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The Structure and Development of Pretend Play Across Childhood

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DEDICATION

I dedicate my dissertation to my mom and dad for giving me the opportunity to play and to my sister for being the best playmate I could ever ask for. I love you all.

ABSTRACT OF THE DISSERTATION

The Structure and Development of Pretend Play Across Childhood

by

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Pretend play is a powerful mechanism of and context for children's cognitive, affective, and social development. Research has documented relations between features of pretend play, such as the quality of expressed fantasy and the quantity of expressed affect, and varied developmental outcomes. Although there is theoretical and empirical support for the importance of both cognitive and affective facets of play in development, little is known about changes in the form and function of play across childhood. This investigation evaluated the structure and development of children's pretend play in a diverse community sample of 250 children across three longitudinal play assessments at ages 4, 6, and 8. The data supported a two-factor play structure across childhood and in diverse groups with regard to child gender, race/ethnicity, and poverty status. Multilevel models documented the level and linear change patterns in cognitive and affective play factors over time. Although Hispanic race/ethnicity was associated with lower levels of the cognitive play factor at age 4, and poverty status was associated with lower levels of the cognitive play factor and the affective play factor at age 4, no predictors accounted

for the significant variance that remained in the linear change parameter for the cognitive, but not the affective, factor. Together, these findings extend the literature on pretend play by evaluating competing models of the structure of play and documenting patterns of cognitive and affective development in children's pretend play over time and in diverse groups. Implications are discussed to inform research on play and adjustment and guide practice and policy efforts that foster both.

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Children's play is multi-dimensional, consisting of cognitive, affective, and behavioral features, and multi-consequential, with implications for social, academic, emotional, and behavioral competence (Pellegrini, 2009, 2010). Yet, opportunities for play have come under fire from critics who question its value, especially in educational settings (Lillard et al., 2013; Stout, 2011). The current study evaluated the structure and development of children's play as a necessary first step toward documenting the developmental significance of children's pretend play and, by extension, informing empirical, applied, and policy efforts targeting play.

A Brief History of Play

Although play has long been recognized as a central activity in childhood (Groos, 1898, 1901a, 1901b), there remains extensive debate about the definition, form, and function of play within and across disciplines (Pellegrini, 2009). Perspectives on play range widely from theories that characterize play as a meaningless outlet for surplus energy (Spencer, 1897) to those that position play as a driving mechanism underlying cognitive and socioemotional development (Bergen, 2013; Groos, 1901a; Russ, 2004; Smith & Gosso, 2010). In response to this variability, some scholars have argued that it is almost impossible to define play, let alone understand its function or purpose in child development (Burghardt, 2011; Wilson, 1975).

Most definitions of play focus on 1) the psychological disposition of the player, 2) the behavior and context supporting the play, and/or 3) the consequences of the play (Burghardt, 2011). For example, Krasnor and Pepler (1980) identified four general

features of play, noting that it is 1) intrinsically motivated, 2) voluntary and pleasure-focused such that it is "done for its own sake," 3) variable in its expression across children and situations, and 4) characterized by *pretending* wherein the child treats an object or situation "as if" it were something else. In an alternate conceptualization of play, Burghardt (2011) identified five specific criteria for defining play as a behavior that 1) has no immediate function or contribution to survival, 2) is enacted for its own sake rather than for an ultimate goal, 3) appears exaggerated and "playful" in structure (e.g., one would easily apprehend *play* fighting as distinct from an actual fight), 4) is repetitive in a way that does *not* indicate psychopathology or atypical development, and 5) is more than a mere survival response (i.e., one does not engage in play behavior under duress or to meet basic needs). Not surprisingly, amidst varying definitions of play, there is little consensus as to how best to classify types of play (e.g., functional play vs. pretend play).

Play typologies typically emphasize one or more central play dimensions. Some play typologies emphasize sociocognitive features. For example, Parten (1925) posited that play advances toward increasing cognitive sophistication and social integration as children develop through periods of unoccupied play (i.e., the child is neither playing, nor engaged in any other activity, but merely observing her/his surroundings), solitary play (i.e., the child plays by her/himself without interacting with other children), onlooker play (i.e., the child watches other children play, but does not play with them), parallel play (i.e., the child plays alongside another child using similar toys, but s/he does not interact with the other child), associative play (i.e., children observe each other and share toys, but do not play together or share play themes), and, finally, cooperative play (i.e.,

children engage in collaborative play themes and actions). Other typologies emphasize the structure and function of play. For example, Smilansky (1968) proposed a 4-sequence model that included 1) functional play (i.e., simple movements with objects; not pretending with the toys), 2) constructive play (i.e., making things with objects), 3) dramatic play (e.g., pretending to be a fire fighter), and, 4) games with rules (e.g., playing sports, board games). Finally, other typologies emphasize the importance of context in defining play (Pellegrini & Smith, 1998). For example, when children are wrestling and laughing it may signal dramatic play; however, when children are expressing anger rather than joy, they are probably engaged in an actual fight. The ongoing debate regarding how best to define and partition play into meaningful variants reflects the overarching complexity, multidimensionality, and likely salience of play in development.

Paralleling varying definitions and typologies of play, theorists have offered a range of explanations for the function of play in development (see Bateson, 2011; L'Abate, 2009; Levy, 1978 for reviews). Even among early evolutionary theorists, opinions ranged from views of play as a means for children to expel excess energy with no significant value in development (e.g., Spencer, 1897) to a context within which children practice and master important skills (Groos, 1901a). Similar debates continue among contemporary theorists, some of whom argue that play is crucial for survival because it prepares children to deal with environmental change through creative skills and flexibility (Bjorklund & Pellegrini, 2000, 2002), whereas others suggest that play is not particularly influential in child development (Lillard et al., 2013).

Psychodynamic theorists, such as Freud and Erikson, viewed play as an important force in emotional and interpersonal development. Freud (1961) argued that play allows children to cope with stressful situations that they cannot control. For example, a child may play peekaboo as a way of reenacting (and ultimately understanding) the uncontrollable departure of an attachment figure. In doing so, Freud argued, play allows children to turn passive, anxiety-inducing situations into those in which the child has more control. Erikson (1964) claimed that play progresses through different stages that parallel their psychosocial development. For example, in the initiative versus guilt stage, a child who is burdened by guilt about breaking rules set by adults might be more goal-oriented in her/his play, whereas a child who feels more adventurous and has the desire to try new things may engage in more exploratory play. In contrast, when older children (ages 6-11) are thought to negotiate the need to work hard (i.e., industry) with concerns about competence (i.e., inferiority), especially social competence, they tend to engage in more social and rule-governed play, such as team sports and structured games. Thus, like Freud, Erikson viewed play as a vehicle through which children create model situations to process their experiences.

Early cognitive theorists emphasized the role of play as a mechanism and reflection of cognitive development. For example, Piaget (1934, 1952) argued that children in the sensorimotor stage (ages 0-2) could participate in object play, but not pretend play, such that very young children could play with toys or objects in their environment, but they do so without pretense (i.e., they do not pretend with the object). Piaget viewed play as an important venue in which children practice skills that they learn

in their environment, and express and reconcile the imbalance they experience between assimilation (i.e., interpreting new experiences to fit existing schemas) and accommodation (i.e., reconstructing old schemas to account for new experiences). Piaget believed assimilation prevails in the world of play, wherein children's egocentric perspective combines with reduced environmental constraints to support their practice and consolidation of new skills that would be lost without the rehearsal afforded by play, and/or overly challenging within the confines of the real world (Harris, 2006).

The sociocognitive theorist, Lev Vygotsky (1967), viewed play as an important foundation for symbolic thinking because it supports children's learning about how to separate meaning from objects. Vygotsky (1967) believed young children in the early stages of symbolic development are unable to think abstract thoughts such that they cannot think about an object without seeing the object in the real world. He argued that play helps children learn to use one object to represent another and thus promotes abstract thinking, such that pencils may represent cars, or boxes may become houses. Importantly, like Freud, Vygotsky also recognized the importance of play for affect regulation. According to Vygotsky, the child at play is engaged in constant behavioral and emotional regulation. For example, rule-based play demands that children learn to inhibit their desires in accordance with the rules of the game. In a game of freeze tag, for example, the tagged child must inhibit her/himself from running to accommodate the rules of the game, even if s/he enjoys running free and wants to win. In this way, Vygotsky argued, play creates a zone of proximal development wherein children practice, and ultimately master, skills and abilities that are necessary for adaptive development, but would prove

too challenging outside the supportive context of play. Echoing Vygotsky's view of play as a zone of proximal development, other cognitive theorists, such as Bruner (1972) and Sutton-Smith (1967), suggested that play is a way for children to free themselves from the constraints of the real world to develop complex cognitive abilities, such as creativity, and explore different ways they can respond to varying situations they encounter in their environment.

