The validity of interactive peer play competencies for Latino preschool children from low-income households

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Abstract:

In accord with a strength-based, eco-cultural model, the present study examined the validity of the Penn Interactive Peer Play Scale-Teacher report (PIPPS-T; Fantuzzo, Coolahan, Mendez, McDermott, & Sutton-Smith, 1998) for use with Latino preschool children from low-income backgrounds. Capitalizing upon a large, statewide sample of Latino children (*N* = 824, *M* age = 52.54 months (SD = 8.73)), exploratory and confirmatory factor analyses identified three reliable and distinct dimensions of peer social competence: Play Interaction, Play Disruption, and Play Disconnection. Findings from multilevel models controlling for program, family, and child demographic variables, provided criterion-related validity for the three dimensions with some differential associations to concurrent assessments of children's learning-related and pre-academic skills at the end the Head Start year. Study findings extend prior research, supporting the utility of the PIPPS to assess the construct of peer social competence for Latino children from low-income backgrounds. Implications for early childhood research, practice, and policy are discussed.

Keyword: Interactive peer play | Latino children from low-income backgrounds | Learning behaviors | Pre-academic skills

Article:

1. Introduction

Identifying opportunities to promote the development of children from low-income, ethnic minority households is critical to promote their early school success, as they face disproportionate risks during the formative early childhood period (Garbarino, 1995). In particular, Latino children, the fastest growing ethnic minority group of young children in the U.S., comprise 23% of the nation’s population younger than 18 years of age (Passel, Cohn, &

Lopez, 2011), and face increased risks to their academic readiness for kindergarten. They are statistically more likely to come from non-English-speaking immigrant families living in poverty (U.S. Census Bureau, 2013), more likely to perform poorly in U.S. schools in reading and other academic areas upon kindergarten entry (Rathbun, West, & Germino Hausken, 2004), and more likely to be retained and drop out of school in the long-term (Gersten & Woodward, 1994).

Early childhood programs serving low-income children have the opportunity to provide high-quality educational services during a time in development, when children's learning is most malleable and amenable to intervention (Heckman & Masterov, 2007). Programs such as Head Start serve increasing numbers of children from Latino households, with 38% of Head Start preschool programs' annual enrollment comprising Latino children (Child Trends Databank, 2014). Services are aligned with a comprehensive, whole child and a resilience-oriented framework, and focus on identifying and building upon children's strengths as they naturally occur within early learning contexts (Lamb-Parker, LeBuffe, Powell, & Halpern, 2008; Luthar, Cicchetti, & Becker, 2000; Zigler & Bishop-Josef, 2006). Social competence observed through children's engagement in interactive play with peers is identified as a naturally occurring, developmentally appropriate, context for learning (Coolahan, Fantuzzo, Mendez, & McDermott, 2000). A line of research has validated a multidimensional teacher and parent rating scale of peer social competence, specifically for preschool children from low-income, ethnic minority households. Fantuzzo et al. (1998) developed and validated the Penn Interactive Peer Play Scale (PIPPS) as a culturally sensitive and developmentally appropriate assessment of children's strengths and needs, within the context of peer play. Overall, this research conducted with predominantly African American children attending Head Start documents consistent associations between positive engagement in peer play within the preschool classroom and the development of both social and pre-academic skills critical to early school success (Bulotsky-Shearer et al., 2012a,b).

However, to date, few studies have examined the validity of the PIPPS specifically for use with children from low-income, Latino households. More research is needed to inform classroom-based intervention practices as well as our understanding of the developmental strengths of Latino children. Therefore the purpose of our study was to extend the validity of the teacher version of the PIPPS for use with Latino children, capitalizing on a statewide sample of Latino children enrolled in Head Start. We examined (a) whether reliable and valid dimensions of peer play competence were evident in a large, state-wide sample; and (b) whether resultant dimensions of peer play competence differentially related to two key domains of school readiness for preschool children: teacher-report of approaches to learning (e.g., how children initiate, engage, and persist during learning tasks); and direct assessments of pre-academic skills in language, literacy and mathematics assessed in both Spanish and English.

1.1. Strength-based eco-cultural framework for Latino children

Both a strength-based resiliency and eco-cultural theoretical model provide a framework for studying peer social competence within the preschool setting for children from low-income, Latino backgrounds. A resilience framework promotes identifying competencies within naturalistic settings, such as the preschool classroom and home context to support early

development (Lamb-Parker et al., 2008). Particularly for ethnic minority children, Cabrera and The SRCD Ethnic and Racial Issues Committee (2013) call for our field to move more deliberately from the deficit orientation of research examining risk processes toward an emphasis on positive developmental processes. During the early childhood period, peer interactions often occur naturally and spontaneously within the context of play, and are an important positive developmental context for children's social and academic development. For example, peer play interactions provide opportunities for children to practice and extend vocabulary skills, mathematic and scientific concepts, and in general construct a deeper understanding of the world around them (Singer, Golinkoff, & Hirsh-Pasek, 2006). Through cooperative peer and symbolic play, other early cognitive skills such as creativity, prosocial skills such as sharing, helping, and learning empathy towards others, and self-regulatory skills can be fostered (Coplan & Arbeau, 2009; Singer et al., 2006).

From an eco-cultural perspective, an important consideration in the development of Latino children's peer social competence is the unique context of their family and community (Bridges et al., 2012; Galindo and Fuller, 2010). Eco-cultural theories recognize that children's proximal experiences are influenced by more distal variables (e.g., parents' immigrant background, years in the U.S.) and that these ecological factors play a dynamic role in children's social and academic development (Reese, Garner, Gallimore, & Goldenberg, 2000). Understanding children's unique eco-cultural context is important for ethnic minority children as they transition from the home environment into the preschool setting (Ogbu, 1999; Rogoff, 2003). For example, research suggests that Latino children are socialized by their families to demonstrate a cultural value of "respeto." This cultural value emphasizes obedience and deference to adults, and encompasses a set of attitudes and behaviors shown by the child to illustrate this respect for adults, particularly in the family (Calzada, Fernandez, & Cortes, 2010). Growing up within a family that emphasizes this cultural value provides a strong foundation for positive social behavior for children in school (Calzada et al., 2010).

In accord with this eco-cultural framework, scholars have called for research utilizing a *within group* (versus a comparative) approach in order to reveal the unique developmental strengths of Latino preschool children (Castro, Mendez, Garcia, & Westerberg, 2012; Fuller & Garcia Coll, 2010). Halle et al. (2014) acknowledge heterogeneity in the social-emotional competencies of Latino children from low-income families, and such variability was related directly to the language(s) spoken at home, the immigrant status of the child and family members, the expectations for social and language development from the family, and the demands and resources available at the child's preschool. Although research suggests that social competence is a strength of Latino children (e.g., they are socialized within their family and community to show respect for adults and comportment in public settings; Bridges et al., 2012; Calzada et al., 2010; Calzada, Tamis-LeMonda, & Yoshikawa, 2012), to date, few studies have examined the peer social competence of Latino children and how this contributes to learning. More research is needed to examine Latino children's social competence using validated assessments.

1.2. Relationships between peer social competence, approaches to learning, and pre-academic skills

Early childhood research consistently documents positive associations between social, emotional, and regulatory skills, approaches to learning, and pre-academic skills for national samples of low-income and middle-class children (Raver, 2002). In addition, a body of research documents these associations for predominantly African American preschool children from low-income backgrounds (Bulotsky-Shearer et al., 2012a,b). With respect to children from Latino, low-income backgrounds, limited studies of children's social competence have been conducted. These studies employ large local samples of low-income preschool children (DeFeyter & Winsler, 2009) or nationally representative kindergarten samples such as the ECLS-K (Crosnoe, 2007; Galindo and Fuller, 2010; Halle et al., 2014). Findings from this set of comparative studies suggest that Latino children demonstrate strengths in social skills and approaches to learning, compared to other ethnic minority children. One recent within-group study used the PIPPS to identify profile groups of social and academic competence for a sample of 207 Latino, blingual low-income preschool children from the Northeast; two of the groups of children displayed profiles of socially competent behavior. Children within this "resilient" group concurrently displayed strengths in self-regulation, automous behavior, non-verbal cognitive skills, and oral language skills (Oades-Sese, Esquivel, Kaliski, & Maniatis, 2011). Findings replicated prior work conducted with African American samples suggesting that social competence is associated with other important readiness competencies (Mendez, Fantuzzo, & Cicchetti, 2002).

1.3. Social competence and approaches to learning

Approaches toward learning, a key domain of school readiness, is defined as initiative, curiosity, enthusiasm, persistence, flexibility, and problem-solving skills in the face of challenging learning tasks (Hyson, 2008). Approaches to learning skills are domain-general skills, which serve as a foundation for learning more domain-specific skills (such as literacy, language skills). Typically, three dimensions are assessed: initiative/motivation to learn, attention/persistence during challenging tasks, positive attitude toward learning (McDermott, Green, Francis, & Stott, 2000). Studies conducted with predominantly African American Head Start samples document positive associations between children's peer play skills observed in the classroom and both attention/persistence and a positive attitude toward learning (Coolahan et al., 2000). In contrast, difficulties engaging in positive peer play interactions, such as withdrawn or disconnected behavior, are associated with lower competence motivation (Coolahan et al., 2000). Disruptive behavior in the peer context within the Head Start classroom also has been negatively associated with lower attitude toward learning (Bulotsky-Shearer, Fernandez, Dominguez, & Rouse, 2011). The present study extends this research by examining these associations for Latino children from low-income backgrounds.

1.4. Social competence and pre-academic skills

Studies conducted with predominantly African American Head Start children, have found peer social competence associated with direct assessments of receptive vocabulary, and teacher-rated literacy, language, and mathematics skills in preschool (Bulotsky-Shearer, Bell, Romero, & Carter, 2012; Dobbs, Doctoroff, Fisher, & Arnold, 2006; Fantuzzo, Sekino, & Cohen, 2004). As children transition to elementary school, these preschool competencies are associated with higher grades in kindergarten, and mathematics and reading achievement in third grade (Hampton &

Fantuzzo, 2003; Sekino, 2006). In mixed community preschool child care and Head Start samples, studies also have identified positive associations between observed classroom prosocial skills and mathematics skills (Doctoroff, Greer, & Arnold, 2006); and teacher-rated social skills and direct assessments of pre-literacy, receptive vocabulary, and mathematics (Arnold, Kupersmidt, Voegler-Lee, & Marshall, 2012). For most of these samples, the ethnic composition of the samples was predominantly African American or White (with Hispanic children ranging from 2 to 38% of the sample).

A limited number of recent studies have been conducted with Latino children. These studies find similar patterns of positive associations between social competence and language and literacy skills. For example, in a predominantly Latino, low-income community child care sample, children who were rated by their preschool teacher with higher social and emotional skills in the classroom, also displayed higher language skills on direct assessments (DeFeyter & Winsler, 2009). Oades-Sese et al. (2011) in a sample of urban, low-income preschool children from Latino backgrounds found that profiles of social competence (including interactive play) were associated with higher oral language skills (regardless of whether Spanish or English was their dominant language). Additionally, Han (2010) found in the national ECLS-K sample that fluent bilingual and Spanish dominant bilingual children exhibited higher social competence in comparison to monolingual English and dominant English speaking peers through fifth grade.

