Symbolic Play of Preschoolers with Severe Communication Impairments with Autism and Other Developmental Delays: More Similarities than Differences

Kathy S. Thiemann-Bourque, **Nancy C. Brady**, and **Kandace K. Fleming**
Schiefelbusch Institute for Life Span Studies, University of Kansas, 1000 Sunnyside Ave, Room 1065, Lawrence, KS 66045-7555, USA

Kathy S. Thiemann-Bourque: thiemann@ku.edu

Abstract

Children with autism are often described as having deficient play skills, particularly symbolic play. We compared the play of 35 children with autism to 38 children with other developmental delays. All children were preschool-age and produced less than 20 different words. Results indicated no significant differences across the two groups in their play. Children with autism engaged in more conventional play, that is, putting objects together according to how the toys were constructed (e.g., pieces in a puzzle, lid on a teapot). Results also indicated high correlations between play, language, and cognitive measures. Findings indicate that play relates to language and cognitive levels yet may not discriminate children with autism and children with other developmental delays early in their development.

Keywords

Autism; Symbolic play; Developmental delays; Preschool; Cognition; Language delays

Introduction

Children engage in symbolic play by using one object to represent another object or event (e.g., use a bucket for a hat). Studying children's play may provide insight into underlying symbolic understanding that might not be obvious through other cognitive and language assessments. Several studies have reported deficits in symbolic play of young children with autism, and some propose a distinctive play deficit (Sigman and Ruskin 1999; Ungerer and Sigman 1981). Other researchers have reported similarities when comparing symbolic play of children with autism to typically developing children (Dominguez et al. 2006), and to children with other developmental delays (DD) (Libby et al. 1997). The aim of the present study is to address these contradictory reports by examining different play behaviors of children with autism and other DD by using comprehensive play measures.

Play Differences and Similarities

Efforts to illuminate the possible distinctive play abilities of typically developing children and children with DD including autism have focused on defining specific developmental levels of play (Belsky and Most 1981; Libby et al. 1997). In one of the first studies to validate a developmental progression of play, Belsky and Most showed that infant play

behavior followed a sequence from mouthing and simple manipulation of toys, to recognition of conceptual relationships between objects (i.e., functional play), to increasingly decontextualized play (i.e., symbolic or pretend play). The outcomes suggested that children's play was a valid and reliable way to evaluate progressively complex and cognitively demanding behaviors, and paved the way for the development and use of sequential play classifications (Lifter 2000; Lifter and Bloom 1989; Lifter et al. 1993).

Pretend or symbolic play typically develops in children around 18–24 months. During symbolic play children pretend that an object is something it is not (e.g., a block is a car), or assign properties to an object that it does not have (e.g., holds bottle to dolls hand as if it could hold it; Baron-Cohen 1987). Prior to the development of symbolic play, children engage in functional play. Actions on toys reflect an appropriate use of the object (e.g., put puzzle together, put cup on saucer). Assessing play of children with autism and other DD may provide insight into underlying symbolic understanding not apparent through other cognitive and language assessments. In fact, assessment of symbolic play is included as part of some diagnostic assessments (e.g., the Autism Diagnostic Observations Schedule, ADOS; Lord et al. 1999).

Deficits across all of these levels of play have been identified in children with autism. Williams et al. (2001) found that young children with autism engaged almost exclusively in simple play acts with the same objects compared to children with Down syndrome (DS) and typically developing children who demonstrated more complex play routines with a variety of objects. Sigman and Ruskin (1999) found that children with autism engaged in less varied symbolic play than children with DS or DD. Early studies reported less engagement in and fewer number of functional play acts, less pretend doll play, and shorter play sequences (Sigman and Ungerer 1984; Ungerer and Sigman 1981). To measure functional play, these authors constructed a checklist with 62 objects and asked a nurse to identify objects that she believed the child could use in a functional way; children's actions on objects was not observed in a play context. Further, play skills of a comparison group of typically developing children or those with other DD was not assessed.

Some research on children with autism has shown more similarities than differences in play, however. Dominguez et al. (2006) found that although children with autism showed less interest in specific types of toys (e.g., construction toys, dolls, and house toys) than peers without disabilities, there were no differences in overall rates of functional or symbolic play behaviors. In this study, the authors combined functional and symbolic types of play into one behavioral category. Others have found that children with autism engage in symbolic play and can attend to and imitate symbolic play acts (e.g., cook an egg, or feed a doll) similar to mental-age matched children (Warreyn et al. 2005). Similarly, when differences in age and developmental levels were considered, Naber et al. (2008) reported no differences in length of play time or time spent in manipulative, functional, or symbolic play between groups of children with and without autism. Warreyn et al. used a more conservative method of scoring symbolic play, in that the child had to express a vocalization or story in combination with the symbolic act. The play context used in Naber et al. was free play with a familiar play partner, the mother.

Other studies have shown that children with autism do demonstrate an understanding of symbolic play, and demonstrate higher play levels in structured situations (Jarrold et al. 1993, 1994; Libby et al. 1997). Jarrold and colleagues reasoned that perhaps difficulties reported for children with autism relate to a performance deficit verses a competence deficit. That is, a lack of spontaneous play may not be due to an inability to play symbolically (competence in), but under the right conditions they can exhibit (performance in) pretend play similar to language matched controls. The comparison group of typically developing

children in Libby et al. (1997) often told the examiner "no" when asked to use toys in a pretend way (e.g., use a block as a cup and pretend to drink); whereas the children with autism imitated the act without protest. Libby et al. suggested that the children with autism may have successfully imitated symbolic acts due to the adult-guided context, possibly without interpretation of the act as symbolic.

