The Games They Play: Observations of Children with Autism Spectrum Disorder on the School Playground

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Abstract

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Children with autism spectrum disorder (ASD) spend a considerable amount of their school day on the playground with peers. Previous literature on playground engagement has used quantitative methods, but there is limited research using qualitative observations. Using a mixed-methods approach, 55 elementary school-aged children with ASD were observed on the school playground using the Playground Observation of Peer Engagement. Data were examined through collecting, analyzing, and merging qualitative and quantitative data. This study found that children with ASD: mostly participated in solitary and peripheral activities; demonstrated appropriate initiations and responses to peers; displayed atypical, motoric behavior during solitary activities; and most frequently displayed neutral affect. These findings are important as they can inform schools of intervention and supports for children with ASD.

The Games They Play: Observations of Children with Autism Spectrum Disorder on the School Playground

Autism spectrum disorder (ASD) is a pervasive developmental disorder characterized by impairments in social interactions, language and communication, and the presence of restricted and repetitive behavior (American Psychiatric Association, 2013). Deficits may be in the areas of social-emotional reciprocity, nonverbal and verbal language, and forming and maintaining relationships (American Psychiatric Association, 2013). Children with ASD often are unaware of their social environment and experience greater loneliness (Bauminger & Kasari, 2000; Bauminger, Shulman, & Agam, 2003), difficulty recognizing and exhibiting emotions appropriately, flat affect (American Psychiatric Association, 2013; Begeer, Koot, Rieffe, Meerum Terwogt, & Stegge, 2008; Loveland et al., 1994; Samson et al., 2014; Strid, Heimann, Gillberg, Smith, & Tjus, 2013), and a number of challenges with perspective taking and sharing emotions with others (Bauminger, Solomon, & Rogers, 2010; Tager-Flusberg, 1999). Social communication deficits impact children with ASD in the classroom as they may have challenges with initiating and concluding interactions as well as communicating with someone who has a different interaction style (Kangas, Uusiautti, & Määttä, 2011). This may relate to theory of mind and perspective-taking (Bauminger et al., 2010; Tager-Flusberg, 1999). These impairments may impact friendship formation and relationship quality (Bauminger et al., 2010; Tager-Flusberg, 1999). Emotional competence (i.e. expression, perception, responding, and understanding) among this population varies depending on severity, context, age, and intelligence (Begeer et al., 2008).

Research using playground observations found that children with ASD often are on the periphery of activities (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011), have decreased

interactions, are less physically active, and gravitate to adult figures more than their peers (Lang et al., 2011; Memari et al., 2015). Bauminger et al. (2003) learned that in comparison to typically developing children, children with ASD spent only half the time in a social interaction while at recess or snack time. In fact, Locke and colleagues (2016) reported that children with ASD spent 30% of recess in solitary activities and 40% of recess in joint engagement with peers. Other studies have found that children with ASD often exhibit more stress during interactions with peers and decreased social motivation during free play (Macintosh & Dissanayake, 2006), which negatively impacts social communication and relationships with peers (Corbett et al., 2014; Schupp, Simon, & Corbett, 2013). While these findings quantify the amount of time children with ASD spend with peers on the playground, more evidence is needed to determine what children with ASD are actually engaged in on the playground.

Few studies have described the activities of children with ASD on the playground during recess especially with typically developing peers. The playground is important as it is a way for children to socialize, exercise, gain play skills, and form friendships (Couper, Sutherland, & Van Bysterveldt, 2013). Recess is an opportune time for children with ASD to practice social skills with their peers as they have social communication challenges, limited interests, and atypical behaviors (Lang et al., 2011; Couper et al., 2013; Samson et al., 2014). It is vital to consider how the playground can positively or negatively impact a child with ASD as the child may be excluded from play with peers (Couper et al., 2013). Negative treatment by classmates may further exacerbate social communication challenges and atypical behavior (Ochs, Kremer-Sadlik, Solomon, & Sirota, 2001). Understanding the playground activities and behaviors of children with ASD may point to the ways in which school personnel and providers can facilitate a more

inclusive and supportive playground context that may complement strategies used in the classroom.

Largely, there is a lack of research on how children with ASD interact on the playground, their interests, and affect while engaged in different activities. Locke and colleagues (2016) quantitatively measured peer engagement using playground observations to evaluate how the percentage of intervals spent in solitary and joint engaged activities differed between children with ASD and their peers. They found that children with ASD spend more time in solitary activities and less time joint engaged compared to typically developing children. While quantitative research documents the amount of peer engagement of children with ASD during recess, there is a need to use qualitative measures in order to understand the nuances of playground engagement. Specifically, studies that explore the activities children engage in and the ways in which they engage may point to how children with ASD interact differently on the playground and how to best promote social interactions among peers. In this study, we used qualitative data to better understand the nuanced details of children's experiences on the playground and evaluate commonalities in the data. Given the gaps in the literature, this mixed methods study explored the activities of elementary-aged children with ASD during recess. Using both complementary and expansion techniques, we examined activities children with ASD participated in, social communication, atypical behaviors, and affect. This research explores these themes in the context of the playground in order to better understand what influences the recess experience of children with ASD.

