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DADS' PARENT INTERACTIONS WITH CHILDREN-CHECKLIST OF

OBSERVATIONS LINKED TO OUTCOMES (PICCOLO-D):

DEVELOPING AN OBSERVATIONAL MEASURE OF

FATHER-CHILD INTERACTION

by

Sheila Anderson

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Family and Human Development

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2012

ABSTRACT

Dads' Parent Interactions with Children-Checklist of Observations Linked to

Outcomes (PICCOLO-D): Developing an Observational Measure of

Father-Child Interaction

by

Sheila Anderson, Doctor of Philosophy

Utah State University, 2012

Major Professor: Lori A. Roggman, Ph.D.
Department: Family, Consumer, and Human Development

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valid, reliable observational measure of father-child interaction, based on research and

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home visiting practitioners. This study sought to fulfill this need by developing a new

measure called Dads' Parenting Interactions with Children—Checklist of Observations

Linked to Outcomes (PICCOLO-D) for home visitors to use to identify fathering

strengths. Developed with extant video observations of over 400 ethnically diverse, low-

income fathers, 73 positive observable behavioral items of early positive father-child

interaction were tested for variability, reliability, and validity. The final measure of 21

items representing four domains of positive parenting, *affection, responsiveness, encouragement*, and *teaching*, demonstrated good reliability and validity, including associations with children's language, cognitive, and social emotional outcomes into prekindergarten. Contextual influences were examined within father ethnicity and child gender groups and in a second observational setting. European and Latino American fathers had higher scores than African American fathers. Fathers had higher scores with daughters than sons. Fathers had higher scores in a semistructured play setting than in a father-choice setting. The new measure is intended for use as part of an individualized strengths-based approach for home visiting practitioners.

(207 pages)

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Sheila Anderson

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CHAPTER I

INTRODUCTION

Fathers are important for their children's development (Lamb & Lewis, 2004; Pleck & Masciadrelli, 2004), and the ways that fathers interact with children have a significant impact on their well-being. Involved fathers who created close relationships with children tend to have children who experience greater educational achievement, engaged in less delinquent behavior, were less likely to become teen parents, and had more competent psychosocial adjustment (Flouri, 2005; Harris, Furstenberg, & Marmer, 1998). Empirical evidence suggests that the influence of positive father-child interaction on child development begins early (Grossman et al., 2002), and is sensitive to intervention (Benzies, Magill-Evans, Harrison, MacPhail, & Kimak, 2008). To more fully understand the early contributions fathers make to child development and to effectively promote positive father-child interaction, researchers and home visiting practitioners need a reliable, valid, and useful measure of father-child interactions that support children's early development. The purpose of this study was to develop such a measure.

Historical Context

The role of fathers has largely been neglected in theory and research during much of the 20th century. In the early 1980s social-cultural changes and the work of Michael Lamb (e.g., Lamb, 1977; Lamb, Pleck, Charnov, & Levine, 1985) cast new light on the importance of fathers, challenging society and researchers to become more inclusive of fathers. The contributions fathers make to child outcomes have since become more

recognized and valued, and the social roles of fathers have become more flexible. With these changes, research has shifted from a focus on father presence and involvement to studying the processes involved in father-child interaction. In addition, programs providing parenting support have become more inclusive of fathers.

These social changes in perceptions and roles of fathers have posed both theoretical and methodological challenges for researchers interested in understanding father-child interactions. Scholars have struggled with conceptualizing and measuring the specific processes through which fathers influence the development of their children (Day & Lamb, 2004). In 1999, Cabrera, Tamis-LeMonda, Lamb, and Boller identified three methodological limitations of the existing measures of father involvement. First, most were self-report; second, many measures ask fathers to report on their fathering behaviors in general, rather than in relation to one of their children specifically; and third, much of the research has focused on men with middle-class incomes. Since that time, examining measure equivalence for parenting constructs, such as positive regard and intrusiveness, for mothers and fathers has become more common (e.g., Adamson & Buehler, 2007), but no studies have been identified that sought to develop an observational measure of early father-child interaction.

An observational measure of father-child interaction is needed to address these limitations. This study sought to fulfill this need by developing a new measure called Dads' Parenting Interactions with Children—Checklist of Observations Linked to Outcomes (PICCOLO-D). It is a measure of parenting intended for use by home visiting practitioners in infant-toddler early childhood programs such as Head Start (HS) and

Early Head Start (EHS). PICCOLO-D was designed as a tool for home visitors to use for identifying fathering strengths that support child development, not as a diagnostic measure of father-child relationships.

To address the limitations identified by Cabrera and colleagues (1999), the new PICCOLO-D measure was observational rather than self-report. Parents have been known to be more likely to inflate estimates of change after intervention when parenting was measured through self-report (Aspland & Gardner, 2003), while observational measures of parenting tend to be more accurate and better predictors of longterm child outcomes (Zaslow et al., 2006). The second limitation was addressed by designing an observational measure practitioners could use to directly observe fathers interacting with the child being targeted by the program. The third limitation was addressed by incorporating substantial research literature on fathers from diverse ethnic and SES backgrounds into identification of positive behavioral items for the measure (e.g., Cabrera, Ryan, Mitchell, Shannon, & Tamis-LeMonda, 2008; Vogel, Bradley, Raikes, Boller, & Shears, 2006) and by using extant video observations of HS/EHS fathers from diverse backgrounds to develop the measure and improve generalizability to this population.

Theoretical Framework

A measure is a collection of items that reveals an underlying theoretical construct (DeVellis, 2003). Clearly defined theoretical constructs were necessary for development of a valid measure. Cabrera, Fitzgerald, Bradley, and Roggman (2007) presented a

dynamic model of paternal influences on children that "assumes that two parenting systems can coexist as complementary systems" (p. 2). This framework proposed that mothers and fathers engage in many interactions with children that are similar to one another and benefit children's development in an additive manner. Fathers and mothers may also engage in different parenting behaviors that make complementary contributions to child outcomes (Lamb & Tamis-LeMonda, 2004). More fully understanding positive father-child interaction required identifying and testing father parenting behaviors that were both similar to, and different from mother-child interaction. PICCOLO-D is being developed as a complementary measure to the original Parenting Interactions with Children—Checklist of Observations Linked to Outcomes (PICCOLO; Cook & Roggman, 2008; Roggman, Cook, Innocenti, Jump Norman, & Christiansen, 2009) developed for observing mother-child interaction, using theory, research, and video observations of mother-child interaction (see Appendix A: PICCOLO Description).

The theoretical framework used for the original PICCOLO measure for mothers was attachment theory (Bowlby, 1969, 1988). Bowlby described successful development as largely influenced by parents' ability to provide a sense of security for children while encouraging emerging competencies. Reflecting this theoretical premise, the current PICCOLO measure was organized in four domains of parenting: *affection, responsiveness, encouragement,* and *teaching* (see Appendix A for description). Each domain included positively worded observable behavioral items of parent-child interaction observed for mothers as a representative sample of parenting behaviors for that domain.

Researchers such as Grossmann and colleagues (2002), Lamb (1977), and

Paquette (2004) have presented theoretical extensions of attachment theory (Bowlby,

1988) that have broadened conceptualizations of father-child interaction. Lamb examined

mother and father affiliative and attachment behaviors with infants, finding that infants

displayed no preference in attachment for mother and fathers, but mothers and fathers

provided different types of experiences for infants. Fathers held children more during

play, and mothers held children more during caregiving. Grossman and colleagues

suggested that the key to the father-child relationship may be measured more accurately

by the father's ability to activate the exploration system while providing a sense of

security in the face of challenge. Fathers do this primarily through play as they support

children in developing additional strategies for mastering novel aspects of the

environment and help children practice activating and synchronizing exploration and

security. Paquette used the term "father-child activation relationship" to describe this

process and emphasized the importance of play as a vital context for it.

Some parenting behaviors may be more typical of fathers than mothers. Examples

of behaviors more typical of father-child interaction reflected in current research includes

physically active play (e.g., Boller et al., 2006; Pellegrini & Smith, 1998), scaffolding of

exploration (Grossmann et al., 2002; Lamb & Lewis, 2004; Roggman, 2004), and

directive, challenging language interaction (Rowe, Coker, & Pan, 2004; Tamis-LeMonda,

Shannon, Cabrera, & Lamb, 2004). Thus, current research and theory on fathering

suggests that the PICCOLO-D parenting domains needed to accurately represent and

measure father-child interaction, would include each of the four domains of parenting

within the current PICCOLO measure (*affection, responsiveness, encouragement*, and *teaching*), and an additional *playfulness* domain representing fathers' ability to engage children in enjoyable spontaneous interactions.

Contextual Influences

Fathers' behaviors with their children should be understood in relation to their social and cultural context. Father-child interactions are embedded within diverse socio-historical cultural contexts that influence fathers' childrearing goals, expectations of gender appropriate behavior, and expectations of roles in the lives of their children. PICCOLO-D was intended for use with diverse populations of fathers, especially fathers with children involved in HS/EHS programs. To ensure the new measure would exhibit external and internal validity for this population it was crucial to consider ethnicity, child gender, and observational setting in relation to measurement validity.

Ethnicity of Father

The ethnicity of fathers and their families may influence how fathers interact with their children. Fathering roles and behaviors have been more heterogeneous than those of mothers, displaying wider variability across and within cultures, both structurally (i.e., resident, nonresident, divorced, and single fathers) and functionally (i.e., cultural child rearing goals, cultural role expectations, and direct interactions with children; Cabrera & Coll, 2004; Marsiglio, Amato, Day, & Lamb, 2000; Roopnarine, 2004). Much of the research on minority fathers has been characterized by a deficit approach focusing on father absence, instability, and lack of providing financial support (Cabrera & Coll, 2004;

Marsiglio et al., 2000; Roopnarine, 2004). Marsiglio and colleagues have advocated

shifting from a deficit perspective of fathers from minority cultures to strength-based

approaches.

Gender of Child

Child gender may influence father behavior, particularly in some cultures.

Research on father-child relationships indicates that gender of child has been a significant

moderating influence on father-child interaction. Several studies have found that fathers,

compared with mothers, show more gender specific expectations and were more directive

in play, especially with sons (e.g., Lamb, 1977; Lovas, 2005; MacDonald & Parke,

1986). This may be a transactional relationship as children (especially boys) appeared to

enjoy physical play more with fathers than with mothers (Pellegrini & Smith, 1998). The

development of sex differences and gender expectations has been strongly influenced by

cultural values and expectations (Brody, 1999), suggesting that ethnic group

consideration of variations in father behaviors with boys and girls would be important.

Immediate Setting

The immediate setting of father-child observation may influence father-child

interaction. Fathers may prefer a more relaxed setting, and engage in more playful

behaviors in this setting than in a structured setting typically used to observe mothers

with their children (Paquette, 2004; Summers, Boller, Schiffman, & Raikes, 2006;

Volling, McElwain, Notaro, & Herrera, 2002). Examining father behaviors in two

observational settings, including a more relaxed setting where fathers can choose

activities to engage in with children could increase the variability, and ecological validity of behaviors observed.

Summary

Fathers make important contributions to the development of children that have not been fully understood when viewing fathers through the lens of maternal theory and research. To more fully understand and support father contributions to child development outcomes, valid, reliable observational measures of positive father-child interactions have been needed. To accomplish this development of the new PICCOLO-D measure required addressing methodological limitations of current measures, theoretical clarity, and practical utility. Contextual factors likely to influence validity of a measure of father-child interaction included ethnicity, gender of the child, and immediate setting. Programs providing support for father parenting skills have need of a practical, but psychometrically strong, measure of fathers' parenting interactions with their children.

Purpose

The primary purpose of this project was to develop a valid, reliable measure of father-child interaction, based on research and theory, that predicts child outcomes, identifies fathers' strengths, and will be useful for home visiting practitioners. A secondary purpose was to use this measure to examine contextual differences in father behavior. PICCOLO-D was developed by identifying 73 behavioral items of positive father-child interaction from research literature. The behavioral items were then tested for variability, reliability, and validity in two observational settings (a 10-minute

semistructured play and 5-minute father-choice) and the items that best fit the research model using variability, reliability, and validity criteria were selected for the final version.

Research Questions

Four research questions were addressed by this project. Research Question 1 included multiple subordinate questions addressing methodological issues in measurement development. Research Questions 2, 3, and 4 addressed variations in father behavior, measured by PICCOLO-D, comparing groups divided by child gender, father ethnicity, and observational setting.

1. What are the "best" observable behavioral indictors (items) of positive father-child interaction?

   a. Which are the best behavioral items in terms of content validity? For a useful measure, practitioners and researchers should consider the behaviors as important part of the construct of developmentally supportive father-child interaction behaviors (DeVellis, 2003).

   b. Which are the best behavioral items in terms of interobserver reliability? Useful observable behavioral items should be easy to observe for practitioners with limited training, and have higher levels of agreement between observers (Bakeman & Gottman, 1987).

   c. Which are the best behavioral items in terms of variability? Useful items should vary across fathers, rather than being common to almost all fathers

or very rare among fathers (Bakeman & Gottman, 1987).

    d. Which are the best behavioral items in terms of scale reliability? Items in the same domain should show internal consistency (DeVellis, 2003).

    e. Which are the best behavioral items in terms of factor structure? Items in the same domain should be inter-related enough to reflect a single factor.

    f. Which are the best behavioral items in terms of construct validity? Together, the items in each behavioral domain should be related to previously established measures of similar constructs (DeVellis, 2003).

    g. Which are the best behavioral items in terms of predictive validity, for predicting child outcomes in cognitive, language, and social-emotional domains? The scores from each behavioral domain and from the total measure should predict positive child outcomes (DeVellis, 2003).

2. How do PICCOLO-D scores differ between groups whose ethnicity is European American, African American, or Latino American? Fathers' parenting behaviors may vary across ethnic groups because cultural values influence parenting behaviors (Hofferth, 2003), but PICCOLO-D should be psychometrically strong for each ethnic group.

3. How do PICCOLO-D scores differ between groups divided by child gender? Fathers' parenting behaviors may be different with boys than with girls (Lamb, 1977; Lovas, 2005; MacDonald & Parke, 1986), but PICCOLO-D should be psychometrically strong for each child gender group.

4. How do PICCOLO-D scores differ between the unstructured father-choice

and semistructured play settings? Fathers' parenting behaviors may be different in different contexts (Paquette, 2004; Summers et al., 2006; Volling et al., 2002), and psychometric properties may differ across contexts. It is important to identify the best situation for observing fathers' parenting behaviors.

CHAPTER II

REVIEW OF THE LITERATURE

The primary goal of this study was to develop a valid, reliable, useful measure of father behaviors that predict positive child outcomes. The purpose of reviewing the empirical literature was to clarify theoretical constructs underlying each parenting domain that guided selection of items to be tested for the PICCOLO-D measure. Relevant theories and empirical evidence were used to inform measure usefulness, develop a research model, define constructs, and identify potential items.

Theoretical Framework

The theoretical framework developed to guide this study was grounded in a broad heuristic model of contextual influences on father-child relationships and a specific research model of father-child interaction reflecting hypothesized domains of positive parenting. Theoretical constructs for these domains and empirical evidence for possible behavioral items were examined.

The heuristic model developed by Cabrera and colleagues (2007) specified possible pathways from predictors of father involvement to child outcomes. The model depicts transactional relationships between fathers and children with the direct interaction between father and child embedded within dynamic systems that change over the life course. In this model father involvement is influenced by contextual factors, characteristics of father (rearing history, cultural history, and biological history), and family characteristics. Extending this perspective to those who work directly with fathers,

Roggman, Bradley, and Raikes (in press) advocated for a more person-centered focus emphasizing the positive dynamic contributions of fathers to their children's early development. Such approaches encourage researchers and home-visiting practitioners to replace deficit models focusing on fathers' role inadequacies with strength-based approaches recognizing that fathers develop along with their children. Researchers and practitioners accomplish this by attending to the unique needs of fathers, acknowledging fathers give meaning to their role based on personal and cultural backgrounds, and building upon the strengths that fathers bring to their relationships with children (Cabrera & Coll, 2004; Marsiglio et al., 2000; Roggman, 2004).

Strength-based intervention approaches have focused on encouraging practitioners to collaborate with fathers in identifying meaningful goals for children and planning developmentally supportive experiences. These strategies have been more likely to improve feelings of self-esteem, as well as parenting efficacy among fathers from diverse backgrounds (Fagen & Stevenson, 1995; Wilson & Prior, 2011). Because PICCOLO-D was intended to help practitioners identify the strengths of fathers from diverse backgrounds, only positively worded items were tested for the measure. This will enable practitioners to use a facilitative approach in supporting fathers by making specific suggestions, providing detailed observational feedback, and offering suggestions to improve parenting skills (Roggman, Boyce, & Innocenti, 2008).

Research Model

The research model (Figure 1) clarified the processes through which fathers make direct contributions to child outcomes. The overlapping circles in the model represented
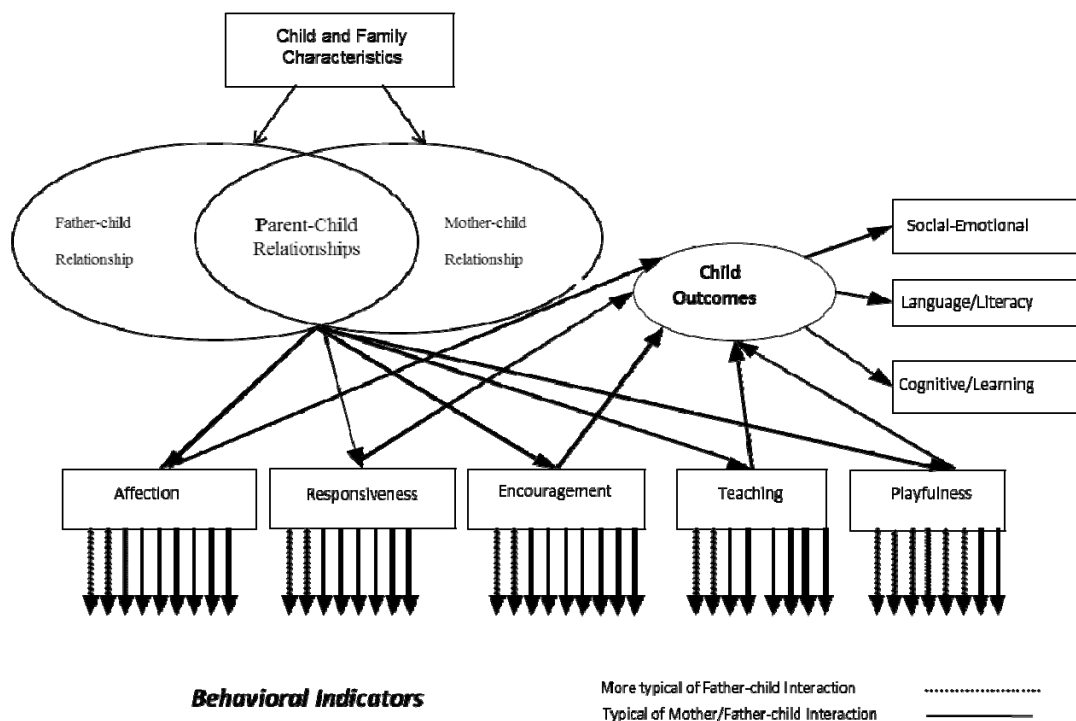
Figure 1. PICCOLO-D research model.

the complementary nature of mother- and father-child interaction. Fathers and mothers interact with children in similar and additive ways, and in ways that make unique contributions to child outcomes (Flouri, 2005; Lamb & Lewis, 2004). The father-child relationship consisted of five domains of parenting, representing aspects of father-child relationship important for supporting child outcomes: *affection, responsiveness, encouragement, teaching*, and *playfulness*. Each domain consisted of several items describing observable parenting behaviors that support healthy development through the attachment, exploration, affiliative, and behavioral systems (Bischof, 1975; Bowlby, 1969; MacDonald, 1992). Some behavior items may be characteristic of both father- and mother-child interaction; other behavioral items may be more typical of father-child

interaction.

The PICCOLO-D research model predicted differences would emerge between mother and father interaction with children. For instance, a qualitative study of 575 EHS fathers found that fathers described being sensitive and responsive in slightly different ways than typical of mother-child interaction (Summers et al., 2006). Table 1 compared these descriptions with the domains of parenting identified in original PICCOLO measure for mothers. The playfulness domain represented a key difference in mother-child interaction and father-child interaction.

In the PICCOLO-D research model, each domain of fathers' parenting behavior was linked to child outcomes. The arrows from each domain to child outcomes indicated child outcomes can be predicted from behavioral items of positive father-child

Table 1

Domains of Parenting: *Father's Perspective*

Parenting domains (Roggman et al., 2009)	Father's perspective (Summers et al., 2006)
Affection: Warmth, physical closeness, and positive expressions toward child	Physical and verbal demonstrations of love, cuddling, provide comfort, rocking, positive communication
Responsiveness: Responding to child's cues, emotions, words, interests, and behaviors	Being there for children, help them when they get hurt, providing physical and emotional security and protection, support the interests of children, relating to them, talking to them one-on-one, staying connected
Encouragement: Active support of play, exploration, curiosity, initiative, skills and creativity	Being there to share accomplishments, help them learn to persist, exposing child to the world, setting expectations, guiding & preparing child, teach child to work, making child feel wanted, praise accomplishments
Teaching: Shared conversation and play, cognitive stimulation, explanations, and questions.	Teaching right from wrong, providing structure, discipline, authority figure, includes academics, social values, gender differences, being a role model, answering questions, playing games
Playfulness (new domain) mutual enjoyment, novel, active play.	Engaging in physical gross motor types of play, chasing, makes child smile or laugh, hanging-out

interaction. Rationale for each domain was derived from theoretical and empirical research linking specific aspects of parent behavior to specific outcomes in children's development, thus providing rationale for potential behavioral items. Observations of these behaviors were tested for inclusion in the final measure. The theoretical and empirical rationale for each domain follows.

Affection

  Theoretical construct. The *affection* domain represented positive emotions such as acceptance, warmth, and positive regard that characterize parent relationships with children. This "important proximal mechanism that underlies the capacity for high-investment parenting as a biological adaptation" has been commonly referred to as warmth in the empirical literature, in the research model the term affection is for this domain as it is a more familiar to parents (MacDonald, 1992, p. 756). Attachment and warmth systems were separate but have a tendency to covary. Attachment is based on the need for security, met by maintaining proximity to caregiver which reduces fear and anxiety. The warmth system is characterized by feelings of love, reciprocity, commitment, and cooperation, motivated by enjoying someone else. Reciprocal feelings of affection promote father investment of resources in children, and children's "uptake" of social, emotional, and physical resources fathers have to offer (McDonald, 1992).

  Potential behavioral items. Characteristics of father-child relationships indicative of the *affection* domain included verbal and nonverbal displays of love, acceptance, cooperation, and enjoyment (MacDonald, 1992). For example, in a large sample that was representative of national ethnic diversity, father self-report of holding

and tickling 9-month-old infants demonstrated the best fit with a warmth factor (Bronte-Tinkew, Carrano, & Guzman, 2006). Among 129 nonresident, primarily African American and European American, fathers and their preschool-aged children, father report of hugging and expressing appreciation were found to reflect father warmth (Harper & Fine, 2006), and in a longitudinal study of 350 European middle-class families, indictors of father warmth included joking and playing with the child and expressing affection by hugging, kissing, and holding (Mezulis, Shibley, & Clark, 2004).

Expected child outcomes. In theory, father *affection* should increase positive outcomes for children by supporting development of the affiliative system that facilitates compliance, internalization of values, and social and cognitive competence (McDonald, 1992). Father warmth has been positively related to father reports of child well-being (Harper & Fine, 2006), and fewer internalizing problems when children's mothers were depressed (Mezulis et al., 2004). In a large cross-cultural comparative study, low father warmth with children was associated with increased rates of aggressive behaviors among adult populations (Veneziano, 2003).

Father and child characteristics. Empirical evidence has provided support for both common patterns and variations in father affection associated with father and child characteristics. Across 186 societies fathers displayed affection for children by showing approval, being interested, praising, cuddling, caressing, hugging, playing, and attempting to please children (Veneziano, 2003). In another study of 189 European American and African American nonresident father's warmth predicted higher father reported child well-being, and higher father-child relationship quality. For African

American children, there was also a positive effect for non-resident father limit setting on child well-being that was mediated by higher-quality father child relationships (Harper & Fine, 2006). Younger fathers, and fathers with less than a high school education, reported lower levels of behaviors indicative of positive emotions (Bronte-Tinkew et al., 2006). A lack of nonresident father warmth or father distress among nonresident fathers has also been associated with lower well-being for girls, but not boys (Harper & Fine, 2006).

Summary. The *affection* domain represents a father's positive emotions towards his child. Affection facilitates development of the affiliative system, and is distinct from responsiveness and sensitivity. Potential behavioral items include tickling, physical closeness, hugging, caressing, praising, smiling, expressing positive emotions, and showing interest in what children do. Potential moderators of affection in father-child interaction include father ethnicity, age, level of education, and child gender (Bronte-Tinkew et al., 2006; Figure 2).

Responsiveness

Theoretical construct. The responsiveness domain represents the ability of parents to accurately perceive and respond appropriately to the cues and needs of their child, or sensitivity. The construct of responsiveness is based on Ainsworth's (Ainsworth & Bell, 1970) construct of sensitivity. When parents consistently acknowledge and appropriately respond to the cues and needs of children, children develop a sense of security that their needs will be met. This supports healthy development of the attachment system (Bowlby, 1969, 1988).
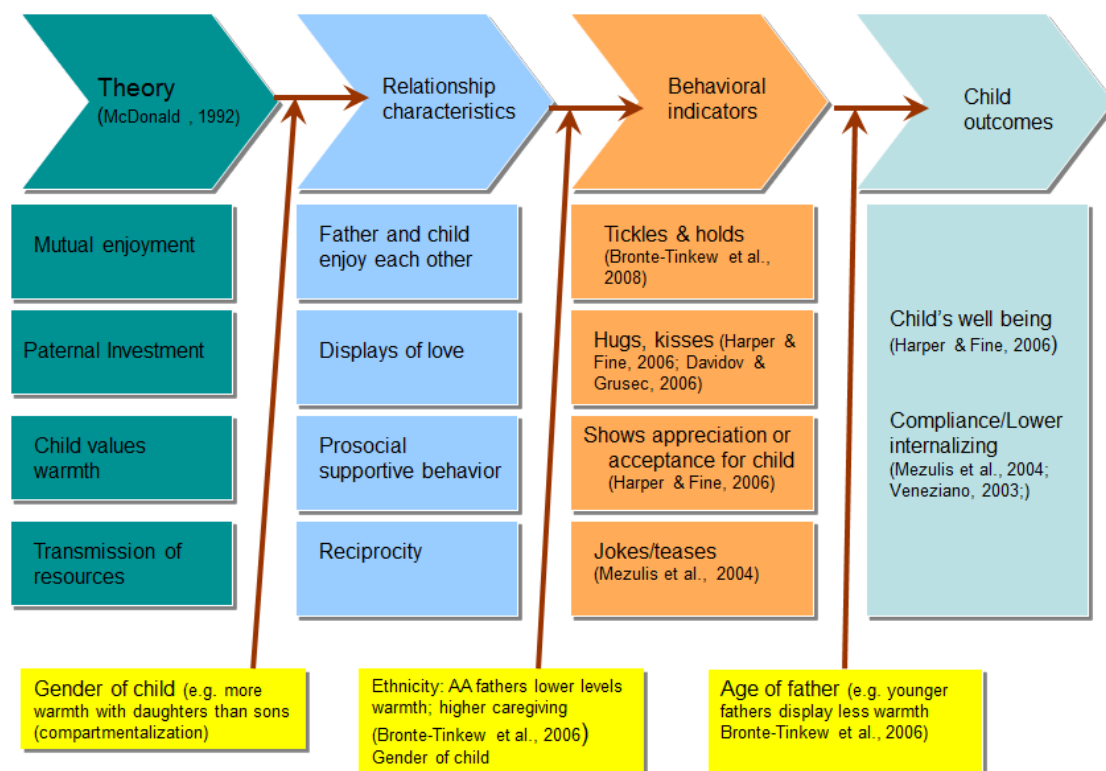
Figure 2. Affection logic model.

Empirical evidence supports the importance of father responsiveness. In a meta-analyses of studies of attachment with mothers and fathers, the relationship between father sensitivity and infant-father attachment security was weaker than for mothers, yet the overall percentage (67%) of infants who were securely attached to fathers was the same as for mothers (van IJzendoorn & DeWolff, 1997). Grossman and colleagues (2002) and Grossman and Kassubeck (1999) believed fathers who provide both emotional security and cognitive scaffolding to children during play promote both father-child attachment and the child's organization of the exploration system by providing emotional security when introducing or encountering novelty.

Potential behavioral items. Characteristics of father-child relationships indicative of the *responsiveness* domain included attending to child's cues, responding

appropriately, and synchronizing arousing interactions with the child. Several studies provided empirical evidence for potential behavioral items; for instance, following a toddler's interest, listening to what the toddler says, showing genuine interest in what the child does, and providing reassurance (Grossman et al., 2002). In a study with infants, father-infant coregulation of arousal tended to exhibit more intensity and positive arousal than infant-mother coregulation (Feldman & Klein, 2003). In another study responsive items that predicted children's social-communicative outcomes included appropriate responses to infant's nonverbal cues and emulating infant's emotions using voice, gestures, and facial expressions (Shannon, Tamis-LeMonda, & Cabrera, 2006).

Expected child outcomes. Fathers who consistently attended to children's cues and responded appropriately provided children with a sense of security that fostered emotion-regulation (Bowlby, 1969). Infants from 85 White middle-class families, showed more positive affect, were less likely to use self-soothing, and were less distressed, during the strange situation and competing demand tasks when they were securely attached to fathers (Diener, Mangelsdorf, McHale, & Frosch, 2002). In a comprehensive longitudinal study of European parents, fathers' sensitive challenging play when children were 24 months was a strong predictor of security of attachment related outcomes in adolescence (Grossman et al., 2002).

Father and child characteristics. Father responsiveness occurs across diverse ethnic groups and differences in behaviors may be observed with sons and daughters. Among 74 younger, ethnically diverse fathers with low-incomes and lower levels of education, father sensitivity changed to more appropriately respond to children as

children grew (Shannon et al., 2006). For families of 90 toddlers in Israel, fathers tended to use more sensitive regulation with daughters than with sons, and girls showed more self-regulated compliance toward both mothers and fathers than did boys (Feldman & Klein, 2003). Among a group of 18- to 24-month-old toddlers in 113 predominantly middle-class families, fathers were more sensitive with daughters than with sons, and daughters were more responsive to fathers than sons (Lovas, 2005).

Summary. When fathers accurately perceived and responded appropriately to cues and needs of children, they fostered secure attachment. Many of the items found on measures used in father research were observed across ethnic groups and predict positive child outcomes (Shannon et al., 2006). Several researchers (Feldman & Klein, 2003; Lovas, 2005) documented significant differences in father sensitivity related to child gender, indicating that fathers tend to display less sensitivity and higher, more frequent levels of intense arousal play with boys (Figure 3).

Encouragement

Theoretical construct. The *encouragement* domain represented the ability of parents to actively foster children's exploration which ensures adaptive skills were gained (Bowlby, 1969, 1988). Expanding on Ainsworth's (Ainsworth & Bell, 1970) concept of cooperation, Grossman and Kassubeck (1999) explained that sensitive challenging play scaffolds the exploration system. Scaffolding has been defined as "providing increasingly complex information about a task…appropriate for the infant's developmental level and contingent upon the infant's behavior" (Crockenberg & Leerkes, 2000, p. 81). This allows children to successfully develop new competencies while gaining a sense of self-
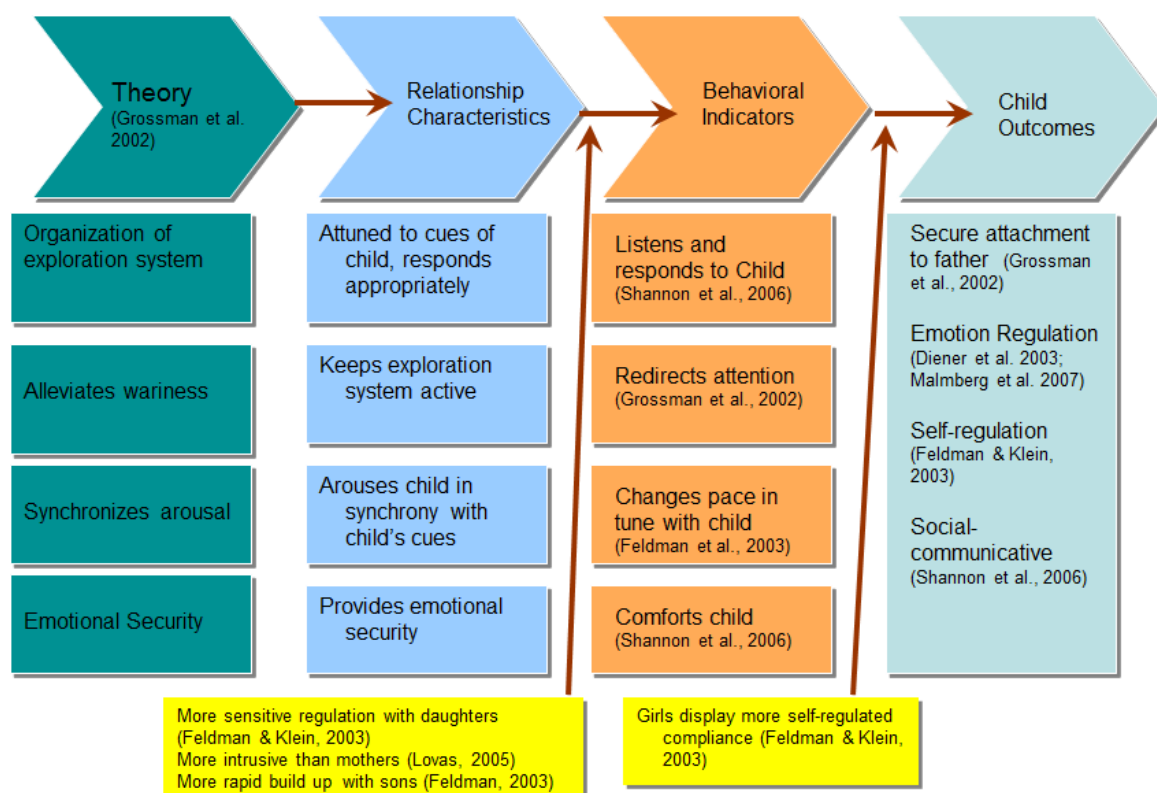
Figure 3. Responsiveness logic model.

efficacy and motivation to master new tasks (Frodi, Bridges, & Grolnick, 1985;

Grossman et al., 2002). Paquette (2004) extended this idea by proposing that fathers open

the social and physical world for children by providing novelty within the context of a

safe and familiar "father-child activation relationship."

Potential behavioral items. Characteristics of the *encouragement* domain

included encouraging appropriate risk-taking, helping children persist in activities, and

scaffolding more mature play. Observable behaviors included helping the child stay

focused on the task by making suggestions or providing assistance in a way that the child

still masters the activity him or herself (Grossman & Kassubeck, 1999), stimulating the

child with an object, engaging children with the physical environment, structuring a

problem for the child to solve, and encouraging the child to explore a toy (Yarrow et al., 1984).

