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A Systematic, Reliable Approach to Play Assessment in Preschoolers

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ABSTRACT Play assessment is gaining attention as a measure of the developing skills of young children. The procedures and methods of coding child behaviours vary considerably across researchers and practitioners. Because of this, definitive statements about the use of play assessment cannot be made without further research. The present study is an attempt to report a set of standardized procedures for play assessment along with an empirically based coding scheme (PIECES). The reliability of this system of play assessment is also investigated. High inter-observer reliability was found along with moderate test–retest correlations for both the typically developing (r = 0.48) and exceptional (r = 0.58) children. Thus, this version of play assessment holds promise as an observation system for intervention and progress monitoring in early childhood. The authors stress that more research is needed in this area before play assessment can either be used in early childhood or discounted as an inappropriate tool.

KEY WORDS: alternative assessment; assessment; early childhood; play; reliability

The importance of early intervention services to prepare students for school is gaining international support (Grimley and Bennett, 2000). The belief is that, given appropriate intervention services at an early age, many potential academic, behavioural and physical problems can be prevented or at least lessened in intensity. In the United States, the Individuals with Disabilities Education Act of 1997 (IDEA 97) specifies services for infants and young children to fulfill the goals of prevention and reduction of intensity. Other countries have similar programs that focus on the needs of children prior to reaching school age. One goal common to all countries that focus on early intervention is to find those individuals who need services. Critical to this process is an appropriate assessment approach.

The assessment of preschool-aged children is challenging and involves several separate but related goals. Clearly, assessment is necessary for determining eligibility for early intervention and we have numerous evaluation processes and tests that meet this goal. However, the IDEA 97 indicates that assessments must go beyond determining eligibility and involve data collection processes that result in functional information that can be used to determine appropriate interventions and monitor progress. Many standardized tests and evaluation procedures, developed for the purpose of making eligibility decisions, do not provide the type of information needed for developing and monitoring interventions (Neisworth and Bagnato, 1992). Therefore, earlychildhood practitioners have sought out new methods of assessment that assist in determining appropriate targets of intervention and monitoring the effectiveness of these interventions. One increasingly popular choice is play assessment.

Play assessment is intuitively favourable to early childhood practitioners because preschoolers learn through play. It then is logical that the assessment system match the early childhood ‘curriculum’ of play. Play is what young children do. If more information can be obtained about where the child’s developmental functioning level is in terms of play, then the appropriate intervention can be developed and monitored. Play assessment has also increased in popularity because of dissatisfaction with existing standardized instruments (Barnett et al., 1992; Eisert and Lamorey, 1996; Fewell, 1991; Ross, 2002). For

example, Bagnato and Neisworth (1994) surveyed school psychologists working in early childhood and found that, while nearly 60 percent reported using standardized tests, they also reported that approximately 43 percent of the children were 'untestable' when using these same tests. Furthermore, 80 percent of the psychologists reported using alternative strategies, with play assessment being one of the most popular, second only to parent interview. Several models of play assessment have been developed since the method was first proposed in the 1970s, but use was not widespread until the early 1990s and the release of Linder's (1990, 1993) texts (Athanasiou, 2000).

In general, the play assessment process consists of an observation of a child's skills in the context of play. Early childhood professionals rate the child's abilities in various domains and determine whether they are significantly discrepant from typically developing peers. Play assessment results in a rich description of the referred child's strengths and weaknesses (Fewell, 1991; Linder, 1993; Linder et al., 1999). Play assessment is appealing because it is viewed as ecologically valid, flexible and motivating for the child, especially when compared to traditional standardized instruments. In addition, play assessment is believed to produce accurate information about a child's developmental level in important domains, and to lead directly to intervention development and progress monitoring (Fewell and Glick, 1993; Lifter, 1996; Linder, 1993; Lowenthal, 1997; Ross, 2002) all of which are important components to successful early childhood programs.

