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## Play behaviour of children with autism spectrum disorders

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### Abstract

*Background* We investigated the play behaviours of children with autism. Cognitive and social levels of play engaged in by 4- to 8-year-old children with autism spectrum disorders were examined in naturalistic classroom settings. In addition, play at home was compared with play at school via mother and educator questionnaires.

*Method* Seventeen school-aged children, their educators, and their mothers participated in the study. Each participant was observed for one free play session on 5 separate days.

*Results* The most frequently observed play behaviours included parallel-functional play, adult interactions, and solitary-functional play. Mothers and educators did not differ significantly in their perspectives of the participants' play behaviours. In general, educators' and mothers' reports were positively related to researcher observations of participants' play behaviours.

*Conclusions* This study provides baseline data for future research on the play behaviours of children with autism spectrum disorders. Methodological considerations and practical implications of the findings are discussed.

### Introduction

Play has been linked to many areas of development, including intellectual, social, and emotional growth (Hughes, 1999; Rubin & Coplan, 1998; Sullivan, 1953). For example, play is thought to promote intellectual development by providing the young child with a context in which he or she can practise his or her language and communication skills. In addition, play creates an opportunity to fantasise, plan strategies, and solve problems. Social development also occurs through play. In effect, role-playing prepares the child for the many complex tasks of adult life. Finally, emotional development is advanced through play. Identification of emotions enables the child to describe his or her perspective, ask for assistance, and ensure that his or her feelings are respected (Hughes, 1999). Opportunities for play, therefore, are critical for all children. Unfortunately, children with autism experience difficulties with social interactions and are reported to often not play with their peers (Lord, 1984; Restall & Magill-Evans, 1994; Tilton & Ottinger, 1964). Research on the naturalistic play behaviours of children with autism, particularly in a school setting, however, is limited. To address this issue, this study specifically examines the play behaviours of children with autism during free play activities at school.

It is common for children with autism (at the age that typically developing children engage in more sophisticated types of play) to choose play objects based on the sensory stimulation they provide (i.e., interesting to smell, touch, hear, taste or see). According to Siegel (1996), rarely will children with autism develop an attachment to a particular toy; rather, they may prefer to play with other items they have found around the house (e.g., water bottle caps, elastic bands, etc.). Interaction with a play object often lacks the imagination evident in the play of typically developing children (Siegel, 1996). Further, the play of a child with autism has a very repetitive and stereotyped quality, a phenomenon known as perseveration (Hughes, 1998).

Unfortunately, prior research in this area has focused primarily on the play of single participants in laboratory settings (e.g., Lord, 1984; Tilton & Ottinger, 1964) or clinical anecdotes (Siegel, 1996). Hence, a need exists for play research conducted with children with autism in a naturalistic setting. Williams, Reddy, and Costall (2001), and Restall and Magill-Evans (1994) examined the play behaviours of children with autism in the home, however there is limited research on play activities with peers in a naturalistic setting such as the school. Brown and Whiten (2000) examined briefly the play activities of children with autism in a school setting,

but it was a residential school specifically designed for children with autism and communication disorders, and the typical peer context found in integrated schools was absent. In addition, the children in that study were older (aged 7 to 15 years) than the children typically observed in studies examining play behaviours. The current study addresses these limitations in the literature by incorporating into the methodology naturalistic observations of the play behaviours of young children with autism at an integrated school. Thus the goal of the present study was to determine what types of play young children with autism engaged in during free play time at school.

Further, we sought to determine whether parents and educators differ in their perceptions of the capability of children with autism to engage in different social and cognitive types of play. If there is a discrepancy between the parents' and educators' opinions, the children may be treated differently at home from at school. This could lead to inconsistency in the difficulty levels of tasks given to the children at home and at school. As a result, the children might feel frustrated and confused. In addition, we wanted to compare the perceptions of parents and educators with our actual observations of play behaviours in the school setting, to assess whether the perceptions of these groups matched our observations.

Overall, the research questions this study attempted to answer were: 1) During free play time at school, at what cognitive and social levels do a sample of young children with autism play? 2) Are there differences between parent and educator reports of the play behaviours of children with autism? and 3) Are there differences between the observed play behaviours and parent and educator reports of the play behaviours of children with autism?

