children with HFASD are indicating dissatisfaction with current peer relationships through reports of poorer friendship quality as well as less social involvement and engagement. Although this dissatisfaction is not manifesting in reports of loneliness, the present study prompts further research into this population's understanding of friendships in order to enhance current efforts of peer inclusion.

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