THE ROLE OF MATERNAL VERBAL SENSITIVITY DURING PARENT-CHILD SHARED BOOK READING IN SOCIO-EMOTIONAL FUNCTIONING IN THE PRESCHOOL YEARS

by

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ABSTRACT OF THE DISSERTATION

The Role of Maternal Verbal Sensitivity during Parent-child Shared Book Reading in Socio-emotional Functioning in the Preschool Years

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The concept of maternal sensitivity has shifted over time to include a focus on engagement with the child at a mental level in addition to physical and emotional care. This study investigates this idea, using data from the Early Childhood Longitudinal Study-Birth Cohort. Maternal verbalization was captured using the Reading Aloud Profile–Together coding during mother-child book reading. Findings using latent class analyses showed that mothers could be classified into two distinct classes having different verbalization styles. Identified maternal verbal sensitivity was marked by bringing her child's world into communication and by facilitating the child to engage in communication, asking both close- and open-ended questions; whereas, less sensitivity at the verbal level was marked by focusing on the book rather than the child's experiences. The predictive validity of maternal verbal sensitivity was supported as it was positively associated with the child's social competence as rated by mothers, while at the same time being negatively associated with the child's externalizing behaviors as rated by both mothers and early care/education providers. This study fills a gap in the literature concerning correlates of maternal verbal interactive styles. Its findings suggest that

maternal verbal sensitivity is a behavior not depending on contextual factors. Its findings also support Ainsworth's conceptualization of maternal sensitivity—a capacity to tailor responses to the child's individuality. Importantly, the overall findings showed the moderating role of maternal verbal sensitivity on the relation between mother/child background characteristics and the child's socio-emotional functioning, suggesting the effectiveness of interventions utilizing mother-child dyadic book-reading contexts. Furthermore, the findings imply that preschoolers have come to refine or re-organize the internal working models of the social worlds in the context of mother-child communication, which supports theoretical notions posited by attachment researchers. Finally, the findings underscore the methodological advantages of a person-level approach in investigating a new construct which is exploratory in nature and empirically driven. This study looked at the constellation of verbalizations at the person-level, thereby yielding the information about the complexity of them.

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CHAPTER I

INTRODUCTION

The psychological well-being of children is an important research agenda. A growing body of research suggests that the onset of emotional and behavioral problems become apparent in early childhood (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Knitzer & Cooper, 2006; Shaw & Gross, 2008). Evidence has consistently shown that about 10 to 20 % of preschoolers exhibit externalizing problems at a significant level at home or in preschool settings, and approximately half of them continues to display externalizing behaviors over time, thereby warranting a Diagnostic and Statistical Manual of Mental Disorder diagnosis (Campbell, 2002; Fanti & Henrich, 2010; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996; Najin & Tremblay, 1999; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Speltz, McClellan, Deklyen, & Jones, 1999).

These emotional and behavioral problems have been shown to be associated with parenting behaviors (Erickson, Sroufe, & Egeland, 1985; Greenberg, Speltz, DeKlyen, & Jones, 2001; Keller, Spieker, & Gilchrist, 2005; Kim & Baer, 2010; LaFreniere & Sroufe, 1985). Specifically, maternal sensitivity, a theoretical tenet of attachment theory, has been widely studied in research on child behavior problems and social competence. However, very little work has been done on the verbal aspects of maternal sensitivity and their effects on preschoolers' behavior problems and social competence. Therefore, this dissertation addressed this gap by investigating the construct of maternal verbal sensitivity during mother-child book reading. Maternal verbal sensitivity is herein defined as the mother's verbal elaboration of her child's responses and her directives to the child to engage in mother-child communication. This activity is purported to increase

her preschooler's mental organization of thoughts, feelings, and experiences. Furthermore, the study filled a gap in the literature by investigating correlates of maternal verbal interactive styles in regard to maternal background characteristics, which may be involved in parenting, such as education, marital/romantic relationship, and depressive symptoms. Study characteristics of the child, which may affect parenting in book reading contexts, include: sex, temperament, attachment security, and language and literacy ability. These characteristics of mothers and children were examined for the mediating and/or moderating effects of maternal verbal sensitivity on the children's socio-emotional functioning.

This study used a nationally representative sample to investigate which characteristics of maternal verbalization in a dyadic book-reading context consolidate children's capacity for adaptive responses to impulses and desires, a concomitant of behavior problems and social competence. No published study, using a nationally representative sample, examining these relationships was located to-date. Furthermore, most studies of mother-child communication have relied on white middle-class samples, which limits the generalizability of the findings to a more diverse population. Data for this study come from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), a longitudinal study of a birth cohort of children born in the year of 2001 in the United States.

CHAPTER II

LITERATURE REVIEW

This chapter discusses the theoretical framework of this study. The framework covers verbal aspects of maternal sensitivity during parent-child book reading, mothers' and children's characteristics that affect verbal aspects of parenting behavior, and child socio-emotional functioning. Study characteristics of the mother include education, husband/partner relationship, and depressive symptoms. Study characteristics of the child include sex, temperament, early attachment security, and language and literacy ability. Related empirical findings follow. Following the literature review, research questions, hypotheses, and conceptual models are addressed.

Theoretical Framework

Maternal sensitivity is a component of attachment theory. Attachment theory postulates the process by which internal working models (IWM) of self and others are developed in early childhood. What follows is a review of the concept of maternal sensitivity from its earlier conceptualization to recent research: (a) maternal sensitive responsiveness to the infant's needs for physical care and affectionate bonding; and (b) maternal verbal sensitivity to engagement with the child at a mental level. This review also demonstrates the need to assess developmentally-appropriate maternal sensitivity, particularly sensitive verbalizations of mothers whose children are at preschool age.

The Concept of Maternal Sensitivity

A core parenting construct referred to as 'maternal sensitivity' is a theoretical tenet of attachment theory. It has been empirically identified as important to behavioral problems (Belsky & Fearon, 2002; Erickson et al., 1985; Kim & Baer, 2010) and social

competence (Ainsworth, Bell, & Stayton, 1974; Belsky & Fearon, 2002; LaFreniere & Sroufe, 1985; Sroufe, Egeland, & Carlson, 1999) during early childhood. Attachment theory postulates that caregiver sensitivity provides a foundation for a child's expectations about and approach to the social world (Bowlby, 1969, 1982), and also a foundation for a child's capacity to modulate emotion and behavior (Cassidy, 1994; Weinfield, Sroufe, Egeland, & Carson, 2008). This process in turn affects the child's socio-emotional functioning that involves emotional and behavioral coordination in dealing with social demands. Supporting the important role of maternal sensitivity, Main (1990) also mentioned that just as many biological systems have evolved to permit human adaptation, as infants have evolved with the capacity to respond flexibly to a particular type of caregiving. Thus, infants learn to tailor their own emotion and behavior in a range of response options, which are based on their history of experiencing maternal sensitivity.

However, as children develop language, parent-child discourse is the avenue through which children learn to evaluate their experiences. Therefore, an important issue in studying maternal sensitivity is to capture the nature and quality of maternal responses beyond the child's infancy. Since Ainsworth's conceptualization of maternal sensitivity, attachment theorists have tried to fully grasp it manifested in different modes. A body of research findings indicates that maternal verbal sensitivity is important, especially for children at the preschool age.

Ainsworth's Conceptualization of Maternal Sensitivity. In the 1970s, the concept of maternal sensitivity was constructed on the basis of both the literature of attachment theory (Bowlby, 1969) and a series of home observations of mother-infant dyads

(Ainsworth et al., 1971, 1974; Ainsworth, Blehar, Waters, & Wall, 1978). Ainsworth et al. (1971) defined the concept of 'maternal sensitivity' as the mother's ability to perceive and interpret her infant's signals accurately and then respond to these signals consistently, contingently, appropriately, and promptly. They established four dimensions for assessing maternal behavior in early infant-mother interactions: sensitivity, acceptance, cooperation, and accessibility. These four dimensions were found to be strongly related to the infant's (aged between 12 and 18 months) secure attachment behavior in the Strange Situation, with mothers who scored highly on sensitivity and who demonstrated more acceptance, cooperation, and accessibility with their infants. Ainsworth et al. (1971, pp. 43) described mothers of securely attached infants as being "capable of perceiving things from [the child's] point of view" and "respect[ing] his activity-in-progress and thus avoid[ing] interrupting him". Finally, Ainsworth and her colleagues concluded that the most important aspect of maternal behavior commonly associated with infant attachment emerges as "sensitive responsiveness to infant signals and communications" (Ainsworth et al., 1978, pp.152). Subsequent research employing Ainsworth et al.'s sensitivity scale has supported the relation between early maternal sensitivity and the security of attachment relationship in comparable American samples (Isabella, 1993). Furthermore, Sagi's (1990) cross-cultural analysis also supported it, based on analyses of data from different countries including Germany, Israel, Sweden, Holland, Japan, and USA.

Expanded Conceptualization of Maternal Sensitivity in Emotional Availability Framework. While maternal behaviors in relation to infant attachment security continued to be studied to determine the antecedent conditions that influence the development of attachment, Biringen and Robinson (1991) presented a reconceptualization of maternal

sensitivity in their emotional availability framework. Their interpretation of sensitivity in Ainsworth et al.'s original definition included two other features. One was the mother's ability to negotiate dissonant moments. The other was the dyadic expression of a range of affectivity with a preponderance of positive affect and effective affect regulation. Based on this framework, the Emotional Availability Scales (EAS: Biringen, Robinson, & Emde, 1993) assesses maternal sensitivity on four dimensions: sensitivity, structuring, nonintrusiveness, and nonhostility.

Although more replication of the study is needed before concluding that the EAS subsumes Ainsworth's concept of maternal sensitivity, the mixed findings on the EAS across different age groups suggest that the nature of appropriate parenting changes as children develop. Bretherton (2000) also noted that the EAS may be more appropriate for measuring maternal sensitivity of mothers whose children are toddlers than those whose children are infants, given that structuring and negotiation is more common in toddler–parent interactions. For example, a study (Ziv, Aviezer, Gini, Sagi, & Koren-Karie, 2000) of 687 Israeli infant-mother dyads found a significant difference on infant attachment security, but only for the maternal sensitivity dimension not for the other three dimensions. Meanwhile, a study (Kang, 2005) of 86 American toddler-mother dyads found that all four dimensions of the EAS were significantly associated with the toddlers' externalizing problems, and the dimensions of non-intrusiveness and non-hostility were significantly negatively correlated with their internalizing problems.

Rethinking Maternal Sensitivity: Maternal Mind-mindedness. Re-examination of the concept of maternal sensitivity was advocated in response to the meta-analysis by De Wolff and van IJzendoorn (1997). The medium effect sizes for the association between

maternal sensitivity and the infant's attachment security challenged the exclusive postulation of maternal sensitivity as a determinant of attachment security. Thus, another type of behavior was considered as indicative of the mother's sensitivity to her infant's mental state. According to Meins, Fernyhough, Fradley, and Turkey (2001), the central criterion of Ainsworth et al.'s definition of sensitivity is that mother's response to her infant is not merely prompt or contingent, but also appropriate to the infant's signals. Reconsidering the feature of appropriateness of maternal responses within a Vygotskian approach, Meins (1997) introduced the concept of maternal mind-mindedness to describe the mother's willingness to treat her infant as a mental agent capable of having representations of the world and different stances or perspectives. In particular, Fonagy, Steele, Steele, Higgitt, and Target (1994) and Meins et al. (2001) argued that sensitive responsiveness to the child's physical and emotional needs should be distinguished from the mother's capacity or willingness to engage with her infant at a mental level. They argued the importance of considering maternal mind-mindedness when measuring maternal sensitivity, rethinking Ainsworth et al.'s construct of maternal sensitivity that had been broadly operationalized.

Verbal Aspects of Maternal Sensitivity at the Verbal Developmental Stage

The developmental changes of children circle back to the issue of appropriateness of maternal interactive behavior in Ainsworth et al.'s concept of maternal sensitivity. Beyond infancy, by 30 months of age when the child enters the verbal phase of brain development (Bowlby, 2007), maternal sensitivity may be manifested through mother-child dialogues, a process in which they co-construct the child's everyday experiences. As a child engages in organizing a complex body of information that is discussed with

the attachment figure, the child has an opportunity to appraise and further reinterpret various feelings and thoughts.

Attachment theorists have mentioned the importance of mother-child communication in the development of attachment security beyond infancy. Bowlby (1973, 1979, 1988) speculated that parent-child communication plays an important role in the development of internal working models of self and others beyond infancy. According to Bretherton (1990, 1995), children's experience of sensitive, open and fluid communication with parents provides the child with feelings of security, which in turn gives the child the ability to modulate affect and further coherently organize the internal working models. Through structuring dialogues and leading questions, parents and a child may co-construct the child's beliefs and expectations about self with attachment figures in an organized way in accordance with their experience.

Relatively recently, some investigators of autobiographical memory have provided tools for examining Bowly's speculation about the contribution of parent-child communication to the child's mental representations of the social world (Bretherton & Munholland, 2008), which in turn affect a child's socio-emotional functioning. This line of investigation found that maternal use of an elaborative discourse style is marked by open-ended questions and expansion of information provided by children (Fivush, Haden, & Reese, 2006; Fivush & Fromhoff, 1988; Reese, & Fivush, 1993). Emerging research has examined the role of parental discourse style from an attachment perspective. Although empirical support is scant, studies found that child attachment security was correlated with maternal elaborative style during parent-child memory talk (Bost, Shin,

McBride, Brown, Vaughn, Coppola, Verĭssimo, Monteiro, & Korth, 2006; Farrant & Reese, 2002; Fivush & Vesudeva, 2002; Laible, 2004a; Laible & Panfile, 2009).

In addition, although this co-construction process is bidirectional, attachment theory highlights the initial importance of maternal sensitivity for responding to the child's signals with appropriate feedback (Bretherton, 1993). Empirical findings support this theoretical speculation: the larger roles in co-constructing preschool aged children's beliefs and expectations are played by mothers. According to Fivush (2007), regarding reminiscing, children aged 3 to 5 are able to engage in more detailed conversations about the past, but they still rely on adults to provide most of the structure and content. Brown, Donelan-McCall, and Dunn's study (1996), using natural language data from thirty-eight 47-month-olds, found that mothers referred to mental states about four times as often as did their children. Also, studies (Beeghly, Bretherton, & Mervis, 1986; Ensor & Hughes, 2008; Garner, Dunsmore, & Southam-Gerrow, 2007; Howe, Rinaldi, & Recchia, 2010; Howe & Ross, 1990; Laible, 2004a; Lagattuta & Wellman, 2002) have documented that preschoolers are more likely to employ their mothers' use of internal-state references as well as their mothers' use of elaborative discourse styles. In this regard, the proposed study will focus on individual differences in mother's verbal behaviors rather than the child's in this co-constructing process.

Based on the theoretical framework and empirical studies of mother-child discourse, maternal verbal sensitivity herein is defined as the mother's verbal elaboration of her child's responses and her directives to the child to engage in mother-child communication. This conceptualization of verbal sensitivity of mothers whose children are in preschool period could be considered reflecting the concept of maternal sensitivity

as described by Ainsworth et al., given the developmental appropriateness considering the child's cognitive and linguistic skills and the initial importance of maternal sensitivity tailoring mothers' response to the child's individuality. Also, this concept of maternal verbal sensitivity reflects the concept of maternal mind-mindedness as described by Meins. Carpendale and Lewis (2004) also hypothesized that parent-child discourse would be intricately linked to maternal mind-mindedness in that both pertain to engaging with her child at a mental level. That is, mothers who see their children as a mental agent capable of constructing mind presumably talk to their children about the thoughts of the child, primarily concerning the children's stances on their experiences.

Summary

Since Bowly's (1969, 1973, 1982) theoretical achievements and Ainsworth's (1963, 1967, 1971, 1978) empirical support for attachment theory, it has been the most comprehensive framework for explaining early socio-emotional development. Attachment theory suggests that caregiver sensitivity is strongly related to the child's attachment quality, which is the internalization of patterns of experiences with the primary caregiver (Ainsworth, 1990; Ainsworth, et al., 1971). Within the internal working models of self with the attachment figures, children evaluate their situations and make plans in interaction with others, which in turn influences their socio-emotional functioning (Bowlby, 1980; Sroufe, 1983).

As for socio-emotional development beyond infancy, attachment theorists (Bowlby, 1973, 1988; Bretherton, 1990) also postulated that sensitive, open communication with parents provides the child with feelings of security, which in turn gives the child the ability to modulate affect and further coherently organize the internal

working models of self and others. Based on this theoretical notion, the verbal level of maternal sensitivity has been postulated in addition to the behavioral level (Bretherton, 2005; Fonagy et al., 1994; Meins et al., 2001). While the behavioral level involves sensitive responsiveness to the child's physical and emotional needs, the verbal level emerges from the caregiver's sensitivity to engagement with her child at a mental level. Recent work on parental behaviors (Fivush, 2007; Ontai & Virmani, 2010; Page, Wilhelm, Gamble, & Card, 2010; Shin, 2007) suggests that parental sensitivity and parental communication are importantly involved. This supports the theoretical notion that parent-child discourse contributes to the child's mental organization of experiences, feelings and beliefs by affording opportunities to appraise, re-evaluate, and organizing various feelings and thoughts in accordance with experience. Based on this theoretical framework, maternal verbal sensitivity herein is defined as the mother's verbal elaboration of her child's responses and her directives to the child to engage in mother-child communication by asking for information and expanding the information provided by children. Meanwhile, studies of verbal aspects of maternal sensitivity are emerging, suggesting that more research is needed on the concept of the verbal level of maternal sensitivity.

Verbal Aspects of Maternal Sensitivity and Preschoolers' Socio-emotional Functioning

Only a few studies have empirically assessed the relation between the verbal aspects of maternal interactive behavior and the child's socio-emotional functioning in the preschool period. Further, overall findings from studies of mothers' elaboration have been mixed. Oppenheim, Nir, Warren, & Emde (1997) found no significance between

children's behavior problems and maternal elaboration, where maternal elaboration was marked by effective guidance to help the child organize themes in a coherent form during co-construction of a fictional story at children's ages of 4 ½. In Oppenheim et al.'s study, behavior problems were measured by children's CBCL/4-18 scores as reported by mothers at children's ages of 4 ½ and 5 ½. Curenton & Craig (2009) also found that evaluative discourse during both storytelling and shared-reading has no significance in mother-reported behavior problems of preschoolers aged between 38 and 66 months, where maternal evaluative discourse was marked by facilitation to address unintended consequences of the story character's behaviors or the story character's behaviors, thoughts or feelings.

Inconsistent with the findings reviewed earlier, Garner et al. (2007) demonstrated that maternal unelaborated comments on emotion were a significant contributor to children's physical aggression in a same-gender triadic play situation, where parent-child talk was observed in the context of a wordless picture book reading. Studies also suggest a significance of maternal elaborative discourse in child behavior problems. In Laible's (2004b) study of children between the age of 30 and 36 months, maternal elaborative discourse predicted children's behavioral regulation observed 6 month later. Maternal elaboration was assessed in the context of emotion-laden discourse (i.e., two conversations about the child's past good behaviors and misbehaviors). The same results were reported in a cross-sectional study (Laible, 2004a) of children between the age of 3 and 5 years, where maternal elaboration was assessed in both a reminiscing talk and a storybook reading context.

As for social competence, mixed results were also reported. In Laible's studies (2004a, 2004b) maternal elaborative discourse did not make a significant contribution in predicting both prosocial behaviors and autonomous compliance with family rules—both as reported by mothers. Curenton and Craig (2009) also reported no significance of evaluative discourse. However, Garner et al. (2007) demonstrated that maternal explanation of emotions was positively associated with the child's prosocial behaviors in a same-gender triadic play situation.

Taken together, in all the identified studies linking maternal verbalization with children's socio-emotional functioning, maternal verbalization in mother-child dyadic interaction was marked by maternal characteristics of elaborative styles that afford a child's coherent organization of thoughts and feelings by facilitating her child's engagement in the discourse, asking for information, and providing expanded information in response to the child's comments. However, the studied contexts of mother-child talks varied, which may lead to inconclusive results in predicting children's socio-emotional functioning. For example, Oppenheim et al. (1997) provided with plausible explanations of the unexpected results, where the mother-child talk was observed in the context of a fictional story making. Some mothers may be effective facilitators in real-life parent-child talks, but may not be less experienced or comfortable in a fictional, play-narrative mode. Thus, the nature of task may hinder the capture of real maternal verbal behaviors practiced in everyday parent-child talk. This suggests that future studies employing contexts reflecting realistic maternal verbal behaviors may be necessary to build knowledge of maternal verbal sensitivity's role in shaping child's socio-emotional functioning. In addition, it appears that all previous studies relied on small-size, white,

mostly middle- or upper middle-class samples of preschooler-mother dyads. Thus, studies of diverse population are needed. The next section reviews previous research that examined factors influencing individual differences in parental interactive verbal behaviors.

Factors Related to Maternal Verbal Sensitivity

The literature on parent-child communication and parent-child interaction has identified both maternal and child characteristics as sources of the variability observable in mothers' communication with children, suggesting the importance of considering both types of characteristics when studying maternal verbal sensitivity.

Maternal Characteristics

Educational attainment. Studies have suggested that a covariate of socioeconomic status, maternal educational attainment influences maternal talk with young children. For example, Hoff-Ginsberg (1992) showed that college-educated mothers produced more talk, more conversational-eliciting talk, and less directive talk in interaction with their toddlers than did high school-educated mothers. Rowe, Pan, and Ayoub (2005) also found that maternal educational attainment had a significant positive effect on the amount of maternal talk within dyads from low-income families, where the dyads were observed at child ages 6, 14, and 24 months during a semi-structured play in home.

Furthermore, studies have consistently suggested that maternal educational attainment predicts maternal verbal interactive behaviors better than does socioeconomic status. For example, Borduin and Henggeler (1981) found that maternal verbal ability was a better predictor than socioeconomic status of maternal use of questions and commands during play interactions and also the manners that mothers command of their

preschooler sons in intact white families. Middle-class mothers asked higher rates of questions than did the lower-class mothers while the lower-class mothers issued higher rates of direct commands than did the middle-class mothers. A related study (the NICHD Early Child Care Research Network, 2005) also showed that maternal education had greater substantive significance for maternal sensitivity than income-to-need ratio.

Husband or partner relationship. Few studies have examined the influence of the spouse/partner relationship on maternal verbal interactive behaviors toward her child. Thus, less is known about the influence of the spouse/partner relationship on maternal verbal interactive behaviors. Many studies demonstrated positive influence of two-parent status on parenting (Ainsworth, 1963; Lyons-Ruth, Wolfe, Lyubchik, & Steingard, 2004; The NICHD Early Child Care Research Network, 2005). However, Lyons-Ruth, Lyubchik, Wolfe, and Bronfman (2002) suggested more hostile parenting in two-parent families than in single-parent families, based on a study using nationally representative survey data. These conflicting findings may suggest the importance of considering the spouse/partner relationship in studying maternal sensitivity at the verbal level.

Additionally, given that the spouse/partner relationship could be a resource buffering stressful life events or could be a situational demand where relational adjustment is required (Abidin, 1992; Belsky, 1984), the spouse/partner relationship may have the potential to influence maternal verbal sensitivity. To date, the influence of this type of stressor on maternal verbal interactive behaviors has not been studied although a significant relation between parenting stress and maternal sensitive responsiveness (DeGroat, 2003; Feldman, Eidelman, & Rotenberg, 2004; Peetsma, Paulussen-Hoogeboom, Hermanns, & Stams, 2008) has been identified.

Depressive symptoms. Previous studies consistently reported negative effects of maternal depression on maternal verbal interactive behaviors. Compared to mothers without depression, depressed mothers showed less verbal responsiveness during semi-structured plays and picture book reading with children aged 31 to 52 months (Hwa-Froelich, Cook, & Louise, 2008) and, likewise, in a naturalistic setting with children aged between 24 and 42 months and between 2 and 3 years (Zvia & Tracy, 1987, 1997, respectively). Compatible results were also shown in dyads from low-income family at child ages 6, 14, and 24 months (Rowe et al., 2005). A study by Jacob and Johnson (1997) also suggested the significance of maternal depression: depressed mothers exhibited less approval and less congeniality characterized as using humor and talk, compared to their less depressed counterparts during parent-child communications for problem solving with children aged between 10 and 18 years.

In addition to the studies of parent-child communication, other related studies have suggested that maternal depression influence maternal verbal sensitivity. A meta-analysis (Lovejoy, Graczyk, O'Hare & Neuman, 2000) demonstrated a small to moderate association between depression and maternal parenting disengagement. Maternal depression was associated with lower levels of stimulation to their infants (Tronic & Weinberg, 1997), hostile and inconsistent caregiving for children under the age of 3 years across income levels (Lyons-Ruth, et al.,2002; Lyons-Ruth, et al., 2004), insensitivity and unresponsiveness to 3-years-old children (The NICHD Early Child Care Research Network, 2005), insensitivity to 4-year-old children (Trapolini, Ungerer, & McMahon, 2008), while some studies found no significant relation between maternal depression and either joint attention in a sample from middle class in U.S. (Henderson & Jennings, 2003)

or sensitivity in a sample of black South African living in extreme poverty (Tomlinson, Cooper, & Murray, 2005) during an interaction with their 18-months-olds.

Child Characteristics

Sex. Studies suggest that maternal use of elaboration is related to the sex of preschoolers. When sex differences are reported, parents used more yes/no questions with boys than girls (Sales, Fivush, & Peterson, 2003) and mother-son dyads together used more evaluative comments than mother-daughter dyads (Curenton & Craig, 2009). On the other hand, mothers were more elaborative in reminiscing talk with their daughters than with sons at the child's age of 40 months. However, these differences disappeared when children were 70 months old (Reese, et al., 1996). Although these studies identified sex differences in the preschool period, a recent study (Bost, Choi, & Wong, 2010) found no sex differences in maternal use of elaboration during memory talk and semi-structured play among 36 mother-preschooler dyads in which the children's mean age was 32 months.

Temperament. Young children's temperament has been considered a factor linked to the quality of parenting (Bauer & Burch, 2004; Bost et al, 2010; Lewis, 1999; Mills-Koonce, Graiépy, Propper, Sutton, Calkins, Moore, & Cox, 2007; Park, Belsky, Putnam, & Crnic, 1997; Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma, 2008; Rubin, Nelson, Hastings, & Asendorpf, 1999) exerting a bidirectional influence on mother-child interaction in tandem with maternal characteristics (Clak, Kochanska, & Ready, 2000; Kochanska, Friesenborg, Lange, & Martel, 2004). Temperament refers to a dispositional individual difference in the emotional and behavioral reactivity and self-regulation that are exhibited by infants or young children across different contexts in response to a range

of stimuli (Rothbart & Bates, 1998; Zeanah & Fox, 2004). It has been shown to be moderately stable over time (Rubin, et al., 1999; Sanson, Hemphill, & Smart, 2004), but was also shaped by experience (van den Akker, Deković, Prinzie, & Asscher, 2010; Derryberry & Rothbart, 1997; Kochanska, 2001).

A few studies on parent-child talk have examined how child temperament is related to maternal conversational engagement and style. Further, studies have examined only contemporaneous associations and the findings are mixed. While Bost, et al. (2010) found no significance between child temperament and maternal elaboration during memory talk with their preschoolers, Laible (2001a) found that mothers of children with negative reactivity were more likely to adopt an elaborative style than were their counterparts. On the contrary, Lewis (1999) found that mothers of preschoolers with a difficult temperament that was characterized as less active and less sociable were more likely to repeat the same information and confirm or negate their children's utterances, rather than to elaborate them during reminiscing talk with their children aged between 3 and 5 years. Similarly, Bauer and Burch (2004) found that parents were more verbally engaged with their toddlers if they had rated their children's temperament as more interested and persistent.