Children's *play* has long been universally recognized as important to cognitive development and has been the focus of much basic research and theorizing (e.g. Piaget, 1962; Vygotsky, 1933). Therefore, it is not surprising that play *assessment* is appealing to many early childhood practitioners. Adequate research, however, does not yet exist to support the use of play as a valid and reliable means of assessment (Ross, 2002). Because of its relatively new entry into the assessment arena, only a handful of studies have been conducted to determine the psychometric qualities of play assessment.

Fewell's Play Assessment Scale was the first measure of its kind to be subjected to empirical scrutiny. This method of play assessment involves a toy set appropriate to the child's age and coding guidelines. Some support exists for the scale's validity. Specifically, Fewell and Rich (1987) evaluated 17 children who were multiply handicapped and found strong correlations between the children's PAS scores and scales measuring behaviour, communication and cognitive skills. Support was also provided by Finn and Fewell (1994) who reported high correlations between PAS scores and nonstandardized measures of communication skills in a sample of 18 children who were deafblind.

Similarly, Myers et al. (1996) examined the social validity of Linder's (1993) Transdisciplinary Play-Based Assessment (TPBA) model and found that parents and professionals preferred it over more traditional methods of assessing young children. The evaluations were reported to result in more functional data about the referred child and be conducted in a timelier manner, both of which were important characteristics for parents and professionals in the study.

More recently, published research has emerged examining the relationship between various play assessment techniques and other standardized techniques (Farmer-Dougan and Kaszuba, 1999; KellyVance et al., 1999b). For example, Farmer-Dougan and Kaszuba (1999) examined the reliability and validity of play assessment in young children using a 13-item play assessment scale originally developed by Rubin et al. (1976). Farmer-Dougan and Kaszuba's sample consisted of 42 typically developing preschoolers who attended Head Start or YWCA childcare facilities. Play was observed and coded in real time as children engaged in circle time and free play with their peers. Adequate inter-observer

agreement was established by observing videotapes of a subset of the data. The results of the play assessment were subsequently compared to the Battelle Developmental Inventory (BDI) and the Social Skills Rating System-Teacher Form (SSRS) with the overall play score predicting the BDI score but not the SSRS.

In their study, Kelly-Vance et al. (1999b) investigated play assessment in a sample of 38 at-risk two-year olds. Kelly-Vance and her colleagues compared children's results on the cognitive domain from Linder's (1993) TPBA and the Bayley Scales of Infant Development – Second Edition. Play was coded by a single practitioner with substantial experience with both instruments. A statistically significant correlation between the two measures was found, with play assessment resulting in slightly higher scores overall than the Bayley. Thirty-five of the 38 children received the same eligibility decision on both assessment techniques. The remaining three children did not qualify for services based on their play assessment results but would have qualified according to the Bayley score.

The studies reported above use a variety of procedures and coding schemes and, therefore, it is difficult to compare them in order to evaluate the usefulness of play assessment. As a result, our knowledge base about the psychometric characteristics of play assessment is minimal at best. Given that play assessment measures are being used by practitioners to evaluate the performance levels of young children, more rigorous study of the process is desperately needed (Athanasiou, 2000; Fewell, 1991). Currently, various procedures and coding schemes are being used in the field, with PAS and TPBA being the most common (Athanasiou, 2000). Procedures vary primarily in terms of level of adult and/or peer facilitation and interaction and the types of play behaviours that are coded (see Linder and Fewell for a more in-depth description of their play assessment models).