Few studies have examined links between social competence and mathematics skills in low-income preschool children from Latino backgrounds. Using data from the ECLS-K, Galindo and Fuller (2010) found that Latino immigrant children's social competence, mostly driven by positive approaches to learning, had a strong positive relationship with growth in mathematics skills over the kindergarten year. Overall, these findings for pre-academic outcomes identify positive associations between social competence and mathematics, and language and literacy skills for Latino children. However, more research is needed to examine these relations using a within-group approach, specifically for other populations of Latino children; in addition, if children are Dual Language Learners (DLL) and Spanish speaking, research is needed using assessments of academic skills administered in both English and Spanish. Best practices in early childhood assessment recommend that skills of DLL children should be assessed in both languages in order to obtain a clear picture of children's academic abilities (Barrueco, López, Ong, & Lozano, 2012; CECER-DLL, 2011; Espinosa, 2005, 2013; López, 2011).

1.5. Need for reliable, valid, and developmentally appropriate assessment of social competence for Latino children

Recent calls from the field highlight the lack of validated measurement tools to assess domains of school readiness for Latino preschool children (Barrueco et al., 2012). The need for the use of psychometrically sound instruments that are valid with language-minority populations is also described in best practice documents including the Standards for Educational and Psychological Testing (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 1999). The National Association for the Education of Young Children (2009) guidelines indicate that assessment of dual language learners (DLL) should be used to inform curriculum planning and teaching strategies, as well as

to “monitor development and learning in all domains” (p. 6). Halle et al. (2014) in their recent review of 14 peer-reviewed studies examining social-emotional development of DLL children note the strengths exhibited by DLL children in social development; but also note the lack of available validated measures of these competencies for culturally and linguistically diverse Latino preschool populations.

1.6. Initial development and validation of the PIPPS

In response to the need for developmentally appropriate measures of peer social competence for use with preschool children from low-income, ethnic minority households, Fantuzzo et al. (1998) developed and validated the Penn Interactive Peer Play Scale (PIPPS) in close collaboration with Head Start teachers and parents. The 32-item Likert scale is comprised of three dimensions, distinguishing between more competent and less successful peer interactions: play interaction, play disruption, and play disconnection (Fantuzzo et al., 1998). Play interaction comprised 9 items characterizing children's positive, cooperative behaviors in play with peers, such as taking initiative during play, helping and sharing with other children during play, showing creativity, and leadership during play. Play disruption comprised 15 items measuring behaviors that actively interfered with successful play with peers, such as aggressive, oppositional, or destructive behavior. Play disconnection was comprised of 10 items that captured withdrawn, avoidant behavior that interfered with children's successful initiation into peer play activities (e.g., hovers outside play group, withdraws). Convergent and divergent validity of these dimensions has been established with predominantly African American samples of children attending Head Start in the Northeast, using direct observations of play, peer sociometrics, and measures of learning behaviors, temperament, emotion regulation, psychological adjustment, social skills, and language, literacy, and mathematics skills (Bulotsky-Shearer et al., 2012a,b; Coolahan et al., 2000; Fantuzzo et al., 1998).

To date, there has been only one published study examining the construct validity of the PIPPS with a sample of Latino children (N = 320, with 72% Hispanic, 28% Black) who were receiving child care subsidies in eight centers in Miami-Dade County. This study generally replicated the three factors (Castro, Mendez, & Fantuzzo, 2002); however, the study included a mix of both African American (28%) and Latino children, and validity analyses were limited to concurrent bivariate correlations between PIPPS dimensions and teacher-rated externalizing and internalizing behavior, as assessed by the Social Skills Rating Scale. More research is needed examining other key readiness domains with a larger, more diverse sample of Latino children, using a multilevel modeling approach that controls for program-, family-, and child-level variables. Given the heterogeneity of the Latino population in the U.S., a validity study that uses an ecocultural approach, and includes a broad sample of children from different countries of origin and communities is needed to strengthen the utility of the PIPPS for use in preschool programs serving increasing numbers of Latino children.

1.7. Study purpose

The purpose of this study was therefore to extend the validity of the Penn Interactive Peer Play Scale (PIPPS; Fantuzzo et al., 1998) for use with Latino Head Start children by capitalizing upon

a diverse, multi-county sample drawn from across a large southeastern state. We examined whether three reliable and valid dimensions of peer play competence of the PIPPS could be replicated in this Latino sample. In addition, using multilevel modeling and a multi-source and multi-method approach, we examined whether the resultant PIPPS dimensions demonstrated evidence of concurrent validity as related to dimensions of approaches to learning; and to direct assessments of language, literacy, and mathematics abilities assessed in Spanish and English.

2. Method

2.1. Participants

2.1.1. Overall sample of children

Participants included 824 Latino Head Start children across six counties in a southeastern state. The mean age of children at initial assessment (spring of Head Start) was 52.54 months (SD = 8.73; 52% female). All families met the federal poverty criteria for enrollment in Head Start (at least 200% below poverty). Children were participating in two discrete University-Head Start partnership research projects, conducted within the same large Southeastern state. Overall, these two studies shared the same purpose to examine the social competence and school readiness skills of Latino preschool children from low-income families. Comparisons of the two samples are described below, with some ethnic/racial differences found in the backgrounds of the teachers across the two samples, but no differences in years of experience or education levels. Given the opportunity to validate the PIPPS using this large heterogeneous statewide sample of Latino children attending Head Start, the two samples of children were combined for the purpose of factor analyses and concurrent validity analyses.

2.1.2. Sample 1

Sample 1 included 357 preschool children ranging in age from 43 to 69 months (M = 58.64, SD = 6.76), with 55% being female. All children were attending one of five Head Start programs in the Southeastern United States. Based on the information obtained from parents, 63% of the sample reported speaking all or mostly Spanish at home. Additionally 99% of the parents identified their child as Latino/Hispanic. Of this sample, 7.6% of mothers reported being born in the U.S. For those mothers born outside of the U.S., years in the U.S. ranged from 2 to 35 years (M = 11.0, SD = 5.95). Mother's country of origin included 16 Spanish-speaking countries. The largest immigrant group came from Mexico (52.8%), followed by Cuba (14.2%). Approximately 55% of mothers reported receiving a High School diploma or above.

2.1.3. Teaching staff

Fifty-one lead teachers participated. Of the lead teachers, 100% were female. With regard to race and ethnicity, 47% of teachers identified themselves as White, not-Hispanic; 10% identified themselves as Black, Non-Hispanic; 31% identified themselves as Hispanic; 2% Asian; 6% Native American; 2% multi-racial (with 2% missing). Education levels were varied, with 17% of teachers reporting earning a high school diploma or GED, 18% earning an Associate's Degree, 55% earning a Bachelor's Degree and 10% earning a graduate degree. Teachers' years of

experience teaching ranged from zero to 43 years (*M* = 13.33; SD = 11.00). Twenty percent of teachers reported speaking Spanish in their classroom 50% of the time.

2.1.4. Sample 2

Sample 2 included 468 preschool children ranging in age from 41 to 75 months (*M* = 56.89, SD = 7.04); 50% of the children were female. All children were attending a Head Start program in a large urban Southeastern municipality. Based on the information obtained from parents, 85% of the sample reported speaking all or mostly Spanish at home. Additionally 91% of the parents identified their child as Latino/Hispanic, with 4% Biracial/Multiracial or Other, and 5% White. Of this sample, 19% of mothers reported being born in the U.S. For those mothers born outside the U.S., years in the U.S. ranged from 1 to 30 years (*M* = 12.17, SD = 5.69). Mother's country of origin included 16 Spanish-speaking countries and the United States. The largest immigrant group came from Cuba (24%), followed by Mexico (22%), Columbia (6%), Nicaragua (6%), El Salvador (4%), and Argentina (3%). Approximately 72% of mothers reported receiving a High School diploma or above.

2.1.5. Teaching staff

Forty-three lead teachers and 43 teacher assistants participated, with 100% being female. Of the lead teachers, 64% reported being Hispanic or Latino, 28% reported being Black, Non-Hispanic, 4% reported being White, Non-Hispanic or Other, and 4% race/ethnicity not reported. Approximately 17% of lead teachers had a Master's degree, 57% a Bachelor's degree, 23% an Associate's Degree, and 4% did not report their education level. On average, lead teachers reported working as a preschool teacher for 13 years (SD = 7.9, Range = 1–30 years). Teacher assistants were 98% female, 46% were Hispanic or Latino, 34% African American, and 20% did not report their ethnicity. Teacher assistants reported 11% having a Bachelor's degree or higher, 68% an Associate's Degree, 6% a High School degree or GED, and 16% did not report their education level. On average, teacher assistants reported working as a preschool teacher for 12 years (SD = 10.5, Range = 1–36 years). Fifty percent of lead teachers reported speaking Spanish in their classroom 50% of the time.

2.2. Measures

2.2.1. Peer play competence

The teacher version of the Penn Interactive Peer Play Scale (PIPPS- T; Fantuzzo et al., 1998) was used to assess children's peer play interactions within the classroom. The PIPPS-T is a 32-item rating scale used to measure common play behaviors that promote or interfere with prosocial peer interactions. Teachers rate each item on a 4-point Likert-scale ("Never, Seldom, Often, or Always"). The PIPPS-T was developed in collaboration with Head Start parents and teachers specifically for use with low income, urban, Head Start children. Construct validity studies of the PIPPS-T have revealed three reliable and valid dimensions: Play Interaction, Play Disruption, and Play Disconnection, each demonstrating high internal consistency with Head Start samples (Cronbach's alpha = .92, .91, and .89, respectively).

Items on the play interaction scale reflect prosocial, creative, and cooperative behaviors that facilitate successful peer play interactions such as “shares toys with other children,” “helps settle peer conflicts,” “encourages others to join play,” “comforts others who are hurt or sad,” verbalizes stories in play,” “show positive emotions in play,” “shows creativity in making up play stories and activities.” Items on the Play Disruption scale reflect aggressive and antisocial play behaviors that interfere with play interactions, such as “starts fights and arguments,” “does not take turns,” and “disrupts play of others.” Items on the Play Disconnection scale reflect withdrawn and avoidant play behaviors that are characterized by a lack of play interactions, such as “hovers outside play group,” “wanders aimlessly,” and “confused in play.” Convergent and divergent validity has been established using direct observations of play, peer sociometrics, and measures of learning behaviors, temperament, emotion regulation, psychological adjustment, and social skills (Coolahan et al., 2000; Fantuzzo et al., 1998; Mendez et al., 2002).

2.2.2. Approaches toward learning

The Preschool Learning Behavior Scale (PLBS, McDermott, Leigh, & Perry, 2002) was used to measure children’s learning-related behaviors at the end of the Head Start year (McDermott et al., 2000). The PLBS is a 29-item nationally standardized teacher rating scale of observable learning behaviors within the classroom. Three dimensions are validated: Competence Motivation, Attention/Persistence, and Attitude toward Learning (with Cronbach’s alpha coefficients in the national normative sample of .85, .83, and .75, respectively). Alpha reliability coefficients in the current study samples were (Sample 1, .81, .83, and .70; and in Sample 2 were .84, .89, and .76, respectively). Teachers rate the child's behavior on a Likert scale, from “most often applies, sometimes applies, or does not apply.” The Competence Motivation scale assesses children’s willingness to take on tasks and their determination to complete activities successfully. The Attention/Persistence dimension measures the degree to which children pay attention and are able to persist with difficult tasks. The Attitude toward Learning dimension focuses on such concepts as children’s willingness to be helped, desire to please the teacher, and ability to cope when frustrated. Convergent and divergent validity for each of the PLBS subscale scores have been established for urban, low-income preschool children (Fantuzzo et al., 2004a,b; McDermott et al., 2002).