Related longitudinal studies, although more about parenting style than parent-child talk, may suggest the evocative influence of child temperament on maternal verbal sensitivity. A path model (Rubin et al., 1999) showed that children's early shyness at age 2, as rated by the mother, directly influenced the mothers' later discouragement of independence at age 4. An example of questions assessing encouragement of independence included encouraging my child to be curious, to explore, and question

things. Similarly, Kochanska, Aksan, and Joy (2007) found that children's temperamental proneness to fear, observed at 7 months, was negatively associated with maternal power assertive verbal and physical discipline in semi-structured laboratory contexts when the children were 17 months. The same results were also found in the interval between the ages of 22 and 33 months.

Attachment security. Studies of child attachment and maternal elaborative verbalization indicate that they are positively related to each other(Etzion-Carasso & Oppenheim, 2000; Farrant & Reese, 2002; Fivush & Vesudeva, 2002; Laible, 2004a; Laible & Panfile, 2009; Shin, 2007) and to the mother's own mental representation of her attachment experience (Shin, 2007; Vaughn, Coppola, Verissimo, Monteiro, Santos, Posada, Carbonell, Plata, Waters, Bost, McBride, Shin, & Korth, 2006; Dykas, Woodhouse, Cassidy, & Waters, 2006). Although previous studies suggest that the mother's own mental representation of her attachment experience is an important variable for maternal verbal sensitivity, this review focuses on child attachment since the current study do not include it because the information is not in the ECLS-B data.

Previous findings consistently support the notion that mothers of securely attached children tend to be more responsive to their children's narrative, compared to mothers of insecurely attached children. For example, Etzion-Carasso and Oppenheim (2000) demonstrated a link between children's earlier attachment security and mother–child talk at age 4½ years. Securely attached child-mother dyads in infancy, as assessed by the Strange Situation procedure, later displayed a more open communication style after a brief separation. An open communication style was more coherent and co-constructive, with mothers following their children's lead, exploring related topics, and

centering the conversation on the children. Studies of reminiscing talk have also found that attachment security as assessed by the AQS was correlated with maternal elaborative reminiscing, suggesting that secure attachment facilitates and insecure attachment impedes this socialization process: attachment security at 19 months was correlated with maternal elaborative style at all three ages of 25, 32, and 40 months over time (Farrant & Reese, 2002); maternal elaborative style was contemporaneously correlated with attachment security among 4-year-olds (Fivush & Vesudeva, 2002) and preschoolers aged 3 to 5 years (Laible, 2004a).

Language and literacy ability. Because shared book reading is a language- and literacy-based task, children's language and literacy abilities may be related to maternal verbalizations. Several studies of mother-child talk about past have found mothers to be more elaborative with young preschoolers who have higher receptive and expressive language ability (Farrant & Reese, 2000; Haden, Ornstein, Rudek, & Branstein, 2009; Newcombe & Reese, 2004; Reese et al., 1993). Mothers who were more elaborative when their children were young remained more elaborative that other mothers as their children grew older and more linguistically sophisticated (Newcombe & Reese, 2004). This result suggests that maternal verbal sensitivity pertains to the maternal capacity for engaging with the child rather than depending on children's individual differences. However, this link between children's linguistic ability and maternal elaborativeness has not been found in studies of older preschoolers (Reese & Brown, 2000; Reese et al., 1993) or in a study of children aged 5 to 6 (Reese, Bird, & Tripp, 2007).

Other Factors Related to Preschooler's Socio-emotional Functioning

There are many ways of identifying preschoolers' socio-emotional functioning, such as categorical approaches (e.g., conduct disorder, oppositional defiant disorder, anxiety disorder, and depression) and dimensional approaches (e.g., externalizing behaviors, internalizing behaviors, and social competence). This study adopted a multi-dimensional approach since the ECLS-B data provide the dimensional information on socio-emotional functioning. Although dimensional approaches do not include enough symptom specificity (e.g., frequency, duration, and onset), when compared to categorical approaches, they are more informative for identifying clusters of socio-emotional functioning during preschool age (Achenbach & Rescorla, 2000) than for diagnosing young children. The externalizing dimension corresponds to aggressive, defiant, destructive, and/or hyperactive behavior. The internalizing dimension corresponds to anxious and/or depressed and withdrawn behavior (Achenbach, 1991a, 1991b, 1992; Campbell, 1990).

Meanwhile, researchers and clinicians are increasingly concerned with individuals' competent functioning beyond the traditional concept of health as the absence of disease. A focus on competence means that symptoms alone do not make a disorder: their functional significance for individual's adapting successfully to social and environmental demands also must be considered (Zeanah & Zeanah, 2009). According to Waters and Sroufe (1983), the coordination of affect, cognition, and behavior is closely tied to flexible adaptive responses to demands. Thus, social competence in the preschool years refers to "flexibility in managing impulses and desires in engaging problems and

opportunities in the environment" (Warters & Sroufe, 1983, p. 10). Therefore, this study considered social competence as well.

This section reviews previous research that examined factors influencing individual differences in children's socio-emotional functioning. The literature on socio-emotional functioning has identified both maternal and child characteristic as sources underlying the considerable variability in children's socio-emotional functioning. This suggests the importance of considering both types of characteristics when studying children's socio-emotional functioning. As for maternal characteristics, since the literature connecting maternal verbal sensitivity and children's socio-emotional functioning was reviewed in the earlier section, this section addresses the other characteristics of mothers. In addition, since the ECLS-B data do not include sufficient information on internalizing problems, this section reviews the literature, focusing on externalizing behaviors and social competence rather than internalizing behaviors.

Maternal Characteristics

Educational attainment. The evidence is fairly consistent that socioeconomic status is associated with child behavior problems. A systematic review (Qi, & Kaiser, 2003) of 30 studies of preschoolers aged 3 to 5 years found that children from low socioeconomic status backgrounds had a higher incidence of behavior problems than the general population. A large-scale, longitudinal study (Fanti & Henrich, 2010), using the NICHD Study of Early Child-Care, demonstrated that children having externalizing problems were influenced by overall socio-demographic status consisting of family finance, maternal marital status, and maternal education, as assessed at during the child's

infancy. Thus, maternal educational attainment, a covariate of socioeconomic status, was examined in terms of the child's socio-emotional functioning.

As for social competence, little is known about socioeconomic status differences. Given documented socioeconomic status differences in externalizing problems, perhaps socioeconomic status differences in preschoolers' social competence are suggested by certain indirect findings. These include reported negative associations between overt aggression and pro-social behavior (Crick, Casas, & Mosher, 1997), and between externalizing behaviors and social skills (Winsler & Wallace, 2002), as rated by preschool teachers. Pro-social behavior was assessed by the Preschool Social Behavior Scale-Teacher Form (PSBS-T; Crick et al., 1997) in Crick, et al.'s (1997) study and social skills were assessed by the Preschool and Kindergarten Behavior Scales (PKBS; Merrell, 1994) in Winsler and Wallace's (2002) study.

Husband or partner relationship. Studies have shown an advantage for children growing up in married households versus those growing up with single parents (Grindglas & Weinraub, 1995; Hetherington, Bridges, and Insabella, 1998; Jenkins & Smith, 1993). Those studies suggest the indirect effects on the child's socio-emotional development of single-parent homes, which exacerbate risk factors for child behavior problems and social incompetence, such as less adequate parenting, lower maternal emotional well-being, and greater financial disadvantage (Spjeldnes & Choi, 2008). However, Kesner and Patrick (2001) found that there was no difference in social skills among preschoolers between single- and two-parent homes after controlling for families' socio-economic status. Thus, these inconsistent findings suggest that it is needed to consider spouse/partner relationships as well.

In terms of marital functioning, according to Hetherington et al. (1998), children from divorced and remarried families were more likely than children from non-divorced families to exhibit externalizing and internalizing behaviors. A recent study (Peters & Dush, 2009) of children between the ages of 4 and 15 years, using the National Longitudinal Survey of Youth, found that children who were born and grown up in stable single-parent homes had less behavior problems than children who, while their mothers underwent marital status change, underwent a transition in parenting; and they were not different from those in stable married households in regard to behavior problems.

In addition, Garner et al.'s (2007) identified adverse family ecology, including life stress during the preceding 6 months, as a risk factor influencing the child externalizing problems. This may suggest that maternal marriage or romantic relationship change affects child behavior problems. Accumulated research has shown an association between marital relationship quality and children's externalizing problems (Cummings & Davies, 2002; Feldman, 2007; Fincham, 1998; Gottman & Katz, 1989; Grych, Fincham, Jouriles, & McDonald, 2000; Henderson, Sayger, & Horne, 2003; Pauli-Pott & Beckmann, 2007; Spjeldnes & Choi, 2008). This association has been consistent across a wide range of age groups from toddlers to elementary school-aged children. These studies suggest that effects on externalizing problems are predominately mediated or moderated by an indirect pathway resulting from less adequate parenting or the child's temperament.

As for social competence, accumulated evidence has shown the indirect effect of marital relationship quality (Finger, Eiden, Edwards, Leonard, & Kachadourian, 2010; Gotman & Katz, 1989; Hipwell, Murray, Ducournau, & Stein, 2005; McCloskey &

Stuewig, 2001; Stocker & Youngblade, 1999). These studies suggest that effects on social competence are predominately mediated by parenting practice. For example, Gottman and Katz (1989) found that marital distress was associated with an unresponsive parenting style, which, in turn, predicted lower levels of peer interaction and more negative peer interaction among the 4- to 5-year-old children. Additionally, Goodman, Barfoot, Frye, and Belli (1999) found the direct effects of marital dysfunctioning on poor social problem-solving skills.

Depressive symptoms. The evidence appears to be fairly consistent that maternal depression is associated with child socio-emotional functioning (Kim & Baer, 2010). A large-scale longitudinal study (Fanti & Henrich, 2010) demonstrated trajectories of externalizing and internalizing problems from ages 2 to 12, using a latent class growth-curve modeling. Children scoring high in behavior problems at age 2 showed increased symptoms over time. Externalizing problems were influenced by maternal depression that was reported during the child's infancy. Consistent associations were found by Jacob and Johnson (1997) among children aged 13.74 months on average. Ashman, Dawson, and Panagiotides (2008) followed 159 children from infancy to age of 6 ½, using growth mixture modeling. Children of chronically depressed mothers were found to have elevated externalizing behavior problems and decreased social competence. Dietz, Jennings, and Abrew (2005) also found that toddlers exposed to maternal depression demonstrated significantly more defiance and less social skill in their self-assertive strategies when interacting with their mothers than did toddlers who were never exposed to maternal depression.

Child Characteristics

Sex. Well documented sex differences indicate that boys are more likely to exhibit externalizing behaviors then girls, and girls are more likely to exhibit internalizing behaviors than boys (Fanti & Henrich, 2010). For example, Oppenheim, et al. (1997) found that boys had more externalizing problems than girls at age of 4 ½ when their behavior was assessed using the Child Behavior Checklist/4-18 (CBCL: Achenbach, 1991). Similarly, Garner et al.'s (2007) study of children between 41 and 67 months found that boys displayed significantly more physical aggression in a same-gender triadic play situation than girls.

Sex differences in preschoolers' social competence are consistently reported. Lupinetti (2000) found that girls were more socially competent than boys, when eighty children aged 48 to 59 months were rated by teachers using the Prosocial Behavior Questionnaire (PBQ: Weir & Duveen, 1981). Spjeldnes, Koeske, and Sales's (2010) study of preschoolers also showed sex difference. Although it involves findings from first graders, a related study (Green & Cillessen, 2008) of 156 Australian children found that girls were more likely to be identified as collaborators than boys in a situation requiring them to enter and maintain their position.

Temperament. Current knowledge indicates that temperament is antecedent to, and underlies individual differences in, behavior and affect that jointly characterize adjustment (Vuaghn, Bost, & van IJzendoorn, 2008). Both Greenbergs et al.'s (2001) study of preschoolers from middle-class families and Keller et al.'s (2005) study of children from teen mothers agree on the significance of child temperamental qualities. Children's temperament was one of the most influential factors that affect externalizing

problems when it exerts with other factors such as insecure attachment and less optimal parenting.

As for social competence, temperament has been identified as a critical antecedent (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Fabes, Shepard, Guthrie, & Martin, 1997; Laible, 2004a; Rhoades, Greenberg, & Domitrovich, 2009; Szewczyk-Spkplowski, Bost, & Wainright, 2005). For example, temperamental difficulty was negatively associated with peer sociometric acceptance and positively associated with peer rejection (Szewczyk-Spkplowski et al, 2005); and temperamental effortful control predicted prosocial behaviors 6 month later (Laible, 2004a) among preschoolers. Both studies used mother reports of child temperament. Compatible results were also demonstrated among preschoolers in a Head Start classroom (Rhoades et al., 2009), in which social skills were assessed with the Preschool and Kindergarten Behavior Scales (PKBS: Merrell, 1996) that were rated by a teacher.

Attachment security. Empirical studies have repeatedly found that children with secure attachment histories are more cooperative and empathic and on the whole evince fewer behavior problems than children with insecure attachment histories (Belsky & Cassidy, 1994; Belsky & Fearon, 2002; Dallaire & Weinraub, 2007; Deklyen & Greenberg, 2008; Fearon, Bakermans-Kranenburg, van IJendoorn, Lapsley, & Roisman, 2010; Greenbergs et al., 1991; Greenbergs et al., 2001; Keller, et al., 2005; Sroufe, Carlson, & Shulman, 1993; Szewczyk-Spkplowski et al, 2005; Thompson, 1998; Urban, Carlson, Egeland, & Sroufe, 1991; Weinfield et al., 2008). Children with insecure attachment histories had more difficulties than those with secure histories in negotiating salient development issues in later years, including development of independence, and

social competence, and they showed more externalizing problems. As an example of externalizing problems, Keller et al. (2005) examined externalizing problem trajectories by a latent variable growth-mixture modeling. Externalizing behaviors were assessed at 24 and 30 (with the Behavior Problems Index: BPI; Baker & Mott, 1989), 36 (with the CBCL/2-3; Achenbach, 1992), and 54 months (with the CBCL/4-18; Achenbach, 1991). Since the goal of their study was to examine the role of attachment in context, all cross-domain combinations involves attachment security at 12 months assessed with Ainsworth's Strange Situation. In two-domain analyses, insecurely attached children with infant temperamental negativity had a greater likelihood of displaying an externalizing behavior trajectory, whereas securely attached with high negativity did not. Further, securely attached children with positive parenting had a less likelihood of displaying an externalizing behavior trajectory. The three-domain analyses provided additional specificity. The elevated probability of an externalizing behavior trajectory was observed when insecure-attachment and high-risk-parenting were combined with multi-problem family ecology or high infant negativity. These findings suggest that secure attachment serves as a protective factor when other risks exist. As an example of social competence, attachment security, assessed with the AQS, was positively associated with peer socio-metric acceptance among preschoolers (Szewczyk-Spkplowski, et al, 2005).

Overall Summary and the Purpose of the Study

Attachment theory has provided the most comprehensive framework for explaining early socio-emotional development. In spite of its emphasis on parent-child communication beyond infancy, a few studies have investigated verbal aspects of maternal sensitivity and its effects on the child's socio-emotional functioning. Only

recently, inspired by the area of autobiographical memory, researchers have shown that maternal elaborative discourse style is associated with the child's attachment security or mental representations of attachment relationships. Further, studies of relations between maternal discourse style and child socio-emotional functioning are emerging under the auspices of attachment theory.

This quite new research focus has demonstrated inconsistent findings, perhaps because verbal aspects of maternal sensitivity have not been systematically defined or fully captured. To address this conceptual and measurement issue, this study adopted a different approach from previous studies by using a person-oriented rather than a variable-oriented method. The person-oriented method involves examining profiles of maternal verbal interactive behaviors rather than aggregating values of variables (Bogat, Levendosky, & von Eye, 2005). Another reason for equivocal results among previous studies might be the small size of the mostly white, middle-class samples. The limited variability of the socio-emotional outcomes in the restricted samples might have elevated Type II error in some studies. To address this issue, additional research with a large scale, nationally representative sample is needed. Finally, related studies suggest the importance of considering the mother's characteristics (i.e., education, spouse/partner relationship, and depressive symptoms) and the child's characteristics (i.e., sex, temperament, attachment security, and language and literacy ability). However, a few studies have considered some of these maternal and child characteristics. Furthermore, little is known about which maternal characteristic affects maternal verbal sensitivity, and about what role maternal verbal sensitivity plays in child socio-emotional development when these characteristics are considered. Overall, the importance of the study variables to child

socio-emotional development as well as problems with the existing research including equivocal findings and methodological issues regarding the measure of maternal verbal sensitivity and small samples, all underscore the importance of the current investigation.

In addressing the gaps in previous research, this study extends our current understanding of the concept of maternal verbal sensitivity, the correlates of maternal verbal sensitivity, and the relationship between maternal verbal sensitivity and child socio-emotional functioning. The purposes of this research were as follows: (1) to investigate the construct of maternal verbal sensitivity by exploring patterns of maternal verbalization during mother-child shared book reading; (2) to examine characteristics of the mother (i.e., education, marital/romantic relationship, and depressive symptoms) and the child (i.e., sex, temperament, attachment security, and language and literacy ability) in association with maternal verbal sensitivity; (3) to test the effect of maternal verbal sensitivity on the child's socio-emotional functioning that is a precursor of mental health and is indicated by externalizing behavior problems and by social competence; and (4) to test the meditating and/or moderating role of maternal verbal sensitivity on the relations between characteristics of the mother and child and the child's socio-emotional functioning. Following each of the four primary purposes, specific research questions and hypotheses are presented below.

Research Questions and Hypotheses

(1) Patterns of Maternal Verbalization and Level of Maternal Verbal Sensitivity

Research Question #1: Are there patterns of maternal verbal interactive behaviors that identify a mother who is sensitive verbally during mother-child book reading?

Hypothesis 1: There will be discrete classes of mothers characterized by different profiles of maternal verbal interactive behaviors: Highly sensitive mothers, compared to less sensitive mothers, will facilitate her child's engagement in the discourse more frequently by asking for information, providing expanded information in response to her child's comments, relating a story to child's experiences, and providing opportunities to organize the story.

Research Question #2: If there are discrete classes of mothers identified by their verbal interactive behaviors during mother-child book reading, which verbalization indicators distinctively differentiate verbally sensitive mothers from less sensitive mothers?

Hypothesis 2: Elaborative discourse style will be identified more frequently in verbally sensitive mothers than less sensitive mothers by the following verbal behaviors: 'relate the story to the child's experience'; 'expand on the story or the child's comment'; 'respond/answer the child's questions'; 'ask open-ended questions'; 'remind the child of other similar books'; and 'summarize the story with the child involvement'.

(2) Effect of Mother and Child Background Characteristics on Maternal Verbal Sensitivity

Research Question #3: Are there maternal background characteristics that help classify mothers as sensitive verbally?

Hypothesis 3a: College-educated mothers will be more likely to show high verbal sensitivity than those with less than college education.

Hypothesis 3b: Mothers in happier relationships with their spouses/partners will be more likely to show higher verbal sensitivity than those in less happy relationships or those in no relationship.

Hypothesis 3c: Mothers with fewer depressive symptoms will be more likely to show higher verbal sensitivity than those with more depressive symptoms.

Research Question #4: Are there characteristics of children that help classify mothers' verbal sensitivity?

Hypothesis 4a: Mothers will be more likely to show high verbal sensitivity when interacting with girls than when interacting with boys.

Hypothesis 4b: Mothers will be more likely to show high verbal sensitivity when interacting with children with an easy temperament than when interacting with children with a difficult temperament.

Hypothesis 4c: Mothers will be more likely to show high verbal sensitivity when interacting with securely attached children than when interacting with less securely attached children.

Hypothesis 4d: Mothers will be more likely to show high verbal sensitivity when interacting with children with high reading scores than when interacting with children with low reading scores.

(3) Effect of Maternal Verbal Sensitivity on Child Socio-emotional Functioning

Research Question #5: Is children's socio-emotional functioning associated with maternal verbal sensitivity?

Hypothesis 5: Maternal verbal sensitivity will be negatively associated with children's externalizing behaviors, and positively associated with children's social competence.

Research Question #6: Will the background characteristics of mothers have an effect on children's socio-emotional functioning?

Hypothesis 6a: Children whose mothers are college-educated will be more likely to be socially competent and less likely to have externalizing behaviors, compared to those whose mothers have less than college education.

Hypothesis 6b: Children with mothers in happier relationships with husbands/partners will be more likely to be socially competent, and less likely to have externalizing behaviors, compared to those with mothers in less happy relationships or in no relationship.

Hypothesis 6c: Children whose mothers report more depressive symptoms will be less likely to be socially competent and more likely to have externalizing behaviors than those whose mothers report fewer depressive symptoms.

Research Question #7: Is children's socio-emotional functioning at preschool age associated with their background characteristics?

Hypothesis 7a: Boys will be less likely to be socially competent and more likely to have externalizing behaviors than girls.

Hypothesis 7b: Temperamental difficulty at the age of 9 months will be negatively related social competence and positively related to externalizing behaviors.

Hypothesis 7c: Attachment security at toddlerhood will be positively related to social competence and negatively related to externalizing behaviors.

(4) Role of Maternal Verbal Sensitivity in Linking Mother's and Child's Background Characteristics with Child Socio-emotional Functioning

Research Question #8: Will maternal verbal sensitivity moderate the effect of maternal background characteristics on children's socio-emotional functioning?

Hypothesis 8a: The effect of maternal education on child social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal education will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of college-educated mothers will be more likely to be socially competent than children of mothers with no college education.

Hypothesis 8b: The effect of maternal education on child externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal education will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of college-educated mothers will be less likely to have externalizing behaviors than children of mothers with no college education.

Hypothesis 8c: The effect of maternal spouse/partner relationship on child social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal husband/partner relationships will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity,

children of mothers in happier relationships with their spouses/partners will be more likely to be socially competent than children of mothers in less happy relationships or those in no relationship.

Hypothesis 8d: The effect of maternal spouse/partner relationship on child externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal spouse/partner relationships will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of mothers in happier relationships with their spouses/partners will be less likely to have externalizing behaviors than children of mothers in less happy relationships or those in no relationship.

Hypothesis 8e: The effect of maternal depressive symptoms on child social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal depressive symptoms will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of mothers who have more depressive symptoms will be less likely to be socially competent than children of mothers have few depressive symptoms.

Hypothesis 8f: The effect of maternal depressive symptoms on child externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal depressive symptoms will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children

of mothers who have more depressive symptoms will be more likely to have externalizing behaviors than children of mothers have few depressive symptoms.

Research Question #9: Will maternal verbal sensitivity moderate the relationship between the sex of the child and his or her socio-emotional functioning?

Hypothesis 9a: The sex difference in social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the sex difference will no longer exist for the children whose mothers have higher verbal sensitivity. Among children of mothers with less verbal sensitivity, girls will be likely than boys to have high social competence.

Hypothesis 9b: The sex differences in externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the sex difference will no longer exist for the children whose mothers have higher verbal sensitivity. Among children of mothers with less verbal sensitivity, boys will be more likely than girls to have externalizing behaviors.

Research Question #10: Will maternal verbal sensitivity moderate the relationship between children's temperament and their socio-emotional functioning?

Hypothesis 10a: The effect of temperament on social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the difference due to temperament will no longer exist for the children whose mothers have higher verbal sensitivity. Among children of mothers with less verbal sensitivity, those with greater temperamental difficulty will be less likely to be socially competent than those with less temperamental difficulty.

Hypothesis 10b: The effect of temperament on externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the difference due to temperament will no longer exist for the children whose mothers have higher verbal sensitivity. As for the children of mothers with less verbal sensitivity, the children of more temperamental difficulty will be more likely to have externalizing behaviors than those of less temperamental difficulty.

Research Question #11: Will maternal verbal sensitivity moderate the link between children's attachment security at toddlerhood and socio-emotional functioning at preschool age? Or, will maternal verbal sensitivity partially mediate the link between children's attachment security and socio-emotional functioning?

Hypothesis 11a: Maternal verbal sensitivity will moderate the relationship between the children's attachment and social competence.

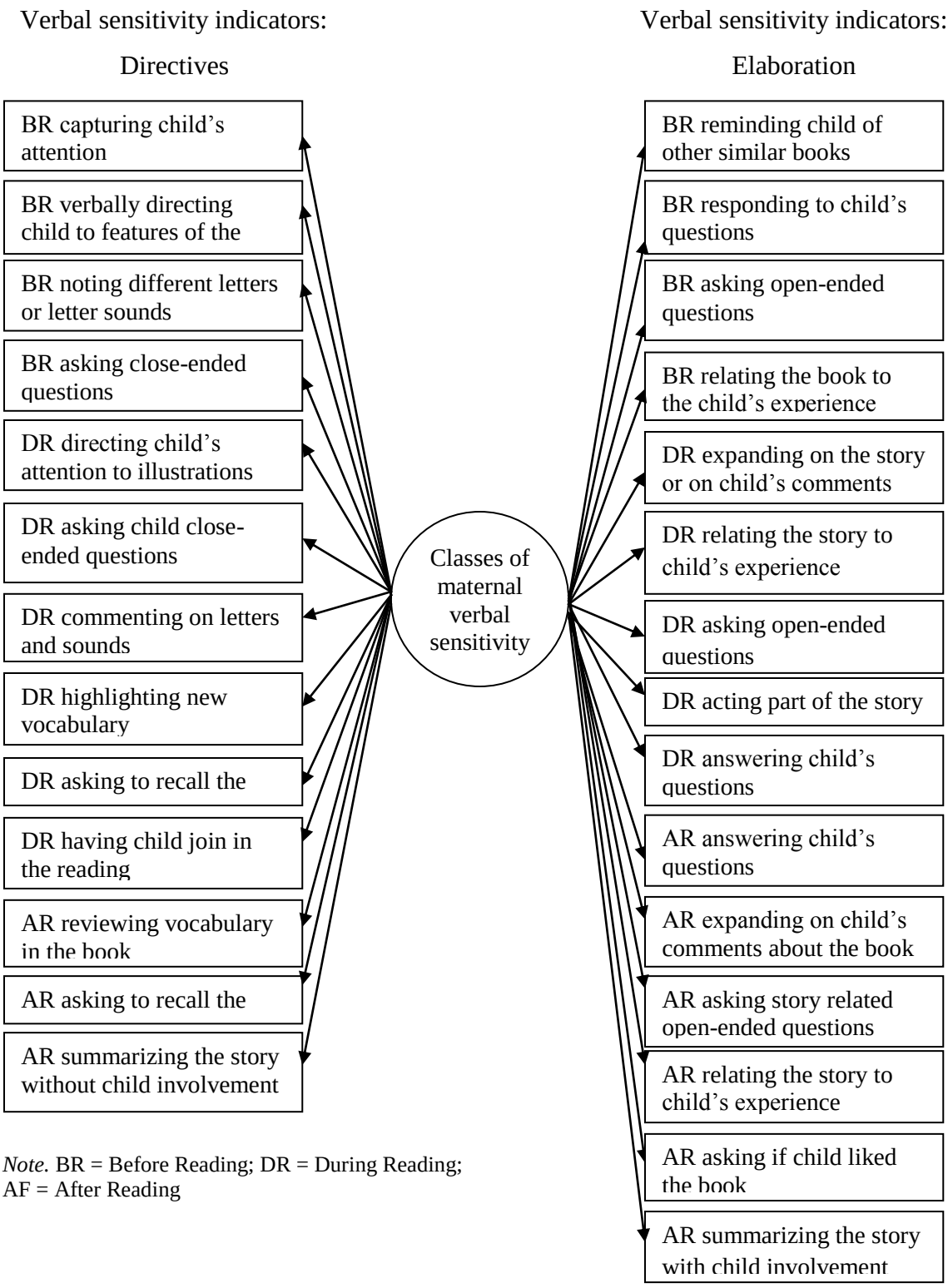
Hypothesis 11a': Maternal verbal sensitivity will partially mediate the relationship between the children's attachment and social competence.

Hypothesis 11b: Maternal verbal sensitivity will moderate the relationship between the children's attachment and externalizing behaviors.