Relationship of Play, Language and Cognitive Skills

Are play skills commensurate with other cognitive skills or do they reflect a different construct that may independently relate to language within and across various diagnostic groups? Symbolic play has been related to language development in both typical populations (Kelly and Dale 1989; Laakso et al. 1999; McCune-Nicolich 1981) and in children with autism and other DD (Cunningham et al. 1985; Kasari et al. 2001; McDonough et al. 1997; Sigman and Ruskin 1999; Stone et al. 1990). Typically developing toddlers using single words engage in more symbolic play than toddlers not using words. Eisert and Lamorey (1996) reported significant relationships between play and language development, with developmental level a stronger predictor of play level than chronological age.

Similar relationships between symbolic play abilities and later language skills have been documented for children with autism, DS, and DD. Sigman and Ruskin (1999) compared the number of *different* functional and symbolic play acts for preschoolers with autism, DS, DD, and typically developing (TD) children. The children with autism engaged in significantly fewer functional play acts only compared to the children with DS; and less varied symbolic play skills than all the other groups. Children with autism who showed a higher number of different functional play acts between the ages of 2 and 6 years had higher expressive language skills 7–10 years later. These groups were not matched on language age. Further, preschoolers with autism who play with a wider variety of different toys have been reported to show greater gains in expressive vocabulary 1 year later (Sigman and Ruskin 1999; Yoder 2006).

Unfortunately, some studies do not describe child characteristics as related to receptive and expressive language skills, severity of autism symptoms, and some lack a comparison group (Libby et al. 1997; Ungerer and Sigman 1981; Yoder 2006). Attending to language differences as a mediating variable is important given the wide range in degree of severity of language performance in children with autism and other DD. One way to accomplish this is to examine differences in play of children with autism compared to those with other DD at similar communication levels. For example Warreyn et al. (2005) reported that children with autism with more developed language skills tended to engage in more symbolic play than children with lower language. Hence, controlling for cognitive level would seem to be important for determining the specificity of play deficits across populations.

In summary, reports describing play development of children with autism and other DD have drawn similar conclusions in some areas, and conflict in others. As described above, possible reasons for these contradictory findings include: (a) sensitivity of the coding and play measurement system, (b) the sampling context in terms of play partner, number and type of toys, and structure, (c) varying definitions of functional and symbolic play behaviors across play taxonomies, and (d) a lack of reporting on severity of language deficits and autistic symptoms. The present study was designed to address inconsistencies in these reports by assessing play behaviors of children with autism and other DD with similar language abilities, using free play and thematic (structured) play sets.

The current study focuses on two sets of research questions. The first question addresses contradictory findings on whether or not there are significant differences in play behaviors of children with autism and children with other DD. Based on previous research showing

marked deficits in attending to, imitating, and responding to actions and social behaviors of others, we are also asking about the specificity of a play deficit for children diagnosed with autism. We hypothesized that preschoolers with autism would demonstrate more limited symbolic play skills compared to preschoolers with other DD.

The second set of questions focuses on the nature of play, and cognitive and language development. Specifically, what are the relationships between play, nonverbal cognitive measures, and language measures for pre-schoolers with severe communication delays and autism or other DD? We predicted that child performance on our measures of play would correlate to standardized measures of cognitive and language performance for both children with autism and other DD. Secondarily, we were interested in examining the relationship between play and language after controlling for cognitive development. Gaining insights into possible parallels between play and language will be important in our longitudinal analyses of language growth for these two populations as we follow their development over the next 2 years.

Methods

Participants

Play assessments were completed on 73 preschool children with developmental disabilities between the ages of 37 and 71 months, with an average age of 49.5 months. Thirty-five children had a diagnosis of autism (mean age 49.2 months), and 38 had other DD (mean age 49.7 months). All 73 participants were part of a larger longitudinal study investigating child and environmental predictors of communication success; therefore, the groups were not equally matched in number. Of the participants with autism, 6 were girls and 29 were boys. There were 11 girls and 27 boys in the group with other DD (see Table 1 for demographic participant information). At the start of the study, each participant was administered all subtests on the Mullen Scales of Early Learning (MSEL, Mullen 1995) and the Preschool Language Scale-4 (PLS-4, Zimmerman et al. 2003) (see Table 2).

Participants were selected based on the following: (a) chronological age between 3 and 6 years and attending preschool, (b) expressive vocabulary of less than approximately different 20 words (included spoken words or signs), (c) score of more than one standard deviation below the mean on the MSEL (Mullen 1995), (d) eligible to receive special education services through the school district, (e) motor skills sufficient to select a symbol or activate a switch with at least one hand or arm, and (f) vision corrected to 20/80 or better in at least one eye and hearing levels 25 dB HL or better in at least one ear.

A diagnosis of autism was reported for 35 participants based on meeting a minimum of three of the following four criteria: educational or clinical diagnosis of autism by school district personnel or a credited agency not affiliated with the authors' research lab, results on the ADOS (Lord et al. 1999), results on the Childhood Autism Rating Scale (CARS, Schopler et al. 1993), clinical features defined by DSM-IV (APA, 1994), and scores of 15 or above on the Social Communication Questionnaire (SCQ, Rutter et al. 2003). The SCQ was administered to parents by project staff. Completion of all other diagnostic assessments was confirmed through parent report.

Materials and Measures

Toy Sets—Five play sets were used to assess children's play in unstructured (Set 1) and semi-structured (Sets 2–5) activities for a total of 15 min of play (3-min per set) with an examiner. These play sets and activities were adapted from Kasari et al. (2001, 2006). We wanted to observe children's spontaneous play behaviors; therefore, only one symbolic play

act was modeled for the child for each toy set. If the child immediately imitated the examiner's symbolic act, it was not coded. Reported play deficits for this population may stem from difficulties orienting to and imitating the salient actions of others (Wetherby 2006). Thus, we reasoned that one modeled act with one toy from an array of toy options would not markedly influence independent play behaviors. See Table 3 for play sets and examples of symbolic play acts modeled by the examiner.

