

Contextually-Relevant Validation of Peer Play Constructs with African American Head Start Children: Penn Interactive Peer Play Scale

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Fantuzzo, J., Coolahan, K., [Mendez, J.](#), McDermott, P., & Sutton-Smith, B. (1998). Contextually – relevant validation of peer play constructs with African American Head Start children: Penn Interactive Peer Play Scale. *Early Childhood Research Quarterly*, 13, 411-431.
doi:10.1016/S0885-2006(99)80066-0

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Abstract:

The purpose of this investigation was to evaluate the construct and concurrent validity of a modified version of the Penn Interactive Peer Play Scale (PIPPS), a teacher-rating instrument of interactive play behaviors of preschool children. PIPPS were collected on 523 urban African American Head Start children. The PIPPS scales were confirmed, supporting the following constructs of peer play: Play Interaction, Play Disruption, and Play Disconnection. The 32-item PIPPS represented a significant improvement over the 36-item version. Scale validity was established using conceptually related indicators of social competence including teacher report, peer report, and direct play observation data. Children who evidenced high interactive play ratings received high social skill ratings from teachers, and were well liked by peers and engaged during play sessions. Children who were disruptive in play received ratings of low self-control and were more likely to be engaged in solitary play. Disconnection in play was associated with low acceptability by peers and lack of involvement in play sessions. Practical use of the PIPPS and further study of developmentally appropriate social competencies for African American Head Start children are discussed.

Article:

School readiness is a national priority. Heading the list of the National Educational Goals for the year 2000 is the objective that all children will enter elementary school "ready to learn" (Kagan, Moore & Bredekamp, 1995). Head Start, the largest federally funded program committed to school readiness for children living in poverty, has recently received an increase in funding to identify and enhance quality early childhood practices (Epstein, 1993). Early childhood associations, including the National Association for the Education of Young Children (1991), identify quality practices as those that are shaped by valid assessment of the developmental needs and capacities of young children. Meeting our national school readiness goals, therefore, necessitates having quality measures to evaluate the relationship between developmentally appropriate practices and positive developmental outcomes for an ethnically diverse population of Head Start children in the United States.

Unfortunately, the lack of empirically tested measures for Head Start children represents a significant barrier to assessing age-appropriate and culturally sensitive competencies. Within the important domain of social competence, the enhancement of which represents a principal

objective of all Head Start programming, existing teacher rating scales are insufficient to meet assessment needs for several reasons. First, measures are too often deficiency oriented and fail to assess children's strengths. Second, scales that do seek information concerning competencies generally fail to address the particular developmental challenges being negotiated by preschool children, such as children's peer interactions. Most measures are either downward extensions of scales initially developed for elementary school children or global decontextualized inventories of general social functioning with adults and peers (Ladd & Profilet, 1994). These inventories fail to address the specific contextually relevant competencies that are emerging during the preschool years. Lastly, the psychometric rigor of some preschool behavior ratings scales is seriously lacking (Aman & Rojahn, 1994; Martin, 1986), especially with regard to low-income or minority children. Scale developers often fail to include these important subpopulations, which represent a high priority target for school readiness intervention, in the psychometric evaluation of their scales (Fantuzzo, McDermott, Manz, Hampton, & Burdick, 1996). Therefore, the design and validation of quality measures of preschool social competencies for major Head Start subpopulations that are based on a developmental approach are needed to inform quality practices (Collins, Kinney, & Haran, 1990). This is the primary objective of the present study.

A developmental approach to the study of social functioning requires attention to age-appropriate social competencies in context (Cavell, 1990; Ford, 1982). An application of this perspective to the preschool years involves the examination of peer play as a specific social context in which children develop effective peer relationships (Gallagher, 1993; National Association for the Education of Young Children, 1991). The formation of effective peer relations is a critical, developmentally salient task for preschool children and is considered an indicator of healthy adjustment (Guralnick, 1993; Cicchetti, 1990). An inability to successfully negotiate the implicit social rules and exchanges among peers often results in peer rejection (Coie, Dodge, & Kupersmidt, 1990; Hatch, 1987). Longitudinal research has linked peer rejection with detrimental consequences during later developmental periods, including emotional maladjustment, school failure and delinquent behavior (Denham & Holt, 1993; DeRosier, Kupersmidt, & Patterson, 1994; Parker & Asher, 1987).

Piaget and others have identified children's peer play as a primary context for the acquisition of important social competencies. Piaget (1952, 1962) established that play is often the medium through which children build social collaboration skills and learn to coordinate multiple points of view. Specifically, play interactions within the peer group are critical for providing the young child with feedback necessary for the socialization of the child. Children who are involved in free play activities (e.g., negotiation over toys, sharing) are provided with increased opportunities for exposure to the opinions, attitudes, and ideas of other children (Guralnick, 1993). Through interaction with peers in play, children are able to move away from egocentrism towards acknowledging realities and perspectives that are different from their own. These repeated interpersonal interactions, especially those involving prosocial behavior or aggressive encounters, are important experiences that impact children's overall cognitive and social development (Hartup, 1983; Ladd, Price & Hart, 1990).