The first research question is: What general activities do children with ASD participate in during recess? We predict children with ASD will more frequently engage in solitary activities such as playing alone or with an object (e.g., ball, jungle gym). This is expected since children

with ASD spend more time solitary and unengaged (Kasari et al., 2011; Lang et al., 2011; Memari et al., 2015). When joint engaged with peers, we expect children with ASD will engage in a structured game with rules. This is predicted since children with ASD are often rule-based and have a preference for routines (Baron-Cohen, 2006; Swanson, 2005).

The second research question is: What does the social communication of children with ASD look like during recess? We expect that children with ASD with higher engagement will have more social communication interactions such as conversations with peers or conflicts over certain items or activities. Conflicts are expected since children with ASD often have difficulties with theory of mind and conflict resolution (Bauminger et al., 2010; Larson, South, Clayson, & Clawson, 2012; Tager-Flusberg, 1999).

The third research question is: How is atypical behavior associated with the activities of children with ASD on the playground? We hypothesize that children with ASD will display more atypical behaviors (e.g., arm flapping, inappropriate body orientation, and self-orientated behaviors, etc.) while in solitary activities as they are suspected to be more focused on themselves and less engaged.

The fourth research question is: How is affect associated with engagement states? Landa, Holman, and Garrett-Mayer (2007) found children with ASD frequently demonstrate decreased joint attention and shared positive affect. We hypothesize affect will change with engagement and type of activity. For example, we anticipate that neutral or sad affect will occur more frequently when children with ASD are unengaged at recess, whereas positive affect will occur more frequently when children with ASD are joint engaged.

Method

Participants

Fifty-five school-aged children with ASD participated in this study. All participants were included in kindergarten through fifth grade from 16 public elementary schools in the eastern United States. Participants were an average age of 8.68 (SD = 1.76) years. We focused on elementary school-aged children as this group typically has a recess or playground period during the school day. Eighty-four percent of students were male, and the majority was White (55%) with some students identifying as African American (25%), Multi-racial (9%), Asian (5%), Hispanic/Latino (4%), or Other (2%). Inclusion criteria included: 1) a referral from school administrators; 2) an ASD diagnosis confirmed by a school provider or clinician in the community; and 3) inclusion in a general education classroom for 80% or more of the school day. See Table 1.

[insert table 1 here]

Measures

Playground Observation of Peer Engagement *(POPE;* Kasari, Rotheram-Fuller, & Locke, 2005). The POPE is a timed-interval behavior coding system designed to evaluate peer engagement and social communication of children with ASD during lunch period or on the playground (Kasari et al., 2011). Independent observers documented each child's engagement and social communication with peers on the playground. Observers watched children with ASD for 40 consecutive seconds and coded for 20 seconds. Observations were not videotaped but were recorded in vivo via the POPE. Engagement states were explored through the percentage of intervals children spent in solitary play (when the child was not engaged with peers or solely engaged with an adult) and joint engagement (turn-taking, reciprocal conversations, and group

activities) with peers. Meanwhile, social communication included initiations and responses. Initiations were coded in two ways: successful or unsuccessful initiations. Successful initiations were coded when the child with ASD used nonverbal or verbal language to at least one peer who responded either nonverbally or verbally. Unsuccessful initiations were coded when the child communicated nonverbally or verbally to at least one peer, but the peer did not respond. Furthermore, responses to a peer's initiation were coded in two ways: appropriate and missed. Appropriate responses were pragmatically suitable (e.g. a peer says, "Thank you!" and the child says, "You're welcome") while in missed responses, the child did not respond to the peer's initiation.

Observers were trained and considered reliable with percent agreement ≥ 80. Reliability for the study was collected on 20% of total play periods with an average 87% agreement (range 80-97%). In addition to the quantitative ratings, each interval included qualitative data that detailed additional information regarding each child's social communication, activities, affect, engagement states, atypical behavior, and miscellaneous notes regarding the child's play and social functioning. Observers wrote comments as brief words or sentences describing the child's behavior while on the playground. This study closely examined the qualitative comments to explore trends in activities, affect, engagement, and behaviors while using quantitative data to expand or complement these findings.