Play Level Measure—The play measure used to assess participants play development was based on research by Lifter (2000; Lifter and Bloom 1989; Lifter et al. 1993), specifically the Developmental Play Assessment (DPA) Instrument. The DPA consists of eight play levels, and 15 play categories within these levels. For this project, we included 11 of the 15 DPA play categories. The four levels not included were single scheme sequences, multi-scheme sequences, sociodramatic play, and thematic fantasy play. We did not include these four levels because the early work of Lifter et al. showed that preschool children with DD rarely demonstrated these higher level play skills. The 11 categories comprised four Play Levels: Level 1: Indiscriminate Actions, Level 2: Functional Play/Object Use, Level 3: Functional Combinatorial, and Level 4: Symbolic Play (see Table 4 and Lifter et al. 1993 for details). Level 1, Indiscriminate Actions (i.e., mouthing, shaking, banging, and inspecting) were considered undifferentiated play, and therefore were not included in any play measures or analyses.

On-Line Play Coding Program—All play categories were entered into an on-line play coding program modeled after one created by Tapp and Yoder (2001) and adapted for this study. The program consisted of a list of every type of toy in each toy set and a list of *'anticipated'* play actions, that is, a list of actions that we predicted or expected a child would perform with each toy or combination of toys. We were interested in the number of unique actions on each toy, and did not code the same action used with the same toy (e.g., child puts puzzle piece in twice, only counted as one play act; child puts a block in shape sorter then puts block in a cup coded as two acts). Based on the types of toys in each set, anticipated actions were not possible for every play category. For example, in play Set 1, unstructured play, no doll was present therefore Doll as Agent did not have any anticipated actions. Possible anticipated play actions ranged from 6 to 11 across the five play sets. We included a category called "Unexpected Substitutions" in order to capture each symbolic play act that was not predicted. Coders were able to enter a code for this unexpected symbolic play act.

Coding Play Behaviors—Play skills were coded in three ways. First, we calculated a weighted play score. Similar weighting procedures have been used to measure other areas of development such as communication (Greenwood et al. 2003; Luze et al. 2001). We calculated weighted play by assigning one point for any Level 2 play act, two points for any Level 3 act, and three points for any Level 4 act. Thus, each different play act (or unique action) was assigned a score of 1, 2, or 3. For example, a child who took two nesting cups apart received one point for that act (Level 2, Functional Play-Takes apart combinations), and a child who put a piece of sponge on a spoon and fed a baby doll received three points for that act (Level 4, Symbolic Play—Substitutions). Each unique play act was assigned a score, and then these scores were totaled to obtain a weighted play score for each child reflecting complexity of play across all toys played with. Scores were continuous and we included individual child scores in our analyses.

Second we calculated an 'object interest' score, which assessed each child's differentiated intentional actions on objects. Object interest was assessed given reports of a restricted range of interest in a variety of toys for children with autism and those with other DD (Bruckner and Yoder 2007; Sigman and Ungerer 1984). Across all five play sets, the total

number of times a child acted on a different toy (e.g., puts shape in shape sorter; stacks blocks, or opens toy phone) was counted and summed per child. If two toys were acted on in combination, both were counted. For example, placing a cup on a saucer would count as two objects of interest.

The third play variable was the highest level of play that was described as *emerging* and/or or *mastered* based on the type and number of play acts observed in play levels 2, 3 and 4 (not including Level 1: Indiscriminate actions on objects; see Table 4). Emerging was defined as demonstration of a minimum of two different play acts at one level. Mastered was defined as demonstration of four or more play acts at one level. These definitions were based on research by Lifter et al. (1993) and Kasari et al. (2006).

Cognitive and Language Measures—Nonverbal cognitive ability was calculated by combining the Fine Motor and Visual Reception subtest raw scores on the MSEL, following the work of Wetherby et al. (2004) and Yoder (2006). These two subtests do not assess expressive language or speech production. This MSEL nonverbal cognitive measure was used in the correlational analyses, as were the raw scores obtained on the PLS-4 (Zimmerman et al. 2003). Although there was a range of cognitive and language abilities across the two groups, both groups demonstrated significant developmental delays as evidenced by the outcomes of these two assessments (see Table 5). The children with DD had slightly superior receptive language skills compared to the children with autism on both the Mullen and the PLS-4 auditory comprehension subtests.

Procedures

Examiners were instructed to arrange the toys in the play sets in specific ways to elicit a wider variety of anticipated play acts (e.g., some pop beads together and some apart, puzzle pieces outside of the puzzle, and doll sitting up or laying down). With the exception of the first free play toy set, the examiner modeled one symbolic play act using each pretend object (i.e., for toy sets two through five, see Table 3). After this model, a timer was started and the child could play with an array of toys within each toy set for 3-min. The examiner was instructed to touch or play only with those toys that the child had already picked up or played with. It was acceptable to imitate the child's actions on a toy, but not to play with a toy in a way the child had not demonstrated (i.e., that may prompt child to use a higher level of play). If a child fixated on a specific toy for 1-min or longer in a perseverative way, that toy was replaced with another one. Examiners were trained to limit language facilitating strategies.

Each play session was videotaped on a Flip mino HD camera, uploaded to a computer in the research lab and then burned to a DVD. A trained research assistant (RA) opened the on-line play coder program on a desktop computer and observed the child's play on the DVD via Windows Media or VLC Media Player. The RA stopped the tape at each instance of a different play act on a toy and entered the time in minutes and seconds. The RA then selected the appropriate Play Set (1 through 5), and the specific toy that was acted on. The RA then selected the child's action from a drop down menu of all anticipated actions listed in the program for that toy. This continued until all play acts on objects in each set were coded. Symbolic play acts that occurred within 5-s of the examiner's model were not coded.