Other developmental theorists such Erikson (1968) and Vygotsky (1976) also identify play as a primary setting in which important peer socialization experiences occur during the preschool years, and research has supported these claims. In a metaanalysis of 46 studies on play and

development, Fisher (1992) concluded that play resulted in "moderately large" to "noteworthy" improvements in children's development, enhancing the progress of early development from 33% to 67% by improving adjustment and reducing language problems and socioemotional difficulties. Research has also revealed significant correlations between preschoolers' levels of sociodramatic play and measures of social competence and peer acceptance (Connolly & Doyle, 1984; Rubin & Hayvern, 1981) and between the ability to become accepted in play and all other estimates of peer acceptability (Pellegrini, 1988).

CULTURAL FACTORS AND PEER PLAY

Despite research findings touting the developmental benefits of peer play, Smith (1995) cautions against drawing simple conclusions concerning the benefits of play for diverse groups of children. He points to the unanswered questions surrounding play, including whether and how the value of play varies among different cultural groups. Although some research indicates that socioeconomic status (Rubin & Hayvern, 1981) and ethnicity (Bierman, 1986) contribute to differences in the quality of children's social relationships, these issues remain poorly understood. Based largely upon work with white middle-class, elementary school children (Kennedy, 1988), the existing knowledge base regarding social competence with peers inadequately characterizes the developmental processes and functioning of minority and low-income groups of children (Garcia Coll et al., 1996). The resultant application of majority-based theory and norms to minority children has yielded little information about unique aspects of minority children's development (Spencer, 1990). New approaches are needed, therefore, to explore normative processes within groups of minority children (Garcia Coll et al., 1996).

African American children represent an important and understudied segment of the population and comprise the largest group of Head Start children, especially within urban settings (US Department of Health & Human Services, 1993). Some research has examined play among low-income and minority children; however, considerable disagreement persists within this literature regarding the amount and quality of play among low-income and black children (McLoyd, 1985). Although many studies involving children from these groups are questionable due to measurement issues, assumptions regarding the deficiencies inherent in black children's pretend play remain widely accepted (McLoyd, 1985). Consequently, scholars have stressed the importance of conducting intragroup studies of children's play in order to disentangle the effects of socioeconomic status and ethnicity (Fein, 1981; McLoyd, 1985; Weinberger & Starkey, 1994). A recent observational study of Head Start children's pretend play documented the diverse play types of African American children including functional play, constructive play, and pretend play—with pretend play being short in duration but high in quality (Weinberger & Starkey, 1994). Other work addressing minority children's play has emphasized the study of natural play contexts in order to appreciate cultural variations in play (Farver & Howes, 1993). In sum, this literature calls for more studies that focus on the natural play settings of African American children and survey the strengths and diversity of children's play behaviors.

Addressing this need to refine our understanding of African American children's play requires a strategy for learning about minority children's development that does not impose upon the inquiry process any preconceived, majority-based theories of behavior and development (Ogbu, 1988; Burlew, Banks, McAdoo & Azibo, 1992). Gaskins (1994) recommends four steps to enhance the cultural and developmental validity of psychological measurement for ethnic-

minority populations: a hypothesis-generating phase, a category-generating phase, a measure-generating phase, and after data collection—an interpretation-generating phase. Specifically, these phases must target the examination of behavior in the child's natural context. These recommendations for conducting research are consistent with ethological methods, which have also been endorsed for the study of preschool children's peer play (Pellegrini, 1992).

An ethological approach is based upon detailed, inductively-derived descriptions of children's behavior in their natural context rather than upon existing theory and categorical systems which are largely noninclusive of nonmainstream groups (Pellegrini, 1992). Ethological methodology calls for a preliminary phase of unstructured observation during which a descriptive base of typical behavior patterns is compiled (Smith & Connolly, 1972). Significant effort is devoted to first describing the phenomena of interest without making judgments about categorization of behaviors. Once a thorough descriptive base is catalogued, factor analytic and/or sequential analytic techniques can be employed to uncover behavioral categories. These categories can eventually become the foundation for the development of measurement tools. Because ethological methods promote the inductive description and categorization of behaviors and minimize the extent to which preconceived, culture-laden conceptualizations are imposed upon the phenomena of interest, they are a sensible first step to conducting research with understudied, nonmainstream populations.

One setting which could greatly facilitate such investigations is the Head Start classroom. Head Start is a place dedicated to the service of low-income families, and is currently fostering the development of increasingly diverse groups of children (Zigler & Styfco, 1994). Indeed, researchers are beginning to call for "a new agenda of research on Head Start" which attempts to account for the range of needs and experiences of children from diverse populations (Takanishi & DeLeon, 1994). Of course, examination of these processes must be predicated on researchers' dedication to the development of psychometrically sound measurement designed for and in collaboration with members of minority populations. The following section describes how ethological principles were applied to the development of a measure of preschool interactive peer play behaviors with a population of African American Head Start children living in a large urban center.