## Method

### *Participants*

Thirty-four families, drawn from 15 schools in a mid-sized Canadian city, were invited to take part in the study. Approval by Brock University's Research Ethics Board was obtained for the study and an active parental consent procedure was used. Eighteen families agreed to participate, a 53% response rate. One child was excluded from the analysis because he was diagnosed with Asperger's syndrome rather than autism. The remaining 17 participants (13 males and 4 females) ranged in age from 4.25 to 8.25 years ( $M=6.21$  years,  $SD=1.22$

years). Seven of the children (41.2%) were enrolled in senior kindergarten (the program for children who are 5 years of age) at the time of the study. The remaining 10 children were either in junior kindergarten (the program for children who are 4 years of age: 23.5%) or Grade 1 (the program for children who are 6 years of age: 23.5%). Most of the participants (82%) lived with both parents. While both mothers and fathers were invited to participate in the study, only the data from the participants' mothers were analysed because few fathers agreed to participate in the study.

Sixteen of the children had been diagnosed with a disorder on the autism spectrum before participation in the study: eight had been diagnosed with autism, three with Pervasive Developmental Disorder (PDD), and five with autism and PDD. One child had not received an official diagnosis at the time of the study, but was included in the research because her caregivers and educators believed that she would soon receive a diagnosis and her data were not outlying compared with the other participants.

Participant verbal mental age, as measured by the *Peabody Picture Vocabulary Test-Revised* (PPVT-R: Dunn & Dunn, 1981), was calculated to determine at what chronological age the participants were functioning. The PPVT-R is a proxy measure for verbal mental age. It was important to establish this so that descriptive comparisons with typically developing children of the same approximate verbal mental age could be made regarding play behaviours. The PPVT-R measures receptive vocabulary rather than general intelligence; vocabulary is strongly associated with academic success (Dunn & Dunn, 1981). The test does not require the research participant to be able to read or write, which makes it ideal to use with children with autism (McCabe, Jenkins, Mills, & Dale, 1996; Morgan, Cutrer, Coplin, & Rodrigue, 1989). The psychometric properties of the scale are excellent (see Dunn & Dunn, 1981, for further information). The mean verbal mental age for the participants was 4.39 years ( $SD=1.60$ ). A paired-samples  $t$ -test revealed that participants' verbal mental age and chronological age differed significantly ( $t(12) = 4.86$ ,  $p < .0001$ ). All of the participants were functioning at a level at least six months below that of their chronological age, indicating a possible delay in receptive vocabulary ability and academic functioning.

### *Measures*

*Play information provided by parents and educators.* The adults completed a brief written questionnaire asking them to describe the play behaviours of their

children/students. The *Preschool Play Behaviour Scale* (PPBS; Coplan & Rubin, 1998) was selected because it assesses social and cognitive play behaviours of young children. The adults were asked to indicate how often the child engages in five types of play behaviours on a 5-point Likert scale (1=never, 2=hardly ever, 3=sometimes, 4=often, 5=very often).

The PPBS consists of five subscales (Coplan & Rubin, 1998). The Reticent subscale assesses a combination of onlooker and unoccupied behaviours (e.g., staring into space, watching others play, but not joining them, etc.). The Solitary Passive subscale measures actions such as playing alone while trying to explore objects, examining objects, constructing objects, etc. The Solitary Active subscale assesses behaviour such as playing alone while engaging in activities for the physical sensations they yield (e.g., motor activities, pretend play, etc.). The Social Play subscale measures peer conversation, group and sociodramatic play. Finally, the Rough Play subscale assesses rough-and-tumble play and mock fighting.

As the PPBS was designed specifically to assess adults' perceptions of the play behaviours of typically-developing preschool children, some modifications were required before it could be used with children with autism. We added a sixth category to the PPBS, labelled as the Autism subscale. The six items on this subscale describe play behaviours believed to be typical of children with autism, including frequency of repetitive play, preference for junk items, preference for play with the same toy all the time (even when other toys are offered), loss of interest in new toys quickly, choosing toys based on the sensory stimulation they might provide, and playing more appropriately when prompted to do so (Hughes, 1998; Siegel, 1996; Tilton & Ottinger, 1964).

The Cronbach alphas (for combined mother and educator ratings) were .59 for Reticent, .70 for Solitary Passive, .85 for Solitary Active, .92 for Social Play, .70 for Rough Play, and .33 for the Autism subscale. When the item "Plays more appropriately when prompted to do so" was removed from the analysis, the Cronbach alpha for the Autism subscale improved to .62. Thus, this item was left out of all analyses.