Expected child outcomes. Providing sensitive challenges activates the exploration system, fosters mastery, contributes to children's sense of competence, and supports cognitive abilities (Grossman & Kassubeck, 1999; Paquette, 2004). Fathers who engaged in more physical and attention-focusing stimulation, had infants that persisted longer (Yarrow et al., 1984), father didactic responsive behaviors (combined sensitivity and cognitive stimulation) were associated with higher child social-communicative outcomes (Shannon et al., 2006), and for African American fathers more restrictive less encouraging attitudes were associated with children's lower cognitive and language outcomes (Kelley, Smith, Green, Berndt, & Rogers, 1998).

Father and child characteristics. Evidence has suggested fathers from diverse ethnic backgrounds engage in scaffolding behaviors, but the influence of child gender is unclear. Shannon and colleagues (2006) found low-income fathers showed low levels of intrusiveness, and high levels of didactic-responsive behaviors. Other studies found fathers were more likely to use tactile stimulation with sons, compared with daughters (Yarrow et al., 1984), and to be more intrusive with sons (Feldman & Klein, 2003).

Summary. Encouragement of exploration supports the acquisition of adaptive behaviors needed for successful functioning. Potential behavioral items include encouraging problemsolving, tickling child with a toy, and providing suggestions to assist child. Encouraging behaviors have been associated with better child social, cognitive, and communicative outcomes (Figure 4).
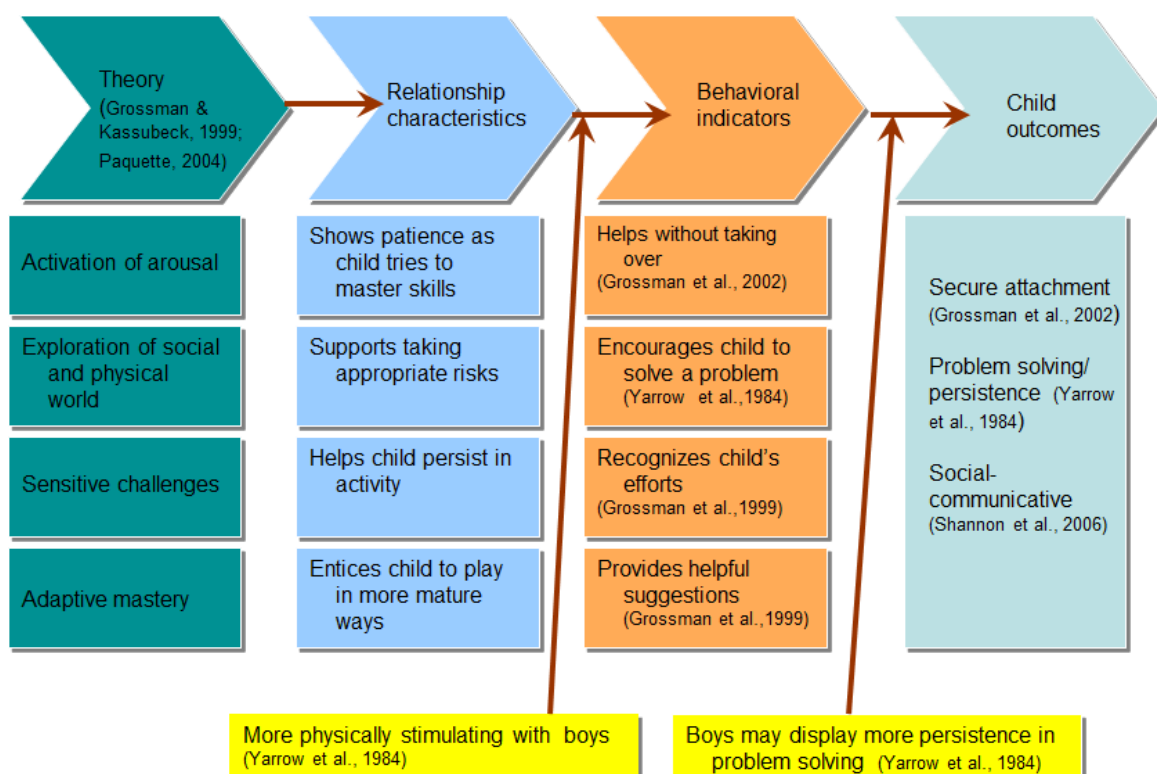
Figure 4. Encouragement logic model.

Teaching

      Theoretical construct. The teaching domain represented the ability of parents to provide language and cognitive stimulation. Social capital theory (Amato, 1994) asserted that as distinct individuals, fathers and mothers provide a variety of stimulation for children, expanding children's range of cognitive and social abilities. The bridge hypothesis proposed fathers would be more challenging conversational partners for children than mothers because they share less background knowledge with children (e.g., Rowe et al., 2004) and require children to be more active role in conversations.

      Potential behavioral items. Characteristics of father-child relationships indicative of the *teaching* domain included teaching about experiences, playing

unconventional games, extending thinking, providing clear expectations (Grossman & Kassubeck, 1999; Paquette, 2004), and pretend play (Kern, Feldman, Namdari-Weinbaum, Spitzer, & Tyano, 2005). Among a sample of 146 families with low-incomes, fathers were significantly less likely than mothers, to engage in singing songs, telling nursery rhymes, and reading stories, than mothers but engaged in more complex conversations with children (e.g., more questions, requests for clarification, varied vocabulary, longer utterances; Rowe et al., 2004).

Expected child outcomes. When fathers taught children about the world and provided children with diverse experiences, children's cognitive and language abilities improved. Children tended to talk more and use more diverse and longer utterances when speaking with fathers (Rowe et al., 2004). Father engagement in cognitive stimulating activities with 9-month-old infants reduced the likelihood of negative cognitive outcomes by 4% in a large (6,000+) nationally representative sample (Bronte-Tinkew, Carrano, Horowitz, & Kinukawa, 2008), and father support of pretend play was associated with children engaging in more advanced pretend play (Kern et al., 2005).

Father and child characteristics. Fathers from diverse backgrounds have been found to engage in teaching behaviors, which may be especially important for boys. One study reported that early positive father play behaviors were associated with positive language and cognitive outcomes for African American children (Black, Dubowitz, & Starr, 1999). Other studies found that ethnically diverse fathers engaged in cognitive stimulating activities with their young children (Tamis-LeMonda et al., 2004), and in biological resident families early positive father interactions predicted later academic

success into fifth grade (Cook, Roggman, & Boyce, 2011). There appeared to be no difference between daughters and sons in father-child language interactions (Rowe et al., 2004), but some evidence that positive father interactions had a stronger influence in reducing the odds for negative cognitive outcomes for sons than daughters (Bronte-Tinkew et al., 2008).

Summary. Father teaching behaviors have been shown to support children's cognitive and language development. Fathers engage children in conversations, play games, and explicitly teach. Potential behavioral items included explaining how a toy works, providing a creative suggestion to extend play, asking wh- questions, and asking children to clarify ideas. Teaching behaviors have been observed among ethnically diverse fathers (Tamis-LeMonda et al., 2004), and had a stronger influence on cognitive outcomes for sons than daughters (Bronte-Tinkew et al., 2008; Figure 5).

Playfulness

Theoretical construct. *The playfulness* domain represented the ability of fathers to effectively activate and destabilize children's affiliative and exploration systems through playful behaviors that communicated both warmth and control (Paquette, 2004). Playful behaviors foster adaptability to novel situations (MacDonald, 1992). Much of the literature on father playfulness has focused on physical play. For instance, it was theorized that physically unpredictable play may be an extension of emotional attunement between father and child that begins developing in infancy (Paquette, 2004), as fathers and children must emotionally and physically coordinate their actions. This is thought to support emotion regulation and social competency by providing a safe context for
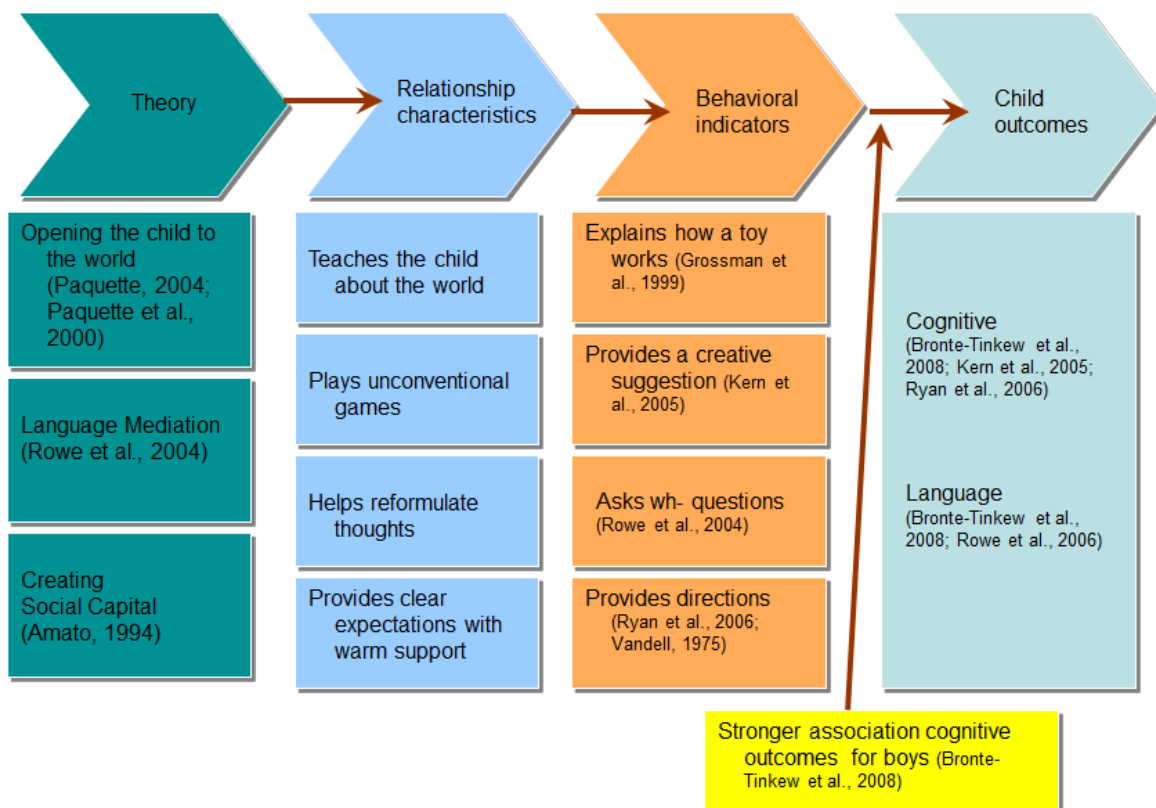
Figure 5. Teaching logic model.

children to practice facing challenges and experience novel behaviors (Paquette, 2004;

Pellegrini & Smith, 2005). However, Pellegrini and Smith emphasized that physical play

may be only one way to gain social competency. Playful behaviors that occur outside the

physical or rough and tumble play context, such as when fathers joke or engage in

dramatic play antics with children may serve a similar function to fostering adaptability

and social competence.

Potential behavioral items. Characteristics of father-child relationships

indicative of playfulness included fathers' enjoyment, provision of innovation and

novelty, exaggerated movement patterns, creation of anticipation, and enjoyable teasing.

Potential behaviors may include: physical and rough and tumble play, tickling, climbing,

running, jumping, "can you" challenges, activities that demand coordination and balance

(Pellegrini & Smith, 1998), moving the child's body though space, such as by swinging

the child, tossing the child in the air, bouncing the child on the father's knee, rolling the

child on a soft surface, wrestling with the child, and tumbling together (MacDonald &

Parke, 1986).

Expected child outcomes. It has been suggested that father playfulness supports

development of the affiliative system increasing compliance, appropriate competition,

and emotion regulation (Paquette, 2004). Most of the empirical evidence focuses on the

influence of father physical and rough and tumble play, which may serve an integrating

function for the central nervous system, reducing obesity and facilitating cognitive

functioning (Pellegrini & Smith, 1998, 2005). Father physical play behaviors with

preschool children were positive correlated with children's physical play behaviors with

peers (Lindsey & Mize, 2001), but children's retrospective reports of frequency of father

rough and tumble play significantly and positively correlated with teacher reports of

boy's aggression in kindergarten (Paquette, Carbonneau, Dubeau, Bigras, & Tremblay,

2003). Evidence for playfulness outside a rough and tumble context is limited with a few

studies using self-report measures to ask about father joking with children (Harper &

Fine, 2006, Mezulis et al., 2004), and only two studies with observational measures of

father joking or teasing (Carson & Parke, 1996; Shannon et al., 2006).

Father and child characteristics. The amount and quality of playfulness may

vary across cultures and gender, but most studies focused on differences in physical play,

and rough and tumble play. In Canada, fathers compared with mothers, reported more

rough and tumble play with children. However, the majority of mothers (73%) reported having play-fights with children at least twice a week (Paquette et al., 2003). In Aka culture fathers did not engage in rough and tumble play with children at all. Fathers in the Aka culture remained within reach of infants approximately 50% of the time (Hewlett, 2000), while in the Efe culture, boys in middle-childhood engaged in more physical play with younger children than parents (Morelli & Tronick, 1992).

Father playfulness with children may be more frequent, intense, and directive with sons. Again, most of the literature has focused on differences in physical play with frequency of father-child rough and tumble play being highest when children were between 24 and 35 months of age, and sons being more likely than daughters to become angry when engaging in rough and tumble play with fathers (Paquette et al., 2003). More negative restrictive behavior with sons may be evident in other play contexts as well. When engaging in dramatic play with sons, fathers were more directives, and with daughters fathers used more polite commands (Lindsey & Mize, 2001).

Summary. The *playfulness* domain represented the ability of fathers to engage children in active, and spontaneous, but enjoyable, interactions that have an integrative function in facilitating adaptability and social competence. Much of the empirical evidence has focused on physical play and rough and tumble play, but some behaviors such as exaggerating movements, teasing or joking with the child, and creating anticipation may occur in other contexts as well. Ethnicity and child gender may moderate father playfulness, with fathers engaging in more intense physical play and directive interactions with sons (Figure 6).
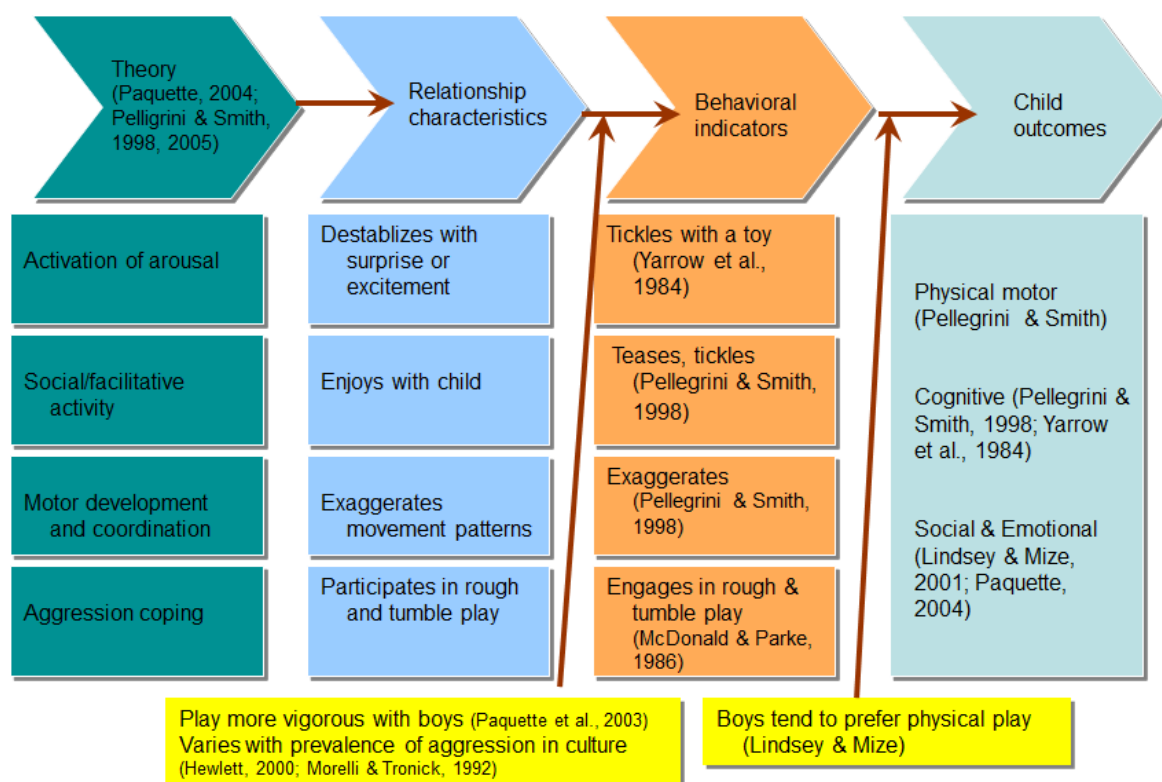
Figure 6. Playfulness logic model.

Immediate Setting

The settings used for observing father behaviors influence what behaviors will be observed. Observational research of father-child interaction has typically required fathers to participate in a particular observation setting designed to elicit various parenting behaviors. Structured and semistructured settings have been frequently used to elicit specific behaviors from fathers and children relative to the phenomena being studied. Observations of father-child play based on instructions and materials developed for observations of mother-child play may limit fathers' interactions. When allowed to play with children in any way they wish, a broader array of father behaviors may emerge,

particularly across diverse ethnic groups.

Examples of very structured settings include asking fathers to have toddlers help pick-up toys in order to observe father discipline strategies and child compliance or having father and child complete a puzzle together in order to observe how fathers scaffold children's problem-solving. Semistructured settings may include providing fathers and children with set of specific toys likely to elicit particular behaviors like pretend play and literacy activities and then providing parents with open-ended directions like "play with your child how you normally would" (e.g., Lindsey & Mize, 2001; Shannon et al., 2006). Unstructured settings include observing or videotaping father and child at home while, encouraging fathers to choose to do whatever they want.

Structured and unstructured settings have informed the perspective of researchers and home visiting practitioners in distinct ways. For instance, in a study of parents and infants, researchers used a teaching and free-play session. Significant differences in the amount of physical play with infants were only found during the free-play session. Physical play was significantly related to infant displays of pleasure only in free play session and only with fathers (Volling et al., 2002). Understanding how items on the PICCOLO-D measure function across two immediate settings, a semistructured play and a father-choice setting, may provide opportunities for the observation of a wider variety of father behaviors.

Archived video observations in the Early Head Start Research and Evaluation Project (EHSREP) that will be used for this study include both 10-minute semistructured play and 5-minute father-choice observational settings. These observations were collected

in the homes of families. In the 10-minute semistructured play setting fathers were provided with three bags, each with a toy inside, and asked to sit on a small blanket with their child while playing with the toys in each bag. In the father-choice setting fathers were invited to do whatever they wanted with their child for five minutes, with no specific materials or structure. Observing fathers in this setting may provide an opportunity to observe more playful behaviors than in the 10-minute semistructured play setting originally developed for observing mother parenting behaviors.

Summary

The purpose of this literature review was to provide a foundation for this study by clarifying theoretical constructs used for selection of items to be tested for the observational measure. The heuristic model of contextual effects (Cabrera et al., 2007) that influences father-child interaction provided rationale for a strengths-based approach, suggesting only positive items of father-child interaction be included on the measure. Theoretical constructs, behavioral items, child outcomes, and potential moderators were identified for five proposed domains of father-child interaction. Each domain represented important fathering behaviors supporting healthy development of children's attachment, exploration, and affiliative systems (Figures 2-6). Examining father behaviors in two settings may provide opportunities for observation of a wider variety of father behaviors.

Current empirical evidence has several limitations. Few studies examine father interaction with toddlers, and of those studies most of them were from the EHSREP using the same extant data as used for this study (e.g., Roggman, Fitzgerald, Bradley, & Raikes,

2002). Many studies fail to provide detailed accounts of coding systems, and operationalize constructs related to the separate domains of parenting in diverse ways. This makes it more difficult to predict how specific behaviors will influence child outcomes. Research has been lacking regarding differences in father-child interaction related to ethnicity, especially with Latino American fathers. The PICCOLO-D study will contribute to knowledge about father behaviors, associations between father behaviors and child outcomes, differences in father behaviors between father ethnicity and child gender groups, and the influence of observational setting on father behaviors.

CHAPTER III

METHOD

The primary purpose of this study was to develop a valid, reliable, observational measure of positive father-child interaction that predicts child outcomes, and is useful for Head Start practitioners in identifying fathers' strengths. The study design was similar to that used in developing the original PICCOLO measure of positive mother-child interaction. Initial items describing positive father-child interaction were identified from a review of extant literature on fathering with infants, toddlers, and young children. Father researchers and HS/EHS practitioners were asked to complete an online survey scoring each item for its importance to child development and for its ease of observation. Items were then used to observe archived videos of father-child interaction and tested for between observer agreement, scale reliability, and associations of items with similar measures and with child outcomes from a secondary data set. Psychometric data were evaluated, and the measure was refined and retested.

Data Sources

Extant video observations from the EHSREP study were used for this study. These video observations were part of an archive of data and video from a multi-site longitudinal study, beginning in 1996, that collected data across a sequence of time points from children and parents from low-income families. Video observations were collected at three child ages: 14, 24, and 36 months. When children were 24 and 36 months old, eight sites in the national EHSREP study participated in collecting data from fathers.

These sites were located in Arkansas, California, Iowa, New York, Pennsylvania, Utah, Vermont, and Tennessee. In addition to collecting the 24- and 36-month observations for the national study, the Utah site collected observations of 86 fathers when children were 14 months old. These observations were added to the national sample to allow examination of father behaviors across a broader age range of children.

Families were recruited using the same advertising typically used by EHS programs. Families who inquired about EHS services and agreed to participate in the study completed an application form with family demographic data. Primary care providers (typically mothers) who enlisted in the research were asked, during later data collection (the exact time point varying by site), to identify the child's father or a father figure most involved in the child's life (Administration for Children and Families [ACF], 2002b; Boller et al., 2006; Roggman, Boyce, Cook, & Cook, 2002). The identified father was then contacted and asked to participate in a study. Each parent received approximately $50 to complete each set of interviews and assessments (ACF, 2002b; Boller et al., 2006).

There were 491 fathers with video data in the combined national and local archive. Then 63 fathers were excluded from analysis due to poor video quality, father of ethnicity other than African American, European American, or Latino American, or there was evidence of low stability of the father in the child's life that may limit the contribution of father-child interaction to child outcomes. To determine stability of the father in the child's life, father biological and legal relationships, length of residency, and frequency of time spent with child were considered based on data available at the time of

observation. All biological resident fathers were included in the sample. Biological

nonresident fathers were included if they had been present in the child's life since the

child was one year old or younger and had spent time with the child weekly.

Nonbiological resident fathers were included if they were an adoptive stepfather, had

been present in child's life since birth, or were married to child's mother and had lived

with the child for at least one year. Nonbiological, nonresident father figures were

excluded from the sample. Observations of 34 fathers who did not meet stability criteria

were included in interobserver reliability analysis because stability should not influence

observer agreement, but these cases were excluded from other reliability and validity

analyses.

Table 2 provides demographic information for number of cases or individual

fathers used for this study for the full sample and within each ethnic group. Demographic

information includes father residency and relatedness, child gender, father age, and father

level of education. It has been noted by other authors that these participants were not

nationally representative, because they tend to be older, more educated, and more stable

due to the selective nature of recruitment through mother referral (Tamis-LeMonda et al.,

2004). Table 3 provides the number of video observations at each child age for the full

sample and by ethnicity.

Data analysis was conducted at the case level and at the observation level. The

case level refers to the final number of cases or individual fathers with at least one

observation at one of the child ages, which was 428 (Table 1). Data were analyzed at the

case level for predictive validity. Interobserver agreement, descriptive statistics, scale

Table 2

Sample Demographics

			Father ethnicity					
Father characteristic	All (*N*= 428)		African American (*n* = 121)		European American (*n* = 249)		Latino American (*n* = 58)	
Biological resident	70%		48%		78%		79%	
Biological nonresident	15%		29%		09%		14%	
Nonbiological resident	15%		23%		13%		07%	
Child is male	48%		53%		45%		48%	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	30	7.78	31	9.55	30	7.00	29	6.48
Years of education	12	2.58	12	1.92	12	2.39	11	3.37

Table 3

Number of Semistructured Video Observations by Child Age and Father Ethnicity

		Father ethnicity		
Child age	All (*N* = 629)	African American (*n* = 158)	European American (*n* = 400)	Latino American (*n* = 71)
14 months	85	0 (0%)	82 (96%)	3 (4%)
24 months	290	75 (26%)	170 (58%)	45 (16%)
36 months	254	83 (33%)	148 (58%)	23 (9%)

reliability, and construct validity were analyzed at the observation level. The observation level refers to the total number of observations across all three ages and includes observations of the some of the same fathers more than once, violating assumptions of independence for inferential statistics. In this data 262 fathers had one video observation, 131 fathers had two video observations, and 35 fathers had three video observations.

In the semistructured observation setting there were 428 cases with 629 observations. Video observations of each father-child dyad were collected in the home of the family. There were two observational settings. For the 10-minute semistructured play observation using the "Three-bag" procedure, fathers were instructed to sit on a small blanket with their child and were given three bags with different types of activities: the first bag had a book, the second had dramatic play props, and the third had other toys. For a 5-minute father-choice setting, fathers were instructed to choose any activity they had done before with their child. No toys or objects were provided by the researchers; fathers and children could choose their own toys or activities like having a snack together or rough and tumble play. Using both observations allowed testing of items across more than one setting to examine how father behaviors vary in relation to the unstructured father-choice and semistructured play (three-bag) settings (Research Question 4). The 10-minute semistructured play observation was expected to provide more opportunities for father and child to engage in language and literacy activities, pretend play, and constructive play. The 5-minute father-choice observation was expected to provide more opportunities for physically active play. In the father-choice observation there were 614 total observations. This was less than the number of semistructured observations due to

technical difficulties and problems with child participation. The total number of video

observations for both settings used for the study was 1,243.

Procedures

There were three stages involved in selecting items for the measure. First, positive

behavioral items were identified from research literature and defined in easily understood

observable terms. Second, expert practitioners and researchers were recruited to score

items for content validity. Third, items were tested and refined based on interobserver

agreement, scale internal consistency, and correlations of items with similar measures

and with child outcomes.

Identify Behavioral Items from
Research Literature

Items describing positive father-child interaction were identified in the fall of

2009 by examining constructs and measures reported in studies of father-child interaction

in relation to children's early development. To increase generalizability, studies with

sample characteristics similar to those of HS/EHS populations were emphasized (Boller

et al., 2006), but due to the emerging nature of research on early father-child interaction,

studies from other populations were also included because the majority of the most

applicable empirical literature has come from studies using the same EHSREP extant data

used for this study. Evidence available at that time for items and domains have been

summarized in Appendix B (Tables B1-B4). Items identified on the original PICCOLO

measure for mothers were included because father behaviors were expected to be similar

to mothers; there was support for each of them in the empirical literature, and these items have demonstrated good psychometric properties. Measures of father behaviors associated with positive child outcomes were included. Items and observational descriptions from the measures were identified relative to the theoretically and empirically established PICCOLO-D domains of *affection, responsiveness, encouragement,* and *teaching.* The strongest empirical support for specific father behaviors was found for the *affection* and *responsiveness* domains. Evidence for specific behaviors was more limited for the *encouragement* and *teaching* domains and scarce for the *playfulness* domain.

Due to the exploratory nature of developing the *playfulness* domain and scant empirical literature, potential items for this domain were developed from two additional sources. First, brief qualitative narratives describing what father playful behaviors look like were written from 10 randomly selected father-choice setting observations. Second, in response to a recommendation of the funding agency to include the perspective of fathers, an informal discussion group was conducted with three graduate-student fathers (two European American, one Latino American), familiar with theoretical foundations in development and family studies, to generate relevant behavioral descriptions of playfulness that may not be present in the literature. Appendix C provides the qualitative results of the father discussion group.

Initially, 73 items were selected based on relevance to parenting and child development theory, evidence of psychometric properties, and appropriateness for low-income ethnically diverse families. Once identified, items were worded to be easily

understood and observed in order to increase interobserver reliability (Aspland &

Gardner, 2003).

Obtain Content Validity From Expert
Item-Importance Ratings

Content validity was conducted using an online survey completed by a panel of

11 father researchers (published in past 5 years) and 9 EHS/HS practitioners (home

visitors and teachers with at least 2 years of experience) familiar with observing father-

child interactions. The EHS/ HS practitioners were recruited from a local HS program in

the mountain west. This program served a large geographical area (three counties) with

diverse needs (650 families, 20% Hispanic/Latino, 78% White). This program was

selected because it had allocated significant resources to developing specialized services

for fathers.

Of the 20 researchers and practitioners (7 men, 13 women) who participated in the

survey, one reported Latino American ethnicity and all others reported European

American ethnicity. Participants were sent an email asking them to participate in the short

20-minute survey within the next 10 days (Appendix D). Items were rated on a scale from

1-5 (1 = not at all, 5 = very much) on two questions: Is it important to child development?

Is it observable? There were 73 items.

A reduced set of 55 items were selected based on these scores. Items were

organized in five domains: *affection, responsiveness, encouragement, teaching*, and

playfulness (see Appendix E, PICCOLO-D initial version). Items were formatted for

coding using a 3-point scale based on whether the behavior was clearly present (2),

barely present (1), or not observed at all (0).

Test and Refine Items

To ensure PICCOLO-D would have both strong psychometric properties and be useful for home visiting practitioners, decisions about retaining items were informed by psychometric properties and practical utility. To be useful for home visiting practitioners, it was important that the measure: identify father behaviors that support child development, will be easy for home visitors to observe, and help home visitors identify strengths of diverse fathers with a broad range of parenting skills.

Coding of video observations occurred over five semesters (including summers). During this time a total of 18 student observers were recruited from undergraduate and graduate courses in child development, family studies, and psychology at Utah State University. The majority of students were enrolled for credit in a psychology research practicum course on campus that requires 60 hours of research experience. Most of these students had little or no professional experience working with parents or young children. Student observers worked approximately 5 hours a week for 12 weeks. After Institutional Review Board (IRB) certification and training, most students completed 40 hours total of coding for the project. Efforts were made to recruit students of both genders and diverse ethnicity. Eight coders were male, ten were female. One observer was African American ethnicity and worked on the project for four of the five semesters. A Latino American observer was recruited, but was unable to pass reliability training criteria. All observers that spoke Spanish were of European American ethnicity, but had lived in a Spanish-speaking country or community. Following protocols required by the university IRB for

the protection of human subjects, all observers were required to complete the National

Institute of Health certification regarding protection of human subjects before receiving

training and viewing video observations.

Each observer received a minimum of 10-12 hours of training with some

requiring additional practice time and feedback. Training format included readings and

tests, group meetings, lecture, practice and discussion, and individual and partner

practice. Training materials originally developed for the PICCOLO training and users'

guide (Roggman et al., 2009) were adapted for the father observations. Training content

included confidentiality protections and observational procedures, data entry procedures,

an introduction to the PICCOLO approach to observing parenting behaviors, a

description of how father-child interaction may influence child development outcomes,

and practice scoring video observations of father-child interaction. All video clips used

for training were from fathers who provided informed consent to allow the video

observations to be used for training purposes.

During training, observers were informed of the purposes of the study and

research objectives were disclosed, because observers have been reported as being more

likely to be accurate when they understand the purpose is measurement development

(Reid, 1982). Before participating in collecting data for the project, student observers had

to complete a reliability test. The reliability test consisted of coding four video clips

previously coded by three expert observers who reached consensus. Trainees were

required to pass the test within 80% agreement of the master scores within each domain.

After passing the reliability test, each observer's item, domain, and full measure

agreement was monitored closely, and they received weekly feedback and support. After passing the reliability test, most observers required an additional 3-9 hours of observational experience to achieve consistent agreement. Weekly meetings were held to prevent observer drift and ensure recent scoring clarifications for items were being used. Pairs of observers were assigned to observe the same observations within the same week. This ensured timely feedback on interobserver reliability. All coding assignments were dispersed randomly to prevent order effects in testing father behavior differences by ethnicity, geographic location, child age, or immediate setting of observation, and to prevent the same observer from viewing clips of the same father in different settings or at different child ages. Observers were blind to the EHSREP geographic site where sample participants were located.

In order to estimate how easy an item would be to observe in "live" observation, interobserver agreement was based on observations after a "single view" (no playback) to simulate live observation field use by home visiting practitioners. These single-view scores, from observers with stable agreement, were used to calculate interobserver percent agreement for each item during measurement development. To estimate single-view interobserver agreement for the final version of PICCOLO-D, 120 randomly selected observations were independently scored by pairs of observers, who had not previously viewed the observations. These interobserver agreement estimates were reported in the results section addressing interobserver reliability.

To ensure reliable estimates for validity and scale reliability analyses during measure development, observer pairs met each week to discuss and reach a consensus

score for any observations with item level agreement under 80% across all items and for items within each domain. To reach consensus scores, observers could review the observation again. Average absolute percent agreement was .93 across all observations used for validity and scale reliability analyses.

Measures

Father Behaviors

PICCOLO. Because mothers and fathers engage in many similar behaviors (Lamb & Tamis-LeMonda, 2004) and there was empirical evidence with fathers supporting the inclusion of these items (Appendix B), items from the current PICCOLO measure of mother behaviors were used to code father behaviors in the video clip observations along with the potential new items for PICCOLO-D. On the original PICCOLO measure, when used with mothers, interobserver reliability was .85 and internal consistency for the full measure of .70. The dimensions of parenting in PICCOLO were moderately correlated with one another, suggesting they were related, but not measuring the same thing. Construct validity for PICCOLO was examined using scores from the Three Bag Assessment Coding Scales (see below) and demonstrated moderate correlations. Predictive validity for PICCOLO in relation to cognitive, language, and behavior outcomes at ages 36 months and prekindergarten, tested in a large sample of European American, Latino American, and African American HS/EHS families, demonstrated statistically significant correlations across age and ethnicity (Cook & Roggman, 2008; Roggman et al., 2009).

Construct Validity Measures

Construct validity was examined in relation to the Three Bag Assessment Coding Scales, a widely used and established observational measure of parent-child interaction, which was used to code observations of both mothers' and fathers' parenting in the EHSREP study and have predicted child outcomes from father behaviors (Berlin, Brady-Smith, & Brooks-Gunn, 2002; National Institute of Child Health and Human Development [NICHD], 1992; Tamis-LeMonda et al., 2004; Ware, Brady, O'Brien, & Berlin, 1998). The measure included codes for the parenting dimensions of sensitivity (*responsiveness* in the PICCOLO-D measure), cognitive stimulation (*teaching* in the PICCOLO-D measure), intrusiveness (the opposite of *encouragement* in the PICCOLO-D measure), positive regard (*affection* in the PICCOLO-D measure), negative regard (the opposite of *affection* in the PICCOLO-D measure), and detachment. The positive regard, sensitivity, and cognitive stimulation scales were combined into a single parent supportiveness variable. Coeffient alpha for these scales have been reported as .86 at 24 months and .82 at 36 months (Administration for Children and Families, 2002a). This score will be used to test convergent validity for the full measure. Divergent validity will be tested using the combined score of the negativity and intrusiveness scores. Coeffient *alpha* for these scales in our sample was .70. Average interobserver reliability on the Three Bag Assessment Coding Scales, 1-7 point rating scale scores within plus or minus one point, was 93% at 24 months and 94% at 36 months (ACF, 2002a, 2002b).