Inter-Rater Reliability

Four RAs were trained on the play coder program, and were considered reliable when their agreement with the first author was at a minimum 80% inter-rater agreement on total play actions over three different play assessments. Percent agreement was calculated by dividing the total # of play acts matched by both coders by the total # of acts observed by the primary

coder plus the # of acts observed by the secondary coder. A total of 40% (29 of 73) of the play assessments were randomly selected and coded by a second RA to measure inter-rater reliability. The average inter-rater reliability was 88.3% (range 67–100%). Interclass correlation coefficients (ICCs) were also calculated for the weighted play score and object interest. The ICC for the overall weighted play score was quite high at .99. The ICCs for the individual play types that were combined to form the weighted play score were also quite high ranging from .87 for Takes Apart Combinations to .99 for Child as Agent and Specific Combinations. For the measure object interest, the ICC was 1.00. Another play outcome variable of interest in the current analysis was highest play level mastered. Twenty-three of the 29 play observations that were coded for reliability had sufficient play acts (4 play acts) within a category to have mastered that play level. Of these 23 mastered level scores, 21 (91%) were consistent between the primary and secondary raters. The two discrepancies resulted from very small differences in the number of substitution play acts observed (e.g., for one child the primary coder observed three and the reliability coder observed five substitutions; for a second child, the primary coder observed four and the reliability coder observed three substitutions). This small difference resulted in a different *highest play level mastered* score between the raters.

Analysis Approach

To test if the play skills of the children with autism were significantly lower than those of the children with other DD, independent samples *t* tests were used to examine differences between the two groups on average weighted play and average object interest scores. In addition to analyses of the main levels of play, between group differences were also investigated in the play subcategories (across categories 2 through 11, see Table 4). Independent samples *t* tests were also used to compare the rates of each of the individual types of play acts. We also used descriptive statistics to summarize the proportion of children in each group who were emerging or had mastered specific play levels and *z* tests to determine if the proportions were significantly different across groups. We used Pearson correlations to determine if cognitive and language abilities (raw scores on MSEL and PLS-4) were related to play (average weighted score) and also used partial correlations to control for the relationship with nonverbal skills. Raw scores were used in the analyses due to limited variability in this sample in standard scores, with most scores at or near the bottom of the possible standard scores for a given age

Results

Group Differences in Play Levels, Object Interest, and Mastery

The first question to be addressed in the analysis was whether there were differences in play behaviors between children with autism and those with other DD. There were three different but related play outcome variables of interest used to address this question: total weighted play score (based on play levels), object interest, and highest play level mastered. Means and standard deviations for weighted total play and object interest for each group are presented in Table 6. Shapiro–Wilk Tests for normality of weighted total play scores within each group indicated that the scores were not significantly non-normal. Levene's Test of Equality of Variances was significant indicating that the variance of the autism group was significantly smaller than the variance of the DD group. Therefore, the Welch-Satterthwaite correction was used to compare the mean weighted total play scores. The weighted total play scores were not significantly different across groups ($t(67.9) = -.40$, $p = .69$, $d = -.09$). Additionally no significant differences between the two groups were found for object interest scores ($t(71) = -.94$, $p = .35$, $d = -.22$).

In order to determine if there were differences between the two groups on emerging symbolic play, a *z* test for the difference in two proportions was used. Ten of the 13 children in the autism group (26%) and 10 of 38 children in the DD group (29%) met the criteria for *emerging* at the symbolic level of play (at least two acts). These proportions were not significantly different from one another ($z = -.05$, $p > .05$). Similarly, there were no significant differences in levels of play mastered ($z = .10$, $p > .05$). Across the different categories, three (9%) of the children with autism had mastered symbolic play (Level 4) compared to two (5%) of the children with other DD. Twenty-one (60%) of the children with autism had mastered functional combinatorial (Level 3) play, compared to 20 (53%) of the DD children. These were not significantly different proportions, $z = .40$, $p > .05$. Finally, five children in both groups (14% of the children with autism; 13% of children with other DD) had mastered functional play/object use (Level 2). These were not significantly different proportions, $z = -.20$, $p > .05$. Overall, there were no significant group differences in the play outcomes of the two groups of children across any of the three play measures.

Group Differences in Play Subcategories

Analysis of the specific subcategories of symbolic play revealed that the groups were similar in this regard as well. Twenty (57%) of the children with autism performed at least one substitution play act, compared to 21 (55%) of the children with other DD. These were not significantly different proportions, $z = -.07$, $p > .05$. One child with autism engaged in at least one symbolic play act that involved 'doll as agent' compared to three children with other DD; however, this difference was not significant, $z = .43$, $p > .05$. The only play category with a significant difference between groups was the 'presentation combination' category ($t(71) = -3.27$, $p = .002$, $d = .76$); in that children with autism averaged 2.14 play acts while children with other DD averaged 1.16 play acts. This is considered to be a moderate effect size (Cohen 1988).

Group Differences in Cognition and Language

We investigated the possibility of group differences in cognition and language by analyzing raw score mean differences on the tests of cognitive and language development across groups (see Table 5). Tests for normality indicated that PLS-4 Auditory Comprehension scores were not normally distributed for either the autism or DD groups. Additionally, the MSEL Receptive Language raw score was not normally distributed in the autism group. Examination of the distribution of scores indicated that a few children in each group scored exceptionally high for their group and that variability was larger in the DD group. Figure 1 presents the box plots for these language comprehension scores and shows the distributions for both groups.

Independent samples *t* tests using the Welch-Satterthwaite correction indicated that children in the two groups differed in terms of their receptive language abilities as there were significant mean differences on the PLS-4, Auditory Comprehension Raw Score ($t(59.40) = 2.50$, $p = .015$, $d = .58$) and the MSEL Receptive Language Raw Score ($t(69.04) = 2.03$, $p = .047$, $d = .47$). For both receptive language measures, the means for the DD group were significantly higher than the means for the autism group. No significant differences between groups were observed for expressive language abilities ($t(71) = -.85$, $p = .40$) or nonverbal cognitive skills (i.e., Fine Motor and Visual Reception subtests of the MSEL) ($t(56.26) = -.47$, $p = .15$).