Hypothesis 11b': Maternal verbal sensitivity will partially mediate the relationship between the children's attachment and externalizing behaviors.

Conceptual Models

Figure 1. Latent class model for maternal verbal sensitivity



Note. BR = Before Reading; DR = During Reading; AF = After Reading

Figure 2. Moderation model involving background characteristics temperament and maternal verbal sensitivity in the prediction of child socio-emotional functioning

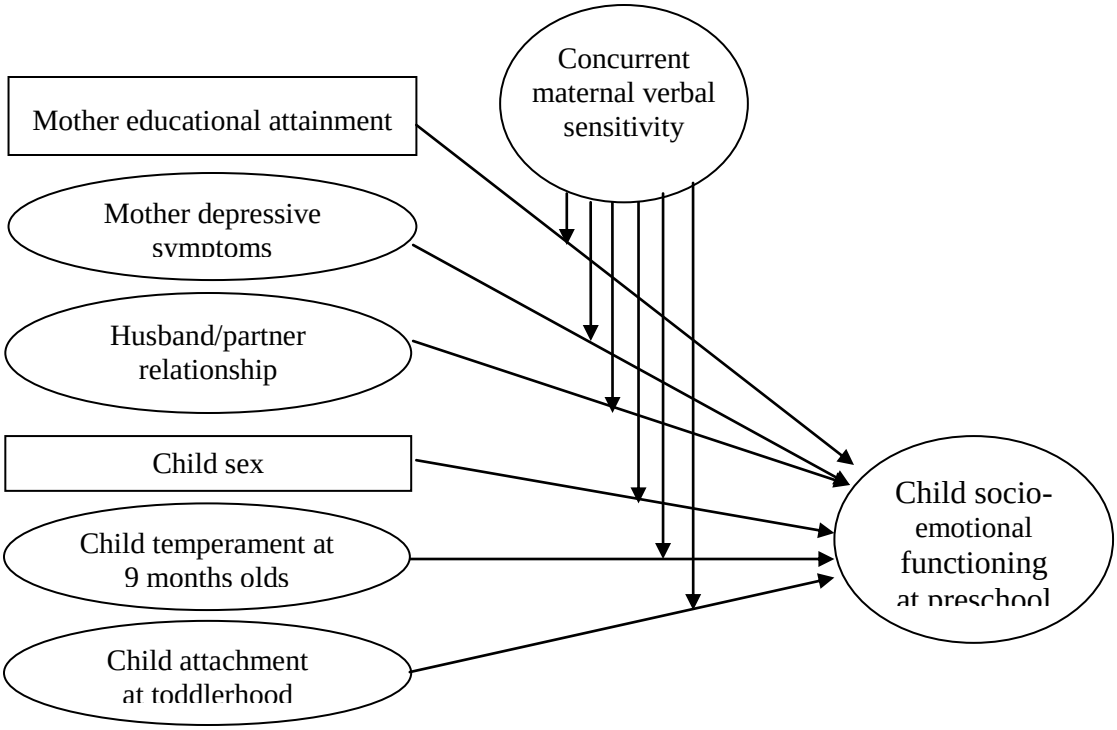
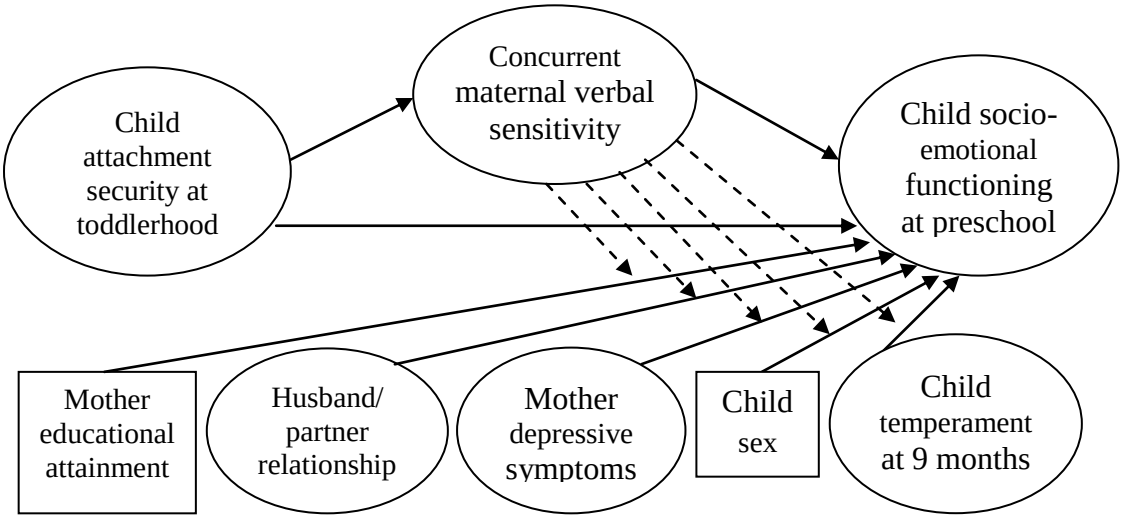


Figure 3. Latent class mixture model involving mediation of maternal verbal sensitivity between child attachment and socio-emotional functioning



CHAPTER III

METHODOLOY

Research Design

This study had a non-experimental, correlational, longitudinal design using a secondary data analysis of the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B).

Data

The study used existing national data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) collected by National Center for Education Research and sponsored by the U.S. Department of Education and other federal agencies (Nord, Edwards, Andreassen, Green, & Wallner-Allen, 2006). The ECLS-B is a longitudinal study of the home, family, childcare, and educational experiences of a nationally representative sample of a birth cohort of children born in the year of 2001 in the United States. Data were collected from children, their families, their care providers, their teachers, and their schools through direct observations, computer-assisted personal interviews (CAPI), and self-administered questionnaires at multiple time points from the child's age of 9 months through entry into kindergarten. The data contain child assessments in the domains of cognitive, physical, and social development. The ECLS-B also contains measures of the home environment and early care, such as types of child care arrangements and child-care-setting observations.

The sample was followed prospectively from birth through first grade and data were collected at five time points–when children were approximately 9-months old (2001-02), 2-years old (2003-04), preschool-aged/4-years old (2005-06) and at

kindergarten entry (fall 2006-07). A follow-up data collection was conducted in the fall of 2007 through 2008 for approximately 25% of the sample who had not yet entered kindergarten by the 4th data collection wave or who were repeating kindergarten in the 2007-08 school year. Data collecting points from the third wave were based on school age rather than biological age. The current study uses data collected from the first three waves of the study.

ECLS-B sample. The ECLS-B employed a clustered, list frame design to select a nationally representative probability sample of children born in 2001 in the United States. The target population for the ECLS-B included all children born in the U.S. in 2001, but excluded children born to mothers under 15 years of age, children who died before the baseline assessment at 9-months, and children who were adopted before the baseline assessment. Using criteria defined by the National Center for Health Statistics (NCHS), 96 primary sampling units (PSU) defined as counties or groups of contiguous counties were identified for the study. Registered births (i.e. birth certificates) within the PSUs were sampled from the NCHS vital statistics system across 36 strata defined by child race, birth weight, and plurality (i.e., twin or non-twin). The core sampling frame of the ECLS-B consisted of approximately 14,000 births sampled from birth certificates. The target sample was reduced by non-response; for example, respondents could not be located, refused to participate, or could not be in the study for other reasons such as death or adoption of the focal child. At an overall weighted response rate of 74.1 %, the final sample for the ECLS-B consisted of 10,688 completed cases for the 9-month data collection. The sample size for wave 2 (2 years old) was 9,800 at an weighted response rate of 93.1 %; for wave 3 (preschool years), 8,900 at an weighted response rate of 90.8

%; for wave 4 (kindergarten years), 7,000 at an weighted response rate of 91.8 %; and for the follow-up (late entry into kindergarten and repeaters), 1,900 at an weighted response rate of 92.5 % (Nord, et al., 2006).

Analytic Sample

The ECLS-B coded a simple random subsample of 800 parent-child dyads from the ECLS-B sample, using the Reading Aloud Profile-Together (RAPT) coding scheme. Since this coding provides detailed information about maternal verbal interactive behaviors, the analytic sample was determined after applying to the subsample the following inclusion criteria: 1) children with normal birth weight; 2) children without disability; and 3) children living with the same mother figure from the 9 month to the preschool data collection point.

Data reduction. Out of the subsample (n = 800) only 697 dyads were codable for various reasons, such as the required minimum amount of time with the activity (i.e., 2 minutes) unmet, technical problems on a DVD, and used languages that were not supported by the RAPT coding team (Najarian, et al., 2010). Thus, the three inclusion criteria of this study were applied to the codable 697 dyads. First, when the criterion of children with normal birth weights was applied, 197 cases were dropped. Next, when the criterion of children with no disability was applied, additional 30 cases were dropped. Further, when the criterion of children living with the same mother figure from the 9 month to the preschool data collection was applied, additional 22 dyads were dropped and 448 dyads remained. Out of the 448 dyads ten dyads included birth fathers and one dyad included an adoptive mother and they were additionally dropped in order to study a homogeneous study sample. Thus, the remaining 437 dyads consisted of a birth mother

and her child. Finally, an additional 104 dyads were dropped for which the early care/education provider (ECEP) were not included in the ECLS-B. The final sample therefore consisted of 333 dyads.

Analytic sample demographics. An overview of the study sample, as well as the influence of statistical weighting, provides an understanding of the demographic composition (Table 1).

Table 1

Demographic Characteristics of the Analytic Sample (Unweighted *n* = 333, Weighted *N* = 2,207,339)

	% (Freq.)	*Mean* (*SD*)	*SE*	Min.	Max.	Weighted %	Weighted *Mean*	Linearized *SE*
Child Sex								
Boys	47.75 (159)		.03			52.22		.04
Girls	52.25 (174)		.03			47.78		.04
Plurality								
Singleton	89.47 (289)		.02			96.80		.01
Twin	10.53 (39)		.02			2.93		.01
Not ascertained	1.50 (5)		.01			.27		.00
Mother Age at 9 Month Data Collection, in years		29.38 (6.39)	.35	16.00	46.00		28.95	.43
Child Age at Preschool Data Collection, in months		52.56 (3.73)	.20	44.90	61.90		52.02	.24
Boys		52.52 (3.66)	.29	44.90	61.70		52.00	.35
Girls		52.59 (3.78)	.29	44.90	61.90		52.03	.34

Table 1 (continued)

Demographic Characteristics of the Analytic Sample

	% (Freq.)	*Mean* (*SD*)	*SE*	Min.	Max.	Weighted %	Weighted *Mean*	Linearized *SE*
Child Age at 2 Year Data Collection, in months								
		24.57 (1.48)	.08	22.50	38.20		24.53	.10
Boys		24.54 (1.65)	.13	23.00	38.20		24.47	.14
Girls		24.61 (1.32)	.10	22.50	32.60		24.59	.13
Child Age at 9 Month Data Collection, in months								
		10.27 (1.64)	.09	7.50	20.20		10.22	.11
Boys		10.23 (1.45)	.12	8.20	16.40		10.23	.15
Girls		10.30 (1.80)	.14	7.50	20.20		10.21	.18
Child Race/Ethnic Background								
White[a]	45.35 (151)		.03			58.35		.03
Black/African-American[a]	12.91 (43)		.02			13.06		.02
Hispanic	16.82 (56)		.02			19.87		.03
Asian[a]	9.61 (32)		.02			2.39		.01
Pacific Islander[a]	.90 (3)		.01			.17		.00
American Indian/ Alaska Native[a]	4.50 (15)		.01			.55		.00
More than one race[a]	9.91 (33)		.02			5.62		.02
Primary Home Language								
English	84.98 (283)		.02			86.69		.02
Other	15.02 (50)		.02			13.31		.02

Table 1 (continued)

Demographic Characteristics of the Analytic Sample

	% (Freq.)	*Mean* (*SD*)	*SE*	Min.	Max.	Weighted %	Weighted *Mean*	Linearized *SE*
Language used by Mothers during the Mother-Child Shared Book Reading								
English	94.89 (316)		.01			94.51		.02
Spanish	3.90 (13)		.01			4.76		.02
Chinese	.60 (2)		.00			.66		.00
Other	.60 (2)		.00			.06		.00
Language of the Book during the Mother-Child Shared Book Reading								
English	95.80 (319)		.01			94.79		.02
Spanish	4.20 (14)		.01			5.21		.02
Urbanicity								
Urban inside urban clusters	66.07 (220)		.03			66.92		.03
Urban outside urban clusters	17.42 (58)		.02			14.88		.02
Rural	14.41 (48)		.02			14.91		.03
Not Ascertained	2.10 (7)		.01			3.29		.01
Poverty Indicator at Preschool Data Collection								
Below poverty threshold	15.62 (52)		.02			13.87		.02
At or above poverty threshold	84.38 (281)		.02			86.13		.02

Table 1 (continued)

Demographic Characteristics of the Analytic Sample

	% (Freq.)	*Mean* (*SD*)	*SE*	Min.	Max.	Weighted %	Weighted *Mean*	Linearized *SE*
Socioeconomic Quintile at Preschool Data Collection								
First (lowest)	9.31 (31)		.02			9.93		.02
Second	17.12 (57)		.02			16.90		.03
Third	18.32 (61)		.02			21.44		.03
Fourth	24.32 (81)		.02			22.11		.03
Fifth	30.93 (103)		.03			29.61		.03
Mother's Highest Education at 9 Month Data Collection								
Less than HS	9.61 (32)		.02			9.39		.02
HS/Equivalent	24.92 (83)		.02			24.95		.03
Some college	26.43 (88)		.02			27.37		.03
Bachelor's degree	20.72 (69)		.02			20.89		.03
Some graduate school or higher	18.32 (61)		.02			18.40		.03
Mother's Marital Status at Preschool Data Collection								
Married	71.77 (239)		.02			70.98		.03
Separated	1.20 (4)		.01			2.16		.01
Divorced	6.01 (20)		.01			5.44		.01
Widowed	.30 (1)		.00			.04		.00
Never married	19.52 (65)		.02			20.53		.03

Table 1 (continued)

Demographic Characteristics of the Analytic Sample

	% (Freq.)	*Mean* (*SD*)	*SE*	Min.	Max.	Weighted %	Weighted *Mean*	Linearized *SE*
Not ascertained	1.20 (4)		.01			.85		.00
Stability[b] of the Presence of Father Figures								
Stable	72.97 (243)		.02			71.52		.03
Unstable	27.03 (90)		.02			28.48		.03

Note. [a]Non-Hispanic; [b]The same resident father figure in the household from the 9 month data collection to the preschool data collection is considered stable: any other patterns regarding the presence of resident father figures is considered unstable.

Variables and Measures

Dependent Variable

Child Socio-emotional Functioning

The 26-item socio-emotional measure developed for the ECLS-B is a modification of several socio-emotional scales: 18 items from the PKBS-2 (Preschool and Kindergarten Behavior Scales-Second Edition: Merrell, 2003), 6 items from the Social Skills Rating System (SSRS: Gresham & Elliott, 1990), and 1 item from the Family and Child Experiences Study (FACES) items. Additionally, it includes 1 new item developed for the ECLS-B. This measure was designed to provide more comprehensive measurement of behavior problems and social adjustment during the past 3 months in preschool-aged children.

Items were selected from the 42-item Problem Behaviors scale of the PKBS-2 that was designed to reflect common preschool and kindergarten children's behavior problems (e.g., has temper tantrums, is physically aggressive, and seems unhappy), and

from the 34-item Social Skills scale of the PKBS-2 that was designed to describe adaptive or positive behaviors reflecting both peer-related and adult-related forms of social adjustment (e.g., invites other children to play, is invited to play by other children, and comfort others). Items selected from the SSRS were: shows eagerness to learn, keeps working until finished, pays attention well, works/plays independently, worries about things, and is angry. One item from the FACES asked how often a child volunteers to help others. One item developed newly for the ECLS-B asked how often a child uses words to describe feelings.

For all items, responses were based on a 5-point scale. The responses were collected from both mothers and early care/education providers (ECEP) at preschool-data collection point. The instrument for mothers contains 24 items and the ECEP instrument contains 20 items: The same 18 items were asked of both mothers and early care or education providers; the other 6 items were asked only of mothers and 2 other items were asked only of early care or education providers. The reliability for the original subscales of the PKBS-2 was reported: Cronbach's α ranging from .84 to .97 on internal consistency (Merrell, 2003; Rhoades et al., 2009) and *r* ranging from .62 to .87 on test-retest reliability (Merrell, 2003). The subscales of the 60-item preschool version SSRS, based on a 3-point scale, showed internal consistency, with Cronbach's α ranging from .84 to .95 (Gresham & Elliott, 1990). PKBS-2 Social Skills and Problem Behaviors scale scores are positively correlated with those of the SSRS (Gresham, 2004) and also Conners' Teacher Rating Scale (Conners, 1990) which measures similar behaviors (Merrell, 1995).

This study used mean-scores of the mother's and the ECEP's rating for each scale as the outcome variables. Possible scores ranged from 1 to 5 on the social competence scale, with a score of '1' indicating lower social competence. Possible scores ranged from 1 to 5 on the externalizing problem scale, with a score of '1' indicating lower externalizing behaviors. This study conducted factor analyses to explore the possibility of combining items to generate the subscales for dimensions of socio-emotional functioning. More details are reported in the Results section later.

Intervening Variable

Maternal Verbal Sensitivity

Maternal interactive behaviors during reading a book *Corduroy* by Don Freeman (1968) with her child at home were videotaped during the preschool data collection, and were coded using the 32-item Reading Aloud Profile–Together (RAPT) coding scheme. To code targeted maternal behaviors, the RAPT divides the joint book reading activity into three distinct phases: (1) activity before reading the book, (2) activity during book reading, and (3) activity after reading the book. Activity before reading the book includes all book-related discussion and activity prior to beginning the text of the story (discussion about the book itself, the cover, the title pages, etc.). The second phase of the activity, during book reading, begins once the story text has begun. When the story text is completed and the dyad is no longer discussing the last page, any further discussion about the book or the story is coded as part of activity after reading. Each targeted maternal behavior was coded dichotomously in terms of the behavior's presence: 1 = yes; 0 = no. Overall inter-rater reliability was reported as more than 98 percent agreement (Najarian, Snow, Lennon, & Kinsey, 2010). In addition, if a dyad did not spend at least 2 minutes

for this reading activity or did not read in either English or Spanish, the case was treated uncodeable.

For activity before reading, the 10 targeted maternal behaviors were: capturing child's attention, ensuring child comfort, verbally directing child to features of the book, pointing to features of the book, noting different letters or letter sounds, reminding the child of other similar books, responding to the child's questions, asking closed-ended questions, asking open-ended questions, and relating the book to the child's experience.

For activity during reading, the following 12 maternal behaviors were coded: tracking print, using gestures or dramatic voices, directing the child's attention to the illustrations, asking the child story-related closed-ended questions, expanding on the story or on the child's comments, answering the child's questions, commenting on letters and sounds, highlighting new vocabulary, asking recall questions, relating the story to the child's experience, asking story-related open-ended questions, and having the child join in the reading. If the dyad chose to read the book a second time, the same 12 behaviors were targeted and, if evidenced, were scored and included in the data file with a corresponding code noting the occurrence of a second read. In such cases, the current study includes only information from the first reading.

For activity after reading, mothers were scored as engaging in any of the following 10 behaviors: asking if the child liked the book, allowing the child to look at the book, answering questions from the child regarding the story or story topic, expanding on the child's comments about the book, reviewing vocabulary in the book, asking the child to recall parts of the book, asking story related open-ended questions,

relating the story to the child's experience, and summarizing the story either with or without the child's participation.

Among the 32 items, 28 reflect maternal verbalization. Thus, these 28 items were initially used for this study. The 28 items are presented in Figure 1. However, only twelve items were used for the current study. More details are reported in the Result section later.

Rationale for using the RAPT coding system. The RAPT was developed for the Even Start Classroom Literacy Interventions and Outcomes Study (CLIO) by Goodson, Layzer, Smith, and Rimzdius (2004). It is a measure of joint book reading behaviors of parents and children, which was designed to capture behaviors related to the major domains of early literacy development (Najarian, Snow, Lennon, & Kinsey, 2010). One of the major domains related to this study is comprehension/higher-order thinking. The RAPT coding system defines the behaviors related to this domain as processing new vocabulary, getting information about the content of the text, linking the meaning of the text to the child's own experience, and reviewing the text or the meaning of the child's own experience to build on understanding of the text. The other domains related to this study are the use of open-ended questions, by which mothers can facilitate their children to engage in discussion and expand the information provided by their children. This study assumes that the two domains, comprehension/higher-order thinking and the use of open-ended questions, are closely related to maternal verbal engagement with the child at a mental level and the child's development of mental representation of experiences in relation to self and others. Therefore, although the RAPT coding system was originally developed to capture the parent-child dyad's behaviors that afford the child's understanding of the text, its domain of comprehension/higher-order thinking may also

allow capturing maternal verbal interactive behaviors that afford the child's coherent organizing of thinking by asking for information and providing expanded information in respond to the child's comments and in accordance with the child's experiences.

Indeed, the national evaluations of the CLIO curricula that involved parent-child literacy activities for low income families (Judkins, St.Pierre, Gutmann, Goodson, von Glatz, Hamilton, Webber, Troppe, & Rimdzius, 2008) had reported no significant impacts of the curricula on any of the child language development and early literacy outcomes. However, the CLIO curricula did have a significant positive incremental effect on parents' interactive reading skills, responsiveness to their children (parents' interactive reading skills and responsiveness to their children were both assessed with both the RAPT coding system and the parent interview), and child social competence (as rated by teachers). Although the association between parents' interactive reading skills and child social competence was not examined, these findings suggest that the RAPT coding system includes important aspects of parental verbal interactive behaviors that afford children opportunities to evaluate and reorganize their thoughts and experiences in relation to self and others. From the extant data using the RAPT coding system, it cannot be captured whether the child is evaluating and reorganizing his or her thoughts and experiences in relation to self and others. However, this study assumes that maternal verbal engagement affording her child's higher-order thinking composes the child's internal working models of self and others, which in turn affects child socio-emotional functioning. This idea related to attachment theory was tested in the child's socio-emotional functioning outcomes in lieu of direct measures of the child's mental representation.

Furthermore, the previous studies used composite scores of parents' interactive reading skills and of parents' responsiveness, employing the RAPT coding system. This variable-oriented method captures information driven by the underlying theory of a coding system. That is, the variable aggregating data is determined a priori by a theory or a researcher (Bogat, Levendosky, & von Eye, 2005). Since this study used extant data using the RAPT coding system whose underlying theoretical framework of early literacy development is different from that of this study, a person-oriented method, rather than a variable level method, was used. The person-oriented method allows examining the latent construct of maternal verbal sensitivity by providing an empirically driven typology of maternal verbal interactive behaviors.

Finally, the predictive validity of the classes of mothers (e.g., verbally sensitive mothers vs. less sensitive mothers) formed from the person-oriented method was determined by making sure the classes differed on children's socio-emotional functioning outcomes. This explains the utility of the classes under the theoretical rationale of the current study (Bogat et al., 2005).

Independent Variables

Maternal Characteristics

Educational attainment. The mother's report of her highest grade or year of school completed was collected during the 9-month parent CAPI. Twenty-three response categories ranged from no formal schooling to professional degree after bachelor's degree. For this study, based on previous findings (e.g., Hoff-Ginsberg, 1992), two categories were generated: 0 = less than or equal to high school education; 1 = BA or above.

Husband or partner relationship. The mother's report of the spouse/partner relationship satisfaction, as well as the child's parents who reside in the household, was collected at the 2 year data collection. For this study, using the response to these two items, a 3 category variable of spouse/partner relationship was generated: 1) not in relationship; 2) less happy relationship; and 3) happier relationship. The relationship satisfaction was responded on a 3-point scale (1 = very happy; 2 = fairly happy; and 3 = not too happy), but in order to obtain a reasonable variability the coding was made as follows. Responses to fairly happy or not too happy relationship were combined and coded as less happy relationship. Responses to very happy were coded as happier relationship.

Depressive symptoms. The 37-item Composite International Diagnostic Interview-Short Form (CIDI-SF; Kessler, Andrew, Mroczek, Űstün, & Wittchen, 1998) was used to obtain information about mothers' experience with depression. The CIDI-SF is a diagnostic interview designed to screen for disorders defined in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The CIDI-SF has classification accuracy of 93 % for major depressive disorder (Kessler, *et al.*, 1998). For this study, depressive symptom scores were calculated based on the scoring instruction from the World Health Organization website (www.who.nit/msa/cidi/index.html): if a respondent endorses the stem questions (i.e., dysphonic mood or anhedonia lasting at least 2 weeks), a summary depressive symptom scores is calculated by summing positive responses to the seven additional questions. These seven questions ask about losing interest, feeling tired, changes in weight, difficulty sleeping, trouble concentrating,

feeling down, and thought about death. Possible scores range from 0 to 7, with scores closer to 0 indicating fewer depressive symptoms.

Child Characteristics

Sex. Child's sex was coded as: 0 = girl vs. 1 = boy.

Temperament. A subset of 8 items from the 19-item 9 month version of the Infant/Toddler Symptom Checklist (ITSC: DeGangi, Poisson, Sickel, & Wiener, 1995) was completed by mother's report during the parent CAPI at 9-month data collection. These 8 items cover the domains of self-regulation, sleep-wake regulation, and attending. Scores on the item asking for a rating of "the overall degree of difficulty the child would present for the average parents to raise" were based on a 5-point scale ranging from 1 (not at all) to 5 (very difficult). For all the other seven items, responses were based on a 4-point scale: 0 = never, 1 = used to be, 2 = sometimes, and 3 = most times. The 7 items include: the child is frequently irritable or fussy, goes easily from a whimper to an intense cry, demands attention and company, wakes up 3 or more times in the night and is unable to go back to sleep, needs a lot help to fall asleep, startles or is upset by loud sounds such as a vacuum, doorbell, or barking dog, and is unable to wait for food or toys without crying or whining. The 8 items all differentiated (each $p < .05$) children with regulatory disorders from those without such disorders, and Cronbach's α was .63 (DeGangi et al., 1995). This study used mean scores of the scale. Possible scores range from 0 to 3, with scores closer to 0 indicating easier temperament. This study conducted factor analyses to explore the best indicators. More details are reported in the Result section later.

Attachment security. The Toddler Attachment Sort-45 (TAS-45), a shortened and modified version of the Attachment Q-Sort (AQS: Waters & Deane, 1985), was used to

assess child attachment. Each item is a description of children's behaviors with the mother under stressful circumstances, such as when a friendly stranger is in the room. A laptop application of the sorting procedure was completed by the interviewer after the home visit of 2 or more hours at 2-year data collection. The ECLS-B coded an attachment security score that is similar to the AQS. Possible scores range from -1.00 to 1.00, with scores closer to -1.00 indicating low ability to use the adult as a secure base.

In addition, the analytic work to develop the TAS-45 is described in more detail in the ECLS-B Psychometric Report for the 2-Year Data Collection (Andreassen & Fletcher, 2007). Briefly, the developer of the TAS-45 began by acquiring AQS data sets from researchers in the United States, Colombia, Germany, Sweden, Japan, and China, among other countries. These datasets were then aggregated into one large dataset. Multidimensional Scaling followed by Facet Cluster Analysis were then used to map the items. The AQS cannot obtain a D classification because it does not have any items that describe D behaviors. Thus, the developer also acquired datasets from attachment investigators who were researching the disorganized style of attachment in children. The developer then identified the items that were most successful in identifying children with a disorganized attachment style. The disorganized dimension and its items were then added to the TAS-45.