Predictive Validity Measures

Extant measures of children's behavior and self-regulatory abilities, child social

and emotional development, cognitive development, and language development were used to examine concurrent and predictive validity. Child measures were available from one or more time points: child age 24 months, child age 36 months, and prekindergarten entry. All child outcome measures were administered by trained individuals according to protocol developed for the EHSREP.

Child Behavior Checklist. The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) was used to examine predictive validity associated with child social and emotional outcomes. Father report of child behavior at child ages 36 months and prekindergarten using the CBCL were available from the EHSREP. This measure was a parent report measure for children between the ages of 18 months and 5 years. Parents rank the behavior of children on 99 problem items. The ranking includes 0 (not true), 1 (somewhat true), or 2 (very true). The 100th question was open-ended for parents to add additional concerns. Test-retest reliability for the internalizing scale was .90 and externalizing was. 87. Construct validity is $r \geq .55$ with a high of .75.

Bayley Scales of Infant Development Mental Development Index. Predictive validity for child cognitive outcomes was tested using the Bayley Scales of Infant Development (BSID-II) Mental Development Index (MDI; Bayley, 1993). Children were assessed with these measures at 24 and 36 months. The MDI assesses the child's ability to follow simple spoken directions that indicate an understanding of prepositions, size comparisons, quantities, colors, and simple numbers; his or her spoken vocabulary during the assessment; and spatial concepts, memory, and the ability to match shapes and identify patterns. Internal consistency for this measure has been reported as an alpha of

.92 (ACF, 2002b).

Bayley Scales of Infant Development Behavior Rating Scales. Predictive validity for child social emotional outcomes was tested using The Bayley Scales of Infant Development (BSID-II) Behavior Rating Scales (BRS; Bayley, 1993). Children were assessed with these measures at 24 and 36 months. Scores for the emotion regulation and orientation and engagement scales were combined. Rating items used for the Emotional Regulation score included ratings of fearfulness/trust, energy/activity level, and adaptation to transitions. Internal consistency reliability estimates had been reported at .90-.92 in the national sample (ACF, 2002a). Rating items used for the orientation/ engagement scale includes ratings of child attention, exploration, and interest in toys. Internal consistency estimates for the national sample were reported at .80 (ACF, 2002a). To provide the most parsimonious estimates of children's social and emotional outcomes, scores from these two scales were averaged. Cronbach's alpha level was lower than typically recommended (24-month alpha = .65; 36-month alpha = .53).

Leiter emotion regulation. Predictive validity for child emotion regulation outcomes at prekindergarten was tested using scores from the Leiter-Revised Examiner Rating Scale (LER; Roid & Miller, 1997). It provides a standardized composite score of emotion regulation rating by examiners for effective emotional self-regulatory aspects of performance in challenging tasks. The LER was standardized on a large national sample (over 1,500 typical children and adolescents and 692 atypical children ages two and up) stratified by age, gender, and socioeconomic status based on 1993 U.S. Census statistics. Cronbach's alpha coefficient for this scale was .96 (Love et al., 2011).

Woodcock-Johnson applied problems. Cognitive outcomes at prekindergarten were measured using the Woodcock Johnson Psycho-Educational Test Battery-Revised *(*W-JAP*;* Woodcock & Johnson, 1989*)* applied problems subtest. This subtest assessed mathematical skills, including showing two fingers, counting objects, and adding or subtracting small numbers. Problems were presented orally, and visual stimulus of numbers or texts was provided. Children answered verbally or by holding up fingers. Internal consistency of *alpha* = .90 and good construct validity (.60-.70) were reported for the national study (ACF, 2002b). The standardized test scores were used for analysis.

Peabody Picture Vocabulary Test-III. Child receptive language outcomes, for testing predictive validity, were measured at 36 months and prekindergarten using the Peabody Picture Vocabulary Test-III (PPVT-III; Dunn & Dunn, 1997). This was an individually administered test. Examiners show children four pictures and ask children to point to the picture of the word said by the examiner. Reliability for this measure includes internal consistency Cronbach's *alpha* of .92. Test-retest reliability (approximately 1-month interval) demonstrates a correlation coefficient of .91. Standardized scores were used for analysis.

CHAPTER IV

RESULTS

Introduction

To develop a valid, reliable, useful measure of father-child interaction analyses, the researcher first addressed interobserver agreement, scale reliability, content validity, construct validity, and predictive validity for the full sample using the 10-minute semistructured play observational setting. Then, using the final version total scores, domain scores, and item scores, analyses examined variations in these psychometric properties in relation to father ethnicity and child gender. Finally, the influence of observation setting was examined by comparing scores for the 5-minute father-choice setting with scores for the 10-minute semistructured play observation setting.

Each research question was addressed in turn and a summary provided of the final measure. First, results have been presented for the full sample of participants using the 10-minute semistructured play setting to answer the first research question regarding the best behavioral indicators of positive father-child interaction. The second and third research questions address variations in PICCOLO-D father behaviors associated with father ethnicity and child gender in the semistructured setting. The fourth research question addresses differences between observation settings. Items in the *playfulness* domain were eliminated when using scores from the semistructured play setting observations due to low variability in this setting but were reported with results for research question four.

Research Questions

  Research question 1: What are the best behavioral indicators (items) of

positive father-child interaction? Research question 1 tested the domains identified in

the research model and items identified within each domain with the semistructured play

setting observations. Tables 4-7 provide a summary of content validity, percent

agreement, scale reliability, and construct validity analysis conducted at the observation

level. This means that observations across all child ages were combined and include more

than one observation of some fathers (see Table 2, and clarification on p. 35). When

inferential statistics were used this violates the assumption of independence, which may

artificially reduce the standard error, thus results should be interpreted conservatively.

Results for eliminated items have been reported up to the point of elimination. For

instance, when items were eliminated due to low variability, construct and predictive

validity results were not reported. In Tables 4-7, a brief label for each item was used.

Scale reliability and validity of PICCOLO-D at each child age (14, 24, 36 months) for the

full measure and domain scores were also examined to better understand how changes in

children's development may influence psychometric properties of the measure.

  An initial a priori cut-off score criterion was set for eliminating items with a mean

importance or ease of observation score below 2.75, .25 higher than the scale median.

However, no items rated below the cut-off level, and resources were not available to test

all items, so items were sorted within each domain in ascending order of the mean

importance score and then by ease of observation score. Items with lower scores on

importance and ease of observation were eliminated, with the goal of testing

Table 4

Affection Domain and Item Content Validity, Percent Agreement, Scale Reliability, and Construct Validity

PICCOLO-D father behavior	Content validity (N = 20)[e]		Interrater agreement (N = 113)[f]	Variability (N = 629)[f]		Scale reliability		Construct validity (N = 615)[f]
	Mean importance	Mean observe	% agree	M	SD	α	Factor loadings	r
Affection domain	4.44	4.06	76	8.05	2.21	0.69		0.59***
Speaks with warm voice	4.60	4.16	93	1.80	0.44	0.64	0.61	0.36***
Smiles at child	4.55	4.55	66	1.26	0.65	0.69	0.37	0.25***
Praises child	4.63	4.53	65	1.07	0.69	0.70	0.45	0.54***
Is engaged	4.75	4.10	77	1.71	0.49	0.65	0.74	0.34***
Shows emotional warmth	4.60	3.15	80	1.67	0.52	0.59	0.70	0.44***
Eliminated (n = # of clips coded when item was eliminated)								
Playfulness[d] (n = 628)	N/A	N/A	70	0.59	0.65	0.69	0.36	
Positive expressions[c,d] (n = 596)	4.60	4.05	80	0.62	0.71	0.72	0.36	
Physically close[d,e] (n = 596)	4.16	4.63	83	1.87	0.36	0.71	0.31	
Physical affection[c] (n = 442)	4.60	4.80	76	0.22	0.46			
Express feelings[a]	4.25	3.55						
Positive touch[a]	4.10	4.25						
Is relaxed[a]	4.00	2.85						

Note. Items eliminated for following reasons: [a] content validity, [b] percent agreement, [c] variability, [d] scale reliability, [e] construct validity, [f] *N* for final item at top of table. For eliminated items, *n* at time of elimination is noted by item. Unit of analysis: [e] expert rater, [f] observation, [g] correlation with positive regard rating from Three Bag Assessment Coding Scales.

*** $p \leq .001$.

Table 5

Responsiveness Domain and Item Content Validity, Percent Agreement, Scale Reliability, and Construct Validity

PICCOLO-D father behavior	Content validity (N = 20)[e]		Interrater agreement (N = 113)[f]	Variability (N = 629)[f]		Scale reliability		Construct validity (N = 615)[f]
	Mean importance	Mean observe	% agree	M	SD	α	Factor loadings	r
Responsiveness Domain	4.39	3.95	70	7.85	1.98	0.78		0.45[***]
Is attentive	4.25	4.10	88	1.85	0.36	0.75	0.66	0.34[***]
Changes pace	4.60	3.85	55	1.35	0.64	0.74	0.64	0.28[***]
Follows what child is doing	4.16	3.53	80	1.54	0.57	0.70	0.77	0.37[***]
Responds to child's emotions	4.55	3.53	66	1.44	0.62	0.74	0.69	0.39[***]
Replies to child	4.58	4.32	60	1.67	0.48	0.77	0.55	0.30[***]
Eliminated (n = # of clips coded when item was eliminated)								
Looks when child talks[b] (n =596)	4.35	4.25	49	1.72	0.50	0.76		
Is flexible[b] (n =596)	4.35	3.55	60	1.59	0.54	0.75		
Uses touch to reassure[c] (n =442)	4.15	4.35	82	0.12	0.33			
Comforts child[c] (n =175)	4.70	4.26	96	0.06	0.31			
Helps calm child[c] (n =175)	4.15	3.60	91	0.09	0.35			
Verbally reassures[a]	4.40	4.15						

Note. Items eliminated for following reasons: [a] content validity, [b] percent agreement, [c] variability, [d] scale reliability, [e] construct validity. [f] *N* for final item at top of table. For eliminated items, *n* at time of elimination is noted by item. Unit of analysis: [e] expert rater, [f] observation, [g] correlation with sensitivity rating from Three Bag Assessment Coding Scales.

[***] *p* ≤ .001.

Table 6

Encouragement Domain and Item Content Validity, Percent Agreement, Scale Reliability, and Construct Validity

PICCOLO-D father behavior	(N = 20)[e] Content validity Mean importance	Mean observe	(N = 113)[f] Interrater agreement % agree	(N = 629)[f] Variability M	SD	Scale reliability α	Factor loadings	(N = 615)[f] Construct validity[g] r
Encouragement Domain	4.03	3.93	73	7.42	2.11	0.75		-0.15***
Encourages handling toys	3.65	4.05	82	1.84	0.37	0.74	0.54	-0.11**
Supports child's choice	4.30	3.55	74	1.54	0.62	0.69	0.59	-0.22**
Supports on own	4.30	3.60	73	1.50	0.58	0.69	0.61	-0.16**
Verbal encouragement	4.40	4.35	58	1.08	0.75	0.74	0.52	0.02
Enthusiasm	4.40	3.90	75	1.46	0.60	0.66	0.77	-0.11**
Eliminated [(n = # of clips coded when item was eliminated)]								
Waits for child's response[b] (n = 596)	4.25	4.25	46	1.38	0.64	0.74		
Offers suggestions to help[c] (n = 596)	4.10	3.90	70	0.70	0.72			
Takes turns[b] (n = 596)	4.20	4.25	49	0.91	0.63			
Challenges child[b] (n = 442)	4.05	4.26	45	1.13	0.67			
Imitates child's actions[c] (n = 313)	4.30	3.45	75	0.21	0.39			
Provides help[b] (n = 313)	4.45	4.25	50	1.23	0.68			
Tells or shows child next step[b] (n = 442)	3.70	3.55	35	0.69	0.60			
Tailors assistance[a]	4.26	3.32						
Child's permission[a]	3.10	3.85						
Physically guide child[a]	3.21	4.26						

Note. Items eliminated for following reasons: [a] content validity, [b] percent agreement, [c] variability, [d] scale reliability, [e] construct validity, [f] N for final item at top of table. For eliminated items, *n* at time of elimination is noted by item. Unit of analysis: [e] expert rater, [f] observation. [g] correlation with intrusiveness rating from Three Bag Assessment Coding Scales. Expected direction is negative.

** $p \leq .01$.

*** $p \leq .001$.

Table 7

Teaching Domain and Item Content Validity, Percent Agreement, Scale Reliability, and Construct Validity

PICCOLO-D father behavior	$(N = 20)$[e] Content validity		$(N = 113)$[b] Interrater agreement	$(N = 629)$[f] Variability		$(N = 629)$[f] Scale reliability		$(N = 615)$[f] Construct validity
	Mean importance	Mean observe	% agree[f]	M	SD	α	Factor loadings	r
Teaching Domain	4.05	4.08	71	8.34	2.15	0.64		0.49***
Suggests to extend	4.16	3.84	57	1.43	0.59	0.61	0.47	0.23***
Repeats or expands	4.35	4.40	67	1.39	0.61	0.59	0.51	0.27***
Labels	4.30	4.50	79	1.79	0.43	0.59	0.49	0.26***
Pretends	4.15	4.20	74	0.90	0.76	0.61	0.42	0.35***
Talks about characteristics	3.75	4.10	59	1.17	0.65	0.57	0.46	0.31***
Asks for information	3.84	4.00	88	1.66	0.51	0.58	0.58	0.31***
Eliminated[c] (n = # of clips coded when item was eliminated)								
Explains reasons[c] ($n = 596$)	4.11	4.05	69	0.37	0.58			
Sequence of steps[c] ($n = 596$)	3.35	3.60	67	0.43	0.59			
Helps focus child's attention[b] ($n = 596$)	3.85	4.16	63	1.39	0.60			
Read books or tells stories[c] ($n = 596$)	4.55	4.32	77	0.84	0.85			
Set rules or boundries[b,c] ($n = 442$)	4.40	3.50	441	0.68	0.66			
Tells child how[b] ($n = 442$)	3.90	4.05	38	0.80	0.62			
Demonstrates something[b] ($n = 442$)	3.90	4.10	447	1.23	0.65			
Narrates what child is doing[a]	3.95	4.35						

Note. Items eliminated for following reasons: [a] content validity, [b] percent agreement, [c] variability, [d] scale reliability, [e] construct validity, [f] *N* for final item at top of table. For eliminated items, *n* at time of elimination is noted by item. Unit of analysis: [e] expert rater, [f] observation, [g] correlation with cognitive stimulation rating from Three Bag Assessment Coding Scales.

**$p \le .001$.

approximately 10 items per domain. Items were also rescreened for redundancy and eliminated or combined where possible. For instance, showing physical affection was combined with gentle positive touches. The first two columns of Tables 4-7 show the overall means for scores of father researchers and HS/EHS practitioner scores of item importance and ease of observation. Content validity for the *playfulness* item in the *affection* domain was not reported in Table 4, because this item was developed later by combining multiple items from the *playfulness* domain.

Overall, 19 items were eliminated, 10 from the *playfulness* domain (Table 8), resulting in 55 items selected for further testing (Appendix E, Table E1). Most of the PICCOLO items for mothers ranked among the highest in importance for fathers, with the exceptions of: *encourages child to handle objects, does things in a sequence of steps, talks about characteristics of objects*, and *asks child for information*. These items were retained because they had been important for mothers and had strong theoretical and empirical support. By domain, items in the *playfulness* domain averaged the lowest importance scores, with *encouragement* items second lowest.

Subgroup analyses of researcher and practitioner scores were conducted to further understand how differences in the perspectives of these two types of experts influenced average item scores. To compare practitioners and expert scores of *playfulness* items, *t* tests were used. The most statistically significant differences appeared to be for items in the *playfulness* domain, with practitioners scoring items higher on importance than researchers. Practitioners rated 10 of the items statistically significantly higher than researchers did (see Table 8). Because the measure was intended primarily for EHS/HS

Table 8

Father Researchers and Head Start Practitioner Playfulness Item Importance Scores

PICCOLO-D father behavior	Father researcher (*n* = 11)	Head Start practitioner (*n* = 9)
Engages in rough and tumble play [a]	3.45	4.44[*]
Laughs with child [a]	4.00	5.00[*]
Modifies intensity with child's response	4.45	4.00
Demonstrates novel ways to use objects [a]	3.82	4.33
Is on or below child's level [a]	3.64	4.33
Stimulates child with touch [a]	3.36	4.67[**]
Jokes or uses humor child enjoys [a]	3.55	4.33
Encourages climbing or balance [a]	3.80	4.00
Move child in space (e.g., tosses child) [a]	3.45	4.33
Encourages physical movement [a]	3.09	4.56[**]
Engages child in vigorous physical play [a]	3.45	4.00
Creates anticipation [a]	3.40	4.00
Makes child laugh	3.45	3.89
Teasing child enjoys	3.09	4.22[**]
Makes sound effects	3.09	3.89
Alternates exciting and quiet play	2.55	4.44[*]
Behaves unexpectedly as part of play	2.44	4.11[**]
Pretends the child is stronger, or winning	2.64	3.89[*]
Exaggerates behaviors [a]	2.82	3.67
Pretends gruffness or fighting	2.55	3.89[**]
Tickles child	2.36	4.00[**]
Physical play that restrains child (holding)	2.90	3.22

[a] Items were retained on final measure.

*p ≤ .05 t test.

**p ≤ .01 t test.

practitioners, who ranked these items higher, and because the empirical literature on father playfulness was scant, some playfulness items were retained for item testing despite lower overall mean scores.

Research Question 1b: Which were the best behavioral items in terms of interobserver reliability? Interobserver reliability was calculated as absolute percent agreement between pairs of observers scoring PICCOLO-D from a single-view pass in order to estimate how easy an item would be for home visiting practitioners to observe in a live observation. Observers used a 3-point rating scale (0, 1, 2) to score father behaviors: Absent (0), no behavior was observed; Barely (1), brief, minor, or emerging behavior was observed; and Clearly (2), definite, strong, or frequent behavior was observed. Absolute percent agreement was used rather than the Kappa statistic (Cohen, 1960) that corrects for chance agreement because the Kappa statistic provides less accurate estimates when prevalence of a trait is very high or very low resulting in underestimation of agreement (Gwet, 2002; Strijbos, Martens, Prins, & Jochems, 2006). During measurement development, interobserver agreement at the item level was used to consider specific items for the final PICCOLO-D measure. Eight items were eliminated due to poor interobserver agreement. The initial set point for retaining items for percent agreement was 70%. Some items below that level were retained in the final version, however, due to item contributions to scale reliability, construct, predictive validity, and practical utility.

Because item-scoring guidelines were refined and the number of items was reduced over the course of the project, a test of interobserver reliability for the final

PICCOLO-D measure with six newly trained observers was conducted on randomly selected observations at the end of the study. Results showing interobserver agreement for these observations on all items in the PICCOLO-D final measure have been presented in column three of Tables 4-7. The domain agreement reported in these tables is an average of the percent agreement for the final items in that domain. For these observations, absolute percent agreement across the full measure for the semistructured setting observations was .71.

Interobserver reliability after a single-view pass was also examined using domain difference scores and correlations between coders. Domain difference interobserver agreement within 2 points across 512 semistructured observations was 90% for the affection domain, 85% for the responsiveness domain, and 84% for the encouragement and teaching domains. The correlation between coders for full measure scores was $r = .69$, $p < .001$, for the affection domain was .77, $p < .001$, for the responsiveness domain was .61, $p < .001$, for encouragement .68, $p < .001$, and for teaching .70, $p < .001$.

Research Question 1c: Which were the best behavioral items in terms of variability? Variability is the degree that a behavior varies across individuals and indicates differences among them. Behaviors that almost all parents or almost no parents engage in have limited usefulness as a domain item (Bakeman & Gottman, 1987). Moderate variability was desired for an item to be retained, and items with limited variability were discarded. Items with a mean of approximately 1.0 and standard deviation of 0.50 to 0.75 were targeted. Means and standard deviations for PICCOLO-D domains and items calculated at the observation level have been reported in columns four

and five in Tables 4-7. Descriptive statistics for the PICCOLO-D full measure were not reported in these tables. For the full measure across all observations ($N = 629$), $M = 31.14$, $SD = 6.88$, with a minimum score of 5.50 and a maximum score of 42. Some items with a mean near 2 such as *warm tone of voice, smiles, paying attention, encouraging children to handle objects,* and *labeling objects or actions,* were retained because the measure was intended to be used as part of a strengths-based approach, and it was important that home visiting practitioners would be able to identify some strengths for all parents, even very low functioning parents. Additionally, because fathers were observed in play settings, high levels of positive behaviors were expected (Tamis-LeMonda et al., 2004).

Seventeen items were eliminated due to low frequency and poor variability. For instance, it was rare that children became upset and needed to be comforted, and most of the items in the *playfulness* domain occurred infrequently in the semistructured play setting. For some of the playfulness items, such a *rough and tumble play*, this was expected in the semistructured setting and was the reason for testing items in two observational settings. These items were further examined in regard to research question number four. But other items such as laughing, joking with the child, and exaggerating behaviors could occur in either setting. Thus, the research team discussed the possibility of combining these items into a single *playfulness* item, rather than a domain of several items. From this discussion and meetings with observers, a *playfulness* item was developed and tested, first in the encouragement domain, then in the *affection* domain due to stronger scale reliability with the *affection* domain.

Variability was examined at each child age. PICCOLO-D full measure scores averaged 31.92, *SD* = 6.78, at 14 months, 31.56, *SD* = 6.72, at 24 months, and 30.33, *SD* = 7.14, at 36 months. *Affection* domain scores averaged 8.11, *SD* = 1.72, at 14 months, 7.89, *SD* = 1.97, at 24 months, and 7.58, *SD* = 2.10, at 36 months. *Responsiveness* domain scores averaged 8.49, *SD* = 1.54, at 14 months, 7.89, *SD* = 1.97, at 24 months, and 7.58, *SD* = 2.10, at 36 months. *Encouragement* domain scores averaged 7.77, *SD* = 2.08, at 14 months, 7.49, *SD* = 2.09, at 24 months, and 7.21, *SD* = 2.12, at 36 months. *Teaching* domain scores averaged 7.55, *SD* = 2.08, at 14 months, 8.57, *SD* = 2.03, at 24 months, and 8.35, *SD* = 2.12, at 36 months.

Research question 1d and 1e: Which were the best behavioral items in terms of scale reliability and factor structure. Internal consistency refers to the degree of consistency among items measuring an underlying construct. To examine scale reliability, items were tested in relation to each other at the observation level, combining observations from all child ages, within the domains of *affection, responsiveness, encouragement,* and *teaching*. Scale reliability for each of these domains within each child age was also examined to understand changes in father behaviors as children's development progresses. Because the *playfulness* domain was eliminated in the semistructured play setting due to low frequency of occurrence, internal consistency estimates were not presented for that domain. Internal consistency within each domain was calculated using Cronbach's alpha and by testing a single factor structure within each domain, using confirmatory factor analysis.

Cronbach's alpha for each domain and the alpha if deleted for each item have

been reported in column six of Tables 4-7. At the observation level of analysis each

domain demonstrated adequate scale reliability at or near alpha = .70, except for the

teaching domain that was alpha = .64. When examining differences within each child

age, internal consistency for the *teaching* domain varied from alpha = .53 with 14-month-

old children when fathers engaged in the lowest levels of *teaching* behaviors (see results

for Research Question 1c), to alpha = .69 with 36-month-old children when fathers

engage in the highest levels of *teaching* behaviors. Scale reliability for the *responsiveness*

domain had alphas ranging from .67 with 14-month-old children and .80 with 36-month-

old children. For the *encouragement* domain alphas were between .74 -.76. The *affection*

domain scale reliability was alpha = .61 with 14-month-old children, alpha = .67 with 24-

month-old children, and alpha = .68 with 36-month-old children. Scale reliability alpha

for the full measure was over.89 across the three age groups.

Confirmatory factor analysis at the observation level (combining observations for

all child ages) was used to test for best fit between a single factor model of "positive

parenting," with all items loading on one factor, versus the four factor research model,

with items loading differentially on *affection, responsiveness, encouragement,* and

teaching. Conducting factor analysis at the observation level violates the assumption of

independence of observations that may result in a lower standard error. Thus, results

should be interpreted conservatively. MPlus version 5.2 software (Muthén & Muthén,

1998-2007) was used for the analysis. The chi-square test for the single factor model fit

with all items loading on one scale was $x^2 = 996.36$ (189). For the model with four

factors, the chi-square test for model fit was $x^2 = 922.21$ (183*)*. A test for incremental

model fit of the four-factor solution over the one-factor solution was computed as the

difference between these two chi-square values, also distributed as chi-square at $x^2 =$

12.35 (6), $p < .05$, indicating that the underlying factor structure for the four domains

hypothesized in the research model was a better fit with the data than a one-factor

solution.

Factor loadings for individual items have been reported in column seven of Tables

4-7. Factor loadings for all items were above recommended loadings of .40, with the

exception of smiling (.37) in the *affection* domain where the factor loading was just under

the cut off.

Research Question 1f: Which items were the best behavioral items in terms

of construct validity? Construct validity refers to the association of a measure with an

established measure of the same construct. The PICCOLO-D full measure, domain, and

item scores were tested at the observation level for construct validity with measures from

the EHSREP study, across the entire sample and within age groups. The semistructured

play observations used for this study were previously rated in the EHSREP study using a

different and more complex rating scale, the Three Bag Assessment Coding Scales

(Berlin et al., 2002). PICCOLO-D item and domain scores were compared with the

EHSREP scores for the same observations. The PICCOLO-D *affection* domain and items

were expected to have a positive correlation with the EHSREP rating of positive regard

(expressions of love and respect). The PICCOLO-D *responsiveness* domains and items

were expected to have a positive correlation with the EHSREP rating of sensitivity (child

focused, praise, encouragement, balances support, and exploration). The PICCOLO-D

teaching domain and items were expected to have a positive correlation with the

EHSREP rating of cognitive stimulation (efforts to bring child above current level in

perceptual, cognitive, and language development). There was no scale measuring a

construct that was defined similarly to the *encouragement* domain (although it was

expected to correlate positively with sensitivity), but conceptually this domain should

demonstrate the strongest negative correlations to the EHSREP rating of intrusiveness

(failure to acknowledge child's perspective, persisting in actions that do not interest child,

grabbing toys away from child, not allowing child to make choices).

Bivariate correlation coefficients for each domain and item score with respective

EHSREP ratings have been reported in column eight of Tables 4-7. All domain and item

scores demonstrated statistically significant moderate to strong correlations in the

intended direction with respective EHSREP ratings, with the exception of verbal

encouragement, in the encouragement domain. This item was not statistically

significantly correlated with intrusiveness, but was significantly correlated with all

positive EHSREP ratings.

Table 9 shows the bivariate correlations for all PICCOLO-D domains with all of

the Three Bag Assessment Coding Scales (Berlin et al., 2002). The *affection* domain was

most strongly associated with positive regard, *responsiveness* with sensitivity,

encouragement with intrusiveness, and *teaching* with cognitive stimulation.

Encouragement was also strongly positively correlated with sensitivity. This

pattern of correlations was similar across all age groups with the exception father

PICCOLO-D behaviors with 14-month-old children, for which the *teaching* domain

Table 9

Bivariate Correlations of all PICCOLO-D Domains with all EHSREP Ratings in the Semistructured Play Setting

Domain (*N* = 615)	Affection	Responsiveness	Encouragement	Teaching
Positive regard	0.58***	0.43***	0.49***	0.34***
Sensitivity	0.51***	0.45***	0.46***	0.35***
Cognitive stimulation	0.47***	0.41***	0.43***	0.49***
Intrusiveness	-0.11**	-0.11**	-0.15***	-0.12**

**p* ≤ .01.

****p* ≤ .001.

scores had no statistically significant correlation with sensitivity, and none of the

PICCOLO-D domains were statistically significantly negatively correlated with

intrusiveness.

Convergent and divergent construct validity were tested by examining

correlations between PICCOLO-D full measure scores and Three-Bag Assessment Scale

(Berlin et al., 2002) scores for supportiveness (combined positive regard, sensitivity, and

cognitive stimulation), and harsh controlling (combined negativity and intrusiveness).

Correlations were calculated using all observations, both across and within child ages.

The PICCOLO-D full measure score across all observations demonstrated strong

convergent construct validity with the supportiveness score $r = .61, p < .001$ ($N = 615$).

The PICCOLO-D full measure score across all observations had small negative

correlations with harsh control, $r = -.15, p < .001$ ($N = 615$). Convergent validity was

shown in correlations with the supportiveness score at 14 months, $r = .60, p < .001$ ($n = 84$), 24 months, $r = .66, p < .001$ ($n = 281$), and 36 months, $r = .59, p < .001$ ($n = 250$).

Correlations with the harsh controlling score, were not statistically significant at 14

months, but were significant at 24 months, $r = -.25$, $p < .001$ ($n = 289$), and at 36 months,

$r = -.22$, $p < .001$ ($n = 250$), but the effect size still remained small.

Bivariate correlations among the PICCOLO-D domains were examined at the

observation level, both across and within child age groups, to test if the domains where

highly correlated enough to indicate they could be measuring the same underlying

construct. PICCOLO-D domains had moderate to strong correlations with each other.

Research question 1g: Which items were the best behavioral items in terms

of predictive validity, for predicting child outcomes in cognitive, language, and

social-emotional domains? Predictive validity refers to the association of a measure

with outcomes that it should predict. PICCOLO-D father behavior full measure domain

and item scores were analyzed with extant EHSREP measures of children's language

cognitive and social-emotional outcomes. Child outcomes were measured when children

were 24-months-old, 36-months-old, and the summer before kindergarten (Pre-K).

Language outcomes were measured with the PPVT (Dunn & Dunn, 1997) when children

were 36 months and prekindergarten. Cognitive outcomes were measured with the MDI

(Bayley, 1993) when children were 24- and 36-months-old and with W-JAP (Woodcock,

& Johnson, 1989) at prekindergarten. Social-emotional outcomes were measured with the

BRS (Bayley, 1993) when children were 24- and 36-months-old, with the LER (Roid &

Miller, 1997) at prekindergarten, and with the fathers' reports on the CBCL (Achenbach

& Rescorla, 2000) at 36 months and prekindergarten.

Child outcome data were examined and outliers beyond three standard deviation

of the mean were removed. Eight cases were excluded. For the PPVT at prekindergarten

three cases were removed, one was a Latino American female, and the others were European American (one male, one female). For the LER at prekindergarten, two cases were removed; one was a European American male, the other an African American male. For the BRS at 36 months, one case was removed, an African American male. For the W-JAP at prekindergarten two cases were excluded, one Latino American male and one European American male. Descriptive statistics for each outcome for children observed at each father age of observation have been shown in Table 10. Potential covariates to be included in the partial correlation analyses for the PICCOLO-D full measure scores included child gender, and father ethnicity, age, level of education, residency, and relatedness (Table 11). Father age was the only covariate unrelated to child outcomes.

Final analysis of predictive validity for full measure scores were conducted using Pearson partial correlations to test whether PICCOLO-D scores were correlated with child outcomes when controlling for covariates. An a priori alpha level of .05 and correlation effect size of .15 were established for this analysis. Table 12 shows partial correlation coefficients with the PICCOLO-D full measure score and child outcomes, to estimate the predictive power of PICCOLO-D independent of other influences. For item selection, however, bivariate Pearson correlations were used to examine patterns in associations for item and domain scores with child outcomes without covariates because the goal was to select items based on whether more of a particular behavior predicted better outcomes, regardless of other influences. For this reason, a lower a priori alpha level of .10 and correlation effect size of .12 were used because it was expected that single items and domain scores would have weaker associations than full measure score.

Table 10

Descriptive Statistics for Child Outcomes by Time of Father Observation and Child Age at Outcome

Child outcome measure	Child age[a] outcome measured	Child age[b] at father observation	n	M	SD
PPVT	36	14	63	91.17	14.46
		24	227	86.05	14.95
		36	229	85.30	16.09
	Pre-K	14	67	100.39	16.02
		24	236	94.69	16.97
		36	224	94.94	16.57
MDI	24	14	78	98.72	13.66
		24	248	92.17	14.00
	36	14	62	96.61	12.88
		24	223	92.17	14.45
		36	228	92.47	14.53
W-JAP	Pre-K	14	66	98.92	14.29
		24	225	93.01	17.64
		36	221	92.90	16.59
BRS	24	14	76	8.27	1.10
		24	274	7.33	1.34
	36	14	66	8.73	1.08
		24	236	7.95	1.24
		36	239	7.97	1.22
LER	Pre-K	14	66	91.41	6.32
		24	227	92.00	7.18
		36	216	92.13	7.56
CBCL	36	14	69	19.06	9.37
		24	166	18.87	8.50
		36	219	18.94	8.35
	Pre-K	14	79	16.39	9.14
		24	163	16.12	10.08
		36	152	16.64	10.06

[a] 24- and 36-month measures taken within a month of child's 2nd and 3rd birthday, Pre-K measures taken summer before child entered kindergarten.

[b] Child age in months when father behavior observed.

Table 11

Child Outcome Correlations with Potential Covariates

Child outcome	Child age in months	African American[a]	European American[a]	Latino American[a]	Father biological resident[a]	Father level of education[b]	Father age[b]	Child is male[a]
PPVT	36	-0.29***	0.23***	0.07	0.11*	0.26***	0.09	-0.15**
	Pre-K	-0.36***	0.38***	-0.08	0.16**	0.35***	0.05	0.01
MDI	24	-0.23***	0.34***	-0.19***	0.18***	0.26***	-0.01	-0.12*
	36	-0.30***	0.37***	-0.14**	0.15**	0.36***	-0.03	-0.09
W-JAP	Pre-K	-0.28**	0.33**	-0.10	0.15**	0.29***	-0.02	-0.01
BRS	24	-0.18***	0.20***	-0.04	0.13**	0.25***	0.00	-0.11*
	36	-0.23**	0.22***	-0.01	0.24***	0.18***	-0.01	-0.19**
LER	Pre-K	0.14*	-0.15**	0.03	-0.00	0.06	0.05	-0.12*
CBCL	36	0.00	0.00	0.01	0.00	-0.08	-0.03	0.10
	Pre-K	-0.07	0.14*	-0.13	-0.03	-0.06	-0.07	0.03

[a] Dichotomous coded variables (e.g., 1= African American, 0 = not African American).
[b] Continuous variable = number of years of education.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

PICCOLO-D domain and item score bivariate correlation coefficients were organized by domain in Tables 13-16. Coefficients for the CBCL were not reported in the tables because only one was statistically significant: *follows child* at 14 months with the prekindergarten CBCL, $r = -.24$, $p < .05$ ($n = 78$).