2.2.3. Pre-academic skills

The Woodcock–Johnson III Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001) and Batería III Woodcock–Muñoz (Batería-III; Muñoz-Sandoval, Woodcock, McGrew, & Mather, 2005) were used to assess children's academic skills. The WJ-III and Batería-III are individually administered nationally normed assessments of academic achievement validated for ages 2–90 years. Parallel items in both English and Spanish cover basic mathematics operations, literacy, and language skills. Items for the Batería-III, the Spanish adaptation of the WJ-III, were developed and Rasch-calibrated via Item Response Theory with W-J III items. Spanish items are scaled to be equivalent in difficulty to parallel English items (Schrank et al., 2005).

Three subtests of the WJ-III or Batería-III were chosen for use in this study because of their established reliability and validity with preschool children: Letter–Word Identification, Picture

Vocabulary, and Applied Problems. The subtests have adequate reliabilities for preschool children and are widely used in national studies of Head Start children. The Letter–Word Identification subtest (Cronbach alpha's = .97–.99, for preschool aged children) assesses children's ability to identify icons, letters, and words and to pronounce words correctly. The Picture Vocabulary subtest (Cronbach alpha's = .76–.84, for preschool aged children) assesses receptive vocabulary knowledge such as identifying words and concepts that are orally presented by the examiner. The Applied Problems subtest (Cronbach alpha's = .92–.94, for preschool aged children) assesses basic mathematics skills, such as simple addition and subtraction problems, inequalities, and other skills such as telling time or reading a thermometer. For the present study, raw scores were converted to *W* scores (Woodcock & Dahl, 1971) based on the published manual scoring program. *W*scores are a transformation of the Rasch ability scale with a mean of 500, and variable standard deviations depending on the subscale and age of the child tested (Mather & Woodcock, 2001). Alpha reliabilities in the current sample were also appropriate; with coefficient alphas for the WJ-III subtests ranging from .79 to .85, and for the Batería-III subtests, ranging from .85 to .95.

2.3. Procedures

Approval for the projects was obtained from each of the Principal Investigators' University Institutional Review Boards (IRB), from the Directors of the Head Start Programs, and from the Head Start Programs' Parent Policy Councils. In the fall of the preschool year, members of the research teams met with the directors of each Head Start center to obtain consent for participation in the research study. Classroom teachers were then contacted. During brief meetings with the teachers, the research team explained the study and obtained consent for those teachers who were willing to participate. Parental consent was then obtained for all children in the participating classrooms with the assistance of the teachers. All children for whom parents signed consent forms and indicated that children were of Latino background and that Spanish was one of the languages spoken at home were chosen to participate in the present study.

In the fall, children's primary caregivers were asked to complete a brief demographic questionnaire. For the current study, 92% of the questionnaires (where caregivers indicated their primary relationship to the child) were completed by mothers and therefore we refer to primary caregivers, as mothers. The questionnaire was either sent home and returned to teachers or completed over the phone with a member of the research team. In mid-May, teachers rated children's peer interactions using the PIPPS and PLBS. In mid-April and May, direct assessments of children's academic skills were conducted for participating children. Assessors were undergraduate and graduate students in psychology who participated in an extensive 2-day training on the administration of WJ/WM measures. They were certified by the Principal Investigators of the study at the two sites prior to assessing the children. Assessors were bilingual and assigned to administer either Spanish or English assessments. There were encouraged to only speak in the language of assessment to the child. Children were assessed in both English and Spanish approximately one week apart using a battery of measures including the three subtests from the WJ-III and Bateria-III. Order of administration was counterbalanced such that half of the children participated in the English assessment first and the other half of the children

participated in the Spanish assessment first. All research assistants received extensive training on the measures prior to conducting the assessments. Children were assessed by a trained Spanish-speaking bilingual or English-speaking assessor in a quiet space outside of the classroom and received a sticker for their participation.

2.4. Data analytic approach

To examine whether the published factor structure of the PIPPS emerged in our sample of low-income Latino preschool children, a series of exploratory and confirmatory factor analyses was conducted using the overall sample of $N = 824$ children. Following this set of analyses, multilevel modeling was used to examine whether the three PIPPS dimensions related to teacher-ratings of approaches to learning and direct assessments of language, literacy, and mathematics skills in Spanish and English, concurrently assessed in the spring of children's Head Start year.

2.4.1. Exploratory factor analyses

The overall sample was randomly split into two mutually exclusive subsamples (a sample used for exploratory factor analyses ($n = 361$), and a sample used for confirmatory factor analyses ($n = 362$)). A series of common factor analyses was conducted in SAS to examine the latent structure of the 32 PIPPS items using squared multiple correlations as initial communality estimates (Snook & Gorsuch, 1989). Retained factors were rotated using orthogonal (varimax, equamax) rotations. The final orthogonal solution was then subjected to a series of oblique (promax) rotations, at variable levels of power. The most parsimonious factor solution was evaluated based upon multiple criteria that: (a) satisfied the constraints of tests for the number of factors [e.g., Cattell's scree test (Cattell, 1966), minimum-average partialing (Velicer, 1976), and parallel analysis (Buja & Eyuboglu, 1992; Horn, 1965)]; (b) retained at least 4 items per factor with salient loadings, where loadings >.40 are considered salient (Gorsuch, 1983); (c) yielded high internal consistency for each factor, with alpha coefficients >.70; (d) held simple structure (mutually exclusive assignment of items to factors with the maximum number of items retained); (e) yielded the highest hyperplane count (Gorsuch, 1983); and (f) comported with early childhood research.

2.4.2. Confirmatory factor analyses

The final structural model for the exploratory solution was submitted to confirmatory factor analysis (CFA) in a structural equation modeling (SEM) framework in Mplus version 6.10 (Muthén & Muthén, 1998–2011). Approximate fit indices were used to assess the fit of the overall model to these data. The Comparative Fit Index (CFI > .95; Bentler, 1990), an incremental fit index, and the root mean square error of approximation (RMSEA < .06; Steiger, 1990), a parsimony corrected index, of each model were evaluated. Given the categorical nature of the item-level data, robust WLS estimators were employed, and the weighted root mean square residual (WRMR < 1; Yu & Muthén, 2002) was considered. If fit indices were adequate, a model with a significant χ^2 test of model fit ($p < .05$) was considered acceptable given the complexity of the model and large sample size (Bollen & Long, 1993).

2.4.3. Concurrent associations with approaches to learning and pre-academic skills

Prior to conducting multilevel analyses, we examined all variables to be included in the analyses for missingness. Family demographic variables had a considerable amount of missing data (26.7%, 28.3%, 21.2%, respectively for maternal primary language spoken in the home, education, and country of origin). Therefore, per Enders (2010) multiple imputation was used to deal with missing data; multiple imputation has less strict assumptions about the mechanisms for the missing data patterns and tends to yield more accurate estimates than traditional missing data handling techniques (e.g., listwise deletion) (Schafer & Graham, 2002). We imputed missing values for the three family demographic variables using the multiple imputation procedure in SPSS. Using a fully conditional specification algorithm, we generated 10 imputed data sets, which yielded different estimates for the missing values. The 10 complete data sets were imported into the software HLM Version 7 (Raudenbush, Bryk, & Congdon, 2011) to conduct all analyses. HLM software runs each model separately for the datasets and then provides a table of pooled parameter estimates, which we report in our results.

Multilevel modeling was employed to examine: (a) direct associations between dimensions of interactive peer play and approaches to learning (b) and direct associations between dimensions of interactive peer play and literacy, language, and mathematics skills assessed in Spanish; and (c) direct associations between dimensions of interactive peer play and literacy, language, and mathematics skills assessed in English. A series of two-level models were estimated, separately for each set of outcomes.

Models were built in a series of steps. The first set of models were unconditional models to determine the distribution of variance in each set of outcomes (a) PLBS attitude toward learning, competence motivation, and attention/persistence dimensions; (b) W–M letter–word identification, picture vocabulary, and applied problems; and (c) W–J letter–word identification, picture vocabulary, and applied problems subtests, attributable to Level 1 (variability due to differences between children within classrooms) and Level 2 (variability due to differences between classrooms). Once the variability at each level was determined, child-level demographics were entered at Level 1 as predictors of academic skills. Age (months) and gender (0 = male, 1 = female) were entered as covariates. Because children were enrolled in either a statewide sample or a municipal sample, a dummy code indicating the child's program enrollment was included in all models as a covariate (0 = statewide sample, 1 = municipal sample). In addition, family demographic variables were entered at Level 1: primary home language (Spanish = 1, English = 0), whether mother was born in the U.S. (born in U.S. = 1, outside of U.S. = 0), and mother's highest level of education (0 = less than a high school degree, 1 = high school degree or higher). For parsimony, the random effects of the child and family demographic covariates were fixed to zero (i.e., they were not allowed to vary at Level 2). Note that in addition to Level 1 child and family demographic covariates, we included a set of classroom and teacher covariates at Level 2 that captured teacher classroom language use; however in our model building steps, few of these variables contributed significantly to our outcome models, and findings did not substantially change when these covariates were not included. For parsimony, these were not included in our set of final analyses reported below.

Next, the child-level variables of interest (the three PIPPS dimensions of play interaction, play disruption, play disconnection) were entered at Level 1 as predictors for each school readiness outcome. Because these variables were the Level-1 variables of interest, the random effects for the peer interaction variables were estimated (i.e., allowed to freely vary at Level 2). Child-level demographic covariates were centered at the grand mean and child-level PIPPS dimensions were centered at the group mean as recommended by Enders and Tofighi (2007).

3. Results

Table 1 presents descriptive statistics for child variables. All variables were examined for outliers, skewness, and kurtosis. The distribution for all variables was normal with the exception of the W–J Applied Problems W Score outcome, which in our sample was negatively skewed and kurtotic (meaning that most children received scores lower than the national mean and there was less variability on this outcome variable in our sample). Table 2 presents bivariate correlations among the three PIPPS dimensions, the three PLBS dimensions, and the three subtest scores for the Woodcock–Johnson and Woodcock–Munoz (Letter–Word Identification, Picture Vocabulary, and Applied Problems). Play interaction was positively associated with all approaches to learning dimensions, Woodcock–Johnson subtests, and the Woodcock–Munoz letter–word identification and applied problems subtests. Play disruption was negatively associated with all approaches to learning dimensions, the Woodcock–Johnson letter–word identification subtest, and the Woodcock–Munoz letter–word identification and applied problems subtests. Play disconnection was negatively associated with all approaches to learning dimensions, and negatively associated with all academic skills, with the exception of the Woodcock–Munoz picture vocabulary and letter–word identification subtests.

Table 1. Descriptive Statistics for Spring Child-level Measures.