In contemporary theory and research, Sandra Russ (2004) has highlighted the multi-faceted contributions of play to both cognitive and socioemotional development. Russ observed that, despite developmental theorists' early emphasis on socioemotional processes in play (e.g., Erikson, 1964; Freud, 1961) and the inclusion of emotional components in play definitions (e.g., Krasnor & Pepler, 1980), extant theory and research have focused on the cognitive components of play to the detriment of our understanding how affective expression in play may influence child development. Therefore, Russ (1993, 2004) proposed a new model of play that identified both cognitive play features (i.e., organization, elaboration/complexity, imagination, and comfort) and affective play features (i.e., the frequency of negative and positive affect expression, and the variety of affect expressed) as important for development. In subsequent empirical studies based on this model, Russ and others have shown that cognitive and affective play features evidence distinct relations with a range of developmental outcomes, such as emotion knowledge, emotion regulation, divergent thinking, and academic achievement (e.g., Chessa et al., 2013; Christiano & Russ, 1996; Fehr & Russ, 2013; Hoffmann & Russ,

2012; Hsieh, 2012; Marcelo & Yates, 2014; Russ & Kaugars, 2001; Seja & Russ, 1999; Wallace & Russ, 2015; Yates & Marcelo, 2014)

Assessing Play

Amidst varied definitions, typologies, and theories of play, researchers have developed multiple methods and measures to assess play and its components. Play assessments range in their degree of emphasis on social factors (e.g., solitary, peer, group), fantasy elements (e.g., pretend), behavioral features (e.g., interest, comfort), and affective expressions (e.g., frequency and variety of emotion) (see Kaugars, 2011 for a review of standardized play measures for 4-10 year olds). For example, the Play Observation Scale (POS; Rubin & Mills, 1988), assesses the frequency with which children engage in different types of play in a group context as informed by the aforementioned typologies of Parten (1925) and Smilansky (1968). In contrast, the Test of Pretend Play (ToPP; Lewis & Boucher, 1997) evaluates the child's ability to engage in independent symbolic thinking using a solitary play paradigm that assesses the child's capacity to a) form representations with objects (e.g., use a banana as a telephone), pretend an absent object is present (e.g., cook imaginary food), and c) attribute an animate characteristic to an object (e.g., pretend toy animals are fighting). Integrating a social emphasis, the Penn Interactive Peer Play Scale (PIPP; Fantuzzo et al., 1995) focuses on peer play patterns in a classroom setting to assess the frequency of interactive peer play, disruptive peer play, and disconnections with peers during play.

Despite theoretical support for the importance of emotion in play, most play research and corresponding assessments that advance beyond the aforementioned

descriptive typologies focus on cognitive dimensions of play. Moreover, even within cognitive measures of play, there is a tendency to focus on the presence versus absence of symbolic thinking or the presence versus absence of pretend play, rather than on specific sub-components of cognitive play features, such as the quality of play with regard to its thematic organization, elaboration, and complexity, as well as the child's interest or engagement in play.

The Affect in Play Scale (APS; Russ, 1993, 2004) is a standardized measure of pretend play that assesses cognitive and affective play features among children between the ages of 6 and 10. Children are presented with two human puppets (boy and girl), three blocks, and the following instructions:

> *I'm here to learn about how children play. I have here two puppets and would like you to play with them any way you like for five minutes. For example, you can have the puppets do something together. I also have some blocks that you can use. Be sure to have the puppets talk out loud. The video camera will be on so that I can remember what you say and do. I'll tell you when to stop.*

The 5-minute APS observation period is scored using 5-point scales to assess the global organization, imagination, and elaboration/complexity of the child's play. A global rating of the child's interest and comfort in play is also provided on 5-point scale. In addition, the APS includes three primary affect scores indicating 1) the total frequency of units of affective expression (i.e., the total number of times emotion is expressed in the 5-minute period), 2) the variety of affect across 11 categories (e.g., nurture/affection, happy/pleasure, aggression, anxiety/fear), and 3) the average intensity of expressed affect rated on a 5-point scale.

Research using the APS has demonstrated positive relations of children's quality of fantasy and imagination with an array of adaptive outcomes (see Russ, 2004 for review), such as creativity, divergent thinking, problem solving, and emotion regulation (Goldstein & Russ, 2000; Hoffmann & Russ, 2012; Moore & Russ, 2008; Seja & Russ, 1999; Wallace & Russ, 2015). Research has also demonstrated positive relations between affective expression in play and various adaptive outcomes (see Russ, 2004 for review), including emotional understanding, primary process thinking, coping, and interpersonal behavior (Christiano & Russ, 1996; Niec & Russ, 1996; Russ & Grossman-McKee, 1990; Russ & Peterson, 1990; Russ, Robins, & Christiano, 1999).

Given the clear value of the APS for understanding a variety of adaptive outcomes among older children, Kaugars and Russ (2009) developed a modified version of the APS to assess cognitive and affective play elements among younger children. The Affect in Play Scale – Preschool Version (APS-P) assesses cognitive and affective play features in children as young as age 4 using a standard set of toys to support expressive pretend play. Instead of 2 puppets, 3 blocks, and an open-ended story request, the APS-P presents children with a more expansive set of play items (i.e., a set of small stuffed animals, three cups, a car, a set of plastic animals, and a soft bouncy ball), as well as a structured story prompt in which the examiner illustrates how the child can make up a story using the toys to act out a scenario. As in the APS, the APS-P yields 5-point cognitive ratings of organization, elaboration/complexity, imagination, and comfort, as well as continuous measures of the frequency of affect and the variety of affect across 12 categories (affect intensity is not scored in the APS-P). This measure also evaluates the

frequency of different play types during each 20-second epoch (i.e., no play, functional play, and pretend play). Research using the APS-P has demonstrated positive relations of the cognitive scores and the affective scores with a range of adaptive indices, such as coping flexibility, prosocial behavior, lower ratings of behavior problems, creativity, and social competence (Delvecchio, Mabilia, Li, & Di Riso, 2015; Fehr & Russ, 2013; Kaugars & Russ, 2009; Marcelo & Yates, 2014; Wallace & Russ, 2015; Yates & Marcelo, 2014). Given the demonstrated utility and validity of the APS-P for assessing multiple play features beginning in early childhood, as well as recent evidence that it can be used with older children as well (e.g., ages 6-11;Mazzeschi, Salcuni, Di Riso, Lis, & Bonucci, 2008; Mazzeschi, Salcuni, Parolin, & Lis, 2004), this investigation drew on the APS-P to evaluate the form and development of pretend play in a diverse community sample across 3 longitudinal assessments at ages 4, 6, and 8.

The APS-P was informed by Russ' (1993, 2004) conceptual model of play wherein cognitive and affective play features are viewed as distinct, yet equally important, features of play. However, few studies have evaluated the factorial structure of the APS-P, and none have done so over time and in diverse groups. Fehr and Russ (2014) conducted an exploratory analysis of the factor structure of the APS-P, which suggested that all play features load on one factor. However, they also found support for a two-factor model in which imagination, organization, positive affect, and elaboration loaded on to one (cognitive) play factor, while negative affect, undefined affect, and variety of affect loaded onto a second (affective) play factor. Interestingly, children's comfort in play loaded on both factors. Delvecchio and colleagues (2015) evaluated the two models

found by Fehr and Russ (2014), as well as a theoretical model proposed by Kaugars and Russ (2009), in which the affective play factor was limited to two variables, namely variety of affect and frequency of affect, and comfort was placed on the cognitive factor. Moreover, these authors evaluated the measurement invariance of the APS-P across age groups (i.e., 4-year olds vs. 5-year olds). Delvecchio and colleagues (2015) found evidence for the two-factor model proposed by Kaugars and Russ (2009) and demonstrated its structural invariance, metric invariance, and partial scalar invariance across groups of children at ages 4 and 5. Despite suggestive evidence that the APS-P does yield information about distinct cognitive and affective play factors, the present study was the first to evaluate the longitudinal invariance of children's pretend play in the same sample across multiple time points and in consideration of potential variants across diverse groups as a function of child gender, race/ethnicity, and poverty status.

Development of Play

Age (and experiences that are correlated with it) is one of the most important influences on children's multi-domain competence, and on the development of symbolic or pretend play in particular. As children grow older, their play becomes more sophisticated in form, organized in content, and social in context (Parten, 1925; Slade & Wolf, 1994; Smilansky, 1968; Smolucha & Smolucha, 1998). During the first year of life, children move from exploring the environment and interacting with objects and toys through touch and manipulation toward using objects "as if" in the context of pretend (Belsky & Most, 1981). By 2 years of age, most children engage in pretend play scenarios that feature a clear ability to treat one thing, such as a box, "as if" it were

another, such as a car (Fein, 1981; Hirsh-Pasek & Golinkoff, 2003; Lillard, 2015). With advancing age, the rising salience of peers and the transition to school prompt children to engage in greater levels of social pretend play, wherein they create more complex networks of pretend and invite others to join in shared pretense (Slade & Wolf, 1994). Theorists suggest that pretend play peaks during late preschool and then declines as children enter middle childhood (Fein, 1981; Pellegrini & Smith, 1998), and become increasingly connected to rule-based games and sports.

Despite the consistent consideration of play within prominent developmental theories, there remains a dearth of research that evaluates how play, especially pretend play and its components, develop over time. Cole and la Voie (1985) adopted a microgenetic approach to evaluate the play patterns of 2 to 6 year old children over the span of 6 weeks in the context of peer dyadic play sessions. They found that different types of pretend play evidenced distinct trajectories. For example, object fantasy, which is characterized by pretending with toys (e.g., taking pictures with a toy camera), increased from 3 to 4 years of age and then decreased, whereas person fantasy, which is characterized by dramatic pretend play (e.g., pretending to be a prince or princess), followed a positive linear trend from 3 to 5 years of age and then decreased at age 6. Field, de Stefano, and Koewler (1982) examined young children's progression from reality play to pretend play in the context of classroom observations of peer play. They found that children aged 2 ½ to 3 ½ engaged in primarily reality play, children aged 3-4 years old engaged in object fantasy, and the oldest children, aged 4-5 years, engaged in primarily person fantasy.

Although prior studies demonstrate that peer play practices vary across development, developmental patterns of solitary pretend play remain unclear, as does our understanding of if and how different play components (i.e., complexity of play, affect in play) change over time, particularly beyond the early childhood years. Thus, the current study sought to document the level and change in empirically validated play components across childhood, and in diverse groups.