Relationship of Play, Language, and Cognitive Measures

The second set of questions examined the relationship between play, language, and cognitive behaviors, and the effect of group on this relationship. Preliminary Pearson correlations were examined between weighted total scores and cognitive (MSEL) and

language (MSEL, PLS-4) raw scores. Weighted total score was the only play measure we included in these analyses because all three of the play measures were highly correlated with each other, and the weighted total score appeared to be the best reflection of overall play level. We calculated correlations within each group (autism and other DD). For the children with other DD, results indicated significant correlations ranging from .44 to .71 ($p < .01$ for all) between weighted play scores and raw scores on the MSEL Receptive, MSEL Expressive, PLS-4 EC, and PLS-4 AC. Correlations between weighted play and MSEL Composite and MSEL nonverbal (i.e., Fine Motor and Visual Reception subtests) raw scores were even higher, at r = .83 and r = .84 respectively for the DD group. For the children with autism, correlations between weighted total play and raw scores on the MSEL Receptive, MSEL Expressive, PLS-4 EC, and PLS-4 AC were notably smaller and not statistically significant. Correlations were statistically significant between weighted play scores and raw scores on the MSEL Composite (r = .49, $p < .01$) and MSEL Nonverbal (r = .50, $p < .01$) for the autism group. The MSEL Composite raw score includes performance across all four subtests. When partial correlations controlling for the effect of cognitive development were examined (partialing out the nonverbal scores from the MSEL), none of the correlations for either group remained significant. For the DD group, all correlations which were previously significant were now less than .10. For the children with autism, correlations which were insignificant before remained insignificant after controlling for nonverbal IQ.

Discussion

In this study, we utilized a systematic observational paradigm to measure and determine differences in play skills of developmentally delayed preschool children with and without autism. All children had severe communication impairments. We were unable to confirm our hypothesis that preschool children with autism would engage in fewer symbolic play acts. Results revealed no significant differences between the two groups of children in level of play, or expressed interest in playing with different toys. Our data showed a likeness across the groups in terms of emergence and mastery of symbolic play; although for all children, symbolic play was the least frequently observed type of play. We also failed to find any group differences in diversity of object play. Thus, in contrast to other findings, the level and diversity of functional and symbolic play of children with autism was not lower than that of children with other DD. These results add support to research documenting more play similarities than differences between preschoolers with autism and other DD (Dominguez et al. 2006; Naber et al. 2008); specifically for children with similar expressive language skills.

We were somewhat surprised that overall, the children with autism did as well as the children with other DD on our play measures. Given the comparable play behaviors across the two populations, the results do not provide evidence for a specific play deficit for children with autism. It is possible that we did not find significant differences between the two groups due to recruiting children who were nonverbal or minimally verbal, lending to greater expressive and cognitive similarities across the groups. Although the children were not matched on cognitive and language skills; they were placed in each group based on our recruitment criteria. Thus, group differences may have, in effect, been erased by recruiting participants with a narrow range of language and cognitive abilities.

Play deficits characteristic of young children with autism may be due to difficulties orienting to and imitating caregiver's actions on objects (Wetherby 2006). Such difficulties may disrupt turn-taking and lead to less developed knowledge and mental representations of objects and events (Yoder 2006). Thus, a limited interest in and ability to act on objects appropriately in play contexts may be due to a problem in social learning (Bandura 1977), or a lack of attention to adult models and reinforcement. For example, recreating action

schemas in a pretend play sequence such as feeding a baby doll, burping the doll, and putting the doll to bed requires orienting to the social actions of others, a significant challenge reported for individuals with autism compared to those with other DD such as DS (Sigman and Ruskin 1999). We need more studies to confirm if social learning problems, and/or difficulties attending to salient actions of others, are at the root of reported play deficits for this population. We did find one play difference between the two groups, in that the children with autism combined toys together in a conventional way (e.g., putting a puzzle together, nesting cups, and matching shapes in shape sorter) more so than children in the DD group. This type of play behavior may be easier for children with autism to recreate as it requires an understanding of how objects go together based on knowledge of object properties, a skill less dependent on adult models to learn.

The most common type of play across both groups of children was functional play. They played with objects in conventional ways (e.g., stacked blocks), related objects to self (e.g., brought toy phone to ear to talk), and extended actions to others (i.e., fed examiner with a bottle). Although limited, symbolic play was not completely missing from their play repertoires. For example, a few children would place the sponge on a spoon and pretend to feed the baby doll. Although more children with other DD engaged in symbolic play with dolls, this difference was not significant. Hobson, Lee, and Hobson (2009) posed a cognitive based view for this apparent lack of pretend play by some children with delayed language. Difficulties assigning meaning to toys in a pretend way may be due to limitations in identifying and adopting other people's perspectives. This cognitive view has been discussed as relevant for children with autism; however in the current study, children without autism demonstrated a similar absence of pretend play. Perhaps, regardless of an autism diagnosis, preschool children with significant language and cognitive deficits have not yet developed the cognitive underpinnings and social understanding necessary to play with toys symbolically.

In order to better understand play development of children with autism or other DD, it will be necessary to examine current play taxonomies and find more consistent and sensitive methods to measure more subtle developments in play. For example, decontextualized play described by Belsky and Most (1981) included 'pretend self' and 'pretend other' (or Child as Agent) behaviors. These same behaviors were categorized as 'elaborated functional play' in later research (Williams et al. 2001), and more recently categorized as a subtype of symbolic play (Dominguez et al. 2006; Stanley and Konstantareas 2007). Williams et al. (2001) found play differences only when elaborated or combined play and pre-linguistic behaviors were examined. Children with autism spent less time playing with multiple objects at the same time, or using vocalizations and/or gestures in play. Further, children with autism engage in fewer symbolic play behaviors that involve *attribution of false properties* and *making reference to an absent object* (Libby et al. 1998). These authors suggest there is greater contextual support for substituting one object for another, whereas decontextualized symbolic play requires the child to construct ideas based on events removed from the immediate context. These categories of symbolic play require relatively advanced language abilities. Our participants were all beginning communicators, so the fact that we did not find any differences across groups may reflect floor effects for these more advanced play behaviors. Assessing sequential and elaborated play, or combinations of concurrent play and language behaviors, may be more sensitive to identify differences across populations of children with developmental disabilities.