The PICCOLO-D full measure score, at all three observation ages, predicted child outcomes, at all assessment ages, after controlling for relevant demographic covariates for each child outcome identified in Table 11 using partial correlations. All PICCOLO-D domains, both at 24 and 36 months, demonstrated consistent moderate positive bivariate correlations with child language, cognitive, and social-emotional outcomes through prekindergarten. At 14 months, when the number of cases was smallest, patterns of association with PICCOLO-D domain were somewhat weaker, with the strongest

Table 12

Full Measure Score Correlations With Child Outcomes

| | Child outcomes[a] | | | | | | | | | | | | | | | |
| Child age in months | 36 | | Pre-K | | 24 | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | |
	PPVT	*n*	PPVT	*n*	MDI	*n*	MDI	*n*	W-JAP	*n*	BRS	*n*	BRS	*n*	LER	*n*
14	0.32**	57	0.31**	58	0.02	71	0.05	55	0.17	60	0.12	69	0.15	59	0.16	62
24	0.28***	220	0.31***	229	0.21***	240	0.31***	215	0.30***	217	0.15**	266	0.08	227	0.24***	221
36	0.15*	222	0.15***	217			0.21***	220	0.07	213	0.15*		0.23***	239	0.15*	210

Note. Unit of analysis was case or family level.

[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

$^{\dagger} p \leq .10.$

$*p \leq .05.$

$**p \leq .01.$

$***p \leq .001.$

associations occurring with child language outcomes at 36 months and cognitive outcomes at prekindergarten.

In Tables 13-16 each domain and item could have up to 22 statistically significant coefficients with child outcomes. The best predicting items were *follows child, w*hich predicted 15 ($p < .05$) child outcomes, and *supports child choices,* which predicted 12 (*p* < .05) child outcomes. For both of these items, positive associations were observed for father behaviors with 14-, 24-, and 36-month-old children. An additional 8 items had positive associations with at least 10 ($p < .05$) child outcomes. These items were: *praise, responds to child's emotions, replies, encourages, supports child in doing things on their own, verbal encouragement, shows enthusiasm, repeats or expands, pretends,* and *characteristics of objects.* Items with the weakest associations were *smiles,* which was associated with only 3 ($p < .05$) child outcomes with 24-month-old children, and *suggestions to extend* with 24- and 36-month-old children, which was also associated with only 5 ($p < .05$) child outcomes.

Research question 2: How do PICCOLO-D scores differ between groups whose ethnicity is European American, African American, or Latino American? To compare PICCOLO-D father behaviors among ethnic groups, full measure scores, domain scores, and item scores were tested at the case level in a between-group ANCOVA, to control for potential confounds. To more fully understand how psychometric properties of PICCOLO-D father behaviors vary within ethnic group, scale reliability was conducted at the observation level, and predictive validity was conducted at the case level.

Table 13

Affection Domain and Item Correlations with Child Outcomes

		Child Outcomes[a]															
		36		Pre-K		24		36		Pre-K		24		36		Pre-K	
PICCOLO-D father behaviors	Child age in months	PPVT	n	PPVT	n	MDI	n	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
Affection domain	14	0.28*	62	0.15	66	0.02	77	0.14	61	0.23†	65	0.10	75	0.07	65	0.08	65
	24	0.30***	228	0.33***	237	0.26***	249	0.30***	224	0.32**	226	0.19**	275	0.21**	237	0.21**	228
	36	0.21***	229	0.16**	224			0.20**	228	0.09	221			0.19**	239	0.11†	216
Item																	
Warm voice	14	0.23†		0.20		0.13		0.16		0.22†		-0.03		0.10		0.19	
	24	0.22***		0.17**		0.10		0.14*		0.23***		0.13*		0.09		0.12†	
	36	0.18**		0.08				0.08		0.04				0.19**		0.02	
Smiles	14	0.13		0.03		-0.07		0.05		0.17		-0.01		-0.03		-0.03	
	24	0.12†		0.13*		0.07		0.13		0.16*		0.02		0.12		0.14*	
	36	0.03		-0.04				-0.01		0.00				0.04		0.08	
Praise	14	0.37**		0.22†		0.08		0.30*		0.15		0.28*		0.23		0.00	
	24	0.19**		0.25**		0.25***		0.23***		0.17*		0.11†		0.19†		0.07	
	36	0.15*		0.16**				0.15*		0.10				0.06		0.10	
Engaged	14	0.03		0.02		0.00		-0.02		0.08		0.00		-0.12		0.13	
	24	0.33***		0.33***		0.28***		0.28***		0.28***		0.26***		0.18**		0.26***	
	36	0.16*		0.20**				0.25***		0.09				0.23***		0.07	
Emotional warmth	14	0.11		0.05		-0.06		-0.11		0.19		-0.03		0.00		0.06	
	24	0.23***		0.23**		0.18**		0.26***		0.30***		0.14**		0.20**		0.14*	
	36	0.25***		0.16**				0.24***		0.07				0.16**		0.09	

Note. Unit of analysis was case or family level; number of cases at domain level per child age was same for each item.

[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

† $p \leq .10$. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

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Table 14

Responsiveness Domain and Item Correlations with Child Outcomes

		Child outcomes[a]															
		36		Pre-K		24		36		Pre-K		24		36		Pre-K	
PICCOLO-D father behaviors	Child age in months	PPVT	n	PPVT	n	MDI	n	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
Responsiveness domain	14	0.36**	62	0.15	66	0.10	77	0.18	61	0.24*	65	0.17	75	0.20	65	0.15	65
	24	0.34***	228	0.33***	237	0.26***	249	0.36***	224	0.35***	226	0.22***	275	0.23***	237	0.20**	228
	36	0.16*	229	0.24***	224			0.28***	228	0.14*	221			0.26***	239	0.08	216
Item																	
Attentive	14	0.01		-0.01		-0.04		-0.01		0.05		0.00		-0.03		0.17	
	24	0.21**		0.22***		0.17**		0.18**		0.20*		0.08		0.07		0.22†	
	36	0.16**		0.14*				0.25***		0.11†				0.20**		0.08	
Changes pace	14	0.15		0.16		0.06		0.13		0.08		0.08		0.06		0.02	
	24	0.25***		0.22***		0.17**		0.22***		0.27***		0.14*		0.16**		0.10	
	36	0.09		0.14*				0.18**		0.00				0.23***		0.07	
Follows	14	0.33**		0.07		0.13		0.13		0.21†		0.27*		0.28*		0.14	
	24	0.27***		0.26***		0.27***		0.33***		0.29**		0.19***		0.19**		0.25***	
	36	0.09		0.23***				0.23***		0.16*				0.21***		0.05	
Responds to emotions	14	0.39**		0.14		0.06		0.14		0.32**		0.13		0.20		0.05	
	24	0.23***		0.23***		0.14*		0.29***		0.28**		0.15**		0.18**		0.14*	
	36	0.13*		0.17**				0.21***		0.08				0.15*		0.04	
Replies	14	0.24*		0.09		0.06		0.15		0.06		0.06		0.11		0.14	
	24	0.35***		0.33***		0.22***		0.32***		0.26***		0.24***		0.24***		0.15*	
	36	0.16*		0.18**				0.19**		0.17**				0.23***		0.07	

Note. Unit of analysis was case or family level; number of cases at domain level per child age was same for each item.

[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

† $p \leq .10$. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 15

Encouragement Domain and Item Correlations with Child Outcomes

Child outcomes[a]

PICCOLO-D father behaviors	Child age in months	PPVT 36	n	PPVT Pre-K	n	MDI 24	n	MDI 36	n	W-JAP Pre-K	n	BRS 24	n	BRS 36	n	LER Pre-K	n
Encouragement domain	14	0.30*	62	0.14	66	0.08	77	0.11	61	0.15	65	0.13	75	0.16	65	0.11	65
	24	0.35***	228	0.34***	237	0.26***	249	0.33***	224	0.41***	226	0.14*	275	0.22***	237	0.12†	228
	36	0.20**	229	0.27***	224			0.26***	228	0.12†	221	0.15*	223	0.24***	239	0.06	216
Item																	
Handle toys	14	0.05		-0.10		0.03		-0.04		0.00		-0.01		-0.15		0.21†	
	24	0.18**		0.20**		0.18**		0.17**		0.18**		0.08		0.15*		0.12†	
	36	0.10		0.18**				0.11†		0.08				0.04		0.11	
Supports child's choice	14	0.37**		0.21		0.19†		0.18		0.05		0.09		0.33**		0.03	
	24	0.20**		0.24***		0.22***		0.25***		0.37**		0.11†		0.12†		0.06	
	36	0.14*		0.24***				0.27***		0.18**				0.25***		0.00	
On own	14	-0.04		-0.12		0.03		-0.06		0.03		0.12		0.07		0.15	
	24	0.24***		0.26***		0.15*		0.25**		0.28***		0.03		0.19**		0.10	
	36	0.15*		0.20**				0.18**		0.06				0.20**		0.00	
Verbal encouragement	14	0.26*		0.27*		-0.01		0.11		0.13		0.13		0.10		-0.01	
	24	0.31***		0.25***		0.16**		0.23***		0.25***		0.12*		0.16*		0.05	
	36	0.14*		0.20**				0.21***		0.06				0.14*		0.01	
Enthusiasm	14	0.35**		0.16		0.09		0.13		0.19		0.09		0.13		0.08	
	24	0.32***		0.28***		0.23***		0.30***		0.36***		0.15**		0.21**		0.11	
	36	0.17**		0.13†				0.14*		0.02				0.18**		0.12†	

Note. Unit of analysis was case or family level; number of cases at domain level per child age was same for each item.
[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

† $p \leq .10$. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 16

Teaching Domain and Item Correlations with Child Outcomes

| | | Child outcomes[a] | | | | | | | | | | | | | | |
| | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | |
PICCOLO-D father behaviors	Child age in months	PPVT	n	PPVT	n	MDI	n	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
Teaching domain	14	0.33**	62	0.27**	66	0.09	77	0.09	61	0.21†	65	0.15	75	0.09	65	0.15	65
	24	0.31***	228	0.35***	237	0.29***	249	0.41***	224	0.37***	226	0.27***	275	0.15*	237	0.22***	228
	36	0.18**	229	0.25**	224			0.21**	228	0.17*	221			0.17**	239	0.13†	216
Item																	
Suggests to extend	14	0.04		0.06		-0.06		-0.15		0.05		0.04		-0.14		-0.19	
	24	0.16*		0.22**		0.09		0.18**		0.14*		0.05		0.00		0.02	
	36	0.06		0.09				0.16**		0.00				0.07		-0.03	
Repeats or expands	14	0.27*		0.18		0.07		0.12		0.28*		-0.01		0.19		0.18	
	24	0.27***		0.38***		0.33***		0.36***		0.35*		0.26***		0.13*		0.18**	
	36	0.08		0.11†				0.14*		0.12†				0.13**		-0.02	
Labels	14	0.15		0.11		0.08		0.04		0.04		0.21†		0.00		0.08	
	24	0.15*		0.08		0.13*		0.12†		0.11		0.06		0.05		0.15*	
	36	0.03		0.07				-0.01		0.04				0.13*		0.14*	
Pretends	14	0.34**		0.40***		0.29**		0.25*		0.29*		0.26*		0.18		0.25*	
	24	0.09		0.11†		0.14*		0.24***		0.19**		0.16**		0.10		0.19**	
	36	0.07		0.13†				0.09		0.04				0.04		0.10	
Characteristics	14	0.22†		0.22†		0.00		0.09		0.17		0.05		0.08		0.11	
	24	0.22***		0.13*		0.11†		0.22***		0.18**		0.18**		0.10		0.09	
	36	0.20**		0.28***				0.19**		0.23**				0.12*		0.17**	
Asks for information	14	0.12		0.04		-0.13		-0.04		0.12		0.00		-0.04		0.09	
	24	0.26***		0.35***		0.21***		0.28***		0.34***		0.22***		0.16**		0.12†	
	36	0.23***		0.22**				0.17**		0.18**				0.17**		0.12†	

Note. Unit of analysis was case or family level; number of cases at domain level per child age was same for each item.
[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

† $p \le .10$. * $p \le .05$. ** $p \le .01$. *** $p \le .001$.

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Descriptive statistics for PICCOLO-D full measure score, domain scores, and item scores were examined within each of the three ethnic groups (Tables 17-21). Outliers that were more than three standard deviations below the full measure score mean were identified and excluded. There were two outliers at 24 months, one African American, and one Latino American.

Bivariate correlations with PICCOLO-D father behaviors and father ethnicity (dichotomous dummy coded variables [e.g., African American fathers = 1, other ethnicity = 0]) were used to detect simple differences (see Tables 22 and 23). These analyses were conducted at the case level when children were 24 months and 36 months old. The 14 month observations were excluded because all but two cases were European American. For the Latino group, the number of cases was much smaller than for the African American and European American groups. There were 44 Latino American cases at the 24-month observation and 23 cases at the 36-month observation.

Statistically significant simple differences were further tested using ANCOVA, controlling for covariates that also demonstrated statistically significant correlations with full measure, domain, or item scores. Covariates were father education (years of

Table 17

Descriptive Statistics for Full Measure Within Father Ethnicity Groups

	24 months			36 months		
Father ethnicity	*n*	*M*	*SD*	*n*	*M*	*SD*
African American	74	29.47	6.85	83	28.36	8.10
European American	170	32.17	6.11	148	31.40	6.40
Latino American	44	31.39	6.08	23	30.61	6.77

Table 18

Descriptive Statistics for Affection Domain and Items Within Father Ethnicity Groups

PICCOLO-D father behavior	Father ethnicity	24 months			36 months		
		n	*M*	*SD*	*n*	*M*	*SD*
Affection domain	African American	74	7.14	1.87	83	6.86	2.14
	European American	170	7.87	1.71	148	7.34	1.83
	Latino American	44	7.72	1.59	23	7.41	1.57
Items							
Warm tone	African American		1.61	0.58		1.69	0.53
	European American		1.87	0.33		1.80	0.44
	Latino American		1.88	0.33		1.80	0.49
Smiles	African American		1.36	0.56		1.21	0.68
	European American		1.23	0.65		1.21	0.68
	Latino American		1.36	0.56		1.39	0.52
Praise	African American		0.96	0.72		0.86	0.67
	European American		1.27	0.65		1.00	0.64
	Latino American		0.98	0.74		0.80	0.62
Engaged	African American		1.63	0.50		1.55	0.57
	European American		1.79	0.42		1.70	0.48
	Latino American		1.76	0.48		1.67	0.47
Emotional warmth	African American		1.57	0.51		1.55	0.61
	European American		1.72	0.50		1.63	0.51
	Latino American		1.74	0.46		1.74	0.45

Note. The *n* for domain for each ethnicity was the same for each item.

Table 19

Descriptive Statistics for Responsiveness Domain and Items Within Father Ethnicity Groups

PICCOLO-D father behavior	Father ethnicity	24 months			36 months		
		n	*M*	*SD*	*n*	*M*	*SD*
Responsiveness domain	African American	74	7.41	2.07	83	7.05	2.38
	European American	170	8.19	1.85	148	7.86	1.90
	Latino American	44	7.89	1.75	23	7.74	1.90
Items							
Attentive	African American		1.82	0.38		1.71	0.51
	European American		1.86	0.34		1.86	0.34
	Latino American		1.93	0.23		1.83	0.39
Changes pace	African American		1.20	0.66		1.17	0.73
	European American		1.45	0.62		1.34	0.61
	Latino American		1.31	0.55		1.41	0.60
Follows	African American		1.51	0.57		1.37	0.67
	European American		1.59	0.53		1.58	0.55
	Latino American		1.47	0.59		1.46	0.62
Responds to emotions	African American		1.33	0.58		1.20	0.72
	European American		1.59	0.56		1.37	0.60
	Latino American		1.40	0.66		1.35	0.65
Replies	African American		1.55	0.52		1.60	0.48
	European American		1.71	0.46		1.71	0.46
	Latino American		1.78	0.41		1.70	0.47

Note. The *n* for domain for each ethnicity was the same for each item.

Table 20

Descriptive Statistics for Encouragement Domain and Items Within Father Ethnicity Groups

PICCOLO-D father behaviors	Father ethnicity	24 months			36 months		
		n	*M*	*SD*	*n*	*M*	*SD*
Encouragement domain	African American	74	6.71	2.11	83	6.61	2.26
	European American	170	7.91	1.93	148	7.51	1.99
	Latino American	44	7.57	1.98	23	7.43	2.08
Items							
Handle toys	African American		1.79	0.40		1.80	0.39
	European American		1.87	0.36		1.84	0.37
	Latino American		1.86	0.33		1.85	0.35
Supports child's choice	African American		1.43	0.63		1.43	0.69
	European American		1.65	0.58		1.62	0.59
	Latino American		1.24	0.66		1.39	0.50
On own	African American		1.38	0.58		1.41	0.64
	European American		1.55	0.54		1.55	0.57
	Latino American		1.45	0.57		1.63	0.53
Verbal encouragement	African American		0.80	0.72		0.66	0.69
	European American		1.25	0.71		1.05	0.72
	Latino American		1.45	0.63		1.13	0.80
Enthusiasm	African American		1.30	0.62		1.31	0.67
	European American		1.59	0.52		1.44	0.57
	Latino American		1.56	0.55		1.43	0.66

Note. The *n* for domain for each ethnicity was the same for each item.

Table 21

Descriptive Statistics for Teaching Domain and Items Within Father Ethnicity Groups

PICCOLO-D father behaviors	Father ethnicity	24 months			36 months		
		n	*M*	*SD*	*n*	*M*	*SD*
Teaching domain	African American	74	8.21	1.94	83	7.84	2.47
	European American	170	8.93	1.91	148	8.69	1.79
	Latino American	44	8.22	2.11	23	8.02	2.35
Items							
Suggests to extend	African American		1.39	0.55		1.30	0.67
	European American		1.51	0.56		1.46	0.57
	Latino American		1.47	0.56		1.43	0.57
Repeats or expands	African American		1.32	0.56		1.29	0.60
	European American		1.54	0.59		1.45	0.55
	Latino American		1.43	0.55		1.35	0.49
Labels	African American		1.86	0.32		1.67	0.48
	European American		1.89	0.33		1.75	0.46
	Latino American		1.89	0.37		1.74	0.45
Characteristics	African American		0.89	0.76		0.84	0.72
	European American		0.97	0.79		0.90	0.75
	Latino American		0.94	0.78		0.78	0.81
Pretends	African American		1.17	0.62		1.22	0.59
	European American		1.24	0.63		1.39	0.60
	Latino American		0.81	0.68		0.93	0.68
Asks for information	African American		1.58	0.49		1.52	0.54
	European American		1.78	0.41		1.76	0.43
	Latino American		1.68	0.56		1.78	0.39

Note. The *n* for domain for each ethnicity was the same for each item.

Table 22

Bivariate Correlation Coefficients for PICCOLO-D, Domain, and Item Scores with Father Ethnicity and Covariates (24 Month)

PICCOLO-D father behaviors	African American[a]	European American[a]	Latino American[a]	Years of education[b]	Biological resident[a]	Spanish[a,c] Speaking
PICCOLO-D[a] Total	-0.21***	0.21***	-0.03	0.28***	0.12*	0.05
Affection domain	-0.18**	0.15*	0.01	0.22***	0.11	0.04
Warm tone	-0.26***	0.18**	0.07	0.06	0.16**	0.14*
Smiles	0.08	-0.11	0.05	0.13*	0.04	0.07
Praise	-0.16**	0.22***	-0.10	0.18**	0.05	-0.15*
Engaged	-0.15*	0.12*	0.02	0.15**	0.05	0.05
Emotional warmth	-0.14*	0.09	0.05	0.18**	0.07	0.09
Respond domain	-0.16**	0.16**	-0.01	0.21***	0.07	0.04
Attentive	-0.08	0.00	0.09	0.11	0.03	0.07
Changes pace	-0.15**	0.17**	-0.04	0.18**	0.07	-0.01
Follows	-0.04	0.08	-0.06	0.21***	0.06	0.07
Responds emotions	-0.16**	0.19***	-0.07	0.13*	0.03	-0.08
Replies	-0.15**	0.07	0.09	0.10	0.08	0.12*
Encourage domain	-0.24**	0.21**	0.00	0.29***	0.13*	0.07
Handle toys	-0.10	0.07	0.02	0.10	0.10	0.06
Supports choice	-0.09	0.23***	-0.20**	0.22***	0.06	-0.12*
On own	-0.12*	0.13*	-0.03	0.22***	0.11	0.06
Verbally encourage	-0.29***	0.14*	0.17**	0.21***	0.14*	0.19**
Enthusiasm	-0.22***	0.17**	0.03	0.24***	0.05	0.07
Teaching domain	-0.13*	0.18**	-0.09	0.23***	0.08	0.01
Suggests to extend	-0.09	0.08	-0.01	0.08	0.10	0.04
Repeats	-0.15**	0.15**	-0.03	0.17**	0.05	0.08
Labels	-0.03	0.03	0.00	0.05	-0.09	0.07
Pretends	-0.04	0.04	0.00	0.15*	0.09	0.03
Characteristics	0.01	0.16**	-0.22***	0.17**	-0.05	-0.20***
Asks for information	-0.17**	0.17**	-0.03	0.14*	0.15*	0.06

Note. N = 288 cases for all variables except years of education, which was 286.

[a] Dichotomous coded variables (e.g., 1= African American, 0 = not African American).

[b] Continuous variable indicating number of years of father education.

[c] Spoke Spanish during video observation .

*p ≤ .05. **p ≤ .01. ***p ≤ .001.*

Table 23

Bivariate Correlation Coefficients for PICCOLO-D, Domain, and Item Scores with Father Ethnicity and Covariates (36 Month)

PICCOLO-D father behaviors	African American[a]	European American[a]	Latino American[a]	Level of Education[b]	Biological Resident[a]	Spoke Speaking[a, b]
PICCOLO-D[a] total	-0.18**	0.16**	0.02	0.15*	0.06	0.01
Affection domain	-0.12	0.09	0.04	0.16*	0.03	0.04
Warm tone	-0.10	0.08	0.03	0.12	0.01	0.09
Smiles	-0.02	-0.03	0.08	-0.04	-0.08	0.11
Praise	-0.09	0.12	-0.06	0.23***	0.08	-0.12
Engaged	-0.13*	0.12	0.02	0.06	0.03	0.04
Emotional warmth	-0.08	0.04	0.07	0.17**	0.08	0.05
Responsiveness domain	-0.18**	0.16*	0.02	0.16*	0.05	0.00
Attentive	-0.17**	0.15*	0.01	0.09	0.04	0.03
Changes pace	-0.13*	0.09	0.06	0.12	0.10	-0.05
Follows	-0.15*	0.12*	-0.02	0.09	0.01	0.04
Responds to emotions	-0.12	0.10	0.02	0.22***	0.01	-0.05
Replies	-0.11	0.10	0.02	0.02	0.02	0.08
Encouragement domain	-0.20**	0.17**	0.03	0.12*	0.06	0.03
Handle toys	-0.05	0.04	0.01	0.03	0.03	0.02
Supports child's choice	-0.12*	0.16*	-0.07	0.16**	0.05	-0.08
On own	-0.12	0.07	0.06	0.09	0.05	0.04
Verbal encouragement	-0.26**	0.19**	0.08	0.03	0.06	0.11
Enthusiasm	-0.10	0.08	0.02	0.13*	0.03	-0.01
Teaching domain	-0.17**	0.19**	-0.05	0.09	0.05	-0.02
Suggests to extend	-0.12*	0.11	0.02	0.04	0.04	-0.01
Repeats or expands	-0.12*	0.13*	-0.02	0.03	0.04	-0.00
Labels	-0.08	0.07	0.01	-0.01	0.04	0.06
Pretends	-0.02	0.04	-0.04	0.06	-0.06	-0.04
Characteristics	-0.08	0.18**	-0.18**	0.12	0.07	-0.06
Asks for information	-0.24**	0.19**	0.07	0.07	0.08	0.03

Note. N = 254 cases for all variables except years of education, which was 253.

[a] Dichotomous coded variables (e.g., 1= African American, 0 = not African American).

[b] Continuous variable indicating number of years of father education.

[c] Spoke Spanish during video observation.

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.*

education completed), father relatedness and residency (biological resident or not), and
language spoken (Spanish spoken in observation or not; Table 23).

For all statistically significant ANCOVA results posthoc analyses mean-
difference comparison tests were conducted were conducted using Bonferrroni
correction. Tables 24 and 25 show statistically significant ANCOVA results with scores
11 differences were identified at 24 months and 9 at 36 months. At both ages a consistent
pattern was observed of African American fathers scoring lower than European American
and Latino American fathers.

Table 24

*ANCOVA Results for PICCOLO-D, Domain, and Item Scores Between Father Ethnicity
(24 Month)*

| PICCOLO-D father behaviors | *F* (2, 283) | η² | Ethnicity | | Mean difference | 95% *CI* | |
			Reference	Comparison		Lower bound	Upper bound
PICCOLO-D total	4.95**	0.03	African American	European American	-2.78**	-4.53	-1.03
Affection domain	3.84*	0.03	African American	European American	-0.62**	-1.10	-0.15
				Latino American	-0.68*	-1.33	-0.04
Warm voice	8.04***	0.05	African American	European American	-0.23***	-0.34	-0.09
Praise	4.80**	0.03	African American	European American	0.28**	-0.47	-0.10
Responsiveness domain	3.35*	0.02	African American	European American	-0.67*	-1.19	-0.15
Change pace	3.12*	0.02	African American	European American	-0.22*	-0.39	-0.05
Respond emotions	4.51**	0.03	African American	European American	-0.24**	-0.40	-0.08
Encouragement domain	6.62**	0.05	African American	European American	-0.98***	-1.53	-0.43
				Latino American	-1.01**	-1.76	-0.26
Support choices	4.39**	0.03	European American[a]	African American	0.18*	0.01	0.35
				Latino American	0.37**	0.07	0.66
Verbally encourage	4.03***	0.00	African American	European American	-0.38**	-0.62	-0.14
				Latino American	-0.51**	-0.95	-0.09
Enthusiasm	6.04**	0.00	African American	European American	-0.24**	-0.39	-0.09
				Latino American	-0.29**	-0.49	-0.08
Repeat and expand	2.96*	0.02	African American	European American	-0.20*	-0.35	-0.04

Note. A negative number in the mean difference column means that the reference group was lower than the comparison group.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 25

ANCOVA Results for PICCOLO-D, Domain, and Item Scores Between Father Ethnicity (36 Month)

PICCOLO-D father behavior	F (2, 250)	η^2	Ethnicity		Mean difference	95% *CI*	
			Reference	Comparison		Lower bound	Upper bound
PICCOLO total	3.76*	0.03	African American	European American	-2.63**	-4.58	-0.68
Responsiveness domain	3.13*	0.02	African American	European American	-0.69*	-1.26	-0.11
Attentive	3.65*	0.03	African American	European American	-0.15*	-0.26	-0.04
Follows	3.38*	0.03	African American	European American	-0.21**	-0.37	-0.05
Encouragement domain	4.01*	0.03	African American	European American	-0.79***	-1.37	-0.21
Verbally encourage	8.69***	0.07	African American	European American	-0.39**	-0.59	-0.19
Teaching domain	4.75*	0.04	African American	European American	-0.85**	-1.54	-0.16
Characteristics	6.38**	0.05	Latino American[a]	African American	-0.29*	-0.57	0.01
				European American	-0.45**	-0.72	-0.01
Ask for information	7.70**	0.06	African American	European American	-0.24**	-0.40	-0.09

Note. A negative number in the mean difference column means that the reference group is lower than the comparison group
* $p \leq .05.$ **$p \leq .01.$ ***$p \leq .001.$

Within each father ethnicity group, scale reliability was tested using Cronhbach's *alpha* to further understand whether the psychometric properties of PICCOLO-D varied by ethnic group. Results reported in Table 26 show an *alpha* > .85 for the full measure within each ethnic group, and the lowest scale reliability was observed for the teaching domain where *alpha* = .51 for European American fathers, but *alpha* > .70 for African American and Latino American fathers.

To more fully understand how ethnicity influenced PICCOLO-D, father behaviors' predictive validity was examined within African and European American ethnic groups. Predictive validity within the Latino American group was unable to be examined because of the small number of cases. There were fewer than 25 Latino-Father cases per analysis for the majority of child outcomes. PICCOLO-D full measure scores

Table 26

Within Ethnicity Cronbach's Alpha Scale Reliability for PICCOLO-D Full Measure and Domains with Alpha "If" Item Deleted for Each Item

PICCOLO-D father behavior	African American (*n* = 158)	European American (*n* = 318)	Latino American (*n* = 68)
PICCOLO-D total	0.91	0.88	0.90
Affection domain	0.71	0.67	0.67
Warm tone	0.64	0.61	0.56
Smiles	0.69	0.68	0.63
Praise	0.71	0.67	0.79
Engaged	0.67	0.62	0.58
Emotional warmth	0.57	0.53	0.53
Responsiveness domain	0.81	0.77	0.75
Attentive	0.77	0.75	0.74
Changes pace	0.78	0.72	0.68
Follows	0.73	0.70	0.64
Responds to emotions	0.79	0.71	0.73
Replies	0.81	0.76	0.70
Encouragement domain	0.76	0.73	0.77
Handle toys	0.73	0.73	0.75
Supports child's choice	0.72	0.65	0.71
On own	0.67	0.69	0.72
Verbal encouragement	0.78	0.72	0.75
Enthusiasm	0.60	0.63	0.69
Teaching domain	0.71	0.52	0.71
Suggests to extend	0.68	0.50	0.65
Repeats or expands	0.68	0.46	0.69
Labels	0.67	0.48	0.66
Pretends	0.66	0.43	0.69
Characteristics	0.68	0.49	0.65
Asks for information	0.66	0.47	0.66

Note. Analysis at the observation level.

for African American and European American fathers (at the case level) were examined

when children were 24 and 36 months. To best estimate predictive validity for the final

full measure Pearson partial correlations were used to control for within ethnicity

demographic covariates (child gender, father relatedness and residency, education, age)

that were statistically significantly correlated with child outcomes. Covariates for African

American child outcomes included father education for the PPVT, MDI, and BRS, father

age for the LER, child gender for the CBCL, and father residency for the MDI.

Covariates for European American child outcomes included father education for the

PPVT, MDI, and W-JAP, child gender for the PPVT, MDI, BRS, and LER, and father

residency and relatedness for the BRS and CBCL.

African American PICCOLO-D father behaviors with 24-month-old children

were positively associated with cognitive outcomes at 36 months (MDI), $r = .28$, $p < .05$,

$n = 56$, and prekindergarten (W-JAP) $r = .35$, $p < .05$, $n = 63$, and emotion regulation at

prekindergarten (LER), $r = .29$, $p < .05$, $n = 60$. African American PICCOLO-D father

behaviors with 36-month-old children were positively associated with concurrent

cognitive outcomes (MDI), $r = .33$, $p < .001$.

European American PICCOLO-D father behaviors with 24-month-old children

predicted children's language outcomes at 36 months (PPVT), $r = .33$, $p < .001$, $n = 130$,

and prekindergarten (PPVT), $r = .40$, $p < .001$, $n = 130$, children's cognitive outcomes at

24 months (MDI), $r = .30$, $p < .001$, $n = 149$, 36 months (MDI), $r = .33$, $p < .001$, $n =$

130, and prekindergarten (W-JAP) $r = .30$, $p < .001$, $n = 134$, and children's social-

emotional outcomes at 24 months (BRS), $r = .27$, $p < .001$, $n = 160$, 36 months (BRS), r

= .33, $p < .001$, $n = 136$, and prekindergarten (LER), $r = .23$, $p < .01$, $n = 130$.

Research question 3: How do PICCOLO-D scores differ between groups divided by child gender? To more fully understand how child gender may influence PICCOLO-D father behaviors and psychometric properties of the new measure, score variability, scale reliability, and predictive were examined within each gender group. Analysis of full measure, domain, and item score differences when groups were divided by child gender was conducted at the case level with observations when children were 14, 24, and 36 months. Within each child gender group, scale reliability was estimated at the observation level using all observations across all child ages. Two outliers were excluded at 24 months. Both were boys, one Latino American, the other African American.

Descriptive statistics were examined within each gender group (Table 27). Bivariate correlations for dichotomous dummy-coded variables for child gender (male = 1) with PICCOLO-D full measure score, domain scores, and item scores at each child age were used to determine statistically significant associations with gender (see Table 28). Statistically significant correlations were further tested using ANOVA, both for the full group and within father ethnicity (see Table 29). At 14 months, one item was statistically significant, and at 24 months seven items were statistically significant. For all statistically significant gender differences, the mean score was lower for boys than for girls.