*Play scale.* The *Play Observation Scale* (POS; Rubin & Coplan, 1998) was used to record both the cognitive level of play observed in the naturalistic school setting and the type of social participation engaged in by each child. As this scale was developed to assess typically developing preschool children in a laboratory setting, some modifications were required before it could be used with children with autism

in higher grades in a naturalistic setting. In order to ensure comprehensiveness and relevance of the checklist items, as well as to establish the appropriateness of maintaining more complex play behaviours on the checklist (e.g., group-dramatic play), the modified play scale was pilot-tested with 5 participants before being used in the study. These participants' data were subsequently used as part of the overall participant database. Specifically, participants' play behaviours were observed naturalistically every 10 seconds for 5 minutes, yielding a total of 30 observations for each play period. The checklist was structured in such a way as to allow the researcher to record both the cognitive and social levels of play engaged in by the participant. For example, the Solitary Play categories consisted of solitary-functional, solitary-constructive, solitary-exploratory, solitary-dramatic, and solitary-games. In order to avoid coding too many social and cognitive behaviours within one 10-second interval, the behaviour that occurred most frequently during each 10-second time period was coded. For example, if a participant engaged in parallel-constructive play for 6 seconds and solitary-functional play for 4 seconds, "parallel-constructive" was coded.

Table 1 summarises the definitions of the categories used on the modified POS. Before pilot-testing, all of the original categories listed by Rubin and Coplan (1998) were included in the scale (i.e., functional, constructive, dramatic, games, exploratory, solitary, parallel, group, transitional, unoccupied, onlooker, peer conversation, anxious, hovering, rough-and-tumble, and aggression). We added two categories, "perseveration" and "junk object play", due to the suggestion that children with autism engage in these behaviours when given the opportunity to play (Siegel, 1996).

Pilot-testing indicated that none of the participants had motive or opportunity to play with junk items during free play time. Perseveration was also difficult to operationalise and happened infrequently. Further, some behaviours did occur frequently that were not among Rubin and Coplan's (1998) original categories (i.e., crying, interacting with adults, and leaving the room). Thus, "junk object play," "hovering," and "perseveration" were removed from the POS and "crying," "adult interactions," and "left room" were added to the POS after pilot-testing was completed.

#### *Procedure*

Participants were observed as they participated in free play period in their mainstreamed classrooms.

**Table 1. Variables measured by the modified POS and their operationalisations**

Variable	Operationalisation	Example
Functional play	Play with an object for the function it denotes; repetition of movements for the pleasure they bring.	Running a toy train along a track, running around.
Constructive play	Building or creating something to satisfy constructive goals.	Building a sand castle, solving a puzzle.
Dramatic play	Make-believe and pretend behaviours, role-playing.	Creating a puppet play, dressing up as a firefighter.
Games-with-rules	The creation of games with rules and roles to be played agreed upon by the group.	Board games, tag, sports.
Exploratory play	Examining a play object in order to determine its properties or how it works.	Putting Lego in mouth or running fingers along block instead of playing with it.
Solitary play	Playing apart from other children at a distance of at least three feet or with one's back to other children.	Solving a puzzle alone and away from others while other children are playing a board game together.
Parallel play	Playing within three feet of others, using similar materials, but not playing <i>with</i> them.	Solving a puzzle alone and near others, while other children are solving a puzzle together.
Group play	Playing with others with a common purpose to the activity; interacting socially.	Solving a puzzle <i>with</i> other children.
Transitional behaviour	What the child is doing after completing one play activity and before starting another.	Cleaning up a finished activity or gathering materials for a new activity.
Unoccupied behaviour	The child is not focused on one activity in particular.	Wandering aimlessly or staring off into space.
Onlooker behaviour	Watching the play of others, and perhaps engaging in conversation with them, but not trying to join them.	Watching peers play baseball, observing peers playing a computer game and making comments.
Peer conversation	The verbal interaction between children in a play situation.	One child shows a new toy to another. The other child asks questions about the toy.
Anxious behaviours	Behaviours a child might engage in when upset or nervous.	Automanipulatives (thumb-sucking, pulling on one's own clothes or hair), crying, self-stimulation.
Hovering	Not playing, but being within less than three feet of other children who are playing, for at least three seconds, then moving to another group. Could be watching several activities at once.	Watching one group play and then moving to another group after less than three seconds. Continues to do this for the entire 10-second interval.
Rough-and-tumble play	Play fighting, with no intention to harm others.	Wrestling, chasing and hitting while laughing.
Aggression	Intent to harm another	Name-calling, punching, kicking, fighting over a toy.