In order to conduct empirical research on the utility of play assessment, the process of play assessment must be standardized so that various features may be manipulated in order to understand the influence they have on children and their play. This has been our goal in an ongoing line of programmatic research using a preliminary version of the Play in Early Childhood Evaluation System (PIECES) (Cherney et al., 2003; Gill-Glover et al., 2001; Kelly-Vance and GillGlover, 2002; Kelly-Vance et al., 1999a, b; Kelly-Vance et al., 2000; Kelly-Vance et al., 2002; King et al., 2003; McCaslin et al., 2003; Ryalls et al., 2000). Specifically, we have been attempting to develop a consistent procedure for conducting the observation of a child at play and a research based method for coding the play behaviours (i.e. one that is reliable across raters and settings) and the studies listed above are the early phases of developing our observation procedures and coding scheme. (The results of this work are described in detail in the Methods section.) This way, the procedure and coding scheme can be evaluated to determine psychometric characteristics. We believe that this is what is missing in the existing literature base on play assessment. In our published research to date we have focused on *spontaneous unstructured* play because we believe the easiest way to ensure standardization of the procedure is to remove adult guidance and/or prompting from the play situation. Instead, in our procedure, the toys provide the stimuli for play behaviour. In addition, in our research thus far we have focused solely on the cognitive domain. The cognitive domain was chosen because school psychologists are primarily asked to evaluate the cognitive skills of children who are referred for early intervention services.

Preliminary results examining the characteristics of play in a single session were published previously by Kelly-Vance et al. (2002). In this study we demonstrated empirically that the unstructured free-play of typically developing two- and three-year-old children can be reliably coded using a complicated coding

scheme consisting of multiple subdomains. The results of Kelly-Vance et al. (2002) indicated that the complexity of exploratory play increased with age and, to a lesser degree, across time in session.

The purpose of the present study was to extend the work of KellyVance et al. (2002) and examine the reliablity across raters and sessions of the Play in Early Childhood Evaluation System (PIECES) (described in detail below). Similar to Kelly-Vance et al. (2002) participants in the present study engaged in unstructured solitary free play in a play-room for a minimum of 30 minutes. The present study differed from Kelly-Vance et al. (2002) in that it involved a larger sample of typically developing children, a more practitioner friendly coding process and a significantly modified coding scheme. Furthermore, a sample of exceptional children was also included. Finally and perhaps most importantly, unlike the Kelly-Vance et al. (2002) study, participants in the present study returned for a second play session within three weeks of the original session.

Due to the relative newness of the PIECES, more research is necessary. We had two specific goals in conducting the present research. Our first goal was to establish and report information about inter-observer agreement. Very few published studies have reported inter-rater reliability data for play assessment, especially with scales as complex as the PIECES. Our second goal was to determine the test–retest stability of play assessment. No published play assessment study to date has examined the stability of play behaviours from one play session to the next.

Methods

Participants

Twenty-five typically developing (M = 32.44; Range = 19–46 months) and seven exceptional children (M = 37.57; Range = 22–52 months) participated in this study. The exceptional children were diagnosed with developmental delays in the cognitive and physical domains. Specifically, all of the exceptional children were diagnosed with speech/language delays, six out of seven participants were diagnosed with motor delays and two had serious health problems. All of the exceptional children received early intervention services through their public school system. The participants were from middle-class families and were predominately Caucasian. Specifically, 27 were Caucasian, three were African-American, one was Hispanic and one was Biracial. The sample of typically developing children included eight females and 17 males while the sample of exceptional children included four females and three males. Children were recruited from fliers posted around a college campus, by word-of-mouth and from a local respite care centre.

Instrument

The coding scheme used in the Play in Early Childhood Evaluation System (PIECES) was developed after an extensive review of the literature on play and existing play assessment coding schemes. In the developmental phase of the PIECES, the literature on play and play assessment was thoroughly reviewed. A preliminary version of the coding scheme was developed which included the cognitive items grouped into Subdomains, which are subcategories of cognitive skills in young children. A group of six school psychology and developmental psychology graduate students who had observed children's play during play sessions but had not been trained on any of the coding procedures evaluated the items within each of the Subdomains for understanding. For each item, the students were to list examples of play behaviours that corresponded to the specific item. When significant discrepancies or confusion

existed as to the focus of an item, the item was reworded. This revision process was repeated until a high degree of agreement was obtained. In addition, examples were added to some items when needed for clarification. To eliminate redundancy, items were compared across Subdomains and were reworded or omitted when redundancy was observed.

