5-2002

The Use of Play Assessment to Evaluate the Cognitive Skills of Two-and Three-Year-Old Children

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ABSTRACT Play assessment is increasing in popularity despite the lack of empirical support. The purpose of this study was to explore the use of play assessment with young children and determine its efficacy in determining cognitive levels of development. Eight 2-year-olds and eight 3 ½-year-olds were observed playing in an unstructured format. Results indicated that Exploratory Play becomes more complex with age and is displayed more than Pretend Play in an unstructured play session. Children's play primarily consisted of Exploratory Play, Pretend Play and Problem Solving and Planning Skills. Several of the Supplemental Subdomains measured by play assessment were not observed to occur in the spontaneous play format. A tendency for increasing complexity of play across time in session was also found.

Assessment is a critical component in the process of determining which children are eligible for early intervention programs. The most recent revision of IDEA places increased emphasis on a *functional* assessment of a child's skills, which means that the child's specific strengths and weaknesses must be defined. Assessments are required to provide more than test scores. They must also incorporate a data collection process that will result in information that leads to more measurable, observable and specific goals, and appropriate interventions. The development and use of effective ways of monitoring progress during interventions is also an important component of IDEA 97 that must be documented. Thus, assessment has a much broader purpose than eligibility decisions; the process must now provide functional information that directly relates to developing and monitoring appropriate interventions.

Many standardized tests have been developed for the purpose of making eligibility decisions; however, these tests do not provide data that easily translates into intervention development or progress monitoring (Neisworth and Bagnato, 1992). Assessment devices have been developed recently that hold potential to better meet the goals of developing appropriate interventions and monitoring progress. These new developmental scales and checklists are providing the practitioner with tools for program planning and progress. The general goal of these assessments is not to obtain a standard score but to determine what skills a child has acquired in the major developmental domains and what skills are lacking. The primary means of assessment is through observation of the child as opposed to eliciting responses in a standardized manner. As a result of the observation, a description of the child's strengths and weaknesses in specific areas of development is provided (Athanasiou, 2000; McCormick, 1996). One example of this type of assessment procedure is Transdisciplinary Play-Based Assessment (Linder, 1993).

Many have promoted the use of free play in a natural environment as an appropriate setting to evaluate cognitive functioning in young children (e.g. Barnett et al., 1992; Fewell and Glick, 1993; Fewell and Kaminski, 1988; Greenspan and Meisels, 1996; Linder, 1993; Lowenthal, 1997; and Wolery and Dyk, 1984). Accordingly, play assessment is conducted in the child's natural environment of play where the child spends numerous hours per day. Advantages of play assessment over most standardized methods

are that (a) the assessment occurs in children's natural environment of play as opposed to a sterile, highly structured setting with a question-answer format; (b) play assessment is designed to elicit optimum levels of performance in contrast to most standardized tests in which children may not be given the opportunity to demonstrate their optimum level; (c) play assessment has a flexible format as opposed to the rigid sequenced format of standardized testing and (d) play assessment results in a description of strengths and areas of need for intervention while standardized measures provide numerical scores with minimal descriptors of children's performance. These qualities of play assessment have the potential to provide a more accurate assessment of the skills and cognitive abilities of young children. Because children find pleasure in play and can be spontaneous in the activities they choose, play is motivating (Bronfenbrenner, 1979) and will, therefore, elicit their highest level of performance (Vygotsky, 1967). Not only does play exemplify a current cognitive functioning level, it can also serve as an index of changes in cognitive functioning over time (Linder, 1993).

Children's play has been of interest to basic researchers for several decades (e.g. Piaget, 1962). One developmental change which has been intensively studied is the transition from exploratory to symbolic play (e.g. Elder and Pederson, 1978; Fenson and Ramsay, 1980; Kennedy et al., 1991; Lyytinen, 1991; and McCune-Nicolich, 1981). Exploratory/ sensorimotor play involves children interacting with a toy in a physical manner but excludes any representations and/or acting out of common routines or life events. Symbolic play, sometimes referred to as pretend play, includes representing one object for another and play that is a reflection of common life activities (Rogers, 1988). The transition from exploratory to symbolic play follows a known developmental course and therefore could be used as an assessment tool. However, much less applied research has been conducted examining the use of play as an assessment tool (Athanasiou, 2000).