Relationships between play, language, and cognitive skills have been examined repeatedly across populations of children with varying cognitive and language developmental profiles. Our results showed high correlations between play, language, and cognitive measures, indicating that play is commensurate with these measures and perhaps does not add any

unique insights into a child's language abilities; at least within a single time point comparison. Over time, however, play skills have been found to predict later language outcomes, and studies examining children's communication growth have emphasized the importance of including play as an important prelinguistic treatment goal (Yoder 2006). Through our ongoing longitudinal study we will be able to evaluate how play develops over the pre-school years, and determine if play differences between children with autism and other DD emerge during the transition from pre-linguistic to linguistic communication.

Limitations

It could be construed that the adult modeling of a symbolic play act at the beginning of each play set and replacing toys if a child fixated on a toy, may have inflated the child's symbolic play or object interest behaviors. Even though we did not give a child credit for spontaneous symbolic play if their action immediately followed this model, it is possible that the children imitated this model within the 3 min play set. When models are provided, children with autism can imitate symbolic play acts even better than children with DS and typically developing children (Libby et al. 1997); however, even when no play models are provided children with autism continue to produce symbolic object substitutions at comparable rates to these same groups of children (Libby et al. 1998). When symbolic play models are provided, it would be beneficial to evaluate how often a child imitates this model, and perhaps code only novel symbolic acts to determine if the child truly understands symbolic play. In relation to object interest, few children in the current study required this modification in test administration, and replacement of toys was comparable across the two groups.

One possible explanation for our findings of no significant group differences is that the sampling context did not allow the child to express the range and 'type' of play skills he/she was capable of. For example, the majority of our participants were boys (75%) and two play sets, the Tea Set and Grooming, may have been less appealing to their interests, and concurrently affect motivation to engage in play. Further, the coding system was based on what adults 'anticipated' the child would do in a specific play situation. Observing play behaviors of typically developing children engaged with the same play sets and adding their play acts to the coding system is one future option. Also, adding sequential play actions to the coding system, and perhaps tracking multiple acts on different toys may lead to greater group differences. On the flip side, the play context in this study was very structured with the exception of the initial warm-up. The sets of toys included specific objects that could be used to pretend; therefore, the context may have led to a higher number of symbolic play acts than would have been observed in a less structured, free play context.

Conclusions

In summary, we did not find group differences in quantity of play with different objects and symbolic play behaviors between preschoolers with autism and other DD. This is most likely because we recruited participants at similar language and cognitive stages of development. Future research using common classification systems is needed to illuminate reported play discrepancies and behaviors of young children with DD. This task may also be accomplished by breaking down current classification systems into more detailed behaviors, and including a wider range of symbolic play behaviors that children may engage in without much effort. As expected, strong correlations were found between play, language, and cognition, and the correlations were so strong that when the nonverbal cognitive measures were partialled out, play no longer correlated with language. Over time, our longitudinal analyses may complement current research and show that play is a significant predictor of language, and other early communication skills.

Acknowledgments

References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4. Washington, DC: APA; 1994.

Bandura, A. Social learning theory. Oxford, England: Prentice-Hall; 1977.

Baren-Cohen S. Autism and symbolic play. British Journal of Developmental Psychology. 1987; 5:139–148.

Belsky J, Most R. From exploration to play: A cross-sectional study of infant free play behavior. Developmental Psychology. 1981; 17:630–639.

Bruckner CT, Yoder P. Restricted object use in young children with autism. SAGE Publications & the National Autism Society. 2007; 11:161–171.

Cohen, J. Statistical power analysis for the behavioral sciences. 2. Hillsdale, NJ: Lawrence Earlbaum Associates; 1988.

Cunningham C, Glenn S, Wilkinson P, Sloper P. Mental ability, symbolic play and receptive expressive language of young children with Down syndrome. Journal of Child Psychology and Psychiatry. 1985; 26:255–265. [PubMed: 2579964]

Dominguez A, Ziviani J, Rodger S. Play behaviors and play object preferences of young children with autistic disorder in a clinical play environment. SAGE Publications & The National Autism Society. 2006; 10:53–69.

Eisert D, Lamorey S. Play as a window on child development: The relationship between play and other developmental domains. Early Education & Development. 1996; 7:221–235.

Greenwood CR, Dunn S, Ward SM, Luze GJ. The Early Communication Indicator (ECI) for infants and toddlers: What it is, where it's been, and where it needs to go. The Behavior Analyst Today. 2003; 3:383–388.

Hobson RP, Lee A, Hobson JA. Qualities of symbolic play among children with autism: A social-developmental perspective. Journal of Autism and Developmental Disorders. 2009; 39:12–22. [PubMed: 18509752]

Jarrold C, Boucher J, Smith P. Symbolic play in autism: A review. Journal of Autism and Developmental Disorders. 1993; 23:281–307. [PubMed: 7687245]

Jarrold C, Smith P, Boucher J, Harris P. Comprehension of pretense in children with autism. Journal of Autism and Developmental Disorders. 1994; 24:433–455. [PubMed: 7961329]

Kasari C, Freeman SF, Paparella T. Early intervention in autism: Joint attention and symbolic play. International Review of Research in Mental Retardation. 2001; 23:207–237.