Depending on the child's age, free play period occurred either during centre time (kindergarten) or recess (Grades 1-2). Centre time is defined as a less structured period when the children have some say in what they play with (e.g., computer centre, book centre, house centre, sand table, water table, etc.). Each participant was observed for one session on 5 separate days, to counteract for effects such as environmental changes, and participant and/or educator mood. Each session lasted for approximately 10 minutes. First, the child's behaviour was observed for 10 seconds during the play period, followed by 10 seconds for note-taking. This procedure was repeated throughout the 10 minutes, resulting in a total of 5 minutes of observation and 5 minutes of detailed note-taking on what the child was doing. Instances of cognitive and social level of play, transitional behaviour, unoccupied behaviour,

onlooker behaviour, anxious behaviour, aggression, crying, peer conversation, adult interactions, rough-and-tumble play, and leaving the classroom were recorded. This coding procedure is based on previous studies which used the POS (Coplan, Rubin, Fox, Calkins, & Stewart, 1994; Hymel, Rubin, Rowden, & LeMare, 1990; Rubin, Watson, & Jambor, 1978).

Two coders observed 20% of the free play sessions. Conflicts between the coders were resolved by discussion immediately after each observation session. Cohen's Kappa for the two coders was .86 ( $p < .0001$ ). The remainder of the sessions were coded by the first author.

Each participant's teacher, educational assistant and mother were asked to fill out the PPBS. The participants' caregivers were also asked to provide demographic information about the children, such

as participant age and diagnostic category (i.e., type of DD). We assessed the child's verbal mental age using the PPVT-R during a visit to the participant's home.

## Results

### *The cognitive and social levels of play engaged in by children with autism*

The first research question explored the cognitive and social levels at which children with autism play (see Table 2 for a summary). Overall, participants were engaged in functional play for 25% of the time, in contrast to 12% in constructive play and 10% in exploratory play. They rarely engaged in make-believe play. Although participants engaged in play both alone and in the presence of other people, they typically did not interact with others. In addition, the participants were observed to participate in adult interactions for 12% of the time while peer conversation was observed only 7% of the time,

**Table 2. Percentages of total observed play behaviours across all children in descending rank**

Behaviour	Percent of total 10-second intervals	Range (in percents)
Parallel-functional	13.21	0–3.33
Adult interactions	11.53	0–1.73
Solitary-functional	9.92	0–1.96
Transitional	9.33	.16–1.65
Unoccupied	8.35	0–1.10
Peer conversation	7.06	0–1.45
Parallel-constructive	7.06	0–2.35
Onlooker	6.63	0–1.84
Group-games	5.37	0–2.12
Parallel-exploratory	4.67	0–.90
Solitary-exploratory	4.59	0–1.22
Solitary-constructive	3.84	0–1.22
Solitary-games	2.08	0–2.08
Group-functional	1.73	0–.47
Parallel-games	1.49	0–.71
Group-constructive	1.21	0–.55
Left room	0.83	0–.39
Rough-and-tumble	0.67	0–.47
Parallel-dramatic	0.59	0–.24
Group-dramatic	0.59	0–.24
Group-exploratory	0.47	0–.31
Anxious behaviours	0.47	0–.39
Solitary-dramatic	0.39	0–.27
Aggressive behaviours	0.08	0–.08
Crying	0.08	0–.08

Note: For percent of total observed behaviours, percentages do not add up to 100% due to rounding error. These categories are exclusive. Due to the nature of the sample's interactions, the categories of "adult interactions," "crying" and "left room" were added to the scale.

although adults initiated interactions with the participants more frequently than did peers. Finally, the participants rarely cried or attempted to harm others.

### *Mother and educator perspectives on participant play behaviours*

The second research question examined educators' and mothers' perceptions of participants' play behaviours. Composite scores were created by summing the responses to the questions on the modified PPBS corresponding to the 6 categories of play behaviours measured by the scale (i.e., Reticent, Solitary Passive, Solitary Active, Social Play, Rough Play, and Autism). Because educational assistants (EAs) and teachers based their reports on observations from the same school environment, the first comparisons were made between teachers and EAs. *T*-test analyses did not reveal any significant differences between the teachers and the educational assistants (the largest was  $t(12)=2.03$ ,  $p>.05$  for the autism comparison). Therefore, the data were combined in all subsequent analyses.