Procedures

School district officials were initially contacted to obtain a list of schools that had children with ASD included in a general education Kindergarten through fifth grade classroom. Subsequently, principals were contacted and provided with recruitment materials. The institutional review board and all school districts in this study agreed to participate. Parents and

guardians gave written consent and children assented after being informed about the study. Observers noted each child's peer engagement during the child's recess and lunch period using the POPE, which were used for analysis. Given that lunch periods were conjoined with recess and the duration of recess was variable, observations included any data regarding play and social functioning within these two contexts.

Data Analysis

This study used a mixed-methods approach. Based on Palinkas and colleagues (2011), data were examined through "collecting, analyzing and merging both quantitative and qualitative data" (p. 44). First, the structure of the research was "QUAL + quan" suggesting that quantitative and qualitative data were collected simultaneously, although qualitative data were weighed more heavily in this study given its exploratory nature. Second, the data's function was largely complementary, where qualitative data were used to elaborate on the quantitative findings. The quantitative data offered a better understanding of the qualitative data and aided in exploring trends among participants. The function also included expansion of the data as qualitative findings were used to explain quantitative data (e.g., POPE comments expanded upon the engagement states identified in the quantitative data). Third, the process connected the data. The qualitative data build on the quantitative data through elaboration and expansion. Data were analyzed in this way to better understand the nuances of playground activity among elementary aged children with ASD.

The first author (SG) reviewed all qualitative data to generate the initial codebook with a systematic approach. Operational definitions were provided for each code along with examples. Subcodes for activity were created to categorize solitary and shared activities; subcodes for atypical behavior were created to parse motor, vocal, and sensory behaviors; and subcodes for

affect were created to reflect positive, neutral, and negative affects. Coders were trained in NVivo QSR 10, a qualitative data management program, and data reliability was collected on 20% of qualitative comments from an independent transcriber. Reliability between raters was excellent (96.20%). A blind independent rater coded 20% of overlapping data. Disagreements were discussed and a consensus was reached with 100% agreement between coders. The codebook was revised to include discrepancy in coding and to reflect additional subcodes. See Table 2 for an inventory of codes with its corresponding definitions and examples.

[insert table 2 here]

Descriptive analyses were conducted using SPSS Version 24. The quantitative data focused on the percent of time in solitary and joint engagement, successful and unsuccessful initiations, appropriate and missed responses, and total initiations and responses. After separate analyses of the qualitative and quantitative data were completed, the data were connected in which the qualitative data were the primary source of data and the quantitative data were used as a secondary source. This process was complementary and focused largely on the observational notes and using quantitative data to make sense of those notes. The data were connected by means of looking at the quantitative data and using the qualitative data to expand on its findings. This was particularly useful in interpreting the quantitative data and bridging any gaps the quantitative data may present. Data were triangulated by referring to each individual file and evaluating what each child did and when. Specifically, the interplay of activities, social communication, atypical behaviors, and affect that were occurring during a given time interval were analyzed. Thus, the quantitative and qualitative data were analyzed separately and later connected to better understand not only the percentage of solitary activities or joint engagement

on the playground but what their activities, social communication, atypical behaviors, and affect looked like during solitary and joint engagement.

Results

RQ1: Activities were categorized into solitary (i.e. solo activities or talking to an adult) or shared (i.e. activities involving joint engagement between two or more peers) activities. Engagement states (i.e. solitary and joint engaged) were analyzed using descriptive measures. Quantitative data indicate that children with ASD spent 25% (SD=29) of the time in solitary engagement and 30% (SD=33) of the time in joint engagement. Solitary activities were activities performed alone or with no peer interaction as well as activities solely involving an adult. Activities were labeled: 1) peripheral; 2) object-focused play; 3) motor-oriented; 4) adult engagement; 5) academic-focused; and 6) singing. Peripheral activities were observed among 56% of participants and consisted of sitting or standing on the periphery of the playground (36%), observing or looking around (35%), eating alone (29%), and laying down or napping (5%). Object-focused play was observed among 40% of participants and involved playing with a toy such as Legos, blocks, counting bears, or hula hoops (13%) and playing with natural items such as leaves or rocks (9%). Motor-oriented activities occurred in 38% of participants and consisted of wandering (29%), playing on a structure (25%), running alone (13%), skipping (4%), and dancing (2%). Adult engagement, such as talking to an adult, was observed among 20% of participants. Next, academic-focused tasks were observed among 9% of participants with activities such as reading (4%), playing on a laptop (2%), and completing homework (2%). Lastly, children were observed singing (2%).

With regards to playground structures, children with ASD gravitated toward equipment with tires, seesaws, spiral ladders, swings, monkey bars, swinging poles, bridges, and slides.