Spring	**N**	**Mean**	**SD**	**Range**
Play Interaction (PIPPS)	784	49.82	10.10	18–76
Play Disruption (PIPPS)	772	50.21	9.91	29–80
Play Disconnection (PIPPS)	769	49.90	9.96	33–79
Attitude toward Learning (PLBS)	526	53.64	8.14	21–62
Competence Motivation (PLBS)	521	50.50	8.64	26–61
Attention/Persistence (PLBS)	526	51.75	9.41	25–62
W–J Picture Vocabulary	470	439.15	28.45	88–487
W–J Letter–Word Identification	463	328.45	28.00	264–412
W–J Applied Problems	461	386.85	40.60	305–444
W–M Picture Vocabulary	446	431.77	31.85	368–544
W–M Letter–Word Identification	437	322.41	24.04	282–438
W–M Applied Problems	437	384.57	32.06	301–464

Note. PIPPS = Penn Interactive Peer Play Scale; PLBS = Preschool Learning Behavior Scale; W–J = Woodcock–Johnson III Tests of Achievement; W–M = Batería III Woodcock–Muñoz. Scores for the PLBS represent *T* scores (*M* = 50, SD = 10) based on the PLBS standardization samples (McDermott et al., 2002). Scores for the PIPPS represent *T* scores (*M* = 50, SD = 10)

based on the derived norms from the present study. Scores for the W–J and W–M represent IRT-based *W* scores (*M* = 500, SD = 50) based on their respective national standardization samples.

Table 2. Bivariate Correlations between Concurrent Child-level Measures.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Play Interaction (PIPPS)	–	−.53*	−.50*	.42*	.46*	.52*	.18*	.30*	.16*	.01	.26*	.26*
2. Play Disruption (PIPPS)		–	.51*	−.38*	−.28*	−.44*	−.02	−.19*	−.04	−.10*	−.10*	−.13*
3. Play Disconnection (PIPPS)		–	−.38*	−.39*	−.44*	−.12*	−.17*	−.10*	−.09	−.08	−.13*	
4. Attitude toward Learning (PLBS)		–	.58*	.74*	.14*	.27*	.19*	.07	.20*	.21*		
5. Competence Motivation (PLBS)			–	.75*	.15*	.28*	.22*	.15*	.23*	.30*		
6. Attention/Persistence (PLBS)					–	.15*	.30*	.20*	.15*	.25*	.31*	
7. W–J Picture Vocabulary						–	.39*	.41*	.03	.15*	.21*	
8. W–J Letter–Word								–	.37*	.18*	.40*	.39*
9. W–J Applied Problems									–	.15*	.24*	.30*
10. W–M Picture Vocabulary									–	.34*	.53*	
11. W–M Letter–Word											–	.48*
12. W–M Applied Problems											–	

*$p < .05$. *Note*. PIPPS = Penn Interactive Peer Play Scale; PLBS = Preschool Learning Behavior Scale; W–J = Woodcock–Johnson III Tests of Achievement; W–M = Batería III Woodcock–Muñoz.

3.1. Exploratory factor analyses

A three-factor promax solution (*k* = 5, with a varimax structure matrix serving as the initial orthogonal structure), produced the most useful and parsimonious solution that satisfied the criteria for retention and had the highest hyperplane count (42.71%). Table 3 displays the 32 PIPPS items comprising the three subscales, with their varimax and promax structure loadings. The three-factor structure was almost identical to the three-factor structure derived from prior validation studies (Fantuzzo et al., 1998; Mendez et al., 2002), replicating the scales of Play Interaction, Play Disruption, and Play Disconnection. Play Interaction consisted of 10 items, Play Disruption consisted of 14 items, and Play Disconnection consisted of 9 items. Two items loaded differently from the original published sample (Fantuzzo et al., 1998). Item 15 (disagrees without fighting) loaded on the Play Interaction factor in our sample, while in the original study (Fantuzzo et al., 1998) this item loaded on Play Disruption (negatively valenced). Item 3 (is

rejected by others) loaded on the Play Disruption factor in our sample study; however, in the original study (Fantuzzo et al., 1998) it loaded on the Play Disconnection factor. These different item loadings however replicated those found in the Castro et al. (2002) Latino sample, where item 15 loaded on the Play Interaction factor and item 3 loaded on the Play Disruption factor. Cronbach alpha reliability for the three subscales in our sample was high (.89, .90, and .86, for Play Interaction, Play Disruption, and Play Disconnection, respectively).

Table 3. Exploratory Factor Structure of the Penn Interactive Peer Play Scale for Latino Head Start Children.

		Varimax	**Promax**[a]	**Variance explained**[b]
Play Interaction (alpha = .89)				31.6%
Item 1	Helps other children	0.68	0.69	
Item 6	Shares toys with other children	0.53	0.52	
Item 13	Helps settle peer conflicts	0.61	0.68	
Item 15	Disagrees without fighting	0.41	0.47	
Item 19	Directs others' action politely[c]	0.54	0.55	
Item 21	Encourages others to join play	0.68	0.74	
Item 23	Comforts others who are hurt or sad	0.72	0.79	
Item 25	Verbalizes stories during play	0.74	0.87	
Item 29	Shows positive emotions during play	0.46	0.43	
Item 31	Shows creativity in making up play and activities	0.69	0.76	
Play Disruption (alpha = .90)				9.4%
Item 2	Starts fights & arguments	0.76	0.81	
Item 3	Is rejected by others[c]	0.50	0.45	
Item 4	Does not take turns	0.45	0.45	
Item 8	Demands to be in charge	0.53	0.65	
Item 10	Rejects the play ideas of others	0.44	0.43	
Item 12	Tattles	0.37	0.46	
Item 14	Destroys others' things	0.71	0.75	
Item 18	Verbally offends others (name calling)	0.68	0.74	
Item 20	Cries, whines, shows temper	0.52	0.51	
Item 22	Grabs others' things	0.73	0.75	
Item 27	Disrupts play of others	0.79	0.83	
Item 30	Is physically aggressive	0.73	0.77	

Item 32	Disrupts class during transitions from one activity	0.69	0.69	
Item 6	Shares toys with other children	−0.47	−0.41	
Play Disconnection (alpha = .86)				5.1%
Item 5	Hovers outside play group	0.44	0.51	
Item 7	Withdraws	0.71	0.79	
Item 9	Wanders aimlessly	0.66	0.69	
Item 11	Is ignored by others	0.51	0.49	
Item 16	Refuses to play when invited	0.50	0.48	
Item 17	Needs help to start playing	0.72	0.81	
Item 24	Confused in play	0.65	0.71	
Item 26	Needs teachers' direction	0.53	0.51	
Item 28	Seems unhappy	0.53	0.55	

Note. Factor solution based on a promax oblique rotation, $k = 5$ with the varimax orthogonal rotation serving as the initial orthogonal structure, using the bifurcated subsample, $n = 361$. [a] Factor loadings ≥.395 considered appreciable. [b] Percent of total item variance explained. [c] These two items loaded differently from the (Fantuzzo et al., 1998) Philadelphia factor structure.

3.2. Confirmatory factor analyses

Confirmatory factor analyses revealed an adequate fit of the derived three-factor structure in our sample, with the Tucker–Lewis coefficient (TLI) = 0.911, the Comparative Fit Index (CFI) = 0.918, and the root mean square error of approximation (RMSEA) = 0.075 (90% confidence interval, 0.071, 0.080). The weighted root mean square residual (WRMR) = 1.625 and was considered acceptable (Yu & Muthén, 2002).

3.3. Concurrent validity analyses

Tables 4 through 6 display the results from the multilevel models for each set of outcomes. Unconditional models indicated that for the three approaches to learning dimensions, a substantial amount of variance was attributed to differences between classrooms, warranting a multilevel modeling approach: 23.1% of the variance in children's scores on Attitude toward Learning, 31.0% of the variance attributable to children's scores on Competence Motivation, and 21.1% of the variance in children's scores on Attention/Persistence was attributable to differences between classrooms (Table 4). For Woodcock–Munoz subtests, 13.2% of the variance in children's scores on the Applied Problems subtest, 4.0% of the variance in children's scores on the Letter–Word Identification subtest, and 30.7% of the variance in children's scores on the Picture Vocabulary subtest, was attributable to differences between classrooms (Table 5). For the Woodcock–Johnson subtests, 20.9% of the variance in children's scores on the Applied Problems subtest, 22.6% of the variance in children's scores on the Letter–Word Identification subtest, and 6.7% of the variance in children's scores on the Picture Vocabulary subtest, was attributable to differences between classrooms (Table 6).

Table 4. Relationship between Preschool Interactive Peer Play and Approaches to Learning.

	Attitude toward Learning			Competence Motivation			Attention/Persistence		
Fixed Effects	**Coefficient**	**df**	***t*-ratio**	**Coefficient**	**df**	***t*-ratio**	**Coefficient**	**df**	***t*-ratio**
Intercept (β_{0j})	53.55***	80	92.06	50.25***	79	74.15	51.45***	80	81.09
Age months ($\beta 2_j$)	0.08	494	1.61	0.05	498	1.00	0.14**	494	2.63
Female ($\beta 3_j$)	0.20	494	0.32	1.22*	498	2.08	1.39*	494	2.14
Spanish home language ($\beta 4_j$)	−0.01	494	1.00	−0.88	498	−0.82	−0.66	494	−0.58
Mother US born ($\beta 5_j$)	−0.24	494	−0.19	−1.07	498	−0.92	0.07	494	0.05
Mother HS diploma (β_{6j})	0.25	494	0.34	−1.23	498	−1.73	−1.35	494	−1.54
Play Interaction (β_{7j})	0.20**	80	2.72	0.23**	79	3.00	0.21**	80	2.63
Play Disruption (β_{8j})	−0.27***	80	−4.10	−0.02	79	−0.35	−0.31***	80	−4.11
Play Disconnection (β_{9j})	−0.15*	80	−2.47	−0.29***	79	−4.81	−0.28***	80	−4.46
Random effects	**Variance component**	**df**	**$\chi 2$**	**Variance component**	**df**	**$\chi 2$**	**Variance component**	**df**	**$\chi 2$**
Intercept (γ_{00})	17.57***	80	250.34	25.37***	79	405.41	20.92***	80	313.99
Play Interaction (u_{7j})	0.05	80	63.12	0.11**	79	97.15	0.09	80	59.76
Play Disruption (u_{8j})	0.10***	80	97.62	0.09**	79	86.67	0.16***	80	111.51
Play Disconnection (u_{9j})	0.02	80	42.60	0.03	79	59.89	0.01	80	50.46
Level-1 effects (r_{ij})	33.21	–	–	28.04	–	–	33.20	–	–

Note. Models control for site (dummy coded, Sample 2 = 1, Sample 1 = 0) at level 1 (β_{1j} = − 1.16, p = 0.30, for Attitude toward Learning, β_{1j} = − 1.02, p = .44, for Competence Motivation, and β_{1j} = − 1.40, p = .25, Attention/Persistence.) * $p < .05$.** $p < .01$. *** $p < .001$.

Table 5. Relationship between Preschool Interactive Peer Play and Academic Skills (Woodcock–Munoz).

