Play and Preschool Children With Autism

Gayle Restall, Joyce Magill-Evans

Key Words: social development

Objectives. This research focused on two questions. First, how does the play of children with autism differ from that of normally developing children? Second, what are the relationships between play performance and adaptive abilities?

Method. Nine children with autism and nine children without dysfunction were matched on mental age, gender, and socioeconomic status. Play performance was determined from videotapes of children playing in their homes. Parents provided information on children's adaptive abilities.

Results. The children with autism differed from their peers on the total play score and the participation dimension of the Preschool Play Scale. Communication, as measured by the Vineland Adaptive Behavior Scales, was the adaptive ability most highly associated with play performance of the children with autism.

Conclusion. The results suggest that deficits in social development are a primary feature of autism. The findings support the use of play to evaluate and develop the interpersonal skills and habits of preschool children with this disorder.

Play has an important role in children's development. Reilly (1974) proposed that the product of play is skill and that play assists children in mastering developmental tasks. These tasks include the development of habits necessary to assume complex roles in society (Neville, Kielhofner, & Roveen, 1985). Play also offers children the opportunity to gain a sense of control over their environment (Neville et al., 1985) and to develop interests in activities that are pleasing to them (Kielhofner, 1980).

Autism is a developmental disorder. Children with autism are a heterogeneous group with three central areas of dysfunction (Kaplan & Sadock, 1991). First, the child's ability to partake in social interactions is qualitatively impaired. Second, the child's ability to communicate and to engage in imaginative activity is also impaired. Finally, the child's activities and interests are severely restricted. These areas of impairment manifest themselves in several behavioral characteristics that often include abnormalities in play behavior.

One purpose of this study was to compare the play of children with autism with the play of children without dysfunction in their homes. This information may increase understanding of the developmental deficits and deviances that are associated with autism and how they influence play behavior. This information also has practical implications. Analysis of play behaviors can help to determine areas of developmental delay or deviancy that can be addressed through treatment programs that use play as a therapeutic medium. The second purpose of this study was to examine the relationships between children's play performance and their communication, social, and motor abilities. Understanding these relationships may provide conceptual information that can guide treatment programs that use play to develop adaptive abilities.

Literature Review

Previous research has provided strong evidence of differences between the play of children with autism and that of children without dysfunction. This research has focused on the differences in play behavior in three major areas: social play, imaginative play, and variety of play.

Several researchers have found differences in the social play of children with autism. McHale (1983) found that children with autism spent a greater amount of time in solitary play than their normally developing peers. Lord (1984) summarized several studies in which initiations and responses to interaction during play tended to be low for children with autism. Mundby, Sigman, Ungerer, and Sherman (1987) found that children with autism were less likely to initiate joint attention with their play partner than were children with mental retardation or children without dysfunction. Dewey, Lord, and Magill (1988) observed that the complexity of social play was lower for dyads that included children with autism than for dyads of social development.
Jambor, 1978). Pretend play, a cognitively complex form of imaginative activity during the play of children without dysfunction. The children with autism were able to participate in manipulation, relational play (putting two objects together), and functional play (using realistic objects in a way that reflects their intended use). In contrast, children without dysfunction and children with mental retardation both spent more time in functional play than in either manipulation or relational play. The children with autism were able to participate in mature forms of play, but did not use these abilities tougther than others.

One factor that could account for some of these qualitative differences in pretend play relates to the social impairments of children with autism (Wing, 1988). For children without dysfunction in preschool settings, there is a positive relationship between cognitively complex and socially complex levels of play (Rubin, Watson, & Jambor, 1978). Pretend play, a cognitively complex form of play, includes social qualities when children assume the roles of other people. To assume such roles, children must understand that other people have perspectives different from their own. This ability to attribute different intentions and beliefs to others is called theory of mind (Premack & Woodruff, 1978). Baron-Cohen, Leslie, and Frith (1985) showed that many children with autism lack the capacity to understand other people's perspectives. The lack of pretend play observed in many children with autism may result from cognitive impairments that relate to social understanding.