However, children with ASD also had interest in playing with natural items such as gathering sticks, playing in sand, pulling grass, picking at tree bark, and digging in the dirt. The majority of children with ASD (65%) in this study spent most of their time in solitary activities. It is important to note that in a few instances, solitary activities became shared activities such as talking while on the seesaw or eating lunch.

In contrast, children with ASD engaged in the following shared activities: talking to peers, playground games, ball games, miscellaneous activities with a peer or group of peers, and pretend play/fantasy games. Talking to peers was the most frequently observed shared activity (45% of participants) and comprised conversation with one peer or multiple peers on the playground. Meanwhile, playground games were general activities that involved play rules. Playground games occurred among 24% of total participants and included tag or chase (13%), board games (4%), eeny meeny miny mo (2%), hide and seek (2%), duck duck goose (2%), rock paper scissors (2%), hand games (2%), hopscotch (2%), and four square (2%). Ball games were observed among 20% of participants and consisted of traditional sports or games played with a ball such as basketball (5%), kickball (5%), soccer (4%), ball tag (4%), and volleyball (2%). Meanwhile, miscellaneous activities involved an array of play activities that a small number of participants performed. Though few children with ASD participated in these activities, they were notable in that they involved peer interactions for the majority of recess. Miscellaneous activities occurred among 16% of total participants and included playing with toys such as figurines, hula hoops, cars, spinning tops, gears, and loom bands (9%) with a peer or group of peers, interacting with a peer on a structure including seesaws and slides (5%), dancing to music (4%), wrestling with a peer (2%), and singing (2%). Lastly, pretend-play/fantasy games were observed on the playground among 5% of participants. Pretend-play involved acting like robots (2%), pretending

to be lions (2%), and playing a Pokémon game where children acted like the characters (2%). These pretend activities were infrequent on the playground and each activity was specific to a different child's playground experience. See Table 3.

[insert table 3 here]

RQ2: Social communication referred to the initiations and responses of children with ASD. Particularly, social communication included social interactions (e.g. social rules and conflict resolution), pragmatics, and social cognition of children with ASD when on the playground. For children with ASD, there were a total of 7.47 initiations (SD=8.441) and 6.93 responses (SD=7.645). On average, 5.05 (SD=6.288) of their initiations were appropriate to peers while 2.25 (SD=4.120) were missed or inappropriate. The mean of appropriate responses was 5.56 (SD=5.999) and the mean of missed opportunities was 1.35 (SD=2.444). The success rate of initiations and responses for children with ASD was 80% (SD=26) and 72% (SD=28), respectively. Of interest were the nuances of social communication on the playground such as the content of children's conversations with peers and how children with ASD communicated to peers.

The most frequently noted social communication comments involved conversations with peers, which occurred among 45% of children with ASD. Conversations involved something they were mutually watching, an item a peer was holding, or even topics as broad as Halloween or fart noises. Infrequently, comments were related to conflict among peers. Four children with ASD were observed yelling at a peer and in one instance, peers yelled at the child with ASD. In 80% of instances where social communication was noted, children with ASD were involved in a shared activity such as playing a ball game or sharing toys such as a spinning top or figurine. When peers yelled at a child with ASD, it was due to not sharing a play item and the child with

ASD was focused on broken rules during the same play activity. When children with ASD were yelling at a peer, they were either attempting to gain the attention of a peer and were not successful or did not want to listen to a peer's request. Children with ASD also were observed to demonstrate obedience to peer requests or followed other children's lead in three instances. The qualitative comments indicated peers requesting the child with ASD to move to a different spot during kickball or to cease screaming.

Though children with ASD were seen following peer actions and requests in several situations, one child was observed as the leader among his classmates. Peers joined him in shared activities and when he wanted to move to a new task, his friends followed. Lastly, one child with ASD was observed introducing peers to each other while another child with ASD was observed helping his friend after she fell. Most social communication (i.e. initiations and responses) occurred in games such as ball games or pretend games and when talking to peers.

RQ3: Atypical behavior referred to any noticeable differences during play. Atypical behaviors were categorized into motor, sensory, or vocal. Motoric atypical behaviors included flapping (18% of participants), finger flexing (11%), rocking side to side (5%), fidgeting (5%), flailing (5%), hand motions (4%), running in circles (4%), and running on toes (2%). Second, sensory-related atypical behaviors included staring (18%), rubbing own body parts (5%), putting fingers in mouth to chew or lick (5%), rubbing structures (4%), self-hugging or inappropriate hugging (4%), covering ears or ear plugging (4%), skin picking (2%), and putting items in nose (2%). Third, vocal atypical behaviors included self-talk (9%), scripting (4%), self-humming (2%), and various noises (2%). Among all the participants, only 53% of children with ASD displayed atypical motoric behaviors. Meanwhile, 36% displayed atypical sensory behaviors and 13% displayed atypical vocal behaviors.