Play in Sociocultural Context

According to Bornstein's (2006) ecological model of pretend play, the antecedents of children's pretend play include child characteristics (e.g., age, gender, maturation), and broader societal and cultural influences (i.e., culture, neighborhood, school, socioeconomic status). In support of this assertion, studies have shown that there is variation in pretend play as a function of gender, such that girls tend to engage in more pretend play than boys of the same age (Fung & Cheng, 2015; Muthukrishna & Sokoya, 2008; Sheldon, 2014), and girls tend to express fewer themes of aggression and negative affect in their pretend play as compared to boys. However, to my knowledge, studies have not yet evaluated gender differences in either the structure of pretend play, or its development over time.

Societal and cultural contexts, such as race and ethnicity and socioeconomic status, contribute to the expression and development of pretend play (Göncü, Patt, & Kouba, 2002). Slaughter and Dombrowski (1989) observed that, "children's social and pretend play appears to be biologically based, sustained as an evolutionary contribution to human psychological growth and development... [but] cultural factors regulate the

amount and the type of expression of these play forms" (p. 290). Gaskin, Haight, and Lancy (2006) identified three cultural perceptions of play: 1) culturally cultivated play in which play is viewed as important and adults provide children with opportunities and tools to play, 2) culturally accepted play in which play is accepted, but it is not recognized as important to the culture and is thought to have no significant purpose, and 3) culturally curtailed play wherein play is perceived as a distraction from learning necessary work skills, and opportunities for play are restricted. In support of these observations, Goncu, Jain, and Tuerner (2006) documented significant differences in parents' and teachers' valuation and encouragement of play across African American, European American, and Turkish groups. African American and European American caregivers viewed play as important for children's development, whereas Turkish caregivers perceived play as less valuable. Correspondingly, African American and European American children exhibited higher levels of play than Turkish children.

In addition to play frequency, the structure and content of play may vary across different cultures. For example, Bornstein and colleagues (1999) found that Argentinian mother-child dyads were more likely to engage in symbolic play than American mother-child dyads, whereas American dyads engaged in more exploratory play than Argentinian dyads. Importantly, other evidence suggests that play behaviors may be viewed differently by others as a function of the player's race/ethnicity, which, in turn, may affect patterns of play over time. For example, Yates and Marcelo (2014) found that Black children who exhibited imaginative and emotionally expressive play received lower ratings of school preparedness and peer acceptance and higher ratings of teacher-

child conflict than their non-Black counterparts who expressed comparable levels of imagination and emotion in play. Given evidence that the frequency, content, and/or meaning of play may vary as a function of cultural factors, such as race, this investigation evaluated the invariance of play structure and its development in a diverse community sample of Hispanic, Black, White, and multiracial children.

Although there is mixed evidence regarding the impact of socioeconomic status (SES) on children's play (see McLoyd, 1982 for discussion), several studies have illustrated variation in play form and function as a function of SES (see Göncü & Vadeboncoeur, 2016 for discussion). An early study by Udwin and Shmukler (1981) illustrated that SES was related to levels of imaginative play in preschoolers, but this relation was mediated by parenting factors. Specifically, they observed that SES was related to deficits in pretend play among lower-class children, because their parents of low SES households did not help them integrate their experiences with their environment, which lead to their poor pretend play. In a study of play among Brazilian children from different cultural and socioeconomic groups, including low SES urban, high SES urban, and mixed SES urban, Gosso and colleagues (2007) found that children from high and mixed SES groups engaged in more pretend play than children from lower SES groups. Given the mixed evidence regarding patterns of play across children living in and out of poverty, the current investigation evaluated the (in)variance of play structure and development as a function of children's poverty status.

The Current Study

The rising consideration of both cognitive and affective play features in development, as well as the validation of the APS-P has opened the door for new research efforts to understand the structure and content of play across childhood. However, extant research studies have favored cross-sectional research designs drawing from predominantly White and middle-class samples. Therefore, this investigation sought to evaluate the structure and development of pretend play in a large and diverse community sample of children at ages 4, 6, and 8.

It is an ongoing conundrum in the field of play as to what the core components of play are, and if and how they may vary across time or groups. Some scholars propose single factor models of pretend play, whereas others suggest there are two factors, wherein cognitive and affective features are distinct, and still others suggest the components of play may change with age as cognition and affect become progressively differentiated. This investigation evaluated competing models of play structure to ascertain whether there are two separate factors: cognitive factor and affect factor, or these two factors are not distinct from each other. Given the prior findings of the psychometric evaluation of APS-P, I expected to find support for a two-factor structure model. Moreover, I evaluated the longitudinal measurement (in)variance of the best fitting model based on the CFA in diverse groups as a function of age, child gender, race/ethnicity, and poverty.

There is a dearth in the play literature on the development of play, especially the development of the different factors of play during childhood. Thus, the second aim of

this study is to evaluate the growth of pretend play factors: cognitive factor (i.e., the composite score of organization, elaboration/complexity, imagination, and comfort) and affect factor (i.e., the composite score of variety of affect and frequency of affect), via play samples collected from a diverse group of children at ages 4, 6, and 8. Cross-sectional studies had illustrated that older children express more imagination and better play quality than their younger peers; longitudinal studies also illustrated that as children develop, their play becomes more intricate. Thus, I expected that the cognitive factor of play will increase over time. Although, there are no studies that have evaluated how the ability to express different emotions in play change over time, I expected that the affect factor will also increase overtime. Moreover, I also evaluated how sociodemographic factors: gender, race/ethnicity, and poverty status predicted the intercept and slope of these play factors. I expected that girls would have higher initial status for both factors and would show a steeper increase in their play overtime. Given the prior research on cultural and racial differences on play forms and valuation of play, I expected racial differences in the slope and intercept of play. I expected that Black children will evidence lower initial status than their non-Black peers, and they will also experience slower increase in their play. Finally, I expected that children who are poor will evidence lower initial status of the play factors and also show slower increase in their play.

This study advances of the components and structure of play and the development of play. By evaluating and establishing the validity of APS-P as a measure of play in a diverse sample of children and establish invariance across age, gender, race, and poverty status, future studies can employ this measure, especially in a diverse sample; they will

be able to look at different components of play, especially the understudied affect factor. This will extend our understanding of the importance of affect expression in play in child adjustment. Moreover, this is the first study to look at how different factors of play develop overtime and how this development may vary as a function of gender, race, and poverty status. Understanding the development of these different factors has important implications for research and practice.

Methods

Participants

The sample consisted of 250 children (50% Female) who were participating in an ongoing longitudinal study of children's learning and development. The sample was racially diverse (46% Hispanic, 18% Black, 11.2% White, 24.4% multiracial, and .4% Asian), and representative of the Southern California communities from which it was drawn (U.S. Census Bureau, 2011). These analyses focused on 3 data waves at ages 4 (N = 250; M_{age} = 49.02 months, SD = 2.99), 6 (N = 215, 86% retention; M_{age} = 73.27 months; SD = 2.58), and 8 (N = 214; 85.2% retention; M_{age} = 97.51 months; SD = 2.97). Two or more data waves were completed by 91.2% of the children.

At Wave 1, the majority of caregivers were biological mothers (91.4%) with the remaining caregivers consisting of foster/adoptive mothers (3.6%), and grandmothers or other female kin (5%). Education levels were variable in that 19.8% of caregivers had not completed high school, 17.3% had a high school diploma or GED, and 62.9% had some kind of technical training or college coursework. Just over half the caregivers were employed (55.6%), and the majority were married (61.6%) or in a committed relationship

(18.8%). Poverty status was determined based on the caregiver's reported income divided by the appropriate poverty threshold (U.S. Census Bureau Housing and Household Economics Statistics Division, 2007) for each household size and number of children under 18 in the home. Approximately half the sample (40.4%) resided at or below 130% of the poverty line, which is the federal cut-off for state subsidies such as food stamps (U.S. Census Bureau Housing and Household Economics Statistics Division, 2007). Returning families did not differ significantly from those who did not on all study variables.

Procedures

Families were recruited to participate in a study of children's early learning and development via flyers placed in community-based child development centers and preschool programs. Caregivers completed a brief intake screening by phone before scheduling a 3-hour laboratory assessment. Exclusionary criteria included children with diagnosed developmental disabilities or delays (n = 3), children who were not able to understand English (n = 4), and children who were outside the target age range of 45-54 months (not tracked). At each wave, the child completed a variety of tasks, including measures of intelligence and symbolic play while the caregiver completed a semi-structured interview and questionnaires in an adjacent room.

Informed consent was obtained from the child's legal guardian at each wave, and child assent was obtained beginning at the 6-year-visit. Caregivers were compensated at a rate of $25/hour and children received a toy of their choosing after each laboratory visit.

All procedures were approved by the Human Research Review Board of the participating university.

Measures

Affect in Play Scale - Preschool Version (APS-P; Kaugars & Russ, 2009). The APS-P is a 5-minute standardized play measure that was adapted from the Affect in Play Scale for school-aged children (APS; Russ, 1993, 2004) to measure cognitive and affective processes in the play of preschool-aged children. Whereas the APS uses 2 human puppets to inspire play, the APS-P uses a standardized set of toys that are designed to evoke a range of aggressive, neutral, and affiliative themes. At each data wave, children were presented with the following toys in a scripted fashion: 5 small stuffed animals (i.e., hippo, bear, big dog, little dog, shark), 3 plastic cups, 1 small car, 4 plastic zoo animals (i.e., elephant, giraffe, zebra, and tiger), and 1 small, colored, squishy ball with bumps. After presenting the toys to the child, the examiner narrated a sample play vignette in which the bear toy looked in one cup and found good food to eat and then looked in another cup and found food s/he did not like. Following this play demonstration, the examiner instructed the child to keep playing and make up a story.