The restricted and repetitive nature of play is another characteristic of children with autism. Children with autism spend considerable time in play behaviors (Baron-Cohen, 1987; Lewis & Boucher, 1988; Ungerer & Sigman, 1981). Their choices for play materials and play activities, however, are different in variety and type from those of children without dysfunction matched on cognitive measures. Wing (1988) suggested that restrictions in variety of play may be positively associated with the severity of cognitive impairment and may result, in part, from an unusual attachment to preferred objects. It is still not understood what properties influence these children's preferences for certain objects or activities.

The inherent structure in an activity may influence the toy preferences of children with autism. Dewey et al. (1988) found that children with autism preferred structured games and constructive activities over imaginative activities in contrast to children without dysfunction and children with behavior disorders who preferred imaginative activities. In contrast, children without dysfunction and children with behavior disorders preferred imaginative activities.

Structure also may increase the cognitive complexity of autistic children's play. Gould (1986) found that the pretend play of a group of children who were socially impaired, including children with autism, was more complex during administration of a standardized play test than during observations in natural environments. Other studies have found that the play behavior of children with autism increases when other people provide modeling and reinforcement (Tryon & Keane, 1986), instruction, guidance, modeling, and reinforcement (Meyer et al., 1987), prompting, reinforcement and self-management procedures (Stahmer & Schreibman, 1992), and imitation (Tiegerman & Primavera, 1981).

In summary, previous research has suggested three areas of play in which children with autism may be different from their normally developing peers. The strongest evidence exists for differences in the social aspects of play. Differences in the imaginative aspects of play may not be evident if the child's cognitive ability is considered and the social aspects of play are controlled. Finally, children with autism may play with fewer types of toys than their normally developing peers.

In the present study, our objective was to build on previous research in two ways. First, we examined the individual components of play, including social, imaginative, and motor play in the context of other components rather than in isolation. Second, we evaluated children's play in their homes, not in clinics or preschools. The home environment is familiar to children and can optimize their play behavior.

Method

Sample

Eight boys and one girl with autism between the ages of 3 and 6 years and nine children with normal development participated in the study. Children with mental ages of less than 18 months or with IQs of less than 30 were excluded from the study, as were those with severe physical handicaps. This ensured that all children had the cognitive ability to participate in many forms of play behavior and the mobility to make choices about their play experiences. Each child's parent had to speak and understand English to complete the Vineland Adaptive Behavior Scales (VABS) (Sparrow, Balla, & Cicchetti, 1984) interview.

Children were matched for gender, age, and socioeconomic status. Children were matched for gender because boys and girls have different preferences for play materials and activities by approximately 2 years of age (Rubin, Fein, & Vandenberg, 1983).
Matching for age partially controlled for the influence of cognition on play behavior. The chronological ages of children without dysfunction were matched with the mental ages of children with autism. The mental ages of the children with autism had been determined through a developmental test administered by a clinical psychologist as part of other clinical and research evaluations within a 6-month period of the study (M = 2.8 months before the observations; range = 6 months before the play observations to 1 month after the observations). A single cognitive test was not appropriate for all children because of their wide range of cognitive and language abilities. Although the use of different tests is a methodological concern, it is unavoidable in clinical settings (Lord & Schopler, 1989). Four children were tested with the Merrill-Palmer Scale of Mental Tests (Stutman, 1931). One was tested with the Bayley Scales of Infant Development (Bayley, 1969). Two were tested with the Wechsler Preschool and Primary Scale of Intelligence (Wechsler, 1967). One was tested with the Coloured Progressive Matrices (Raven, 1965), and one with the Leiter International Performance Scale (Arthur, 1952). The mental ages of the children with normal development were assumed to equal their chronological age. Children whose parents expressed concern during questioning about their development or who scored more than one standard deviation higher or lower than the appropriate standard score mean on the VABS were excluded from the study (n = 3). This ensured that the children without dysfunction were neither advanced nor delayed for their chronological age.

Children were matched for parental socioeconomic status because this factor may influence the social and cognitive complexity of children's play (Rubin, 1977; Smilansky, 1968). Parental socioeconomic status (SES) was determined from parental reports of occupation based on Blishen, Carroll, and Moore's (1987) socioeconomic index for Canadian occupations. Scores were dichotomized into two levels (higher and lower) using the median scores for men and women. If both parents were employed, the score of the parent with the highest SES level was used. Seven matched pairs were in the higher SES level and two matched pairs were in the lower SES level.