In the overall field notes that were coded for atypical behaviors, children with ASD demonstrated atypical behaviors 24% (SD=16) of the time. Atypical behaviors most frequently occurred when children were engaged in solitary activities. Particularly, staring was the most frequent atypical behavior which comprised 15% of the total number of observed atypical behaviors. Next, self-talk was observed when playing alone on a structure or walking around the periphery 13% of the time, and flapping was observed 11% of the time while at lunch playtime, walking on the periphery, or on a structure. Less than 4% of the time, all other atypical behaviors mentioned with the exception of self-humming and various noises were observed while solitary (eating, watching a movie, or in the yard). Most often, atypical behavior during a solitary activity was observed while eating lunch.

When kids were in shared activities, the most frequent atypical behavior was flapping which comprised 8% of the total atypical behaviors. Flailing and finger flexing occurred in 3% of the observed atypical behaviors. Less than 2% of the time, staring, self-humming, various noises, inappropriate hugging or self-hugging, or finger licking or chewing were observed. Most often, atypical behavior during a shared activity was observed during a ball game but also seen while playing tag, duck duck goose, sharing figurines, or during pretend play. See Table 4. Mostly, finger flexing and flapping were exhibited “in excitement” during an activity in which the child was overstimulated. This behavior was paired with positive affect and observed almost equally in both solitary and shared activities.

[insert table 4 here]

RQ4: Affect referred to the emotional state of the child. Positive affect was defined as a state of happiness, excitement, or contentment while negative affect was coded when the child with ASD was angry, sad, disappointed, or upset. Neutral affect was when the child displayed a

flat or emotionless facial expression. Children with ASD exhibited a range of affect: 46% (SD=39) of children with ASD demonstrated neutral affect, 44% (SD=37) demonstrated positive affect, and only 9% (SD=20) demonstrated negative affect. The results suggest most of the children with ASD (33%) had neutral affect during a solitary activity. Less frequently (23%), children with ASD displayed positive affect in solitary activities as well as shared activities. During shared activities, a small number (15%) of children with ASD had neutral affect and only 3% had negative affect. Similarly, only 3% of children with ASD displayed negative affect in a solitary activity.

[insert table 5 here]

Discussion

This study explored the activities, social communication skills, atypical behaviors, and affect of elementary school children with ASD during recess. Our results indicate that children with ASD participated in a variety of age appropriate activities alone and with peers. As expected, children with ASD engaged in positive (appropriate initiations and responses, reciprocal conversations) and negative (conflict) social communication, most frequently displayed motor and sensory-related atypical behavior, and neutral affect. These data have implications for strategies to support children with ASD on the playground.

The quantitative data suggest that children with ASD spent 25% of time in solitary activities, where they were on the periphery of activities. However, we also found that children with ASD spent 30% of time in shared activities, which included reciprocal conversations and games with peers. Meanwhile, children with ASD were participating in more solitary activities (65%) compared to shared activities (35%) in the quantitative data. This discrepancy can be attributed to how the POPE defined engagement states. In the quantitative data, engagement

states are based on the majority of an interval. However, engagement changes every 3 seconds (Kasari et al., 2005). As a result, children can be engaged in solitary activities but be coded as joint engaged should the activity occur for the majority of the observed interval (Kasari et al., 2005). Meanwhile, the qualitative notes accounted for whether the child participated in solitary or shared activities during each interval. These data point to activities where children with ASD may broaden their involvement with their peers.

The results from this study also may be important for informing intervention type (e.g. applied behavioral analysis, speech-language therapy, etc.) as well as intervention target (e.g., activity, social communication, atypical behavior, and affect) as school personnel and providers may facilitate opportunities for children with ASD with their peers on the playground. This mixed-methods approach can assist implementation of intervention strategies and highlight various aspects of treatment development by providing a deeper understanding of the process and findings (Aarons, Fettes, Sommerfeld, Palinkas, 2012). The results from this study have important implications to guide intervention as it shows broad activities where children with ASD most frequently engage, which can help school personnel and providers build off children's strengths and interests. The findings can be useful for ensuring schools are equipped to facilitate opportunities for children with ASD. This may include providing more play options that are suitable for children with ASD and fit their needs.

It is important to highlight the positive social communication skills observed on the playground such as being a leader or helping others. Contrary to studies that indicate children with ASD have significant social impairments (Bauminger & Kasari, 2000; Bauminger et al., 2003; Bauminger et al., 2010; Kangas et al., 2011; Tager-Flusberg, 1999), we noted several instances where children with ASD engaged in prosocial behavior with peers. This is important

as it shows children with ASD can be peer role models, spearhead activities, and promote group participation. Social skill interventions can begin with acknowledging prosocial behaviors and building off their strengths.