	Picture Vocabulary	Letter Word Identification	Applied Problems

Fixed Effects	Coefficient	df	*t*-ratio	Coefficient	df	*t*-ratio	Coefficient	df	*t*-ratio
Intercept (β_{0j})	428.14***	82	170.73	321.44***	81	233.64	380.08***	81	182.47
Age months ($\beta 2_j$)	0.80***	486	3.70	0.77***	490	4.54	1.57***	490	7.22
Female ($\beta 3_j$)	4.30	486	1.67	3.99	490	1.76	7.72**	490	2.76
Spanish home language ($\beta 4_j$)	17.55***	486	4.01	3.08	490	0.73	13.63**	490	2.64
Mother US born ($\beta 5_j$)	−12.93*	486	−2.41	−4.65	490	−0.99	−3.54	490	−0.58
Mother HS diploma (β_{6j})	3.29	486	1.02	2.54	490	0.93	2.48	490	0.71
Play Interaction (β_{7j})	−0.06	82	−0.21	0.60*	81	2.04	−0.05	81	−0.14
Play Disruption (β_{8j})	−0.26	82	−1.18	0.03	81	0.14	−0.19	81	−0.62
Play Disconnection (β_{9j})	−0.18	82	−0.68	−0.02	81	−0.08	−0.59*	81	−2.15
Random effects	**Variance component**	**df**	**$\chi 2$**	**Variance component**	**df**	**$\chi 2$**	**Variance component**	**df**	**$\chi 2$**
Intercept (γ_{00})	261.07***	82	333.00	22.82*	81	58.13	130.16***	81	98.96
Play Interaction (u_{7j})	0.30	82	54.19	0.98*	81	63.42	2.22**	81	66.73
Play Disruption (u_{8j})	0.16*	82	48.42	0.97**	81	67.74	30.25	81	56.86
Play Disconnection (u_{9j})	0.81*	82	67.47	0.43*	81	62.19	1.78	81	43.51
Level-1 effects (r_{ij})	506.99	–	–	418.34	–	–	591.84	–	–

Note. Models control for site (dummy coded, Sample 2 = 1, Sample 1 = 0) at level 1 (β_{1j} = 3.80, p = .45) for Picture Vocabulary, (β_{1j} = − 0.72, p = .80) for Letter–Word, and (β_{1j} = − 5.50, p = .18) for Applied Problems. *p < .05. **p < .01. ***p < .001.

Table 6. Relationship between Preschool Interactive Peer Play and Academic Skills (Woodcock–Johnson).

	Picture Vocabulary			Letter Word Identification			Applied Problems		
Fixed Effects	**Coefficient**	**df**	***t*-ratio**	**Coefficient**	**df**	***t*-ratio**	**Coefficient**	**df**	***t*-ratio**
Intercept (β_{0j})	441.25***	82	282.03	327.81***	81	171.40	390.65***	81	118.30

Age months ($\beta 2_j$)	0.94***	486	5.40	1.36***	490	6.94	1.83***	490	8.32
Female ($\beta 3_j$)	−2.79	486	−1.19	−1.35	490	−0.56	1.39	490	0.49
Spanish home language ($\beta 4_j$)	−7.96*	486	−1.84	−1.33	490	−0.30	−2.15	490	−0.39
Mother US born ($\beta 5_j$)	1.39	486	0.27	−7.03	490	−1.33	−6.02	490	0.39
Mother HS diploma ($\beta 6_j$)	3.04	486	1.14	5.49	490	1.76	6.56	490	1.89
Play Interaction ($\beta 7_j$)	0.93*	82	2.42	0.46	81	1.78	−0.47	81	−0.64
Play Disruption ($\beta 8_j$)	0.13	82	0.59	0.05	81	0.27	0.82	81	1.19
Play Disconnection ($\beta 9_j$)	−0.36	82	−1.31	−0.38	81	−1.82	−0.59*	81	−1.97
Random effects	**Variance component**	**df**	**$\chi 2$**	**Variance component**	**df**	**$\chi 2$**	**Variance component**	**df**	**$\chi 2$**
Intercept (γ_{00})	79.92***	82	121.84	132.62***	81	126.85	703.73***	81	110.13
Play Interaction (u_{7j})	5.26**	82	76.26	0.07	81	59.08	33.75	81	58.29
Play Disruption (u_{8j})	0.25*	82	68.22	0.11	81	61.68	30.25	81	65.80
Play Disconnection (u_{9j})	1.52**	82	80.57	0.05	81	53.35	1.78	81	55.87
Level-1 effects (r_{ij})	413.56	–	–	496.22	–	–	524.47	–	–

Note. Models control for site (dummy coded, Sample 2 = 1, Sample 1 = 0) (β_{1j} = 9.25, $p < .01$) for Picture Vocabulary, (β_{1j} = 4.18, $p = .29$) for Letter–Word, and (β_{1j} = 12.98, $p < .001$) for Applied Problems. *$p < .05$. **$p < .01$. ***$p < .001$.

3.3.1. Concurrent associations with approaches to learning

Controlling for children's program enrollment, age, gender, home language, mother's country of origin, and mother's education, direct associations were found between the three PIPPS dimensions and approaches to learning dimensions assessed concurrently in the spring. Play interaction was positively associated with attitude toward learning, competence motivation, and attention/persistence. Play disruption was negatively associated with attitude toward learning and attention/persistence. Play disconnection was negatively associated with all three of the approaches to learning dimensions.

3.3.2. Concurrent associations with academic skills assessed in Spanish

Controlling for child, family, and program covariates, play interaction was positively associated with children's scores on the Woodcock–Munoz Letter–Word Identification subtest. Play disconnection was negatively associated with children's scores on the Woodcock–Munoz Applied Problems subtest.

3.3.3. Concurrent associations with academic skills assessed in English

Controlling for child, family, and program covariates, differential associations were found between the PIPPS dimensions and the Woodcock–Johnson subtests. Play interaction was positively associated with scores on the Picture Vocabulary subtest. Play disconnection was negatively associated with scores on the Applied Problems subtest.

Supplemental analyses were conducted for each of the outcome models to examine the extent to which a set of teacher-reported classroom language use variables entered as covariates at Level 2 were associated with children's outcomes. The dummy-coded variables included whether teachers' used mostly or all Spanish during instruction, equally Spanish and English, or mostly or all English during instruction. However, findings remained consistent aross models and very few associations between the classrorom language variables and children's outcomes were found. Given lack of substaintive changes in the findings, we retained the original model without the Level 2 covariates for parsimony (Table 6).

4. Discussion

The present study employed an eco-cultural approach to extend the construct and criterion-related validity of the Penn Interactive Peer Play Scale—Teacher report (PIPPS-T; Fantuzzo et al., 1998) for Latino preschool children from low-income backgrounds. Using a series of exploratory and confirmatory factor analyses, we replicated prior research, confirming three reliable and distinct dimensions of interactive peer play in our large, statewide sample of Latino children. A significant strength of the study is the inclusion of such a diverse sample of Latino preschool children, parents and teachers drawn from a range of Head Start programs and communities. In addition, concurrent validity was established with two key sets of school readiness competencies in the spring: teacher-reported classroom approaches to learning and direct assessments of academic skills assessed in English and Spanish. Findings extend previous research by validating the construct of interactive peer play in a large, statewide sample of Latino Head Start children and by documenting differential associations with learning-related and pre-academic skills important to early school success. Whereas more research is needed, our findings provide additional evidence that Latino children who demonstrate strong social competence fare better on school readiness outcomes. Findings have implications that support early childhood programs to focus on social as well as academic readiness skills.

4.1. Factor structure of the PIPPS in the Latino Head Start sample

Overall, we found consistency with prior Head Start research in the three-factor structure that emerged in our sample, supporting the use of this scale with Latino Head Start children. Exploratory factor analyses identified three dimensions of peer play competence in our sample

(Castro et al., 2002; Fantuzzo et al., 1998): Play Interaction, Play Disruption, and Play Disconnection. Whereas there were two items that loaded differently in our sample from the Fantuzzo et al. (1998) study, the structure we identified was identical to the factor structure that emerged in a sample of predominantly Latino children attending child care centers in the southeast over 10 years ago (Castro et al., 2002). Confirmatory factor analyses provided evidence that the exploratory structure fit our data well. Play Interaction comprised items measuring prosocial engagement, such as sharing, helping other children, encouraging others to join play, creativity and sharing positive emotions during play. Play Disruption measured conflictual behaviors observed during peer play, such as fighting, crying, verbal or physical aggression. Play Disconnection reflected withdrawn behavior, wandering, refusal to play, or hovering outside the play group. These constructs have been documented in prior validation studies of the PIPPS (Fantuzzo et al., 1998; Fantuzzo & Hampton, 2000), in addition to other early childhood research using observational methods (Coplan & Arbeau, 2009; Eggum-Wilkens et al., 2014; Fabes, Martin, Hanish, Anders, & Madden-Derdich, 2003; Howes & Matheson, 1992).

Following confirmation of the structure, we examined the *T* scores for our sample generated based on the original normative sample from a predominantly African American Philadelphia Head Start sample (Fantuzzo et al., 1998). We found that for our Latino sample, the mean and standard deviation for the *T* score for play interaction was comparable to scores obtained from the original normative sample at the spring time point ($M = 53.74$, with SD = 10.51). Mean *T* scores for play disruption ($M = 48.51$, SD = 5.86) and for play disconnection ($M = 42.82$, SD = 9.30) were lower and the standard deviation was somewhat restricted using the original norms. These results support our original rationale for conducting a new validation study with our Latino sample. An implication of our current study findings would suggest that future research conducted with similar populations of Latino children attending Head Start would use the factor structure we derived as well as these new sample norms for deriving scaled scores.

4.2. Concurrent associations with school readiness skills

4.2.1. Interactive peer play competencies and approaches to learning

The three PIPPS dimensions were differentially associated with approaches to learning. Positive associations were found between play interaction and all three approaches to learning dimensions, attitude toward learning, competence motivation, and attention/persistence. These associations are supported by Head Start research documenting that positive and prosocial interactions within the classroom are associated with domain-general skills that support engagement in learning activities such as children's greater motivation to learn, attend, persist during difficult tasks, regulate emotions, display autonomy, and approach instructional tasks in a positive way (Coolahan et al., 2000; Eggum-Wilkens et al., 2014; Fantuzzo et al., 1998; Mendez et al., 2002).

In addition, negative associations were found between play disruption and attitude toward learning and attention/persistence, and between play disconnection and all three of the approaches to learning dimensions. Both sets of negative associations are supported by Head

Start research suggesting that aggressive and disruptive behavior with peers is associated with a lower attitude toward learning, attention and persistence during learning tasks, especially socially-mediated tasks that require children to tolerate frustration, regulate emotion, and accept help from peers and teachers (Bulotsky-Shearer et al., 2011; Fantuzzo, Bulotsky-Shearer, Fusco, & McWayne, 2005). Prior Head Start studies also suggest that children with difficulties engaging in classroom social or learning activities (displaying shy or disconnected behavior) exhibit lower teacher-rated competence motivation and observed autonomous classroom behavior (Domínguez, Vitiello, Maier, & Greenfield, 2010; Fantuzzo et al., 2004a,b). Findings from our current study, however, extend research by documenting these associations specifically for Latino children from low-income families.

4.2.2. Interactive peer play competencies and pre-academic skills

Overall, in our Latino sample, meaningful associations were found between the PIPPS dimensions and direct assessments of children's literacy, language, and mathematics skills in both English and Spanish. Controlling for several family and program demographic variables across both direct assessments (administered in Spanish and English), positive associations were found between play interaction and language and literacy skills; whereas negative associations were found between disconnected play and children's mathematics skills.