DEVELOPMENT OF THE PENN INTERACTIVE PEER PLAY SCALE

The Penn Interactive Peer Play Scale (PIPPS; Fantuzzo, Sutton-Smith, Coolahan, Manz, Canning & Debnam, 1995), a teacher rating scale of preschool children's interactive peer play competencies, was developed in partnership with Head Start teachers and parents. The primary purpose for developing the measure was to inform early intervention for an important Head Start subpopulation—African American children living in high-risk urban environments. The items of the scale were designed to assess competencies within play that differentiate children who demonstrate positive peer relationships from those who are less successful with peers. This partnership process began with intensive observation and coding of the free play activities of Head Start children by graduate research assistants, parents, and teachers. Behaviors which reliably distinguished successful peer play interactions from unsuccessful peer play interactions were identified, and subsequently crafted into 36 four-point ("never, seldom, often, always") Likert scale items. These items included descriptions of both positive play behaviors and negative play behaviors, thus allowing raters to indicate both strengths and weaknesses of Head

Start children's play behavior. Additionally, incorporating teacher and parent input into each stage of development of this measure was intended to heighten researchers' sensitivity to meaningful cultural expressions contained within children's play.

Analyses were conducted on the PIPPS with a sample of 312 low-income urban African American children to establish construct and concurrent validity (Fantuzzo et al., 1995). With respect to construct validity, exploratory factor analyses of the 36-item scale revealed that the PIPPS consists of 3 underlying dimensions of children's play: interaction, disruption, and disconnection. Play Interaction emerged as an indication of children's play strengths and includes prosocial items such as comforting and helping other children, showing creativity in play, and encouraging others to join play. Play Disruption consists of items relating to aggressive, antisocial play behaviors while Play Disconnection consists of items describing withdrawn behavior and nonparticipation in peer play. These factors were found to be internally consistent and to correlate with each other to an acceptably minor degree, indicating that they reflect measurably differing constructs. Nine of the 36 items, however, were unclassifiable because they were strongly associated with more than one factor. Inspection of these items revealed that they were worded in a relatively vague or unclear manner. Finally, four items did not associate appreciably with any of the factors.

Concurrent validity was established by comparing the factor patterns of the PIPPS with an additional teacher rating scale, the Social Skills Rating System (SSRS; Gresham & Elliot, 1990). Results showed that across the two measures, the PIPPS Play Interaction factor correlated positively with the SSRS social skills factors and negatively with problem behavior factors, whereas the Play Disruption and Play Disconnection factors of the PIPPS correlated positively with SSRS problem behavior factors and negatively with social skills factors.

Based on this initial research, several revisions were proposed to strengthen the structure of the PIPPS. In an attempt to reduce the number of items loading on more than one factor, the research team made minor adjustments to the wording of the nine double-loading items. Additionally, the four nonloading items were removed. The prepared 32-item version of the PIPPS was then ready for extensive testing of its psychometric adequacy as a measure of urban Head Start children's peer play behaviors.

To investigate concurrent validity for the PIPPS, two contextually relevant measures of children's peer play behaviors—peer ratings and observations of peer play—were compared to the PIPPS teacher data. These methods allow for the collection of multimethod, multisource data within the natural setting of the classroom. Because interactive peer play contributes to children's effective peer relations during preschool (i.e., LaFreniere & Sroufe, 1985), the detection of meaningful empirical relationships between children's interactive peer play behaviors and their relative status among peers represents a logical source of validity for this measure. Additionally, direct observations of interactive play can provide further information about children's peer play repertoires. Advocates of observational systems have also argued that research utilizing such approaches to observe social goals and behavioral strategies of young children could form the basis for developing teacher rating instruments (Brown, Odom & Holcombe, 1996). Agreement among these multiple data sources would support the validity of the PIPPS as an indicator of children's classroom peer play behaviors.

The purpose of the present investigation is threefold: (a) to determine if a refined 32-item scale structure represents an improvement over the 36-item scale structure, (b) to replicate prior concurrent validity findings with a new cohort of Head Start children, and (c) to extend concurrent validity for this instrument by utilizing additional conceptually relevant indicators of effective peer interactions and classroom social competence. Toward these ends, the study assessed the construct validity of a 32-item version of the PIPPS and assessed the concurrent validity of the PIPPS with a teacher rating scale of social skills, peer sociometric data and direct play observations. It was hypothesized that children rated by teachers on the PIPPS as engaging in positive play interactions would also be rated as being socially skilled, accepted by peers, and would be observed engaging in positive play interactions with peers. Conversely, children rated by teachers as being disruptive or disconnected from others during peer play were expected to receive less favorable social skill, sociometric, and observational ratings.

DESCRIPTION OF SAMPLE AND DATA COLLECTION PROCEDURES

Five hundred and twenty-three preschool children enrolled in a large central-city Head Start program participated in this study. All children were African American and ranged in age from 37 to 64 months ($M = 51.24$, $SD = 6.84$). Gender was evenly distributed (48.5% boys, 51.5% girls). Demographic data for the sample showed that 65.4% of the children resided in single female-headed households, 24.5% resided in two-parent households, and 10% resided in blended family households. These data also indicated that there were an average of 3.13 ($SD = 1.65$) children per household and that the birth order of the participants was distributed as follows: 36% first-born, 35% second-born, 15% third-born, and 14% fourth child or more in the family.

The participants were recruited from representative Head Start centers across a major metropolitan area in the Northeast. Demographic composition of the program matched national proportions for urban Head Start programs, with 90% of the families having incomes below \$12,000 and most families (64%) having incomes below \$6,000. Before contacting children's parents, Head Start parent-leaders and staff reviewed the research objectives. Upon approval, the objectives of the study were explained to parents, and permission was obtained for child participation.