Atypical behaviors were mostly manifested when children were in solitary engagement. The most common atypical behaviors were motor or sensory-related with the most frequent behaviors being flapping and staring. As suggested by Samson et al. (2014), atypical behaviors often appear when children with ASD were emotionally dysregulated. Since flapping and other motor behaviors were demonstrated during states of excitement regardless of activity, the data suggest that these behaviors were influenced by their affect rather than the activity. Though flapping is noted as an atypical behavior, it is important to consider how flapping during excitement can be a typical and expected central nervous system response. Children and adults often jump and wave their arms upon hearing good news (e.g., when someone gets engaged, a surprise birthday party, etc.). The literature has yet to inform community adaptation and response to motor atypicalities which would be important to explore. Furthermore, these data indicate instances on the playground where atypical behaviors may occur. Particularly, atypical behaviors were most observed during lunch. This would be an opportune time for school personnel and providers to intervene. For example, intervention may include helping children with ASD find a peer to have lunch with. Additionally, Macintosh & Dissanayake (2006) identify the playground as a stressful period of the day for children with ASD. Atypical behavior may point to activities where children with ASD are stressed and understanding what situations on the playground may be most stressful to children with ASD may help school personnel and providers identify and respond to these situations quicker.

The data found that children with ASD mostly displayed neutral affect. This finding is consistent with previous literature where children with ASD often show a flat, emotionless expression (American Psychiatric Association, 2013; Begeer et al., 2008; Loveland et al., 1994; Samson et al., 2014; Strid et al., 2013). However, children with ASD almost as frequently demonstrated positive affect. In this study, children with ASD showed positive affect when engaged with peers, which points to the importance of peer engagement. It is vital to be mindful of affect so school personnel can target and facilitate activities and intervention strategies as well as create opportunities to maximize positive affect as this may aid social motivation and attention (Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012). Interestingly, although infrequent, children with ASD displayed negative affect, which was predominantly a result of peer conflicts. Awareness of affective states of children with ASD on the playground is important for socio-emotional wellbeing. Affect can inform engagement states, which can advise clinicians, teachers, or parents on how to best engage their child during play activities.

Our findings highlight both the challenges and successes of children with ASD on the playground. We observed that some children with ASD are flexible in following their peers' ideas and others tend to direct the play. We also observed that some children with ASD may need support on the playground particularly around how to navigate appropriate conflict resolution. These findings highlight areas where some children with ASD may need support on the playground but also inform the ways in which to support children with ASD in inclusive and general education classrooms. For example, what is observed on the playground may manifest in the classroom environment. With US trends emphasizing more academic and less recess time (Murray & Ramstetter, 2013), it also would be useful to consider how shorter recess time may impact a child with ASD. As the literature shows, there are implications of keeping recess in

curriculum as it can help develop social skills and peer relationships (Couper et al., 2013). This study shows that children with ASD have broad interests of play activities and have opportunities to interact with peers through these different activities. The playground encourages interactions with classmates, which may not be as accessible in the classroom environment. Overall, knowledge of activity, social communication, atypical behaviors, and affect on the playground can provide rich opportunities for peer interaction and can inform how children with ASD may be observed in other environments. These characteristics can help educators, parents, clinicians, and caregivers know how to better support children with ASD.

Limitations and Future Directions

Limitations for this study include a comprehensive understanding of the social behavior of children with ASD as observations were based solely on the conjoined lunch period and playground. Importantly, future studies can further tease apart the lunch versus playground contexts. There may be differences in social communication, affect, and activity in other contexts. Second, this study observed largely male children with ASD, and no sex analyses were conducted. Since females were underrepresented in this, future research should focus on recruiting more female participants and noting differences among genders (Dean et al., 2014). Third, these data were cross-sectional, future research should triangulate data from several observations in order to produce more robust results. Further, different patterns of playground behavior may unfold over time. In order to determine consistency of playground activity, longitudinal studies are warranted to see more nuanced changes in engagement, social communication, atypical behavior, and affect. Importantly, it would be useful to recruit a more diverse sample as this study focused on fully-included verbal children with ASD on the playground context and participants were predominantly male. Future studies may include

participants that are nonverbal, more ethnically diverse, or cognitively variable. Increased variation among participants can improve generalization of findings to broader contexts and across the spectrum.

Conclusion

Previous literature has examined playground engagement using quantitative methods, but few have incorporated qualitative observations to supplement, support, and unpack what we know about the peer engagement of children with ASD. This study provided a mixed-methods analysis of children with ASD on the playground where qualitative data provided a more nuanced understanding of peer engagement. These data highlight a deeper understanding of the activities with which children with ASD engage, how they communicate, and their atypical behavior and effect on the playground. These findings point to areas where schools can intervene or provide additional support.