The final version of the PIECES coding scheme is composed of a 'Core' Subdomain and six 'Supplemental' Subdomains. The Core Subdomain includes 13 exploratory and pretend play behaviours and was drawn from the large literature on this topic (Fenson and Ramsay, 1980; Fenson, 1984; Lyytinen, 1991; Tamis-LeMonda et al., 1992; Tamis-LeMonda et al., 1994). Because exploratory play is the precursor to symbolic play, these skills are ordered along a developmental continuum consisting of 13 types of play behaviours. The five Supplemental Subdomains were originally drawn from a popular available scale (Transdisciplinary Play Based Assessment; Linder, 1993). These Subdomains include: Problem-Solving/Planning Skills, Discrimination/Classification Skills, Drawing Skills, Quantitative Skills and Sequencing Skills. Within each Subdomain, a list of developmentally sequenced items or play behaviours, is provided.

Materials

The playroom was filled with a wide variety of toys that were selected to elicit a rich array of play behaviours (Cherney et al., 2003) Toys were arranged in the room according to general themes such as kitchen area, blocks, colouring area, puzzles, farm, dolls and accessories and mechanical toys. To further ensure standardization, the arrangement was the same for every play session. A hand-held video camera was used to record each play session.

Procedure

Children were observed playing in the playroom on two separate occasions, an initial and a retest session. The initial and retest sessions occurred one to three weeks apart and the procedures involved in each session were identical. Each child was observed individually and two individuals, a session facilitator and camera operator, were responsible for conducting the play session. The session facilitator explained the procedures to the parent, made introductions and was available to play upon the child's request. The camera operator videotaped the child's play during the entire session but did not interact with the child.

To begin the session, the child entered the playroom with the parent and the session facilitator and the parent instructed him/her to play with whatever s/he wanted. The camera operator was already in the room and began taping as soon as the child arrived. In order to ensure standardization of the procedure, the parent was instructed to limit his or her interactions with the child to specified types of behaviors (Ryalls et al., 2000). Specifically, the parent was instructed not to direct or prompt any of the child's play or make any suggestions about toy selection. In addition, parents were asked not to label toys or actions or to ask the child questions. Instead, parents were only allowed to praise the child (e.g. 'Good job!') and imitate the child's play behaviour. The session facilitator sat on the floor and abided by the same rules as the parents. The parent and session facilitator were reminded of the guidelines (e.g. 'Please don't name objects') and allowable utterances (e.g. 'That's neat!', 'Wow!') by colourful signs posted on the walls of the playroom. Children were allowed to play with any of the toys. If a child played with the same toy for more than five minutes, the session facilitator asked the child, 'What else can you play with?',

but did not prompt play with any specific toys. Each session lasted 30–45 minutes and children were given stickers, a small prize and a t-shirt or gift certificate (worth $5.00) for participating.

Data coding

The PIECES was used to analyse the data from each play session. Coders were trained in a three-phase process. In the first phase, the trainers (the first two authors) introduced the PIECES coding guidelines to the team. Each Subdomain and every item within each Subdomain was thoroughly described with examples of play behaviour provided. In the second phase of training, two to three coders watched previously coded videotapes and discussed why the play behaviours were assigned specific codes. At a follow-up meeting, the group members asked questions, discussed the coding scheme and reviewed videotapes with the trainers. Phase three involved the students actually coding a series of videotapes in pairs. Each member of the pair coded separately and then discussed their codes and reconciled any differences. The entire team then met to review the tape and codes with the trainers. Inter-observer agreement was established for each dyad and then each dyad established their agreement with the trainers. Dyad membership changed for each videotape coded. When 90 percent inter-observer agreement was established between all dyads and the trainers, the coders were then allowed to code independently.