After parental permission was obtained and parents had completed a brief demographic questionnaire, 32 teachers from a total of 8 centers were asked to complete measures on those children for whom parental permission had been granted. Approximately 30% of the teachers in this Head Start program were African American. Ratings were also collected from 32 assistant teachers (100% African American) for a subsample of 100 Head Start children. The dissemination and collection of measures occurred each week, with graduate research assistants checking the completion of each measure. This collection process yielded 523 completed PIPPS teacher ratings, and 100 completed PIPPS assistant teacher ratings.

CONSTRUCT VALIDITY

To determine the construct validity of the 32-item PIPPS with African American Head Start children, the 523 teacher PIPPS were subjected to a series of common factor analyses using both orthogonal (varimax, equamax) and oblique (promax) solutions.¹ These exploratory factor analyses revealed the identical three-factor solution derived from the preliminary version: Play

Interaction, Play Disruption, and Play Disconnection. Table 1 presents the item content and factor loadings for each of these factors. The three factor varimax solution was selected because it best satisfied multiple criteria for retention. First, the three factors were within the limit indicated by Cattell's (1966) scree plot. Second, each of the three factors

Table 1. Varimax Factor Structure of the Penn Interactive Peer Play Scale (N = 523)

	Factor 1	Factor 2	Factor 3
Factor 1: Disruption (alpha = .92)			
Starts fights & arguments	.84	.17	.04
Grabs others things	.84	.07	.17
Disrupts play	.83	.12	.11
Is physically aggressive	.83	.08	.02
Verbally assaults others	.74	.16	.05
Destroys others' things	.70	.10	.16
Doesn't take turns	.65	.14	.14
Tattles	.58	.14	.13
Cries, whines, shows temper	.57	.30	.03
Disagrees with others	.57	.01	.18
Does not share toys	.56	.20	.34
Rejects play ideas of others	.51	.31	.09
Factor 2: Disconnection (alpha = .91)			
Is ignored by others	.18	.76	.20
Hovers outside play group	.05	.75	.32
Withdraws	.01	.75	.19
Needs help to start playing	.10	.68	.33
Wanders aimlessly	.19	.69	.30
Seems unhappy	.20	.59	.08
Refuses to play when invited	.17	.57	.08
Confused in play	.21	.56	.26
Needs teacher's direction	.37	.44	.38
Factor 3: Play Interaction (alpha = .89)			
Comforts others when hurt or sad	.04	.11	.79
Helps other children	.16	.18	.74
Creative in making up play	.09	.24	.72
Helps settle peer conflicts	.09	.19	.70
Verbalizes stories	.06	.23	.69
Encourages others to join play	.06	.34	.67
Directs others' actions politely	.22	.08	.64
Positive emotion during play	.19	.34	.42
Remaining Double Loading Items^a			
Is rejected by others	.42	.61	.05
Flexible - can go with the flow	-.48	.26	.44
Has difficulty moving from one activity to another	.42	.49	.22

Note: ^a items are psychologically meaningful on more than one factor.

accounted for greater than 5% of the total variance. Third, each of the three factors had an eigenvalue greater than one. Fourth, this solution resulted in the lowest interfactor correlations. Finally, each construct was found to be highly reliable with Cronbach alphas of .92, .91, and .89, respectively. Additionally, 29 of the 32 items (91%) loaded appreciably on only one dimension, compared to the 27 out of 36 items (75%) for the preliminary version.

The integrity of the proposed solution was substantiated through cross-validation and confirmatory analyses. The large sample used for the above analyses was bifurcated randomly to assess the degree to which the final three-factor solution would replicate across two independent samples. The analyses conducted with each subgroup also supported a three-dimensional structure. The degree of congruence across the final factor solutions derived from the total and two bifurcated samples was statistically analyzed using Wrigley-Neuhaus coefficients of factorial congruence. Wrigley-Neuhaus analyses involve comparisons across every possible combination of factors, yielding two types of coefficients: one that shows the extent of similarity across factors and, conversely, one which shows the degree of dissimilarity. High levels of congruence (coefficients $> .98$) were found for like factors in comparisons between each subgroup and the large sample. Coefficients for unlike factors were low to moderate ($< .48$), appropriately indicating a lesser degree of congruence. Additionally, similar levels of congruence were found for like and unlike factors in comparisons between male and female subgroups and the larger sample. These multiple replications of the factor structure with random and gender-specific subsamples inspire considerable confidence in the integrity of the three-dimensional structure.

In order to confirm composition of the final three factors with the total sample, the 32 items retained during exploratory analyses were subjected to confirmatory analyses (Anderberg, 1973; Harman, 1976). The purpose of confirmatory analyses was to compare other possible factor structures to the empirically derived factor structure to determine if the alternative structures were more statistically acute. The results of these analyses evidenced that the empirically derived factor structure was superior to any of the alternative structures.