Findings for language and literacy outcomes are supported by early childhood research documenting positive associations between peer interaction skills within the preschool classroom and children's pre-literacy skills, receptive and expressive vocabulary development. Observed sociodramatic and cooperative play with peers has been found to be positively associated with children's oral language skills (Bredekamp, 2004; Pellegrini, 1984). Teacher ratings of children's social skills and peer social competence have also been found to be positively associated with children's pre-literacy, and receptive and expressive vocabulary skills in preschool (Arnold et al., 2012; Bulotsky-Shearer et al., 2012a,b; Fantuzzo, Perry, & McDermott, 2004; Mendez et al., 2002; Oades-Sese et al., 2011). Our study extends this research by documenting the consistent associations between peer interaction skills and language and literacy skills for Latino children. Whereas it is likely that children's language skills are transactionally related to their social competent interactions with peers (Oades-Sese et al., 2011; Snow, 2007), future research is needed to more carefully examine the directionality of these associations for Latino children as they practice and develop these important skills within early childhood classrooms.

With respect to mathematics skills, children in our study with difficulties initiating and engaging in socially competent interactions with their peers also concurrently displayed lower mathematics skills. Findings extend previous Head Start research indicating that shy or withdrawn behavior within the context of classroom peer interactions is negatively associated with academic learning outcomes; while specific findings for mathematics skills are documented in only a few recent Head Start studies (Bulotsky-Shearer, Bell, Carter, & Romero, 2014; Fantuzzo et al., 2004a,b). It is not clear why in our sample of Latino children, only negative associations with mathematics emerged with disconnected play behavior, rather than with language and literacy outcomes. One explanation is that the format of mathematics instruction may differ from literacy within the Head Start classroom. Research suggests that over

the course of a typical morning, language and pre-literacy skill activities are more naturally embedded within large whole-group structured activities and children's free-play experiences (Early et al., 2010). When mathematics is taught in preschool settings, teachers provide intentional instruction during more focused small-group activities (Lee & Ginsburg, 2007). For children displaying shy behavior in our study, it could be that learning may have been more challenging within the context of these small cooperative learning groups.

In addition, early childhood mathematics skills have been linked to the development of higher-order problem solving and executive functioning skills including working memory and flexibility (Blair & Razza, 2007; Clark, Pritchard, & Woodward, 2010; Clements, Sarama, Unlu, & Layzer, 2012). These processes may be impaired in children displaying internalizing or socially anxious behavior within the classroom (Blair, 2002; Carlson & Wang, 2007). Given research suggesting that due to their dual acquisition and use of two languages (Tabors, 1997) bilingual children display strengths in executive functioning skills such as attention shifting, working memory, and flexibility (Carlson & Meltzoff, 2008), further research in this area is warranted to identify the set of social, emotional, and regulatory strengths that may be protective factors and perhaps understudied aspects of learning experiences for bilingual Latino children.

4.3. Limitations and directions for future research

Whereas our study contributes additional validity evidence for the use of PIPPS as a measure of interactive peer play for Latino children attending Head Start, there are several limitations that should be acknowledged. First, while convergent and divergent relationships emerged between the PIPPS, PLBS, and the W–J and W–M measures, we note that shared method variance may have played a role in the relations that emerged between the PIPPS and PLBS, since they were both teacher report. Future studies could strengthen validity findings by using alternate sources and methods for measuring learning-related skills and other social-emotional skills that we posit would relate to teacher ratings of preschool interactive peer play.

Second, whereas our study extends prior research by following best practices in the early childhood field and including direct assessments of children's academic skills administered in both English and Spanish (CECER-DLL, 2011; Espinosa, 2013), fewer significant associations were found between the PIPPS and children's language, literacy, and mathematics skills. The magnititude of the correlations was rather modest (ranging from $r = .10$ through .30), however, these are comparable to the magnitude of associations found between teacher report of social competence and direct assessments of pre-academic skills, in other preschool studies (Arnold et al., 2012; Bulotsky-Shearer et al., 2011, 2014). Finally, the inconsistent associations found between play interaction and language and literacy outcomes, (assessed in English and Spanish), may in part be due to variability in children’s development in Spanish and English languages. Many Latino children start preschool with skills in both English and Spanish, and these skills often develop unevenly depending on children’s experiences at home and at school (Espinosa, 2013; Páez, Tabors, & López, 2007; Tabors, Páez, & López, 2003). Scholars in the field, therefore, suggest that children be assessed in both of their languages in order to obtain a complete profile of their school readiness abilities. However, one of the challenges is the use of nationally norm-refenced assessments currently available, such as the W–J or W–M that we used

for the present study. These may not have enough items to capture sufficient variation in younger samples, and particularly in low-income samples where children tend to score 1 SD below the national mean (Waterman, McDermott, Fantuzzo, & Gadsden, 2012). More research is needed to extend our findings to other assessments of children's pre-academic readiness skills, developed and validated for use with bilingual children (Barrueco et al., 2012), or with new measures that are yet to be developed for Latino children.

Given our eco-cultural approach to understanding interactive peer play within the preschool classroom for diverse Latino children from low-income backgrounds, future research is needed to examine individual variation in children's peer play behavior as a function of other proximal contexts that influence children's peer interaction opportunities. This could include more in-depth study of variability in family's encouragement of peer play social competence at home and school, as it is associated with county of origin and recency of immigration. In the classroom context, examining how opportunities for developmentally appropriate play experiences influence the academic learning of Latino children also is greatly needed. For example, the degree to which children's home language matches the predominant language spoken by teachers or peers, has been found to influence preschool peer interactions (Chang et al., 2007; Howes et al., 2011) and would be an important direction for future research.

In our statistical models, we carefully controlled for a set of program-, family-, and child-level demographic variables that might influence children's outcomes. In addition, we included a set of teacher/classroom language use variables, in part to control for this potential influence on children's outcomes, particularly pre-academic skills in language and literacy. However, we did not find that teacher classroom language use contributed significantly to children's approaches to learning or to pre-academic outcomes in either Spanish or English and these variables were trimmed in our models for parsimony. Future studies should take a closer look at this variable and others, such as home–school language match, to examine their influence on associations between social competence and readiness outcomes. Although beyond the scope of the present study, future research might also consider if teachers from different language, ethnic, or cultural backgrounds rate children's peer competence differently, and if rater bias might be present for Latino children particularly in multiethnic classroom settings. Given that researchers have found some evidence of teacher rater differences depending upon student race in elementary school samples (see Mason, Gunersel, & Ney, 2014 for review), limited and inconclusive research to date has been conducted examining rater bias with Latino preschool children (Yates & Marcelo, 2014).

In addition, recent studies suggest that the quality of teacher–child interactions, in particular teachers' ability to use instructional support to enhance higher-order thinking skills, may moderate associations between peer play skills and children's academic outcomes (Bulotsky-Shearer et al., 2014; Stanton-Chapman & Hadden, 2011); examining the extent to which these associations are dependent upon teacher–child interaction quality and classroom language variables for Latino children would be an important next step. Finally, in the home context, factors such as cultural norms and parental expectations regarding children's behavior strongly

influence encouragement of peer social interactions and would be important to consider in future research (Fogle & Mendez, 2006; Fuller & Garcia Coll, 2010).

More research is needed to extend our work longitudinally. In order to obtain a true picture of the associations between peer play competencies and academic skills for Latino children, longitudinal studies should be conducted using academic outcome measures that are vertically aligned and can be used across the transition from preschool to elementary school (Barrueco et al., 2012). For example, we know from Head Start research that English-speaking African American children's play is associated with stronger performance in mathematics by grade 3 (Sekino, 2006), however, longitudinal work with Latino samples is presently lacking. Research on the critical transition from preschool to kindergarten for the growing U.S. population of Latino children can only be done if reliable and valid measures appropriate for the population are available to examine children's skill development longitudinally.

4.4. Implications for early childhood practice

In accord with recent calls from the field to identify strengths within naturally occurring contexts to support the positive development of ethnic minority youth (Cabrera & The SRCD Ethnic and Racial Issues Committee, 2013), findings from our study underscore the importance of peer social competence as a positive developmental competency for Latino children from low-income backgrounds. Our validation of the PIPPS measure extends the availability of psychometrically sound tools that can be used by Head Start teachers providing instruction to children from Latino households. Teachers can use scores from the PIPPS scales to recognize and consider both the peer play strengths and needs of the Latino children in their classroom. Use of the PIPPS to recognize social competence among language-minority children is particularly useful for providing feedback to parents, as the other developmental competencies of Latino children may be overlooked as programs address language exposure and growth for dual language learners. In another example, teachers can identify children displaying disconnected behavior with peers and can individualize their instruction by selecting from a set of evidence-based strategies that encourage social problem-solving and friendship-building skills (Fox, Dunlap, Hemmeter, Joseph, & Strain, 2003). By understanding the profiles of children in their classroom, teachers can also implement class-wide strategies to support all children's social competence, and from a whole-child perspective, establish the social-emotional foundations for academic learning within the classroom.

Finally, given the importance of home–school communication and parent involvement in children's education, teachers can use scores from the PIPPS to facilitate communication with families using the shared "lens" of peer play which can be easily translated into developmental behaviors and skills that parents understand about their children and can support in the home context. Specifically for Latino families, with the home culture emphasizing socialization, respect, and moral development (Fuller & Garcia Coll, 2010), teachers can connect with parents and together discuss from a strengths-based perspective how to best support their shared school readiness goals for children in the home and classroom contexts.

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References

American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 1999

American Educational Research, Association American Psychological Association, & National Council on Measurement in Education. Standards for educational and psychological testing. American Psychological Association, Washington, DC (1999)

Arnold et al., 2012

D.H. Arnold, J.B. Kupersmidt, M.E. Voegler-Lee, N. Marshall. The association between preschool children's social functioning and their emergent academic skills

Early Childhood Research Quarterly, 27 (3) (2012), pp. 376-386, 10.1016/j.ecresq.2011.12.009

Barrueco et al., 2012

S. Barrueco, M.L. López, C.A. Ong, P. Lozano. Assessing Spanish–English bilingual preschoolers: a guide to best measures and approaches

Paul H. Brookes, Baltimore, MD (2012)

P.M. Bentler. Comparative fit indexes in structural models. Psychol. Bull., 107 (2) (1990), pp. 238-246, 10.1037//0033-2909.107.2.238

Blair, 2002

C. Blair. School readiness: integrating cognition and emotion in a neurobiological conceptualization of child functioning at school entry. American Psychologist, 57 (2002), pp. 111-127, 10.1037//0003-066x.57.2.111

Blair and Razza, 2007

C. Blair, R.P. Razza. Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. Child Development, 78 (2007), pp. 647-663

Bollen and Long, 1993

K.A. Bollen, J.S. Long. Testing structural equation models. Sage, Newbury Park, CA (1993)

Bredekamp, 2004

S. Bredekamp. Play and school readiness

E. Zigler, D. Singer, S. Bishop-Josef (Eds.), Children's play: the roots of reading, Zero to Three Press, Washington, DC (2004), pp. 159-174

Bridges et al., 2012

M. Bridges, S.R. Cohen, L.W. McGuire, H. Yamada, B. Fuller, L. Mireles, L. Scott. Bien educado: measuring the social behaviors of Mexican American children. Early Childhood Research Quarterly, 27 (2012), pp. 555-567, 10.1016/j.ecresq.2012.01.005

Buja and Eyuboglu, 1992

A. Buja, N. Eyuboglu. Remarks on parallel analysis. Multivariate Behavioral Research, 27 (4) (1992), pp. 509-540, 10.1207/s15327906mbr2704_2