Language and literacy ability. Early reading was assessed at preschool data collection, and consisted of a language portion (15 items) and a literacy portion (35 items). The measure contained items that examine children's receptive language skills and vocabulary, respectively. The literacy items consist of items examining phonological awareness (8 items), letter knowledge (13 items), awareness of the convention of print (9

items), and word recognition (5 items). The assessment was untimed and individually administered. This study used reading scores coded by the ECLS-B, which were generated based on the distribution of IRT ability estimates from the preschool field test sample. The test items selected ideally had high *r*-biserials (.40 or higher: a low *r*-biserial suggests a weak relationship between the item and the test as a whole) and high IRT "a" discrimination parameters (at least .5, preferably 1.0 or higher), as well as good fits of empirical data to the IRT model. Items with high discrimination parameters permit accurate placement on the ability continuum (Najarian, Snow, Lennon, & Kinsey, 2010).

Plan for Data Analysis

Preliminary Examination

For all study measures, descriptive statistics, data normality, scatter plots of standard errors, correlational relationships, and violations of the assumptions, such as multicollinearity were examined.

To address the design attributes of the ECLS-B, which is a complex sampling design, weights was applied in all analyses. The ECLS-B provides population weights that adjust for differential selection probabilities and differential non-response. To adjust for the biased estimates due to clustering, a survey estimation technique and a Taylor series technique were employed, using Mplus 5 and STATA 11. After preliminary examination of the variables specific items were selected.

Next, the pattern of missing data was examined. The purpose of this procedure is to see if the pattern of missing observations is random or systematic. When the pattern of missing data is significantly systematic, values were adjusted for missing data using EM algorithm-adjusted means and covariance if normality of the data was met. Otherwise, the

current study employed a method using generalized estimation equations, based on Yuan and Bentler (2005). This generalized method drops the normal distribution assumption.

Then, in order to test the parsimony of the model, exploratory factor analyses on child socio-emotional functioning items and child temperament items were conducted. After preliminary examination of the variables, specific items were selected.

Analyses for Research Questions

An overview of the analysis plan is presented first. After stating the four purposes of this study, analysis plans for research questions are presented.

To test whether there are discrete classes of mothers (e.g., verbally sensitive mothers and less sensitive mothers) and whether there are differences in characteristics of mothers and children by the classes of maternal verbal sensitivity, a series of latent class analyses (LCA) was conducted. LCA assumes unobserved population heterogeneity and seeks to identify the number of latent classes of related cases. Each class is characterized by its own profile of endorsement probabilities for items, and each person is assigned to each class by a probability of membership in each class. Mothers will be assigned to the class with the highest membership probability (Dayton, C. M., 1998; Nylund, Asparouhov, & Muthén, 2007).

To test whether there are systematic variations in child socio-emotional functioning across maternal verbal sensitivity classes, a series of structural equation modeling (SEM) procedures was conducted. Additionally, the direct effects of mother and child background characteristics on the child's socio-emotional functioning were also tested using the SEM.

As a test of the moderation models, regressions were used to examine interactions between characteristics of mothers and children and maternal verbal sensitivity on each variable of children's socio-emotional functioning. Baron and Kenny's (1986), Holmbeck's (1997, 2002), Jaccard and Turrisi's (2003), and UCLA Academic Technology Services' (from http://www.ats.ucla.edu/stat/stata/webbooks/reg/chapter3/statareg3.htm) guidelines were used to examine the moderation model. A mediation model that includes relations among children's earlier attachment, maternal verbal sensitivity, and children's socio-emotional functioning was planned to be tested using Mplus mixture modeling. Muthén and Muthén (1998-2010) and Lacobucci (2008) provide guidelines for examining the mediation model.

(1) Patterns of Maternal Verbalization and Level of Maternal Verbal Sensitivity

Research Question #1: Are there patterns of maternal verbal interactive behaviors that identify a mother who is verbally sensitive during mother-child book reading?

Research Question #2: If there are discrete classes of mothers identified by their verbal interactive behaviors during mother-child book reading, which verbalization indicators distinctively differentiate verbally sensitive mothers from less sensitive mothers?

To test if there are discrete classes of mothers (e.g., verbally sensitive mothers and less sensitive mothers) identified by different profiles/patterns of verbalization, a LCA was conducted. This method examines heterogeneity within the group of mothers. Rather than operating at the variable level, LCA computes a posterior probability for each score. The posterior probability is used in predicting latent class membership for cases (i.e.,

mothers) showing various observed response vectors on the items of observed verbalization during mother-child shared book reading interaction. The arrows presented in Figure 1 correspond to the regression of the maternal behavior indicators on a set of dummy variables representing the classes of maternal verbal sensitivity. The probabilities are a function of the model's parameters (i.e., estimated conditional response probabilities and estimated prevalence of each latent class). Each case is assigned to the latent class for which it has the highest a posteriori (Bayesian) probability of membership. The posterior probability of membership in latent class *c*, given response vector u_i for individual *i* equals a ratio in which the numerator is the product of the latent class proportion multiplied by the probability of response vector u_i assuming membership in latent class *c*; and the denominator is the unconditional probability for response vector u_i (Dayton, 1998; McCutcheon, 1987; Muthén & Muthén, 1998-2007). The formula for posterior probability is as follows:

$$P(c_i=k \mid u_{i1}, u_{i2,}...u_{ir}) = [P(c_i=k)\, P(u_{i1} \mid c_i=k)\, P(u_{i1} \mid c_i=k)...P(u_{ir} \mid c_i=k)] \,/\, P(u_{i1,}\, u_{i2,}... u_{ir})$$

where *P* = probability, u = a dichotomous indicator of maternal verbalization numbered *r*, where *r* = 1, 2,...the number of maternal verbalization indicators, *i* = individual, *c* = a categorical latent variable (i.e., class) numbered *k*, where *k* = 1, 2, and so forth.

Latent class model fit and classification quality are determined by multiple criteria including: the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC), with lower values indicating a greater classification quality; the 'entropy' statistics, which ranges from 0 to 1, with values closer to 1 indicating a clearer delineation of classes; the Lo-Mendell-Rubin (LMR) test, which assesses whether a given

k class model fits better than a *k*-1 class model; and the bootstrapped likelihood ratio test (BLRT), which is similar to LMR in assessing whether a given *k* class model fits better than a *k*-1 class model via a chi-square statistics by using bootstrapped samples to estimate the log likelihood difference test statistics. In addition to model fit, researchers also suggest reviewing the substantive meaning of the latent class model (Nylund et al., 2007).

(2) Effect of Mother and Child Background Characteristics on Maternal Verbal Sensitivity

Research Question #3: Are there maternal background characteristics that help classify mothers as verbally sensitive?

Research Question #4: Are there characteristics of children that help classify mother's verbal sensitivity?

To assess any differences in the characteristics of mothers and children by maternal verbal sensitivity, a series of LCA with covariates was conducted. This corresponds to the multinomial logistic regression of the categorical maternal verbal sensitivity class on maternal education, husband/partner relationship and depressive symptoms, child's sex, temperament, attachment security, and language/literacy ability.

(3) Effect of Maternal Verbal Sensitivity on Child Socio-emotional Functioning

Research Question #5: Is children's socio-emotional functioning associated with maternal verbal sensitivity?

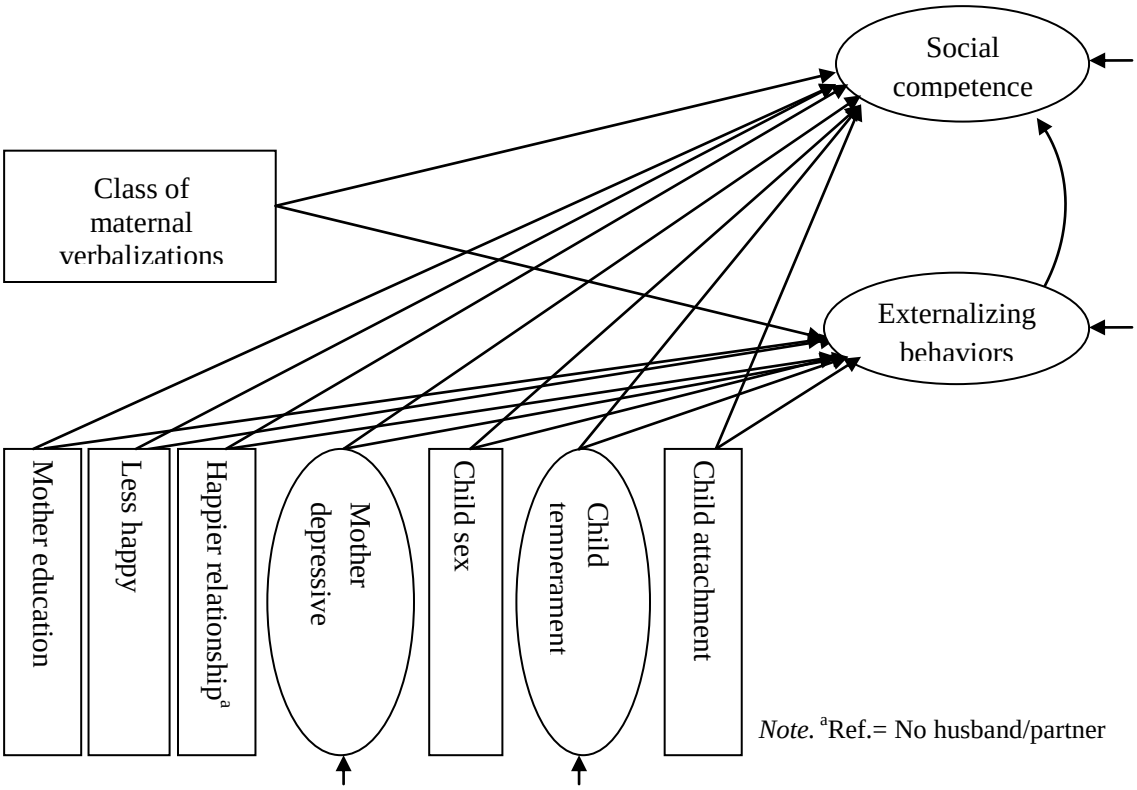
Research Question #6: Will the background characteristics of mothers have an effect on children's socio-emotional functioning?

Research Question #7: Is children's socio-emotional functioning at preschool age associated with their background characteristics?

To examine whether there are systematic variations in distal child outcomes across maternal verbal sensitivity classes, a series of SEM (Muthén & Muthén, 2010) was conducted. The model is shown in Figure 4. The arrows from the classes of maternal verbal sensitivity to the observed child outcomes indicate that the means of the child outcome variables vary across the classes of maternal verbal sensitivity. The arrows correspond to the regressions of the observed child outcomes on a set of the classes of maternal verbal sensitivity.

The direct effect of each of the maternal characteristics and each of the child's characteristics on the child's socio-emotional functioning was also tested in the SEM model.

Figure 4. Hypothesized path model predicting child distal-outcomes



(4) Role of Maternal Verbal Sensitivity in Linking Mother's and Child's Background Characteristics with Child Socio-emotional Functioning

Research Question #8: Will maternal verbal sensitivity moderate the effect of maternal background characteristics on children's socio-emotional functioning?

Research Question #9: Will maternal verbal sensitivity moderate the relationship between the sex of the child and his or her socio-emotional functioning?

Research Question #10: Will maternal verbal sensitivity moderate the relationship between children's temperament and their socio-emotional functioning?

Research Question #11: Will maternal verbal sensitivity moderate the link between children's attachment security at toddlerhood and socio-emotional functioning at preschool age? Or, will maternal verbal sensitivity partially mediate the link between children's attachment security and socio-emotional functioning?

To examine whether the relations between socio-emotional functioning and maternal characteristics and the relations between socio-emotional functioning and children's characteristics are different by classes of maternal verbal sensitivity, regressions was conducted for each variable of socio-emotional functioning. The coefficient of the interaction term was examined. It represents the difference in the slope for the children's socio-emotional outcomes predicted from the focal independent variable, comparing children whose mothers were classified as the child-centered/sensitive verbalization class (Class 1) and those whose mothers were classified in the book-centered/less sensitive verbalization class (Class 2). First, the interaction between maternal verbalization class and each maternal background characteristic such as education, husband/partner relationship, and depressive symptoms was examined. Next,

the interaction between each child background characteristic and maternal verbalization class was examined, after controlling for all maternal background characteristics: child characteristics such as sex, temperament at 9 months of age, and attachment security at toddlerhood were then cumulatively added in order of the time when each variable is manifested. The regression equations and models were as follows:

Model 1: $Y_1 = a_1 + b_1$ (Verbalization) + b_2 (Education) + b_3 (Verbalization) (Education) + e_1

Model 2: $Y_2 = a_2 + b_4$ (Verbalization) + b_5 (Husband/partner relationships) + b_6 (Verbalization) (Husband/partner relationships) + e_2

Model 3: $Y_3 = a_3 + b_7$ (Verbalization) + b_8 (Depressive symptoms) + b_9 (Verbalization) (Depressive symptoms) + e_3

Model 4: $Y_4 = a_4 + b_{10}$ (Verbalization) + b_{11} (Education) + b_{12} (Husband/partner relationships) + b_{13} (Depressive symptoms) + b_{14} (Sex) + b_{15} (Verbalization) (Sex) + e_4

Model 5: $Y_5 = a_5 + b_{16}$ (Verbalization) + b_{17} (Education) + b_{18} (Husband/partner relationships) + b_{19} (Depressive symptoms) + b_{20} (Sex) + b_{21} (Temperament) + b_{21} (Verbalization) (Temperament) + e_5

Model 6: $Y_6 = a_6 + b_{22}$ (Verbalization) + b_{23} (Education) + b_{24} (Husband/partner relationships) + b_{25} (Depressive symptoms) + b_{26} (Sex) + b_{27} (Temperament) + b_{28} (Attachment) + b_{29} (Verbalization) (Attachment) + e_6

where Y_s = child socio-emotional functioning, intercepts, α_s = intercepts, β_s = regression coefficients, ε_s = model fit errors.

To test whether maternal verbal sensitivity partially mediates the link between the children's earlier attachment at toddlerhood and their socio-emotional functioning at

preschool age as shown in Figure 3, a mixture modeling was supposed to be used. The arrow from the child's earlier attachment to maternal verbal sensitivity corresponds to the multinomial logistic regression of the categorical maternal verbal sensitivity class on the child's earlier attachment. The arrow from maternal verbal sensitivity to the child's socio-emotional functioning indicates that the intercept of the child's socio-emotional functioning varies across the classes of maternal verbal sensitivity. The arrow from the child's attachment to the child's socio-emotional functioning corresponds to the regression of the child's socio-emotional functioning on the child's earlier attachment. To illustrate, the broken arrow from maternal verbal sensitivity to the arrow from mother's educational attainment to the child's socio-emotional functioning indicates that the slope in the regression of child's socio-emotional functioning on mother's educational attainment varies across the classes of maternal verbal sensitivity. The Mplus mixture model is estimated by maximum-likelihood (Muthén & Muthén, 2007). The observed-data log likelihood is as follows:

$$logL = \sum_{i=1}^{n} log[\mathbf{y}_i, \mathbf{u}_i \mid \mathbf{x}_i],$$

where $[\mathbf{y}_i, \mathbf{u}_i \mid \mathbf{x}_i]$ is a mixture distribution defined as

$$\sum_{k=1}^{K} P(c_{ik} = 1 \mid \mathbf{x}_i)\ [\mathbf{u}_i \mid c_{ik} = 1, \mathbf{x}_i]\ [\mathbf{y}_i \mid c_{ik} = 1, \mathbf{x}_i]$$

where $\mathbf{x}_i$ = the child's earlier attachment, $\mathbf{u}_i$ = response vector of the maternal verbalization, $\mathbf{y}_i$ = the child's socio-emotional functioning, i = individual, c = a categorical latent variable (i.e., class) numbered k, where k = 1, 2, and so forth.

CHAPTER IV

RESULTS

The presentation of results is organized into four sections. The first section contains the preliminary analyses. First, the treatment of missing data is discussed. Next, factor analyses for child socio-emotional functioning variables and for child temperament are reported. Descriptive statistics for and correlations among child socio-emotional functioning variables are also summarized. This is followed by descriptive statistics for independent variables and maternal verbalization items as well as correlations among maternal verbalization items. Last, regression diagnostics are discussed and correlations among independent variables are displayed. The second section contains the LCA conducted to address Questions 1, 2, 3, and 4. The third section contains the SEM conducted to address Questions 5, 6, and 7. The fourth section contains the regressions conducted to address Questions 8, 9, 10, and 11.

Preliminary Analyses

Treatment of Missing Data

For each item for measuring study variables (i.e., child attachment security scores, child reading scores, externalizing behavior problems reported by either mothers or early care/education providers, and social competence reported by either mothers or early care/education providers), the percentages of missing cases ranged from .30 to 3.90. These small parentages suggest that it is acceptable to consider these missing at random (MAR). Thus, STATA's imputation by chained equations (ICE) technique was used. ICE is a scheme for cycling through all the variables to be imputed using uvis (univariate imputations). This approach is based on each posterior predictive distribution of a

variable given other variables. The imputation by chained equation approach has the advantage of robustness because it relaxes the assumption of multivariate normality. A drawback to this approach is that the conditional distributions can be incompatible. However, simulation studies have shown that in practice it performs well (UCLA: Academic Technology Services, Statistical Consulting Group. from http://www. ats.ucla.edu/stat/stat/library/ice.htm). The number of missing values for each variable or item as well as a set of variables used for each ICE are presented in Appendix A. Regarding early care/education provider's rating of children's socio-emotional functioning, 10 cases were not rated on the whole sets of items for both externalizing behaviors and social competence. For these 10 cases, mean imputations were used for each item after the ICE imputation for the other cases where parts of the scales had missing values.

The percentage of missing cases for the husband/partner relationship satisfaction was 11.54 % (33 missing out of 286 respondents in relationship) after eliminating respondents not in spouse/partner relationship (47 cases). The pattern of missing was examined across the demographics and the other study variables, and no systematic pattern was found. The way that the survey question was asked was then reviewed; this suggested a methodological problem in the survey. Before the question about relationship satisfaction, the following was asked "if you do NOT have a spouse/partner living in your household" and then the self-administered questionnaire directed respondents to skip the relationship satisfaction question. This negative wording seems to produce a discrepancy in the coding for the child's parents who reside in the household, where the 33 mothers, who failed to respond to the relationship satisfaction question, had either the child's

biological father or other father in the household. Thus, an ICE was used for the missing values for the souse/partner relationship satisfaction.

The percentage of missing cases for the maternal verbalization coding, except the item *the mother asked if her child liked the book*, ranged from .30 (1 missing) to .60 (2 missing). The percentage of missing cases for the item *the mother asked if her child liked the book* was 9.91, and a pattern of missing for this item was examined over the demographics and the other study variables, but no systematic pattern was found. Thus, MAR for all the maternal verbalization items was assumed.

Note that missing values for any maternal verbalization item were not imputed because maternal verbalization codings were used for a latent class analysis. Mplus handles missing data on the latent class indicators using FIML (Full Information Maximum Liklihood) (UCLA: Academic Technology Services, Statistical Consulting Group. from http://www. ats.ucla.edu/stat/mplus/seminars/IntroMplus_CFA/default.htm). In FIML, maximum-likelihood estimation draws on theory in Little and Rubin (1987) assuming ignorable missingness with missing at random. Missing at random means that the probabilities of values being missing can be predicted by variables that are not missing, for instance x variables and variables observed at the first time point of a longitudinal study. Mplus computes a covariance coverage matrix that describes the extent of missing data. In the covariance coverage matrix diagonal and off-diagonal elements give the proportion of available observations for each variable and pairs of variables, respectively. A default minimum coverage value of .10 is used to protect against computational difficulties. The estimation of the H_0 model is in general not as strongly influenced by low coverage as the H_1 model. With missing data, an unrestricted

model for the mean vector and covariance matrix is considered when estimating the H_1 model. This model is estimated using the EM algorithm described in Little and Rubin (1987). The default maximum number of iterations is 500. After 10 iterations, convergence is checked based on the change from one iteration to the next. For each parameter value the change must be less than 0.0001 and when this is fulfilled a further requirement is that the |2 n logL| change is less than 0.003. This |2 n logL| value has been found sufficiently strict for the chi-square test of fit of H_0 against H_1 to be numerically precise. In problems where the |2 n logL| criterion is not fulfilled, a stricter convergence criterion than 0.001 for the parameters can be used so that the |2 n logL| criterion becomes fulfilled (Muthen & Muthen, 2010).

Exploratory Factor Analysis

Exploratory factor analyses for items rating children's socio-emotional functioning and for items rating children's temperament were conducted to determine their underlying factor structure.

Child socio-emotional functioning. Maximum likelihood (ML)-based exploratory factor analyses for items rating children's socio-emotional functioning were conducted to determine the underlying factor structure of the socio-emotional functioning in the sample as well as to deal with missing data. Computing an EM covariance matrix is part of the imputation process when there are missing values. (UCLA: Academic Technology Services, Statistical Consulting Group. from http://www. ats.ucla.edu/stat/stat/ faq/factor_missing.htm). Initially, the approach using ML with the expectation-maximization (EM) algorithm to estimate the covariance matrix was conducted on the full 24 items of mother report and the full 20 items of early care/education provider

report, respectively. Finally, as shown in Appendix B, a two-factor solution resulted in a clear and interpretable structure for the 8-item mother report and the 7-item ECEP report of children's socio-emotional functioning, respectively. The Kaiser-Meyer-Olkin measure was adequate, indicating that enough items were predicted by each factor: .69 for mother report socio-emotional functioning and .91 for the ECEP report socio-emotional functioning. The factor correlations were small (i.e., less than .32, corresponding to 10 % of the variance explained) so that orthogonality in the factor structure was assumed for the best-fit factors (Factor Analysis: Statnotes, from North Carolina State University. from http://factulty.chass.nssu.edu/garson/PA765/factor.htm). Table 2 presents the indicators and latent variables selected for this study. Correlations among the variables are presented in Table 3.

Child temperament. Principal component factor analysis for items rating children's temperament was conducted to determine the underlying factor structure of the temperament in the sample. Initially, the factor analysis was conducted on the full 8 items measuring temperament. Finally, as shown in Appendix B, a one-factor solution resulted in a clear structure for the 6 items. The Kaiser-Meyer-Olkin measure was .72, indicating that enough items were predicted by the factor.

Table 2

Latent Variables and Indicators of Child Socio-emotional Functioning

Variable and indicator	Not imputed		Imputed			
	Unweighted		Unweighted		Weighted	
	Mean	*SE*	*Mean*	*SE*	*Mean*	Liniearlized *SE*
Social competence reported by mothers						
	3.67	.04	3.67	.04	3.69	.05
Tries to understand others[a]	3.65	.05	3.65	.05	3.63	.06
Comforts others	3.65	.05	3.65	.05	3.69	.06
Stand up for others	3.71	.05	3.71	.05	3.73	.06
Social competence reported by ECEP						
	3.36	.05	3.36	.05	3.38	.06
Tries to understand others	3.33	.06	3.34	.06	3.40	.07
Comforts others	3.31	.06	3.31	.06	3.34	.07
Stand up for others	3.42	.06	3.42	.06	3.40	.07
Externalizing behaviors reported by mothers						
	2.55	.03	2.55	.03	2.56	.04
Overly active[a]	2.68	.06	2.68	.06	2.71	.08
Difficulty concentrating	2.43	.04	2.44	.04	2.48	.06
Angry[a]	2.86	.05	2.86	.05	2.87	.06
Temper tantrums[a]	2.60	.05	2.60	.05	2.61	.06
Physically aggressive[a]	2.19	.05	2.19	.05	2.21	.06
Externalizing behaviors reported by ECEP						
	2.23	.05	2.23	.05	2.27	.06
Overly active	2.26	.06	2.26	.06	2.30	.08
Difficulty concentrating	2.24	.06	2.24	.05	2.28	.07
Disrupt other child's actives	2.12	.05	2.12	.05	2.16	.06
Restless/fidgety	2.31	.06	2.31	.06	2.35	.07

Note. [a]No missing values for the item so that the imputed values without weights are the same with unimputed values are the same; ECEP = Early Care/Education Provider.

Table 3

Correlations among Latent Variables of Child Socio-emotional Functioning

	Parent report		ECEP report	
	Social competence	Externalizing behaviors	Social competence	Externalizing behaviors
Parent-reported externalizing behaviors	-.10^{+}			
ECEP-reported social competence	.11*	-.14*		
ECEP-reported externalizing behaviors	-.08	.28***	-.23***	

Note. ***p < .001, *p < .05, ^{+}p < .10; ECEP = Early Care/Education Provider.

Descriptive Statistics of Independent Variables

The univariate statistics for the independent variables after being imputed for missing values are presented in Table 4. Next, the univariate statistics for and the correlations among the maternal verbalization items follow in Tables 5 and 6. In order to get some level of variance in each indicator of maternal verbalization classes, some indicators were generated by combining items that measure conceptually similar verbalizations. For example, the original RAPT coded whether the mother asked the child to recall the story separately during reading and after reading. These separate indicators during and after reading were combined to generate an indicator representing the maternal verbalization of asking recall. If a response was presented for least one of the two conceptually similar indicators, it was coded as the presence of the response on the newly generated indicator. Then, the distributions of each item and the correlations among items were examined. Further indicators were dropped through successive steps of LCA to improve the model fit over the previous one. Finally, 12 maternal verbalization

class indicators were selected, resulting in the better LCA model. The univariate statistics for the full 28 items that coded maternal verbalizations are presented in Appendix C.

Table 4

Descriptives of Independent Variables (Unweighted n = 333, Weighted N = 2,207,339)

Variable	% (Freq.)	*Mean* (*SD*)	*SE*	Min.	Max.	Weighted %	Weighted *Mean*	Linearized *SE*
Child characteristics								
Reading score[p]		26.55 (10.53)	.58	12.15	80.29		26.20	.69
Temperament[9]		1.21 (.58)	.03	.00	2.83		1.14	.04
TAS security[2]		.47 (.34)	.02	-.61	.95		.49	.03
Sex								
Boys	47.75 (159)		.03			52.22		.04
Girls	52.25 (174)		.03			47.78		.04
Mother characteristics								
Bachelor's degree or higher education[9]								
Yes	39.04 (130)		.03				38.29	.03
No	60.96 (203)		.03				61.70	.03
Spouse/partner relationship[2]								
No spouse/partner	14.11 (47)		.02				16.34	.03
Less happy	25.83 (86)		.02				25.04	.03
Happier	60.06 (200)		.03				58.62	.03
Depressive symptoms[2]		.49 (1.52)	.08	.00	7.00		.56	.12

Note. [9]At 9-month data collection; [2]At 2-year data collection; [p]At preschool data collection; TAS = the Toddler Attachment Sort – 45.

Table 5

Descriptives of Maternal Verbalizations (Unweighted n = 333, Weighted N = 2,207,339)

Item	Freq.	%	*SE*	Weighted %	Liniearlized *SE*
BR capturing the child's attention					
Yes	261	78.38	.02	79.36	.03
No	70	21.02	.02	19.59	.03
Not Ascertained	2	.60	.00	.01	.01
BR directing the child to the features of the book					
Yes	255	76.58	.02	77.52	.03
No	76	22.82	.02	21.42	.03
Not Ascertained	2	.60	.00	.01	.01
BR reminding the child of other similar books					
Yes	53	15.92	.02	15.44	.03
No	278	83.48	.01	83.51	.03
Not Ascertained	2	.60	.00	1.05	.01
DR acting parts of the book					
Yes	155	46.55	.03	48.27	.04
No	177	53.15	.03	51.68	.04
Not Ascertained	1	.30	.00	.00	.00
DR expanding on the story or on the child's comments					
Yes	206	61.86	.03	64.66	.03
No	126	37.84	.03	35.29	.03
Not Ascertained	1	.30	.00	.00	.00
DR highlighting new vocabulary					
Yes	39	11.71	.02	11.04	.02
No	293	87.99	.02	88.92	.02
Not Ascertained	1	.30	.00	.00	.00
AR asking if the child liked the book					
Yes	109	32.73	.03	33.70	.03
No	191	57.36	.03	56.67	.03
Not Ascertained	33	9.91	.02	9.62	.02

Table 5 (continued)

Descriptives of Maternal Verbalizations

Item	Freq.	%	*SE*	Weighted %	Liniearlized *SE*
DR or AR asking the child to recall the story[a]					
Yes	51	15.32	.02	15.68	.03
No	281	84.38	.02	84.27	.03
Not Ascertained	1	.30	.00	.00	.00
BR, DR, or AR responding to the child's questions/comments[a]					
Yes	154	46.25	.03	47.92	.04
No	179	53.75	.03	52.08	.04
Not Ascertained	0	.00	NA	.00	NA
BR or DR asking close-ended questions[a]					
Yes	281	84.38	.02	83.90	.03
No	52	15.62	.02	16.10	.03
Not Ascertained	0	.00	NA	.00	NA
BR, DR, or AR relating the story to the child's experiences[a]					
Yes	127	38.14	.03	40.50	.04
No	206	61.86	.03	59.50	.04
Not Ascertained	0	.00	NA	.00	NA
BR, DR, or AR asking open-ended questions[a]					
Yes	98	29.43	.03	32.22	.04
No	235	70.57	.03	67.78	.04
Not Ascertained	0	.00	NA	.00	NA

Note. BR = Before Reading; DR = During Reading; AR = After Reading; [a]LCA indicator that is generated by combining items coding the conceptually similar verbalizations.