CONTEXTUALLY-RELEVANT CONCURRENT VALIDITY

Assistant Teacher Report

The purpose of collecting PIPPS ratings from a subsample of assistant teachers was to provide a check on the cultural validity of the PIPPS scales. Cultural validity is addressed when indigenous members of the children's community, who share common characteristics such as ethnicity, neighborhood, and social class, conduct observations and participate in assessment activities. Assistant teachers were selected as raters for our sample because they are a group of African American adults who are also parents of former or current Head Start children. The assistant teachers have the same amount of exposure to the Head Start children as the head teachers, and can provide a mechanism for evaluating the authenticity of the ratings of Head Start teachers. This evaluation was critical, as only 30% of the teachers were African American, and many teachers did not live in the centers' surrounding neighborhoods. The level of agreement between the assistant teachers and teachers' ratings for the PIPPS was calculated for a subsample of 100 Head Start children. A correlation coefficient of .85 was found indicating a high level of agreement between assistant teachers and teachers on PIPPS ratings. This agreement between members of the children's natural context lends support to the cultural validity of the PIPPS.

Teacher Report

The preschool version of the Social Skills Rating System (SSRS; Gresham & Elliot, 1990) was selected for use in establishing convergent and divergent validity. The teacher-report form is a downward extension developed from the elementary school version of the SSRS and consists of two scales: 1) Social Skills and 2) Problem Behaviors. The Social Skills Scale presents a

checklist of 30 prosocial behaviors while the Problem Behaviors Scale includes 10 items. An investigation of the reliability and construct validity of this instrument for urban Head Start children (Fantuzzo, Manz, & McDermott, 1998) found three distinct factors on the Social Skills scale: Self-Control, Interpersonal Skills, and Verbal Assertion. Two factors were found for the Problem Behaviors Scale representing Externalizing behavior problems and Internalizing behavior problems. All factors were reliable, with reliability coefficients of .91, .88, .79, .88, and .77, respectively. However, hierarchical and canonical analyses demonstrated that the five factors yielded only one higher-order factor, with the Social Skills factors loading positively and the Problem Behaviors factors loading negatively. Because the two groups of items are actually inversely related to a common social competence construct and therefore provide redundant information, only the 3 Social Skills factors, Self Control, Interpersonal Skills, and Verbal Assertion, were utilized in this study.

Canonical variance analysis was used to assess the convergent and divergent validity of the PIPPS factors. The three social skills factors of the SSRS served as external validity criteria. Within this context, some investigators would prefer to visually inspect and interpret a bivariate correlation matrix displaying all the possible pairwise correlations between the 3 PIPPS and 3 SSRS factors. But it is well known that such visual inspection and interpretation are prone to error and can be inadvertently distorted based on the observer's presentiments. Many researchers (Thorndike & Weiss, 1973; Weiss, 1972) make clear that any question regarding the complex relationship between multivariate domains (e.g., peer play and social skills) must be simultaneously assessed such that (a) the different divergent and convergent relationships *between* the one set and the other set emerge, and (b) the picture is not confounded by inattention to the redundant relationships among the variables *within* either of the sets. Scientific parsimony would recommend a bivariate solution provided by canonical variance and redundancy analyses, where the PIPPS factors comprises the first multivariate data set and the SSRS factors the second.

Table 2 reports these loadings for the teacher forms of both measures based on the variate pairs associated with three significant canonical correlations (canonical $r = .76, .64, \text{ and } .30$). The Prosocial Interactive variate contains the greatest overlap between the Play Interaction dimension of the PIPPS and the Interpersonal Skills dimension of the SSRS. The greatest overlap in the Disruptive behavior variate was evidenced between Play Disruption on the PIPPS and lack of Self Con-

Table 2. Canonical Structure of the Penn Interactive Peer Play Scale (PIPPS) with the Social Skills Rating System (SSRS)

Variable	Canonical Variate Set		
	Prosocial Interactive Behavior	Disruptive Behavior	Peer Avoidance Behavior
PIPPS Dimensions			
Play interaction	.98	.04	.18
Play disruption	-.14	.98	.11
Play disconnection	-.66	.18	.73
SSRS Dimensions			
Self control	.60	-.80	.05
Interpersonal skills	.96	-.05	-.29
Verbal assertion	.85	.20	.49

Note: $N = 428$.

trol on the SSRS. For the Peer Avoidance variate, the Play Disconnection dimension of the PIPPS showed the highest loading, overlapping slightly with the Verbal Assertion scale of the SSRS. The Verbal Assertion scale primarily involves assertion to teachers about "unfair" conditions and contains only one peer interaction item. As revealed in these variates, the PIPPS and SSRS factors relate to each other in a theoretically consistent and sensible manner. Squared canonical correlations showed that the Prosocial Interactive variate accounted for the largest amount of overlapping variance (58%) between the two measures. Redundancy analyses revealed that the SSRS dimensions could account for 42.9% of the variance in the dimensions of the PIPPS, while the PIPPS constructs could account for 48.8% of the SSRS dimensions. [Wilks' $\lambda = .23$, $F(9, 1027) = 96.64$, $p < .0001$].

Sociometric Assessment

Sociometric ratings and nominations, based on methods adapted by Howes (1988) specifically for preschool children, were also collected. In the context of individual interviews with the current Head Start children, photographs of classmates were used to facilitate the rating and nomination processes. The procedure first ensured that children could identify classmates in their respective photographs by requiring each child to name each peer by photograph. No child performed the task with less than 100% accuracy.