One popular method of play assessment, Transdisciplinary PlayBased Assessment (TPBA), was proposed by Linder (1993). The focus of Linder's TPBA technique is on the child's strengths and areas of need for intervention and can be used to assess skills in the major areas of development including cognitive, communication, social-behaviour, and fine and gross motor skills. This results in a detailed description of a child's current level of performance. The breadth and depth ofinformation obtained from the sessions is a highly attractive feature of TPBA. As conceived by Linder, the play session begins with unstructured play in which the child has total control over the play activities. After approximately 30 minutes, an adult facilitates play activities that were not observed during the unstructured session. Professionals observe the child's play and code it according to guidelines provided in Linder's (1993) manual. While several basic research studies provide guidelines for interpreting exploratory and symbolic play, Linder's system provides information about additional aspects of the child's cognitive development. In addition to what she calls Early Object Use and Symbolic and Representational Skills, Linder includes the following domains of cognitive development: Imitation Skills, Problem-Solving Skills, Discrimination/Classification Skills, One-to-One Correspondence, Sequencing Abilities and Drawing Skills. Because of the additional information gained from the play session, Linder's model provides a more comprehensive and detailed description of a child's cognitive functioning level than many other assessment tools.

As a consequence of the more detailed description, a substantial amount of functional information about the child's play skills can be derived (Lifter, 1996). This information can initially be used to make decisions about what type(s) of service the child may need, based on the strengths and areas of need identified in the play session. Second, data from the play session allow professionals to develop appropriate interventions specific to the unique need of the child. Third, the play assessment process

can be used to monitor the progress of the interventions (Linder, 1993). Thus, play assessment is in accordance with IDEA 97 requirements. Moreover, Linder proposes that play assessment can be used to determine whether children are eligible for early childhood special education when state law allows for this decision to be made without a standardized test.

While highly promising research has been conducted on similar assessment techniques (e.g. Bailey and Bricker, 1986; Bricker et al., 1990; Fewell and Rich, 1987), play assessment has been criticized because very little published research exists that analyses its use in determining cognitive development (Athanasiou, 2000; Fewell, 1991; Malone et al., 1994). In one of the only studies to date that has examined the validity of play assessment, Kelly-Vance et al. (1999) compared results obtained from Linder's TPBA to the Bayley Scales of Infant Development-Second Edition with an at-risk population. The results indicated that TPBA correlated highly with the Bayley. In addition TPBA elicited a higher level of overall performance than the Bayley. An additional study (Myers et al., 1996) examined the social validity of play assessment, defined as the acceptance of the approach by practitioners and parents. In that study, the researchers found that professionals and parents had positive perceptions of the techniques and that, overall, play-based evaluations were completed in a significantly shorter period of time than traditional assessments. Furthermore, the reports generated from data obtained during the play sessions were said to include more functional information than did traditional reports.

The present study was designed to further explore the use of play assessment to evaluate the cognitive development of young children. In this study we used a modified version of Linder's coding scheme to evaluate the spontaneous, unstructured play of typically developing children ages 2 and 3 ½-years of age. This revision retained the breadth and depth of Linder's original coding scheme but placed emphasis on exploratory and pretend play, the domains of play that have been most intensively studied. The evaluation of typically developing children provides important baseline data against which exceptional children can be compared in future research. Practitioners must know what is typical play behaviour for an 'average' child so that they can compare the results of children who are referred for possible special education eligibility. Moreover, the use of spontaneous, unstructured play allows practitioners to standardize play assessment procedures. To date, no one has attempted to standardize the play assessment process and practitioners differ in how they are implementing the procedures. These inconsistencies pose the risk of noncomparable data across children. Practitioners need empirical evidence that play assessment can be implemented in a reliable and valid fashion. Therefore, our purpose was to empirically evaluate the type of information obtained about cognitive development in play sessions using a standardized procedure and a reliable coding scheme.

Specifically, the results of this study provide three important types of information. First, this study provides information concerning differences in play during play assessment sessions between children of different ages. Second, this study provides information concerning potential changes in play across the session. Third, we were interested in whether children would spontaneously display play behaviours that represent each of the specific cognitive subdomains (e.g. problem-solving and planning skills, drawing skills, etc.). No study to date has investigated whether children actually demonstrate behaviours from each subdomain during a play session.