Table 6

Correlations among Maternal Verbalizations

Verbalization	2	3	4	5	6	7	8	9	10	11	12
1. Capture attention	.08	-.01	.21***	.12*	-.03	.14*	-.04	.10^{+}	.12^{+}	.11^{+}	.06
2. Direct to the features of the book		.09^{+}	.20**	.10^{+}	-.04	.07	.13**	.05	.10	.07	.08
3. Remind similar books			.03	.15**	.04	.00	.05	.03	.09^{+}	.07	.03
4. Expand on the story				.05	.21***	.04	.05	.14*	.29***	.31***	.05
5. Act parts of the book					.05	.09	.16**	.22***	.07	.13*	.09
6. Highlight new vocabulary						.11^{++}	.06	.01	.12***	.14*	.07
7. Ask if the child liked the book							.01	.09	.11*	.04	.11^{+}
8. Ask to recall the story								.12*	.16***	.09^{+}	.15**
9. Respond to questions									.10^{+}	.13*	.06
10. Close-ended question										.17***	.20***
11.Relate the story to experiences											.19***
12. Open-ended question											

Note. ***p < .001; **P < .01; *p < .05; ^{+}p < .10.

Regression Diagnostics

Tests were performed to check for violation of assumptions.

Assessment of multicollinearity among independent variables. To determine the best parsimonious predictive variables, multicollinearity among independent variables was assessed. First, the correlations among the potential independent variables are presented in Table 7. Note that both child's age and reading score were included in the correlation matrix. The purpose of the matrix is to examine potential collinearity through the magnitude of relationships between variables. A correlation coefficient greater than .80 suggests collinearity. Although potential collinearity was not detected by correlation coefficient as seen in Table 7, bivariate correlations do not always give the story of multicollinearity. The R^2 of a variable in the VIF (Variance Inflation Factor) equation is not from pairwise correlations. They are multiple correlations from a variable regressed on all the other variables (Armstrong, 2008). Thus, further examination of multicollinearity among the variables was conducted via VIF, tolerance (defined as 1/VIF), the square root of the VIF (SQRT VIF), and condition numbers. When high multicollinearity is present, it is difficult to reject the null: as the degree of multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get widely inflated (UCLA: Academic Technology Services, Statistical Consulting Group. from http://www. ats.ucla.edu/stat/stat/ faq/factor_missing.htm). That is, VIF indicates the impact of collinerarity on the precision of the coefficients. As a rule of thumb, a variable of which VIF is 10 or higher or, equivalently, has a tolerance value of .10 or lower, is a reason for concern. According to Allison (1999), it is justified to be concerned about

multicollinearity when the VIF is over 2.5 and the tolerance is under .40. SQRT VIF gives the factor by which the standard error and confidence interval is inflated as a function of multicollinearity. SQRT VIF less than 2.0 suggests that multicollinearity is not a problem. Additionally, multicollinearity has little effect until R^2 of a variable is quite large, nearly .8. Finally, as collinearity increases, the condition number will increase. An informal rule of thumb is that if the condition number is over 15, multicollinearity is a concern; and if it is greater than 30, multicollinearity is a serious concern (n. a., from http://www.nd.edu/~rwilliam/stats2/l11.pdf).

After considering VIF, tolerance, SQRT VIF, R^2, and condition numbers, child reading scores was chosen for LCA over child age. Thus, child's sex , child's temperament, child's attachment security, child's reading score, maternal education, maternal relationship with a spouse/partner, and maternal depressive symptoms were included in the LCA (Table 8). For regressions, child's sex, child's temperament, child's attachment security, maternal education, maternal relationship with a spouse/partner, and maternal depressive symptoms were included in the model (Table 9).

Homoscedasticity of residuals for dependent variables vs. predicted values. Homoscedasticity refers to the assumption that that the dependent variable exhibits similar amounts of variance across the range of values for an independent variable. If the variance of the residuals is non-constant, namely non-homogenous, then the residual variance is said to be heteroscedastic. Heteroscedasticity may inflate the standard errors for the coefficients by giving too much weight to a subset of the data, in which the error variance is largest, so that it is hard to reject the null hypothesis. This assumption was evaluated by the White's test and the Breusch-Pagan test. Both test the null hypothesis

that the variance of the residuals is homogenous. Therefore, if the *p*-value is very small, the alternative hypothesis is accepted that the variance is not homogenous (UCLA: Academic Technology Services, Statistical Consulting Group. from http://www.ats.ucla.edu/stat/stata/webbooks/reg/chapter2/statareg2.htm). Diagnostic plots were also examined that plot the residuals vs. predicted values that were estimated by regressing a dependent variable on a set of independent variables (i.e., child sex, attachment security, and temperament; maternal education, relationship status, and depressive symptoms). According to both tests (Table 10) as well as the plots (Appendix D), no strong evidence of heteroscedasticity was detected.

Table 7

Correlations among Potential Independent Variables

	Sex	Age	Reading score	Tempera-ment	TAS	BA or higher	No relation	Less happy	Happi-er
Child characteristics									
Sex									
Age[p]	-.01								
Reading[p]	-.10**	.24***							
Temperament[9]	.05	.14**	.02						
TAS security[2]	-.04	-.01	.11*	.00					
Mother characteristics									
BA or higher[9]	-.07	-.05	.28***	-.14**	.08				
Spouse/partner relationship[2]									
No relation	-.01	.08	-.07	.03	.05	-.24***			
Less happy	.01	.05	-.11*	.10^{+}	-.04	.05			
Happier	-.01	-.10^{+}	.15**	-.11^{+}	-.00	.12*			
Depressive[2]	-.04	.02	-.09	-.01	-.01	-.14**	.03	.13^{+}	-.14*

Note. ***p < .001; **P < .01; *p < .05; ^{+}p < .10; [9]At 9-month data collection; [2]At 2-year data collection; [p]At preschool data collection; TAS = the Toddler Attachment Sort – 45; Finally, the child's age was not included as an independent variable for this study after considering VIF, tolerance, SQRT VIF, R^2, and condition numbers.

Table 8

Multicollinearity Diagnostics for LCA

Variable	VIF	SQRT VIF	Tolerance	R^2	Condition index
Child characteristics					
Sex	1.02	1.01	.98	.02	1.00
Reading score	1.13	1.06	.88	.12	2.96
Temperament	1.04	1.02	.96	.05	2.21
TAS security	1.13	1.01	.98	.02	2.53
Mother characteristics					
BA or higher	1.21	1.10	.83	.17	3.54
Husband/partner relationship (ref. = No husband/partner)					
Less happy	2.23	1.49	.45	.55	4.25
Happier	2.24	1.50	.45	.55	6.02
Depressive symptoms	1.05	1.02	.96	.04	6.71

Note. Mean VIF = 1.37; Condition number = 11.92; TAS = the Toddler Attachment Sort – 45.

Table 9

Multicollinearity Diagnostics for Hierarchical Regressions

Variable	VIF	SQRT VIF	Tolerance	R^2	Condition index
Child characteristics					
Sex	1.01	1.01	.99	.01	1.00
Temperament	1.04	1.02	.96	.04	2.03
TAS security	1.02	1.01	.99	.02	2.32
Mother characteristics					
BA or higher	1.12	1.06	.89	.11	2.73
Husband/partner relationship (ref. = No husband/partner)					
Less happy	2.22	1.49	.45	.55	3.27
Happier	2.23	1.49	.45	.55	3.95

Table 9 (continued)

Multicollinearity Diagnostics for Hierarchical Regressions

Variable	VIF	SQRT VIF	Tolerance	R^2	Condition index
Depressive symptoms	1.04	1.02	.96	.04	5.52

Note. Mean VIF = 1.38; Condition number = 9.73; TAS = the Toddler Attachment Sort – 45.

Table 10

Tests on Heteroskedasticity

	White's test		Breusch-Pagan test	
	χ^2 (*df*)	*p*-value	χ^2 (*df*)	*p*-value
Social competence reported by mothers	34.83 (30)	.25	.02 (1)	.88
Externalizing behaviors reported by mothers	44.02 (30)	.05	3.18 (1)	.07
Social competence reported by ECEP	42.63 (30)	.08	.71 (1)	.40
Externalizing behaviors reported by ECEP	40.90 (30)	.09	3.27 (1)	.07

Note. H_0 = Constant variance; ECEP = Early Care/Education Providers.

Bivariate Statistics

In case of suppression effects—reversal in direction on regression coefficients, correlations between independent variables and dependent variables were checked (Table 11).

Table 11

Correlations between independent variables and child outcomes

	Child characteristic			Mother characteristic				
	Boy	Tempera-ment	TAS	BA or higher	No relation[a]	Less happy[a]	Happier[a]	Depre-ssive
Social competence								
Mother report	-.23***	-.14***	.04	.04	.13*	-.03	-.07	.10*
ECEP report	-.17***	.05	.05	.05	.01	-.04	.03	.05
Externalizing behaviors								
Mother report	.11+	.14*	-.00	.05	.12+	.04	-.12*	.10
ECEP report	.23***	-.08	-.08	-.16*	.02	.02	-.03	.01

Note. ***$p < .001$; *$p < .05$; +$p < .10$; TAS = the Toddler Attachment Sort – 45; [a]Marital/romantic relationship; ECEP = early care/education provider.

Latent Class Analysis of Maternal Verbalizations with Covariates

Latent class analysis of responses to the maternal verbalizations during the mother-child shared book reading was conducted in order to identify groups of mothers who use similar patterns of verbalizations. All 12 maternal verbalization items were entered into the model. Additionally, covariates (i.e., child sex, attachment security, and reading scores as well as maternal education, relationship status, and depressive symptoms) were included in the model in order to evaluate the contribution of the covariates.

Research Question #1: *Are there patterns of maternal verbal interactive behaviors that identify a mother who is sensitive verbally during mother-child book reading?*

Hypothesis 1: *There will be discrete classes of mothers characterized by different profiles of maternal verbal interactive behaviors: Highly sensitive mothers, compared to less sensitive mothers, will facilitate her child's engagement in the discourse more frequently by asking for information, providing expanded information in response to her child's comments, relating a story to child's experiences, and providing opportunities to organize the story.*

Two classes of maternal verbalization were identified. The optimal number of classes was determined in terms of overall fit of the models and theoretical considerations as well as the substantive meaning of the classes (Muthén & Muthén, 2009). Table 12 shows the model fit criteria. Several models were examined before arriving at the best model that fit the data well.

The 3-class model was not run properly, suggesting that the model is not identified. Comparing the 1-class and the 2-class models, the larger log-likelihood in the 2-class model suggests that the 2-class model is better although the non significant and similar Pearson χ^2 and Likelihood Ratio χ^2 suggest that both models are possible. In addition, all the three comparative measures of fit, AIC, BIC, and Adj-BIC indicated that the 2-class model fit the data better: lower values indicate a better fit. The entropy of .84 in the 2-class model also indicated that the 2-class model classified people very well. Entropy is a summary of how well the classes classify people, ranging from 0 to 1: Above .70 is acceptable and above .80 indicates a good classification (Muthén & Muthén, 2010).

Table 12

Model Fit Information for Each of the Latent Class Analysis Model Tested

Model	1-Class	2-Class	3-Class
# of parameters	72	89	Model was not identified.
Log-likelihood	-6597.10	-4186.67	
AIC	13338.21	8551.35	
BIC	13612.39	8890.27	
Adj-BIC	13384.00	8607.96	
Pearson χ^2	23477.93	22497.48	
(*df*)	(104, 945)	(104,921)	
(*p*-value)	(1.00)	(1.00)	
Likelihood Ratio χ^2	21051.82	20890.61	
(*df*)	(104, 945)	(104,921)	
(*p*-value)	(1.00)	(1.00)	
Entropy	NA[a]	.84	
Vuong-Lo-Mendel-Rubin LRT	NA[a]	282.17	
(*p*-value)		(.76)	
Lo-Mendel-Rubin LRT	NA[a]	280.16	
(*p*-value)		(.76)	

Note. [a]These indices are not applicable to a 1-class model; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; Adj-BIC = Sample size adjusted BIC; LRT = Likelihood Ratio Test.

As shown in Table 13, the two-class model showed a clear distinction between classes, having only one class with a high probability of being in that class and the other class having a low probability. For mothers in Class 1, the average probability of being in the class was .965 and that of being in Class 2 was .035. For mothers in Class 2, the average probability of being in the class was .907 and that of being in Class 1 was .093. Both Vuong-Lo-Mendel-Rubin LRT (Likelihood Ratio Test) and Lo-Mendel-Rubin LRT

compare the 2-class model to the 1-class model. Those *p*-values suggested that one class is sufficient and the two classes are not really needed. However, since it was reported that both LRTs are not reliable (UCLA: Academic Technology Services, Statistical Consulting Group. from http://www. ats.ucla.edu/stat/mplus/dae/lac1.htm) and the 2-class model fit the theoretical expectations of this study, the 2-class model was selected after considering all the other model-fit information discussed above.

Table 13

Average Latent Class Probabilities of Most Likely Latent Class Membership by Latent Class

Class	1	2
1	.965	.035
2	.093	.907

Research Question #2: *If there are discrete classes of mothers identified by their verbal interactive behaviors during mother-child book reading, which verbalization indicators distinctively differentiate verbally sensitive mothers from less sensitive mothers?*

Hypothesis 2: *Elaborative discourse style will be identified more frequently in verbally sensitive mothers than less sensitive mothers by the following verbal behaviors: 'relate the story to the child's experience'; 'expand on the story or the child's comment'; 'respond/answer the child's questions'; 'ask open-ended questions'; 'remind the child of other similar books'; and 'summarize the story with the child involvement'.*

Item conditional probabilities (Table 14) give an overall picture of the meaning of the two classes identified and help create descriptive labels for the classes. Response

probability profiles corresponding to the item conditional probabilities are presented in Figure 5. The items most endorsed with a probability of .70 or above by both classes were ‘reminding other similar books,’ ‘highlighting new vocabulary,’ and ‘asking to recall the story.’ The item most endorsed with a probability of .70 or above only by Class 1 was ‘asking close-ended questions.’ The items most endorsed with a probability of .70 or above only by Class 2 were ‘acting parts of the book,’ ‘expanding on the story,’ and ‘asking if the child liked the book.’ Response probability profiles (Figure 1) showed that the two classes are clearly distinguished on the following items: ‘expanding on the story’ (probability endorsed by Class 1 = .23 and by Class 2 = .79), ‘acting parts of the book’ (Class 1 = .45 and Class 2 = .75), ‘relating to experiences’ (Class 1 = .52 and Class 2 = .00), ‘asking close-ended questions’ (Class 1 = .93 and Class 2 = .51), ‘responding to the child’s questions’ (Class 1 = .56 and Class 2 = .19), and ‘asking open-ended questions’ (Class 1 = .40 and Class 2 = .04). The profile of Class 1 showed the greater probabilities for the last four items. The profile of Class 2 showed the greater probabilities for the first two items, and lower probabilities for the last four items illustrating the lower probability. Interestingly, response probabilities of Class 2 were close to zero for the following indicators: ‘relating the story to the child’s experiences’ and ‘asking open-ended questions.’ Unexpectedly, ‘reminding the child of other similar books’ was observed with a high probability in both classes. The indicator ‘expanding on the story’ was unexpectedly identified as a feature of the Class 2.

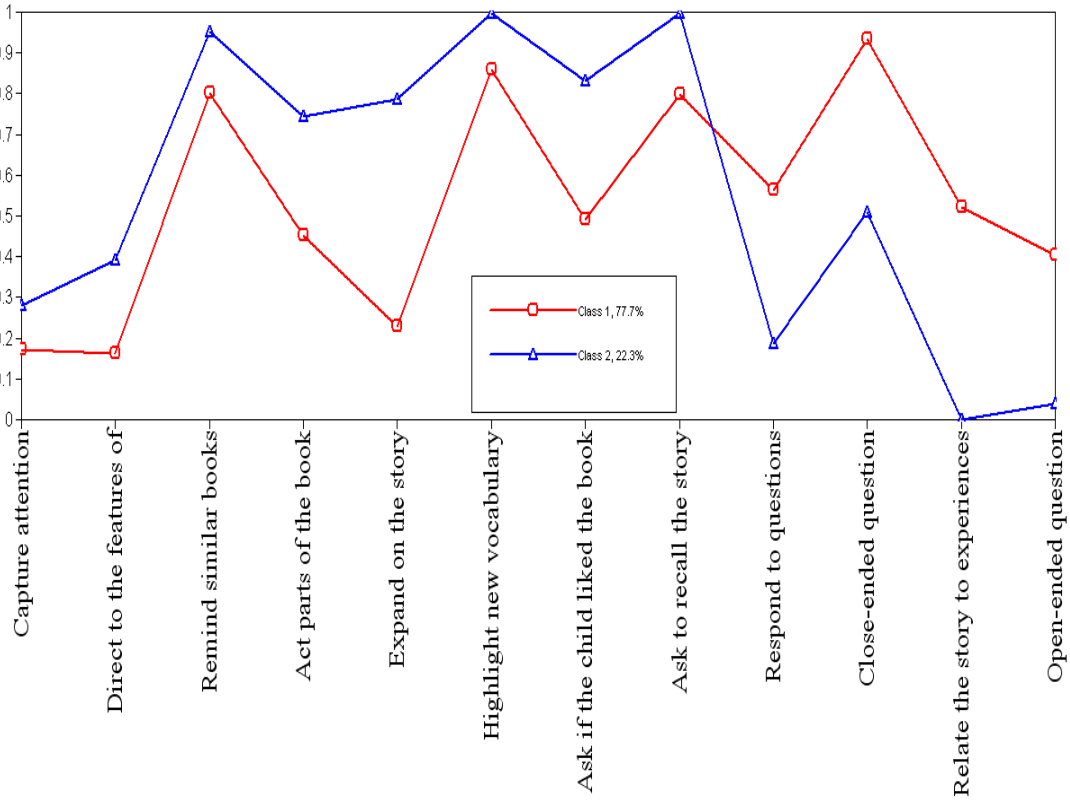
Table 14

Conditional Probabilities of Items within Each of the Two Classes

	Class 1 (77.69 %) Child-centered (sensitive) mother		Class 2 (22.31 %) Book-centered (less sensitive) mother	
Endorsement to item	Yes	No	Yes	No
BR capturing the child's attention	.17***	.83***	.28**	.67***
BR directing the child to the features of the book	.16***	.84***	.39***	.56***
BR reminding the child of other similar books	**.80****	.20***	**.95****	.00***
DR acting parts of the book	.45***	.55***	**.75****	.25***
DR expanding on the story or on the child's comments	.23***	.77***	**.79****	.21*
DR highlighting new vocabulary	**.86****	.14***	**1.00****	.00
AR asking if the child liked the book	.49***	.40***	**.83****	.11+
DR or AR asking the child to recall the story	**.80****	.20***	**1.00****	.00
BR, DR, or AR responding to the child's questions	.56***	.44***	.19*	.81***
BR or DR asking close-ended questions	**.93****	.07**	.51***	.49***
BR, DR, or AR relating the story to experiences	.52***	.48***	.00	1.00***
BR, DR, or AR asking open-ended questions	.40***	.60***	.04	.96***

Note. ***$p < .001$, **$P < .01$, *$p < .05$, $^{+}p < .10$; BR = Before Reading, DR = During Reading, AR = After Reading.

Figure 5. Profiles of maternal verbalization for each of the latent classes



Taken together, these results show two different verbal styles. Class 1 was composed of 77.69 % of the sample: these mothers were more likely to bring the child's world into the conversation by relating the story to the child's experiences, asking close- and open-ended questions, and responding to the child's questions. On the other hand, Class 2 was composed of 22.31 % of the sample: these mothers were more book-focused. They were imaginative, acting parts of the story, and expanding on the story. These mothers also were more likely to highlight new vocabulary, ask the child to recall the story, and remind the child of similar books than Class 1 mothers.

Research Question #3: *Are there maternal background characteristics that help classify mothers as sensitive verbally?*

Hypothesis 3a: *College-educated mothers will be more likely to show high verbal sensitivity than those with lower level of education.*

The class membership was significantly different by maternal educational attainment (Table 15). The log odds of being in Class 1 vs. Class 2 were higher for mothers who have a BA degree or more education than for the counterparts (log odds = 1.89, $p < .05$). In relative terms, mothers who have a BA degree or more education were 6.63 times more likely to be in Class 1, compared to their counterparts without a B.A.

Hypothesis 3b: *Mothers in happier relationships with their spouses/partners will be more likely to show higher verbal sensitivity than those in less happy relationships or those in no relationship.*

Unexpectedly, the class membership did not differ by maternal spouse/partner relationship (Table 15).

Hypothesis 3c: *Mothers with fewer depressive symptoms will be more likely to show higher verbal sensitivity than those with more depressive symptoms.*

Unexpectedly, the class membership was not different by maternal depressive symptoms (Table 15).

Taken together, these results showed that the mother's education predicts maternal verbal sensitivity: college-educated mothers were more likely to belong to Class 1 than those having no college education. Other maternal background characteristics, such as spouse/partner relationship and depressive symptoms, were not significant predictors.

Research Question #4: *Are there characteristics of children that help classify mother's verbal sensitivity?*

Hypothesis 4a: *Mothers will be more likely to show higher verbal sensitivity when interacting with girls than when interacting with boys.*

Unexpectedly, the class membership was not differed by the child's sex (Table 15).

Hypothesis 4b: *Mothers will be more likely to show higher verbal sensitivity when interacting with children of easy temperament than when interacting with children with a difficult temperament.*

Unexpectedly, the class membership was not different by the child's temperament (Table 15).

Hypothesis 4c: *Mothers will be more likely to show high verbal sensitivity when interacting with more securely attached children than when interacting with less securely attached children.*

Unexpectedly, the class membership was not different by the child's attachment (Table 15).

Hypothesis 4d: *Mothers will be more likely to show higher verbal sensitivity when interacting with children with higher reading scores than when interacting with children with lower reading scores.*

The class membership was differed marginally by children's reading scores (Table 15). The log odds of being in Class 1 vs. Class 2 increased as children's reading score increase (log odds = .06, $p < .10$). In relative terms, the odds of being in Class 1 vs. Class 2 were 1.06 times high for each additional unit increase in the reading score.

Taken together, these results showed that mothers were more likely to belong to Class 1 as their child's reading scores increased, but the relation was not substantive. Other child characteristics, such as sex, temperament, and attachment security, were not significant predictors.

Table 15

Estimated Odds Ratio of the Class 1 Membership by the Characteristics of Mothers and Children (ref. = Less Sensitive Class Membership)

	Log-odds	*SE*	*z*-score	Odds ratio
Child characteristics				
Sex (ref. = girls)	.17	.57	.29	1.18
Temperament[9]	-.06	.66	-.09	.94
TAS security[2]	-.53	.64	-.82	.59
Reading score[p]	.06[+]	.03	1.86	1.06
Mother characteristics				
BA or higher education[9]	1.89[++]	.86	2.20	6.63
Spouse/partner relationship[2] (ref. = Not in relationship)				
Less happy	.39	.64	.61	1.47
Happier	1.03	.64	1.62	2.81
Depressive symptoms[2]	.37	.80	.46	1.44

Note. [++]$p < .05$, [+]$p < .10$; TAS = the Toddler Attachment Sort – 45; [9]At 9-month data collection, [2]At 2-year data collection, [p]At preschool data collection.

Structural Equation Modeling Analysis

Path models were tested in structural equation modeling in order to examine whether children's socio-emotional functioning is associated with the identified classes of maternal verbalizations. Socio-emotional functioning variables, both social competence

and externalizing behaviors, were regressed on the identified classes of maternal verbalizations. The path model was examined separately for mother report and for early care/education provider (ECEP) report of children's socio-emotional functioning. In each model, the following variables were controlled: the child characteristics of sex, temperament, and attachment security as well as the maternal characteristics of education, relationship with a spouse/partner, and depressive symptoms. Parameter estimates standard errors were calculated via WLSMV (Weighted Least Square Parameter Estimates) that use a diagonal weight matrix and a full weight matrix, respectively (Hancok & Mueller, 2006). There were no problems in convergence, inadmissible solutions, or under identification of the model. Both unstandardized and standardized parameter estimates are reported. Standardized parameter estimates use the variance of the continuous latent variables as well as the variances of the background and outcome variables for standardization (Muthén & Muthén, 2010).

Research Question #5: *Is the child's socio-emotional functioning associated with maternal verbal sensitivity?*

Mother report of child socio-emotional functioning. A test of the path model results are presented in Figure 6. Fit indices for the model were good (RMSEA =.02, CFI = .98, TLI = .98). Although the *p*-value of χ^2 fit index was significant, χ^2 fit index was not a concern. The reason is that χ^2 is almost always statistically significant when a sample size is large (Kenny, August 14, 2011) and other fit-statistics were good. As for the measurement models of social competence, externalizing problems, temperament, and mothers' depressive symptoms, factor loadings were high and significant. The model explained 34 % of the variance in children's social competence and 16 % of the variance

in children's externalizing problems. Children's social competence was negatively associated with their externalizing behaviors, r = -.03 (standardized r = -.16, p < .05). In addition, children's temperament was negatively associated with maternal depressive symptoms, r = -.10 (standardized r = -.20, p < .05).

Early care/education provider report of child socio-emotional functioning. A test of the path model results are presented in Figure 7. Fit indices for the model were good (RMSEA =.02, CFI = .99, TLI = .99). Again, the p-value of χ^2 fit index was significant but χ^2 fit index was not a concern. As for the measurement models of social competence, externalizing problems, temperament, and mothers' depressive symptoms, factor loadings were high and significant. The model explained 6 % of the variance in children's social competence and 11 % of the variance in children's externalizing problems. Children's social competence was negatively associated with their externalizing behaviors, r = -.16 (standardized r = -.24, p < .001). In addition, children's temperament was negatively associated with maternal depressive symptoms, r = -.10 (standardized r = -.20, p < .05).

Hypothesis 5: *Maternal verbal sensitivity will be positively associated with children's social competence, and negatively associated with children's externalizing problems.*

Based on the maternal report of child behavior, Class 2 mothers were less likely to have a socially competent child and more likely to have a child with externalizing problems, compared to Class 1 mothers. The coefficient for the relationship between the classes of maternal verbalizations with children's social competence was -.35 (standardized β = -.27, p < .01): children with less verbally sensitive mothers had on average a .35 lower score on the social competence scale, which ranged from 1 to 5,

compared to their counterparts with verbally sensitive mothers. The coefficient for the relationship between the classes of maternal verbalizations with children's externalizing behaviors was .26 (standardized β = .23, p < .05): children with less verbally sensitive mothers had on average a .26 higher score on the externalizing behavior scale ranging from1 to 5, compared to their counterparts.

As for the ECEP report, the coefficient for the relationship between the classes of maternal verbalizations with children's externalizing behaviors was .29 (standardized β = .15, p < .10): children with less verbally sensitive mothers had on average a .29 higher score on the externalizing behavior scale ranging from 1 to 5, compared to their counterparts with verbally sensitive mothers.