Children with autism were recruited through a clinic. They were diagnosed according to criteria from the Diagnostic and Statistical Manual for Mental Disorders, third edition (DSM III-R) (American Psychiatric Association, 1987) by two experts: a clinical psychologist who had extensive expertise in the field of autism and another psychologist or a psychiatrist. The children with normal development were chosen from groups whose parents had responded to requests for volunteers from day care and church groups. All 18 mothers of the children in the final sample gave signed consent to participate. The mean mental age, chronological age, and maternal education of both groups of children are shown in Table 1.

### Table 1

<table>
<thead>
<tr>
<th>Age and Maternal Education</th>
<th>With Autism</th>
<th>With Normal Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental age (months)</td>
<td>51.89</td>
<td>26.24</td>
</tr>
<tr>
<td>Chronological age(months)</td>
<td>64.76</td>
<td>46.12</td>
</tr>
<tr>
<td>Maternal education (years)</td>
<td>14.56</td>
<td>11.24</td>
</tr>
</tbody>
</table>

**Note:** n = 9 for both groups.

### Measures

**Preschool Play Scale.** We used the Preschool Play Scale (PPS) (Bledsoe & Shepherd, 1982; Knox, 1974) to measure play performance in a developmental framework. The scale has four dimensions: space management, material management, imitation, and participation. Childhood play behaviors in 1-year time periods from birth to 6 years are combined into categories and described within these dimensions. The child is observed in a free play situation and rated according to the highest age level attained in each category. The mean of the category scores provides a dimension score. The total score is calculated by taking the mean of the dimension scores (Bledsoe & Shepherd, 1982). Reliability and validity studies have been done with samples of children with normal development (Bledsoe & Shepherd, 1982) and children with disabilities (Harrison & Kiellhoffner, 1986).

The PPS was modified in four ways. The music and books categories were eliminated from the imitation dimension and territory and exploration were eliminated from the space management dimension because of the limited number of observations that have been made in these categories in previous studies (Bledsoe & Shepherd, 1982; Harrison & Kiellhoffner, 1986). Bundy (1989) omitted these categories when using the PPS to compare the play of children with sensory integrative dysfunction with that of children without dysfunction. We made changes in the participation dimension because we did not observe the child's play with peers in this study. The type category was eliminated, and the items in the language category that specify communication to peers were changed to specify adults. Finally, all categories of the imitation dimension were combined, because many items in the different categories were similar and created dependencies in scoring separate categories.

Procedures for the use of the PPS were pilot-tested with four preschool children. Interrater reliability was established between the investigator and a second experienced pediatric occupational therapist through use of videotapes of the children in the pilot test until point-by-point agreement was 89% and the intraclass correlation coefficient was .77. During the study, these videotapes were scored by the investigator after observations of nine
standardized, norm-referenced evaluation of adaptive behavior. Interrater’s scores. Point-by-point agreement was .75. The intraclass correlation coefficients (ICCs) for the two independent raters were as follows: total score = .96; participation = .84; imitation = 1.00; space management = .50; material management = .94.

All ICCs were within acceptable ranges except the space management dimension. On this dimension, the raters scored three out of four children identically and differed by one age level for the fourth child.

Types of play materials. The total number of categories of materials played with by a child during the observation period was used as a measure of variety in the child’s interest in play materials. The categories were adapted from Johnson and Ershler (1985) and were as follows:

1. **Dramatic play materials** included small vehicles, house play materials, dolls, dress up clothes, and toys representing farms, stores, five halls and villages.
2. **Construction materials** included blocks, plastic building pieces (e.g., Lego pieces), puzzles, and modeling clay.
3. **Gross motor and sensorimotor materials** included a climbing apparatus, tricycles, scooters, balls, tops, rattles, and kaleidoscopes.
4. **Other toys** included all objects that are commonly considered to be a child’s toy or game but could not be classified elsewhere.
5. **Nontoy objects** included all objects not commonly intended for use as a child’s toy (e.g., household objects and rocks).