Method

Participants

Sixteen children, eight 2-year-olds (M = 27 .63 months; range 24-30 months) and eight 3 ½-year-olds (M = 44.88 months; range 42-48 months), participated in the study. All children were reported to be typically developing and an equal number of boys and girls were included. Participants were primarily Caucasian and middle-class socioeconomic status. Families were recruited through advertisements posted on a university campus and by word of mouth from previous participants. The children included in this investigation were part of a larger study conducted at the university.

Materials

Toys were chosen for inclusion in the room if they had the potential to generate at least one type of play behaviour listed on the coding form. A large number of toys was necessary to elicit a rich variety of play behaviours. An attempt was made to balance the number of toys stereotyped as male, female and neutral (Carter and Levy, 1988). Examples of toys included in the playroom were: kitchen set, mechanical toys, farm set, toy house, dress-up clothes, blocks, crayons, dolls and accessories, puzzles, toy phones, shape sorter and puppets.

Procedure

Individual play sessions were scheduled for each participant. Prior to the session, parents were informed of the procedures. Because the sessions were not facilitated by an adult, the parents were given instructions regarding what could and could not be said to the child once the play began. Specifically, the parents were instructed not to initiate play with the child and only respond if play is directed towards them. Further, they were not allowed to question the child or make any suggestions as to what to play with or how to play with a toy. Parent(s) were also told that they could praise the child and imitate words and activities, but they could not make specific comments about the activity (Ryalls et al., 2000).

The child was then introduced to the playroom and instructed to play with anything s/he wanted. The choice of toy and activity was entirely up to the child. A session coordinator and a camera operator were also present during the procedure. The role of the session coordinator was to answer parent questions and respond to the child's play. The camera operator videotaped the entire play session. During the session, parents sat in the room and completed a series of questionnaires. Play sessions lasted approximately 45 minutes and ended with a reward for the child, such as at-shirt or gift certificates and a small prize.

Data Coding

Coding Scheme. The coding scheme used to analyse the play assessment data was based on a modification of Linder's (1993) original system. Initially, Linder's system was analysed for accuracy, ease of use, and overlap among items. As a result, major modifications were made to the Exploration/Sensorimotor (Lyytinen, 1991; Tamis-LeMonda et al., 1992; Tamis-LeMonda et al., 1994) and Symbolic/Representational Play (Fenson, 1984; Fenson and Ramsay, 1980) sections of the guidelines, with some sections being replaced entirely with empirically validated scales. A new Subdomain, Nonplay, was added (Howe et al., 1993) and Imitation was omitted because only spontaneous play was evaluated. Less extensive modifications included reducing redundancy across and within Subdomains, rewording items to make them more objective and renaming Subdomains. The revised system was piloted and additional minor modifications were made in the wording of items. The

final revision of the coding scheme consisted of the following Core Subdomains: Early Object Use-Simple Exploration (EOU-S), Early Object Use-Complex Exploration (EOU-C), Pretend Play-Decentration (PP-D) and Nonplay Behaviours (NB). Supplemental Subdomains included Problem-Solving and Planning Skills (PSPS), Pretend Play-Integration (PP-D, Pretend Play-Substitution (PP-S), Discrimination/Classification Skills (DCS), Drawing Skills (DS), Quantification Skills (QS), and Sequencing Abilities (SA) (Kelly-Vance et al., 2000).

Coding Procedures. The first (Time 1) and last (Time 2) ten minutes of each child's play session were coded. Each ten-minute segment was divided into twenty 30-second intervals, yielding a total of 40 codeable intervals. These 40 intervals were coded in two steps. First, the highest level of play in each 30-second interval was identified and classified into one of four mutually exclusive Core Subdomains. The rationale for this step was that all play, at a minimum, involves interacting with an object. If a child was not interacting with an object then s/he was not playing and the Core Subdomain of 'Nonplay' was utilized. The second step was to identify and code any play behaviours representative of the Supplemental Subdomains. The highest level of play in each Supplemental Subdomain was coded.