Research Question #6: *Will the background characteristics of mothers have an effect on children's socio-emotional functioning?*

Hypothesis 6a: *Children whose mothers are college-educated will be more likely to be socially competent, and less likely to have externalizing behaviors, compared to those whose mothers have less than college education.*

Unexpectedly, according to both mother and the ECEP reports, neither of the child's socio-emotional functioning variables differed by maternal education.

Hypothesis 6b: *Children with mothers in happier relationships with a spouse/partner will be more likely to be socially competent, and less likely to have externalizing problems, compared to those with mothers in less happy relationships or in no relationship.*

Unexpectedly, compared to mothers in no relationship with a husband/partner, those in less happy relationships (β = -.48, standardized β = -.40, p < .001) or happier

relationships (β = -.37, standardized β = -.34, $p < .01$) had children with less social competence.

Hypothesis 6c: *Children whose mothers report more depressive symptoms will be less likely to be socially competent, and more likely to have externalizing behaviors, compared to those whose mothers report fewer depressive symptoms.*

Unexpectedly, the child's social competence reported by both mothers and the ECEP increased as mothers' depressive symptoms increased. With respect to maternal report, the coefficient for the relation between the child's social competence and mothers' depressive symptoms was .12 (standardized β = .22, $p < .05$). For the ECEP report, the coefficient for the relation between children's social competence and mothers' depressive symptoms was .13 (standardized β = .14, $p < .10$).

Research Question #7*: Is children's socio-emotional functioning at preschool age associated with the background characteristics of the children (indicated by sex, temperament, and attachment security)?*

Hypothesis 7a: *Boys will be less likely to be socially competent and more likely to have externalizing behaviors than girls.*

Based on both mother and the ECEP reports, boys were less likely to be socially competent than girls. The coefficient for the relation between children's social competence and sex was -.34 for mother report (standardized β = -.34, $p < .01$) and -.23 (standardized β = -.17, $p < .01$) by the ECEP report: Boys had on average .34 lower score by mother report and .23 score lower score by the ECEP report on the social competence scale ranging from 1 to 5, compared to girls.

For externalizing behaviors, only according to the ECEP report boys were more likely to have externalizing behaviors than girls. The coefficient for the relation between children's externalizing behaviors and sex was .40 (standardized β = .25, p < .001): boys had on average a .40 higher score by the ECEP report on the externalizing problem scale ranging from 1 to 5, compared to girls.

Hypothesis 7b: *Temperamental difficulty at the age of 9 months will be negatively related to social competence, and positively related to externalizing behaviors.*

Only the maternal report of the child's socio-emotional functioning was related to temperament, indicating that children's socio-emotional functioning decreases as their temperamental difficulty increases. The coefficient for the relation between children's social competence and temperament was -.18 (standardized β = -.17, p < .10): for each additional score of temperament, predicted score of social competence declined by .18. The coefficient for the relation between children's externalizing behaviors and temperament was .28 (standardized β = .29, p < .05): for each additional score of temperament, predicted score of externalizing behaviors increased by .28.

Hypothesis 7c: *Early secure attachment at toddlerhood will be positively related to the child's social competence, and negatively related to the child's externalizing problems.*

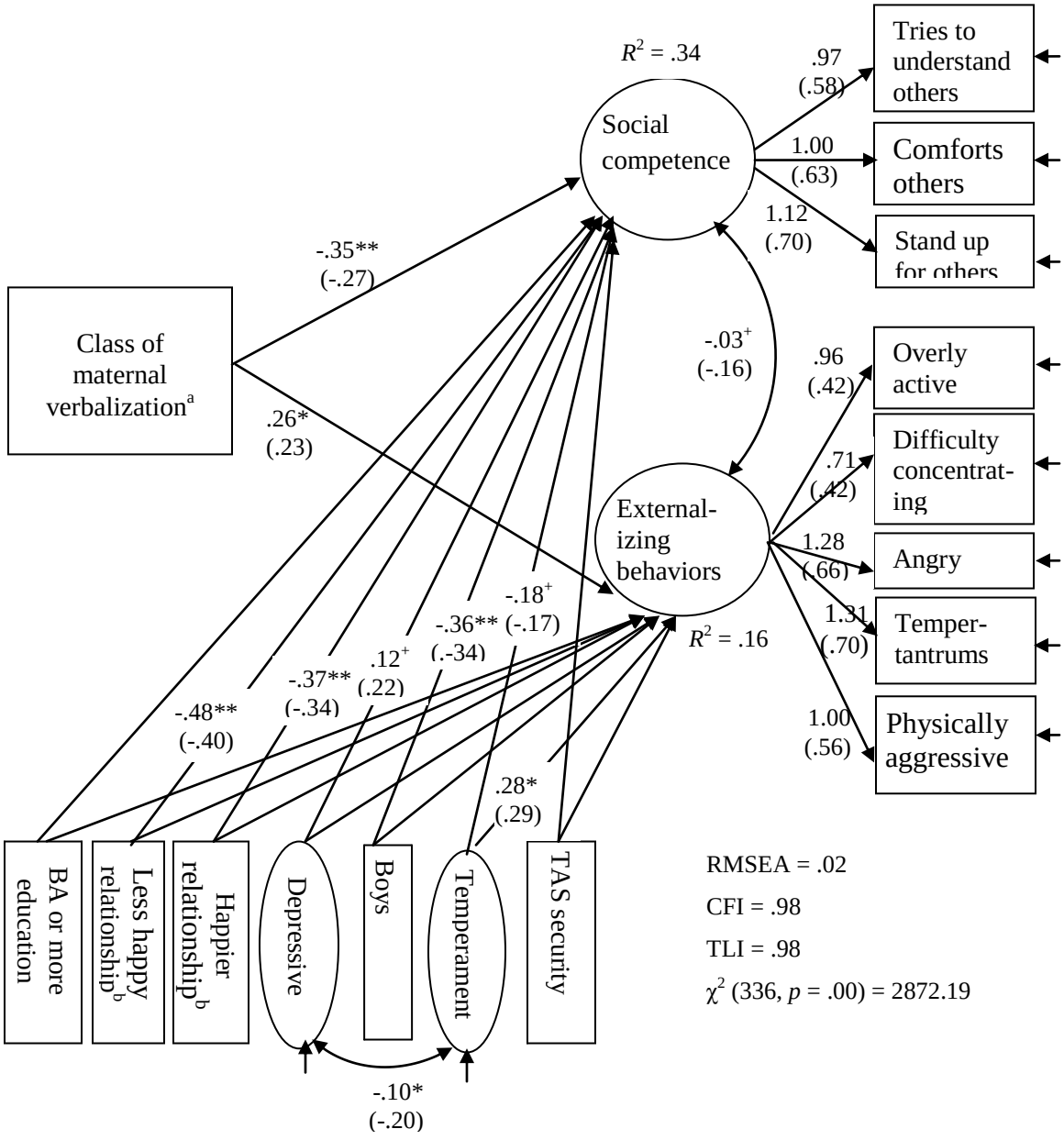
Unexpectedly, in both mother and the ECEP reports neither the child's two socio-emotional functioning variables differed by attachment security.

Overall, when the mother-reported socio-emotional functioning was considered and all study variables were taken into account, child's social competence and externalizing behaviors were negatively related. The children of less verbally sensitive

mothers were less likely to be socially competent, and more likely to have externalizing behaviors. Mothers' relationships with husbands/partners and depressive symptoms were significant predictors of children's social competence in the direction opposite to the hypotheses, but mothers' education predicted neither social competence nor externalizing problems. Boys were less likely to be socially competent than girls, but on sex difference in externalizing behaviors was found. The children with more difficult temperament at the age of 9 months were less likely to be socially competent and more likely to have externalizing behaviors. Children's attachment security at toddlerhood predicted neither social competence nor externalizing behaviors.

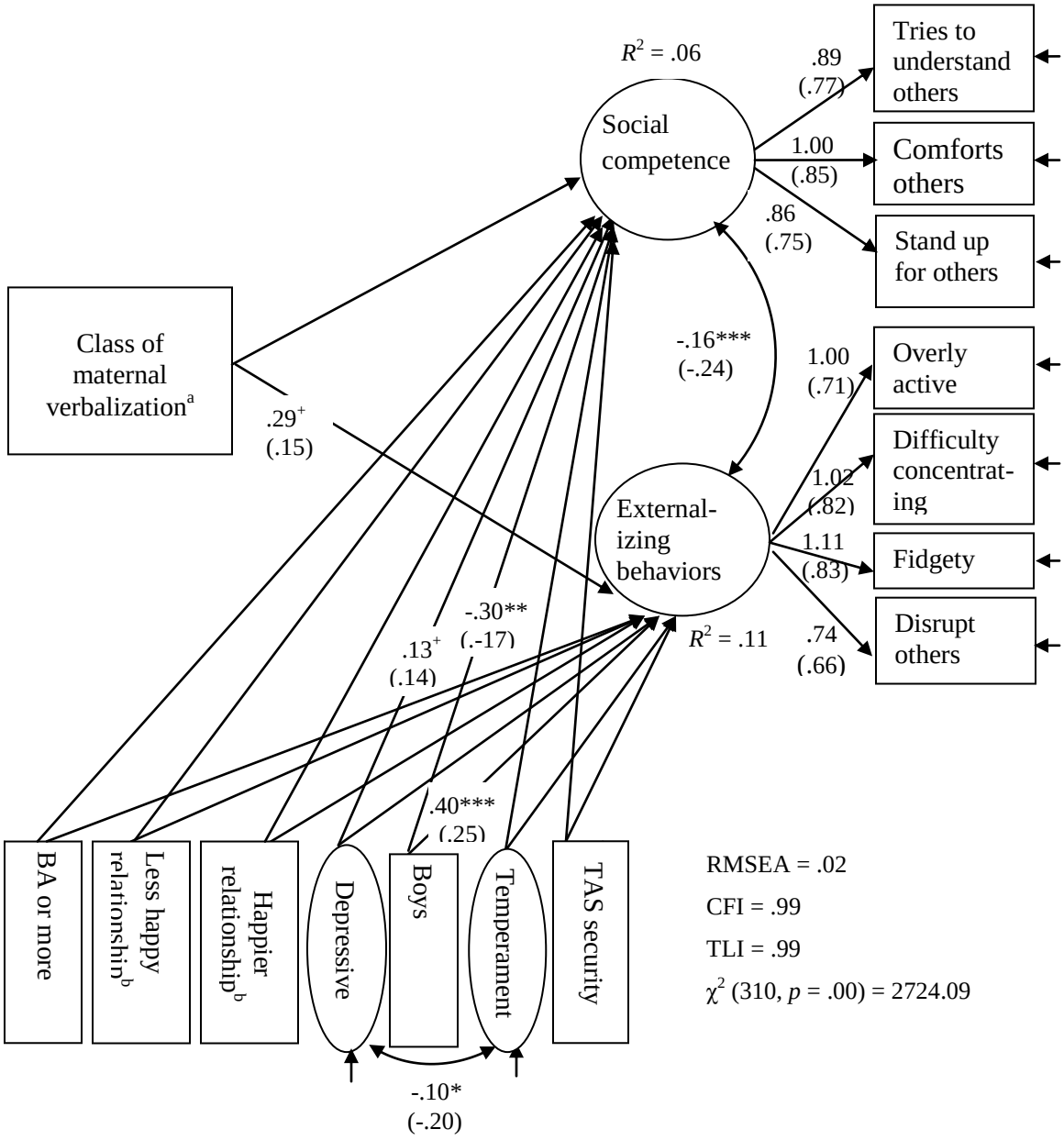
When the ECEP report of the child's socio-emotional functioning was considered and all study variables were considered, social competence and externalizing behaviors were negatively related. Somewhat different from maternal report, the children of less verbally sensitive mothers were more likely to have externalizing problems, but they were not different on social competence. Mothers' depressive symptoms were significant predictors of children's social competence in the direction opposite to the hypothesis, but the other maternal background characteristics (i.e., education and relationship with a spouse/partner) predicted neither social competence nor externalizing problems. Boys were less likely to be socially competent and more likely to have externalizing behaviors than girls. The other background characteristics of the children (i.e., temperament and attachment) predicted neither social competence nor externalizing problems.

Figure 6. Path coefficients predicting child socio-emotional functioning reported by mothers



Note. Only significant estimates at the level of $p < .10$ are presented: ***$p < .001$, **$P < .01$, *$p < .05$, +$p < .10$; Standardized estimates are presented in parentheses; [a]Ref. = Class 1 (child-centered/sensitive), [b]Ref.= No husband/partner; TAS = the Toddler Attachment Sort – 45.

Figure 7. Path coefficients predicting child socio-emotional functioning reported by early care/education providers



Note. Only significant estimates at the level of $p < .10$ are presented: ***$p < .001$, **$P < .01$, *$p < .05$, $^{+}p < .10$; Standardized estimates are presented in parentheses; [a]Ref. = Class 1 (child-centered/sensitive), [b]Ref.= No husband/partner; TAS = the Toddler Attachment Sort – 45.

Regression Analysis

A series of regression analyses was conducted in order to examine the role of maternal verbal sensitivity in linking the background characteristics of mothers and children to the children's socio-emotional functioning. Since, as indicated in the results reported earlier, the prerequisite for a mediation model was not met, moderation models were examined.

Regressions were conducted separately for social competence and externalizing behaviors. First, the interaction between each maternal background characteristic and maternal verbalization class was examined. Next, the interaction between each child background characteristic and maternal verbalization class was examined, after controlling for all maternal background characteristics. Child characteristics such as sex, temperament, and attachment security were then cumulatively added in order. The coefficient of the interaction term was examined. It represents the difference in the slope for the children's socio-emotional outcomes predicted from the focal independent variable, comparing children whose mothers were classified as the child-centered/sensitive verbalization class (Class 1) and those whose mothers were classified in the book-centered/less sensitive verbalization class (Class 2). In addition, descriptives for the study variables and their differences across the classes of maternal verbalization are shown in Table 16.

Table 16

Descriptives of Variables and Their Differences by the Classes of Maternal Verbalization (Weighted N = 2,207,339)

	Class 1			Class 2				
	%	*Mean*	Linearlized *SE*	%	*Mean*	Linearlized *SE*	*T* (*df*)	*F* (*df*)
Child characteristics								
Sex								.04 (1, 332)
Boy	51.87		.04	53.49		.08		
Girl	48.13		.04	46.51		.08		
Temperament		1.14	.04		1.17	.10	.30 (331)	
TAS security		.48	.03		.52	.05	.66 (331)	
Mother characteristics								
BA or higher								19.78*** (1, 332)
Yes	46.65		.04	7.9		.04		
No	53.35		.04	92.1		.04		
Spouse/partner relationship								
Not in relation	11.45		.03	34.16		.07		12.53*** (1, 332)
Less happy	24.70		.03	26.27		.07		.04 (1, 332)
Happier	63.85		.04	39.57		.07		8.49*** (1, 332)
Depressive		.55	.13		.58	.24	.11 (331)	
Socio-emotional functioning outcome								
Social competence								
Mother report		3.74	.05		3.49	.09	-2.20* (331)	
ECEP report		3.37	.07		3.41	.13	.24 (331)	

Table 16 (continued)

Descriptives of Variables and Their Differences by the Classes of Maternal Verbalization

	Class 1			Class 2				
	%	*Mean*	Linearlized *SE*	%	*Mean*	Linearlized *SE*	*T* (*df*)	*F* (*df*)
Externalizing behaviors								
Mother report		2.50	.05		2.76	.09	2.50* (331)	
ECEP report		2.21	.07		2.50	.11	2.12* (331)	

Note. All descriptive and bivariate statistics are weighted results; ECEP = early care/education providers; **$p < .001$, *$p < .05$; TAS = the Toddler Attachment Sort – 45.

Research Question #8: *Will maternal verbal sensitivity moderate the effect of maternal background characteristics on children's socio-emotional functioning?*

The coefficients of the interaction terms were examined for children's social competence and for externalizing behaviors, separately. Maternal characteristics of education, spouse/partner relationship, and depressive symptoms were entered separately along with their interaction term.

Hypothesis 8a: *The effect of maternal education on child social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal education will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of college-educated mothers will be more likely to be socially competent than children of mothers with no college education.*

Results indicated that the interaction term was not significant for either mother or ECEP report of children's social competence.

Hypothesis 8b: *The effect of maternal education on child externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity.* Alternatively, the difference by maternal education will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of college-educated mothers will be less likely to have externalizing behaviors than children of mothers with no college education.

Results indicated that the interaction term was not significant for either mother or ECEP report of children's externalizing behaviors.

Hypothesis 8c: *The effect of maternal spouse/partner relationship on child social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal spouse/partner relationships will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of mothers in happier relationships with their spouses/partners will be more likely to be socially competent than children of mothers in less happy relationships or those in no relationship.*

Results indicated a significant interaction between maternal spouse/partner relationship and maternal verbalization class for the ECEP reported children's social competence (Figure 8). An adjusted Wald test also indicated an overall interaction effect, F (2, 331) = 3.73, $p < .05$. The significant interaction coefficient for mothers' happier spouse/partner relationship and maternal verbalization style (b = -.88, Linearlized SE = .33, $p < .01$) showed that the extent to which the effect of maternal verbalization class

on the ECEP-reported social competence was different when the child's mothers had a happy spouse/partner relationship, as compared to when the child's mothers had no spouse/partner relationship (Table 17).

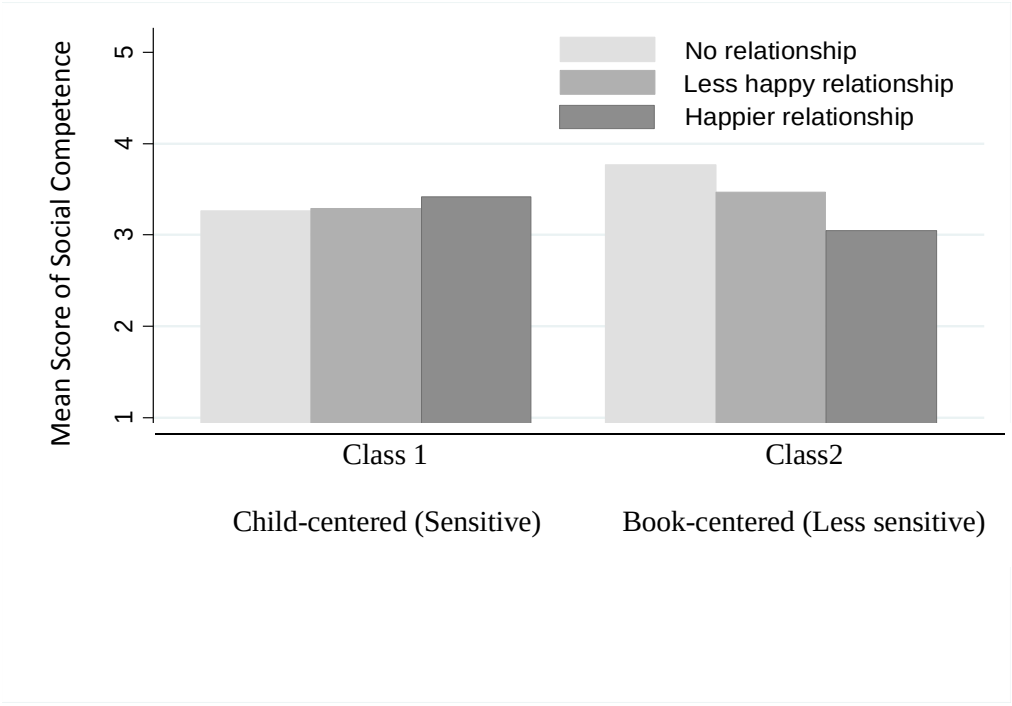
Table 17

Regression for Social Competence Reported by ECEP as Including a Interaction of Maternal Marital/Partner Relationship and Maternal Verbal Sensitivity (*n* = 333, weighted population *N* = 2,207,339)

Predictor	Coefficient	Linearlized *SE*	*t*-statistics
Maternal verbalization[a] (A)	.51	.26	1.95^{+}
Maternal husband/partner relationship[b]			
Less happy relation (B)	.03	.21	.13
More happy relation (C)	.16	.15	1.02
Interactions			
A X B	-.33	.38	-.88
A X C	-.88	.33	-2.65**
Intercept	3.26	.12	25.69***
F-statistic (df)		1.49 (5, 328)	
R^2		.03	

Note. Child social competence = $a + b_1$ (maternal verbalization class) + b_2 (less happy relation) + b_3 (more happy relation) + b_4 (maternal verbalization class X less happy relation) + b_5 (maternal verbalization class X more happy relation) + e; ECEP = early care/education providers; [a]Ref. = the child-centered/sensitive mothers (Class 1); [b]Ref. = no husband/partner; ***$p < .01$, **$p < .01$, +$p < .10$.

Figure 8. Interaction of maternal husband/partner relationships and maternal verbal sensitivity for children's social competence reported by ECEP



Post-hoc analyses showed that there was no difference in the ECEP-reported social competence across types of maternal husband/partner relationship in Class 1. However, in Class 2, children with mothers in a happy spouse/partner relationship (M = 3.05, Linearlized SE = .19) had on average a .72 lower score, t = -2.46, $p < .05$, on the ECEP-reported social competence, compared to children with mothers in no marital/partner relationship (M = 3.77, Linearlized SE = .23).

Hypothesis 8d: *The effect of the maternal spouse/partner relationship on child externalizing behaviors will be smaller for children whose mothers have higher verbal sensitivity than for those whose mother have less verbal sensitivity. Alternatively, the difference by maternal husband/partner relationships will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of mothers in happier relationships with their*

spouses/partners will be less likely to have externalizing behaviors than children of mothers in less happy relationships or those in no relationship.

Results indicated a significant interaction of maternal husband/partner relationship and maternal verbalization style for both the mother and the ECEP reported children's externalizing behaviors (Figure X2 and X3, respectively). Adjusted Wald tests also indicated an overall interaction effect for the mother-reported externalizing behaviors, F (2, 331) = 3.78, $p < .05$, and for the ECEP-reported externalizing behaviors, F (2, 331) = 4.32, $p < .05$.

For mother-reported externalizing behaviors, the significant interaction coefficient of maternal happier marital/partner relationship and maternal verbalization class (b = -.63, $p < .01$) showed that the extent to which the effect of maternal verbal sensitivity on the children's externalizing behaviors is different for children whose mothers are in a happy marital/romantic relationship, as compared to children whose mothers are in a *less* happy marital/romantic relationship (Table 18).

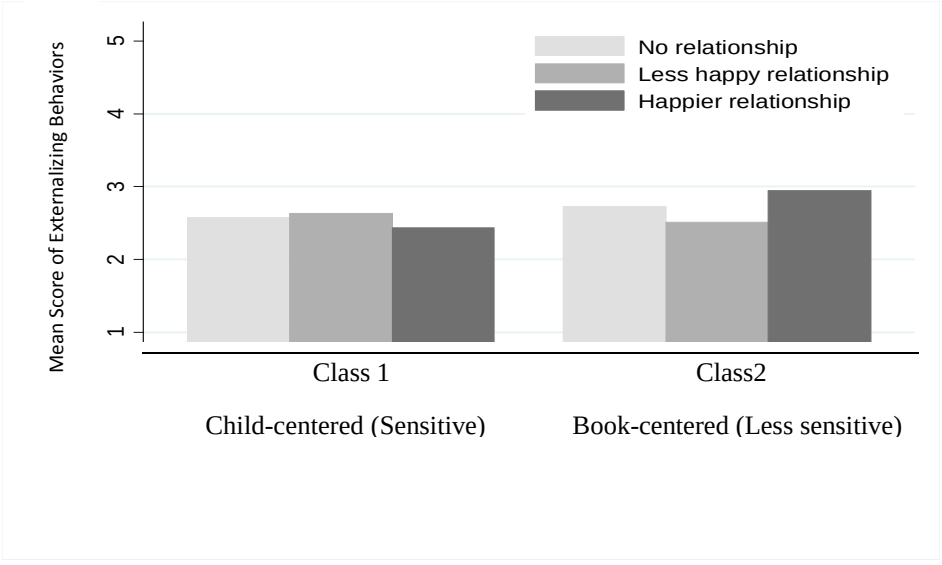
Table 18

Regression for Externalizing Behaviors Reported by Mothers as a Function of Maternal Husband/Partner Relationships and Maternal Verbal Sensitivity (*n* = 333, weighted population *N* = 2,207,339)

Predictor	Coefficient	Linearlized *SE*	*t*-statistics
Maternal verbalization[a] (A)	-.12	.17	-.69
Maternal husband/partner relationship[b]			
No husband/partner (B)	-.06	.21	-.29
Happier relationship (C)	-.20	.09	2.13*
Interactions			
A X B	.28	.31	.89
A X C	.63	.23	2.74**
Intercept	2.63	.07	35.25***
F-statistic (df)		2.90 (5, 328)	
R^2		.07	

Note. Child externalizing behaviors = $a + b_1$ (maternal verbalization class) + b_2 (less happy relation) + b_3 (more happy relation) + b_4 (maternal verbalization class X less happy relation) + b_5 (maternal verbalization class X more happy relation) + e; ECEP = early care/education providers; [a]Ref. = the child-centered/Sensitive mothers (Class 1); [b]Ref. = less happy relationship (Wald test indicated significant overall interaction. But, when 'not in relation' was used as a reference group, the interaction was not shown. So, 'less happy relation' was used as a reference); *$p < .05$, **$p < .01$, ***$p < .001$.

Figure 9. Interaction of maternal husband/partner relationships and maternal verbal sensitivity for children's externalizing behaviors reported by mothers



Post-hoc analyses showed that children with mothers who were in happier husband/partner relationships (*M* = 2.44, Linearlized *SE* = .06) had on average a .20 lower score on mother-reported externalizing behaviors, *t* = -2.13, *p* < .05, than children with mother who were in less happy husband/partner relationships (*M* = 2.63, Lienalized *SE* = .07), in Class 1. However, in Class 2, children with mothers in happier husband/partner relationships (*M* = 2.95, Lienalized *SE* = .14) had on average a .43 higher score, *t* = 2.05, *p* < .05, than children with mothers in less happy marital/partner relationships (*M* = 2.51, Linearlized *SE* = .16).

For ECEP-reported externalizing behaviors, the significant interaction coefficient of maternal happier husband/partner relationship and maternal verbalization class (*b* = .91, *p* < .01) indicated that the extent to which the effect of maternal verbal sensitivity on the ECEP reported children's externalizing behaviors was different for children whose mothers were in happy marital/romantic relationship, as compared to children whose mothers were in no marital/romantic relationship (Table 19).