Each child was then presented with the full set of respective classmate photographs. Consecutively, children were asked to select photos of children with whom they like to play, for a total of three such positive nominations. As each nomination was made, the selected photo was removed. Thereafter, all classmate photos were replaced and the procedure was repeated for comparable nomination of peers with whom they do not like to play. Nominations yielded two scores per child; highest possible nomination (HPN) and lowest possible nominations (LPN). The scores represent the percentage of total positive and negative nominations given to a child by classmates.

Additional peer ratings were obtained by asking children to assign classmate photos to bowls varying in size to indicate degree of preference: "Like to play with," "Do not like to play with." As with peer nominations, ratings were transformed into highest possible rating (HPR) and lowest possible rating (LPR) scores representing the percentage of positive and negative ratings

given to each child by classmates. Nominations and ratings were mixed across gender, indicating no detectable gender bias for the highest or lowest categories. To enable large-group comparison involving children from various classes, rating and nomination scores were standardized based on scores for each classroom.

These sociometric procedures showed acceptable levels of reliability and validity (Howes, 1988). Test-retest assessment of peer ratings demonstrated moderately high ($> .76$) stability for three- and four-year olds over a 2-week interval. Moderate stability ($> .54$) was obtained for positive and negative nominations obtained from the same children. Concurrent validity was established by comparison to teacher ratings of peer acceptance. For both ratings and nominations, high levels of agreement (78%) were reported.

Canonical analyses were then conducted to better understand the relationship between the teacher-reported PIPPS constructs and sociometric ratings and nominations for children from two-thirds of the participating Head Start classrooms ($N = 324$). These analyses revealed one significant variate pair (canonical $r = .35$). This variate is comprised of strong positive loadings for both Play Interaction and High Peer Ratings and strong negative loadings for Play Disconnection and Low Peer Ratings, and was named Peer Acceptance. Although this variate was significant ($p < .0001$), the degree of overlap was relatively small, with the Peer Acceptance variate accounting for just 11.9% of the overlapping variance and redundancy assessments totaling less than 10% [Wilks' lambda = .86, $F(12, 886) = 4.3$, $p < .0001$].

Peer Play Observations

Direct observational data concerning the amount and quality of peer social interactions was considered to be another important indicator of validity for the PIPPS. An interactive peer play observational coding system, based on the developmental preschool play research literature, was tailored for use in Head Start and piloted prior to this study. Parten's (Iwanaga, 1973; Parten, 1932) basic categories of preschool social interaction (unoccupied, solitary, parallel, associative, and cooperative play) were modified to describe concrete characteristics of dyadic play interactions that were observable in Head Start classrooms during free play sessions. Specifically, graduate student and Head Start parent research assistants worked together over several months to adapt this coding system. Their joint effort involved watching videotapes of Head Start children at play and brainstorming about the appropriateness and feasibility of using the existing coding procedures referenced above.

The resulting categories are as follows: nonrelating activities, social attention, interactive play, and negative play interactions. Nonrelating categories included Nonplay (sitting or standing without playing, or watching without playing) and Solitary play (playing independently without looking at or talking to the other child). The Social Attention category referred to independent play in which the child showed some awareness of what the other child was doing (i.e., looks at the other child). Interactive play included Associative and Collaborative play levels. The definitions for these categories are as follows:

Nonplay—unoccupied behavior (sitting or standing without playing) or watching without playing.

Negative—child hits, pinches or otherwise attempts to physically injure other child, or grabs an object from other child; child maliciously insults, teases, curses, screams at, or threatens other child.

Solitary—child plays independently without looking at or talking to other child. *Social Attention*—child plays independently but shows awareness of what the other child is doing (i.e., looks at other child); child does not speak to the other child.

Associative—child talks to, smiles at, and/or exchanges toys with the other child, but does not adjust own behavior to what the other is doing.

Collaborative—child collaborates with other child in play activity in a mutual, complementary way; child may take on a reciprocal role which is distinctively different than that of the other child and adjust his/her behavior according to the actions of the other child.

Coders were trained to code classroom play by using an interval time sampling method that employed alternating 15-s intervals. Coders alternated between watching the play for 15 s and then recording the appropriate codes during the next 15 s over a 10-min period. The highest (i.e., most interactive) level of peer play behavior displayed by dyad members was coded individually for each interval. This procedure yielded 20 samples of play behavior per child per play session. Interrater agreement was established before classroom coding was conducted and checked randomly to prevent drift. Interrater agreement across all observers and categories ranged from .80 to .96.

Correlations between the teacher-reported PIPPS factors and this observational data were computed for a subsample of 82 Head Start children. This subsample was collected within 10 classrooms involving approximately 8-9 children per classroom for whom parent permission to observe was granted. Collaborative play, the most interactive level of coded play, was positively correlated with Play Interaction ($r = .41, p < .001$), while Social Attention and Associative levels of play were negatively correlated with Play Interaction ($r = -.37, p < .001$; $r = -.24, p < .05$). Solitary levels of play (i.e., children playing alone) were positively correlated with Play Disruption ($r = .23, p < .05$) and Play Disconnection ($r = .24, p < .05$). Finally, Social Attention levels of play were positively correlated with Play Disconnection ($r = .22, p < .05$), while Collaborative levels of play were negatively correlated with Play Disconnection ($r = -.25, p < .05$).