Interobserver Reliability. The two authors simultaneously viewed the videotaped play sessions and independently coded the behaviours according to the revised coding scheme. The independent coding was compared and differences discussed and reconciled. Overall interrater agreement was 96% prior to reconciliation.

Analysis and Design. Data were analysed in a number of ways. First, percentage scores were calculated for each child for the four Core Subdomains by dividing the number of intervals in each Subdomain by the total number of intervals in each time period (N = 20). For example, a score of30% in 'EOU-C' indicates that complex exploration (B 1, B2, B3) was the highest level of play behaviour displayed in 30% of the 30-second intervals. These percentage scores were analysed for main effects of and interactions between age, Subdomain, and time of play. Additional descriptive analyses of the Core and Supplemental Subdomains were conducted to determine frequency of occurrence, age trends, time in session trends, specific items observed in play and types of toys that elicited the play.

Results

The results will be presented in a number of sections. First, analyses of the Core Subdomains will be presented. Second, descriptive analyses of the Supplemental Subdomains will be presented, beginning with the most frequently observed, Problem-Solving and Planning Skills, and moving towards the less frequently observed Subdomains. Finally, we will present a summary of our findings with emphasis on the implications for practitioners interested in utilizing play assessment in a valid and reliable fashion.

Core Subdomains

Percentage scores were analysed in a 2 (Age: 2 years and 3 ½- years) x 4 (Subdomain: Early Object Use-Simple Exploration, Early Object Use-Complex Exploration, Pretend Play-Decentration, Non play Behaviours) x 2 (Time of play: Time 1, Time 2) mixed design analysis of variance with Age as a between-subject variable and Subdomain and Time of Play as within-subject variables. The analysis revealed a main effect of Subdomain, $F(3,42) = 10.24, p < 0.01$, a significant interaction between Subdomain and Age, $F(3,42) = 4.55, p < 0.01$, and a marginal interaction between Subdomain and Time of Play, $F(3,42) = 2.22$, $p = 0.099$.

The main effect of Subdomain resulted because, overall, children spent the most time engaged in Complex Exploratory play (M = 45%) followed by Pretend Play (M = 29%), Simple Exploration (M = l56k), and Nonplay (M = 10%). However, this main effect was subsumed by the interaction between Age and Subdomain (see Table 1). As can be seen in the table, 2-year-old children divided their time roughly equally between the three-types of play, with somewhat less time spent in Nonplay. In fact, analyses of simple effects indicated that, for the 2-year-olds, there were no significant differences between any of the Subdomains. In contrast, analysis of simple effects did reveal a main effect of Subdomain for the 3 ½-year-olds, $F(3,21) = 16.43$, $p < 0.01$. Thus, the main effect of Subdomain was largely carried by the older children. Comparing across age groups, simple effects analyses indicated that the younger children engaged in more Simple Exploration than the 3 ½-year-olds ($p < 0.01$), while the older children spent more time engaged in Complex Exploration than the 2-year-olds ($p = 0.01$). Interestingly, there was no age difference in the amount of time spent in Pretend Play or in Nonplay.

The marginal interaction between Subdomain and Time of play resulted because children showed a tendency to shift away from other types of play towards Pretend Play as the session progressed. Specifically, from Time 1 to Time 2 the amount of time spent in Nonplay, Simple Exploration and Complex Exploration decreased by 2, 5, and 10 percent overall, respectively, resulting in a corresponding 17% increase in the amount of time spent engaged in Pretend Play. Analysis of simple effects revealed a marginal increase in Pretend Play between Time 1 and Time 2 ($p = 0.07$). No other differences approached significance.

With regard to the specific behaviours observed in each Core Subdomain, some interesting patterns were observed. As would be expected given the age of the participants, Mouthing, the lowest behaviour in the Early Object Use-Simple Exploration Subdomain, was rarely observed. Most Simple Exploration took the form of Simple Manipulation or Unitary Functional behaviours. With respect to Early Object Use-Complex Exploration, Inappropriate Combinations and Transitional Play occurred infrequently, with Appropriate Combinatorial play being most common. Early Object Use was demonstrated with a wide variety of toys, as might be expected.