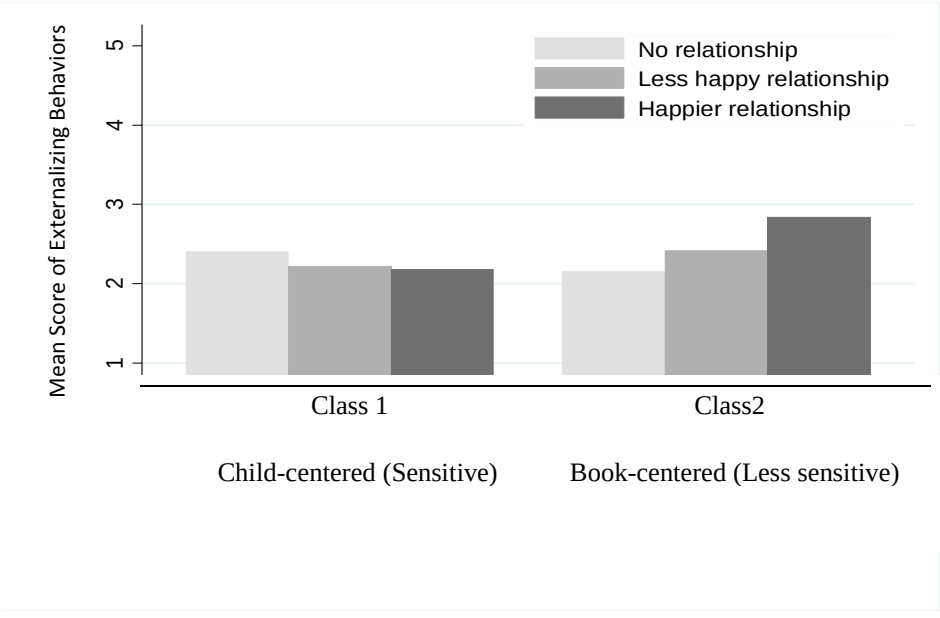
Table 19

Regression for Externalizing Behaviors Reported by ECEP as a Function of Maternal Husband/Partner Relationships and Maternal Verbal Sensitivity (*n* = 333, weighted population *N* = 2,207,339)

Predictor	Coefficient	Linearized *SE*	*t*-statistics
Maternal verbalization[a] (A)	-.25	.23	-1.10
Maternal marital/romantic relationship[b]			
Less happy relation (B)	-.19	.23	-.80
More happy relation (C)	-.22	.19	-1.16
Interactions			
A X B	.45	.33	1.36
A X C	.91	.31	2.94**
Intercept	2.40	.17	13.78***
F-statistic (df)		2.35 (5, 328)*	
R^2		.05	

Note. Child externalizing behaviors = $a + b_1$ (maternal verbalization class) + b_2 (less happy relation) + b_3 (more happy relation) + b_4 (maternal verbalization class X less happy relation) + b_5 (maternal verbalization class X more happy relation) + e; ECEP = early care/education providers; [a]Ref. = the child-centered/Sensitive mothers (Class 1); [b]Ref. = no husband/partner; *$p < .05$, **$p < .01$

Figure 10. Interaction of maternal husband/partner relationships and maternal verbal sensitivity for children's externalizing behaviors reported by ECEP



Post-hoc analyses showed no effect in the ECEP-reported externalizing behaviors of maternal husband/partner relationships in Class 1. However, in Class 2, children with mothers who were in happier husband/partner relationships (M = 2.84, Linearlized SE = .19) had on average a .68 lower score on the ECEP-reported externalizing behaviors than children with mother who were in no marital/partner relationship (M = 2.15, Linearlized SE = .15), t = 2.83, $p < .01$.

Hypothesis 8e: *The effect of maternal depressive symptoms on child social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the difference by maternal depressive symptoms will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of mothers who have more depressive symptoms will be less likely to be socially competent than children of mothers have few depressive symptoms.*

Results indicated that there was no interaction for either mother or ECEP reports of the children's social competence.

Hypothesis 8f: *The effect of maternal depressive symptoms on child externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the difference by maternal depressive symptoms will no longer exist for children whose mothers have higher verbal sensitivity. For the children of mothers with less verbal sensitivity, children of mothers who have more depressive symptoms will be more likely to have externalizing behaviors than children of mothers have few depressive symptoms.*

Results indicated that there was no interaction for either mother or ECEP reports of the children's externalizing behaviors.

Overall, the results showed that the maternal husband/partner relationship, not maternal education or depressive symptoms, contributed to the preschoolers' socio-emotional functioning via an interaction with maternal verbal sensitivity.

Research Question #9: *Will maternal verbal sensitivity moderate the relationship between the sex of the child and his or her socio-emotional functioning?*

In the second stage of the regression analyses, the coefficients of the interaction terms involving the child's sex and maternal verbalization style were examined, controlling for all the maternal background characteristics.

Hypothesis 9a: *The sex difference in social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the sex difference will no longer exist for the children whose mothers have higher verbal sensitivity. Among children of mothers with less verbal sensitivity, girls will be likely than boys to have high social competence.*

Results indicated a significant interaction of the child's sex and maternal verbalization class for the ECEP reported children's social competence, $b = .58$, Linearlized $SE = .29$, $p < .05$ (Figure 11 and Table 20).

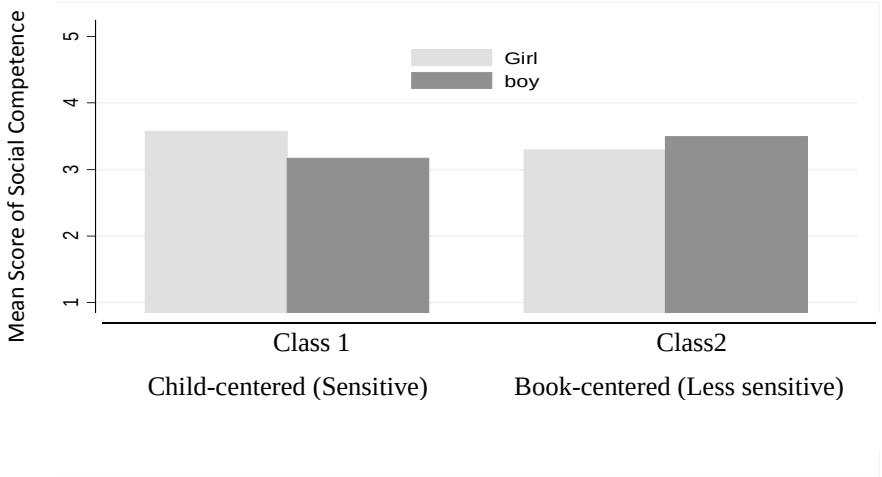
Table 20

Regression for Social Competence Reported by ECEP as a Function of the Child's Sex and Maternal Verbal Sensitivity (*n* = 333, weighted population *N* = 2,207,339)

Predictor	Coefficient	Linearlized *SE*	*t*-statistics
Maternal verbalization[a] (A)	-.28	.23	-1.19
Maternal characteristics			
BA or more	.05	.14	.36
Less happy relation[b]	-.17	.19	-.91
More happy relation[b]	-.13	.15	-.85
Depressive symptoms	.22	.48	.46
Child characteristics			
Boy (B)	-.39	.14	-2.77**
Interactions			
A X B	.58	.29	2.00*
Intercept	3.66	.15	23.62***
F-statistic (df)		1.29 (7, 326)*	
R^2		.05	

Note. Child externalizing behaviors = $a + b_1$ (maternal verbalization class) + b_2 (education) + b_3 (depressive) + b_4 (less happy relationship) + b_5 (more happy relationship) + b_6 (child's sex) + b_7 (maternal verbalization class X child's sex) + *e*; ECEP = early care/education providers; [a]Ref. = the child-centered mother (Class 1); [b]Ref. = no husband/partner; *p < .05, **p < .01, ***p < .001.

Figure 11. Interaction of the child's sex and maternal verbal sensitivity for children's social competence reported by ECEP



Post-hoc analyses showed that there was no sex difference in the ECEP-reported social competence in Class 2. However, in Class 1, boys (M = 3.18, Linearlized SE = .09) had on average a .41 lower score on the ECEP reported-social competence than girls (M = 3.58, Linearlized SE = .10), t = -2.93, $p < .01$.

Hypothesis 9b: *The sex differences in externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the sex difference will no longer exist for the children whose mothers have higher verbal sensitivity. Among children of mothers with less verbal sensitivity, boys will be more likely than girls to have externalizing behaviors.*

Results indicated that the interaction term was not significant for either mother or ECEP reports of children's externalizing behaviors.

Overall, when mothers were verbally sensitive, girls were more socially competent than boys by ECEP report. Unexpectedly, the sex of the child contributed to his or her social competence significantly more when mothers had higher verbal sensitivity than when mothers had less verbal sensitivity. As noted, it was hypothesized that the sex difference would be larger when mothers had less verbal sensitivity than when mothers had higher verbal sensitivity. The results showed that maternal verbal sensitivity moderates the relationship between the sex of the child and his or her social competence but in a way that augments the sex difference when mothers were verbally sensitive not when mothers were less verbally sensitive. These results suggest that maternal verbal sensitivity is more beneficial for girls than boys in terms of their social competence. For externalizing behaviors, the results suggested that maternal verbal

sensitivity does not moderate the relationship between the child sex's and externalizing behaviors.

Research Question #10: *Will maternal verbal sensitivity moderate the relationship between children's temperament and socio-emotional functioning?*

In the third stage of the regression analyses, the coefficients of the interaction terms of the children's temperament and maternal verbalization style were examined, after controlling for the maternal background characteristics and the child's sex.

Hypothesis 10a: *The effect of temperament on social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the difference due to temperament will no longer exist for the children whose mothers have higher verbal sensitivity. Among children of mothers with less verbal sensitivity, those with greater temperamental difficulty will be less likely to be socially competent than those with less temperamental difficulty.*

Results indicated that the interaction term was not significant for either mother or ECEP reports of the children's social competence.

Hypothesis 10b: *The effect of the child's temperament on the child's externalizing problems will be smaller for the children whose mothers have higher verbal sensitivity than for the children whose mothers have less verbal sensitivity. Alternatively, the sex difference will not exist for the children whose mothers have high verbal sensitivity but for those whose mothers have less verbal sensitivity. As for children of mothers with less verbal sensitivity, children with more difficult temperament will be more likely to have externalizing problems than those with less difficult temperament.*

Results indicated that the interaction term was not significant for either mother or ECEP reports of the children's externalizing behaviors.

Research Question 11: *Will maternal verbal sensitivity moderate the link between children's attachment security at toddlerhood and socio-emotional functioning at preschool age? Or, will maternal verbal sensitivity partially mediate the link between attachment security and socio-emotional functioning?*

Because, as indicated in the results indicated earlier, the prerequisite for a mediation model was not met, only moderation models were examined. In the final stage of the regression analyses, the interaction terms of the child's attachment security and maternal verbalization class were entered in order to examine its influence on child's social competence and externalizing behaviors after controlling for the maternal background characteristics, and for the child's sex, temperament, and attachment security, as well as maternal verbalization class.

Hypothesis 11a: *The effect of the child's attachment on social competence will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Otherwise, the difference due to attachment security will no longer exist for the children whose mothers have higher verbal sensitivity. As for the children of mothers with less verbal sensitivity, the more securely attached children will be more likely to be socially competent than the less securely attached children.*

The results indicated that the interaction term of children's attachment security and maternal verbalization style was significant for the ECEP reported social competence (b = 1.28, Linearlized SE = .47, $p < .01$) (Table 21). Figure 12 also showed that children of

Class 1 mothers tended to be more socially competent independent of their attachment security, whereas children of Class 2 mothers tended to be affected by their attachment security. Securely attached children were likely to have a higher level of social competence in Class 2.

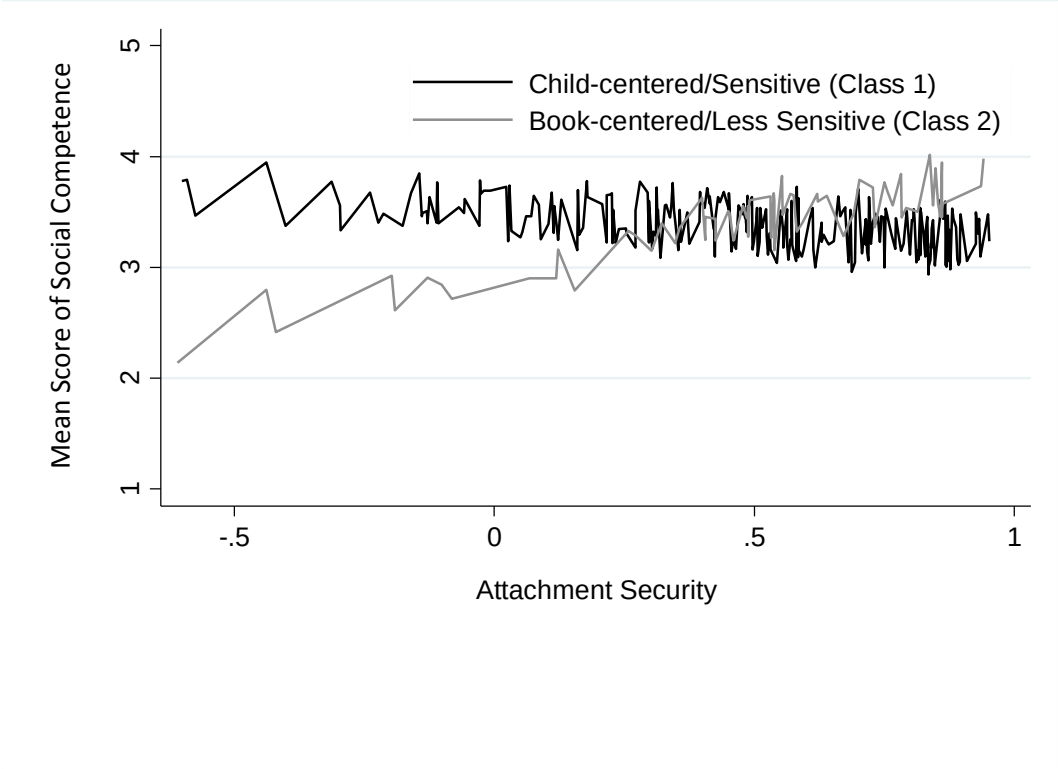
Table 21

Regression for Social Competence Reported by the ECEP as a Function of the Child Attachment Security and Maternal Verbal Senstivity (n = 333, weighted population N = 2,207,339)

Predictor	Coefficient	Linearlized *SE*	*t*-statistics
Maternal verbalization[a] (A)	-.59	.28	-2.10*
Maternal characteristics			
BA or more	.11	.15	.72
Less happy relation[b]	-.18	.19	-.94
More happy relation[b]	-.09	.14	-.66
Depressive symptoms	.32	.05	.72
Child characteristics			
Boy	-.32	.12	-2.66**
Temperament	.10	.11	.87
Attachment Security (B)	-.34	.22	-1.57
Interactions			
A X B	1.28	.47	2.74**
Intercept	3.62	.22	16.46***
F-statistic (df)		1.29 (9, 324)	
R^2		.07	

Note. Child social competence = $a + b_1$ (maternal verbalization class) + b_2 (education) + b_3 (depressive) + b_4 (less happy relationship) + b_5 (more happy relationship) + b_6 (child's sex) + b_7 (temperament) + b_8 (attachment) + b_9 (maternal verbalization class X child's attachment) + e; ECEP = early care/education providers; [a]Ref. = the child-centered/Sensitive mothers (Class 1); [b]Ref. = no husband/partner; *p < .05;**p < .01, ***p < .001.

Figure 12. Interaction of the child's attachment security and maternal verbal sensitivity for children's social competence reported by ECEP



Post-hoc analyses showed that in Class 2, for each additional unit of attachment security, the predicted score of ECEP-reported social competence ranging from 1 to 5 tended to increase by .85 ($p < .05$). On the other hand, in Class 1, attachment security was not a significant predictor for the ECEP-reported social competence.

Hypothesis 11b: *The effect of the child's attachment on externalizing behaviors will be smaller for the children whose mothers have higher verbal sensitivity than for those whose mothers have less verbal sensitivity. Alternatively, the difference due to attachment security will no longer exist for the children whose mothers have higher verbal sensitivity. As for the children of mothers with less verbal sensitivity, the more securely attached children will be less likely to have externalizing behaviors than the less securely attached children.*

The results indicated that the interaction term of children's attachment security and maternal verbalization class was marginally significant for mother report (b = -.57, Linearlized SE = .32, $p < .10$) and significant for the ECEP report (b = -1.20, Linearlized SE = .37, $p < .01$) of the children's externalizing behaviors (Table 22 and 23, respectively).

For externalizing behaviors reported by both mothers and the ECEP, Figure 13 and 14 showed that externalizing behaviors of children with Class 1 mothers tended to have lower externalizing behaviors independent of their attachment security, while externalizing behaviors of children with Class 2 mothers were negatively associated with their attachment security.

Figure 13. Interaction of the child's attachment security and maternal verbal sensitivity for children's externalizing behaviors reported by mothers

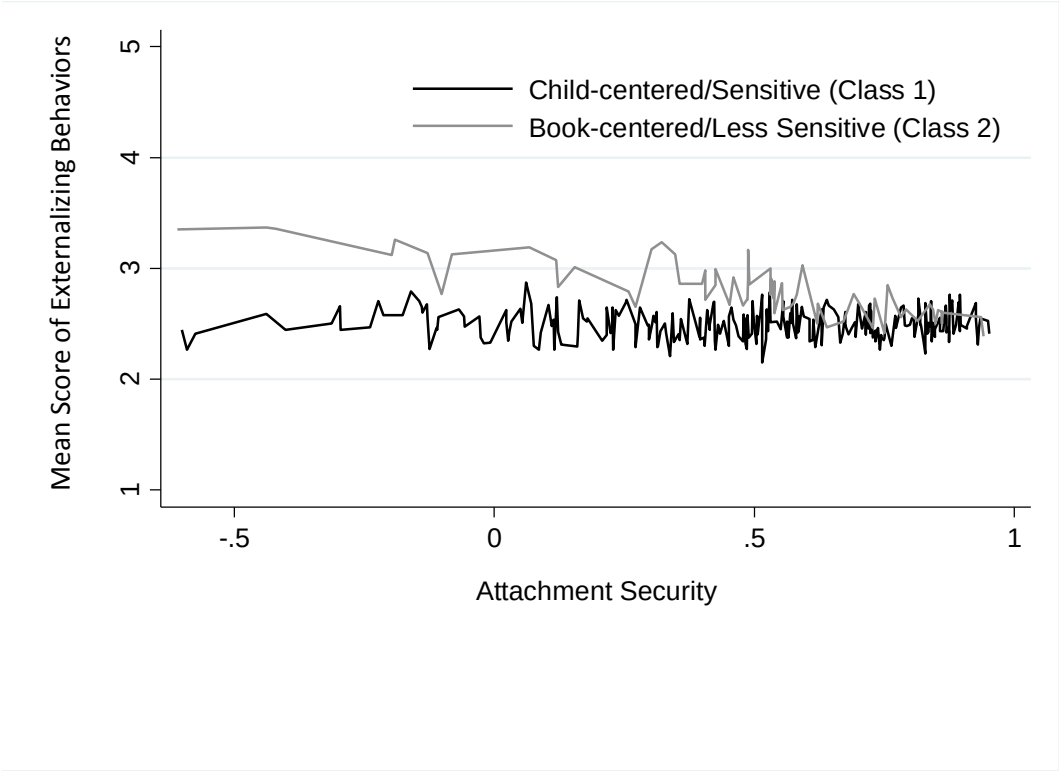


Table 22

Regression for Externalizing Behaviors Reported by mothers as a Function of the Child Attachment Security and Maternal Verbal Sensitivity (*n* = 333, weighted population *N* = 2,207,339)

Predictor	Coefficient	Linearlized *SE*	*t*-statistics
Maternal verbalization[a] (A)	.55	.21	2.65**
Maternal characteristics			
BA or more	.09	.08	1.08
Less happy relation[b]	-.04	.15	-.27
More happy relation[b]	-.10	.15	-.68
Depressive symptoms	.03	.03	.86
Child characteristics			
Boy	.14	.08	1.77^{+}
Temperament	.17	.06	2.61*
Attachment Security (B)	-.00	.16	-.03
Interactions			
A X B	-.57	.32	-1.75^{+}
Intercept	2.25	.19	12.13***
F-statistic (df)		1.29 (9, 324)**	
R^2		.10	

Note. Child externalizing behaviors = $a + b_1$ (maternal verbalization class) +bβ_2 (education) + b_3 (depressive) + b_4 (less happy relationship) + b_5 (more happy relationship) + b_6 (child's sex) + b_7 (temperament) + b_8 (attachment) + b_9 (maternal verbalization class X child's attachment) + e; ECEP = early care/education providers; [a]Ref. = the child-centered mother (Class 1); [b]Ref. = no husband/partner; +$p < .10$; *$p < .05$;**$p < .01$, ***$p < .001$.

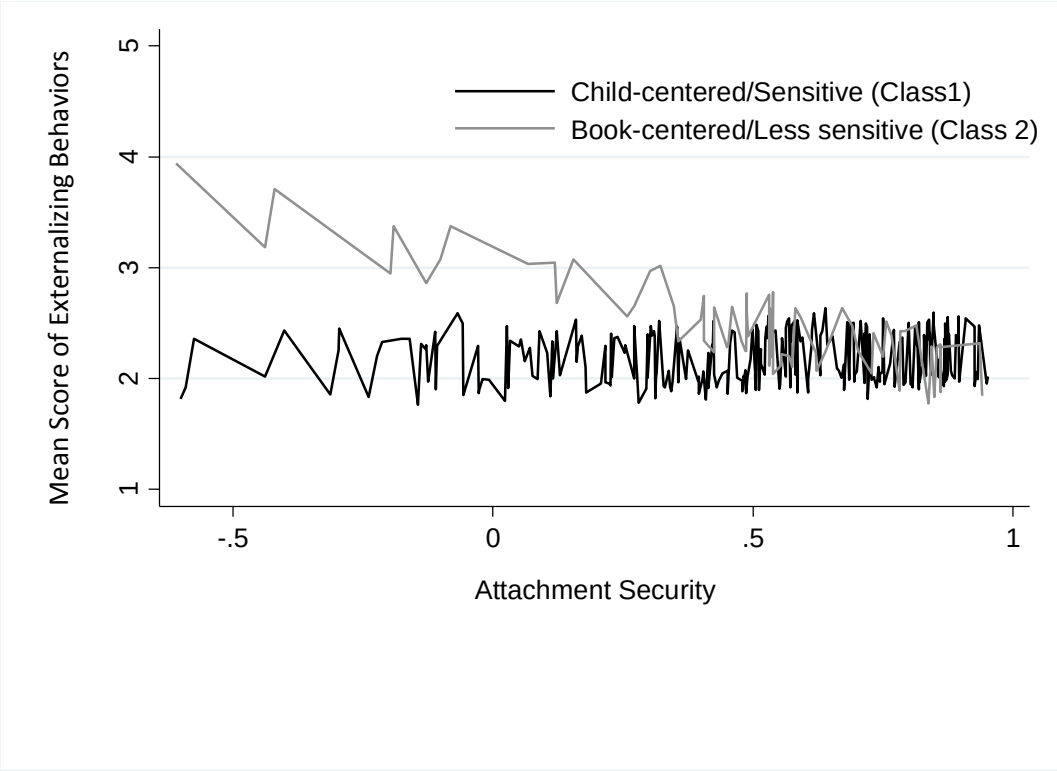
Table 23

Regression for Externalizing Behaviors Reported by ECEP as a Function of the Child Attachment Security and Maternal Verbal Sensitivity (*n* = 333, weighted population *N* = 2,207,339)

Predictor	Coefficient	Linearlized *SE*	*t*-statistics
Maternal verbalization[a] (A)	.89	.22	4.09***
Maternal characteristics			
BA or more	-.02	.13	.09
Less happy relation[b]	.00	.18	.00
More happy relation[b]	.01	.15	.09
Depressive symptoms	.03	.03	.85
Child characteristics			
Boy	.44	.11	4.05***
Temperament	-.13	.10	-1.29
Attachment Security (B)	.12	.21	.55
Interactions			
A X B	-1.20	.37	-3.25**
Intercept	2.06	.22	9.34***
F-statistic (df)	1.29 (9, 324)***		
R^2	.12		

Note. Child externalizing behaviors = $a + b_1$ (maternal verbalization class) + b_2 (education) + b_3 (depressive) + b_4 (less happy relationship) + b_5 (more happy relationship) + b_6 (child's sex) + b_7 (temperament) + b_8 (attachment) + b_9 (maternal verbalization class X child's attachment) + e; ECEP = early care/education providers; [a]Ref = the child-centered mother (Class 1); [b]Ref = no husband/partner; **$p < .01$, ***$p < .001$.

Figure 14. Interaction of the child's attachment security and maternal verbal sensitivity for children's externalizing behaviors reported by ECEP



Post-hoc analyses showed that in Class 2, for each additional unit of attachment security, the predicted score of mother-reported externalizing behaviors ranging from 1 to 5 tended to decrease by .52 ($p < .05$) and that of ECEP-reported externalizing behaviors decreased by .92 ($p < .05$) on the externalizing problem scale ranging from 1 to 5. On the other hand, in Class 1, attachment security was not a significant predictor for externalizing behaviors reported by either mothers or ECEP. For these post-hoc analyses, all the background characteristics were controlled.

Overall, the results showed that maternal verbal sensitivity moderated the relations between children's attachment security and socio-emotional functioning. Based on the ECEP-report, the children's attachment security was a significant predictor of their social competence for the class of less verbally sensitive mothers, as compared to the

class of verbally sensitive mothers. For externalizing behaviors based on both mother- and ECEP-report, the child's attachment security was found to be a significant predictor of children's externalizing behaviors for the class of less verbally sensitive mothers as opposed to the class of verbally sensitive mothers.

CHAPTER V

DISCUSSION

This study had four purposes. The first was to examine maternal verbalization patterns during shared book reading and thus investigate the construct of maternal verbal sensitivity in a nationally representative probability sample of children born in the U. S. in 2001. This was done by empirically deriving classifications of maternal verbalizations designed to provide a lens for investigating the construct of maternal verbal sensitivity. The second purpose was to investigate which background characteristics of mother (i.e., education, spouse/partner relationship, and depressive symptoms) and child (i.e., sex, temperament, attachment security, and language ability/literacy) affect maternal verbal sensitivity: this was done to identify factors related to maternal verbal sensitivity during interactions with their children. The third purpose was to examine a path model predicting the child's socio-emotional functioning, which included as predictors maternal verbal sensitivity as well as background characteristics of mother and child. This was done to test the validity of this empirically-derived construct of maternal verbal sensitivity in predicting a child's socio-emotional functioning after controlling for the background characteristics. The fourth purpose was to examine whether maternal verbal sensitivity moderates or partially mediates the effects of background characteristics of mother and child on the child's socio-emotional functioning: this was done to investigate the potential efficacy of treatments and preventive interventions that are based on maternal verbal sensitivity.

Patterns of Maternal Verbalization and Level of Maternal Verbal Sensitivity

The findings showed that mothers could be classified into two distinct classes based on their response patterns. One class (child-centered or sensitive: Class 1) had more members than the other (book-centered or less sensitive: Class 2). The two latent-class model that best described the data was exploratory in nature and empirically driven. LCA is different from methods that analyze data at the variable-level because heterogeneity within the sample is glossed over in these conventional methods. This study used a person-level approach and examined the heterogeneity within the sample of maternal verbalizations. Thus, a major methodological advantage of this study is the use of a person-level approach to identify profiles of maternal verbalization in the sample.

The two classes were differentiated by their responses as follows. The items distinctive of Class 1 were: '*relating the story to experiences*'; '*asking open-ended questions*'; '*responding to the child's questions*'; *and* '*asking close-ended questions.*' For Class 2 the distinctive items were: '*expanding on the story or on the child's comments*'; '*acting parts of the book*'; and '*asking if the child liked the book*.'

As noted in the previous section, these two classes represent two different verbal styles. Class 1 mothers focused more on the child's world: they were more likely to bring the child's world into the conversation by responding to the child's questions and relating the story to the child's experiences. On the other hand, Class 2 mothers were more story-focused and educative: they were more imaginative, acting parts of the story and expanding on the story; they also were more likely to highlight new vocabulary. These findings support the literature of parent-child memory talk from the field of autobiographical memory study (Fivush & Fromhoff, 1988; Fivush, Haden, & Reese,

2006; Reese & Fivush, 1993), which found two distinct styles of maternal verbalization during memory talk: the elaborative style and the repetitive/pragmatic style. Given that the elaborative style is marked by the provision of considerable background details and open-ended questions, the first three characteristics of verbalizations distinctive of Class 1 seem to confirm this literature. Studies have consistently found correlations between children's attachment security and maternal elaborative styles during memory talk (Bost, Shin, McBride, et al., 2006; Farrant & Reese, 2002; Fivush & Vesudeva, 2002; Laible, 2004a; Laible & Panfile, 2009). This implies that the elaborative style is a feature of maternal sensitivity that provides opportunities for children to organize their feelings and thoughts along with their experiences, especially referring to the child's point of view. Meanwhile, the repetitive/pragmatic style is marked by repeating the same question until children provide a specific answer instead of aiding their informational access during memory talk. It is therefore not surprising that Class 2 mothers seem more educative and less inclined during the shared book reading to adapt their communication during to the child's perspective.