Children were encouraged to play freely for 5 minutes. If the child did not play after the first 30 seconds, s/he was encouraged to "go ahead, play with the toys and make up a story." The same prompt was used again if the child continued not to play for an additional 60 seconds. The task was discontinued after 2 minutes if the child did not play. If the child played, but did not verbalize within 30 seconds, the examiner prompted the child to "talk out loud, so I can hear you." Finally, if the child stopped playing before the

5 minutes elapsed, s/he was told to "keep playing, I'll tell you when to stop." Examiners repeated each child's utterance to facilitate coding accuracy and encourage ongoing play, as in other play assessments with young children (Emde, Wolf, & Oppenheim, 2003).

APS-P administrations were video recorded and transcribed verbatim for coding by doctoral and advanced research assistants. Global ratings of imagination (i.e., the amount of pretending the child engaged in during the play assessment), organization (i.e., the coherence of the play events), elaboration/complexity (i.e., complexity of themes, use of sound effects, character development), and comfort (i.e., how interested and engaged the child was in the play task) were rendered on 5-point scales from low (*1*) to high (*5*) levels of each construct. The child's verbal and nonverbal affect expressions in the play narrative (e.g., "They are saved [the little dog and the big dog hug];" "You ate all my grass and I kick your butt with my tail") were coded as present/absent across 12 categories (e.g., happy/pleasure, sad/hurt, anger/aggression, nurture/affection) during each 10-second play interval. In addition, the predominant type of play was coded as functional, pretend, or absent during each 20-second play interval.

Although designed to support the assessment of play in children as young as 4 years of age (Kaugars & Russ, 2009), the APS-P has been validated for use with children up to 11 years of age (Mazzeschi et al., 2008). In contrast, the APS was designed support the assessment of play in children beginning at age 6, but it has proven to be too abstract to use with younger children (Kaugars & Russ, 2009). In addition, evidence points to concurrent validity between the APS-P and the better-established APS scale (Mazzeschi

et al., 2008). Therefore, the APS-P was administered at the age 4, 6, and 8 assessments in this study.

Interrater reliabilities across 25% of the sample at each time point, were excellent for the play constructs, which include Organization (ICC_{age4}=.92, ICC_{age6}=.84, ICC_{age8}=.87), Elaboratin/Complexity (ICC_{age4}=.91, ICC_{age6}=.76, ICC_{age8}=.90), Imagination (ICC_{age4}=.91, ICC_{age6}=.89, ICC_{age8}=.94), Comfort (ICC_{age4}=.87, ICC_{age6}=.87, ICC_{age8}=.89), Variety of Affect (i.e., the number of different types of affect categories the child expressed out of 12 possible affect categories; ICC_{age4}=.98, ICC_{age6}=.96, ICC_{age8}=.94), and Frequency of Affect (i.e., the number of 10-second intervals in which the child expressed any affect.; ICC_{age4}=.96, ICC_{age6}=.97, ICC_{age8}=.89).

Analysis

Data Analytic Plan

Data preparation and missingness. All data were sufficiently normal to render parametric statistics valid (Afifi, Kotlerman, Ettner, & Cowan, 2007). Of the 250 participating children, attrition and recording errors resulted in missing APS-P data for .4% (n = 1) of the children at wave 1, 18.8% (n = 47) of the children at age 6, and 24.8% (n = 62) of the children at age 8. Missing data were addressed using the full-information maximum likelihood procedure (Schafer & Graham, 2002), as Little's (1988) MCAR test was not significant, $\chi^2(42) = 42.868$, $p = .434$. All analyses were conducted in M*plus* 6.12 (Muthén & Muthén, 1998-2011).

Preliminary analyses. A repeated measures multivariate analysis of variance (MANOVA) followed by Bonferroni-corrected post hoc comparisons evaluated group

differences in the study variables as a function of the within subjects child age variable and the between subjects gender, race/ethnicity, and poverty status variables (i.e., 130% or below the federal poverty level, which qualifies the household for social service supplements, such as food stamps), as well as their interactions. Bivariate analyses explored relations among individual play variables within and across time.

Confirmatory Factor and Invariance Analyses. Confirmatory factor analyses (CFA) evaluated competing models of the APS-P structure, including a two-factor model based on Kaugars and Russ (2009) and a single factor model based on Fehr and Russ (2014). Absolute model fit was evaluated based on Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI) values (Van de Schoot, Lugtig, & Hox, 2012). Bayesian Information Criterion (BIC) and Satorra-Bentler chi-square difference test values were used to compare models (Sattora, 2000). Model invariance was indicated by a non-significant chi-square difference test, a smaller BIC value, and a $\Delta CFI \leq .01$ (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000). Longitudinal multigroup confirmatory factor analyses evaluated the invariance of the best fitting model across ages 4, 6, and 8, as well as between groups over time as defined by gender (girls versus boys), race/ethnicity (Hispanic versus non-Hispanic), and poverty status (i.e., below versus above 130% of the poverty threshold). Successive analyses evaluated configural invariance (i.e., constraining the factorial structure to be the same), metric invariance (i.e., constraining the factor loadings to be the same), and scalar invariance (i.e., constraining the factor intercepts to be the same).

Growth Curve Analyses. Multilevel models assessed level and change in each play factor over time. Prior to evaluating models, preliminary univariate models were used to test within and between-group variability. A fully unconditional means model examined whether there was within- and between-person variance in each play factor over time, and unconditional growth models evaluated linear change in each play factor across ages 4, 6, and 8. Conditional models were estimated to identify significant correlates of the intercept and/or linear change in each play factor, including gender, race/ethnicity, and poverty status. As recommended by Singer and Willett (2003), pseudo *R*-squared values were reported for each analysis as a proxy for effect size indicating the amount of variance explained in the intercept and linear change of each play factor by the multilevel model predictors.

Results

Descriptive Analyses

Table 1 depicts the mean and standard deviation of each play variable by child age, gender, race/ethnicity, and poverty status. A repeated measures MANOVA evaluated the main effects of age, gender, race/ethnicity, and poverty status on the play variables, as well as their interactions. There was a significant age effect on organization (Wilks' λ = .93, p=.004), elaboration/complexity (Wilks' λ = .96, p=.027), and imagination (Wilks' λ = .84, p=.000). Play organization and imagination were significantly higher at age 8 than at ages 4 and 6, and the complexity of play was higher at age 8 than at age 6. There were no significant main or interactive effects of age, gender, race/ethnicity, and poverty status on the other play variables.

Bivariate Analyses

Table 2 depicts bivariate relations among the play variables at ages 4, 6, and 8. All play variables were positively correlated within and across data waves ($.16 < r < .90$).

Confirmatory Factor Analyses

Table 3 shows the fit statistics comparing two competing models of APS-P structure across ages 4, 6, and 8 and their Satorra-Bentler difference values. Model 1 represents the two-factor model proposed by Kaugars and Russ (2009) in which pretend play has two correlated factors, 1) a cognitive factor, which consists of organization, imagination, complexity, and comfort) and 2) an affective factor, which consists of variety of affect and frequency of affect. Model 2 represents the one-factor proposed by Fehr and Russ (2014). These two models were compared using a longitudinal confirmatory factor analysis approach (Brown, 2015), which accounts for "the complete data structure over time [and] the lagged relations among the indicators in addition to within factors covariance, and the correlated errors of the repeated measurement" (p. 253).The model fit indices and the Satorra-Bentler difference test indicated that Model 1 fit the data better than Model 2. All the factor loadings were significant (.80-.97) and the two factors were highly correlated within wave ($r_{age4=}$ .89, $r_{age6=}$ .97, $r_{age8=}$ .96) and across data waves ($.30<r<.97$).

Age invariance analyses. Fit indices for the configural model indicated a good fit for age suggesting that the APS-P structure did not appreciably differ across ages 4, 6, and 8 (see Table 4A.) Likewise, the metric invariance fit indices show adequate fit. Although the comparison of fit indices and the chi-square difference test suggested the

factor loadings may not be equivalent by age, it is likely the models were overpowered. Brown (2015) pointed out that a weakness of the longitudinal metric invariance approach is overpowering the model. In support of this assertion, age invariance analyses within a random subset of 125 (50%) participants yielded support for both configural and metric invariance across both fit indices and a nonsignificant chi-square difference test (see Table 4B). Scalar invariance was not supported in the full sample, nor in the random subset of 50% of the participants.

Gender invariance analyses. Fit indices for the configural model indicated acceptable fit for gender, suggesting that the APS-P structure did not appreciably differ across boys and girls (see Table 5A.) However, the chi-square difference tests were significant for both metric and scalar invariance models in both the full and the randomly selected sample of 50% of the participants. Thus, these data suggest that the loadings and the intercepts of the two-factor model scores were different for boys and girls.

Racial/ethnic invariance analyses. Fit indices for the configural model indicated acceptable fit for race/ethnicity, suggesting that the APS-P structure did not appreciably differ across non-Hispanic and Hispanic children (see Table 6A.) However, the chi-square difference tests were significant for both metric invariance model in the full. Race/ethnicity invariance analyses within a random subset of 125 (50%) participants yielded support for both configural and metric invariance across both fit indices and a nonsignificant chi-square difference test (see Table 6B). Scalar invariance was not supported in the full sample, nor in the random subset of 50% of the participants.

Poverty invariance analyses. The fit indices for the configural model indicated acceptable fit for children who did and did not qualify for state aid (i.e., 130% of the federal poverty level; see Table 7A), suggesting that the APS-P structure did not appreciably differ across children in and out of poverty (see Table 7A). However, the chi-square difference tests were significant for both metric and scalar invariance models in both the full and the randomly selected sample of 50% of the participants (see Table 7B). Thus, these data suggest that the loadings and the intercepts of the two-factor model scores were different across children residing above versus below 130% of the federal poverty line.