When testing within ethnic group gender differences, bivariate correlations were examined with dichotomous dummy coded variables for each ethnicity (e.g., African American = 1, not African American = 0) and observed scores for the full measure, each domain, and items (Table 30). Again, statistically significant correlations were further

Table 27

Descriptive Statistics for Full Measure, Domain, and Item Scores Child Age by Gender

	14 months				24 months				36 months			
	Girls (*n* = 43)		Boys (*n* = 42)		Girls (*n* = 153)		Boys (*n* = 135)		Girls (*n* = 129)		Boys (*n* = 125)	
PICCOLO-D father behavior	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
PICCOLO-D total	32.02	5.73	31.83	7.65	32.64	6.17	30.83	6.65	30.64	7.00	30.02	7.30
Affection domain	8.13	1.54	8.11	1.91	7.84	1.77	7.46	1.73	7.28	1.92	7.10	1.93
Warm tone	1.93	0.26	1.90	0.37	1.79	0.45	1.81	0.39	1.76	0.49	1.76	0.46
Smiles	1.28	0.74	1.36	0.67	1.32	0.62	1.24	0.61	1.27	0.65	1.19	0.68
Praise	1.19	0.72	1.35	0.69	1.18	0.68	1.10	0.72	0.95	0.66	0.92	0.64
Engaged	1.85	0.40	1.71	0.59	1.80	0.43	1.67	0.47	1.67	0.49	1.63	0.53
Emotional warmth	1.88	0.31	1.79	0.47	1.74	0.47	1.62	0.52	1.63	0.53	1.60	0.55
Responsiveness domain	8.67	1.25	8.31	1.76	8.18	1.83	7.68	1.98	7.56	2.07	7.61	2.13
Attentive	1.95	0.21	1.90	0.28	1.90	0.30	1.82	0.37	1.81	0.40	1.81	0.43
Changes pace	1.56	0.52	1.46	0.64	1.41	0.61	1.32	0.65	1.27	0.67	1.31	0.64
Follows	1.81	0.38	1.62	0.52	1.60	0.55	1.49	0.55	1.48	0.61	1.51	0.59
Respond emotions	1.74	0.40	1.65	0.57	1.52	0.60	1.46	0.59	1.35	0.61	1.28	0.68
Replies	1.59	0.53	1.67	0.45	1.75	0.41	1.60	0.53	1.64	0.47	1.71	0.47
Encouragement domain	7.79	1.87	7.76	2.31	7.79	1.94	7.29	2.12	7.31	2.11	7.11	2.14
Handle toys	1.93	0.26	1.77	0.47	1.88	0.34	1.82	0.39	1.85	0.37	1.81	0.38
Supports choice	1.69	0.44	1.60	0.60	1.61	0.56	1.44	0.68	1.53	0.62	1.55	0.63
On own	1.55	0.58	1.55	0.60	1.54	0.53	1.44	0.58	1.52	0.59	1.50	0.60
Verbal encourage	1.19	0.82	1.30	0.77	1.20	0.71	1.13	0.76	0.98	0.74	0.89	0.74
Enthusiasm	1.44	0.62	1.55	0.59	1.57	0.53	1.44	0.59	1.44	0.60	1.36	0.64
Teaching domain	7.43	2.31	7.65	2.52	8.84	1.89	8.40	2.05	8.50	2.07	8.20	2.16
Suggests to extend	1.45	0.60	1.44	0.67	1.48	0.54	1.47	0.58	1.41	0.56	1.40	0.65
Repeats or expands	1.07	0.69	1.23	0.77	1.53	0.56	1.39	0.60	1.38	0.56	1.39	0.57
Labels	1.73	0.49	1.74	0.63	1.89	0.32	1.87	0.34	1.74	0.44	1.70	0.49
Pretends	0.85	0.73	0.87	0.76	1.03	0.78	0.85	0.77	0.91	0.76	0.82	0.72
Characteristics	0.87	0.58	0.93	0.71	1.18	0.66	1.13	0.64	1.35	0.63	1.23	0.60
Asks information	1.45	0.65	1.45	0.67	1.73	0.46	1.69	0.47	1.70	0.47	1.67	0.49

Table 28

Correlation Coefficients for Full Measure, Domain, and Item Scores with Child Gender [a]

PICCOLO-D father behavior	14 months (*n* = 85)	24 months (*n* = 288)	36 months (*n* = 254)
PICCOLO-D total	-0.01	-0.14*	-0.04
Affection domain	0.00	-0.11	-0.05
Warm tone	-0.04	0.02	0.00
Smiles	0.06	-0.07	-0.06
Praise	0.11	-0.06	-0.02
Engaged	-0.13	-0.14*	-0.03
Emotional warmth	-0.12	-0.12*	-0.03
Responsiveness domain	-0.12	-0.13*	0.01
Attentive	-0.10	-0.11	0.00
Changes pace	-0.09	-0.07	0.03
Follows	-0.21*	-0.11	0.02
Responds to emotions	-0.09	-0.06	-0.06
Replies	0.08	-0.16**	0.07
Encouragement domain	0.00	-0.13*	-0.05
Handle toys	-0.20	-0.07	-0.05
Supports child's choice	-0.09	-0.13*	0.02
On own	0.00	-0.08	-0.01
Verbal encouragement	0.07	-0.04	-0.06
Enthusiasm	0.09	-0.11	-0.07
Teaching domain	0.05	-0.11	-0.07
Suggests to extend	-0.01	-0.01	-0.01
Repeats or expands	0.11	-0.12*	0.00
Labels	0.00	-0.03	-0.05
Pretends	0.01	-0.11	-0.06
Characteristics	0.04	-0.04	-0.10
Asks for information	0.00	-0.05	-0.03

Note. Analysis at the case level.
[a] For child gender variable male = 1.
* $p < .05$. ** $p < .01$.

Table 29

*Between Gender[a] ANOVA Tests for Full Means, Domain,
and Items with Significant Differences*

PICCOLO-D father behavior	df	F	p
14-month			
Follows	1,83	3.96	.05
24-month			
PICCOLO-D total	1,287	5.78	.02
Engaged		5.73	.02
Emotional warmth		3.98	.05
Responsiveness domain		4.86	.03
Replies		7.11	.01
Encouragement domain		4.40	.04
Supports child's choice		5.23	.02
Repeats or expands		4.21	.04

Note. Analysis at case level.
[a] For all statistically significant gender differences, the mean score was lower for boys than for girls.

tested using ANOVA. There were no statistically significant child gender differences for African American fathers. For European American fathers the full measure means, and means for the two items at 24 months, *replies* and *repeats and expands*, were statistically significant (Table 31). For Latino American fathers, three items were also statistically significant at 24 months, *smiles, supports child choices,* and *pretends* (see Table 32). Again, for all significant gender differences scores were lower for boys than girls.

Scale reliability Cronbach's alpha estimates were used to examine PICCOLO-D domain internal consistency within gender groups. Results reported in Table 33 show alpha > .85 for the full measure for both males and females. Domain reliability alphas for *responsiveness* and *encouragement* ranged from .73 to .79. Lower reliabilities were observed for the *affection* domain, alpha = .69 with sons and alpha = .67 with daughters.

Table 30

Between Ethnicity [a] *Correlation Coefficients for Full Measure, Domain, and Item Scores with Child Gender*

PICCOLO-D father behavior	24 months			36 months		
	African American ($n = 74$)	European American ($n = 170$)	Latino American ($n = 44$)	African American ($n = 83$)	European American ($n = 148$)	Latino American ($n = 23$)
PICCOLO-D[ns] total	-0.08	-0.15*	-0.14	0.00	-0.03	-0.16
Affection domain	-0.01	-0.11	-0.20	0.00	-0.06	-0.14
Warm tone	0.09	0.02	0.07	0.02	-0.01	0.01
Smiles	0.02	-0.04	-0.37*	-0.06	-0.02	-0.45*
Praise	0.16	-0.12	-0.17	0.12	-0.11	0.08
Engaged	-0.23	-0.13	0.03	-0.02	-0.04	0.05
Emotional warmth	-0.17	-0.08	-0.08	-0.04	-0.01	-0.12
Responsiveness domain	0.00	-0.12	0.05	0.03	0.02	0.00
Attentive	-0.16	-0.07	-0.08	-0.01	-0.02	0.29
Changes pace	-0.07	-0.09	0.05	-0.03	0.12	-0.28
Follows[ns]	-0.30**	-0.07	0.08	0.12	0.01	-0.14
Responds to emotions	-0.13	-0.02	-0.06	-0.09	-0.05	0.07
Replies	-0.17	-0.20**	0.17	0.19	0.00	0.18
Encouragement domain	0.00	-0.13	-0.08	0.00	-0.04	-0.14
Handle toys	-0.08	-0.13	0.24	-0.08	-0.07	0.25
Supports child's choice	-0.06	-0.14	-0.31*	0.08	0.01	-0.02
On own	-0.15	-0.08	0.06	0.04	-0.05	0.14
Verbal encouragement	-0.01	-0.02	-0.02	-0.01	0.00	-0.47*
Enthusiasm	-0.03	-0.14	-0.08	-0.06	-0.06	-0.09
Teaching domain	0.01	-0.14	-0.20	-0.05	-0.03	-0.24
Suggests to extend	0.07	-0.01	-0.08	0.02	0.02	-0.26
Repeats or expands	-0.06	-0.17*	0.05	0.09	-0.05	0.09
Labels	0.04	-0.07	0.04	0.05	-0.07	-0.32
Pretends	0.06	-0.10	-0.44**	-0.09	-0.02	-0.24
Characteristics	-0.03	-0.04	-0.14	-0.20	-0.02	-0.15
Asks for information	-0.01	-0.07	0.01	-0.06	0.01	-0.04

Note. Analysis at case level.
[a] Dichotomous coded variables; e.g., 1= African American, 0 = not African American.
[ns] ANOVA test not significant.
* $p < .05$. ** $p < .01$.

Table 31

ANOVA Statistically Significant Differences for Child Gender[a] Within European American Ethnicity

PICCOLO-D father behaviors	df	F	p
24 month			
PICCOLO-D total	1, 168	4.08	0.04
Replies		6.87	0.01
Repeats or expands		5.35	0.02

Note. Analysis at the case level
[a] For all statistically significant gender differences the mean score was lower for boys than for girls.

Table 32

ANOVA Statistically Significant Differences for Child Gender[a] Within Latino American Ethnicity

PICCOLO-D father behaviors	df	F	p
24 month			
Smiles	1, 42	6.49	0.01
Supports child's choice		4.55	0.04
Pretends		9.80	0.00

Note. Analysis at the case level.
[a] For all statistically significant gender differences the mean score was lower for boys than for girls.

The *teaching* domain coefficients were the lowest with alpha = .65 with sons and alpha = .61 with daughters.

Predictive validity was examined for PICCOLO-D full measure scores of father behaviors with sons and daughters when children were 24, and 36 months old. Due to the small number of cases at 14 months, subgroup analysis at this child age was not conducted.

For predictive validity analyses, partial correlations were used to control for

Table 33

Between Child Gender Cronbach's Alpha Scale Reliability for PICCOLO-D Full Measure, and Domains with Alpha If Item Deleted for Each Item

PICCOLO-D father behavior	Female ($n = 324$)	Male ($n = 304$)
PICCOLO-D total	0.85	0.89
Affection domain	0.67	0.69
Warm tone	0.59	0.60
Smiles	0.66	0.71
Praise	0.70	0.68
Engaged	0.60	0.65
Emotional warmth	0.53	0.55
Responsiveness domain	0.77	0.79
Attentive	0.75	0.75
Changes pace	0.70	0.76
Follows	0.68	0.71
Responds to emotions	0.71	0.75
Replies	0.76	0.78
Encouragement domain	0.73	0.75
Handle toys	0.72	0.74
Supports child's choice	0.67	0.70
On own	0.67	0.70
Verbal encouragement	0.72	0.75
Enthusiasm	0.65	0.66
Teaching domain	0.61	0.65
Suggests to extend	0.60	0.62
Repeats or expands	0.56	0.61
Labels	0.57	0.61
Pretends	0.58	0.64
Characteristics	0.54	0.60
Asks for information	0.56	0.59

Note. Analysis at the observation level.

within-ethnicity demographic covariates (father ethnicity, relatedness and residency, education, age) that were statistically significantly correlated with child outcomes. Covariates for girls' and boys' outcomes included father ethnicity for all child outcomes except CBCL, father education for the PPVT, MDI, W-JAP, and BRS for boys, and father residency and relatedness with the PPVT, BRS, and CBCL, and with the MDI, W-JAP, and CBCL only for boys.

Higher levels of PICCOLO-D father behaviors with 24-month-old girls and boys predicted higher outcomes for both, but PICCOLO-D father behaviors with 36-month-old children predicted higher outcomes only for girls. When fathers engaged in more PICCOLO-D behaviors with 24-month-old daughters, daughters tended to have better receptive language development at 36 months (PPVT), $r = .23$, $p < .01$, $n = 113$, and prekindergarten (PPVT), $r = .30$, $p < .001$, $n = 119$; better cognitive outcomes at 24 months (MDI), $r = .30$, $p < .001$, $n = 119$, 36 months (MDI), $r = .25$, $p < .05$, $n = 116$, and prekindergarten (W-JAP), $r = .37$, $p < .001$, $n = 116$; and better emotion regulation outcomes at prekindergarten (LER), $r = .19$, $p < .05$, $n = 117$. Higher levels of PICCOLO-D father behaviors with 36-month-old girls were associated with higher receptive language scores at prekindergarten (PPVT), $r = .27$, $p < .01$, $n = 113$; better cognitive outcomes at 36 months (MDI), $r = .29$, $p < .01$, $n = 116$, and prekindergarten (W-JAP), $r = .18$, $p < .05$, $n = 113$; and better emotion regulation at 36 months (BRS), $r = .32$, $p < .05$, $n = 117$.

When fathers engaged in more positive PICCOLO-D behaviors with 24-month-old boys, boys tended to have higher language outcomes at 36 months (PPVT), $r = .33$, p

< .001, *n* = 130, and prekindergarten (PPVT); *r* = .40, *p* < .001, *n* = 130, cognitive

outcomes at 24 months (MDI), *r* = .30, *p* < .001, *n* = 149, 36 months (MDI), *r* = .33, *p* <

.001, *n* = 130, and prekindergarten (W-JAP) *r* = .30, *p* < .001, *n* = 134; and social-

emotional outcomes at 24 months (BRS), *r* = .27, *p* < .001, *n* = 160, 36 months (BRS), *r*

= .33, *p* < .001, *n* = 136, and prekindergarten (LER), *r* = .23, *p* < .01, *n* = 130.

Research question 4: How do PICCOLO-D scores differ between the

unstructured father-choice and semistructured play immediate settings? Analyses

for research question number four consisted of comparing PICCOLO-D father behaviors

in the 10-minute semistructured play setting with PICCOLO-D father behaviors in a 5-

minute unstructured father-choice setting at child ages 14, 24, and 36 months. Scores

from each setting were compared directly using bivariate correlations to examine stability

of the behavior of individual fathers across settings and paired *t* tests to examine setting

mean differences for the full measure, domain, and item scores. The number of

observations used for these analyses was slightly lower than for previous research

questions because there were technical difficulties in the father-choice setting (e.g., child

uncooperative, audio or video problems) with 15 of the father-choice video observations

that resulted in these observations being excluded.

Descriptive statistics, percent agreement, internal consistency for domain, and

item scores in the father-choice setting were calculated and examined at the observation

level (Table 34). Scale reliability estimates were calculated using Cronbach's *alpha* and

confirmatory factor analysis at the observation level and results should be interpreted

conservatively as the standard error may be smaller due to violating the assumption of

Table 34

Descriptive Statistics, Internal Consistency, and Factor Loadings for Domains and Items in Father-Choice Setting

PICCOLO-D father behavior	interobserver % agree[a]	*M*	*SD*	α if deleted	Factor loading
Affection domain	75	7.29	2.02	0.68	
Warm tone	81	1.78	0.47	0.64	0.69
Smiles	68	1.44	0.70	0.62	0.55
Praise	71	0.74	0.75	0.77	0.25
Engaged	79	1.70	0.52	0.62	0.78
Emotional warmth	76	1.62	0.57	0.58	0.78
Responsiveness domain	64	7.60	2.18	0.76	
Attentive	78	1.83	0.41	0.73	0.67
Changes pace	64	1.27	0.72	0.72	0.61
Follows	57	1.48	0.65	0.69	0.71
Responds to emotions	62	1.43	0.64	0.68	0.73
Replies	67	1.59	0.59	0.76	0.45
Encouragement domain	.67	6.39	2.49	0.72	
Handle toys	71	1.50	0.75	0.72	0.30
Supports child's choice	71	1.38	0.72	0.67	0.53
On own	64	1.24	0.71	0.61	0.54
Verbal encouragement	64	0.88	0.77	0.68	0.49
Enthusiasm	67	1.39	0.67	0.65	0.85
Teaching domain	70	5.28	2.40	0.62	
Suggests to extend	61	1.06	0.74	0.62	0.39
Repeats or expands	64	0.98	0.71	0.56	0.52
Labels	64	1.20	0.70	0.50	0.61
Pretends	84	0.30	0.62	0.65	0.17
Characteristics	74	0.53	0.66	0.55	0.55
Asks for information	73	1.20	0.72	0.54	0.57

Note. Unit of analysis was observation level. $N = 614$ for *M, SD,* and internal consistency.
[a] *N* for percent agreement is 117, method parallel to that used for semistructed setting.

independence of observations. The same method was used for the confirmatory factor analysis as previously reported for analysis of the semistructured setting observations. When testing for the best fit between a single-factor model of "positive parenting" with all items loading on one factor, versus the four-factor research model (*affection, responsiveness, encouragement,* and *teaching*), the chi-square test for the single-factor model fit with all items loading on one scale was $x^2 = 1778.47$ (209). For the model with four factors, the chi-square test for model fit was $x^2 = 1518.39$ (203*).

The chi-square difference test value between the two models was $x^2 = 86.70$, (3), *p* < .001, indicating that the underlying factor structure for the four domains hypothesized in research model were a better fit than a one-factor solution in the father-choice setting, as had been found for the semistructured setting.

Descriptive statistics and internal consistency for the *playfulness* domain in the 5-minute father-choice setting and 10-minute semistructured play setting were reported in Table 35. *Playfulness* items occurred more often in the father-choice setting, but almost all items still exhibited low variability. Only one item, *physically gets on child's level,* met the variability criteria of a mean score near 1 and a standard deviation 0.5 to 0.75. This item was further tested in the *responsiveness* domain but then eliminated due to poor factor loading of 0.17 in the father-choice setting and 0.31 in the semistructured play setting.

Differences in PICCOLO-D father behaviors between observational settings was tested for all item, domain, and full measure scores using paired *t* tests. Stability of father PICCOLO-D behaviors between observational settings was tested by examining the

Table 35

Descriptive and Internal Consistency for Playfulness Domain in Father-Choice and Semistructured Play Settings

PICCOLO-D father behaviors	Father-Choice (*n* = 345)			Semistructured (*n* = 378)		
	M	*SD*	α	*M*	*SD*	α
Playfulness domain	5.29	4.92	0.86	2.25	2.01	0.61
Rough and tumble	0.29	0.61	0.84	0.01	0.14	0.60
Laughs	0.81	0.80	0.85	0.56	0.67	0.61
Nonconventional	0.14	0.41	0.86	0.09	0.31	0.60
Physically on child's level	1.06	0.79	0.87	0.70	0.64	0.64
Stimulates with touch	0.65	0.81	0.84	0.27	0.49	0.59
Jokes and humor	0.34	0.56	0.85	0.21	0.45	0.50
Climb or balance	0.20	0.53	0.85	0.00	0.04	0.62
Move through space	0.31	0.64	0.84	0.01	0.14	0.60
Supports physical movement	0.40	0.68	0.85	0.01	0.08	0.61
Engages in physical play	0.38	0.68	0.86	0.01	0.09	0.62
Creates anticipation	0.36	0.60	0.84	0.12	0.29	0.56
Exaggerates behaviors	0.36	0.60	0.85	0.24	0.49	0.54

Note. Unit of analysis was observation level.

correlation between the behavior in the semistructured and father choice observational settings. Statistically significant paired *t* tests and correlations were reported at each child age in Tables 36-38. Setting differences were observed in the full measure scores, with fathers scoring lower in the father-choice setting than in the semistructured setting at all child ages. Fathers *smiled* more, *praised* less, were more *playful*, and scored lower on *teaching* domain behaviors in the father-choice setting at all child ages. With 24- and 36-month-old children, fathers scored lower on *encouragement* domain items in the father-choice setting. Moderate to strong bivariate correlations were observed for individual father full measure and domain scores between observational settings.

Predictive validity for PICCOLO-D in the father-choice setting was examined

Table 36

Observational Setting Comparison Correlation Coefficients and Statistically Significant t-*Test Results (14 Month)*

PICCOLOD father behaviors at child age 14 months ($n = 83$)	r	M difference[a]	SE M	t (df = 82)
PICCOLO-D total	0.55***	3.77	0.65	5.76***
Affection domain	0.53***			
Warm tone	0.54***			
Smiles	0.44***	-0.34	0.08	-4.48***
Praise	0.22*	0.57	0.10	5.95***
Engaged	0.18†			
Emotional warmth	0.53***			
Playfulness	0.36***	-0.43	0.10	-4.36***
Responsiveness domain	0.40***	0.41	0.20	2.03*
Attentive	0.37***			
Changes pace	0.18			
Follows	0.29**			
Responds to emotions	0.19**			
Replies	0.21*	0.27	0.08	3.38***
Encouragement domain	0.44***			
Handle toys	-0.11			
Supports child's choice	0.22*			
On own	0.11			
Verbal encouragement	0.24*			
Enthusiasm	0.57***			
Teaching domain	0.36***	3.00	0.27	11.02***
Suggests to extend	0.20†			
Repeats	0.21†	0.54	0.15	3.63***
Labels	0.11	0.83	0.13	6.48***
Pretends	0.12	0.64	0.15	4.29***
Characteristics	0.19†	0.56	0.12	4.52***
Asks for information	0.25*	0.55	0.12	4.70***

[a] Positive direction means score was higher for semistructured setting.
† $p \le .10.$ * $p \le .05.$ ** $p \le .01.$ *** $p \le .001.$

Table 37

Observational Setting Comparison Correlation Coefficients and Statistically Significant t*-Test Results (24 Month)*

PICCOLO-D father behaviors at child age 24 months (*n* = 281)	*r*	*M* difference[a]	*SE M*	*t* (*df* = 280)
PICCOLO-D total	0.44***	5.09	0.43	11.72***
Affection domain	0.43***	0.31	0.12	2.57*
Warm tone	0.25***			
Smiles	0.27***	-0.17	0.05	-3.69***
Praise	0.31***	0.37	0.05	7.31***
Engaged	0.22***			
Emotional warmth	0.22***			
Playfulness	0.27***	-0.17	0.05	-3.14**
Responsiveness domain	0.32***	0.34	0.14	2.39*
Attentive	0.19**			
Changes pace	0.08			
Follows	0.23***			
Responds to emotions	0.32***	0.09	0.04	2.12*
Replies	0.24***			
Encouragement domain	0.30***	1.28	0.16	8.00***
Handles toys	-0.02	0.35	0.05	6.88***
Supports child's choice	0.24***	0.19	0.05	3.83***
On own	0.18**	0.29	0.05	5.95***
Verbal encouragement	0.29***	0.31	0.05	5.83***
Enthusiasm	0.37***	0.14	0.04	3.39***
Teaching domain	0.36***	3.16	0.15	21.60***
Suggests to extend	0.18**	0.44	0.05	9.02***
Repeat to expand	0.35***	0.37	0.04	8.31***
Label	0.10	0.66	0.04	15.34***
Pretend	0.05	0.64	0.06	11.25***
Characteristics	0.12*	0.57	0.05	10.84***
Asks for information	0.26***	0.47	0.04	10.73***

[a] positive direction means score was higher for semistructured setting.
† *p* ≤ .10. * *p* ≤ .05. ** *p* ≤ .01. *** *p* ≤ .001.

Table 38

Observational Setting Comparison Correlation Coefficients and Statistically Significant t-*Test Results (36 Month)*

PICCOLO-D father behavior at child age 36 months ($n = 250$)	r	M difference[a]	$SE\ M$	t ($df = 249$)
PICCOLO-D total	0.51***	4.47	0.48	9.40***
Affection domain	0.50***			
Warm tone	0.45***			
Smiles	0.27***	-0.13	0.05	-2.44*
Praise	0.37***	0.23	0.05	4.51***
Engaged	0.22***			
Emotional warmth	0.40***			
Playfulness	0.19**	-0.18	0.06	-2.98**
Responsiveness domain	0.38***			
Attentive	0.21***			
Changes pace	0.12†			
Follows	0.26***			
Responds to emotions	0.37***			
Replies	0.17**			
Encouragement domain	0.37***	1.08	0.17	6.41***
Handles toys	0.09	0.35	0.05	6.88***
Supports child's choice	0.26***	0.19	0.05	3.83***
On own	0.10	0.29	0.05	5.95***
Verbal encouragement	0.26***	0.31	0.05	5.83***
Enthusiasm	0.40***	0.14	0.04	3.39***
Teaching domain	0.51***	4.47	0.48	9.40***
Suggests to extend	0.07	0.39	0.06	6.51***
Repeat to expand	0.19**	0.43	0.05	8.37***
Label	0.13*	0.50	0.05	9.85***
Pretend	0.12†	0.55	0.06	9.43***
Characteristics	0.22***	0.74	0.05	14.65***
Asks for information	0.28***	0.44	0.05	9.13***

[a] positive direction means score was higher for semistructured setting.
† $p \le .10$. * $p \le .05$. ** $p \le .01$. *** $p \le .001$.

using partial correlations for the full measure with the same covariates as were used for the semistructured play setting to estimate predictive validity while controlling for potential confounds. Bivariate correlations were used at the domain and item level. Tables 39-43 summarize these results. Full measure scores predicted child outcomes most strongly from father behaviors with 24-month-old children, predicting only language outcomes for 14 and 36 month PICCOLO-D scores in the father-choice setting.

In Tables 39-43, each domain and item could have up to 22 statistically significant coefficients with child outcomes. At all three ages, the best predicting items were *follows child,* which was positively associated with 10 ($p < .05$) child outcomes, and *enthusiasm* which was positively associated with 11($p < .05$) child outcomes. Two other items had positive associations with at least 10 ($p < .05$) child outcomes. These items were: *follows, replies.* Items with the weakest associations were *smiles* with 14-month-old children was associated with 1 ($p < .05$) child outcomes, and *pretends* with 36-month-old children was positively associated with 3 ($p < .05$) child outcomes.

In the father-choice setting, a pattern emerged of associations for PICCOLO-D behaviors at with lower child problem behavior scores (CBCL) that was more consistent than in the semistructured play setting, with many of the correlation coefficients trending towards statistical significance. Father ratings of child behavior problems (CBCL) were negatively correlated with several items and domains, but most of these correlations only approached statistical significance, and effect sizes were small. Father *praise* at 14 months, $r = -.26, p \le .05$, and 24 months $r = -14, p \le .10$, *engaged with child* at 14 months, $r = -.15, p \le .10$, *replies to child* at 14 months, $r = .14, p \le .10$, *encourages*

Table 39

Father-Choice Setting Full Measure Score with Child Outcomes

| | | Child outcomes[a] | | | | | | | | | | | | | | |
| | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | |
PICCOLO-D father behavior	Child age in months	PPVT	n	PPVT	n	MDI	n	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
PICCOLO-D	14	0.44***	56	0.02	59	0.08	70	0.14	54	0.21	58	0.16	68	0.14	58	0.18	61
	24	0.22***	213	0.19**	222	0.07	242	0.18**	208	0.25***	211	0.12†	267	0.24***	221	0.20**	217
	36	0.11	220	0.24***	220	0.10	206	0.10	216	0.09	186	0.03	220	0.03	227	0.08	208

Note. Unit of analysis was case or family level.

[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

† $p \leq .10$. *$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 40

Father-Choice Setting Affection Domain and Item Correlations with Child Outcomes

PICCOLO-D father behavior	Child age in months	36		Pre-K		24		36		Pre-K		24		36		Pre-K	
		PPVT	n	PPVT	n	MDI	N	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
Affection domain	14	0.46***	61	0.15	64	0.18	76	0.22†	60	0.31**	63	0.09	74	0.23†	64	0.25*	64
	24	0.25***	221	0.17**	230	0.08	242	0.22***	217	0.23***	219	0.17**	267	0.27***	230	0.12†	222
	36	0.15**	227	0.16**	220		206	0.14*	224	0.09	217		220	0.11†	235	0.06	213
Item																	
Warm voice	14	0.27*		0.17		0.08		0.19		0.21†		0.00		0.04		0.08	
	24	0.22***		0.12†		0.01		0.17**		0.14*		0.07		0.21**		0.01	
	36	0.13*		0.12†				0.15*		0.06				0.10		-0.03	
Smiles	14	0.28*		0.00		0.02		0.01		0.23†		0.05		0.16		-0.03	
	24	0.04		-0.03		-0.05		0.06		0.03		0.02		0.08		-0.02	
	36	0.09		0.01				0.03		0.00				0.07		0.09	
Praise	14	0.20		0.12		0.24*		0.21		0.15		0.09		0.17		0.40**	
	24	0.22***		0.22***		0.22***		0.18**		0.24***		0.24***		0.23***		0.24***	
	36	0.02		0.09				0.10		0.08				0.02		0.00	
Engaged	14	0.47***		0.16		0.14		0.18		0.29**		0.04		0.18		0.19	
	24	0.21**		0.17**		0.02		0.18**		0.18**		0.13*		0.20**		0.09	
	36	0.12		0.16*				0.16*		0.12†				0.06		0.05	
Emotional warmth	14	0.39**		0.11		0.10		0.17		0.22†		0.08		0.17		0.15	
	24	0.20**		0.10		0.05		0.17*		0.21**		0.10†		0.23***		0.06	
	36	0.18**		0.16*				0.06		0.06				0.13*		0.07	
Playful	14	0.23†		0.06		-0.05		-0.12		0.07		0.14		0.15		-0.01	
	24	0.06		-0.01		-0.03		0.08		0.03		-0.04		-0.06		-0.03	
	36	0.12†		0.04				0.00		-0.06				0.01		0.03	

Note. Unit of analysis was case or family level. Number of cases provided at the family level. Number of cases provided at the domain level was the same for each corresponding child age for all items.
[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).
† $p \leq .10$. *$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 41

Father-Choice Setting Responsiveness Domain and Item Correlations with Child Outcomes

		Child outcomes[a]															
		36		Pre-K		24		36		Pre-K		24		36		Pre-K	
PICCOLO-D father behavior	Child age in months	PPVT	n	PPVT	n	MDI	N	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
Responsiveness domain	14	0.45***	61	0.08	64	0.03	76	0.07	60	0.20	63	0.15	74	0.11	64	0.03	64
	24	0.24***	221	0.22***	230	0.13*	242	0.23***	217	0.26***	219	0.18**	267	0.28***	230	0.11	222
	36	0.16*	227	0.29***	220		206	0.21**	224	0.16*	217		220	0.05	235	0.04	213
Item																	
Attentive	14	0.42**		0.21		0.10		0.22†		0.33**		0.01		0.23†		0.13	
	24	0.16*		0.17**		0.01		0.05		0.15*		0.10		0.20**		0.03	
	36	0.08		0.13*				0.13*		0.12†				0.01		-0.06	
Changes pace	14	0.47***		0.01		0.03		0.05		0.08		0.22		0.14		0.07	
	24	0.08		0.11†		0.01		0.15*		0.16*		0.04		0.14*		0.09	
	36	0.16*		0.24**				0.16*		0.12†				0.00		0.02	
Follows	14	0.23†		-0.06		0.04		0.01		0.16		0.13		0.09		0.03	
	24	0.28***		0.22***		0.22***		0.24***		0.27***		0.22***		0.29***		0.19**	
	36	0.10		0.19**				0.15*		0.11				0.02		0.05	
Responds to emotions	14	0.27*		0.05		-0.01		-0.06		0.10		0.10		0.11		0.00	
	24	0.20**		0.10		0.05		0.19**		0.15*		0.11†		0.20**		0.03	
	36	0.13†		0.24**				0.13†		0.06				0.10		0.01	
Replies	14	0.29*		0.14		-0.03		0.09		0.14		0.05		-0.06		-0.05	
	24	0.16*		0.20**		0.15*		0.16*		0.22***		0.18**		0.19**		0.03	
	36	0.10		0.22***				0.19**		0.16*				0.06		0.11	

Note. Unit of analysis was case or family level. Number of cases provided at the domain level was the same for each corresponding child age for all items.

[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

† $p \leq .10$. *$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 42

Father-Choice Setting Encouragement Domain and Item Correlations with Child Outcomes

| | | Child outcomes[a] | | | | | | | | | | | | | | | |
| | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | |
PICCOLO-D father behavior	Child age in months	PPVT	n	PPVT	n	MDI	n	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
Encouragement domain	14	0.32*	61	-0.01	64	0.11	76	0.18	60	0.15	63	0.05	74	0.16	64	.19	64
	24	0.27***	221	0.22***	230	0.10	242	0.25***	217	.027***	219	0.12*	267	0.27***	230	0.18**	222
	36	0.11†	227	0.26***	220		206	0.16*	224	0.14*	217		220	0.02	235	0.03	213
Item																	
Handle toys	14	0.27*		0.05		0.08		0.19		0.05		0.07		0.14		0.01	
	24	0.04		0.01		-0.03		0.01		0.06		0.00		0.06		0.06	
	36	-0.02		0.13*				0.06		0.04				-0.03		-0.06	
Supports child's choice	14	0.23†		0.03		0.07		0.20		0.06		-0.02		0.04		0.10	
	24	0.25***		0.20**		0.09		0.25***		.027***		0.05		0.20**		0.12†	
	36	0.13†		0.27**				0.17**		0.19**				0.06		-0.05	
On own	14	0.07		-0.07		-0.08		0.08		-0.02		-0.07		0.03		0.12	
	24	0.18**		0.18**		0.10		0.22**		0.20**		0.11		0.20**		0.13†	
	36	0.08		0.19**				0.06		0.16*				0.00		0.03	
Verbal encourage	14	0.25†		-0.09		0.16		0.10		0.19		0.06		0.19		0.15	
	24	0.26**		0.20**		0.11†		0.21**		0.17*		0.13*		0.21***		0.18**	
	36	0.07		0.13†				0.12†		0.03				0.01		0.07	
Enthusiasm	14	0.35**		0.09		0.17		0.14		0.22†		0.17		0.18		0.27*	
	24	0.16*		0.14*		0.09		0.15*		0.21**		0.12*		0.24***		0.12†	
	36	0.14*		0.16*				0.16*		0.07				0.05		0.11	

Note. Unit of analysis was case or family level. Number of cases provided at the domain level was the same for each corresponding child age for all items

[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

$p \leq .10$. *$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 43

Father-Choice Setting Teaching Domain and Item Correlations with Child Outcomes

| | | Child outcomes[a] | | | | | | | | | | | | | | | |
| | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | | 24 | | 36 | | Pre-K | |
PICCOLO-D father behavior	Child age in months	PPVT	n	PPVT	n	MDI	n	MDI	n	W-JAP	n	BRS	n	BRS	n	LER	n
Teaching domain	14	0.23†	61	0.11	64	0.15	76	0.26*	60	0.23†	63	0.21†	74	0.06	64	0.17	64
	24	0.24**	221	0.33**	230	0.20**	242	0.26**	217	0.34**	219	0.19**	267	0.20**	230	0.14*	222
	36	0.20**	227	0.35**	220		206	0.22**	224	0.23**	217		220	0.10	235	0.03	213
Item																	
Suggests to extend	14	0.32*		0.05		0.16		0.31*		0.05		0.13		0.15		0.10	
	24	0.11†		0.12		0.01		0.10		0.15*		0.06		0.16*		0.13	
	36	0.08		0.24***				0.13		0.15*				0.04		-0.06	
Repeats or expands	14	0.25*		0.24†		0.17		0.30*		0.25*		0.11		0.08		0.10	
	24	0.22***		0.29***		0.22***		0.20**		0.24***		0.21***		0.17**		0.08	
	36	0.10		0.12				0.11		0.11				-0.04		-0.02	
Labels	14	0.07		0.10		0.03		0.17		0.24		0.04		-0.08		0.16	
	24	0.04		0.11		0.10		0.14*		0.16*		0.08		0.09		0.05	
	36	0.18**		0.31***				0.17**		0.22***				0.15*		-0.03	
Pretends	14	0.18		0.06		0.13		0.11		0.17		0.21†		0.14		0.10	
	24	0.08		0.04		0.03		0.09		0.08		0.05		-0.08		0.01	
	36	0.15*		0.20**				0.09		0.06				0.13*		0.08	
Characteristic	14	-0.17		-0.15		-0.03		-0.04		-0.02		-0.03		-0.17		-0.05	
	24	0.19**		0.29***		0.18**		0.18**		0.23**		0.08		0.11†		0.07	
	36	0.17**		0.22***				0.18**		0.17**				0.06		0.08	
Asks for information	14	0.05		0.02		0.01		0.01		0.06		0.24*		0.03		0.12	
	24	0.16*		0.23***		0.13*		0.17*		0.25***		0.14*		0.21**		0.10	
	36	0.09		0.17**				0.15*		0.13†				0.04		0.08	

Note. Unit of analysis was case or family level. Number of cases provided at the domain level was the same for each corresponding child age for all items

[a] Child Behavior Checklist (CBCL), Mental Development Index (MDI), Woodcock Johnson Psycho-Educational Test Battery-Revised (W-JAP), Behavior Rating Scales (BRS), Leiter-Revised Examiner Rating Scale (LER), Peabody Picture Vocabulary Test-III (PPVT-III).