In order to assess differences between mothers' and educators' (i.e., averaged teacher and EA) perspectives of the participants' play behaviours as measured by the PPBS, a MANOVA procedure was conducted. Rater (i.e., mother vs. educator) was the independent variable and the 6 PPBS subscales were the dependent variables (see Table 3 for means and standard deviations). No significant differences emerged between these two groups (Wilks  $F(1, 26)=0.88$ ,  $p=.53$ ), and the data for mothers and educators were combined in subsequent analyses.

Paired-samples *t*-tests were conducted in order to determine if the mothers and educators perceived any of the play behaviours as occurring significantly more frequently than others. Using the modified

**Table 3. Means and standard deviations for play scale ratings by mothers and educators**

Variable	Mother ( $n=15$ )		Educator ( $n=13$ )	
	Mean	SD	Mean	SD
Social Play	2.74	0.79	2.27	0.68
Solitary Passive	3.57	0.78	3.45	0.49
Reticent	2.87	0.68	2.76	0.43
Rough Play	2.63	1.23	1.93	0.65
Solitary Active	3.53	1.03	2.73	1.13
Autism	3.00	0.70	2.84	0.56

Note: 1=never, 2=hardly ever, 3=sometimes, 4=often, 5=very often.

Bonferroni procedure to control for the number of *t*-tests, the level of significance was set at  $p=.017$ . Results are summarised in Table 4. Solitary passive play was perceived by the participants' mothers and educators as occurring significantly more frequently than all of the other behaviours. Reticent behaviours, solitary active play and autism-like behaviours occurred significantly more frequently than rough-and-tumble play. Rough-and-tumble play was perceived by mothers and educators as the least frequently occurring play behaviour.

*Comparing free play observations with educators' and mothers' reports*

The final research question examined whether observed play behaviours differed from educator and/or mother perspectives. Correlational analyses were conducted (see Table 5). The averaged responses on the PPBS for the mothers and educators were correlated with the average frequency of observed behaviours of the independent raters. There was a significant and positive relation between observed and reported solitary-exploratory ( $r=.54, p=.047$ ) and solitary-constructive play ( $r=.54, p=.037$ ) as well as peer conversation ( $r=.84, p<.0001$ ). Significant correlations were also found between observed unoccupied and reported onlooker behaviours ( $r=.53, p=.041$ ), observed group play and reported peer conversation ( $r=.60, p=.018$ ), observed group dramatic play and reported rough-and-tumble play ( $r=.64, p=.010$ ), observed peer conversation and reported group dramatic play ( $r=.69, p=.005$ ), and observed rough-and-tumble play and reported peer conversation ( $r=.57, p=.025$ ).

**Table 4. Summary of paired-samples *t*-tests for comparisons between PPBS subcategories**

Comparison	<i>t</i> -test	<i>df</i>
Social vs. Solitary passive	-6.43*	13
Social vs. Reticent	-1.67	14
Social vs. Rough-and-tumble	1.38	14
Social vs. Solitary active	-2.66	14
Social vs. Autism	-1.78	12
Solitary passive vs. Reticent	4.42*	13
Solitary passive vs. Rough-and-tumble	6.09*	13
Solitary passive vs. Solitary active	2.85*	13
Solitary passive vs. Autism	3.53*	12
Reticent vs. Rough-and-tumble	3.27*	14
Reticent vs. Solitary active	-0.80	14
Reticent vs. Autism	-1.20	12
Rough-and-tumble vs. Solitary active	-3.39*	14
Rough-and-tumble vs. Autism	-4.35*	12
Solitary active vs. Autism	0.05	12

Note: \* $p<.017$ ,  $\alpha$  set at .017 using modified Bonferroni procedure to account for the large number of *t*-tests.