References

Aarons, G., Fettes, D., Sommerfeld, D., & Palinkas, L. (2012). Mixed methods for implementation research: Application to evidence-based practice implementation and staff turnover in community-based organizations providing child welfare services. *Child Maltreatment, 17*(1), 67-79.

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th edn. Washington DC, 2013.

Baron-Cohen, S. (2006). Two new theories of autism: Hyper-systemising and assortative mating. *Archives of Disease in Childhood, 91*(1), 2.

Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child Development, 71*(2), 447-456.

Bauminger, N., Shulman, C., & Agam, G. (2003). Peer interaction and loneliness in high-functioning children with autism. *Journal of Autism and Developmental Disorders, 33*(5), 489-507.

Bauminger, N., Solomon, M., & Rogers, S. (2010). Predicting friendship quality in autism spectrum disorders and typical development. *Journal of Autism and Developmental Disorders, 40*(6), 751-761.

Begeer, S., Koot, H. M., Rieffe, C., Meerum Terwogt, M., & Stegge, H. (2008). Emotional competence in children with autism: Diagnostic criteria and empirical evidence. *Developmental Review, 28*(3), 342-369.

Chevallier, Kohls, Troiani, Brodkin, & Schultz. (2012). The social motivation theory of autism. *Trends in Cognitive Sciences, 16*(4), 231-239.

Corbett, B. A., Swain, D.M., Newsom, C., Wang, L., Song, Y., & Edgerton, D. (2014). Biobehavioral profiles of arousal and social motivation in autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, *55*(8), 924–934.

Couper, L., Sutherland, D., & Van Bysterveldt, A. (2013). Children with autism spectrum disorder in the mainstream playground. *Kairaranga, 14*(1), 25-31.

Dean, M., Kasari, C., Shih, W., Frankel, F., Whitney, R., Landa, R., Lord, C., Orlich, F., King, B., & Harwood, R. (2014). The peer relationships of girls with ASD at school: Comparison to boys and girls with and without ASD. *Journal of Child Psychology and Psychiatry, 55*(11), 1218-1225.

Kangas, S., Uusiautti, S., & Määttä, K. (2011). Social interaction among children with autism spectrum disorders (ASD). *International Journal of Early Childhood Special Education, 3*(2), 160-174.

Kasari, C., Locke, J., Gulsrud, A., & Rotheram-Fuller, E. (2011). Social networks and friendships at school: Comparing children with and without ASD. *Journal of Autism and Developmental Disorders, 41*(5), 533-544.

Kasari, C., Rotheram-Fuller, & Locke. J., (2005). The development of the playground observation of peer engagement (POPE) Measure. Unpublished manuscript. Los Angeles, CA: University of California Los Angeles.

Landa, R., Holman, K., & Garrett-Mayer, E. (2007). Social and communication development in toddlers with early and later diagnosis of autism spectrum disorders. *Archives of General Psychiatry, 64*(7), 853-864.

Lang, R., Kuriakose, S., Lyons, G., Mulloy, A., Boutot, A., Britt, C., Caruthers, S., Ortega, L., O'Reilly, M., Lancioni, G. (2011). Use of school recess time in the education and

treatment of children with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders, 5*(4), 1296-1305.

Larson, M.J., South, M., Clayson, P.E., & Clawson, A. (2012). Cognitive control and conflict adaptation in youth with high-functioning autism. *Journal of Child Psychology and Psychiatry, 53*(4), 440-448.

Locke, J., Shih, W., Kretzmann, M., & Kasari, C. (2016). Examining playground engagement between elementary school children with and without autism spectrum disorder. *Autism, 20*(6), 653-662.

Loveland, K., Tunali-Kotoski, B., Pearson, D., Brelsford, K., Ortegon, J., & Chen, R. (1994). Imitation and expression of facial affect in autism. *Development and Psychopathology, 6*(3), 433-444.

Macintosh, K., & Dissanayake, C. (2006). A comparative study of the spontaneous social interactions of children with high-functioning autism and children with asperger's disorder. *Autism: The International Journal of Research & Practice, 10*(2), 199-220.

Memari, A., Panahi, N., Ranjbar, E., Moshayedi, P., Shafiei, M., Kordi, R., & Ziaee, V. (2015). Children with autism spectrum disorder and patterns of participation in daily physical and play activities. *Neurology Research International, 2015*(4), 7.

Murray, R., & Ramstetter, C. (2013). The crucial role of recess in school. *Pediatrics, 131*(1), 183-8.