† $p \leq .10$. *$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

handling toys at 14 months, $r = -.23$, $p \leq .10$, *verbally encourages efforts* at 14 months, $r = -.28$, $p \leq .10$, and 36 months, $r = -.11$, $p \leq .10$, *suggestions to extend play* at 14 months, $r = -.24$, $p \leq. 05$, *repeats and expands* at 14 months, $r = -.21$, $p \leq .10$, and the *teaching* domain at 14 months, $r = -.27$, $p \leq .05$, and 24 months, $r = -.13$, $p \leq .10$.

Summary

Items for the final measure were selected based on content validity, interobserver agreement, scale reliability, construct validity, predictive validity, and practical utility for practitioners. Evaluation of content validity scores from expert father researchers and EHS/HS practitioners resulted in elimination of 22 items, 10 from the *playfulness* domain. The majority of the remaining 28 items were eliminated primarily due to low interobserver agreement, frequency, and/or variability. Only three items were eliminated primarily due to poor scale reliability. All remaining *playfulness* domain items were eliminated due to low frequency and variability. Some *playfulness* behaviors were combined into a single *playfulness item* and eventually eliminated due to low scale reliability. Twenty-one items were selected for the final measure: five items in the *affection, responsiveness, encouragement* domains, and six items in the *teaching* domain. Some items such as smiles were retained due to strong face validity and practical utility.

Comparisons by ethnicity showed African American fathers scoring lower than European American fathers on the total measure score at 24 and 36 months. There were fewer and less consistent differences for Latino American fathers, who scored higher than African American fathers on *affection* and *encouragemen*t. Within-group Cronbach's

alpha scale reliability estimates demonstrated that internal consistency for the *teaching* domain was highest for the African American and Latino American fathers. Scores for a few PICCOLO-D father behaviors were lower with boys than girls but only for European American and Latino American fathers.

In the father-choice setting, compared with the semistructured play setting, Observational setting comparisons showed differences in PICCOLO-D father behaviors. In the father-choice setting fathers were more *playful* and *smiled more*. In the semistructured setting fathers engaged in more *encouragement* and *teaching* behaviors. Full measure and domain scores demonstrated moderate to strong consistency between observational settings for the full measure score at 24 months but weaker correlations for individual items, and full measure score for father behaviors with 14- and 24-month-old children.

CHAPTER V

DISCUSSION

The goal of this study was to develop an observational measure of positive father-child interaction that predicted child outcomes and would be useful for practitioners, such as home visitors, who work with parents of young children. Although observational parenting measures have been developed for practitioners to use with mothers (Baggett & Carta, 2006; Bradley & Caldwell, 1988; Roggman et al., 2009), a practical observational measure of father behaviors was needed because fathers make important contributions to the development of children. Intervention programs aiming to increase family support of children's development need a practical, but psychometrically strong, observational measure of fathers' positive parenting interaction with their children.

The PICCOLO-D observational measure of positive father behaviors that support child development was developed with extant video observations of over 400 ethnically diverse, low-income fathers with children at ages 14, 24, and 36 months. The PICCOLO-D full measure and separate *affection, responsiveness, encouragement,* and *teaching* domains all demonstrated good reliability and convergent validity across the full sample; and predictive validity with children's language, cognitive, and social emotional outcomes into prekindergarten. Its psychometric strengths suggest that it is a reliable and valid measure of father's developmentally supportive behaviors with their infants and toddlers. In addition to measurement development, contextual and observational setting factors that influence fathers' interaction with children and the associations of these interactions with children's later development were also examined.

Was Playfulness Important?

The research model predicted that many father behaviors important for child development would be similar to those of mothers, but that some behaviors, particularly playful behaviors not currently on the measure for mothers, would be a characteristic of father-child interaction that was important for child outcomes. The *playfulness* domain behaviors, however, were eliminated because they rarely occurred in the observational settings used for this study. A single *playfulness* item was developed by combining several items from the *playfulness* domain, and tested in the *affection* domain because the items were correlated with other items in that domain. This *playfulness* item occurred more frequently than any of the single items in the *playfulness* domain, especially in the father-choice observational setting when fathers could choose to do whatever they wanted. However, *playfulness* behaviors did not predict child outcomes in the father-choice setting. This may be because in the father-choice setting playfulness was more likely to occur during rough and tumble play and a recent study found rough and tumble play to be negatively associated with child outcomes when fathers did not set limits to regulate the play (Flanders et al., 2010). This suggests that although rough and tumble play may be one context that fathers are playful in, the contribution of father playfulness may be moderated by other qualities of father-child interaction such as limit setting.

Further analysis of the *playfulness* item in the father-choice setting will be needed to more fully understand associations between playfulness and rough and tumble play. Examining playfulness in other observational settings, such as naturalistic observations of caregiving tasks (e.g., Belsky, Hsieh, & Crnic, 1998) like bathing or preparing meals and

feeding children, could be used to further examine playfulness as a style of parent

interaction that occurs across domains, rather than a specific parenting domain or item. It

may also be that participant reactivity limited fathers' expression of more naturalistic

playful behaviors across both settings, but that reactivity would also limit the usefulness

of observations of playfulness to practitioners or researchers trying to identify parenting

strengths that support children's early development.

All items identified on the PICCOLO-D measure for fathers were also included in

the PICCOLO measure for mothers. This does not mean that all the behaviors necessarily

"looked" the same with fathers and mothers. Some behaviors tended to have different

qualities with fathers and mothers. For instance, for the item warm tone of voice,

observers with experience observing mothers and fathers reported that fathers' used less

high-pitched tones. There were also items on the PICCOLO measure for mothers that

were eliminated from PICCOLO-D due to low frequency and variability. Lower

frequency of some behaviors by fathers may have been due to the smaller more selective

nature of the sample, compared with the sample of over 2,000 mothers used to develop

the original PICCOLO measure (Roggman et al., 2009).

Were Affection, Responsiveness, Encouragement, and Teaching Important?

PICCOLO-D father behaviors in the *affection, responsiveness, encouragement,*

and *teaching* domains predicted child outcomes in multiple developmental areas. This

provides support for the research model that was grounded in a view of parenting that

supports children's development through interconnected developmental systems. The closely related nature of these systems would suggest that parenting behaviors supporting each would be highly correlated. Indeed other researchers have conceptualized key contributions of father-child interaction as being both "sensitive and challenging" and thereby supporting both attachment and exploration systems simultaneously (Grossman & Kassubeck, 1999). Low divergent validity correlations with the encouragement domain and intrusiveness may suggest that fathers' encouragement of children may be intrusive in some ways. Parenting that encourages exploration and teaches language and ideas may be somewhat intrusiveness. For instance, fathers may encourage children to *handle toys* by describing the toy and tickling the child with the toy to spark interest. Similar to the findings of other authors, we found *encouragement* and *teaching* domain scores predicted not only cognitive and language outcomes (Rowe et al., 2004) but also social-emotional outcomes (Grossman et al., 2002).

Affectionate and responsive parenting behaviors, by fathers in this study, and fathers and mothers in other studies, have predicted not only social-emotional outcomes (Brown, McBride, Shin, & Bost, 2007), but also cognitive and language outcomes (Black et al., 1999; Fagan & Iglesias, 1999). As shown in the research model (McDonald, 1992), findings from this study provided support for *affection* and *responsiveness* domains as separate constructs. Compared with the responsiveness domain, the affection domain had stronger positive correlation with the extant parenting measure of positive regard and stronger correlations between father choice and semistructured observational settings (Table 36) indicating greater stability across observational settings.

Context of Father Parenting

Examination of contextual effects on PICCOLO-D father behaviors found effects for father ethnicity, child gender, and immediate context. For father ethnicity most differences were between African American and European American fathers, with Latino American fathers tending to be more similar to European American fathers. Fewer differences for Latino American fathers may be influenced by the lower sample size. African American fathers tended to score lower than European American fathers on the full measure at the 24- and 36-month observations and lower than European American and Latino American fathers on *affection* and *encouragement* domain scores at the 24-month observation. These differences between African American and European American fathers were similar to findings noted in the *affection* domain logic model by Bronte-Tinkew and colleagues (2006) and Hofferth (2003), that African American fathers showed less affectionate behaviors towards children.

Father residency and level of education were potential confounds for these comparative father ethnicity differences. In this sample a larger proportion of African American fathers were nonresident fathers, compared with European American and Latino American fathers. Being a biological resident father was positively associated with the full measure PICCOLO-D score and the *encouragement* domain scores, with 24-month-old children (Table 22). Residency and biological relatedness of father may influence father-child interaction. Fewer shared experiences with children may make it more challenging for fathers to attune interactions to children's developmental level. Other authors, using this extant data, have reported that being a biological resident father

was positively correlated to having higher levels of education, and higher levels of education were positively correlated with lower intrusiveness when children were 24 months and with higher sensitivity when children were 24 and 36 months (Tamis-LeMonda et al., 2004). Although we controlled for biological relatedness and residency of father at the time of father observations, other potential covariates, including stability of residency, group variations in geographic location and level of education. Many items in the *teaching* domain were language items. Contextual influences associated with father ethnicity such as geographic location and level of education may contribute to differences in parent's language use with children (Hart & Risley, 1995). In this sample European American fathers were represented at nearly all the geographic sites participating in the study. Conversely, African American and Latino American fathers tended to cluster in specific sites.

There may also be greater within ethnic group diversity in level of education for European American fathers. Fathers with children qualifying for EHS may be low-income for a wide variety of reasons. European American fathers may be more likely than African American and Latino American fathers to be low income because they were post-secondary students (Knapp, Kelly-Reid, & Ginder, 2011). In a study of racial and ethnic differences in nonresident father involvement with adolescents, the differences in the association between level of education and father involvement was larger for European American fathers than for ethnic minorities. More highly educated European American fathers tend to talk to children more frequently (King, Harris, & Heard, 2004). Further examination of internal consistency in the *teaching* domain for the European

American father group may provide a better understanding of how within-group variations in factors such as level of education and geographic location may influence verbal and non-verbal father teaching behaviors.

The logic models predicted that fathers' would be more affectionate and responsiveness with girls than boys (Feldman & Klein, 2003; Harper & Fine, 2006). Fathers in this study tended to engage in PICCOLO-D behaviors, across all domains, more with girls than with boys. At the 24-month observation, fathers with daughters, compared with those with sons, were more *encouraging, engaged, emotionally warm, responsive,* and *replied to* and *repeated or expanded* more child vocalizations. Similar differences have been well documented in the empirical literature. Fathers with sons, compared with fathers of daughters, have demonstrated more gender specific expectations, more directive behaviors (e.g., Lamb, 1977; Lovas, 2005; MacDonald & Parke, 1986), and less sensitive behaviors (Kelley et al., 1998). There were also within father ethnicity child gender differences for European American and Latino American fathers, with fathers engaging in more positive behaviors with girls. There were no within ethnicity child gender differences for African American fathers. Within ethnicity child gender differences may reflect more traditional sex roles in European American and Latino American families, and more equalitarian roles in African American families (Hoffereth, 2003).

Setting of Father-Child Observations

Examining influences of observational setting, particularly the father-choice

setting, was a unique contribution this study makes to what is known about observing early father-child interaction. The father-choice observational setting from the EHSREP study has not been previously examined. Despite the wider variations in the types of activities fathers chose to do and shorter time period of the father-choice setting, compared with the semistructured setting also used to measure mothers' parenting behaviors, the PICCOLO-D measure demonstrated similar though somewhat weaker psychometric properties in the father-choice setting. The fact that fathers *smiled at children* more and were more *playful* in the father-choice observational setting across all child ages suggested the value of observations in similar settings, perhaps for longer periods of time, to inform our knowledge of fathers.

Observers noted that in the father-choice setting, when fathers were more playful with children, they tended to engage in fewer communicative behaviors and more physical or rough and tumble play. Fathers tended to display playful behaviors such as exaggerating behaviors and animating their voice when engaging in *pretend* play with children and playful fathers usually scored highly on the item *shows emotional warmth*. Future directions for understanding father play with children would be to examine the associations among *playfulness, warmth*, and *pretend* play.

There were also psychometric differences in PICCOLO-D between observational settings. For instance, the item *encourages child to handle toys* displayed much weaker psychometric properties in the father-choice setting. Perhaps this was because no toys or other objects were involved when father chose activities like physical and rough and tumble play, or singing and dancing. Lower frequency of the behaviors in the father-

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choice setting, then, does not necessarily mean the behavior was not typical for a

particular father, but that it was not typical for the activity he chose to do in this setting.

Another example was that the item *physically close* had lower variability with fathers

than mothers in the semistructured setting, with almost all fathers scoring a 2. This was

because the protocol for the semistructured setting, originally designed for observations

of mothers, required fathers to sit on a small blanket with children. Because most fathers

tended to have taller and bigger physical builds than mothers, they were usually very

physically close to the child if they were on the blanket.

Such differences may provide a partial explanation for why percent agreement

was lower for PICCOLO-D items than for the original PICCOLO items for mothers

(Roggman et al., 2009). Observer agreement may have also been influenced by scoring

behaviors in the two different observational settings, which were randomly assigned to

observers to prevent order effects, while the PICCOLO measure for mothers was based

on scoring behaviors only in the semistructured observation setting. Scoring behaviors in

two settings that were different lengths of time and settings may have been more

challenging for observers to develop and maintain consistent coding strategies.

Practical Implications

By using PICCOLO-D to observe fathers' interactions with their infants and

young children, practitioners who work with families can strengthen parenting supports

for children's development. Similar to the findings of Grossman and colleagues (2002),

fathers' positive interaction behaviors with 24-month-old children had strong and

consistent associations with positive child outcomes, supporting the importance of fathers in scaffolding development of the exploration system early in children's development (Bowlby, 1988). This suggests that supporting positive early father parenting behaviors offers an important avenue for promoting early development in young children at-risk for later school failure.

The overlap in prediction of PICCOLO-D domains to multiple aspects of children's development is good news for practitioners, suggesting that if a parent was strong in one domain of parenting, those strengths could be encouraged and developed in ways that were meaningful for the parent and yet supported multiple child development outcomes. Employing a "parenting-focused" model that puts "the parent and child in interaction with each other" has been thought to promote parents' improved awareness of their positive parenting behaviors, to increase parents' knowledge of child development, and to improve parents' ability to take an active role in supporting child development (Roggman et al., 2008, p. 7). For instance, to support parents in planning meaningful ways to capitalize on their strengths and promote developmentally supportive parenting, home visitors may identify a parent's strength, such as teaching and talking to their children, and then bridge this strength to other areas by asking parents questions such as, "How could you verbally express affection?"

For infant-toddler programs aiming to increase the involvement of fathers in program services, the goal has generally been to improve child outcomes by engaging fathers in positive interactions with their children. To do this, programs must identify the parenting strengths and needs of fathers and evaluate the effectiveness of intervention by

measuring parenting. As part of a multimeasure approach to program evaluation, PICCOLO-D can provide programs with crucial data needed to fully understand the consequences of intervention services for fathers, tailor improvement strategies, and demonstrate changes in both parent and child outcomes over time in relation to program services (Cabrera et al., 1999; McBride & Lutz, 2004).

When PICCOLO-D is used for program evaluation a standardized observational setting will be important for detecting sensitivity to intervention over time (Aspland & Gardner, 2003). For supporting father involvement in home visits, however, it may be useful to use a more flexible observational setting. That PICCOLO-D positive parenting behaviors could be observed in the father-choice setting and predicted child outcomes suggests that this setting could provide a more relaxed atmosphere as a beginning point for engaging fathers in positive interactions with children in a context of activities meaningful for the parenting-child dyad.

Knowledge gained from qualitative comments from observers about father behaviors and findings from examining PICCOLO-D father behaviors between settings may inform field use of the measure. Several of the observers who had also observed mothers noted employing different strategies when observing behaviors by fathers. For example, the item *warm tone of voice* had slightly lower percent agreement when observed with fathers than has been reported for the PICCOLO measure with mothers (Cook & Roggman, 2008). Qualitative comments from observers indicated that fathers less frequently used higher pitched tones of voice with children, than did mothers. For fathers, coders listened more for "interest" and "enjoyment." Another unanticipated

aspect of observing fathers was that when fathers had facial hair or wore hats, *smiles* were more difficult to observe.

Limitations

Data Source

There were several aspects of the sample that present limitations for generalizing findings to other populations. Although this sample was ethnically diverse, it was not nationally representative and was unbalanced at child ages and in geographic locations. A larger proportion of the sample was African American when children were 36 months, than 24 months. European American fathers were represented at all geographic locations, whereas, the majority of African American and Latino American fathers were represented in only a few of the geographic locations. This may have limited the amount of within ethnicity variability. Fathers were contacted based on mothers providing identifying information, and mothers may have been less likely to provide information for fathers when relationships with fathers were not positive. Thus, selection bias is likely, with fathers in this sample tending to be more stable and to have higher levels of education than a nationally representative sample (Tamis-LeMonda et al., 2004). Additionally, the video recorded observations for this study were collected from 1998-2000, and recent sociocultural and economic changes could preclude this sample from being representative of current fathering expectations. Conclusions from between-group comparisons with this sample should be drawn with care due to sample limitations and unequal group sizes in the sample.

Observational Settings

Items selected were necessarily limited to behaviors that could be observed in the two settings used for this study. Each setting introduced time, space, and material limitations. The instructions for the two settings were quite different, with the semistructured setting beginning with instructions to use the bags of toys in numerical order, dividing the 10 minutes how they chose, and the father-choice setting beginning with instructions to do something they had done before with the child. These instructions may have made the setting differences more complex than simply the amount of choice or flexibility offered.

The father-choice setting with only 5 minutes may have reduced the variety of within-individual behaviors observed, while encouraging a wider variety of between-individual behaviors. Additionally, order of "tasks" in the data collection procedures may have influenced father engagement in playful behaviors in the father choice setting. The order of observational settings at 24 months was first a teaching task with stringing beads, then the father-choice setting, and last the semistructured setting. When the teaching task was first, some of the 24-month-old children became so interested in stringing beads that they were not willing participate in another activity for the father-choice activity. The order of observational setting at 36 months was first, the father-choice setting, then the teaching task, and last the semistructured setting. When the father-choice activity was first, some father-child dyads had difficulty deciding on what to do, with some children exhibiting "stage fright" reactivity, which limited child participation. This also could have reduced the observation of playfulness items or items

about fathers' responses to children's initiations.

Observers

Due to funding constraints, observers for this study were primarily undergraduate psychology and family studies students of European American ethnicity working for course credit. Many observers had little or no prior experience observing parenting or working with parents and worked on the project less than 6 hours per week. These factors may have influenced the amount of training time, resulting in lower single-view pass percent agreement estimates. Also, differences by father ethnicity or child gender could indicate observer bias that could have been prevented with more observational experience. Observers were, however, carefully trained and closely monitored, and an observer of African American ethnicity was employed throughout the project.

Measures

Selection of items was influenced by the extant measures used for construct and predictive validity. The Three Bag Assessment Coding Scales were originally developed for use with mothers that may have perpetuated the "mother template" paradigm when selecting items based on their construct validity correlations. The child outcome measures used to test predictive validity were limited to measures available in the extant data, and not all available child outcomes were used. The possibility remains that some items such as *playfulness* may be related to other child outcomes such as child exploration or to later child outcomes after children were in school.

Analysis

Construct validity and factor analysis were performed at the observation level. All available observations were included in the analyses, resulting in about half the cases being represented more than once. This violates the assumption of independence of observations, which may result in smaller standard error estimates and artificially low probability values. Additionally, the analyses necessary to test individual items, domain, and full measure scores at multiple child ages required conducting a large number of statistical tests, increasing the likelihood of Type I errors due to chance associations within this particular sample. Further analysis could compensate for this by employing multilevel factor analysis to adjust for the longitudinal nature of the data in factor analysis and reducing cutoff probability values by half ($p < .025$) to adjust for conducting a large number of statistical tests.

Measurement Bias

Further analysis will be needed to refine psychometric properties. Between-group differences in PICCOLO-D suggest that further analysis of differential item functioning will be necessary for discriminating true differences from systematic error related to measure bias (DeVellis, 2003). Although the four-factor model we tested for confirmatory analysis was a better fit than the one-factor model, further analysis of the data using inductive approaches such as exploratory factor analysis, for the total sample and each ethnicity group, may provide additional models that fit the data better and demonstrate stronger psychometric properties (DeVellis, 2003). Using a purely exploratory inductive data-driven approach to data analysis may illuminate alternative

conceptualizations of father-child relationships that provide additional pathways for theory development regarding fathers' direct engagement of children (Lamb et al., 1985). For instance, an implicit assumption in the research model was that the observable parenting behaviors supporting child development within each domain could be affective, verbal, or behavioral. In the *encouragement* domain, the item *showing enthusiasm* was affective, the item *verbal encouragement* was verbal, and the item *support child in doing things on his or her own* was behavioral. An alternative model for items on PICCOLO-D could be three domains *parents' positive affect, verbal affirmations*, and *supportive behaviors*.

Future Directions

Future directions include further analyses of these data to clarify several questions that arise in relation to both the psychometric properties of the PICCCOLO-D measure and the contextual and setting influences on fathers' parenting behaviors in relation to children's outcomes. Further examination of other dynamic influences on father-child relationships such as family conflict (Minuchin, 1985; Pancsofar, Vernon-Feagans, Odom, & Roe, 2008), coparenting relationships (Feinberg, Brown, & Kan, 2012), child evocative effects (Belsky, 1984), and complementary influences of mothers' and fathers' parenting behaviors (Cabrera et al., 2007; Kwon, Jeon, Lewsader, & Elicker, in press) on more diverse child outcomes would inform what was known about potential moderators and mediators for fathers' early influence on child outcomes. Field testing the measure was valuable for establishing ecological validity (Campell & Stanley, 1969) to ensure

usefulness and further develop strength-based approaches for working with fathers. Examining psychometric properties with other cultures, ethnicities, and younger and older children would improve external validity and could inform potential sources of bias and further refinements.

Conclusion

Early positive father-child interaction is important for child development. Based on strong evidence of reliability, validity, 21 observable behavioral indictors were selected for the PICCOLO-D measure. A variety of positive father behaviors in the *affection, responsiveness, encouragement,* and *teaching* domains predicted child development outcomes. Behaviors in the *playfulness* domain, however, did not. Although some fathers engaged in physical, and rough and tumble play with their young children, this type of play did not predict outcomes. Fathers in this study engaged in many positive behaviors with their young children, teaching and talking to children (Duursma, Pan, & Raikes, 2011; Summers et al., 2006), fostering exploration (Grossman et al., 2002), showing tenderness, and enjoyment (Black et al., 1999), and these behaviors predicted child outcomes. These kinds of father behaviors tended to be strongest when observed in Latino American and European American fathers interacting with their daughters. Variations in father behaviors may reflect the meaning and purpose of fathers' interactions with their young children in relation to culture and context (Bronte-Tinkew et al., 2006). Among all groups, however, all PICCOLO-D domains predicted positive social-emotional and cognitive-language competencies, suggesting that increases in any

of the PICCOLO-D domains could provide improved support for children's early development. Programs seeking to promote child development by facilitating positive relationships between children and all their caregivers, including fathers, need psychometrically strong observational measures of parenting that supports child development and capitalizes on parenting strengths. PICCOLO-D will meet this need.

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APPENDICES

Appendix A

Description of PICCOLO Measure

Description of PICCOLO Measure

PICCOLO
Parenting Interactions with Children:
Checklist of Observations Linked to Outcomes
Utah State University

Investigators: Lori Roggman & Mark Innocenti
Key Research Personnel: Gina Cook, Vonda Jump, Katie Christiansen, Cora Price, & Jim Akers

GRANT PROGRAM

The Administration for Children and Families (ACF), Office of Planning, Research and Evaluation (OPRE) awarded eight grants in September 2004 for the Head Start-University Partnerships: Measurement Development projects. These three-year grants supported the development of measures for assessment of Early Head Start and Head Start low-income children and families. Projects focused on a range of important developmental, academic, social-emotional and health and safety domains, and many projects included culturally and linguistically diverse children and families. Each project also developed training procedures to heighten the quality of implementation and function within the Head Start or Early Head Start settings.

WHAT IS PICCOLO?

PICCOLO stands for Parenting Interactions with Children: Checklist of Observations Linked to Outcomes. PICCOLO is an observational measure of positive parenting interactions with very young children, ages 1, 2, and 3 years if age. These parenting behaviors predict children's outcomes that are part of later school readiness, including their cognitive, language, and social development.

PICCOLO measures important dimensions of parenting interactions that promote children's development. These dimensions include:

• **Affection:** Warmth, physical closeness, and positive expressions toward child.

• **Responsiveness:** Responding to child's cues, emotions, words, interests, and behaviors
• **Encouragement:** Active support of play, exploration, curiosity, initiative, skills and creativity.
• **Teaching:** Shared conversation and play, cognitive stimulation, explanations, and questions.

PICCOLO is an easy-to-learn, easy-to-use observational measure of parenting that provides a valuable addition to the outcome measures used in infant-toddler/early childhood programs such as Early Head Start. For programs that focus on parenting and use a strengths-based approach, a practical measure of parenting is an essential tool. Programs can use PICCOLO to assess parenting behaviors, to guide interventions with families, and to track program outcomes.

PICCOLO **1**

PICCOLO was designed to have several characteristics that programs told us they wanted in a measure of parenting.

PICCOLO is research-based, detailed, culturally relevant, positive, useful, versatile, and sensible. There is evidence for its validity and reliability.

• **Research-Based**: PICCOLO was developed from almost 5,000 videotaped parenting interactions from around 2,000 families.
• **Validity Evidence**: PICCOLO items predict good child development outcomes, including cognitive development, vocabulary, and social behavior.
• **Reliability Evidence**: Independent observers (watching parent child interactions separately) rate PICCOLO items similarly.
• **Detailed**: The PICCOLO measurement form includes detailed coding guidelines. These guidelines provide detailed definitions of every coded parenting behavior item.
• **Culturally Relevant**: PICCOLO items were developed from observations of European-American, Latino, and African-American families. A large portion of these families were Early Head Start participants.
• **Positive**: All PICCOLO items are positive to help guide strengths-based interventions.
• **Useful**: PICCOLO helps practitioners identify parenting strengths they can encourage parents to do more and gaps they can help parents fill.
• **Versatile**: PICCOLO observations can be done live or from video, in homes or centers.
• **Sensible**: PICCOLO makes sense to practitioners who have used it. It is easy to learn and use with families in their programs.

MEASUREMENT DEVELOPMENT

To develop PICCOLO, parenting behaviors were defined in easily observable terms and tested by new observers viewing an archive of almost 5,000 video clips of parenting interactions with children at ages 14 months, 24 months, and 36 months. These video-clips are from around 2,000 families. The library of videotaped observations included families from European-American (44%), African-American (35%), and Latino groups (21%). Most of the families were low-income and their videotapes were collected when they were enrolled in the research sample of the national Early Head Start Research and Evaluation Project. Other families participated in other local research studies that involved videotaping observations of parenting interactions. For reliability analyses, at least 3 observers rated the parenting interactions on each video clip; for validity analyses, at least 1 observer rated each video clip.

To assess construct validity, we wanted to see if parent-child PICCOLO ratings were associated to other parenting measures. In other words, would parents who scored high on some PICCOLO dimension, score as expected on other parenting measures (e.g., Was a high PICCOLO Affection score more likely to occur with a family that scored high on other measures of close, warm relationships?). The PICCOLO observations were analyzed in relation to previously measured abstract dimensions of parent-child interactions. To assess predictive validity, we wanted to see if the PICCOLO scores were associated with children's developmental outcomes (e.g., Do PICCOLO scores at 12 months predict children's school readiness?). PICCOLO ratings were analyzed in relation to children's developmental outcomes. To assess practical validity, PICCOLO items were evaluated by practitioners from three infant-toddler programs.

PICCOLO 2

New observers tested the reduced list of potential items by rating the behaviors observed in video clips from the archive. The new observers received basic information and training comparable to what a new practitioner would receive in an infant-toddler/early childhood program. For th data used to select the final set of items, at least 3 observers rated the PICCOLO items on 10-minute video observations of parent-child interaction.

A final set of items was selected for PICCOLO based on multiple criteria: inter-rater reliability, scale reliability, construct validity, predictive validity, individual variability, inter-correlations between items, and qualitative feedback from raters and program partners. Internal consistency and single factor structure were examined for each domain within each cultural group. Final validity analyses were based on ratings by at least one observer on clips of parenting interactions representing European-American, African-America, and Latino-American families.

The development of PICCOLO was enriched by our collaboration with practitioners working with parents of infants, toddlers, and young children. Practitioners tried out early versions of the PICCOLO items and provided feedback about the clarity and importance of each item. Practitioners also provided extensive feedback about ways to use PICCOLO effectively with parents on home visits and ways to use PICCOLO as a guide for intervention activities with families in home visiting programs.

Training materials have been developed and tested with new practitioners who attended a workshop designed to test training materials related to several related projects. Team observations and feedback from participants guided the development of text and video materials that describe PICCOLO, provide guidelines about how to use the measure with families, and also include suggestions for how to use the data PICCOLO provides.

HOW CAN THE MEASURE BE USED IN HS/EHS PROGRAMS?

Example questions and scores from PICCOLO: Each of the 4 PICCOLO domains includes 7-8 items of observable parenting behavior, with a short descriptive label and a more detailed guide to observing the behavior. As can be seen in the example items, each item is scored on a 0-2 scale, in which 0 = none of the behavior was observed, 1 = some minor or infrequent examples of the behavior were observed, and 2 = lots of consistent evidence of the behavior was observed during the observation.

We recommend doing PICCOLO ratings while watching a video-recording of the observation. Practitioners can do PICCOLO ratings alone, with the parent, or with a supervisor while reviewing the video-recording. Although making video-recordings of PICCOLO observations is recommended, it is not required. PICCOLO can also be used "live" by doing the ratings while watching the parent and child interacting.

EHS Program Use: PICCOLO observations need to be long enough to get a good sample of parenting interaction behaviors but short enough to do easily as part of a busy home visit. We recommend a 10-minute videotaped observation.

A variety of activities can be used for PICCOLO observations as long as they fit program goals, engage both parent and child, and can be done in a small space. Suggested materials include books, puzzles, blocks, art materials, and pretend toys. PICCOLO observations can also be done during typical family routines or planned home visit activities. Parents and children are often

PICCOLO 3

more comfortable doing the activities if they have choices or input into decisions about the activities to be videotaped.

STAFF/FAMILY FEEDBACK:

Practitioners in our partner programs say that PICCOLO helps them be better observers:
"I saw things I didn't see before—how little the mom actually speaks to her child."

PICCOLO helps practitioners see what parents need but also see their strengths:
"PICCOLO helps highlight weak and strong skills."

For home visits, PICCOLO guides planning:
"You see things you might want to work with the parent on the next visit. . . things you don't always see."

Practitioners also find they can use PICCOLO directly with the parents:
"PICCOLO is useful for parents to do so they can look at their skills."

WHERE DO I GO FOR FURTHER INFORMATION?

Measure & Training Resources: A complete version of PICCOLO with items and guidelines is available from Lori Roggman, falori@cc.usu.edu, or Mark Innocenti, minno@eiri.usu.edu. Training materials will also be available. Training workshops can be arranged for more in-depth training for practitioners.

References:
Preliminary results of reliability and validity tests of PICCOLO were presented at the Society for Research in Child Development meetings in 2007. A copy of the presentation is available at http://www.eiri.usu.edu/projects/srcd/

Roggman, L. A., Innocenti, M. S., Cook, G. A., Jump, V. K., Akers, J. F. (2007, March). *Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO)*. Paper presented at the Society for Research in Child Development, Boston, MA.

Appendix B

Evidence for Domains and Items

Evidence for Domains and Items

The tables that follow were compiled as part of the process of identifying potential items for the measure. Four sources of information were considered: theory, empirical evidence, father perspectives, and observational narratives. Father perspectives were obtained through a discussion group including three fathers and research staff. Results were documented in Appendix D. There is one table for each domain and the tables were organized by final items selected to be tested. Under each item the sources of information was listed. For each source the following information is provided: description of item from source, age of child, method used (e.g., self-report, observation), construct definition, associations with child outcomes, and citation of the source.