**Discussion**

It is noteworthy that considerable functional play occurred within the current sample. Some previous research has indicated that children with autism tend to spend most of their time in exploratory play or perseveration (Hughes, 1998; Siegel, 1996; Tilton & Ottinger, 1964). Our findings did not support this assertion. The participants in the study rarely (i.e., approximately 2% of the time) exhibited perseveration during their play. In fact, perseveration was removed as a code on the play checklist due to its extremely rare occurrence. Indeed, Lewis and Boucher (1995) found that children with autism

**Table 5. Correlations between observed and reported play behaviours**

PPBS Scales	POS Scales									
	1	2	3	4	5	6	7	8	9	10
1	.54*	.18	-.31	-.34	-.06	-.05	-.12	.27	.40	.62*
2	.45	-.11	-.34	-.17	.01	.10	.11	-.04	.17	.21
3	.22	-.01	.09	-.28	-.22	-.10	-.26	-.11	.22	.13
4	.04	-.16	.53*	.41	-.24	-.36	-.10	.09	.21	-.15
5	-.15	.14	-.22	.36	.13	-.01	.46	.22	-.23	.06
6	-.10	.14	-.22	.22	.47	.39	.69**	.40	-.24	-.18
7	-.12	-.28	.08	.27	.60*	.38	.84**	.57*	-.43	-.24
8	.02	-.29	-.37	-.07	.26	.64**	.11	.17	-.27	.07
9	.22	.14	.23	.21	-.12	-.38	.06	-.21	.14	.08
10	.47	.05	-.24	-.25	.02	-.04	.12	.07	.17	.54*

Note: \*  $p<.05$ . \*\*  $p<.01$ . PPBS 1=item 2+17, 2=item 7+11, 3=item 9+18, 4=item 12+23, 5=item 6+10, 6=item 5+20, 7=item 1+15, 8=item 3+21, 9=item 14, 10=item 8. POS 1=solitary-exploratory, 2=solitary-dramatic, 3=unoccupied, 4=onlooker, 5=group, 6=group-dramatic, 7=peer conversation, 8=rough-and-tumble, 9=solitary-functional, 10=solitary-constructive.

were as capable of producing ideas for functional play as children with general learning difficulties (these children attended special schools for children with mild to moderate general learning difficulties and had lower vocabulary comprehension and grammar scores than their peers), as well as younger typically developing children.

Several explanations, including level of functioning, diagnosis, and type of school attended may explain these results. It is possible that the research of Siegel (1996) and Tilton and Ottinger (1964) was conducted with children who were not as highly functioning as those in the present sample. A lower functioning group might engage in perseveration and junk object play more frequently than the current participants. While Siegel did not give specific ages at which children with autism are expected to become attached to a particular toy to the exclusion of all others or to play with junk items, the author did state that both behaviours occur when the children are young. In fact, Winzer (1990) stated that children with autism show a fascination with junk objects at 18 months to 2 years, a much younger age level than the current sample. Unfortunately, neither Winzer nor Siegel was specific about how long children with autism remain in sensory or exploratory play. Furthermore, Hughes (1998) pointed out that although children with autism have a tendency to perseverate, it would be unfair to conclude that all children with autism engage in perseveration.

Although the participants in Tilton and Ottinger's (1964) study resembled those in the current study in terms of age (approximately 5 years), they had not been formally diagnosed with an autism spectrum disorder. In the current study, all but one participant was formally diagnosed with an autism spectrum disorder. It also is unclear whether the children assessed in the earlier studies attended integrated schools, as did the participants in the current study. For example, the children with autism observed in Brown and Whiten's (2000) study attended a residential school for children with autism and communication disorders. In addition, the previous studies were based either on laboratory observations with no playmates or on case studies. It is likely that there are differences between the play behaviours that could be observed in a child who is in a novel situation surrounded by strangers and those observed in a child who is in a familiar setting surrounded by familiar peers. For example, it is possible that more anxious behaviours could occur when the child is unsure of his or her surroundings. In addition, the case study method is less generalisable to other children (Huck & Sandler, 1979).

The current results, in contrast, are indicative of the participants' actual experience in daily school life, due to the naturalistic setting which allows for the opportunity to interact with peers.

Based on the observations, the most frequently occurring play behaviour in the sample was parallel-functional play (occurring approximately 13% of the time). This finding lends some support to the work of Lewis and Boucher (1995) who concluded that children with autism did not differ from other children in their ability to produce functional play. However, not as many instances of symbolic play were observed compared with Lewis and Boucher, who contended that children with autism were equally capable of producing symbolic play ideas. Their sample of children with autism was both chronologically and mentally older than the children in our study, which might account for their observation of more dramatic play. In general, older children are more capable of engaging in make-believe due to their ability to reason abstractly (Rubin, Fein, & Vandenberg, 1983).