Bulotsky-Shearer et al., 2014

R.J. Bulotsky-Shearer, E. Bell, T.M. Carter, S. Romero. Peer play interactions and learning for culturally and linguistically diverse low-income preschool children: the moderating role of classroom quality**.** Early Education and Development, 25 (2014), pp. 815-840, 10.1080/10409289.2014.864214

Bulotsky-Shearer et al., 2012a

R.J. Bulotsky-Shearer, E.R. Bell, S. Romero, T. Carter. Preschool interactive peer play mediates problem behavior and learning for low income children. Journal of Applied Developmental Psychology, 33 (2012), pp. 53-65, 10.1016/j.appdev.2011.09.003

Bulotsky-Shearer et al., 2011

R.J. Bulotsky-Shearer, V. Fernandez, X. Dominguez, H. Rouse. Behavior problems in learning activities and social interactions in Head Start classrooms, and early reading, mathematics, and approaches to learning. School Psychology Review, 40 (1) (2011), pp. 39-56

Bulotsky-Shearer et al., 2012b

R.J. Bulotsky-Shearer, P.H. Manz, J.L. Mendez, C.M. McWayne, Y. Sekino, J.W.Fantuzzo. Peer play interactions and readiness to learn: a protective influence for African American preschool children from low-income households. Child Development Perspectives, 6 (3) (2012), pp. 225-231, 10.1111/j.1750-8606.2011.00221.x

Cabrera and The SRCD Ethnic and Racial Issues Committee, 2013

N. Cabrera, The SRCD Ethnic and Racial Issues Committee. Positive development of minority children. SRCD Social Policy Report, 27 (2) (2013), pp. 1-15

Calzada et al., 2010

E.J. Calzada, Y. Fernandez, D.E. Cortes. Incorporating the cultural value of respeto into a framework of Latino parenting. Cultural Diversity and Ethnic Minority Psychology, 16 (1) (2010), pp. 77-86, 10.1037/a0016071

Calzada et al., 2012

E.J. Calzada, C.S. Tamis-LeMonda, H. Yoshikawa. Familismo in Mexican and Dominican families from low-income, urban communities. Journal of Family Issues, 34 (12) (2012), pp. 1696-1724, 10.1177/0192513X12460218

Carlson and Meltzoff, 2008

S.M. Carlson, A.N. Meltzoff. Bilingual experience and executive functioning in young children. Developmental Science, 11 (2008), pp. 282-298, 10.1111/j.1467-7687.2008.00675.x

Carlson and Wang, 2007

S.M. Carlson, T.S. Wang. Inhibitory control and emotion regulation in preschool children. Cognitive Development, 22 (2007), pp. 489-510, 10.1016/j.cogdev.2007.08.002

Castro et al., 2012

D. Castro, J.L. Mendez, S. Garcia, D. Westerberg. Family literacy programs for Latino families in the United States. B. Wasik (Ed.), Handbook on family literacy (2nd ed.), Routledge, New York, NY (2012), pp. 270-288

Castro et al., 2002

M. Castro, J.L. Mendez, J. Fantuzzo. A validation study of the Penn Interactive Peer Play Scale with urban Hispanic and African American preschool children. School Psychology Quarterly, 17 (2) (2002), pp. 109-127, 10.1521/scpq.17.2.109.20856

Cattell, 1966

R.B. Cattell. Handbook of multivariate experimental psychology. Rand McNally, Chicago, IL (1966)

CECER-DLL, 2011

Center for Early Care and Education Research-Dual Language Learners (CECER-DLL) (2011). Issues in conducting research with dual language learners: Summary from listening sessions (Research brief #1). Chapel Hill: UNC, FPG Child Development Institute, Author.

Chang et al., 2007

F. Chang, G. Crawford, D. Early, D. Bryant, C. Howes, M. Burchinal, *et al.* Spanish speaking children's social and language development in pre-kindergarten classrooms. Early Education and Development, 18 (2) (2007), pp. 243-269

Child Trends Databank, 2014

Child Trends Databank (2014). Head Start. Retrieved from <http://www.childtrends.org/?indicators=head-start/>.

Clark et al., 2010

C.A.C. Clark, V.E. Pritchard, L.J. Woodward. Preschool executive functioning predicts early mathematics achievement. Developmental Psychology, 46 (5) (2010), pp. 1176-1191, 10.1037/a0019672

Clements et al., 2012

D.H. Clements, J. Sarama, F. Unlu, C. Layzer. The efficacy of an intervention synthesizing scaffolding designed to promote self-regulation with an early mathematics curriculum: effects on executive function. Presentation at the Society for Research in Educational Effectiveness, Washington, DC (2012) (March)

Coolahan et al., 2000

K.C. Coolahan, J. Fantuzzo, J. Mendez, P. McDermott. Preschool peer interactions and readiness to learn: relationships between classroom peer play and learning behaviors and conduct. Journal of Educational Psychology, 92 (2000), pp. 458-465, 10.1037/0022-0663.92.3.458

Coplan and Arbeau, 2009

R.J. Coplan, K.A. Arbeau. Peer interactions and play in early childhood. K.H. Rubin, W.M. Bukowski, B. Laursen (Eds.), Handbook of peer interactions, relationships, and groups, Guilford, New York, NY (2009), pp. 143-161

Crosnoe, 2007

R. Crosnoe. Early child care and the school readiness of children from Mexican immigrant families. International Migration Review, 41 (1) (2007), pp. 152-181

DeFeyter and Winsler, 2009

J.J. DeFeyter, A. Winsler. The early developmental competencies and school readiness of low-income, immigrant children: influences of generation, race/ethnicity, and national origins. Early Childhood Research Quarterly, 24 (2009), pp. 411-431, 10.1016/j.ecresq.2009.07.004

Dobbs et al., 2006

J. Dobbs, G.L. Doctoroff, P.H. Fisher, D.H. Arnold. The association between preschool children's socioemotional functioning and their mathematical skills. Journal of Applied Developmental Psychology, 27 (2006), pp. 97-108, 10.1016/j.appdev.2005.12.008

Doctoroff et al., 2006

G.L. Doctoroff, J. Greer, D.H. Arnold. The relationship between social behavior and emergent literacy in preschool boys and girls. Journal of Applied Developmental Psychology, 27 (2006), pp. 1-13, 10.1016/j.appdev.2005.12.008

Domínguez et al., 2010

X. Domínguez, V.E. Vitiello, M. Maier, D. Greenfield. A longitudinal examination of young children's learning behavior: child-level and classroom-level predictors of change throughout the preschool year. School Psychology Review, 39 (2010), pp. 29-47

Early et al., 2010

D.M. Early, I.U. Iruka, S. Ritchie, O.A. Barbarin, D.C. Winn, G.M. Crawford, *et al.* How do pre-kindergartners spend their time? Gender, ethnicity, and income as predictors of experiences in pre-kindergarten classrooms. Early Childhood Research Quarterly, 25 (2010), pp. 177-193, 10.1016/j.ecresq.2009.10.003

Eggum-Wilkens et al., 2014

N.D. Eggum-Wilkens, R.A. Fabes, S. Castle, L. Zhang, L.D. Hanish, C.L. Martin. Playing with others: Head Start children's peer play and relations with kindergarten school competence. Early Childhood Research Quarterly, 29 (2014), pp. 345-356, 10.1016/j.ecresq.2014.04.008

Enders, 2010

C.K. Enders. Applied missing data analysis. Guilford Press, New York, NY (2010)

Enders and Tofighi, 2007

C.K. Enders, D. Tofighi. Centering predictor variables in cross-sectional multilevel models: a new look at an old issue. Psychological Methods, 12 (2007), pp. 121-138, 10.1037/1082-989X.12.2.121

Espinosa, 2005

L.M. Espinosa. Curriculum and assessment considerations for young children form culturally, linguistically, and economically diverse backgrounds. Psychology in the Schools, 42 (8) (2005), pp. 837-853, 10.1002/pits.20115

Espinosa, 2013

L.M. Espinosa. Prek-3rd: challenging common myths about dual language learners. A update to the seminal 2008 report. Prek-3rd Policy To Action Brief, Number 10, Foundation for Child Development, New York, NY (2013)

Fabes et al., 2003

R.A. Fabes, C.L. Martin, L.D. Hanish, M.C. Anders, D.A. Madden-Derdich. Early school competence: the roles of sex-segregated play and effortful control. Developmental Psychology, 39 (2003), pp. 848-858, 10.1037/0012-1649.39.5.848

Fantuzzo et al., 2005

J.W. Fantuzzo, R. Bulotsky-Shearer, R.A. Fusco, C. McWayne. An investigation of preschool classroom behavioral adjustment problems and social-emotional school readiness competencies. Early Childhood Research Quarterly, 20 (3) (2005), pp. 259-275, 10.1016/j.ecresq.2005.07.001

Fantuzzo et al., 1998

J. Fantuzzo, K. Coolahan, J. Mendez, P. McDermott, B. Sutton-Smith. Contextually-relevant validation of peer play constructs with African American Head Start children: Penn Interactive Peer Play Scale. Early Childhood Research Quarterly, 13 (1998), pp. 411-431

Fantuzzo and Hampton, 2000

J.W. Fantuzzo, V.R. Hampton. Penn Interactive Peer Play Scale: a parent and teacher rating system for young children. K. Gitlin-Weiner, A. Sandgrund, C. Schaefer (Eds.), Play diagnosis and assessment (2nd ed.), Wiley, New York, NY (2000)

Fantuzzo et al., 2004a

J.W. Fantuzzo, M.A. Perry, P. McDermott. Preschool approaches to learning and their relationship to other relevant classroom competencies for low-income children. School Psychology Quarterly, 19 (3) (2004), pp. 212-230

Fantuzzo et al., 2004b

J. Fantuzzo, Y. Sekino, H.L. Cohen. An examination of the contributions of interactive peer play to salient classroom competences for urban Head Start children. Psychology in the Schools, 41 (2004), pp. 323-336

Fogle and Mendez, 2006

L.M. Fogle, J.L. Mendez. Assessing play beliefs of African American mothers with preschool children. Early Childhood Research Quarterly, 21 (2006), pp. 507-518, 10.1016/j.ecresq.2006.08.002

Fuller and Garcia Coll, 2010

B. Fuller, C. Garcia Coll. Learning from Latinos: contexts, families, and child development in motion. Developmental Psychology, 46 (2010), pp. 559-565, 10.1037/a0019412

Fox et al., 2003

L. Fox, G. Dunlap, M.L. Hemmeter, G.E. Joseph, P.S. Strain. The teaching pyramid: a model for supporting social competence and preventing challenging behavior in young children. Young Children, 58 (4) (2003), pp. 48-52

Galindo and Fuller, 2010

C. Galindo, B. Fuller. The social competence of Latino kindergartners and growth in mathematical understanding. Developmental Psychology, 46 (2010), pp. 579-592, 10.1037/a0017821

Garbarino, 1995

J. Garbarino. Raising children in a socially toxic environment. Jossey Bass, San Francisco, CA (1995)

Gersten and Woodward, 1994

R. Gersten, J. Woodward. The language-minority student and special education: issues, trends, and paradoxes. Exceptional Children, 60 (1994), pp. 310-322

Gorsuch, 1983

R.L. Gorsuch. Factor analysis. (2nd ed.), Erlbaum, Hillsdale, NJ (1983)