Interrater reliability was calculated for the total observation time and for an unstructured play period with videotapes of two children with autism and two children with normal development who participated in the study. Intraclass correlation coefficients (ICCs) for the two independent raters were as follows: total score = .96; participation = .84; imitation = 1.00; space management = .50; material management = .94.

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Interrater reliability was calculated for the total observation time and for an unstructured play period with videotapes of four children. An ICC could not be determined for the number of play materials used during the total observation time because of the lack of variance in one rater’s scores. Point-by-point agreement was .75. The ICC for the unstructured play period was .75.

Vineland Adaptive Behavior Scales. The VABS is a standardized, norm-referenced evaluation of adaptive behavior of persons from birth to 18 years, 11 months of age. It is a useful tool for assessing the adaptive abilities of children with autism (Volkmann et al., 1987; Watson & Marcus, 1988). The survey form has the four behavior domains of communication, daily living skills, socialization, and motor skills. Age-equivalent scores are calculated for the adaptive behavior composite and each domain. Reliability and validity studies are described in the administration manual (Sparrow et al., 1984).

Children were videotaped during free play in their homes in a room chosen by their parent. During the first 15 min, parents responded to their children when approached, but were instructed to intervene only to prevent injury to person or property. Immediately after the first observation period, the investigator asked the child and parent to sit together. The investigator showed the child several toys that she had brought with her. The toys represented the types of objects that elicit different levels of cognitive play: a small vehicle, a doll with clothes, colored blocks, a 4-piece puzzle, a 10-piece puzzle, a ball, a kaleidoscope, and a plastic container. Parents had the option of playing with their child during the second 15-min observation period.

Thus, two different conditions were created. In the first condition, play was unstructured. In the second condition, structure was provided by making specific toys and the child’s parent available to the child. The second condition provided consistency in availability of play materials as well as a play partner so that the social elements of play could be observed.

A set protocol was followed and modified slightly at times to respond to uncontrolled variables in the environment (e.g., the presence of a younger sibling at the time of the videotaping). Efforts were made to limit the sibling’s involvement in the subject’s play. This situation occurred for two children with autism and for one child with normal development.

Final play scores were calculated from the child’s best performance rated during the two 15-min observation periods. This resulted in a total of 30 min of observation. Due to situational and technical difficulties, one autistic child and one normally developing child were scored on the basis of 29 min of observation.

The investigator was blind to the mental ages of the children with autism and, as much as possible, to the chronological ages of the children without dysfunction. She was unaware of the matches between most of the children until the completion of the study.

Most parents were interviewed with the VABS after the PPS observations were completed. Five children with autism had VABS scores from assessments that were completed by a clinical psychologist within the previous 2 to 4 months (M = 3 months). These scores were used instead of requiring the child’s parent to repeat the interview.

Analysis

We analyzed the data with the SPSS-X statistical package (SPSS, 1988) on a mainframe computer system. The alpha level was set at .05. To compensate for the increased chance of Type I errors when doing multiple t-tests, a procedure suggested by Ryan (1959) was followed. The alpha level of .05 was divided by the number of t-tests performed (five) resulting in a new alpha level of .01.
Therefore, the results of t-tests performed in this study were considered significant only if \( p < .01 \). Results of other statistical tests were considered significant if \( p < .05 \). All tests of significance were two-tailed unless otherwise noted.

Results

Differences in Play Performance

The group with autism had significantly lower PPS total scores \((M = 33.57 \text{ months}; SD = 6.55)\) than the group with normal development \((M = 42.53 \text{ months}; SD = 6.11)\), \( t(16) = -3.00, p = .008 \) (one-tailed). To determine whether the groups differed on any of the four PPS dimension scores that comprise the total score, a Hotelling's T was calculated with a multivariate analysis of variance procedure. This analysis yielded an exact \( F(4,13) \) of 3.30, \( p = .045 \) (see Table 2).

Subsequent univariate Roy-Bargman stepdown F tests were also calculated to determine the contribution of each dimension to the variance while controlling for dependency between scores. The participation dimension was entered into the equation first because this dimension was expected to show the greatest difference between groups. We also expected imitation and space management dimensions to contribute significantly to the differences. The material management dimension was entered last because no difference between groups was anticipated. Participation was the only dimension that contributed significantly to the differences between groups (see Table 3).