DISCUSSION

The overall aim of this research was to refine and further validate the Penn Interactive Peer Play Scale for a population of urban Head Start children. We chose to examine peer relationships within play because play is a developmentally salient context in which preschool children acquire social competencies. Additionally, peer play behaviors were assessed within the Head Start classroom because the larger classroom ecology provides an important natural context for the study of peer play. Through this investigation, we obtained a three-factor solution providing support for three constructs of interactive peer play: Play Interaction, Play Disruption, and Play Disconnection. Play Interaction describes creative, cooperative, and helpful behaviors that facilitate successful peer play interactions. Play Disruption describes children's aggressive, antisocial play behaviors that interfere with maintaining ongoing peer interactions. Play Disconnection reflects withdrawn and avoidant behaviors that impede access and active involvement in peer play. These constructs were highly reliable, and 91% of the items on this refined version of the PIPPS loaded appreciably on only one factor. This is a definite improvement from the original version, which had only 75% of the items loading on one factor. Furthermore, the cross-validation and confirmatory analyses supported the factor structure.

Upon obtaining three reliable constructs of interactive peer play, our major effort was to discover if these constructs were indeed valid for this population of preschool children. Since our intent was to develop an assessment tool that was oriented primarily toward measuring social competencies, our validity assessment strategy included multiple methods of measuring effective peer interactions and school readiness constructs related to classroom peer interaction. The PIPPS measure continued to capture positive play interaction behavior among preschool children (Play Interaction factor). Moreover, these PIPPS' play strengths accounted for the majority of shared variance in the validity analyses, confirming the competency orientation that guided the development of this measure.

Findings from this study revealed meaningful relationships across measures that inform our understanding of how children's peer play behaviors comport with other data regarding preschool classroom functioning. In this study, children who demonstrated interactive play behaviors, such as directing play activity and helping other children, also received high teacher ratings for more general social skills. Additionally, children rated by their teachers on the PIPPS as exhibiting high levels of interactive peer play were also well-liked by their peers, as indicated by sociometric data. Although this relationship accounts for a small portion of the multifaceted picture of children's social competence, these results do indicate that children's positive and negative feelings about peers are significantly related to peer play interactions. Lastly, children who were observed to be involved in the highest levels of interactive peer play also received high teacher-reported PIPPS scores for Play Interaction, and low scores for Play Disconnection.

Support for these descriptions of socially competent children derived from our validity assessment can also be found in intensive observational studies and metaanalyses of the play literature. Corsaro's (1985) ethnographic study provides detailed reports of empathetic verbal phrases, stories about past injuries, and caretaking behaviors of preschool children that highly resemble PIPPS items such as "comforts others when hurt or sad," "verbalizes stories," and "helps settle peer conflicts." In addition, descriptions by Goncu (1993) of preschoolers' strategies for maintaining joint play interaction include extensions of play partner's ideas, which would necessitate "creativity in play"—a descriptor found on the Play Interaction factor. Furthermore, Fisher's (1992) metaanalysis of play research indicates a strong relationship between play and social perspective-taking, defined as "greater cooperative behavior, sociability, and heightened peer-group popularity" (p. 171). Lastly, prior ethological studies of young children's free play in the natural classroom environment have uncovered factors of social behavior that comport with our Play Interaction factor, such as Roper and Hinde's (1978) Social Maturity factor that was comprised of interactive peer play behaviors. This literature concurs with descriptors of socially competent children in our study who received high teacher ratings for Play Interaction. These results also provide testimony to the effectiveness of the ethological approach used to develop the PIPPS, as items transformed from direct observations of peer play in its natural context are valid descriptors of children's play behaviors.

In addition to assessing play strengths, the PIPPS also provides information about preschool children's needs with respect to peer-related social competence. For example, our investigations show that children who received high observer ratings for disruptive peer play also received teacher ratings indicating a lack of self-control. Children who were rated by teachers as disruptive in their play with peers also tended to be observed as engaging in solitary play.

Finally, these children were not well accepted by their peers, as indicated by sociometric data, which is consistent with reviews describing the peer difficulties of preschool children with behavior problems (Campbell, 1995). Prior ethological studies of young children's free play have also uncovered factors relating to aggression and expressions of negative affect, such as crying and whining, which overlap with the Play Disruption factor (Blurton Jones, 1972; Smith & Connolly, 1972). Future research on Play Disruption with preschool children is clearly warranted.

The PIPPS Play Disconnection factor relates in important ways to the difficulties that socially isolated children may have with peers within a classroom environment. Children who received high ratings for disconnected peer play (i.e., hovering around the play activity, refusing invitations to play) were observed attending to the play of other children but not participating. This observational data confirms that children who were disconnected in play were less likely to join in play activities. Because these disconnected children are not engaging in disruptive activity, they are potentially the least likely to have their distress recognized by adults. Additional assessments of peer acceptability indicate that children who are disconnected in play are also the least likely to be recognized by peers. Although children who receive high ratings for disruptive or disconnected peer play are not accepted by peers, this finding is most salient for socially disconnected children. This finding is consistent with literature describing disconnected children as going "unnoticed" by peers in the classroom, while disruptive children are at least getting attention, although often for negative behaviors (Coplan, Rubin, Fox, & Calkins, 1994). Our results also coincide with other research (Kistner, Metzler, Gatlin, & Risi, 1993) that found that peer ratings of withdrawn behavior were more strongly associated with peer rejection than peer ratings of disruptive behavior for African American girls.