The play sessions were then coded for the typically developing and exceptional children, using the PIECES. Each session was coded by one of the trained members of the coding team. Thirty minutes of play was coded for each child, beginning when the child first touched a toy in the play room. A coder viewed the tape, documented the play behaviours and coded them according to the Core and Supplemental Subdomains. Then the highest level of play behaviour was determined for every Subdomain (Core and Supplemental). Highest level was used because Linder (1993) used this format and it is the method most commonly used by practitioners. Identical coding procedures were used for the initial and the retest play sessions. A second coder from the team coded 20 percent of the tapes. The inter-observer reliability was 90 percent for the typically developing children and 100 percent for the exceptional children.

Analysis and design

To determine test–retest reliability, the highest levels from the Core Subdomain were compared across the two sessions using a Pearson Product Correlation. As will be discussed below, we were unable to calculate correlations for the Supplemental Subdomains because of inconsistency of occurrence.

Results

The mean level of play in the Core Subdomain for both groups of children is presented in Table 1. Both typically developing and exceptional children engaged in considerable amounts of exploratory play and most children's highest level reached the pretend play level.

For the typically developing children, highest level in the PIECES Core Subdomain was moderately stable ($r = 0.482$, $p = 0.015$) across two sessions. The relationship was similar, although not statistically significant, for the smaller sample of exceptional children ($r = 0.575$, $p = 0.177$).

Although our intention was to calculate reliability for the Supplemental Subdomains, we were unable to do so because the participants did not consistently engage in all types of play represented by those

Subdomains. Relative to the other Subdomains, Problem-Solving/Planning Skills was most commonly observed followed by Discrimination/ Classification Skills; however, Drawing Skills, Quantitative Skills and Sequencing Skills were rarely seen in spontaneous play (see Tables 2 and 3). This was true of both typically developing and exceptional children in our sample.

Discussion

Our overarching goal in conducting this program of research is to provide early childhood practitioners around the world with empirical information about the validity and reliability of play assessment as it is currently being utilized in the United States. Our specific goals in the present study were to provide empirical evidence about inter-observer agreement and test–retest reliability using the PIECES coding scheme. Overall, the results of this research indicate that practitioners can be confident that the PIECES coding system *can* be used reliably and therefore meets one standard of early childhood assessment (NASP, 2000).

Specifically, with regard to reliability across raters, no study to date had examined inter-observer reliability of play assessment. Our results suggest that, in fact, play can be reliably coded at a very high level. This high degree of inter-observer reliability is particularly noteworthy given the breadth and complexity of the PIECES and the relative lack of play assessment experience of most of the observers. Training was no more extensive than what would occur for traditional standardized tests and complex observation systems.

With regard to reliability across sessions, in these two samples of typically developing and exceptional children, play was moderately stable across two sessions within the Core Subdomain. Given the observational nature of play assessment and the unstructured format used in this version, one would not expect the same high level of reliability found with traditional standardized testing formats. Therefore, these reliability coefficients are promising for play assessment especially considering the variable nature of children's play. With regard to the Supplemental Subdomains, which were included to add to the richness of play assessment, children in this study did not engage in these types of play behaviours consistently. These results suggest that this richness may not be attainable in a nonfacilitated format.

Consistent with other views (Fewell, 1991), we believe the appropriate use of play assessment would be as the functional assessment component of the evaluation. The Core Subdomain can be used to determine where the child is functioning, and then to develop the appropriate intervention. By knowing the highest level of exploratory/pretend play, educators can develop interventions that expand this highest level and facilitate the development of the next level in the play sequence. In this research we also learned that typically developing children in our sample gravitated toward functional, exploratory play rather than pretend play in our novel unstructured play setting. Therefore, it should not be alarming when referred children choose more functional play activities than pretend play in unfamiliar, unstructured contexts.

While we are confident in these suggestions about the use of the Core Subdomain, the utility of the Supplemental Subdomains is less clear. Whether or not these subdomains can be used in intervention development has yet to be determined and most likely depends on whether the play behaviours represented in the Supplemental Subdomains can be elicited by structured facilitation. One exception to these conclusions was with regard to the Problem-Solving and Planning Skills Subdomain. Behaviours

from this subdomain were observed quite frequently in nonfacilitated play but highest level varied considerably across sessions. The high degree of variability raises questions about the appropriateness of this subdomain in play assessment.