Growth Curve Analyses – Unconditional models

An unconditional means model evaluated the amount of variance in children's cognitive play factor that could be explained by within- and between-person variance. Results from Model A (see Table 8) revealed a significant intercept for the cognitive factor (γ_{00} = 12.110, *SE* = .228, p <.001), as well as a significant within-person variance for the cognitive factor (σ^2_ε = 14.448, *SE* = .986, p <.001) and a significant between-person variance for the cognitive factor (σ^2_0 = 7.831, *SE*=1.236, p <.001). Findings from Model A suggested that the cognitive play factor varied over time within and across children. According to the intra-class correlation coefficient, 35% of the total variability in the cognitive play factor was explained by the between-person variance.

An unconditional growth model evaluated the presence of linear change in the cognitive play factor (see Model B, Table 8). A significant chi-square difference test, $\chi^2(3) = 26.738$, p <.001, suggested that the unconditional growth model was a better

fitting model for the data than the unconditional means model. The pseudo R^2 for Model B indicated that 16% of variability in the cognitive play factor was explained by a linear growth pattern. There was no significant covariance between the slope and the intercept (σ_{01} =-.490, *SE* =1.020, *p*=.631). However, the negative parameter suggests that children who scored higher on the cognitive play factor at age 4 showed smaller decreases in the cognitive play factor over time. The remaining within-person variance, σ^2_{ε} = 11.725, *SE* = 1.172, *p* <.001, intercept variance, σ^2_0 = 7.799, *SE* = 1.648 , *p* <.001, and slope variance, σ^2_1 = 2.200, *SE* = 1.012, *p* <.001, supported the evaluation of a conditional model to evaluate relations of gender, race/ethnicity, and poverty status with the level and linear change in the cognitive play factor across ages 4, 6, and 8.

An unconditional means model evaluated the amount of variance in children's affective play factor that could be explained by within- and between-person variance. Results from Model A (see Table 9) revealed a significant intercept for the affective play factor (γ_{00} = 12.110, *SE* = .888, *p* <.001), as well as a significant within-person variance (σ^2_{ε} = 67.460, *SE* = 4.606, *p* <.001) and a significant between-person variance (σ^2_0 = 39.344, *SE* = 5.894, *p* <.001). Findings from Model A suggested that the affective play factor varied over time within and across children. According to the intra-class correlation coefficient, 37% of the total variability in the affective play factor was explained by the between-person variance.

An unconditional growth model evaluated the presence of linear change in the affective play factor (see Model B, Table 9). The chi-square difference test $\chi^2(3)$ =6.52, *p=.08* suggested that the unconditional growth model was a marginally better fitting

model for the data than the unconditional means model. The pseudo R^2 for Model B indicated that 7% of variability in the affective play factor was explained by a linear growth pattern. There was no significant covariance between the slope and the intercept (σ_{01} = -2.904, *SE* = 5.525, *p*=.599). However, the negative parameter suggests that children who scored higher on the affective play factor at age 4 showed smaller decreases in the affective play factor over time. The remaining within-person variance, σ^2_{ε} = 62.222, *SE* = 6.534, *p* <.001, intercept variance, σ^2_0 = 43.134, *SE* = 9.200, *p* <.001, and slope variance, σ^2_1 = 4.175, *SE* = 5.349, *p*=.435, supported the evaluation of a conditional model to evaluate relations of gender, race/ethnicity, and poverty status with the level/intercept of children's affective play factor at age 4, but not with its linear slope over time.

Growth Curve Analyses – Conditional models

Model C evaluated the relation of gender, race/ethnicity, and poverty, with the initial status of the cognitive play factor at age 4 (i.e., the intercept; see Table 8). The chi-square difference test comparing Model C to Model B was significant, $\chi^2(6) = 15.49$, *p* <.001. The pseudo R^2 for Model C indicated that 16% of the between-person variability in the cognitive play factor could be explained by the predictors. However, only Hispanic ethnicity and poverty status were significant. Preschoolers of Hispanic descent and preschoolers residing below 130% of the federal poverty line evidenced lower levels of the cognitive play factor than their non-Hispanic and non-impoverished peers. Model D evaluated the associations of gender, race, and poverty status on the level of the cognitive play factor at age 4 and on its linear growth over time. The chi-square difference test

between Model C and Model D was not significant, suggesting that these models were not significantly different from each other. The pseudo R^2 for Model D indicated that 17% of the variability in the cognitive play factor could be explained by age, gender, race/ethnicity, and poverty status; whereas 13% of the variability in the linear change of the cognitive play factor was explained by these predictors. However, none of the predictors significantly predicted the linear change in cognitive factor.

Model C evaluated the relation of gender, race/ethnicity, and poverty with the initial status of the affective play factor at age 4 (i.e., the intercept; see Table 9). The chi-square difference test comparing Model C to Model B was significant, $\chi^2(5) = 11.628$, $p < .05$. The pseudo R^2 indicated that 14% of the between- person variability in the affective play factor could be explained by the predictors. However, only poverty significantly predicted initial status on the affective play factor such that children who resided 130% or below the federal poverty line expressed lower levels of the affective factor than their peers who were not in poverty. Model D was not estimated, because the there was no significant variance in the linear change parameter.

Discussion

This investigation evaluated the structure and development of pretend play across ages 4, 6, and 8 in a diverse sample of children using the Affect in Play Scale-Preschool Version (APS-P; Kaugars & Russ, 2009). Confirmatory factor analyses yielded psychometric support for a two-factor structure of play as compared to a one-factor model of play. As assessed with the APS-P, these findings supported a cognitive factor in children's pretend play consisting of organization, elaboration/complexity, imagination,

and comfort. Consistent with prior assertions that emotion is a salient feature of children's play (Russ, 2004), an affective play factor comprising the variety and frequency of expressed affect in play emerged as distinct from the cognitive play factor, even in early childhood. Longitudinal invariance analyses supported the configural and metric invariance of these factors for age and race/ethnicity, but only configural invariance was established by gender and poverty status.

Building on these findings, separate growth models evaluated the level and linear change in cognitive and affective play factors across childhood. Both the cognitive and affective play factors evidenced significant variance in level at age 4 (i.e., intercept), however, only the cognitive play factor evidenced significant variance in linear change (i.e., slope) across ages 4, 6, and 8. Conditional growth models evaluated sociodemographic predictors of intercept variance for both factors, and of variance in linear change for the cognitive factor. Children of Hispanic descent and those living in poverty evidenced significantly lower levels of the cognitive play factor, whereas only children in poverty evidenced lower levels of the affective play factor. Child gender, race/ethnicity, and poverty status did not account for significant variance in linear change of the cognitive play factor.

Cognition *and* Affect in Play Structure

This study supports efforts to evaluate the development and adaptive significance of cognitive play features, such as the organization of play, as distinct from affective play features, such as frequency of expressed affect in play, in diverse groups of children with regard to age, gender, race/ethnicity, and poverty status. To my knowledge, this is the

first study to evaluate the longitudinal factor structure and measurement invariance of children's pretend play using the APS-P or any play assessment. Configural invariance analyses supported a consistent two-factor play structure across time and in diverse groups, however, metric invariance was supported over time and among children of Hispanic descent as compared to those from other racial/ethnic groups, but it was not supported for girls versus boys, nor for children living below versus above the federal cut-off for social service benefits (i.e., 130% of the federal poverty line). Although this suggests that the APS-P may have some limitations with regard to interpreting play differences by gender and poverty, the actual factor loadings were consistently high and similar across all groups. Thus, model comparison analyses notwithstanding, these findings suggest that the same play constructs were captured over time and by gender, race/ethnicity, and poverty status.

The lack of a valid measure to capture the complexity of children's pretend play across childhood, and especially in diverse groups, has hindered play research and theory testing (Lillard et al., 2013; Stagnitti, 2004). The current effort to establish the factor structure of children's play in the APS-P constitutes a significant contribution to the field because it supports longitudinal studies of children's cognitive and affective play features using the APS-P in diverse contexts. However, ongoing research is needed to further evaluate the metric invariance of the APS-P in other groups (e.g., typically versus atypically developing children, such as those with Autism Spectrum Disorder), as well as by gender and poverty status. The significant model change across groups as a function

of child gender and poverty status rendered conclusions about metric invariance based on the loadings themselves tentative pending further replication.

The Development of Play

This study demonstrated that both cognitive and affective play factors develop across childhood, and, in the case of the cognitive play factor, in different ways across diverse groups. Interestingly, child gender did not predict the level or change in these play factors over time. This counters extant evidence that girls typically engage in more sophisticated pretend play and express more emotion in play than boys (Fein, 1981; Mazzeschi et al., 2008; McLoyd, 1983). At the same time, however, these findings are consistent with other studies that have not found significant differences in play by child gender (Delvecchio et al., 2015; Jing & Li, 2015; Kaugars & Russ, 2009). Gender differences in play performance may be less apparent when children participate in structured versus free play. In this study, children were asked to play with a finite and gender neutral set of toys, whereas in day-to-day play contexts, children may gravitate toward more gender-typical play tools and themes that may magnify apparent gender differences in prior play research (Lindsey, Mize, & Pettit, 1997).

In contrast to prior studies, Hispanic, but not Black, children evidenced lower levels of the cognitive play factor at age 4. Previous studies have not found significant differences in play among Hispanic children as compared to children from other ethnoracial groups (e.g., Cote & Bornstein, 2009). That said, there is evidence that play expression varies as a function of cultural differences in play socialization and evaluation

(Gaskins et al., 2006), and some evidence suggests that, relative to parents from other racial/ethnic groups, Hispanic parents tend to place less emphasis on the importance of play for children's learning and development (DiBianca Fasoli, 2014). Similarly, Farver and Howes (1993) found cultural differences in the way American mothers and Mexican mothers played with their children and the value they ascribed to children's play. Specifically, relative to American mothers from varied cultural backgrounds, Mexican mothers engaged in less pretend play with their children and viewed play as unimportant.