Halle et al., 2014

T.G. Halle, J.V. Whittaker, M. Zepeda, L. Rothenberg, R. Anderson, P. Daneri, *et al.* The social-emotional development of dual language learners: looking back at existing research and moving forward with purpose. Early Childhood Research Quarterly (2014), 10.1016/j.ecresq.2013.12.002

Hampton and Fantuzzo, 2003

V. Hampton, J. Fantuzzo. The relationship between interactive peer play in kindergarten and school adjustment for low income urban children. School Psychology Review, 32 (2003), pp. 77-91

Han, 2010

W.J. Han. Bilingualism and socioemotional well-being. Children and Youth Services Review, 32 (2010), pp. 720-731, 10.1016/j.childyouth.2010.01.009

Heckman and Masterov, 2007

J.J. Heckman, D.V. Masterov. The productivity argument for investing in young children. Applied Economic Perspectives and Policy, 29 (3) (2007), pp. 446-493

Horn, 1965

J.L. Horn. An empirical comparison of methods for estimating factor scores. Educational and Psychological Measurement, 25 (1965), pp. 313-322

Howes and Matheson, 1992

C. Howes, C.C. Matheson. Sequences in the development of competent play with peers: social and social pretend play. Developmental Psychology, 28 (5) (1992), p. 961, 10.1037/0012-1649.28.5.961

Howes et al., 2011

C. Howes, A. Guerra, A. Fuligni, E. Zucker, L. Lee, N.B. Obregon, *et al.* Classroom dimensions predict early peer interaction when children are diverse in ethnicity, race, and home language. Early Childhood Research Quarterly, 26 (2011), pp. 399-408, 10.1016/j.ecresq.2011.02.004

Hyson, 2008

M. Hyson. Enthusiastic and engaged learners: approaches to learning in the early childhood classroom. National Association for the Education of Young Children, Washington, DC (2008)

Lamb-Parker et al., 2008

F. Lamb-Parker, P. LeBuffe, G. Powell, E. Halpern. A strength-based, systemic mental health approach to support children's social and emotional development. Infants & Young Children, 21 (2008), pp. 45-55, 10.1097/01.IYC.0000306372.40414.a7

Lee and Ginsburg, 2007

J.S. Lee, H.P. Ginsburg. Preschool teacher's beliefs about appropriate early literacy and mathematics education for low- and middle- socioeconomic status children. Early Education and Development, 18 (2007), pp. 111-143, 10.1080/10409280701274758

López, 2011

L.M. López. Language and the educational setting. B.A. Goldstein (Ed.), Bilingual language development and disorders in Spanish–English speakers (2nd ed.), Paul H. Brookes, Baltimore, MD (2011), pp. 267-281

Luthar et al., 2000

S.S. Luthar, D. Cicchetti, B. Becker. The construct of resilience: a critical evaluation and guidelines for future work. Child Development, 71 (2000), pp. 543-562, 10.1111/1467-8624.00164

Mason et al., 2014

B.A. Mason, A.B. Gunersel, E.A. Ney. Cultural and ethnic bias in teacher ratings of behavior: a criterion-focused review. Psychology in the Schools, 51 (2014), pp. 1017-1030, 10.1002/pits.21800

Mather and Woodcock, 2001

N. Mather, R.W. Woodcock. Examiner's manual. Woodcock–Johnson III Tests of Cognitive Abilities, Riverside, Rolling Meadows, IL (2001)

McDermott et al., 2000

P.A. McDermott, L.F. Green, J.M. Francis, D.H. Stott. Preschool Learning Behavior Scale. Edumetric and Clinical Science, Philadelphia, PA (2000)

McDermott et al., 2002

P.A. McDermott, N.M. Leigh, M.A. Perry. Development and validation of the Preschool Learning Behaviors Scale. Psychology in the Schools, 39 (4) (2002), pp. 353-365

Mendez et al., 2002

J.L. Mendez, J. Fantuzzo, D. Cicchetti. Profiles of social competence among low-income African American preschool children. Child Development, 73 (4) (2002), pp. 1085-1100

Muñoz-Sandoval et al., 2005

A.F. Muñoz-Sandoval, R.W. Woodcock, K.S. McGrew, N. Mather. Batería III Woodcock–Muñoz. Riverside, Itasca, IL (2005)

Muthén and Muthén, 1998

Muthén, L.K., & Muthén, B.O. (1998–2012). Mplus user's guide (7th ed.). Los Angeles, CA: Author.

National Association for the Education of Young Children, 2009

National Association for the Education of Young Children. Developmentally appropriate practice in early childhood programs serving children from birth through age 8: position statement. Author, Washington, DC (2009)

Oades-Sese et al., 2011

G.V. Oades-Sese, G.B. Esquivel, P.K. Kaliski, L. Maniatis. A longitudinal study of the social and academic competence of economically disadvantage bilingual preschool children. Developmental Psychology, 47 (2011), pp. 747-764, 10.1037/a0021380

Ogbu, 1999

J.U. Ogbu. Cultural context of children's development.
H.E. Fitzgerald, B.M. Lester, B. Zuckerman (Eds.), Children of color: research, health, and policy issues, Garland, New York, NY (1999), pp. 73-92

Páez et al., 2007

M.M. Páez, P.O. Tabors, L.M. López. Dual language and literacy development of Spanish-speaking preschool children. Journal of Applied Developmental Psychology, 28 (2) (2007), pp. 85-102, 10.1016/j.appdev.2006.12.007

Passel et al., 2011

J. Passel, D. Cohn, M.H. Lopez. Hispanics account for more than half of nation's growth in past decade. Pew Hispanic Center, Washington, DC (2011)

Pellegrini, 1984

A.D. Pellegrini. The social cognitive ecology of preschool classrooms. International Journal of Behavioral Development, 7 (1984), pp. 321-332

Rathbun et al., 2004

A. Rathbun, J. West, E. Germino Hausken. From kindergarten through third grade: children's beginning school experiences (NCES 2004–007). U.S. Department of Education, National Center for Education Statistics, U.S. GPO, Washington, DC(2004)

Raudenbush et al., 2011

S.W. Raudenbush, A.S. Bryk, R. Congdon. Hierarchical linear and nonlinear modeling (version 7) [computer software]. Scientific Software International, Lincolnwood, IL (2011)

Raver, 2002

C.C. Raver. Emotions matter: making the case for the role of young children's emotional development for early school readiness. Social Policy Report, 16 (2002), pp. 1-20

Reese et al., 2000

L. Reese, H. Garnier, R. Gallimore, C. Goldenberg. A longitudinal analysis of the ecocultural antecedents of emergent Spanish literacy and subsequent English reading achievement of Spanish-speaking students. American Educational Research Journal, 37 (3) (2000), pp. 633-662

Rogoff, 2003

B. Rogoff. The cultural nature of human development. Oxford University Press, New York, NY (2003)

Schafer and Graham, 2002

J.L. Schafer, J.W. Graham. Missing data: our view of the state of the art. Psychological Methods, 7 (2002), pp. 147-177, 10.1037/1082-989X.7.2.147

Schrank et al., 2005

F. Schrank, K.S. McGrew, M.L. Ruef, C.G. Alvarado, A.F. Muñoz -Sandoval, R.W.Woodcock. Overview and technical supplement (Bateria III Woodcock–Muñoz: Assessment Service Bulletin No. 1). Riverside, Itasca, IL (2005)

Sekino, 2006

Y. Sekino. Investigation of the relationship between preschool peer play and third-grade outcomes for low-income urban students. Doctoral dissertation. University of Pennsylvania (2006) Retrieved from <http://repository.upenn.edu/dissertations/AAI3246236/>.

Singer et al., 2006

Play = learning: how play motivates and enhances children's cognitive and social-emotional growth. D. Singer, R.M. Golinkoff, K. Hirsh-Pasek (Eds.), Oxford, New York, NY (2006)

Snook and Gorsuch, 1989

S.C. Snook, R.L. Gorsuch. Component analysis versus common factor analysis: a Monte Carlo study. Psychological Bulletin, 106 (1989), pp. 148-154

Snow, 2007

K.L. Snow. Integrative views of the domains of child function: unifying school readiness. R.C. Pianta, M.J. Cox, K.L. Snow (Eds.), School readiness and the transition to kindergarten in the era of accountability, Paul H. Brookes Publishing Co., Inc., Baltimore, MD (2007)

Stanton-Chapman and Hadden, 2011

T.L. Stanton-Chapman, D.S. Hadden. Encouraging peer interactions in preschool classrooms: the role of the teacher. Young Exceptional Children, 14 (2011), pp. 17-28, 10.1177/1096250610395458

Steiger, 1990

J.H. Steiger. Structural model evaluation and modification: an interval estimation approach. Multivariate behavioral research, 25 (2) (1990), pp. 173-180

Tabors, 1997

P.O. Tabors. One child, two languages: a guide for preschool educators of children learning English as a second language. Brookes Publishing, Baltimore, MD (1997)

Tabors et al., 2003

P.O. Tabors, M.M. Páez, L.M. López. Dual language abilities of Spanish–English bilingual four-year-olds: initial findings from the Early Childhood Study of Language and Literacy Development of Spanish-speaking Children. NABE Journal of Research and Practice, 1 (2003), pp. 70-91 Retrieved from http://www.uc.edu/njrp.

U.S. Census Bureau, 2013

U.S. Census Bureau. Poverty rates for selected detailed race and Hispanic groups by state and place. U.S. Census Bureau, 2007–2011 American Community Survey (2013) Retrieved from https://www.census.gov/prod/2013pubs/acsbr11-17.pdf.

Velicer, 1976

W.F. Velicer. Determining the number of components from the matrix of partial correlations. Psychometrika, 41 (1976), pp. 321-327

Waterman et al., 2012

C. Waterman, P.A. McDermott, J. Fantuzzo, V. Gadsden. The matter of assessor variance in early childhood education—or whose score is it anyway? Early Childhood Research Quarterly, 27 (2012), pp. 46-54, 10.1016/j.ecresq.2011.06.003

Woodcock and Dahl, 1971

R.W. Woodcock, M.N. Dahl. A common scale for the measurement of person ability and test item difficulty (AGS Paper No. 10). American Guidance, Circle Pines, MN (1971)

Woodcock et al., 2001

R.W. Woodcock, K.S. McGrew, N. Mather. Woodcock–Johnson III Tests of Cognitive Ability. Riverside, Itasca, IL (2001)

Yates and Marcelo, 2014

T.M. Yates, A.K. Marcelo. Through race-colored glasses: preschoolers' pretend play and teachers' ratings of preschooler adjustment. Early Childhood Research Quarterly, 29 (2014), pp. 1-11, 10.1016/j.ecresq.2013.09.003

Yu and Muthén, 2002

C.Y. Yu, B.O. Muthén. Evaluation of model fit indices for latent variable models with categorical and continuous outcomes (technical report). University of California, Graduate School of Education and Information Studies, Los Angeles, CA (2002)

Zigler and Bishop-Josef, 2006

E.F. Zigler, S.J. Bishop-Josef. The cognitive child vs. the whole child: lessons from 40 years of Head Start. D.G. Singer, R.M. Golinkoff, K. Hirsh-Pasek (Eds.), Play = learning: how play motivates and enhances children's cognitive and social emotional growth, Oxford University Press, New York, NY (2006), pp. 15-35