When assessing frequency of social play in the present study, group play among participants was rare. In contrast, parallel and solitary play were the most frequently observed play behaviours. These findings are similar to those of Lord (1984), who concluded that children with autism spend more time playing alone than typically developing children when presented with the option of playing with other children. The findings are also consistent with Restall and Magill-Evans' (1994) conclusion that preschool-level children with autism will prefer to play alone even in familiar settings with well-known adults present.

The comparisons of educators' and mothers' responses on the PPBS yielded no significant differences. It appears that the play behaviours of children with autism at home do not differ from the types of play engaged in at school, indicating consistency between the perspectives of educators and mothers on the participants' play behaviours. This similarity in reports across home and school contexts may be a result of the fact that the questionnaire tapped broad areas of social and cognitive categories of play (e.g., solitary passive, solitary active), as opposed to specific differences in toys and settings, which might be expected to differ across contexts.

Finally, mothers' and educators' perceptions of participant play behaviours were compared with observed participant play activities. In general, the reported and observed play behaviours of the children with autism were similar. Positive correlations were also found between differently named



observed and reported play categories (e.g., observed “unoccupied” and reported “onlooker”). However, all of these correlations were between categories that are often combined in other scales (e.g., both unoccupied and onlooker behaviours are considered part of the Reticent Scale for the PPBS).

*Relation to typically-developing children of the same age*

The participants in the current study had a mean verbal mental age of 4.86 years and a mean chronological age of 6.21 years. The children were in junior kindergarten, senior kindergarten, or Grade 1 at the time of the study. According to previous research, by the time they are in kindergarten, typically developing children should be engaging in more parallel-constructive, parallel-dramatic and group-dramatic play and less unoccupied and onlooker behaviours, solitary-functional and parallel-functional play than they did at preschool age (Rubin et al., 1978). Our results indicated that the participants with autism appeared to be playing more at the preschool level than at the school-age level. Most of their time was spent in either parallel-functional or solitary-functional play. Onlooker and unoccupied behaviours occurred more frequently than did most of the other play behaviours. Although parallel-constructive play was fairly frequent, parallel-dramatic and group-dramatic behaviours were quite rare. The concept of pretence emerges at between 3 to 6 years of age in typically developing children (Rubin et al., 1983). It was rarely witnessed in the current sample of participants.

There are a few caveats to our interpretation of the results of this study. First, only 53% of the families invited to take part in the study agreed to participate. The participating families, therefore, may not be representative of all eligible participants. Second, the possibility of social desirability should also be considered, particularly among the adult participants. Being aware that an observer is present in the classroom might have prompted some of the educators to become more involved in the participants’ play than they might normally have done. Questionnaire responses might also have been influenced by a social desirability bias.

Finally, most of the children in the current sample were diagnosed with an autism spectrum disorder at approximately 3 years of age. Due to their early diagnoses, some have been attending special programs and all have had an educational assistant present in the classroom. This means that they might already have experienced some interventions geared at increasing play skills.

This study provides baseline data for future research on the play behaviours of children with autism spectrum disorders. Further work should compare these findings with the play behaviours of age-matched typically developing peers and children with other developmental disabilities (e.g., Down syndrome). Further, a closer look at the sophistication of various social play acts might be warranted. For example, in their study of individual play behaviour in a home setting, Williams et al. (2001) concluded that children with autism spend somewhat less time engaging in functional play with multiple objects, supported by appropriate vocalisations, or in doll-directed play, than typically developing peers and peers with Down syndrome. They stated that the functional play of children with autism in their study was “less elaborated, less diverse, and less integrated than that shown by the control groups” (p. 74).

A few practical implications of the study are worth considering. Given the importance of play for social and cognitive development, and the limited amount of mature play found in the children in the present study, research examining the effectiveness of interventions that might help to promote more sophisticated levels of play in children with autism spectrum disorders is important. For example, Van Berckelaer-Onnes (2003) assessed a training program where children with autism were encouraged to explore different types of toys in a structured setting. Improvements in play were found directly after the intervention, however follow-up assessments conducted one year after the initial training program found that these improvements were maintained only if the children continued to receive play support (see also D’Ateno, Mangiapanello, & Taylor, 2003; Jahr, Eldevik, & Eikeseth, 2000). These kinds of intervention studies are crucial to enhancing our understanding of how children with autism may best be supported in their play activities.

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