Table B1

Evidence for Affection Domain and Potential Items

#	Item	Age	Method	Construct[a]	Outcome	Citation
1	**Warm tone of voice**					
	Speaks in warm tone of voice. *Parent's voice is positive in tone, and may show enthusiasm or tenderness. A parent who speaks little but warmly should be coded highly.*	1-3	Observation Mothers	Affection: Warmth, physical closeness, and positive expressions toward child	Vocabulary, self-regulation	PICCOLO
	Speaking in a warm tone of voice	24, 36 m	Observation EHSREP	Positive regard: expressions of love, respect and/or admiration for the child.	MDI ,PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Speaking in soft tone to child	8 , 16 m	Observation FAN 74 fathers	Displays of positive affect, attitudes, and emotions towards the child.	Better social-communicative behaviors	Shannon et al., 2006
	Voice conveys positive feelings about child (interviewer rates)	3-12y	Self-report 129 nonresident fathers	Warmth: frequency of certain warm supportive behaviors exhibited towards child in past month	Father-report higher child well-being (health, friendships,	Harper & Fine, 2006
	Speaks in a warm and friendly voice	2	Self-report 254 fathers	Warmth: affection, consistency, satisfaction, and nonconflictual resolution (Schaefer, 1965; Brook, Zheng, Witeman, & Brook, 2001)	Not sig. predictor of aggression	Brook et al., 2001
	Speaking in warm tone of voice	24 m	Observation	Positive regard: demonstrations of love, respect, and admiration for child.	Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
	Warm clear voice quality	2 y	Observation	Sensitivity	Compliance	Feldman & Klein, 2003
2	**Smiles**					
	Smiles at child: *Parent directs smiles toward child, but they do not need to be looking at each other when smile occurs. Includes small smiles.*	1-3	Observation Mothers		Vocabulary, self-regulation	PICCOLO
	Smiling or laughing with child	24, 36 m	Observation EHSREP		MDI ,PPVT	Tamis-LeMonda et al., 2004; 3 bag codes

#	Item	Age	Method	Construct[a]	Outcome	Citation
	Smiling at child	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
	Smiling at infant	3 m	Observation 71 fathers	Positive emotionality: high smiling, looking at infant, low		Trautmann-Villalba, Gschwendt, Schmidt, & Laucht, 2006
	Smiles often	2	Self-report 254 fathers		Not sig. predictor of aggression	Brook et al., 2001
	Smiling or laughing with the child	24 m	Observation		Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
3	**Praising**					
	Praises child. *Parent says something positive about child or about what child is doing. A "thank you" can be coded as praise.*	1-3	Observation mothers		Vocabulary, self-regulation	PICCOLO
	Praise and/or complimenting the child	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Told child you appreciated something he/she did	3-12y	Self-report 129 nonresident fathers		Father-report higher child well-being	Harper & Fine, 2006
	Told child I appreciated what he or she did	0-12	Self-report 2,394 families	Measures warmth of relationship between parent and child: Frequency of behaviors in past month.	No child outcomes reported	Hofferth, 2003
	I make sure my child knows I appreciate what he or she tries and accomplishes	0-5 long	Self-report 350 fathers	Warmth: fathers' affection toward, support for, and positive interactions with the infant.	Buffer internalizing if maternal depression is present.	Mezulis et al., 2004
	I make sure my child knows I appreciate what he tries to accomplish		Self-report	Nurturance: flexible child-rearing attitudes and practices. Willingness of parents to listen to and share feelings and experiences with children.		Rickel & Biasatti, 1982
	My parent often speaks of the good things I do	2	Self-report 254 fathers		Not sig. predictor of aggression	Brook et al., 2001

#	Item	Age	Method	Construct[a]	Outcome	Citation
	Spontaneously praises child for his/her behavior, looks, or other positive qualities	3-12 y	Self-report 129 nonresident fathers		Father-report higher child well-being	Harper & Fine, 2006
	Praise child		Ethnography 186 societies	Warmth and affection: verbal and non-verbal approval and interest in child's wellbeing.	Lower homicide and theft	Veneziano, 2003
	Often praises me	2	Self-report 254 fathers		Not sig. predictor of aggression	Brook et al., 2001
	I believe in praising a child when he is good and think it gets better results than pushing him when he is bad.				Factor analysis to shorten block	Rickel & Lawrence, 1982
	Praises children for achievements		Fathering Indicators Framework	Actively engages with child in enhancing children social competence and academic achievement.	Social effectiveness	Gadsden, Pitt, & Tift, 2001
	Praising and/or complimenting the child	24 m	Observation		Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
	Praising (e.g., "good boy," "good job," "wow!", "You're so smart!"	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
	Positive affect & praise	20 m	Observation 75 families	Emotional supportiveness: encouragement & support	Problem solving (task affect, task rientation), attachment	Easterbrooks & Goldberg, 1984
4	**Physically close**					
	Is physically close to child. *Parent is within arm's reach of child. Consider context: expect more closeness for book reading than for playing house.*	1-3	Observation mothers		Vocabulary, self-regulation	PICCOLO
	Frequent, regular close proximity- regular close relationship or close companionship (top two codes from continuous scale).		Ethnographic codes 186 societies		Lower homicide and theft	Veneziano, 2003
	Being close	3 m	Observation 71 fathers		Lower externalizing	Trautmann-Villalba et al., 2006

#	Item	Age	Method	Construct[a]	Outcome	Citation
	Sitting child on caregiver's lap or leg	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
	Framing child's body with caregiver's own body	8, 16 m	Observation FAN 74 fathers	Positive touch: amount and quality of caregiver positive touch.	Better social-communicative behaviors	Shannon et al., 2006
5	**Positive Expressions**					
	Uses positive expressions with child. *Parent laughs, smiles, says positive things, praises, or uses words like "honey," "sweetie," or an affectionate nickname.*	1-3	Observation mothers	Affection: Warmth, physical closeness, and positive expressions toward child.	Vocabulary, self-regulation	PICCOLO
	Positive affect	2 y	Observation	Sensitivity	Compliance	Feldman & Klein, 2003
	Appropriate range of affect	2 y	Observation		Compliance	Feldman & Klein, 2003
	Displays a "loving gaze" through a warm facial expression	8, 16 m	Observation FAN 74 fathers	Positive affect	Better social-communicative behaviors	Shannon et al., 2006
	Expressing affection or endearment (e.g., "I love you," "What a wonderful girl/boy")	8, 16 m	Observation FAN 74 fathers	Positive verbal statements	Better social-communicative behaviors	Shannon et al., 2006
	Parent displays positive regard and affect towards child includes: voice tone, praise, facial expression, touch.	Toddler	Observation global rating	Warmth: parents positive regard and affect towards child includes: voice tone, praise, facial expression, touch.	No child outcomes reported	McHale et al., 2000
	Laughing with child or in delight of interaction	16 m	Observation FAN 74 fathers	Positive affect, attitudes, and emotions .	Better social-communicative behaviors	Shannon et al., 2006
	Laughing or singing	16 m	Observation	High positive affect: laughing out loud, singing happily.	Shared pos affect related to higher situational compliance	Volling et al., 2006
	Smiling or laughing	24 m	Observation		Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
	My child and I have warm intimate times	0-5 long	Self-report 350 fathers	.	Factor analysis buffer internalizing	Mezulis et al., 2004
	My child and I have warm intimate times together		Self-report		Factor analysis to shorten block	Rickel & Biasatti (1982)

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#	Item	Age	Method	Construct[a]	Outcome	Citation
	Overall emotional ambiance is positive and warm	7, 15, 25 m	Observation	Mutually responsive orientation (MRO): positive, mutually binding, and cooperative relationship between the parents and the child.	Predicts self-regulation	Kochanska, Aksan, Prisco, & Adams, 2008
	Dyad effectively addresses occurrence of distress and negative affect	7, 15, 25 m	Observation		Predicts self-regulation	Kochanska et al., 2008
	Dyad engages in clear bouts of joy	7, 15, 25 m	Observation		Predicts self-regulation	Kochanska et al., 2008
	There are natural displays of affection	7, 15, 25 m	Observation		Predicts self-regulation	Kochanska et al., 2008
	Displays of affection are a source of pleasure for both	7, 15, 25 m	Observation		Predicts self-regulation	Kochanska et al., 2008
	Attempts to please child		Ethnographic codes 186 societies		Lower homicide and theft	Veneziano, 2003
	Spend time with child	0-12	Self-report 2,394 families		No child outcomes reported	Hofferth, 2003
	Demonstrations of love, respect, and admiration	24 m	Observation		Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
	I frequently show my love for my child	2	Self-report 254 fathers		Not sig. predictor of aggression	Brook et al., 2001
	Told child I love them	0-12	Self-report 2,394 families		No child outcomes reported	Hofferth, 2003
	Being loving	3 m	Observation 71 fathers		Lower externalizing	Trautmann-Villalba, 2006
	Looking at infant	3 m	Observation 71 fathers		Lower externalizing	Trautmann-Villalba, 2006
	Supportiveness of parent to child	6 m	Observation	Positiveness affect & animation	Attachment Security	Ainsworth & Bell, 1970
6	**Engaged**					
	Engaged in interacting with child. *Parent is actively involved together with child, not just with activities or with another adult.*	1-3	Observation mothers	Affection: Warmth, physical closeness, and positive expressions toward child	Vocabulary, self-regulation	PICCOLO
	Show interest in child's activities and well-being.		Ethnographic codes 186 societies	.	Lower homicide and theft	Veneziano, 2003

#	Item	Age	Method	Construct[a]	Outcome	Citation
	I encourage my child to wonder and think about life				Factor analysis to shorten block	Rickel & Biasatti, 1982
	I find it interesting and educational to be with my child for long periods				Factor analysis to shorten block	Rickel & Biasatti, 1982
	I encourage my child to be curious, to explore, and question things				Factor analysis to shorten block	Rickel & Biasatti, 1982
	I find some of my greatest satisfaction with my child				Factor analysis to shorten block	Rickel & Biasatti, 1982
	Playing with child throughout interaction	8, 16 m	Observation 74 fathers FANS	Participation with child	Better social and communicative outcomes	Shannon et al., 2006
7	**Emotional support**					
	Shows emotional support, enthusiasm, interest, positive emotion directed at child. *Parent expresses enthusiasm, interest, sympathy, enjoyment, or other positive emotion directed to child.*	1-3	Observation mothers	Affection: Warmth, physical closeness, and positive expressions toward child	Vocabulary, self-regulation	PICCOLO
	Supportive presence	2 y	Observation	Sensitivity	Compliance	Feldman & Klein, 2003
	Clapping in approval of child's action	8, 16 m	Observation FAN 74 fathers	Positive affect	Better social-communicative behaviors	Shannon et al., 2006
	Reinforcing (e.g., "Yeah," "All right," "There you go," "That a girl")	8, 16 m	Observation FAN 74 fathers	Positive verbal statements	Better social-communicative behaviors	Shannon et al., 2006
	Encouraging (e.g., "You can do it!"/"You did it!", "You're going to be a great reader/athlete/etc.")	8, 16 m	Observation FAN 74 fathers	Positive verbal statements	Better social-communicative behaviors	Shannon et al., 2006
	Enthusiasm about the child	24 m	Observation		Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
	Clear enjoyment of the child	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Enjoyment of relationship		Theory	warmth and affection	intimate relationships, reciprocity	MacDonald, 1992

#	Item	Age	Method	Construct[a]	Outcome	Citation
	Clear enjoyment of the child	24 m	Observation		Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
	Verbal expressions such as comforting with reassuring words and sounds and behaviors that help to maintain communication		Fathering indicators framework	Caregiving: convey to children a sense of emotional engagement, love, attachment, and security.	Emotion regulation	Gadsden et al. 2001
	Is accepting of children		Fathering indicators framework	Actively engages with child in enhancing children social competence.	Social effectiveness	Gadsden et al. 2001
	Approve of child (verbally or non-verbally)		Ethnography1 86 societies		Lower homicide and theft	Veneziano, 2003
	Showing concern and/or empathy for the child's distress	24 m	Observation	.	Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
	Listens to children when they talk		Fathering indicators framework	Support social competence	Social effectiveness	Gadsden et al., 2001
	Is responsive to children		Fathering indicators framework	Support social competence	Social effectiveness	Gadsden et al., 2001
	Expresses interest in children's school work		Fathering indicators framework	Support social competence	Social effectiveness	Gadsden et al., 2001
	I encourage my child to talk about his troubles			Support social competence	Factor analysis to shorten block	Rickel & Biasatti, 1982
	I respect my child's feelings and encourage him or her to express them	0-5 long	Self-report 350 fathers		Buffer internalizing if maternal depression is present	
	Is supportive of children		Fathering indicators framework	Support social competence	Social effectiveness	Gadsden et al., 2001
	I talk over and reason when my child misbehaves				Factor analysis to shorten block	Rickel & Biasatti, 1982
	I respect my child's opinions and encourage him to express it.				Factor analysis to shorten block	Rickel & Biasatti, 1982
	When I am angry with my child I let him know.				Factor analysis to shorten block	Rickel & Biasatti, 1982

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#	Item	Age	Method	Construct[a]	Outcome	Citation
	I trust my child to behave as he should, even when I am not with him.				Factor analysis to shorten block	Rickel & Biasatti, 1982
	I usually take into account my child's preference when making plans for the family.				Factor analysis to shorten block	Rickel & Biasatti, 1982
	Showing concern or empathy for child's distress.	24, 36 m	Observation EHSREP		MDI,PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Hugging or other expressions of physical affection.	24 m	Observation	3 "box": Positive regard: demonstrations of love, respect, and admiration for child. Is evident in the ways that the parent listens, watches attentively and looks into the child's face when talking to him/her. *Cog stimulation moderately correlated for m & f. Sensitivity correlation stronger form than f.	Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
8	**Physical affection**					
	Hugging or other expression of physical affection	24, 36 m	Observation EHSREP	Positive regard	MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Tickle child	9 m	Self-report over 6000 fathers	Warmth	Factor analysis, did not test outcomes	Bronte-Tinkew et al., 2006
	Hold child	9 m	Self-report over 6000 fathers	Warmth	Factor analysis, did not test outcomes	Bronte-Tinkew et al., 2006
	Kisses child	3 m	Observation	Physical affection	Factor analysis; security of attachment	Cox, Owen, Henderson, & Margand, 1992
	Caressed, kissed, or hugged, or showed physical affection to child at least once (5 pt. scale not in past month-everyday).	3-12 y	Self-report 129 nonresident fathers	Warmth:	Father-report higher child well-being	Harper & Fine, 2006
	I express affection by hugging, kissing, and holding my child.	6-12 cross	Self-report 106 fathers	Warmth: found appreciation did not load with warmth i.e., hugging and kissing for fathers		Davidov & Grusec, 2006

#	Item	Age	Method	Construct[a]	Outcome	Citation
	I express affection by hugging, kissing, and holding my child.	0-5 long	Self-report 350 fathers		Factor analysis buffer internalizing if maternal depression is present	Mezulis et al., 2004
	I express my affection by hugging, kissing, and holding my child.				factor analysis to shorten block	Rickel & Biasatti, 1982
	Culturally appropriate physical acts of affection and comfort such as touching, hugging, kissing, cuddling.		Fathering indicators framework		emotion regulation	Gadsden et al., 2001
	Hug child		Ethnographic Codes 186 societies		Lower homicide and theft	Veneziano, 2003
	Hug child	0-12	Self-report 2,394 families		No child outcomes reported	Hofferth, 2003
	Caress child		Ethnographic Codes 186 societies		Lower homicide and theft	Veneziano, 2003
	Holding/carrying/ rocking the child	8, 16 m	Observation FAN 74 fathers	Positive touch	Better social-communicative behaviors	Shannon et al., 2006
	Hugging the child in a gentle, non-intrusive manner	8, 16 m	Observation FAN 74 fathers	Positive touch	Better social-communicative behaviors	Shannon et al., 2006
	Kissing child in a gentle, non-intrusive manner	8, 16 m	Observation FAN 74 fathers	Positive touch	Better social-communicative behaviors	Shannon et al., 2006
	Stroking/nuzzling a child's hair, back, leg, arm, etc.	8,16 m	Observation FAN 74 fathers	Positive touch: amount and quality of caregiver positive touch, including gentle loving touch or active playful touch. Caregivers can touch with their hands, face, body, or toys (to lovingly stroke child). Must be deliberate and intentional. Includes playful touches of children in destabilizing manner such as teasing or tickling.	Better social-communicative behaviors	Shannon et al., 2006
	Guiding child's hand to a toy	8, 16 m	Observation FAN 74 fathers	Positive touch	Better social-communicative behaviors	Shannon et al., 2006

#	Item	Age	Method	Construct[a]	Outcome	Citation
	Is relaxed					
	I am easy going and relaxed with my child.	0-5 long	Self-report 350 fathers		Factor analysis buffer internalizing if maternal depression is present	Mezulis et al., 2004
	I am easy going and relaxed with my child.				Factor analysis to shorten block	Rickel & Biasatti, 1982

[a] construct definition was provided only for the first item from that study unless different constructs were defined for individual items.

Table B2

Evidence for Responsiveness Domain and Potential Items

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
1	**Pays attention**					
	Pays attention to what child is doing: *Parent looks at and reacts to what child is doing by making comments, showing interest, helping, or otherwise attending to child's actions.*	Todd	Observation mothers	responding to child's cues, emotions, words, interests, and behaviors		PICCOLO
	When the child is not making bids, the parent allows the child to keep him/herself busy and also "checks in" visually.	24, 36 m	Observation EHSREP	Sensitivity: how the parent observes and responds to the child's cues (gestures, expressions, and signals) during times of distress as well as non-distress by tuning into the child.	MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Observing child's activity (active monitoring, not passive viewing).	8, 16 m	Observation 74 fathers FANS	Participation with child	Better social and communicative outcomes	Shannon et al., 2006
	Looking at infant	3 m	Observation	Father interaction patterns responsive and sensitive	Lower externalizing	Trautmann-Villalba et al., 2005
2	**Changes pace**					
	Changes pace or activity to meet child's interests or needs: *Parent tries a new activity or speeds up or slows down an activity in response to where child looks, what child reaches for, what child says, or emotions child shows.*	Todd	Observation mothers	Responding to child's cues, emotions, words, interests, and behaviors		PICCOLO
	Changing the pace when the child appears under-stimulated, overexcited, or tired.	24, 36 m	Observation EHSREP	Sensitivity	MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Parent perceives infant's signals accurately and vary his or her behavior appropriately.	4 m	Observation	Sensitivity: parent's ability to perceive infant's signals accurately and vary his or her behavior appropriately.	Attachment security	Braungart-Rieker & Stifter, 1996
	Tender careful in handling of baby. Slowing of usual tempo of movement, a muting of characteristic intensity of behavior, and a sensitive pacing of her behavior to the infant's response to contact with parent.	infant	Observation	Close bodily contact: Tender careful holding.	Security of attachment	Lamb 1977

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
3	**Is flexible**					
	Is flexible about child's change of activities or interests: *Parent accepts a child's choice of a new activity or toy, shows enthusiasm about child's choices, or allows child to play in unusual ways with or without toys.*	Todd	Observation	responding to child's cues, emotions, words, interests, and behaviors		PICCOLO
	Adaptation to child's needs and changing communications	2 y	Observation	Sensitivity	Compliance	Feldman & Klein, 2003
	Extent and timing of interventions, clarity, pacing, and grading or directions & strategy flexibility	20 m	Observation 75 families	Quality assistance: style of help giving	Problem solving (task affect, task orientation), attachment	Easterbrooks & Goldberg, 1984
	Telling child, "Okay, you want to do that?" when he/she has chosen a toy	8, 16 m	Observation FAN 74 fathers	Flexibility: Degree that the caregiver is willing to let the child direct an activity.	Social communicative	Shannon et al., 2006
	Accepting child disinterest in a toy and does not force child to play with it any longer	8, 16 m	Observation FAN 74 fathers	Flexibility	Social communicative	Shannon et al., 2006
	Willingness to let infant direct activity	8, 16 m	Observation FANS	Responsive dyadic	Social communication	Shannon et al., 2006
4	**Follows child**					
	Follows what child is trying to do: *Parent both responds to and gets involved with child's activities.*	Todd	Observation Mothers	responding to child's cues, emotions, words, interests, and behaviors		PICCOLO
	Facilitating (but not over-controlling the child's play)	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Picking up on the child's interests and timing activities to reflect the child's interest	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Following toddler's interest.	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the toddler's signals correctly as well as responding to them appropriately), COOPERATION (non-interference), and ACCEPTANCE	Secure partnership oriented strategies	Grossman, et al., 1999, 2002
	The parent is willing to cooperate with the toddler. He/she is attentive, knows what the child would like to	24 m 6 yrs	Observation		Secure partnership oriented strategies	Grossman, et al., 1999

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	do or have, reacts promptly in the interests of the child, even if the toddler show only subtle signals.					
	Actively commenting on the actions of the child	8, 16 m	Observation 74 fathers FANS	Participation with child	Better social and communicative outcomes	Shannon et al., 2006
	Actively commenting on the interaction materials for the child	8, 16 m	Observation 74 fathers FANS	Participation with child	Better social and communicative outcomes	Shannon et al., 2006
5	**Responds to emotions**					
	Responds to child's emotions: Parent reacts to child's positive or negative feelings by showing understanding or acceptance, suggesting a solution, reengaging the child, labeling or describing the feeling, showing a similar feeling, or providing sympathy for negative feelings.	Todd	Observation mothers	Responding to child's cues, emotions, words, interests, and behaviors		PICCOLO
	Matching the child's affect (e.g., increasing or decreasing expression as the child does so).	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Acknowledging child's affect: sensitivity to distress, anger or frustration may involve speaking sympathetically to the child, approaching the child, redirecting the child's activities, hugging, patting, picking up, or holding the child in lap and rocking.	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Gentle and patient handling of child's off-task behavior.	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004
	Child smiles at caregiver-Caregiver smiles back at child	8, 16 m	Observation FANS 74 fathers	Emotional attunement: Degree that caregiver expresses, emulates, and supports the child's displays of emotions using body, voice quality, gestures, and facial expressions.	Social communicative	Shannon et al., 2006
	Child expresses an emotion-Caregiver makes an exaggerated facial expression in response	8, 16 m	Observation FANS 74 fathers		Social communicative	Shannon et al., 2006
	Matching force or intensity of behaviors EX: child bangs toy-Caregiver loudly says, "I'm hungry!" Child gently touches toy-caregiver whispers, "Oh, you're being nice to the horsy"	8, 16 m	Observation FANS 74 fathers		Social communicative	Shannon et al., 2006

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	Child demonstrates surprise at a toy—Caregiver imitates child and says "Wow!"	8, 16 m	Observation FANS 74 fathers		Social communicative	Shannon et al., 2006
	Child exhibits frustration with an activity—Caregiver sighs and says "Ugh, that's hard to do."	8, 16 m	Observation FANS 74 fathers		Social communicative	Shannon et al., 2006
	I believe a child should be given comfort and understanding when he/she is scared and upset.	11-15 m	Self-report	Nurturance	Did not measure child outcomes	Lindsey, Caldera, & Cowell, 2005/ Block child rearing
	Encourage child to express he/her feelings of anger and frustration, fear, anxiety, disappointment.	Grade school	Self-report	Degree that parents perceive themselves as reactive to young children's negative affect in distressful situations	Regulation of negative affect	Fabes et al., 1990
	Soothe or comfort child.	Grade school	Self-report		Regulation of negative affect	Fabes et al., 1990
	React calmly.	Grade school	Self-report		Regulation of negative affect	Fabes et al., 1990
	Reassure child that it will be alright, will feel better soon.	Grade school	Self-report		Regulation of negative affect	Fabes et al., 1990
	Teach coping skills, relaxing, occupying selves to wait.	Grade school	Self-report		Regulation of negative affect	Fabes et al., 1990
	Tell child it's O.K. to cry.	Grade school	Self-report		Regulation of negative affect	Fabes et al., 1990
	Distract or help child shift focus like do something fun with child, talking about happy things.	Grade school	Self-report		Regulation of negative affect	Fabes et al., 1990
	Emulating infant's emotions using voice, gestures, facial expression.	8, 16 m	Observation FANS	Responsive dyadic	Social communication	Shannon et al., 2006
	Parent intimate physical behaviors are always responsive to the child's need for encouragement and support.	2-3 y	Observation	Positive affect includes: supportive presence (warmth & provision of emotional support); positive regard; fun/enjoyment	Security of attachment	Sroufe et al., (1985)
	Parent's patience with child.	6 m	Observation	Positiveness affect & animation	Attachment security	Ainsworth & Bell, 1970; Cox et al., 1992
	Physically comforts child.			Warmth and affection	Lower externalizing (theft and homicides)	Veneziano, 2003

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	Demonstrating developmentally appropriate expectations of child behavior	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
6	**Looks when child talks**					
	Looks at child when child talks or makes sounds: *When child makes sounds, parent's eyes focus on child's face or (if eyes or child's face are not visible) parent's position and head movement face toward child.*	Todd	Observation	responding to child's cues, emotions, words, interests, and behaviors		PICCOLO
	Listening to what toddler says	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY	Secure partnership oriented strategies	Grossman, et al., 1999, 2002, 2005
7	**Replies to child**					
	Replies to child's words or sounds: *Parent repeats what child says or sounds child makes, talks about what child says or could be saying, or answers child's questions.*	Todd	Observation	Responding to child's cues, emotions, words, interests, and behaviors		PICCOLO
	Responds to verbal and non-verbal communication of child.	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the toddler's signals correctly as well as responding to them appropriately), COOPERATION (non-interference), and ACCEPTANCE	Secure partnership oriented strategies in child and adolescence when meeting challenges (Grossman et al., 2002, 2005)	Grossman, et al., 1999
	Contingent and appropriate responsiveness to infant's nonverbal and verbal cues.	8, 16 m	Observation	Responsive-dyadic	Social communication	Shannon, Tamis-LeMonda, & Cabrera, 2006
	Verbal and vocal communication.	3 m	Observation	Father interaction patterns responsive and sensitive	Lower externalizing	Trautmann-Villalba et al., 2005
	Vocalizing back to child when child speaks (e.g., "yeah," "Okay," "Uh Huh")	8, 16 m	Observation FANS 74 fathers	Responsiveness to verbal nondistress	Social communicative	Shannon et al., 2006
	Imitating the child's vocalizations/verbalizations, imitating sounds or words	8, 16 m	Observation FANS 74 fathers	Responsiveness to verbal non-distress	Social communicative	Shannon et al., 2006
	Responds with questions (e.g., "What?", "You want that?"	8, 16 m	Observation 74 fathers FANS	Responsiveness to verbal non-distress	Social communicative	Shannon et al., 2006

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	Responsiveness to child's vocalizations and/or activity	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Talking to baby, making noises	6 m	Observation	Sensitivity: contingent responsiveness to the baby's signals and needs and verbal and nonverbal displays of warmth	No child outcomes measured	Goldberg et al., 2002
	Attentiveness (physical and verbal)	20 m	Observation 75 families	Emotional supportiveness: encouragement & support	Problem solving (task affect, task orientation), attachment	Easterbrooks & Goldberg, 1984
	Acknowledgement of child's interactive signals	2 y	Observation	Sensitivity	Compliance	Feldman & Klein, 2003
	Pretending the child is engaging in an actual conversation by responding in "adult" language	8, 16 m	Observation FANS 74 fathers		Social communicative	Shannon et al., 2006
	Verbalizing a child's positive feelings (e.g., child smiles at farm and caregiver responds by saying, "you like that, don't you?")	8, 16 m	Observation FANS 74 fathers		Social communicative	Shannon et al., 2006

[a] construct definition was provided only for the first item from that study unless different constructs were defined for individual items.

Table B3

Evidence for Encouragement Domain and Potential Items

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
1	**Waits**					
	Pauses after saying something the child could do and waits for the child to answer or do something, whether child actually responds or not.	Todd	Observation mothers	Active support of exploration, effort, skills, initiative curiosity, creativity, and play	PICCOLO	PICCOLO
	Reciprocal play	3 m	Observation	Positiveness affect & animation	Attachment security	From Ainsworth; Egeland & Farber 1984 in Cox et al., 1992
2	**Encourages child to handle objects**					
	Offers toys or says positive things when child sows obvious interest in objects. (Does not include preventing children from mouthing toys).	Todd	Observation mothers	Active support of exploration, effort, skills, initiative curiosity, creativity, and play		PICCOLO
	Holds a toy still so infant can manipulate it.	12-20 m	Observation	Encouragement of autonomous functioning. Behaviors that help maintain infant ongoing behaviors.	Persistence, competence	Frodi et al., 1985
	Allowing child to explore a toy through developmentally appropriate means (such as banging)	8, 16 m	Observation FAN 74 fathers	Flexibility: Degree that the caregiver is willing to let the child direct an activity.	Social communicative	Shannon et al., 2006
	Handing the child a toy that h/she is gazing or reaching for.	8, 16 m	Observation FANS 74 fathers	Responsiveness to non-verbal non-distress: extent that caregiver contingently and appropriately responds	Social communicative	Shannon et al., 2006
	Play with toys with the intent to redirect or introduce an activity with the child (as opposed to parallel play when the caregiver is only interested in their own activity).	8, 16 m	Observation 74 fathers FANS	Participation with child	Better social and communicative outcomes	Shannon et al., 2006
	Offers a toy: hands a toy toward the other, OR rearranges/sets of toys OR throwing/kicking ball directly to the other.	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
	Shows a toy: attempts to get child's attention by looking at or gesturing towards child with toy in hand, or verbalizing about the toy; and showing the toy by holding the toy up or out towards child or	Todd	Observation EHSRESP		Cognitive, language, emotion regulation	Roggman et al., 2004

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#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	pointing/ gesturing towards the toy.					
	Responds when child accepts a toy: manipulates a toy that has been accepted from the other OR talks about an accepted toy (labels, describes, labels actions appropriate to object, etc).	Todd	Observation EHSRESP		Cognitive, language, emotion regulation	Roggman et al., 2004
	Attempts to engage child in joint toy play	Todd	Observation EHSRESP		Cognitive, language, emotion regulation	Roggman et al., 2004
3	**Supports child's choices**					
	Parent offers choices, helps, agrees, or gets involved with activity or toys child chooses at the time	Todd	Observation mothers	Active support of exploration, effort, skills, initiative curiosity, creativity, and play		PICCOLO
	Acknowledges child's offer of a toy: smiles, talks, vocalizes about a toy that is shown/offered (but does not accept it).	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
	Accepts toy child offers, touches it and plays with it in some way.	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
	Imitates action of child: watches and repeats or attempts to repeat action of child	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
	Acknowledging child's intentions, respect for child's individuality, emotional support.	3 yrs	Observation	Supportive presence: emotional support, encouragement, positive emotional regard. Respect for child's autonomy (opposite of intrusiveness)	Buffers externalizing	McHale, Hogan, Lauretti, & Rasmussen, 2000 in Karrenman et al., 2009
4	**Support doing things on own**					
	Shows enthusiasm for things child tries to do without help, lets child choose how things are done, and lets child try to do things before offering help or suggestions. Parent can be engaged in activities child does "on his/her own."	Todd	Observation mothers	Active support of exploration, effort, skills, initiative curiosity, creativity, and play		PICCOLO
	If help is necessary, the parent helps the child in such a way that the toddler seems to have managed herself (i.e., the toddler feels proud of her/his success). The parent never takes over, performs the task himself or puts the child into the role of an admiring onlooker.	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the toddler's signals correctly as well as responding to them appropriately), COOPERATION (non-interference), and ACCEPTANCE	Secure attachment representation	Grossman et al., 1999
	The parent motivates, teaches or helps in tune with the toddler's abilities and never pushes the toddler to over-achieve.	24 m 6 yrs	Observation		Secure attachment representation	Grossman et al., 1999

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
5	**Verbal Encouragement**					
	Parent shows verbal enthusiasm, offers positive comments, or makes suggestions about child's activity.	Todd	Observation mothers	Active support of exploration, effort, skills, initiative curiosity, creativity, and play		PICCOLO
	Genuine interest in and appreciation of the child's contributions that the parent signifies as competent (i.e., serendipitous play products are interpreted as goal oriented pieces or art or structures; "look, you made a plate with your play dough, now I can eat out of it." Or "See, your thing looks like a tree, I will make another tree then we will have a small forest).	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY	Secure attachment representation	Grossman et al., 1999
	Provides verbal information or feedback	12-20 m	Observation	Encouragement of autonomous functioning. Behaviors that help maintain infants' ongoing behaviors.	Persistence, competence	Frodi et al., 1985
6	**Offers suggestions to help child**					
	Parent makes comments to make things easier for child or to add to child's play activities without interfering with child's play.	Todd	Observation			PICCOLO
	Suggestions by the parent are usually attractive to the toddler that he/she usually complies. But non-compliance is not interpreted as rejection by the parent. Instead the parent reacts to non-compliance as if the child had thought of a better way and asked for it.	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the toddler's signals correctly as well as responding to them appropriately), COOPERATION (non-interference), and ACCEPTANCE	Secure partnership oriented strategies in child and adolescence when meeting challenges (Grossman et al., 2002; 2005)	Grossman, et al., 1999
	Help child figure out a solution, brainstorm possible solutions	Grade school	Self-report	Degree that parents perceive themselves as reactive to young children's negative affect in distressful situations	Regulation of negative affect	Fabes, Eisenberg, & Bernzweig, 1990
	Parent manages to prevent impending failures or reinterprets failures as a "good try," thus minimizing frustration and loss of interest in play.	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the toddler's signals correctly as well as responding to them appropriately), COOPERATION (non-interference), and ACCEPTANCE	Secure attachment representation	Grossman et al., 1999
7	**Shows enthusiasm about what child is doing**					
	Parent makes positive statements, claps hands, or shows other clear positive responses to what child is doing, including quiet enthusiasm such as patting child, nodding, smiling, or asking child questions	Todd	Observation mothers			PICCOLO

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#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	about activities.					
	Enthusiasm about the child	24, 36 m	Observation EHSREP		MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes
	Positive encouraging affect	12-20 m	Observation	Encouragement of autonomous functioning. Behaviors that help maintain infants ongoing behaviors.	Persistence, competence	Frodi et al., 1985
	Parent gives positive response to child's efforts		Observation	Challenge: encourage child to move ahead, to strive at bit, and to become more independent. This dimension includes the activities that parents stimulate development, encourage progress, set appropriate expectations, and take pleasure in child's achievement.	Theoretical: gives the child a sense of mastery and develops realistic self-expectations.	Marschak Interaction Method (Lindaman et al., 2000)
	Being involved as manifest by attentiveness to the child and the task and focusing the child on the task as needed, mood setting for a problem solving situation, sharing in the joy of problem solution, being physically present when needed, helping the child achieve a sense of having solved the problem himself.	24 m	Observation	Supportive presence	Attachment security task affect task orientation	Matas, Arend, & Sroufe, 1978 in Easterbrooks & Goldberg, 1984
	Parent and child share pleasure in the achievement		Observation			Marschak Interaction Method (Lindaman et al., 2000)
	Providing a secure base by helping child feel comfortable working at the task	24 m	Observation	Supportive presence	Attachment security task affect task orientation	Matas et al., 1978 in Easterbrooks & Goldberg, 1984
9	**Takes turns**					
	Parent is able to engage the child and work together when appropriate.		Observation	Engagement:	Theoretical: The message is, "You can interact in appropriate ways with others.	Marschak Interaction Method (Lindaman et al., 2000)
	Completes a routine (action): performs an action that completes a routine begun by the other or attempts to	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	complete (e.g., Wind "jack"-push him back down, roll ball-catches ball, tower game) would demonstrate completes.					
10	**Provides challenges for child**					
	The parent succeeds in keeping a good balance between actively challenging the child on the one hand and being lenient or taking the child's lead when the child explores with interest.	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the toddler's signals correctly as well as responding to them appropriately), COOPERATION (non-interference), and ACCEPTANCE	Secure partnership oriented strategies	Grossman, et al., 1999, 2002
	Parent is aware of child's developmental level, and sets tasks that the child, with some effort can master		Observation	Challenge: encourage child to move ahead, to strive at bit, and to become more independent. This dimension includes the activities that parents stimulate development, encourage progress, set appropriate expectations, and take pleasure in child's achievement.	Gives the child a sense of mastery and develops realistic self-expectations.	Marschak Interaction Method (Lindaman et al., 2000)
11	**Imitates child's actions**					
	I imitate my children to encourage them to keep interacting					Father discussion group
	Caregiver imitates child	8, 16 m	Observation FANS 74 fathers	Emotional attunement: degree that caregiver expresses, emulates, and supports the child's displays of emotions using body, voice quality, gestures, and facial expressions.	Social communicative	Shannon et al., 2006
12	**Physically helps child to do themselves**					
	Guiding child in an activity (stirring food, turning pages) but allows he/she the freedom to independently manipulate items.	8, 16 m	Observation FAN 74 fathers		Social communicative	Shannon et al., 2006
13	Tell or show child next step for doing something.			Scaffolding		Vygotsky (1978)
	The parent motivates, teaches, or helps in tune with the toddler's abilities and never pushes the toddler to over-achieve.	24 m 6 yrs	Observation		Secure attachment representation	Grossman et al., 1999
14	**Tailor assistance to needs of child**					
	Tailor assistance to needs of child.			Scaffolding		Vygotksy, 1978

#	Item	Age	Previous Method	Construct[a]	Outcome	Citation
	If help is necessary, the parent helps the child in such a way that the toddler seems to have managed herself (i.e., the toddler feels proud of her/his success). The parent never takes over, performs the task himself or puts the child into the role of an admiring onlooker.	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the toddler's signals correctly as well as responding to them appropriately), COOPERATION (noninterference), and ACCEPTANCE.	Secure attachment representation	Grossman et al., 1999
	The parent motivates, teaches, or helps in tune with the toddler's abilities and never pushes the toddler to over-achieve.	24 m 6 yrs	Observation		Secure attachment representation	Grossman et al., 1999
15	**Asks child's permission**					
	Acknowledging child's intentions, respect for child's individuality, emotional support.	3 yrs	Observation	Supportive presence: emotional support, encouragement, positive emotional regard. Respect for child's autonomy (opposite of intrusiveness).	Buffers externalizing	McHale et al., 2000
16	**Physically guides child's actions**					
	Guiding child in an activity (stirring food, turning pages) but allows he/she the freedom to independently manipulate items	8, 16 m	Observation FAN 74 fathers		Social communicative	Shannon et al., 2006

a construct definition was provided only for the first item from that study unless different constructs were defined for individual items.