With regard to Pretend Play-Decentration, Object-Directed Acts, such as pouring from a pitcher to a cup, were the most frequently observed play behaviours. There were an average of 6.06 Object-Directed Acts per child across the two segments. Passive Other-Directed Acts, such as brushing a doll's hair, were the next most common, with an average of 3.88 per child. Self-Directed Acts were less common and Active Other-Directed Acts occurred quite rarely, with averages of 1.69 and 0.38 per child, respectively. Few age differences were noticeable in the types of behaviours demonstrated. However, there was a change across the play session, with children in both age groups engaging in more Passive Other Directed Acts later in the session than early in the session. When engaging in Pretend Play, children tended to employ toys designed to encourage such play, such as kitchen toys, dolls, the farm set, telephones, and the doctor's kit.

Finally, when children engaged in Nonplay Behaviours they were most likely to be Unoccupied. This behaviour typically involved sitting next to the parent (or on the parent's lap) and looking around the room. Some Conversation and Transition behaviours were also observed. However, Wandering was observed in only a single child and Aggression and Rough and Tumble play were not observed at all. These findings are not surprising given that there was limited space in which to wander and that children had no peers to engage in the latter two types ofbehaviours.

Supplemental Subdomains

Simple descriptive analyses of the data were conducted to determine which additional Subdomains were observed during spontaneous play. Table 2 includes the means for each subdomain by age and time in session. The Supplemental Subdomains are discussed in order of frequency from highest to lowest.

Problem Solving and Planning Skills. Children in this study displayed behaviours from the PSPS Subdomain at a relatively high frequency. PSPS behaviours were observed more frequently than the other Supplemental Subdomains for both age groups at both session times. Of the 12 behaviours included in PSPS, 6 were observed during spontaneous play. The most common problem solving behaviours were the use of nonsystematic trial-and-error problem solving, systematic trial-and-error problem solving, unsuccessful and successful mechanical toy play, and putting small objects into little openings. Occasionally the children used adults to help them achieve a goal. The types of toys that elicited problem solving and planning were puzzles, vehicles and mechanical toys such as a gumball machine, cash register and a pop-up toy. Nonsystematic and systematic trial and error problem solving was demonstrated during play with all types of toys.

Several specific age and time in session trends were noted in problem solving and planning behaviours. First, trends in nonsystematic and systematic trial and error problem solving were observed. In general, trial and error problem solving approaches became more systematic with age. That is, older children in this study used more logical approaches to solving problems with toys than the younger group. For example, when attempting to find the appropriate position for a puzzle piece, 31/2-year-old children inspected and rotated the pieces more frequently prior to placing it in the puzzle board than the 2-year-olds. In contrast, the younger group rarely varied how they attempted to put pieces into the puzzle. Similar behaviours occurred when children were attempting to activate a mechanical toy, with the older group utilizing a more systematic approach. In Time 2, however, the younger children increased their use of systematic problem solving with toys. It appears that the younger group were able to make their problem solving attempts more complex after more experience with a particular toy.

Second, children engaged in play with mechanical toys and these behaviours varied according to age and session time. Two-year-olds decreased their mechanical toy play from Time 1 to Time 2. In contrast, the 3 ½-year-olds played consistently with mechanical toys at the beginning and end of the session. Overall, the mechanical toys were motivating for both groups of children and they demonstrated frequent play with these toys.

Third, initial investigation of the data indicated that the 2-year-old group spent considerable time putting objects into small openings. After further investigation of the data, however, one child was found to have skewed these results. Other children of both age groups rarely demonstrated this behaviour in their play.

Pretend Play - Integration. Both age groups demonstrated integrated pretend play at Time 1 and Time 2. Five of the 3 ½-year-olds engaged in this type of pretend play but one of these children only displayed the behaviour once. Similar results were found for the 2-year-old group but those children who demonstrated integrated pretend play did it less frequently. Integrated pretend play was most often observed when the children were playing in the kitchen area and with dolls. Other toys that elicited this type of play were the phone, car and doctor kit. Most of the children played in the kitchen area while

the other toys were more idiosyncratic to individual children. For instance, only one child played with the doctor kit.