Although these data highlight potentially important features in the development and expression of play among children of Hispanic descent, conclusions about the play patterns of children in other racial/ethnic groups were limited by the necessary, but misleading, evaluation of non-Hispanic children as a unitary group. Indeed, prior data suggest that Black children tend to engage in less pretend play (Castro, Mendez, & Fantuzzo, 2002; McLoyd, 1983; Weinberger & Starkey, 1994). Of note, recent data suggest that, when Black children do engage in imaginative and expressive play, they may be negatively evaluated relative to their similarly imaginative and expressive non-Black peers (Yates & Marcelo, 2014). Thus, it is important to examine the development of cognitive and affective play factors among children of African American descent, as well as to evaluate if and how their adaptive significance may vary as a function of differential perceptions and treatment of children of color in schools and other settings.

Relative to their wealthier peers, poor children in this study evidenced lower levels of cognitive and affective play factors during the preschool period. Although this study did not reveal economic differences in the growth of these play factors over time, it

is clear that poor children begin in a disadvantaged position with respect to their play development. As with racial/ethnic influences on culture, economic factors may influence parental socialization and evaluation of play in poor versus non-poor households. Children in poor households may have more practical responsibilities early on (e.g., caring for their siblings or doing chores), which may fuel parents' (and, ultimately, the child's) perceptions of play as a distraction or source of interference in completing these responsibilities (Göncü et al., 2006). In addition, poor households may have fewer resources to provide children with stimulating play tools, such as toys (Gosso et al., 2007). Finally, given that research has illustrated that play partners, specifically caregivers, are important for the development of play (Keren, Feldman, Namdari-Weinbaum, Spitzer, & Tyano, 2005), poor children may be at a disadvantage when parental work hours and work-related fatigue hinder opportunities for family play (see Göncü & Vadeboncoeur, 2016 for discussion). Finally, diminished play opportunities in low-resource schools as a result of larger classroom sizes and heightened demand for structured learning may contribute to the observed pattern of play among poor children. Given prior evidence that pretend play is important for adjustment (Moore & Russ, 2006, 2008), and these relations may be especially pronounced among children exposed to relatively high levels of stress (Marcelo & Yates, 2014), efforts to support positive play among poor children are of paramount importance.

Both cognitive and affective play factors evidenced significant linear growth over time, however, only the cognitive play factor evidence significant slope variance. These findings are consistent with existing literature on play and development, which suggests

that children engage in more sophisticated play as they grow older. Interestingly, however, none of the sociodemographic predictors accounted for a significant amount of this variation. These findings highlight the need to further examine factors that may influence patterns of change in the cognitive features of pretend play across childhood. As mentioned earlier, interactions with parents and peers may influence when and how children play. Although the structure of children's cognitive and affective play factors appear to remain stable across time, it may be that individual facets within each factor evidence unique patterns of development. For example, some data suggest that positive and negative affect in play may have differential significance for children's adjustment (Marcelo & Yates, 2014), and, in turn, these distinct components of affect warrant consideration in future studies, along with the indices of global affect frequency and variety that were examined here.

Strengths and Limitations

The current study advances the extant state of knowledge about the structure and development of pretend play by providing the first known evaluation of competing theories of pretend play structure, testing the longitudinal measurement invariance of this structure in diverse groups, and documenting the level and change in children's pretend features across ages 4, 6, and 8. Moreover, in contrast to prior studies, this investigation employed a large and diverse sample of children to evaluate both unitary and distinct play factors. Despite these strengths, several limitations both qualify the interpretability of the current findings and lay the foundation for future research on play.

First, this study focused on solitary play in a structured laboratory setting. As noted earlier, this may have enabled a more accurate evaluation of play in diverse groups by neutralizing the kinds of play tools and social demands across children. However, given ample evidence that play patterns vary across contexts (Fein, 1981; Gosso et al., 2007; McLoyd, 1983), these findings have limited generalizability to social play and play in other settings, such as schools or neighborhoods. Future research should evaluate play in different settings (e.g., school, home, community) and with different social partners (e.g., parents, siblings, peers).

Second, although this is the first study to evaluate the growth of play over time, particularly with regard to distinct cognitive and affective play factors, future studies should examine the constituent components of each factor individually. For example, it may be that children's comfort and interest in play declines with age, whereas the complexity of play may increase. These differences may be particularly striking across affective subcomponents of play, including those not included in contemporary models of play structure. For example, positive affect expression (e.g., expressing nurturance, happiness) in play may increase over time, whereas negative affect expression (e.g., aggression) may decrease over time. Building on extant studies suggesting that distinct play features have different correlates and vary in expression across different groups (Castro et al., 2002; Fehr & Russ, 2013; Marcelo, Kafka, & Yates, in preparation), it is important to expand upon the current findings to inform play intervention studies and promote positive child adaptation.

Third, although this study offered a novel longitudinal design to examine growth in play factors over time, the availability of only three time points limited this evaluation to linear change. There is theoretical support and empirical evidence to suggest that play develops in a curvilinear pattern (Field et al., 1982).

Fourth, this study employed a notably diverse sample of children relative to prior studies; yet, sample size constraints limited the evaluation of play to broad racial/ethnic groups among typically developing children. As noted earlier, there is a need to examine these play factors within specific racial/ethnic groups, particularly among children of African descent. In addition, studies that include atypically developing children, such as those with Autism Spectrum Disorder or congenital blindness, may reveal important differences in play expression that both highlight areas for supportive intervention and reveal aspects of play development that cannot be seen in studies of typically developing populations. For example, Lam and Yeung (2012) found that children with autism engaged in less pretend play than their typically developing peers. Further, based on the known deficits associated with autism, these authors concluded that decrements in pretend play among children with autism might follow from difficulties in understanding other people's thoughts (i.e., theory of mind). In a study of children with congenital blindness, Bishop, Hobson, and Lee (2005) found evidence that sociability (i.e., peer competence) may influence play such that blind children who were sociable played more than blind children who were not sociable. Multiple factors likely influence the expression and development of play, but their influence may only be apparent across studies of diverse populations, including those with atypical developmental trajectories.

Implications and Conclusions

Children's play is multi-consequential with implications for cognitive, socioemotional, and interpersonal competencies across development and in varied populations. The current findings provide further evidence that play is also *multi-faceted*, with two distinct but correlated factors tapping cognitive and affective play dimensions. Earlier studies on play and development focused on constructs within the cognitive play factor, such as the frequency and quality of imagination during play, to the relative exclusion of constructs within the affective play factor, such as the frequency or variety of emotion expression during play. However, accumulating evidence indicates that affect expression in play has important and unique implications for development and adaptation, even beyond cognitive factors (Marcelo & Yates, 2014; Russ & Grossman-McKee, 1990; Russ & Peterson, 1990). Moreover, the current findings support the robustness of both cognitive and affective play factors over time and in diverse groups. Thus, the field of play research is well-positioned to advance toward a nuanced understanding of how cognitive and affective play features contribute individually and interactively to children's multi-domain adjustment.

This investigation demonstrates the utility of the APS-P as a valuable tool for assessing clear play features among children in a diverse community sample. Thus, this study begins to address the ongoing need for developmentally, culturally, and economically valid play measures that can be used to evaluate play over time and in diverse groups. As opportunities for play and creative expression come under fire in contemporary western education, the need to understand children's play and evaluate its

influence on children's negotiation of age-salient developmental issues has never been greater. The push to eliminate play may have significant negative consequences for children's development that have yet to be realized. The current findings suggest these negative effects may be especially robust among children of Hispanic descent and/or among those residing in families living near or below the poverty line. Thus, applied efforts to protect opportunities for playful expression in childhood must be protected, particularly in these highly vulnerable populations.

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Table 1

Descriptive Statistics for Play Variables by Child Age, Gender, Race/Ethnicity, and Poverty Status

	Child Age			**Child Gender**		**Child Race/Ethnicity**				**Poverty Status**		**RM MANOVA**
	Age 4 *M* (*SD*)	**Age 6** *M* (*SD*)	**Age 8** *M* (*SD*)	**Male** *M* (*SD*)	**Female** *M* (*SD*)	**White** *M* (*SD*)	**Black** *M* (*SD*)	**Hispanic** *M* (*SD*)	**Multi/Other** *M* (*SD*)	**≥ 130%** *M* (*SD*)	**≤ 130%** *M* (*SD*)	***F Age***
Organization	2.67 (1.13)	2.63 (1.16)	3.05 (1.31)	2.72 (1.10)	2.79 (1.30)	3.00 (1.21)	2.96 (1.22)	2.66 (1.22)	2.67 (1.15)	2.84 (1.19)	2.63 (1.22)	5.62***
Complexity	2.53 (1.07)	2.44 (1.12)	2.80 (1.35)	2.57 (1.10)	2.57 (1.26)	2.93 (1.33)	2.79 (1.21)	2.43 (1.14)	2.51 (1.12)	2.66 (1.19)	2.44 (1.16)	3.69*
Imagination	2.93 (1.28)	3.20 (1.34)	3.69 (1.40)	3.30 (1.35)	3.18 (1.38)	3.48 (1.35)	3.46 (1.34)	3.10 (1.39)	3.22 (1.33)	3.36 (1.34)	3.05 (1.38)	14.76***
Comfort	3.47 (1.40)	3.58 (1.31)	3.62 (1.46)	3.66 (1.44)	3.51 (1.39)	3.75 (1.33)	3.79 (1.37)	3.42 (1.44)	3.60 (1.32)	3.69 (1.37)	3.39 (1.41)	.76
Variety of Affect	4.35 (2.51)	4.31 (2.65)	4.95 (2.59)	4.72 (2.67)	4.37 (2.53)	5.11 (2.46)	4.68 (2.60)	4.24 (2.59)	4.74 (2.63)	4.76 (2.59)	4.22 (2.60)	2.67
Frequency of Affect	13.21 (8.14)	14.05 (8.55)	14.51 (8.22)	14.50 (8.65)	13.22 (7.97)	15.36 (7.77)	14.48 (8.38)	13.51 (8.69)	13.38 (7.84)	14.48 (8.13)	12.91 (8.56)	.48

Note: **p* < .05, ***p* < .01, ****p* < .001.