Significant correlations among the four dimension scores could account for the lack of significant contributions to differences between groups by the dimensions that were entered into the equation after the participation dimension. Pearson correlations were used to determine whether there were significant associations between the four dimension scores. The dimension scores were not significantly correlated for either group.

We used a t-test to calculate the number of play material categories used by each group. The mean total number of categories was identical for the two groups \((M = 4.00)\).

Associations between Play Performance and Adaptive Abilities

The group with autism had significantly lower VABS total scores \((M = 29.14 \text{ months}; SD = 8.36)\) than the normally developing group \((M = 54.47 \text{ months}; SD = 11.45)\), \( t(16) = -5.36, p = .000 \). To determine the associations among PPS scores, VABS scores, and the mental or chronological age variable, Pearson correlations were calculated. PPS total scores were significantly correlated with VABS total scores for both the group with autism \((r = .698, p = .037)\) and the group with normal development \((r = .685, p = .042)\). In contrast, PPS total scores were not significantly correlated with the mental or chronological age variable for either group.

To determine the adaptive abilities that were most highly associated with play performance, PPS total scores were correlated with the communication, socialization, and motor skills domain scores of the VABS with Pearson correlation matrices. Daily living scores were not included in this analysis because this domain was not considered relevant to the present study. Different patterns of correlations existed for each group. For the group with autism, communication was the only domain score that correlated significantly with the PPS total score, \( r = .755, p = .019 \). For the group with normal development, socialization was the only domain score that correlated significantly with the PPS total score, \( r = .729, p = .026 \).

Discussion

The results of this study build on the growing body of literature that suggests deficits in social development are a central feature of autism (Denckla, 1986; Fein, Pennington, Markowitz, Braverman, & Waterhouse, 1986). Previous studies that used parental reports of their children's play activities supported this idea (Volkmar et al., 1987). This study adds additional support with naturalistic observations of children's play in their homes. Lord (1984) found that familiarity, an active play partner, and few cognitive and communicative demands can maximize the social interaction of children with autism. The naturalistic observations used in this study provided children with a familiar environment, few cognitive and communicative demands, and the opportunity for parents to become actively involved in their play. Even in this environment, social participation emerged as the one dimension of play

\[
F \quad df \quad p
\]

### Table 2

**F Tests of Group Differences in Preschool Play Scale Dimension Scores**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>With Autism M</th>
<th>With Normal Development M</th>
<th>F (1,16)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>44.00</td>
<td>12.37</td>
<td>13.16</td>
<td>.002</td>
</tr>
<tr>
<td>Imitation</td>
<td>24.00</td>
<td>10.39</td>
<td>3.60</td>
<td>.076</td>
</tr>
<tr>
<td>Space management</td>
<td>44.00</td>
<td>16.97</td>
<td>0.00</td>
<td>1.000</td>
</tr>
<tr>
<td>Material management</td>
<td>38.93</td>
<td>7.28</td>
<td>3.74</td>
<td>.071</td>
</tr>
</tbody>
</table>

\[
(r = .685; p = .042)\]

### Table 3

**Stepdown F Test Results of PPS Dimension Scores**

<table>
<thead>
<tr>
<th>PPS Dimension</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation</td>
<td>13.16</td>
<td>1.16</td>
<td>.002</td>
</tr>
<tr>
<td>Imitation</td>
<td>1.02</td>
<td>1.15</td>
<td>.327</td>
</tr>
<tr>
<td>Space management</td>
<td>.09</td>
<td>1.14</td>
<td>.769</td>
</tr>
<tr>
<td>Material management</td>
<td>.38</td>
<td>1.13</td>
<td>.549</td>
</tr>
</tbody>
</table>
on which children with autism differed from their normally developing peers.