Table B4

Evidence for Teaching Domain and Potential Items

#	Item	Age	Method	Construct[a]	Outcome	Citation
1	**Explains reasons**					
	Says something that could answer a "why" question, whether child asks a question or not.	Todd	Observation mothers	Shared conversation and play, cognitive stimulation, explanations, and questions	PICCOLO	PICCOLO
	Verbally responding to child	2 yr	Observation	Cognitive stimulation: enhance perceptual, cognitive, and linguistic stimulation	MDI, PPVT	Tamis-LeMonda et al., 2004
2	**Suggests to extend**					
	Says something child could do to add to what child is already doing, but does not interrupt child's interests, actions, or play	Todd	Observation mothers	Shared conversation and play, cognitive stimulation, explanations, and questions		PICCOLO
	Suggesting more sophisticate play	2 yr	Observation	Cognitive stimulation: enhance perceptual, cognitive, and linguistic stimulation	MDI, PPVT	Tamis-LeMonda et al., 2004
	Offers an idea such as a suggestion or direction	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
3	**Repeat & expands on what child says**					
	Parent says the same words or makes the same sounds the child makes or repeats what child says while adding something that adds to the idea.	Todd	Observation	Shared conversation and play, cognitive stimulation, explanations, and questions		PICCOLO
	Imitates child's sounds or words	Todd	Observation	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
4	**Labels**					
	Names what child is doing, playing with, or looking at.	Todd	Observation	Shared conversation and play, cognitive stimulation, explanations, and questions		PICCOLO
	Labeling actions and things	2 yr	Observation	Cognitive stimulation: enhance perceptual, cognitive, and linguistic stimulation	MDI, PPVT	Tamis-LeMonda et al., 2004
5	**Pretend Play**					
	Plays make believe in any way – for example, by "eating" pretend food.	Todd	Observation	Shared conversation and play, cognitive stimulation, explanations, and questions		PICCOLO

#	Item	Age	Method	Construct[a]	Outcome	Citation
	Engaging in pretend play	2 yr	Observation	Cognitive stimulation: enhance perceptual, cognitive, and linguistic stimulation	MDI, PPVT	Tamis-LeMonda et al., 2004
6	**Does things in a sequence**					
	Does an activity in a way that steps can be seen even if parent does not say exactly what the steps are.	Todd	Observation	Shared conversation and play, cognitive stimulation, explanations, and questions		PICCOLO
	Presenting activities in organized sequence of steps	2 yr	Observation	Cognitive stimulation: enhance perceptual, cognitive, and linguistic stimulation	MDI, PPVT	Tamis-LeMonda et al., 2004
	Repeating a routine: performs again an action that completes a routine begun by the child (e.g., wind up Jack in the box, catch ball child throws, stack and knock down blocks).	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
7	**Talks about characteristics of objects**					
	Uses words or phrases that describe features such as color, shape, texture, movement, function, or other characteristics	Todd	Observation	Shared conversation and play, cognitive stimulation, explanations, and questions		PICCOLO
	Verbally describes or asks questions about the toy, but does not physically touch the toy. Describing or questioning to show a toy or aspect or a toy. Examples: "Does it need a lid? What's that? What color is squash? Turn the oven on (points to knob).	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
	Describe toys or objects, elaborate on what child is look at	2 yr	Observation	Cognitive stimulation: enhance perceptual, cognitive, and linguistic stimulation	MDI, PPVT	Tamis-LeMonda et al., 2004
8	**Asks child for information**					
	Asks any kind of question or says, "tell me," show me" or other command that may require a yes/no response, short answers, or longer answer-whether or not child replies.	Todd	Observation	Shared conversation and play, cognitive stimulation, explanations, and questions		PICCOLO
	Asking child questions	2 yr	Observation	Cognitive stimulation: enhance perceptual, cognitive, and linguistic stimulation	MDI, PPVT	Tamis-LeMonda et al., 2004
	asks questions about the toy	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004
9	**Helps child focus attention**					
	When the child's attention is about to shift from exploration (a goal worth pursuing) to attachment	24 m 6 yrs	Observation	Ainsworth's SENSITIVITY (perceiving and interpreting the	Secure partnership oriented strategies	Grossman, et al., 1999

#	Item	Age	Method	Construct[a]	Outcome	Citation
	behaviors, the parent, by his/her reassuring presence or with comforting words, manages to keep the toddler's attention on her/his activities.			toddler's signals correctly as well as responding to them appropriately), COOPERATION (non-interference), and ACCEPTANCE		
	Pointing, language cues look, see			Joint attention	Theoretical : Social communication	Rogoff, in press
10	**Read books or tell stories**					
	Reads books or sings songs		Self-report	Cognitive stimulation	Reduce risk for low cognitive scores	Bronte-Tinkew et al., 2008
11	**Set rules or boundaries**					
	Provides clear structure appropriate for child's developmental level.		Observation	Forms foundation for other dimensions. Being trustworthy and predictable, help define and clarify child's experience. Sets boundaries to ensure child's safety and help child to understand the world that she lives in.	Theoretical: experience with appropriate challenges gives the child a sense of mastery and develops realistic self-expectations.	Marschak Interaction Method (Lindaman et al., 2000)
	Clear positive expectations			Providing clear expectations for behaviors was noted by several researchers as being very important on the content validity survey, fathers in the discussion group also emphasized preparing children to understand limit and function in the world was an important goal.	Theoretical: Baumrind, authoritative parenting	Discussion group Content validity
12	**Tell child how to do something**					
	Describe what to do when accomplishing a task			Scaffolding Fathers felt it was important for them to teach their children how to be successful in the world.		Vygotsky, 1978, father discussion group
13	**Demonstrates something**					
	Demonstrates cause and effect/helps child understand the cause and effect of their actions					
	Demonstrates: showing how a toy works, showing child an action with a toy while child is watching or calling child's attention to the play action (pointing to something on the book page, demonstrating telephone, throwing/kicking the ball in the others direction, pushing the car, beeping the horn, dialing	Todd	Observation EHSRESP	Social toy play	Cognitive, language, emotion regulation	Roggman et al., 2004

#	Item	Age	Method	Construct[a]	Outcome	Citation
	the phone, pointing to parts on the baby doll, winding jack in the box, pushing "jack" up and down, showing each side of the block). *Do not code if verbally directing attention only.					

[a] Construct definition was provided only for the first item from that study unless different constructs were defined for individual items.

Table B5

Evidence for Playfulness Domain and Potential Items

#	Item	Age	Method	Construct[a]	Outcome	Citation
1	**Creates anticipation**					
	Walks fingers up child's arm, saying "I'm gonna get ya."	1-3 yr	Observation	Playfulness		Narratives of father choice observation
	When reading a book: Dad peeks at the next page "oh" he says in surprise then looks back at the child, "what do you think it is?" he asks.	1-3 yr	Observation	Playfulness		Narratives of father choice observation
2	**Teasing**					
	Keep away (show child a toy then repeatedly withdrawing it)	8, 16 m	Observation FAN 74 fathers	Teasing: Part of affect, refers to extent that caregiver teases child in either a playful or antagonistic manner.	Better social-communicative behaviors	Shannon et al., 2006
	Taunting by refusing to give an object (keeping it out of child's reach but in the child's sight)	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
	Hiding toys	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
	Throwing toys at child	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
	Frustrating the child by tapping (with hand, leg, or object), pushing or pulling child	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
	Knocking over or throwing toys child is playing with	8, 16 m	Observation FAN 74 fathers		Better social-communicative behaviors	Shannon et al., 2006
3	**Exaggerates behaviors**					
	Exaggerated movements are characteristic of rough and tumble play, they cue others that the fighting is pretend	N.A.	Observation	Play	Theoretical: Social competence	Pellegrini & Smith, 2005)
	Father pretends to be the patient and child is the doctor. He animates his voice and exaggerates movements as the child gives him a shot "ow that	1-3 yr	Observation	Playfulness		Narratives observations

#	Item	Age	Method	Construct[a]	Outcome	Citation
	smarts!" he says, as he jumps.					
4	**Behaves unexpectedly as part of play**					
	Novelty			Difference in sameness	Competence, motivation, efficacy	White, 1959
	Spontaneous behaviors			Activation, play, spontaneity	Theoretical: Adaptability & social competence	Paquette, 2004; Pellegrini & Smith, 2005
	Parent and child are able to be playful while still accomplishing the task		Observation	Engagement: Parent provides surprise, and stimulation in order to maintain a maximal level of alertness and engagement. They also soothe and claim the child when necessary so that the child is again available for engagement. Efforts are attuned to child's emotional state.	Theoretical:. The message is, "You can interact in appropriate ways with others.	Marschak Interaction Method (Lindaman et al. 2000)
5	**Sound effects**					
	Father pretends car is driving up child's arm "vrrrrmmmm, vrrrrrm" he says, child smiles	1-3 yrs	Observation	Playfulness		Narrative Observations
6	**Makes child laugh/ laughs with child**					
	Laughing with child or in delight of interaction	16 m	Observation FAN 74 fathers	Positive affect, attitudes, and emotions	Better social-communicative behaviors	Shannon et al., 2006
	Laughing OR Singing	16 m	Observation	High positive affect: laughing out loud, singing happily.	Shared positive affect related to higher situational compliance	Volling et al., 2002
	Smiling OR Laughing	24 m	Observation		Higher Bayley MDI scores, with all pos parenting factors	Ryan et al., 2006
7	**Modifies intensity / Alternates quiet and exciting play**					
	Father is crawling on the floor and chasing the 1-year-old. Child squeals and runs toward the father. Father nuzzles the child in the stomach. Child laughs, then pushes father's head away. Father stops, sits up and waits for child to initiate more play.	1-3 yr	Observation	Playfulness		Narratives observations
	Providing an appropriate level of stimulation and appropriate range and variety of activities	24, 36 m	Observation EHSREP	Sensitivity: how the parent observes and responds to the child's cues (gestures, expressions, and signals) during times of distress as well as	MDI, PPVT	Tamis-LeMonda et al., 2004; 3 bag codes

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#	Item	Age	Method	Construct[a]	Outcome	Citation
				non-distress. Key defining characteristic is that it is child centered. Involves "tuning in" to the child and manifesting awareness of child's needs, moods, interests, and capabilities.		
	Higher intensity positive arousal	4 m	Observation	Co-regulation	Self- or emotion regulation	Feldman & Klein, 2003
8	**Demonstrates novel ways to use objects**					
	Child is interested in objects that are affected by actions of child.			Competence, motivation, efficacy	Theory, mastery motivation, competence	White, 1959
	Creativity-resourcefulness	2 y	Observation	Sensitivity	Compliance	Feldman & Klein, 2003
	Parent inventiveness—repertoire of behaviors.	6 m	Observation	Positive affect & animation	Attachment security	From Ainsworth & Bell, 1970; Egeland & Farber 1984 in Cox et al., 1992
	Novelty			Difference in sameness	Competence, motivation, efficacy	White, 1959
9	**Physically on or below child's level**					
	Rough and tumble play, self-handicapping.			Physical play	Theoretical: Adaptability & integration of cognitive processing	Pellegrini & Smith, 2005
10	**Stimulates child with touch**					
	Gentle playful touch using hands, face or body.	8, 16 m	Observation FANS	Responsive dyadic	social-communication	Shannon et al., 2006
11	**Jokes or uses humor**					
	Never too busy to joke and play.	3-12 y	Self-report 129 nonresident fathers		Father-report higher child well-being (health, friendships, prospects for future, feelings about self, relationship with mother	Harper & Fine, 2006
	I joke AND play with my child.	0-5 long	Self-report 350 fathers		Factor analysis buffer internalizing if maternal depression is	Mezulis et al., 2004

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#	Item	Age	Method	Construct[a]	Outcome	Citation
					present	
	Joked or played with child	0-12	Self-report 2,394 families		No child outcomes reported	Hofferth, 2003
	Humor AND joking: includes making silly sounds or faces in addition to more verbal forms of humor. Sarcastic remarks and humor at the expense of one of the participants are not coded as humor/joking.	4-5	Observational	Affect codes: humor, joking	Positive affect in reaction to child's negative affect related to more positive social behaviors (e.g., more sharing, less verbal aggression)	Carson & Parke, 1996
12	**Engages in rough and tumble play**					
	Rough and tumble play			Activation, play, spontaneity	Theoretical: Adaptability & social competence	Paquette, 2004; Pellegrini & Smith, 2005
13	**Encourages child to climb or balance on things**					
	Physical play			Physical play	Theoretical: Adaptability & integration of cognitive processing	Pellegrini & Smith, 2005
14	**Move child through space (e.g., tossing, or rolling)**					
	Physical play			Physical play	Theoretical: Adaptability & integration of cognitive processing	Pellegrini & Smith, 2005
15	**Encourages physical movement**					
	Physical play			Physical play	Theoretical: Adaptability & integration of cognitive processing	Pellegrini & Smith, 2005
16	**Engage in vigorous physical play with child**					
	Physical play			Physical play	Theoretical: Adaptability & integration of cognitive processing / social competence	Pellegrini & Smith, 2005
17	**Pretend child is stronger or winning**					
	Self-handicapping			Physical play	Theoretical: Adaptability &	Pellegrini & Smith, 2005

#	Item	Age	Method	Construct[a]	Outcome	Citation
					integration of cognitive processing	
	"want to fight?" father asks, child growl and jumps on father, "oh, oh, no you got me" father says as he falls down.	1-3 yr	Observation	Playfulness		Narrative Observations
18	**Pretends gruffness or fighting**					
	Pretending gruffness, aggressive play, or pretend fighting	8,16 m	Observation FAN 74 fathers		Better social-communicative behaviors.	Shannon et al., 2006
	I wrestle with children to teach them how to be aggressive if they need to be, but they have to know when to control it.	1-3 yr	Discussion group	Rough and Tumble play	Helps child learn to regulate emotions by going in and out of strong emotions.	Father discussion group
19	**Tickles child**					
	Tickle child	9 m	Self-report over 6000 fathers	Warmth	Factor analysis, did not test outcomes.	Bronte-Tinkew et al., 2006
20	**Physical play that restrains child (e.g., holding or wrestling)**					
	Father and child are wrestling. Father pretends to hold child down, "try and get up" he says to the child, the child squirms and wriggles out, standing up triumphantly.	1-3 yrs	Observation	Playfulness		Narrative observations

[a] Construct definition was provided only for the first item from that study unless different constructs were defined for individual items.

Appendix C

Father Discussion Group Summary

Father Discussion Group Summary

This appendix summarizes findings from an informal discussion group with fathers initiated as a first step in including the perspective of fathers in this research. Participants included three doctoral graduate students who were fathers (2 White, 1 Latino), a faculty mentor who is an expert father researcher, the doctoral student researcher for this study, and a data analyst assisting with the study. During the discussion group video observations of fathers and toddlers were viewed then discussed using two open-ended questions

- "What was this father doing that is important for his child's development?"
- "How does it support child development?"

The doctoral student researcher kept a written record of the group discussion. In addition, all participants were asked to keep notes of key personal insights on large "post-it" notes. These notes were gathered at the end of the meeting and compiled with the written record. Analysis included entering notes of what the fathers said during the meeting into a spreadsheet program. These statements were categorized according to common themes by the doctoral student researcher. Five themes emerged: *Preparing Children for the World, Teaching about Power and Control, Enjoying, Connecting,* and *Teasing.* These results were then reviewed by the faculty mentor. Below is matrix constructed to demonstrate the interrelations between themes.

Table C1

Father Discussion Group Summary

	Prepare for the world (*wants child to be competent in the world*)	**Power and control** (*wants child to understand power relationships*)	**Enjoyment** (*enjoys child and wants child to enjoy him*)	**Connecting** (*wants to know and child, and have child trust him*)	**Teasing** (*humor, silliness, testing limits through play*)
Prepare	"I'm not going to be there all the time." "I want to instill strength in my child." "It is important to help them learn to pull thing back together."	Teach how power structures work: "The father is physically pushing, directing, rules,…communicating this is how it works, I am in control, I get the ball." "I want my children to understand power structures, respect, so they can manage the world. They need to understand when someone is in charge and they need to follow." "With my daughter I'm more worried about her getting hurt."	They like rough and tumble play and teasing b/c it is fun for them, but and it helps children learn about relationships in the world.	Using exaggerated facial expressions helps children connect to the father and activity, making the father's expression easy to identify. Dad connects with the child by imitating the child, or matching the child's excitement.	Teasing can help children gain a sense of accomplishment by lightening emotions when they get frustrated. "By teasing fathers make it harder, so then it will be easier without the teasing."
Power & control	Fathers' help children learn to control emotions by "going into the emotion and coming back out." Children need to learn that "Its O.K. to be rough but there are boundaries and rules." Teasing and play helps children expand their boundaries.	Fathers provide a strong, confident presence through physical contact, labeling strong objects. Boundaries and control are maintained by fathers by controlling objects and conversation. This is how fathers direct play, show the child how to play, initiate contact. Fathers' direct play, may have less talking and teaching words while emphasis is on who is in charge.	Fathers play with emotions with children. May exaggerate and imitate children's emotions like fear and power with silly screams, sounds, to play with emotions , modeling what he wants child to do.	Fathers connect with children when they create new rules with children. This occurs during physical play: "Do you want to trust me to throw you?" and physical presence: Being behind, around child is a mentoring position, shows child what to do. Listen for the tone of voice—up then down, starts directive, changes to request means more connecting with child, and when fathers talk less they are giving the child more control. *Daughters are more affectionate and clingy.	Fathers tease to get to know their children. They want to know what the child will do, or how the child will react. How far they can push each child. Physical play and teasing are aggressive power, physical interaction is testing reactions and abilities of the child.

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	Prepare for the world (wants child to be competent in the world)	Power and control (wants child to understand power relationships)	Enjoyment (enjoys child and wants child to enjoy him)	Connecting (wants to know and child, and have child trust him)	Teasing (humor, silliness, testing limits through play)
Enjoy			Fathers animate and imitate children because it is fun for them, and encourage children to repeat behaviors. It is a way of being creative. Play with their children helps fathers unwind.	Play interaction helps fathers learn about children. As they get to know children better they can make more suggestions, expand on what children are trying to do. More familiarity with children leads to more imaginative fun.	"I tease because I want to give them a sense of humor." "I tease because it is fun & exciting."
Connect					When I tease I'm asking "How do I play this with you?" "I can't tease all my children the same way, some like it more, some I push further with my teasing."

Appendix D

Content Validity Email

Email sent to father researchers

Because of your significant research contributions on father involvement with young children, I am hoping that you will be willing to review a list of father behaviors in terms of how important they are to child development and how observable they would be. Fathers significantly influence the well-being of children, yet there are only a few measures of father direct interactions with young children. Funded by a Head Start Graduate Student Research grant, I am hoping to identify specific interactive behaviors by fathers that are important for children's early development and observable by practitioners who work in Head Start programs. Dr. Lori Roggman is my mentor and dissertation supervisor.

An online survey of 74 items will take 15-20 minutes to complete. No personally identifying information will be collected. (Upon request, the survey can be sent by email for you to complete and return, but it would not remain anonymous.). We will be collecting responses until Friday Feb 12th.

Here is a link to the survey:
http://www.surveymonkey.com/s.aspx?sm=XPrpo5lkPFmHBkNf9ivmiQ_3d_3d

If you do not wish to participate or receive reminder emails from us, please click the link below, and you will be automatically removed from our list.
http://www.surveymonkey.com/optout.aspx?sm=XPrpo5lkPFmHBkNf9ivmiQ_3d_3d

Thank you,

Sheila Anderson, M.Ed.
Sheila.anderson@aggiemail.usu.edu

Lori Roggman, Ph.D.
loriroggman@yahoo.com

Please do not forward this message.

Appendix E

Initial Version of Measure

This appendix includes the initial version of the measure. The initial version provides a full list of all items tested. In this version domain definition and scoring guidelines were not included on the scoring sheet, but coders had references sheets with this information. The domain definitions for the initial version were the same as for the final version. For all items on the original PICCOLO for mothers we began with the scoring guidelines developed for mothers, then further refined guidelines as necessary for fathers. For all items not on the original PICCOLO for mothers, guidelines were developed and refined from examples in the empirical literature, and questions observers identified on the scoring sheets.

Table E1

PICCOLO-D Initial Version Item List

Affection & Affect	Absent	Barely	Consistently	Examples & Questions
1.speaks in a warm tone of voice	☐	☐	☐	
2. smiles at child	☐	☐	☐	
3. praises child	☐	☐	☐	
4. is physically near child	☐	☐	☐	
5. uses positive expressions with child	☐	☐	☐	
6. is engaged in interacting with child	☐	☐	☐	
7.shows emotional support toward child	☐	☐	☐	
8. shows physical affections (including hugs, kisses, gentle positive touches)	☐	☐	☐	
Responsiveness	**Absent**	**Barely**	**Consistently**	
1. is attentive to what child is doing	☐	☐	☐	
2. changes pace or activity to meet child's interests or needs	☐	☐	☐	
3. is flexible about child's changes of activities or interests	☐	☐	☐	
4. follows what child is trying to do	☐	☐	☐	
5. responds to child's emotional expression or affect	☐	☐	☐	
6. looks at child when child is talking or vocalizing	☐	☐	☐	
7. replies to child's words or vocalizations	☐	☐	☐	
8. comforts child	☐	☐	☐	
9. uses touch to encourage or reassure (e.g., pats child's back)	☐	☐	☐	
10. helps child calm down after exciting play	☐	☐	☐	

Encouragement	Absent	Barely	Consistently
1. waits for child's response after suggesting an activity	☐	☐	☐
2. encourages child to handle toys	☐	☐	☐
3. supports child's choices or activity changes	☐	☐	☐
4. supports child in doing things on his/her own	☐	☐	☐
5. verbally encourages child's efforts	☐	☐	☐
6. offers suggestions to help child	☐	☐	☐
7. shows enthusiasm about what child is doing	☐	☐	☐
8. helps child when child asks or has difficulty	☐	☐	☐
9. imitates child's actions	☐	☐	☐
10. takes turns with child	☐	☐	☐
11. provides a challenge for child (e.g., can you...)	☐	☐	☐
12. tells or shows child next step for doing something	☐	☐	☐

Teaching/Talking	Absent	Barely	Consistently
1. explains reasons for something to child	☐	☐	☐
2. suggests activities to extend what child is doing	☐	☐	☐
3. repeats or expands child's words or vocalizations	☐	☐	☐
4. labels objects or actions for child	☐	☐	☐
5. engages in pretend play with child	☐	☐	☐
6. presents activities in a sequence of steps	☐	☐	☐
7. talks to child about characteristics of objects	☐	☐	☐
8. asks child for information	☐	☐	☐
9. reads books or tells stories	☐	☐	☐
10. sets rules of boundaries (verbal or non-verbal)	☐	☐	☐
11. tells child how to do something	☐	☐	☐

	Absent	Barely	Consistently
12. shows child how something works	☐	☐	
13. helps child focus attention	☐	☐	
Playfulness	☐	☐	☐
1. engages in rough and tumble play (e.g., wrestling, pretend gruffness or fighting, self-handicapping)	☐	☐	
2. laughs with child	☐	☐	
3. demonstrates novel ways to use objects or toys (nonconventional)	☐	☐	
4. is physically on or below child's level	☐	☐	
5. stimulates child with touch	☐	☐	
6. jokes or uses humor (silly sounds or faces, not sarcasm)	☐	☐	
7. encourages or allows child to climb or balance on things (including himself)	☐	☐	
8. makes child move through space (e.g., tosses child)	☐	☐	
9. encourages physical movement	☐	☐	
10. engages in physical play with child	☐	☐	
11. creates anticipation during play interactions	☐	☐	
12. exaggerates behaviors	☐	☐	

CURRICULUM VITAE

SHEILA ANDERSON

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EDUCATION

Ph.D.   Family & Human Development, Early Childhood Emphasis, Utah State University, 2012.

M.Ed.   Education Curriculum & Instruction, Early Childhood Emphasis, Weber State University, 2004.

B.S.   Psychology and Human Development, University of Utah, 1994.

A.A.S.   Child Development, Southern Utah University, 1992.

SELECTED PROFESSIONAL EXPERIENCE

10/09 to Present	Project Manager/Dads' Parents Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D). Three years of experience collecting and analysis of observational data. Department of Family, Consumer, and Human Development, Utah State University (PI: Lori Roggman)
09/11 to Present	Research Assistant/ Parents Interactions with Children-Checklist of Observations Linked to Outcomes DVD (PICCOLO-DVD). Department of Family, Consumer, and Human Development, Utah State University (PI: Lori Roggman)
08/09 to Present	Research Assistant/Data Collection, Child Assessment, & Teacher Training/ Promoting Effective Engagement, Communication, and Self-regulation with English language learners (PEECESE). Three years of experience in collecting and analysis of data. Early Intervention Research Institute, Utah State University (PI: Lisa Boyce)
09/10 to 05/12	Instructor/ Courses: Introduction to Human Development (FCHD 1500), Readings and Conferences (FCHD 4990). Department of Family, Consumer, and Human Development, Utah State University (Department Chair: Scot Allgood)
09/04 to 05/09	Adjunct Instructor/ Courses: Introduction to Human Development (CHF 1500), Child Development Birth-8 (CHF 2500), Introduction to Early Childhood, (CHF 2600) Child Guidance (CHF 2610), Planning Creative Experiences (CHF 2620), Seminar in Childhood Develop (CHF 2990), Diverse Families (CHF 3350), Child and Family Studies Student Group Advisor. Department of Child and Family Studies, Weber State University (Department Chair: Rosalind Charlesworth; Craig Campbell)
03/06 to 09/09	Child Care Training & Consulting/ Topics: Positive Guidance, Child Social Emotional Well-being, Curriculum Planning, Special Needs. The Children's Center, Salt Lake City, UT (Department Head: Alda Jones)

09/06 to 08/09   Author/Revisions Utah State Office of Child Care School Readiness Training Curriculum. Utah State Child Care Professional Development Institute and Salt Lake Community College (Director: Carolyn Taylor-Christensen)

09/06 to 08/09   Author/Revisions to supplements for Charlesworth, R. (2007, 2010) *Understanding Child Development*, 7*th*, 8*th* ed. Clifton Park, NY: Thomson/Delmar Learning.

09/00 to 07/03   Childcare Supervisor/Non-Traditional Students Hourly Childcare. Student Services Department, Weber State University (Department Head: Jennifer Grandi)

09/92 to 08/00   Early Childhood Educator/Toddler, Pre-school, Kindergarten. Jewish Community Center, Salt Lake City, UT (Director: Mary Ogan)

GRANTS

Head Start Graduate Student Research Grant, Dads' Parents Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D), Administration on Children, Youth and Families, Washington, D.C., 2009-2011, Utah State University 2009.

Child Care Acess Means Parents in School (CCAMPIS), Office of Postsecondary Education, Weber State University, 2001.

PUBLICATIONS

Charlesworth, R., & Anderson, S. (2010). *Instructors Manual for Understanding Child Development,* Clifton Park, NY: Thomson/Delmar Learning.

Anderson, S., & Lund, B. (July, 2010). Professionals in excellence: Davis County Head Start Fatherhood Program. *Newsletter of the Utah Association for the Education of Young Children*. Salt Lake City, Utah.

Anderson, S. (2007). *Professional Enhancement: Child Development,* Clifton Park, NY: Thomson/Delmar Learning.

UNPUBLISHED PRODUCT

Roggman, L. A., Anderson, S., & Cook, G. A. (2011). *Dads' Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO-D).* Logan, UT: Utah State University.

RESEARCH REPORTS

Anderson, S., & Roggman, L. (2011, December) *Dads' Parents Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D); Year 2*. Annual report submitted to Administration for Children, Youth, & Families, US Department of Health and Human Services, Washington, DC

Anderson, S., & Roggman, L. (2010, December) *Dads' Parents Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D); Year 1*. Annual report submitted to Administration for Children, Youth, & Families, US Department of Health and Human Services, Washington, DC

Anderson, S. (June, 2004). *Campus childcare and the persistence of student-parents.* A report prepared for the National Coalition for Campus Children's Centers.

MANUSCRIPTS IN PREPARATION

Anderson, S., Roggman, L. A., Boyce, L., & Cook, G. (in preparation). *Early father and mother play interactions and the development of aggression.*

Anderson, S., & Roggman, L. A. (in preparation). *Early father and mother contributions to language development in the context of family conflict.*

Gurko, K., Anderson, S., Austin, A., & Fronk, A. (submitted). International Awareness of Child Development. (Association for Childhood Education International).

Boyce, L. K., Innocenti, M. S., D'zatko, K., Roggman, L. A., & Anderson, S. (in preparation). *The enduring effects of early impacts on the home environment: An examination of Latino children's school readiness skills.* (Early Childhood Research Quarterly).

REFEREED CONFERENCE PRESENTATIONS

Anderson, S., Roggman, L., & Cook, G., (2012, June). *Developing an observational measure for Head Start Practitioners to use with fathers: Dads' Parent Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D).* Submitted for the Head Start Research Conference, Washington, DC.

Anderson, S., Roggman, L. A., Searle, S., Westover, K., Norman, J., & Cook, G. (2011, March). *Ethnic variations and similarities in father-toddler play activities.* Presentation in poster symposium at the Society for Research in Child Development, Montreal, CANADA.

Anderson, S., Roggman, L. A., Ota, C., Boyce, L., Cook, G., & Norman, J. (2011, March). *Early father play and aggression in toddler boys.* Presentation in poster symposium at the Society for Research in Child Development, Montreal, CANADA.

Anderson, S., Roggman, L., Cook, G., Jump Norman, V., & Price, C. (2010, March). *Fathers' support of toddler play.* Paper presented at the Biennial Meeting of the Society for Research in Human Development, San Antonio, TX.

INVITED CONFERENCE PRESENTATIONS

Anderson, S., & Roggman, L. (2010). *Preliminary reliability and validity for observational measure Dads' Parents Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D).* Head Start Graduate Research Fellows Annual Meeting, Administration on Children, Youth, and Families, Washington, DC.

Anderson, S., Roggman, L., & Cook, G. A. (2010, June). *Dads' Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO-D).* Poster presented at the Head Start National Research Conference, Washington, DC.

Anderson, S., & Roggman, L. (2009). *Dads' Parents Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D) project overview.* Head Start Graduate Research Fellows Annual Meeting, Administration on Children, Youth, and Families, Washington, DC.

MENTORED GRADUATE STUDENT PRESENTATION

McMurdie, S., Anderson, S., Roggman, L. A., Cook, G. A., & Jump Norman, V. (2012, February). *Early positive father behaviors and pre-kindergarten outcomes in minority families.* Poster accepted for

presentation at Society for Research in Child Development Themed Meeting: Positive Development of Minority Children, Tampa, FL.

MENTORED UNDERGRADUATE STUDENT PRESENTATIONS

Aller, T., Anderson, S., & Roggman, L., (March, 2012). *Early family environment and children's 5th grade language and literacy outcomes.* Poster presentation submitted for the National Conference on Undergraduate Research, Ogden, UT.

Aller, T., Anderson, S., & Roggman, L., (March, 2012). *Early father language interactions and children's 5th grade reading achievement.* Poster presentation presented at Student Showcase, Logan, UT.

Anderson, S., & Lee, E. (2011, May). *Father support of toddler language development.* Poster presented at Rocky Mountain Psychological Association Conference, Salt Lake City, UT.

Jump Norman, V., Anderson, S., & Roggman, L.A. (2011, February). *Early father teaching behaviors across culture and context: Father report and observation*. Poster presented at Utah Conference on Undergraduate Research, Ogden, UT.

Jump Norman, V., Anderson, S., & Roggman, L.A. (2011, January). *Early father teaching behaviors across culture and context*. Poster presented at Undergraduate Research on the Hill, Salt Lake, UT.

PROFESSIONAL SERVICE PRESENTATIONS

Anderson, S. (2011, October). *Using Dads' Parent Interactions with Children-Checklist of Observations Linked to Outcomes (PICCOLO-D).* Davis County Head Start, Early Head Start home visitor training, Kaysville, UT.

Lund, Anderson, S., & Gurko, K. (2011, October). *FISHing for fathers*. 9th Annual Utah Child Care Professional Development Conference, Salt Lake City, UT.

Anderson, S., & Ota, C. (2009, October). *Effective, efficient, staff motivation: The butterfly effect*. 7th Annual Utah Child Care Professional Development Conference, Salt Lake City, UT.

Anderson, S. (2009, July). *Mathematics for young children*. Ogden-Weber Community Action Partnership Head Start Staff Training, Ogden, UT.

Anderson, S. (2009, June). *Experimenting with constructivism for adults,* Teaching Family Science Conference, St. George, UT

Anderson, S. (2008, September). *Does money matter? The impact of family income on child outcomes.* Families Alive Conference, Weber State University, Ogden, UT.

Anderson, S. (2008, March). *Five components of trusting relationships.* 33rd Annual Utah Early Childhood Conference. Salt Lake City, UT.

Anderson, S., & Garff, P. (2007, October). *Creating in the classroom II*. 6th Annual Utah Child Care Professional Development Conference, Salt Lake City, UT.

Anderson, S. (2007, March). *Creating in the classroom.* 32nd Annual Utah Early Childhood Conference, Salt Lake City, UT

Anderson, S. (2006, March). *Raising Einstein.* 31st Annual Utah Early Childhood Conference, Salt Lake City, UT.

SELECTED COMMUNITY AND PROFESSIONAL SERVICE

08/04 to Present	Executive Board Member/Vice President/Utah Association for the Education of Young Children (UAEYC). (Current President: Katie Ricord)
03/11 to Present	Early Head Start Research Father Workgroup member/ Early Head Start Research and Evaluation Consortium (Chair: Natasha Cabrera)
09/11 to Present	Community Policy Council Representative/ Ogden Weber Community Action Partnership / Ogden Weber Community Action Partnership. (Program Director: Laura Traum)
09/11 to Present	Dads Really Are Wonderful (D.R.A.W.) committee member/ Ogden Weber Community Action Partnership / Ogden Weber Community Action Partnership. (Program Director: Laura Traum)
07/11 to 09/11	Reviewer/Head Start Research Conference. (Chair: Faith Lamb-Parker)
08/04 to 2010	Governing Board Member/Newsletter Editor/Utah Association for the Education of Young Children (UAEYC). (Current President: Katie Ricord)
08/07 to Present	Professional Development Committee/ Utah Office of Child Care, Salt Lake City, UT. (Program Director: Carolyn Taylor Christensen)
08/07 to 2011	Advisory Board Member/Utah Office of Child Care, Salt Lake City, UT. (Director: Lynette Rasmussen)
09/04 to 05/07	Governing Board Member/Angels for Orphans Co-Director/School of Arts and Recreation (SOAR), Bountiful, UT. (Executive Director: Chris Fife)
01/04 to 06/05	Validator/National Association of Education for Young Children, Washington, D.C.

PROFESSIONAL ORGANIZATION MEMBERSHIP

National Association for the Education of Young Children (1991-2011)
Society for Research in Child Development (2009-2011).