Table 2

Bivariate Correlations among Play Variables at Ages 4, 6, and 8.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	Organization at Age 4	--																	
2.	Organization at Age 6	.28**	--																
3.	Organization at Age 8	.27**	.45**	--															
4.	Complexity at Age 4	.90**	.23**	.25**	--														
5.	Complexity at Age 6	.33**	.85**	.42**	.30**	--													
6.	Complexity at Age 8	.28**	.42**	.87**	.28**	.45**	--												
7.	Imagination at Age 4	.85**	.21**	.29**	.88**	.29**	.32**	--											
8.	Imagination at Age 6	.30**	.80**	.42**	.27**	.81**	.44**	.25**	--										
9.	Imagination at Age 8	.29**	.42**	.83**	.28**	.49**	.78**	.35**	.44**	--									
10.	Comfort at Age 4	.75**	.24**	.25**	.765	.29**	.28**	.80**	.27**	.27**	--								
11.	Comfort at Age 6	.26**	.62**	.32**	.24**	.68**	.36**	.25**	.77**	.37**	.27**	--							
12.	Comfort at Age 8	.24**	.41**	.77**	.22**	.43**	.80**	.29**	.47**	.84**	.21**	.43**	--						
13.	Variety of Affect at Age 4	.66**	.36**	.33**	.68**	.41**	.35**	.67**	.34**	.34**	.68**	.26**	.30**	--					
14.	Variety of Affect at Age 6	.21**	.64**	.39**	.18*	.67**	.41**	.19**	.75**	.35**	.26**	.66**	.36**	.34**	--				
15.	Variety of Affect at Age 8	.29**	.44**	.66**	.31**	.45**	.70**	.32**	.50**	.75**	.23**	.40**	.70**	.37**	.38**	--			
16.	Frequency of Affect at Age 4	.74**	.32**	.31**	.72**	.33**	.31**	.75**	.34**	.35**	.74**	.32**	.29**	.74**	.28**	.35**	--		
17.	Frequency of Affect at Age 6	.29**	.65**	.37**	.26**	.66**	.40**	.27**	.80**	.42**	.31**	.63**	.43**	.33**	.68**	.43**	.37**	--	
18.	Frequency of Affect at Age 8	.17*	.28**	.69**	.16*	.27**	.69**	.22**	.34**	.81**	.18*	.28**	.73**	.21**	.29**	.70**	.27**	.37**	--

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3

Goodness of Fit Indices of APS-P Model 1 and Model 2 at Ages 4, 6, and 8

Goodness of fit indexes categories	Fit indexes	Model 1: TwoFactor Model	Model 2: One-Factor Model	Good fit	Acceptable Fit
df		102	116		
Satorra-Bentler scaled χ^2		167.60^{***}	221.55^{***}	$0 \leq \chi^2 \leq 2df$	$2df \leq \chi^2 \leq 3df$
Descriptive measures of overall model fit	RMSEA	.05 (.03, 06)	.06 (.04,.07)	0 ≤ RMSEA ≤ .05	.05 ≤ RMSEA ≤ .08
Descriptive measures based on model comparison	TLI	.98	.97	.95 ≤ TLI ≤ 1.00	.90 ≤TLI ≤ .95
	CFI	.97	.96	.95 ≤ CFI ≤ 1.00	.90 ≤ CFI ≤ .95
Descriptive measures of model parsimony	Model BIC	12741.44	12719.53	Smaller than BIC for Comparison Model	
Δ S-Bχ2 (*p*)		52.24, $p < .001$			

Note: RMSEA root mean square error of approximation, *TLI* Tucker-Lewis Index, *CFI* Comparative Fit Index, *BIC* Bayesian Information Criterion

Table 4A

Longitudinal Measurement Invariance of APS-P by Age for the Full Sample (N = 250)

Model	*df*	χ^2	CFI	RMSEA	BIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	100	152.722**	.986	.046	12435.08	--	--	--	--	--
Metric Invariance	108	159.238**	.986	.044	12411.94	8	7.44	.490	.00	.002
Scalar Invariance	120	298.593**	.951	.077	12765.42	20	139.68	.000	.030	-.033

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Configural Invariance			
	Age 4	**Age6**	**Age 8**
Cognitive			
Organization	.890	.815	.860
Complexity	.917	.836	.887
Imagination	.952	.968	.958
Comfort	.856	.799	.883
Affect			
Variety of Affect	.823	.802	.812
Frequency of Affect	.902	.845	.855
Metric Invariance			
	Age 4	**Age6**	**Age 8**
Cognitive			
Organization	.891	.838	.858
Complexity	.928	.858	.869
Imagination	.952	.949	.962
Comfort	.812	.818	.881
Affect			
Variety of Affect	.830	.803	.804
Frequency of Affect	.892	.843	.860

Table 4B

Longitudinal Measurement Invariance of APS-P by Age for the 50% of the Sample (N = 125)

Model	*df*	χ^2	CFI	RMSEA	AIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	101	146.378**	.977	.059	61046.49	--	--	--	--	--
Metric Invariance	108	156.590**	.976	.058	6096.117	7	5.07	.651	.001	.001
Scalar Invariance	120	223.449**	.947	.082	6137.549	19	78.79	.00	.03	.023

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Configural Invariance			
	Age 4	**Age6**	**Age 8**
COG			
Organization	.883	.861	.856
Complexity	.925	.860	.874
Imagination	.943	.961	.942
Comfort	.880	.732	.895
AFF			
Variety of Affect	.852	.845	.753
Frequency of Affect	.871	.867	.815
Metric Invariance			
	Age 4	**Age6**	**Age 8**
COG			
Organization	.891	.838	.858
Complexity	.928	.858	.869
Imagination	.952	.949	.962
Comfort	.812	.818	.881
AFF			
Variety of Affect	.830	.803	.804
Frequency of Affect	.892	.843	.860

Table 5A

Longitudinal Measurement Invariance of APS-P by Gender for the Full Sample (N=250)

Model	*df*	χ^2	CFI	RMSEA	BIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	226	320.536**	.975	.058	12978.353	--	--	--	--	--
Metric Invariance	234	335.899**	.973	.059	12946.439	6	16.74	.01	.003	-.002
Scalar Invariance	244	432.708**	.950	.079	12981.735	8	17.83	.02	.023	.021

Note: *p < .05, **p < .01, ***p < .001.

	Configural Invariance					
	Age 4 Females	Age 4 Males	Age 6 Females	Age 6 Males	Age 8 Females	Age 8 Males
COG						
Organization	.861	.929	.825	.828	.854	.864
Complexity	.916	.929	.832	.843	.886	.890
Imagination	.973	.920	.991	.933	.972	.942
Comfort	.860	.839	.799	.788	.899	.854
AFF						
Frequency of Affect	.775	.867	.771	.832	.794	.836
Variety of Affect	.889	.909	.831	.838	.806	.879
	Metric Invariance					
	Age 4 Females	Age 4 Males	Age 6 Females	Age 6 Males	Age 8 Females	Age 8 Males
COG						
Organization	.888	.915	.855	.841	.848	.865
Complexity	.918	.946	.861	.863	.866	.876
Imagination	.976	.922	.964	.927	.974	.948
Comfort	.816	.845	.814	.824	.900	.857
AFF						
Frequency of Affect	.780	.871	.767	.833	.784	.822
Variety of Affect	.895	.905	.836	.838	.816	.885

Table 5B

Longitudinal Measurement Invariance of APS-P by Gender the 50% of the Sample (N = 125)

Model	*df*	χ^2	CFI	RMSEA	BIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	228	357.563**	.938	.094	6553.871	--	--	--	--	--
Metric Invariance	234	380.791**	.930	.099	6536.627	6	29.939	.00	.012	.008
Scalar Invariance	246	436.324**	.910	.110	6536.927	18	111.034	.00	.028	.016

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Configural Invariance						
	Age 4 Females	Age 4 Males	Age 6 Females	Age 6 Males	Age 8 Females	Age 8 Males
COG						
Organization	.933	.923	.860	.882	.851	.852
Complexity	.966	.991	.862	.869	.885	.859
Imagination	.926	.846	.986	.916	.962	.897
Comfort	.846	.795	.798	.706	.901	.872
AFF						
Frequency of Affect	.815	.886	.843	.855	.766	.772
Variety of Affect	.857	.884	.873	.852	.819	.776
Metric Invariance						
	Age 4 Females	Age 4 Males	Age 6 Females	Age 6 Males	Age 8 Females	Age 8 Males
COG						
Organization	.878	.891	.870	.887	.852	.857
Complexity	.928	.963	.872	.869	.868	.844
Imagination	.957	.923	.978	.896	.965	.900
Comfort	.859	.869	.858	.766	.907	.878
AFF						
Frequency of Affect	.799	.905	.836	.848	.785	.790
Variety of Affect	.854	.887	.879	.850	.800	.762

Table 6A

Longitudinal Measurement Invariance of APS-P by Race/Ethnicity for the Full Sample (N=250)

Model	*df*	χ^2	CFI	RMSEA	BIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	228	337.104	.971	.062	12987.024	--	--	--	--	--
Metric Invariance	238	356.854	.969	.063	12948.956	10	20.418	.026	.002	.001
Scalar Invariance	246	471.417	.940	.086	13014.156	18	145.286	.00	.031	.024

Note: **p* < .05, ***p* < .01, ****p* < .001.