It is interesting that the children with autism did not differ from their peers on the imitation dimension. Previous research has suggested that children with autism have deficits in imaginative (Baron-Cohen, 1987; Stone & Lemanek, 1990; Wing, Gould, Yeates, & Brierley, 1977) and imitative (Riquet, Taylor, Benaroya, & Klein, 1981) abilities. The low power of the statistical test (due to the small sample size) is one possible explanation for the nonsignificant findings. Another possible explanation is the relationship between imitation, imagination, and social play. The imitation dimension of the PPS is related to social learning (Knox, 1974). It is possible that once the social aspects of play are accounted for through the participation dimension, imitation and imagination do not add to differences between groups. The lack of imitative and imaginative play observed with children with autism may be related to social learning rather than a unique feature of the disorder.

The lack of difference between groups on the space management dimension must be interpreted with caution. The observational methods used in administering the PPS made it difficult to detect a broad range of motor skills. This difficulty was most pronounced when using the PPS with children in the older age groups. For example, if a 6-year-old child sat playing with a video game for the entire observation time, the opportunity to observe his or her motor abilities was limited. The child had to be scored with the PPS items so the highest observed behavior was an ability to sit without balance. This resulted in an age-equivalent score of 12 months although it was obvious that the child was capable of much more complex gross motor movement.

In spite of the possible measurement difficulties in other aspects of play, strong evidence of differences in social play existed between the two groups. The implication for occupational therapists is that therapeutic interventions should focus on developing social play. Occupational therapists must be aware of the effect of environment on play behavior. The children with autism in this study demonstrated a variety of play behaviors in their home environments. The familiarity of the home environment may be a more optimal environment for facilitating social play than unfamiliar clinic settings. An important area of future research is to investigate differences in play performance among home, preschool settings, and clinic settings.

The findings related to the positive associations between adaptive abilities, particularly those in the area of communication, and children's play performance suggest that play may be a very worthwhile medium for developing these behaviors. If play is a means by which children build skills and practice roles (Kielhofner, 1980), then the therapeutic use of play with children with autism may be important in developing the skills necessary for interpersonal interaction and for experimenting with roles that require communication with others.

However, play is intrinsically motivated (Rubin et al., 1983). Children's desires to engage in certain activities may be affected not only by their interests, but also by their skills and competency in the activity. Kielhofner and Burke (1985) argued that choices for participating in activities are dependent, in part, on personal causation. Personal causation is people's belief in their own ability to affect their environment. Feedback about performance in activities shapes this belief. Children with autism may frequently receive feedback that their social participation does not meet the expectations of their environment or the standards of their peers. This may lead to a decreased desire to engage in play activities that require social participation. The result is a negative cycle in which the children do not avail themselves of opportunities to practice the skills that they need.

The challenge for the occupational therapist is to facilitate play in a way that is attractive and that uses the learning styles of the child. The results of this study show that many preschool children with autism can be interested in a variety of play materials and will spontaneously use the materials. Previous research has shown that play behavior of children with autism can be modified through techniques such as modeling and reinforcement (Tryon & Keane, 1986) and imitation (Tiegerman & Primavera, 1981). Modifying play behavior through these techniques and supplying attractive play materials may be a starting point for facilitating children's engagement with their play environment and increasing their desire to explore and master interpersonal and social skills. If play represents an element of children's productivity (Reed & Sanderson, 1983) and by itself is meaningful occupation (Bundy, 1993), then promoting competency in play is important in its own right. The resulting cycle would then be positive: Occupational therapists facilitate play, children practice skills and habits through play, children then use these skills and habits to increase competency in play.

An important area of future investigation is to examine the relationships between play performance in this age group and long-term outcomes. This study demonstrated the concurrent relationships between adaptive abilities and play performance. Future investigation could examine the relationships between preschool play performance and future adaptive abilities. Such investigations would help to establish how important play itself is in determining future social competency. As Lord (1984) suggested, an ability to play may be an important factor in facilitating the interactions of children with autism with their peers.

Play provides a medium through which preschool children develop skills, experiment with roles, and interact with others. Differences between the play of children with autism and children who are developing normally suggest that children with autism are disadvantaged in...
their use of play for these purposes. The current trend of providing early intervention to improve the long-term outcomes of children with autism supports the importance of preschool children's play in future research and treatment intervention.

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This research was submitted by the first author as a master's thesis in occupational therapy at the University of Alberta, Edmonton, Alberta.

References


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