Four items comprised this area of pretend play, single-scheme combinations, Multischeme Combinations, Events and Episodes. The most common behaviour for both ages at both session times was Multischeme Combinations. One of the 3 ½-year-old children frequently engaged in highly complex pretend play that was categorized as 'Episodes'. Most of this play occurred at the end of the session and that partially explains why the mean for this Subdomain is higher for the 3 ½-year-old group at Time 2. Only two other children engaged in episodic pretend play.

Discrimination / Classification Skills. Ranking third in the Supplemental Subdomains were skills that required children to classify objects into groups. These skills occurred at a higher rate in the 3 ½-year-olds than the 2-year-olds. Seven 3 ½-year-olds and five 2-year-olds demonstrated discrimination/classification skills. Furthermore, the 3 ½-yearolds engaged in this type of play more at Time 1 than Time 2. Behaviours in this Subdomain were most often elicited by puzzles and nested toys.

Nineteen items comprise the DCS Subdomain and 13 of these behaviours were observed during spontaneous play. The most frequent behaviours were: combines objects on perceptual and thematic similarities, identifies objects and parts that go together, and completes one or more pieces of nested puzzle. The latter two behaviours were seen more in the play of 3 ½-year-olds than 2-year-olds. Other behaviours occurred at a very low rate of frequency.

Drawing Skills. Although drawing ranked fourth in the Supplemental Subdomains, it was only observed in 3 ½-year-olds during Time 2. Moreover, only two of these 3 ½-year-old children spontaneously used the crayons and paper. No other child chose to draw. A total of 21 possible types of drawing comprise this scale and children in this study almost exclusively drew lines and arcs.

Pretend Play - Substitution. This type of pretend play was rarely observed in either age group that participated in this study. The two items of substitutive and inventive acts constitute this Subdomain. One 2-year-old and two 3 ½-year-olds demonstrated substitutive acts. No inventive acts were observed.

Quantification Skills. A total of three children demonstrated counting skills, two of whom were 3 ½-years old and one who was 2 years old. Of the 10 items in this Subdomain, only 2 were observed (accurately uses 1 and counts up to 3 objects).

Sequencing Abilities. Three 2-year-olds and no 3 ½-year-olds demonstrated sequencing skills in their spontaneous play. Sequencing skills were noted through the children's language. Two children correctly used the word 'big' and one child accurately used 'little' during play.

Discussion

The purpose of the present study was to investigate the use of play assessment as a tool to measure the cognitive skills in 2 and 3 ½-year-old children. A standardized data collection procedure was utilized to examine the type and frequency of behaviours children display during spontaneous play. In addition, a coding scheme was developed and used to quantify the children's play behaviours. The results provide information about the types of play children spontaneously exhibit, age and time of session trends in this type of play, and the toys children prefer. These results will be described in detail below.

Children spontaneously exhibited high levels of Complex Exploratory Play, Pretend Play, and Problem Solving and Planning Skills. These play behaviours were observed without adult prompts, in an unfamiliar room and for a relatively short period of time. One might not find it surprising that Complex Exploratory Play and Pretend Play were observed because the coding procedures required that all behaviours be coded into one of four Core Subdomains. It is notable, however, that Simple Exploration and Nonplay were infrequent despite the fact that they were two of the four Core Subdomains. Perhaps more interesting is the finding that children spontaneously displayed high levels of Problem Solving and Planning Skills given the fact that this is a Supplemental Subdomain and, therefore, not a required code as were the Core Subdomains.

Although children displayed high rates of the above-mentioned behaviours during spontaneous play, they rarely engaged in several types of play from the other Subdomains. Children displayed Discrimination/ Classification Skills with some frequency but at a much lower rate. Drawing, counting and sequencing behaviours were rarely observed.

Consistent with previous research, statistically significant age trends were found in Exploratory Play. Overall, the older children engaged in more complex types of play than the younger children did. These results validate the use of the coding scheme for the Subdomains of Early Object Use-Simple Exploration, Early Object Use-Complex Exploration and Pretend Play. To date, no other research has investigated how play changes across time in session. Results from this study indicate a trend toward play becoming more complex from the beginning to the end of a play session. Any trends in the Supplemental Subdomains are tentative due to low frequency of occurrence.

The playroom used in this study included a wide variety of toys but children showed preferences for specific toys. For example, children spent a large portion of time with dolls, kitchen toys, mechanical toys, puzzles, vehicles, farm set and telephones. Children in this study rarely played with blocks, puppets, drawing materials, dress-up clothes or dinosaurs.