In sum, the factors of Play Interaction, Play Disruption, and Play Disconnection provide information regarding the strengths and needs with respect to preschool children's interactive peer play competencies. Confirmation of the ecological validity of these play constructs is the high interrater reliability obtained for this scale between Head Start teachers and their assistants. In this study, all the teaching assistants were African American and were also parents of former Head Start children. Therefore, the interrater agreement is not just a statistic indicating reliability—this finding is an indicator of validity for these play constructs. This high interrater reliability for the PIPPS supports its cultural validity and continued use with African American Head Start children. This approach is consistent with recommendations for ensuring cultural validity of measurement by gathering ratings from key socialization agents from the children's natural environment (American Psychological Association, 1985; Gaskins, 1994).

Implications for Early Childhood Practice and Future Research

The development and validation of the PIPPS represents the initiation of an important learning process that is central to role of early childhood educators. Using ethological methods, teachers, teacher assistants, parents, and researchers carefully observed the play of African American preschool children and identified play behaviors that were associated with effective peer play interactions. These behaviors were incorporated into a rating scale that was readily understood and used by teachers and former Head Start parents (the African American teaching assistants). This process is consistent with recommendations concerning high quality early childhood instruction (Bredekamp & Copple, 1997; Bredekamp & Rosegrant, 1995). Across relevant

domains of development, teachers are expected to know how to observe children's classroom behavior and to assess their level of functioning. Additionally, they are expected to consider program activities that will promote development and to have a means of monitoring progress and sharing their observations with parents. Because this rating scale is derived directly from classroom observations of behaviors identified by teachers and parents to be developmentally and culturally salient, commonly noted disconnections between assessment and intervention practices and between settings can be averted. The PIPPS can facilitate a process that includes gathering and sharing of important information regarding children's needs and capacities related to peer play. This sharing can then serve as the basis for developing useful interventions to promote positive peer play interactions in both home and school settings.

For researchers, the PIPPS may stimulate interactions with teachers and parents to learn more about the richness and variability of the play behavior of African American preschool children. Given that we have documented these various patterns of play behavior, we now can study how classroom structure influences these patterns for African American preschool children over time. Clearly, future research must examine the predictive validity of the PIPPS. Specific understanding of the ways in which preschool children's play repertoires predict social functioning during later developmental stages would help to inform the design of school-based intervention, targeted at both overt and covert displays of distress in the play and learning behaviors of young children. Successful peer-mediated intervention strategies have already been implemented, focused on improving the social competence of withdrawn preschool and elementary school children (Fantuzzo et al., 1997; Fantuzzo, Davis, & Ginsburg, 1995). Additionally, the relationship between peer play competencies and school success throughout the elementary school years would constitute a major contribution to the knowledge base surrounding early social development of African American children in high risk environments (Fantuzzo et al., 1995). More studies that attempt to link childhood competencies to positive developmental outcomes in later life are needed to ground school readiness programs in empirical findings regarding developmentally appropriate practices.

Further extensions of this measure will involve examining the relationship between the PIPPS and other significant contexts of social functioning besides the child's classroom. As research has indicated the importance of both parent and teacher input in decision-making (Haager & Vaughn, 1995; Lochman et al., 1995), an area for further study would be the relationship between the constructs of this teacher rating scale and constructs of a scale completed by parents. Ongoing debate within the assessment literature concerning the ability of parents to provide reliable and valid reports of children's behavior (Diamond & Squires, 1993; Fagot, 1995) could be addressed through comparisons of parent and teacher ratings of peer play interactions. A parent form of the PIPPS could help inform how children's interactive peer play is supported or constricted by home, neighborhood or school settings, and how play competencies and difficulties may change as a function of context. The PIPPS might also be used to assess continuity across home and school settings and how significant family variables impact the development of children's peer play competencies.

The overarching intent of this research was to examine the PIPPS play constructs with an urban African American Head Start population. The results of this study represent a significant extension of the validity of the PIPPS, as this instrument relates in important ways to

measurement derived from both teachers and peers, as well as from naturalistic observations. Findings from this study also provide a significant contribution to the emerging knowledge-base on African American children, who currently constitute the single largest ethnic group in Head Start (Children's Defense Fund, 1995). More importantly, the process of refining the PIPPS illustrates our purposeful attempt to measure specific competencies that are developmentally appropriate with an understudied group of preschool children (Takanishi & DeLeon, 1994). Continuation of this research will clearly involve a closer examination of peer play with more diverse samples to provide data on the normative development of important subpopulations of minority children (Garcia Coll et al., 1996).

AUTHORS NOTE

This research project was supported in part by grants received from the U.S. Department of Health and Human Services' Head Start Bureau and the National Center for Child Abuse and Neglect.

A special thanks goes to our collaborators at Head Start: Director Rosemary Mazzatenta and her Head Start staff. This outstanding group of educators and innovators made notable contributions to this research.

NOTES

1. Squared multiple correlations were used as the initial communality estimates for the common factor analyses. Additionally, promax rotations were run at varying levels of power, $k = 3,5,7$, and each oblique solution was compared to the final orthogonal solution to determine the most parsimonious explanation.

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