Kasari C, Freeman S, Paparella T. Joint attention and symbolic play in young children with autism: A randomized controlled intervention study. Journal of Child Psychology and Psychiatry. 2006; 47:611–620. [PubMed: 16712638]

Kelly CA, Dale PS. Cognitive skills associated with the onset of multiword utterances. Journal of Speech Language Hearing Research. 1989; 32:645–656.

Laakso ML, Poikeus AM, Eklund K, Lyytinen P. Social interactional behaviors and symbolic play competence as predictors of language development and their associations with maternal attention-directing strategies. Infant Behavior and Development. 1999; 22:541–556.

Libby S, Powell S, Messer D, Jordan R. Imitation of pretend play acts by children with autism and Down syndrome. Journal of Autism and Developmental Disorders. 1997; 27:365–383. [PubMed: 9261664]

Libby S, Powell S, Messer D, Jordan R. Spontaneous play in children with autism: A reappraisal. Journal of Autism and Developmental Disorders. 1998; 28:487–497. [PubMed: 9932235]

Lifter, K. Linking assessment to intervention for children with developmental disabilities or at-risk for developmental delay: The developmental play assessment (DPA) instrument. In: Gitlin-Weiner, K.; Sandgrund, A.; Schafer, C., editors. Play diagnosis and assessment. New York: Wiley; 2000. p. 228-260.

Lifter K, Bloom L. Object knowledge and the emergence of language. Infant Behavior and Development. 1989; 12:395–423.

Lifter K, Sulzer-Azaroff B, Anderson S, Cowdery GE. Teaching play activities to preschool children with disabilities: The importance of developmental considerations. Journal of Early Intervention. 1993; 17:139–159.

Lord, C.; Rutter, M.; DiLavore, P.; Risi, S. Autism diagnostic observation schedule (ADOS). Los Angeles: Western Psychological Services; 1999.

Luze GJ, Linebarger DL, Greenwood CR, Carta JJ, Walker D, Leitschuh C, et al. Developing a general outcome measure of growth in expressive communication of infants and toddlers. School Psychology Review. 2001; 30:383–406.

McCune-Nicolich L. Toward symbolic functioning: Structure of early pretend games and potential parallels with language. Child Development. 1981; 52:785–797.

McDonough L, Stahmer A, Schreibman L, Thompson S. Deficits, delays, and distractions: An evaluation of symbolic play and memory in children with autism. Development and Psychopathology. 1997; 9:17–41. [PubMed: 9089122]

Mullen, E. Mullen scales of early learning: AGS edition. Circle Pines, MN: AGS; 1995.

Naber F, Bakermans-Kranenburg MJ, van IJzendoorn MH, Swinkels S, Buitelaar JK, Dietz C, et al. Play behavior and attachment in toddlers with autism. Journal of Autism and Developmental Disorders. 2008; 38:857–866. [PubMed: 17896172]

Rutter, M.; Bailey, A.; Lord, C. Social Communication Questionnaire (SCQ). Los Angeles: Western Psychological Services; 2003.

Schopler, E.; Reichler, R.; Rochen Renner, B. Childhood autism rating scale (CARS). Los Angeles: Western Psychological Services; 1993.

Sigman M, Ruskin E. Continuity and change in the social competence of children with autism, Down syndrome, and developmental delays. Monographs for the Society for Research in Child Development. 1999; 64:1–139.

Sigman M, Ungerer JA. Cognitive and language skills in autistic, mentally- retarded, and normal children. Child Development. 1984; 63:796–807. [PubMed: 1505241]

Stanley GC, Konstantareas MM. Symbolic play in children with autism spectrum disorder. Journal of Autism and Developmental Disorders. 2007; 37:1215–1223. [PubMed: 17082977]

Stone W, Lemanek K, Fishel P, Fernandez M, Altemeier W. Play and imitation skills in diagnosis of autism in young children. Pediatrics. 1990; 86:267–272. [PubMed: 2371101]

Tapp; Yoder, P. Playcoder. Nashville, TN: Vanderbilt University; 2001.

Ungerer JA, Sigman M. Symbolic play and language comprehension in autistic children. Journal of the American Academy of Child Psychiatry. 1981; 20:318–337. [PubMed: 6167603]

Warreyn P, Roeyers H, De Groote I. Early social communicative behaviors of preschoolers with autism spectrum disorder during interaction with their mothers. Autism. 2005; 9:342–361. [PubMed: 16155053]

Wetherby, A. Understanding and measuring social communication in children with autism spectrum disorders. In: Charman, T.; Stone, W., editors. Social and communication development in autism spectrum disorders: Early identification, diagnosis, & intervention. New York, NY: Guilford Press; 2006. p. 3-34.

Wetherby A, Woods J, Allen L, Cleary J, Dickinson H, Lord C. Early indicators of autism spectrum disorders in the second year of life. Journal of Autism and Developmental Disorders. 2004; 34:473–493. [PubMed: 15628603]

Williams E, Reddy V, Costall A. Taking a closer look at functional play in children with autism. Journal of Autism and Developmental Disorders. 2001; 31(1):67–77. [PubMed: 11439756]

Yoder P. Predicting lexical diversity growth rate in young children with autism spectrum disorders. American Journal of Speech-Language Pathology. 2006; 15:378–388. [PubMed: 17102148]