Implications for Practitioners

Results from this study have several important implications for conducting play assessment sessions and coding and interpreting play behaviours. First, practitioners should consider using a standardized procedure that includes nonfacilitated play. Practitioners should avoid directing the child's play and, instead, allow the child to demonstrate behaviours spontaneously. Furthermore, the spontaneous play should be observed for at least 30 minutes in order to determine the child's optimal level of play in the Core Subdomains and in Problem Solving and Planning Skills. If practitioners are interested in eliciting behaviours from the Supplemental Subdomains, they may choose to facilitate play after 30 minutes of spontaneous play. Although a variety of toys is necessary to elicit different Subdomain behaviours, an entire playroom may not be essential.

Second, the coding scheme used in this study was appropriate for analysing the behaviours observed in play assessment. We achieved very high inter-rater reliability with a very complex coding scheme. Therefore, with training and experience, practitioners can use this coding scheme with confidence when assessing 2 and 3 ½-year-olds.

Finally, until this study, no standards existed for what typical children demonstrate during nonfacilitated play sessions. Therefore, practitioners run the risk of drawing inappropriate conclusions from the play

session. For example, if a practitioner assumes that children engage in a variety of types of play during the session, they may assume that the lack of certain play behaviours suggests that the child does not possess that particular skill. The results of the present study actually indicate that it may be typical for children to show limited range in their play skills. More research is obviously necessary to support this claim.

Limitations

The purpose of the present study was to begin investigating play assessment as a measure of cognitive skills in young children. As with most research conducted with young children, recruiting a wide variety of participants can be problematic. Participants in this study were primarily middle-class and Caucasian. Thus the results do not immediately generalize to other groups. Further, the qualitative component of the study must be interpreted with caution due to the small number of participants and the low incidence of play behaviours from the Supplemental Subdomains.

Future Directions

Research on play assessment is limited and many more studies are needed before it can become an established method of evaluating cognitive skills in young children. Future studies should expand the participant characteristics to include all socioeconomic and ethnic groups. After researching the procedures and coding scheme in typically developing children, studies must extend to exceptional children. For play assessment to be useful to practitioners, it must successfully discriminate between children who need early intervention services and those who do not. The present study has provided preliminary evidence that play assessment is sensitive to age differences and, therefore, one might hypothesize that it will be able to identify children in need of special services.

The use of Core and Supplemental Subdomains deserves further attention and future studies should explore their use in determining eligibility for special services. Because the Core Subdomains are observed during spontaneous play, their use in making eligibility decisions should be investigated.

The qualitative portion of this study should be replicated and expanded to determine the usefulness of the Supplemental Subdomains. Although Early Object Use and Pretend Play have been extensively studied, much less research has been conducted on these Supplemental Subdomains, especially with regard to their value in assessment.

Conclusions

This research is merely a first step towards validating a promising assessment tool, play assessment. The study provides important empirical evidence that play assessment can be used in a reliable manner and provides useful information.

Table 1. *Mean percentage of time engaged in play by subdomain and age group*

	Age Group	
Subdomain	*2 yr olds*	*3½ yr olds*
Non-Play	12.81	07.50
Simple Exploration	28.12	02.81
Complex Exploration	32.81	57.50
Pretend Play	26.56	32.19

Table 2. *Mean frequency of play behaviors in subdomains by age group and time in session*

	2 yr olds		*3½ yr olds*	
Subdomain	*Time 1*	*Time 2*	*Time 1*	*Time 2*
PSPS	4.88	3.50	4.13	4.75
PP-I	2.25	3.13	1.75	5.63
DCS	1.38	1.25	5.25	1.88
DS	0.00	0.00	0.00	1.75
PP-S	0.00	0.13	0.25	0.63
QS	0.13	0.00	0.38	0.25
SA	0.38	0.13	0.00	0.00

Note. PSPS = Problem Solving and Planning Skills; PP-I = Pretend Play-Integration; DCS = Discrimination/Classification Skills; DS = Drawing Skills; PP-S = Pretend Play-Substitution; QS = Quantification Skills; SA = Sequencing Abilities

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