In developing the PIECES coding system we are attempting to develop a scheme that maximizes clarity and utility while providing a comprehensive evaluation of a child's strengths and areas of need. The breadth of the PIECES has the potential to provide a rich description of children's cognitive skills, which is useful when translating assessment into interventions. Although we have addressed important dimensions of play assessment, the results of this study have also raised several questions that can guide future research. This research should be expanded to include a larger, more diverse sample. The study deserves replication and expansion in countries other than the United States to analyse cross-cultural issues in play assessment. As previously stated, replication studies will be critical and it will be important to continue investigating play assessment in both typically developing and exceptional children. The impact of facilitation was not addressed in this study and it will be important for future studies to investigate *if* structured facilitation can be implemented in a standardized fashion and how structured facilitation might impact children's highest level of play in the Core Subdomain. Further research is also critical to determine if structured facilitation can be used to *elicit* play in the Supplemental Subdomains. Researchers should analyse how both adults and peers might impact play. Our research was conducted in a play lab that was unfamiliar to the children. Future studies should compare children's play in an unfamiliar context versus a familiar setting such as the home or childcare facility. Finally, all coding was conducted from videotape and it remains to be seen whether the same degree of reliability can be established in real-time coding.

The appropriateness of using highest level of play as a measure also deserves additional research. From an educational perspective, highest level of play is a logical outcome of the play assessment procedure. Using highest level of play as a measure gives the practitioner a baseline or 'starting point' on which to build with the appropriate intervention. It remains to be seen if highest level of play is appropriate for intervention development and progress monitoring. Future analyses could address other means of describing or measuring children's play and developing appropriate methods to monitor progress through interventions.

In conclusion, we were able to standardize play assessment and support its reliability as a measurement tool. The findings from this study, however, are tentative until additional research is conducted. This study provides a valuable addition to the sparse research base on play assessment. We hope that this study motivates others to address critical issues in the use of play assessment.

Table 1 *Mean highest level of play in the Core Subdomain (exploratory / pretend play) by group and session*

Group and Session	*Mean*[a]	SD	*Range*
Typical children			
Initial session	9.28	2.69	5–13
Retest session	9.68	2.2	5–13
Exceptional children			
Initial session	7.57	4.16	0–11
Retest session	7.57	2.70	5–13

[a]Maximum = 13.

Table 2 *Percentage (and number) of typical children demonstrating any level of performance in the Supplemental Subdomains by session*

	PSP	*DCS*	*QS*	*SA*	*DS*
Demonstrated at both initial and retest	88 (22)	64 (16)	8 (2)	4 (1)	0
Demonstrated at initial but not retest session	12 (3)	8 (2)	8 (2)	4 (1)	12 (3)
Demonstrated at retest but not initial session	0	24 (6)	8 (2)	16 (4)	20 (5)
Did not demonstrate	0	4 (1)	76 (19)	76 (19)	68 (17)

Note: Problem-Solving/Planning (PSP), Discrimination/Classification Skills (DCS), Quantitative Skills (QS), Sequencing Skills (SS), and Drawing Skills (DS).

Table 3 *Percentage (and number) of exceptional children demonstrating any level of performance in the Supplemental Subdomains by session*

	PSP	*DCS*	*QS*	*SA*	*DS*
Demonstrated at both initial and retest	71 (5)	43 (3)	0	0	14 (1)
Demonstrated at initial but not retest session	0	0	0	0	14 (1)
Demonstrated at retest but not initial session	14 (1)	29 (2)	0	0	0
Did not demonstrate	14 (1)	29 (2)	100 (7)	100 (7)	71 (5)

Note: Problem-Solving/Planning (PSP), Discrimination/Classification Skills (DCS), Quantitative Skills (QS), Sequencing Skills (SS), and Drawing Skills (DS).

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