Zimmerman, IL.; Steiner, VG.; Evatt Pond, R. Preschool Language Scale–Fourth Edition (PLS-4). San Antonio, TX: Pearson; 2003.
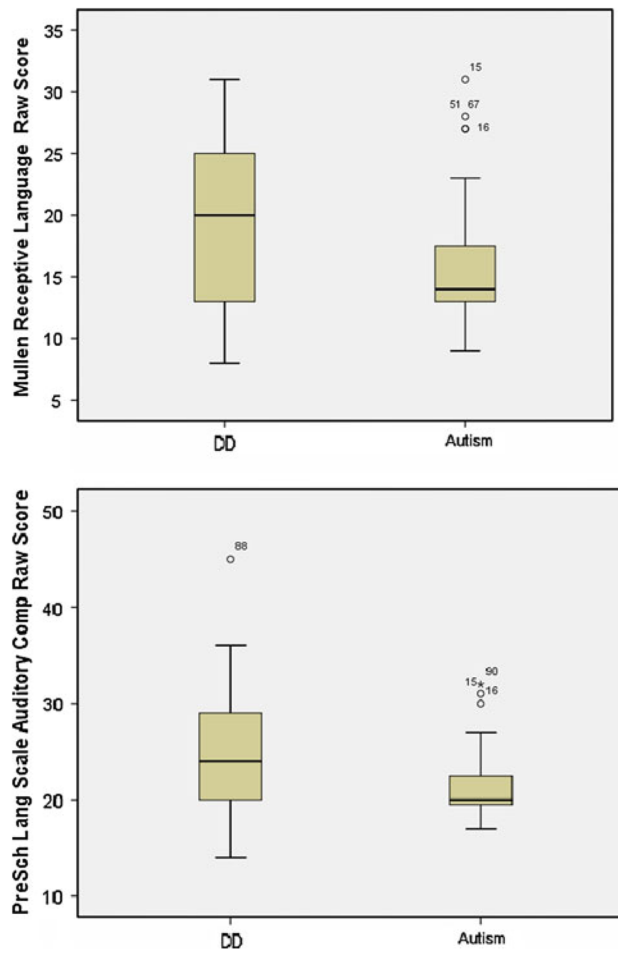
Fig. 1.
Distribution of raw scores on the MSEL receptive language subtests and the PLS-4 auditory comprehension subtest

Table 1

Demographic information

	Autism (n = 35)	DD (n = 38)
Race		
Caucasian	25	27
African American	6	7
Multiracial	2	2
Asian	1	2
Other	1	n/a
Gender		
Girls	6	11
Boys	29	27

Table 2

Means and standard deviations for chronological ages, and medians and ranges for age equivalent scores (in months) for the standardized tests

	Autism (N = 35)		DD (N = 38)	
	M	**SD**	**M**	**SD**
Chronological age (in months)	49.2	8.6	49.7	9.1
	Median	Range	Median	Range
MSEL fine motor	21.0	12–33	18.0	5–34
MSEL visual reception	21.0	6–29	19.5	<1–37
MSEL receptive language	13.0	7–34	19.0	6–34
MSEL expressive language	14.0	4–24	14.5	0–26
PLS-4 total (AC + EC)	15.0	10–28	21.0	7–45
PLS-4 AC	20.0	11–27	19.5	7–27
PLS-4 EC	17.0	10–27	18.0	7–30

MSEL Mullen scales of early learning, *PLS-4 AC* Preschool language scale-4 auditory comprehension, *EC* expressive communication

Table 3

Play materials and modeled symbolic play acts

Play set	Toys used	Modeled symbolic act
Set 1: free play	Nesting cups, puzzle with large wooden knobs, pop beads, squishy ball, and shape sorter	N/A
Set 2: tea set	Baby doll, spoon, teapot and lid, bowl, bottle, 2 cups and 2 saucers, and piece of a sponge	Feed doll piece of sponge with hand or on spoon as if it were food, and say "mmmm"
Set 3: grooming	Doll with hair, hairbrush, mirror, and toy telephone	Bring telephone to doll's ear as if it could speak, say "hello" or "goodbye"
Set 4: sleeping	Toy bed, 2 small plastic people, table, 2 plastic chairs, pillow, and a piece of paper	Lay doll on bed and cover it with piece of paper as if it were a blanket; make a sleeping noise
Set 5: fire station	Fire station, fire truck with ladder, 2 plastic firemen, 2 road signs, and a plastic straw	Hold the straw up to the fireman's hand and pretend it is a hose; make a 'shhhh' sound as if for water spraying

Table 4

Sequence of play levels and categories

Play levels	Play categories	Example play acts
Level 1: indiscriminate actions	1. Mouthing-shaking-banging-inspecting	Putting toy in mouth
Level 2: functional play/object use	2. Discriminative actions on single objects	Rolling a ball, pushing a fire truck
	3. Takes apart combinations	Taking pieces out of puzzle
Level 3: functional combinatorial	4. Presentation combinations	Puts piece in puzzle; puts cup on saucer
	5. General combinations	Lines up nesting cups
	6. Pretend self	Puts phone to ear to talk
	7. Specific combinations physical	Stacks nesting cups upside down to make a tower
	8. Child as agent	Throws ball to evaluator
	9. Specific combinations conventional	Stirs with spoon in cup
Level 4: symbolic play	10. Substitutions	Uses straw as if it were a fire hose
	11. Doll as agent	Puts straw in fireman's hand to use as fire hose
	Includes: Unexpected substitutions	

Table 5

Means and standard deviations for raw scores on standardized cognitive and language tests

	Autism (N = 35)		DD (N = 38)	
	M	**SD**	**M**	**SD**
MSEL composite	75.49	13.21	73.68	22.74
MSEL nonverbal	60.86	10.22	60.00	19.30
MSEL receptive language	16.17	5.38	19.11	6.95
MSEL expressive language	14.63	4.37	13.68	5.09
PLS-4 total (AC +EC)	46.11	6.26	47.53	10.27
PLS-4 AC	21.69	3.83	24.87	6.77
PLS-4 EC	24.43	3.48	22.66	4.94

MSEL Mullen scales of early learning, *PLS-4 AC* preschool language scale-4 auditory comprehension, *EC* expressive communication

Table 6

Means and standard deviations for raw scores on play measures

	Autism (N = 35)		DD (N = 38)	
	M	SD	M	SD
Weighted total	34.17	16.51	32.37	22.31
Object interest	20.86	8.33	18.84	9.89