Configural Invariance						
	Age 4 Hispanics	Age 4 Non-Hispanics	Age 6 Hispanics	Age 6 Non-Hispanics	Age 8 Hispanics	Age 8 Non-Hispanics
COG						
Organization	.912	.863	.846	.779	.870	.849
Complexity	.932	.902	.866	.800	.878	.901
Imagination	.922	.982	.982	.962	.942	.970
Comfort	.845	.860	.805	.793	.899	.867
AFF						
Frequency of Affect	.858	.788	.797	.771	.799	.817
Variety of Affect	.909	.897	.883	.834	.844	.864
Metric Invariance						
	Age 4 Hispanics	Age 4 Non-Hispanics	Age 6 Hispanics	Age 6 Non-Hispanics	Age 8 Hispanics	Age 8 Non-Hispanics
COG						
Organization	.912	.864	.869	.801	.867	.845
Complexity	.941	.909	.885	.826	.857	.877
Imagination	.919	.977	.966	.942	.946	.976
Comfort	.813	.830	.827	.810	.899	.868
AFF						
Frequency of Affect	.864	.793	.805	.780	.787	.805
Variety of Affect	.903	.895	.873	.831	.851	.871

Table 6B.

Longitudinal Measurement Invariance of APS-P by Race/Ethnicity for the 50% of the Sample (N = 125)

Model	*df*	χ^2	CFI	RMSEA	BIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	228	356.965	.939	.094	6569.775	--	--	--	--	--
Metric Invariance	236	367.113	.938	.093	6538.159	8	9.61	.293	.001	.001
Scalar Invariance	244	417.902	.917	.106	6575.345	16	63.23	.000	.012	.012

Note: **p* < .05, ***p* < .01, ****p* < .001.

Configural Invariance

	Age 4 Hispanics	Age 4 Non-Hispanics	Age 6 Hispanics	Age 6 Non-Hispanics	Age 8 Hispanics	Age 8 Non-Hispanics
COG						
Organization	.895	.859	.844	.856	.879	.833
Complexity	.949	.896	.869	.832	.860	.900
Imagination	.918	.969	.980	.972	.910	.952
Comfort	.871	.881	.737	.739	.992	.846
AFF						
Frequency of Affect	.888	.781	.835	.831	.780	.767
Variety of Affect	.930	.813	.895	.864	.819	.787

Metric Invariance

	Age 4 Hispanics	Age 4 Non-Hispanics	Age 6 Hispanics	Age 6 Non-Hispanics	Age 8 Hispanics	Age 8 Non-Hispanics
COG						
Organization	.895	.864	.854	.864	.885	.836
Complexity	.967	.910	.877	.852	.849	.868
Imagination	.914	.968	.971	.962	.916	.960
Comfort	.820	.839	.815	.807	.991	.845
AFF						
Frequency of Affect	.871	.788	.836	.821	.783	.775
Variety of Affect	.938	.811	.891	.868	.810	.780

Table 7A.

Longitudinal Measurement Invariance of APS-P by Poverty for the Full Sample (N=250)

Model	*df*	χ^2	CFI	RMSEA	BIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	224	275.700	.986	.043	13013.614	--	--	--	--	--
Metric Invariance	234	296.340	.983	.046	12976.246	10	22.02	.015	.003	.003
Scalar Invariance	244	432.434	.949	.079	13048.176	20	179.56	.00	.037	.036

Note: **p* < .05, ***p* < .01, ****p* < .001.

	Configural Invariance					
	Age 4 In Poverty	Age 4 Not in Poverty	Age 6 In Poverty	Age 6 Not in Poverty	Age 8 In Poverty	Age 8 Not in Poverty
COG						
Organization	.916	.885	.797	.832	.853	.868
Complexity	.953	.907	.845	.865	.893	.885
Imagination	.938	.938	.981	.957	.947	.953
Comfort	.850	.837	.790	.794	.880	.888
AFF						
Frequency of Affect	.847	.790	.868	.778	.806	.831
Variety of Affect	.931	.887	.856	.810	.798	.863
	Metric Invariance					
	Age 4 In Poverty	Age 4 Not in Poverty	Age 6 In Poverty	Age 6 Not in Poverty	Age 8 In Poverty	Age 8 Not in Poverty
COG						
Organization	.909	.878	.822	.853	.850	.866
Complexity	.947	.872	.854	.859	.871	.861
Imagination	.942	.929	.965	.928	.952	.959
Comfort	.840	.829	.824	.823	.884	.889
AFF						
Frequency of Affect	.861	.803	.864	.770	.794	.819
Variety of Affect	.961	.875	.855	.805	.808	.872

Table 7B.

Longitudinal Measurement Invariance of APS-P by Poverty for the 50% of the Sample (N = 125)

Model	*df*	χ^2	CFI	RMSEA	BIC	Δdf	$\Delta\chi^2$	*p*	ΔCFI	ΔRMSEA
Configural Invariance	234	291.542	.971	.062	6573.672	--	--	--	--	--
Metric Invariance	236	297.975	.969	.064	6568.516	12	30.60	.002	.002	.002
Scalar Invariance	254	367.789	.943	.084	6548.672	30	102.655	.000	.028	.022

Note: **p* < .05, ***p* < .01, ****p* < .001.

	Configural Invariance					
	Age 4 In Poverty	Age 4 Not in Poverty	Age 6 In Poverty	Age 6 Not in Poverty	Age 8 In Poverty	Age 8 Not in Poverty
COG						
Organization	.872	.876	.845	.858	.811	.887
Complexity	.938	.905	.804	.885	.828	.854
Imagination	.943	.939	.996	.956	.923	.935
Comfort	.862	.898	.735	.778	.879	.921
AFF						
Frequency of Affect	.886	.823	.845	.856	.612	.790
Variety of Affect	.854	.857	.882	.864	.660	.885
	Metric Invariance					
	Age 4 In Poverty	Age 4 Not in Poverty	Age 6 In Poverty	Age 6 Not in Poverty	Age 8 In Poverty	Age 8 Not in Poverty
COG						
Organization	.865	.872	.873	.873	.808	.881
Complexity	.938	.912	.826	.897	.852	.850
Imagination	.952	.947	.977	.926	.942	.948
Comfort	.832	.874	.781	.800	.872	.917
AFF						
Frequency of Affect	.885	.821	.837	.850	.633	.822
Variety of Affect	.862	.858	.883	.872	.616	.872

Table 8

Results of Multilevel Model for Change in Cognitive Factor in Play (N=250) (White = reference)

		Parameter	Model A	Model B	Model C	Model D
Fixed Effects						
Initial Status π_{0i}	Intercept	γ_{00}	12.110***	11.465***	12.481***	12.811***
	Gender	γ_{01}			-.438	-.817
	Hispanic	γ_{02}			-.879*	-1.132***
	Black	γ_{03}			.660	.950+
	Multiracial	γ_{04}			-.471	-.302
	Poverty Status	γ_{05}			-1.170*	-1.432***
Linear Change, π_{1i}	Intercept	γ_{10}		.725***	.712***	.222
	Gender	γ_{11}				.574
	Hispanic	γ_{12}				.406
	Black	γ_{13}				-.427
	Multiracial	γ_{14}				-.246
	Poverty Status	γ_{15}				.362
Variance Components						
Level-1	Within-person	σ^2_{ε}	14.448***	11.725***	11.707***	11.745***
Level-2	In initial status (intercept)	σ^2_0	7.831***	7.799***	6.587***	6.454***
	linear change (slope)	σ^2_1		2.200***	2.213*	1.935+
	Covariance	σ_{01}		-.490	-.180	.001
Intraclass r	ρ		.35			
Pseudo R^2 Statistics						
	P^2_{ε}			.16		
	P^2_0				.16	.02
	P^2_1					.13
Goodness-of-fit						
	Deviance		3773.962	3747.224	3731.734	3725.582
Nested Comparison						
$\Delta\chi^2$				26.738***	15.49**	6.152
Δdf				3	5	5

Note. †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$. Model A = Unconditional means. Model B = Linear Change. Model C = Intercept as outcome Model D = intercept and slope as outcome.

Table 9

Results of the multilevel models for change in Affect Factor in Play (N=250) (White = Reference)

		Parameter	Model A	Model B	Model C
Fixed Effects					
Initial Status	Intercept	γ_{00}	18.345***	17.507***	19.939***
π_{0i}	*Gender*	γ_{01}			-2.049+
	Hispanic	γ_{02}			-1.208
	Black	γ_{03}			.424
	Multiracial	γ_{04}			-.807
	Poverty Status	γ_{05}			-2.246*
Linear Change, π_{1i}	Intercept	γ_{10}		.952*	.935*
	Gender	γ_{11}			
	Hispanic	γ_{12}			
	Black	γ_{13}			
	Multiracial	γ_{14}			
	Poverty Status	γ_{15}			
Variance Components					
Level-1	Within-person	σ^2_ε	67.460***	62.222***	61.945
Level-2	In initial status (intercept)	σ^2_0	39.344***	43.134***	37.254***
	linear change (slope)	σ^2_1		4.175	4.324
	Covariance	σ_{01}		-2.904	-1.059
Intraclass r	ρ		.37		
Pseudo R^2 Statistics					
	P^2_ε		--	.07	
	P^2_0		--		.14
	P^2_1		--		
	P^2_2		--		
Goodness-of-fit					
	Deviance		4780.038	4773.518	47613.890
Nested Comparison					
$\Delta\chi^2$				6.52	11.628
Δdf				3	5

Note. †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$. Model A = Unconditional means. Model B = Linear Change. Model C = Intercept as outcome. Model D = intercept and slope as outcome.