Ochs, E., Kremer-Sadlik, T., Solomon, O., & Sirota, K. (2001). Inclusion as social practice: Views of children with autism. *Social Development, 10*(3), 399-419.

Palinkas, L., Aarons, A., Horwitz, G., Chamberlain, S., Hurlburt, P., & Landsverk, M. (2011). Mixed method designs in implementation research. *Administration and Policy in Mental Health and Mental Health Services Research, 38*(1), 44-53.

Samson, A.C., Phillips, J.M., Parker, K.J., Shah, S., Gross, J.J., & Hardan, A.Y. (2014). Emotion dysregulation and the core features of autism spectrum disorder. *Journal of Autism and Developmental Disorders, 44*(7), 1766-1772.

Schupp, C.W., Simon, D., & Corbett, B.A. (2013). Cortisol responsivity differences in children with autism spectrum disorders during free and cooperative play. *Journal of Autism and Developmental Disorders, 43*(10), 2405–2417.

Strid, K., Heimann, M., Gillberg, C., Smith, L., & Tjus, T. (2013). Deferred imitation and social communication in speaking and nonspeaking children with autism. *Focus on Autism and Other Developmental Disabilities, 28*(4), 230-240.

Swanson, T. (2005). Provide structure for children with learning and behavioral problems. *Intervention in School and Clinic*, *40*, 182-187.

Tager-Flusberg, H. (1999). A psychological approach to understanding the social and language impairments in autism. *International Review of Psychiatry, 11*(4), 325-34.

Table 1. *Participant baseline characteristics: Descriptive statistics*

	Participants (n = 55)
Sex	
Male	46
Female	9
Race/Ethnicity	
African American	14
Hispanic	2
White	30
Asian	3
Multiethnic	5
Other	1
Grade	
Kindergarten	4
1st	6
2nd	16
3rd	6
4th	6
5th	17
Age (M=8.65; SD=1.73)	

Table 2. *Qualitative Data Codes*

Code	Definition	Example
Activity	Activities refers to popular activities children with autism participated in. Activities were categorized by solitary or shared play.	Soccer
Social Communication	Social communication refers to the social interactions and pragmatics of children when on the playground. Social interaction may include social rules and conflict resolution. Pragmatics includes verbal and nonverbal communication such as discourse, body language, and eye contact.	"Discussing fart noises"
Atypical Behavior	Atypical behavior refers to any noticeable differences in play. Atypical behaviors are not characteristic of typically developing children; These behaviors are often characteristics of an autism diagnosis, but can also be unique to the child.	Staring
Affect	Affect refers to the emotional state of the child	Neutral affect

Table 3. *Activities*

Solitary	% of Participants	Shared	% of Participants
PERIPHERAL	56	*TALK TO PEERS*	45
Sit or stand on periphery	36		
		PLAYGROUND GAMES	24
Observe or look around	35		
		Tag or chase	13
Eat alone	29	Board games	4
Lay down or nap	5	Eeny Meeny Miny Mo	2
		Hide and Seek	2
OBJECT-FOCUSED PLAY	40	Duck Duck Goose	2
		Rock Paper Scissors	2
Play on structure	25	Hand games	2
Play with toy	13	Hopscotch	2
Play with nature	9	Four Square	2
MOTOR-ORIENTED	38	*BALL GAMES*	20
Wander	29	Basketball	5
Run alone	13	Kickball	5
Skip	4	Soccer	4
Dance	2	Ball tag	4
		Volleyball	2
ADULT ENGAGEMENT	20		
		MISCELLANEOUS	16
		Play with toy	9
ACADEMIC-FOCUSED	9	Structure	5
		Dance	5
Read	4	Wrestle	2
Play on laptop	2	Sing	2
Homework	2		
		PRETEND PLAY	5
SINGING	2	Act like robots	2
		Pretend to be a lion	2
		Pokémon game	2

Table 4. *Atypical Behaviors*

Atypical Behaviors	% of Participants
MOTOR	53
Flapping	18
Finger flexing	11
Rocking	5
Fidgeting	5
Flailing	5
Hand motions	4
Running in circles	4
Running on toes	2
SENSORY	36
Staring	18
Rubbing own parts	5
Putting fingers in mouth	5
Rubbing structures	4
Self-hugging or inappropriate hugging	4
Covering ears or ear plugging	4
Skin picking	2
Putting items in nose	2
VOCAL	13
Self-talk	9
Scripting	4
Self-humming	2
Various noises	2

Table 5. *Affect and Engagement States*

Solitary	**% of Participants**	**Shared**	**% of Participants**
Positive	23	Positive	23
Neutral	33	Neutral	15
Negative	3	Negative	3