'*Asking close-ended questions*' was also more probable in Class 1. We hypothesized that this verbalization would correspond to lower maternal verbal sensitivity, based on the description of the repetitive/pragmatic style from studies of parent-child memory talk (Fivush & Fromhoff, 1988; Fivush, et al., 2006; Reese & Fivush, 1993). These studies defined the repetitive/pragmatic style as being marked by providing few details and asking a series of repetitive close-ended questions. Our unexpected finding may be due to methodological differences. Previous studies using a variable-level approach to measure overall verbalization style did not reveal the

constellation of verbalizations across verbalization styles. In contrast, this study used a person-level approach that addressed the constellation of verbalizations across verbalization styles. Our findings showed that Class 1 mothers were likely to '*ask close-ended questions*' more often than Class 2 mothers, yet they were also more likely to use more elaborative verbalizations than Class 2 mothers. In conclusion, our study showed that Class 1 mothers asked both open-ended and close-ended questions as well as responded to the child's questions more than Class 2 mothers, while spreading out the profile of verbalization indicators.

Class 2 mothers were distinctive for '*expanding on the story or the child's comments*.' We hypothesized that this verbalization would correspond to higher maternal verbal sensitivity, based on studies of parent-child memory talk (Haden, Haine, & Fivush, 1997; Leichtman, Pillemer, Wang, Koreishi, & Han, 2000; Reese, Haden, & Fivush, 1993). These studies reported elaborative parents as holding embellished conversations and tending to collaboratively recreate stories with their children about shared experiences. A post-hoc interpretation of this finding is that this type of verbalization may not be a necessary and sufficient condition for maternal verbal sensitivity. Perhaps maternal *'expanding on the story'* per se does not necessarily require referencing the child's point of view. If a mother expands on the story *without* referencing her child's point of view, this verbalization may reflect a lack of maternal mind-mindedness –that is, the maternal capacity to engage the child at a mental level. Fonagy, Steele, Steele, Higgitt, and Target (1994) and Meins, Fernyhough, Fradley, and Turkey (2001) suggested the importance of considering maternal mind-mindedness when measuring maternal sensitivity. Additionally, the RAPT coded '*expanding on the story or the child's*

comments' as a single item, although it actually contains two potentially independent verbalizations which can be better understood as separate codes.

'*Asking if the child liked the book*' was also a feature of Class 2. We hypothesized that this verbalization would pertain to maternal verbal sensitivity, due to its feature of mind-mindedness (Meins, 1997). However, this finding indirectly supports an implication from Garner, et al.'s (2007) research, in which maternal un-elaborative comments on emotion were positively related to children's physical aggression while maternal explanation of emotions was positively related to children's pro-social behaviors.

The methodological problem of conflating two potentially independent verbalizations into one category (i.e., the item 'expanding on the story or on the child's comments') makes it difficult to characterize some of the verbalizations. However, looking at the profiles of Class 2, all verbalizations except the four distinctive ones in Class 1 showed higher probabilities in Class 2 than Class 1. Thus, these three verbalizations could be characterized as placing emphasis on the content of the book rather than the thoughts of the child. This characterization supports the description of the repetitive/pragmatic style that focuses on the child's memory performance or "correct" answer with short and directive conversations (Haden, et al., 1997; Leichtman, et al., 2000; Reese, et al., 1993).

Furthermore, some similarities in verbalizations were found across the two classes. Both classes were likely to '*ask the child to recall the story*,' '*highlight new vocabulary*,' and '*remind the child of other similar books*.' These findings suggest that mothers help the child learn cognitive processing steps in organizing book materials during shared

book reading with their preschool-aged children, regardless of maternal verbal sensitivity as conceptualized in this study. On the other hand, neither class was likely to use verbalization to '*capture the child's attention*'. These findings suggest that, regardless of maternal verbal sensitivity, mothers do not often use verbal directives to get the child's attention during shared book reading with their preschool-aged children.

Some developmental tasks of children in the study's age group include: word play; asking questions; asking how material in the book relates to the child's life; and giving the child an opportunity to relate his or her life in the dialogue. The maternal verbalizations in Class 1 were more closely aligned with these developmental tasks. However, Class 2 mothers were more likely to highlight new vocabulary, which is also a salient aspect of developmental tasks during this period. Indeed, all mothers used the book-centered approach to some extent. However, Class 1 mothers did so somewhat less than Class 2 mothers, while at the same time engaging the child with questions and making links to the child's experience more: they combined teaching with paying attention to the child's thoughts.

Taken together, the findings from this study suggest that it is important to look at the constellation of verbalizations at the person-level which yield information about the separate aspects of maternal verbalizations. This study identified maternal verbal sensitivity as being marked by bringing the child's world into communication and by facilitating the child to engage in communication, asking both close- and open-ended questions.

Effect of Mother and Child Background Characteristics on Maternal Verbal Sensitivity

The background characteristics of the mother (i.e., educational attainment, relationship with a husband/partner, and depressive symptoms) and the child (i.e., sex, temperament, attachment security, and reading scores) were studied. Results showed that only the mother's education and the child's reading scores covaried with maternal verbal sensitivity, when controlling for the background characteristics.

The findings also showed that the mother's education predicts maternal verbal sensitivity. College-educated mothers were more likely to belong to Class 1 than those having no college education. This result supports previous studies that have consistently reported an effect of maternal education on maternal verbalization styles (e.g., Hoff-Ginsberg, 1992; Rowe, et al., 2005) and maternal sensitivity (Bernier & Matte-Gagné, 2011; NICHD Early Child Care Research Network, 2005). For example, college-educated mothers produced more conversation-eliciting talk with their toddlers than did high school-educated mothers (Hoff-Ginsberg, 1992).

The findings also showed that the child's language and literacy ability was positively associated with maternal verbal sensitivity, although its statistical significance was marginal. As children's reading scores increased, mothers became more likely to belong to Class 1. This supports the previous findings (Farrant & Reese, 2000; Haden, Ornstein, Rudek, & Branstein, 2009; Newcombe & Reese, 2004; Reese et al., 1993) that have consistently reported a positive correlation between younger preschoolers' language abilities and maternal elaborativeness. Although the age of children in this study ranged widely, most of the children were younger preschoolers. However, it is noteworthy that

previous studies of older preschoolers and 6 year-olds (Reese, Bird, & Tripp, 2007; Reese & Brown, 2000; Reese et al., 1993) have found no association between children's language abilities and maternal elaborativeness. This study found a marginally statistically significant result for the relation between children's language abilities and maternal verbalization class. This may be attributable to a weak or no such relation among the older preschoolers included in this study. These findings altogether also imply that maternal verbal sensitivity as defined in this study is a parenting practice salient at the developmental stage of younger preschoolers.

With respect to husband/partner relationships, the current study found that mothers who were in either a more happy or a less happy relationship were not different on verbal sensitivity from those who were in no relationship. This finding is inconsistent with the literature (Abidin, 1992; Ainsworth, 1963; Belsky, 1984; Lyons-Ruth, Wolfe, Lyubchik, & Steingard, 2004; The NICHD Early Child Care Research Network, 2005) suggesting the importance of husband/partner relationships in maternal parenting behaviors. Our unexpected findings may be due to the temporal distance between the measures of husband/partner relationships and maternal interactive verbalizations with the child. Husband/partner relationships were measured when the child was at 2 years of age whereas maternal verbalizations were measured when the child was at preschooler age. Further, these findings suggest that maternal verbal sensitivity is a stable capacity independent of husband/partner relationships. Since there is little study of the influence of husband/partner relationship on mother-child communication, more attention to this link is needed in future studies.

In terms of maternal depression, this study found that depressive symptoms did not predict maternal verbal sensitivity. This finding is inconsistent with previous studies that consistently reported an effect of depression on maternal verbal interactive behaviors (Bresnits & Tracy, 1987, 1997; Hwa-Froelich, Cook, & Louise, 2008; Rowe et al., 2005), parenting disengagement (Lovejoy, Graczyk, O'Hare, & Neuman, 2000), or insensitivity and unresponsiveness (e.g., NICHD Early Child Care Research Network, 2005; Trapolini, Ungerer, & McMahon, 2008). A plausible reason of this inconsistent finding may be that the community-based population and also the inclusion criteria in this study do not display enough variance in depressive symptoms to detect significant effects. Similar to this study's findings, some studies using a homogeneous sample on socioeconomic status measures (Henderson & Jennings, 2003; Tomlinson & Murray, 2005) also found no effect of maternal depression on joint attention or maternal sensitivity.

In the case of child's sex, this study found no sex difference in maternal verbal sensitivity. This finding supports a recent study by Bost, Choi, and Wong (2010), which reported no sex differences in maternal use of elaboration during memory talk and semi-structured play with preschool-aged children. However, given that many studies have reported effects of child's sex on maternal verbal interactions, this link should be further examined in future studies in order to better understand whether child's sex affects the nature of this socialization process, mother-child communication.

With respect to the child's temperament, this study found that temperament at 9 months of age did not predict maternal verbal sensitivity. This finding is inconsistent with related longitudinal studies of parenting styles, which reported a positive association between children's shyness and the mother's encouragement of her child's exploring or

questioning things (Rubin et al., 1999), and a negative correlation between children's temperamental proneness to fear and maternal power-assertive verbal and physical discipline (Kochanska, Aksan, & Joy, 2007). The current results are discrepant from the previous studies, but may lend themselves to a methodological explanation. The indicators of temperament used in this study measured temperament in terms of the difficulty in raising a child, while Rubin et al. (1999) and Kochanska et al. (2007) measured children's shyness or fear-proneness. Thus, the conceptual differences in temperament measures may lead to the inconsistency. Additionally, a cross-sectional study by Bost et al. (2010) conceptualized temperament similarly to this study and found no significance between child temperament and maternal elaboration during memory talk with preschoolers.

With respect to children's attachment, this study found that attachment security measured with an observer-sorted Q-set at 2 years of age did not predict maternal verbal sensitivity. This finding is inconsistent with previous longitudinal studies, which consistently reported the significance of attachment for maternal elaborative reminiscing (Farrant & Reese, 2002) or open communication styles (Etzion-Carasso & Oppenheim, 2000) with preschoolers. Different from our study, Farrant & Reese (2002) used mother-sorted Attachment Q-set (AQS: Waters, 1987/1995) to measure attachment security at 18 months of age; and Etzion-Carasso & Oppenheim (2000) used the Strange Situation procedure (Ainsworth, et al., 1978) to measure attachment types at 12 to 16 months of age. In addition, previous cross-sectional studies (Farrant & Reese, 2002; Fivush & Vesudeva, 2002; Laible, 2004a; Laible & Panfile, 2009; Shin, 2007) also consistently reported that mothers were more elaborative with more securely attached preschoolers.

All these cross-sectional studies used the AQS to measure attachment security and most of them used mother-sorted AQS except Shin (2007) who used observer-sorted AQS. This discrepancy between the current study and previous studies may be attributed to methodological differences. First, our study does not used Ainsworth's Strange Situation or the same version of the AQS by Waters. Second, the raters and the time-point of attachment Q-sets were different among studies. Another possibility for our unexpected findings may involve the composition of the sample. The current study's sample was diverse, whereas the samples used in previous studies consisted of mostly white middle-class dyads.

Based on the effects of maternal background characteristics on maternal verbalization style, maternal verbal sensitivity is considered a behavior not dependent on contextual factors. Among the maternal characteristics, only college education predicted maternal verbal sensitivity. This finding is supported by several studies, which underscored the relative importance of maternal education or verbal ability for mother-child interaction quality, as compared to socioeconomic status (Borduin & Henggeler, 1981; the NICHD Early Child Care Research Network, 2005). However, it is noteworthy that the data set for this study measured husband/partner relationship and depressive symptoms at the 2-year data collection point so that effects on maternal verbal sensitivity are distal, rendering the contextual variables insignificant.

Based on the effects of child background characteristics on maternal verbalization style, only language/literacy ability was positively associated with maternal verbal sensitivity. Since child literacy ability and maternal verbal sensitivity were measured contemporaneously, it cannot be concluded that children's literacy predicts maternal

verbal sensitivity or vice versa. On the one hand, several studies (Reese, 1995; Reese, Stewart, & Newcombe, 2003; Saprks, Reese, & Kalia, 2005; Srivastava, Reese, & Newcombe, 2004) demonstrated that maternal elaborative reminiscing is related to children's later literacy. Importantly, no significance was found for child's sex, temperament, and attachment. This is consistent with Ainsworth's (1971) theoretical notion of maternal sensitivity, which emphasizes that sensitivity consists of a mother's capacity to adjust her responses to her child's individuality.

Effect of Maternal Verbal Sensitivity on Child Socio-emotional Functioning

The third purpose of this study was to test the validity of maternal verbal sensitivity in predicting children's socio-emotional functioning, after controlling for a number of background characteristics. Two dimensions of socio-emotional functioning – social competence and externalizing behaviors – were rated by mothers and early care/education providers (ECEP).

The predictive validity of maternal verbal sensitivity was supported, as it was positively associated with the child's social competence as rated by mothers, while at the same time being negatively associated with the child's externalizing behaviors as rated by both mothers and ECEP. These findings are consistent with several studies demonstrating the significance of maternal verbal interactive behaviors for the child's prosocial behaviors in a triadic play situation with other children (Garner, et al., 2007) and for the child's externalizing behaviors or behavioral regulation (Laible, 2004a, 2004b; Garner, et al., 2007). They were, however, inconsistent with Laible's findings (2004a, 2004b) that reported no significance of maternal verbal interactive behaviors with respect to social behavior.

On the other hand, the child's social competence as rated by ECEP was not associated with maternal verbal sensitivity. This unexpected finding may be considered in terms of a measurement issue. The socio-emotional measure for the ECLS-B adopted items from several preexisting scales; and further, this study reduced the number of items to achieve a reasonable internal validity. The modified measure and the resulting reduced items might hinder fully capturing children's social competence at preschool settings. Alternatively, maternal verbal sensitivity may not be associated with the child's social competence at preschool settings as our finding suggested. However, this conclusion should be drawn cautiously, considering the very different settings in which informants observe the child and informants'different subjective perceptions. Mothers may be rating their own experiences with their children, not their children's social competence when interacting with many others, as the ECEP dies. Based on all the results, the predictive validity of maternal verbal sensitivity in predicting the child's externalizing behaviors (as reported by both mothers and ECEP) and social competence (at least as reported by mothers) suggests the importance of maternal verbal sensitivity in bringing the child's world into mother-child conversation in the child's socio-emotional development. Thus, one may speculate that maternal verbal sensitivity as identified in this study helps the child to construct healthy internal working models of the social world, which seems to be important to children's mental health as well as their school readiness, as is postulated by attachment theory.

The Moderating Role of Maternal Verbal Sensitivity in Linking Mother and Child Background Characteristics with Child Socio-emotional Functioning

The fourth purpose of this study was to examine whether maternal verbal sensitivity moderates or partially mediates the effects of background characteristics of the mother and the child on the child's socio-emotional functioning. Since the prerequisites for a mediation model (Baron & Kenny, 1986) were not met, the partial mediation hypotheses were not supported. Therefore, in the following discussion, for each background characteristics (i.e., maternal education, maternal husband/partner relationships, maternal depressive symptoms, child sex, child temperament, and child attachment) the moderation by maternal verbal sensitivity is discussed first, followed by the direct effect of the background characteristics.

This study found that among maternal background characteristics, only husband/partner relationships had differential effects on the child's socio-emotional functioning across the two classes of maternal verbalizations. The effects of maternal husband/partner relationships on both social competence and externalizing behaviors were larger for the children whose mother was less verbally sensitive (Class 2) than for children of more sensitive mothers (Class 1). Maternal verbal sensitivity moderated the association between maternal husband/partner relationships and social competence reported by ECEP, but in an unexpected way. Children of mothers in a happy husband/partner relationship had lower social competence than those whose mothers had no husband/partner when mothers were verbally less sensitive but not when mothers were sensitive. This finding suggests that children of mothers in happy husband/partner relationships are more susceptible to maternal verbal sensitivity. The findings also

suggest that children may be compensating socially for the mother's unhappiness. With regard to externalizing behaviors, maternal verbal sensitivity moderated the association between maternal husband/partner relationships and externalizing behaviors regardless of whether the informant was the mother or a teacher. Just as for the results of the ECEP reported social competence, children of mothers in a happy husband/partner relationship had higher externalizing behaviors reported by ECEP than those of mothers in no husband/partner relationship when mothers were less verbally sensitive but not when mothers were sensitive. Also, children of mothers in a happy husband/partner relationship had higher externalizing behaviors (as reported by mothers) than children of mothers in a less happy husband/partner relationship when mothers were verbally less sensitive but not when mothers were sensitive.

Overall, maternal verbal sensitivity appears to moderates the influence of a given environment in case of maternal husband/partner relationships, not maternal education or depressive symptoms. However, somewhat unexpectedly, the findings suggest that preschoolers of mothers in a happy husband/partner relationship are susceptible to their mothers' failure to provide verbal sensitivity. These findings suggest the importance of investigating children's mental representations of the family's dynamic in order to better understand the impact of maternal husband/partner relationships on children's socio-emotional development.

Based on the direct effects of each maternal background characteristic, an increase in maternal depressive symptoms predicted better social competence in children regardless of who was the informant. These counterintuitive findings are inconsistent with previous studies although the effects of depressive symptoms were small and

statistically marginal in the current study. In addition, the mothers' husband/partner relationship also predicted mother-reported social competence in an unexpected direction. Children whose mothers were in no relationship were more likely to be socially competent than those whose mothers were in a husband/partner relationship. These unexpected negative associations between maternal marital/romantic relationship and the child's social competence were found only in the mother report not in the ECEP report. This may suggest that the perceptions of the informant also play a role in rating at least children's social competence. Alternatively, perhaps social desirability may lead to bias in the single mothers' reporting of their children's social competence because these mothers may implicitly compensate for the absence of a father figure in the household in some way. Or again, this may be a compensatory function of the child.

With respect to the effect of the child's sex, after controlling for the maternal background characteristics, maternal verbal sensitivity moderated the association between the child's sex and social competence reported by the ECEP, but in an unexpected way. This study showed that there were effects of the child's sex on social competence for children whose mothers were verbally sensitive, but not for those whose mothers were less verbally sensitive. The sex difference was thus augmented when mothers were verbally sensitive, suggesting that maternal verbal sensitivity is more beneficial for girls than boys in terms of their social competence during this developmental period. With regard to externalizing behaviors, maternal verbal sensitivity did not moderate the effect of the child's sex.

Sex differences in children's socio-emotional functioning have been well documented (e.g., Garner et al., 2007; Lupinetti, 2000; Orr, 2011; Spjeldnes, Koeske, &

Sales, 2010), findings which are partially supported by the current study. Boys were less likely to be socially competent (at least as reported by mothers) and more likely to have externalizing behaviors (regardless of the informants) than girls after controlling for maternal verbal sensitivity and background characteristics.

With respect to the effect of children's temperamental difficulty, after controlling for the maternal background characteristics and the child's sex, maternal verbal sensitivity did not moderate the link of the child's temperament to socio-emotional functioning.

The direct effect of temperament on socio-emotional functioning has been well documented (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Fabes, Shepard, Guthrie, & Martin, 1997; Greenbergs et al., 2001; Keller et al., 2005; Laible, 2004a; Rhoades, Greenberg, & Domitrovich, 2009; Szewczyk-Spkplowski, Bost, & Wainright, 2005; Vuaghn, Bost, & van IJzendoorn, 2008), and was partially supported by this study. The current study found that temperamental difficulty predicted less social competence (regardless of the informants) and more externalizing behaviors (at least as reported by mothers) in the path models.

With respect to the effect of the child's toddlerhood attachment security, after controlling for the maternal background characteristics as well as the child's sex and early temperament, this study showed that maternal verbal sensitivity moderated the association between attachment security at 2 years and later socio-emotional functioning (ECEP-reported social competence, and externalizing behaviors reported by both informants). The effects of attachment security on externalizing behaviors were larger for children whose mothers were less verbally sensitive than for those whose mother were

sensitive, regardless of the informants. When mothers were less verbally sensitive, children who had been assessed as securely attached in toddlerhood showed less externalizing behaviors than less securely attached children. The earlier attachment security had little impact on externalizing behaviors among children whose mothers were verbally sensitive. These findings suggest that earlier attachment plays a role in the child's later manifestations of externalizing problems when their mothers fail to engage with the child in a verbally sensitive manner during the preschool period. However, when mothers are verbally sensitive during the preschool period, earlier attachment seems to have no effect on the child's later manifestation of externalizing behaviors. It is worthwhile to note that the little effect of early attachment on socio-emotional functioning in Class 1 could be attributed to shared variance between early attachment and maternal verbal sensitivity. Also, maternal verbal sensitivity moderated the effect of attachment security on social competence as reported by ECEP. When mothers were verbally less sensitive, children who had been assessed as securely attached in toddlerhood showed better social competence than less securely attached children. On the other hand, the earlier attachment security had little impact on social competence in children whose mothers were verbally sensitive.

These findings also suggest that maternal verbal sensitivity provides preschoolers who were insecurely attached earlier opportunities to revise their insecure internal working models of the world into healthy ones involving evaluation of thoughts, feelings and events as well as evaluation of possible responses to social demands by bringing the child's world into the mother-child communication. Thus, the findings suggest that internal working models of the social world are malleable and open to change, while

earlier attachment security may serve a lasting protective function even when the mother is not verbally sensitive during the preschool period.

The findings from this study support emerging evidence that highlights the importance of the concurrent parenting quality in the link between earlier attachment and later socio-emotional functioning. Belsky and Fearon (2002b) found that maternal sensitivity at age 2 moderated the association between infant-mother attachment and mother-rated social competence at age 3: Of the children who were insecurely attached in infancy, those who experienced more maternal sensitivity at age 2 were more likely to be socially competent at age 3. Previous studies also offer suggestive evidence in support of our findings that maternal verbal sensitivity moderates the effect of earlier attachment. Ontai and Thompson (2002) found that the interaction of elaborative discourse and earlier attachment security predicted children's understanding of emotion at age 5 and conscience development at age 4 (Laible & Thompson, 2000).

Although the direct links between earlier attachment security and children's socio-emotional functioning at preschool age were not found in the current study when controlling for maternal verbal sensitivity and the background characteristics, modest to moderate associations between infant-mother attachment and children's socio-emotional development have been well documented: for example, in mother-rated social competence at age 3 (Belsky & Fearon, 2002a) and from ages 4 through 6 (National Institute of Child Health and Human Development Early Child Care Research Network: NICHD ECCRN , 2006); in mother-rated externalizing behaviors of preschoolers (Keller et al., 2005); and in teacher ratings of externalizing behaviors during kindergarten and first grade (NICHD ECCRN, 2006). The discrepancy with previous studies may be

attributed to the methodological difference in measuring attachment security, as mentioned earlier.

Based on the evidence regarding the moderating role of maternal verbal sensitivity, this study demonstrated that maternal verbal sensitivity moderates the effect of maternal husband/partner relationship, on social competence reported by ECEP and externalizing behaviors; the effect of the child's sex on social competence reported by ECEP; and the effect of the child's attachment security on externalizing behaviors and ECEP-reported social competence. On the other hand, after controlling for maternal verbal sensitivity and the background characteristics, the mother's husband/partner relationship was an unexpectedly strong predictor of mother-reported social competence; male sex of the child was a strong predictor of lower social competence and ECEP-reported externalizing behaviors; and maternal perception of temperamental difficulty was a modest predictor of ECEP-reported externalizing behaviors.

Overall, the findings suggest that maternal verbal sensitivity moderate the influence of a given family environment—maternal husband/partner relationships and the child characteristics on the child's socio-emotional functioning. These findings also suggest that maternal verbal sensitivity that brings the child's world into the mother-child communication facilitates the child's healthy socio-emotional development by providing the child opportunities to re-evaluate thoughts, feelings, and events as well as possible responses to social demands. This socialization process seems to reduce the influence of maternal husband/partner relationships and the child's earlier attachment security in shaping the child's socio-emotional functioning. However, the child's sex and temperament seem to be critical antecedents of ECEP-reported externalizing behaviors

regardless of maternal verbal sensitivity. It was noteworthy that maternal verbal sensitivity was more beneficial for girls than boys in terms of their social competence. Given these sex differences, boys may develop healthy socio-emotional functioning via a process that is different from that of girls. More attention to boys' socialization process is recommended for future studies. Another noteworthy finding was that children of mothers in happy husband/partner relationships were more affected by maternal verbal sensitivity than those of mothers in no husband/partner relationships or in less happy husband/partner relationships in terms of their socio-emotional functioning. More attention to the effect of maternal husband/partner relationships on children's socio-emotional functioning is recommended for future studies.

Theoretical Implications

First, this study looked at the constellation of verbalizations at the person-level which address the complexity of the interactive sequences and yield information about the heterogeneity among them The findings suggest the methodological advantages of a person-level approach in investigating a new construct which is exploratory in nature and empirically driven.

With respect to attachment theory, the findings showed that the verbalization pattern of Class 1 mothers (i.e., child-centered or verbally sensitive mothers) is characterized by bringing the child's world into the communication, supporting the notion of a maternal capacity to engage with children at a mental level as was described by Meins et al. (2001). Fivush et al. (2006) also suggested that by elaborating shared experiences through mother-child reminiscing talk, children build a coherent sense of self as integrating evaluative information about their social world. The findings also showed,

however, that the child's sex, temperament, and attachment security had little influence on maternal verbalization classes (i.e., the verbal level of maternal sensitivity), supporting Ainsworth's concept of maternal sensitivity as being characterized by a maternal capacity to tailor responses to the child's individuality. The findings also suggest that this parenting characteristic is more influential than earlier attachment security on socio-emotional functioning at the preschool years. This supports the notion that the concept of maternal sensitivity should be considered along with children's developmental stage in terms of cognitive and linguistic development. Thus, it would be potentially problematic if maternal verbal sensitivity as defined herein were applied to groups with a wide age range, either in infancy or beyond the preschool ages. This corresponds to the issue of developmental appropriateness of maternal interactive behaviors suggested by attachment researchers. That is, maternal sensitivity in infancy involves emotional and physical care tailored to the child's signals while maternal sensitivity during preschool years involves verbal communication for engagement with the child at a mental level in addition to emotional and physical care. Overall, the maternal verbalization pattern distinctive of Class 1 is considered to represent maternal sensitivity at the verbal level, which is developmentally appropriates in the preschool years and conforms to the various aspects of the theoretical notion of maternal sensitivity. Similarly, Fivush et al. (2006) suggested that elaborativeness is a proxy for maternal sensitivity during the preschool period. Furthermore, the concurrent validity of maternal verbal sensitivity in linking to the child's socio-emotional functioning supports the importance of verbal sensitivity during the preschool years.

Importantly, our findings showed the moderating role of maternal verbal sensitivity between earlier attachment security and the child's socio-emotional functioning, which may support Bowlby's (1969, 1982) postulation that the internal working models or mental representations of the social relationship are open to revision. This suggestion is somewhat distal from our findings because this study did not directly measure mental representations. However, given Bowlby's theory that the internal working models are executed in children's behaviors, there would not be too much of a leap of logic in juxtaposing the internal working models and socio-emotional functioning. Additionally, consistent with Bowlby's theory, several studies suggest that developmental changes in the internal working models during the preschool years, along the cognitive and linguistic development. What is implied by these studies (Bretherton, 1993; Dunn, 1994) is that preschoolers have come to refine or re-organize the internal working models in accordance with their experiences in the context of mother-child communication. By verbally engaging with the child in regard to the child's thoughts and feelings about experiences, maternal verbal sensitivity may provide opportunities the child to re-evaluate his or her experiences and hence construct healthier working models of self with others.

A major gap in the literature of mother-child communication, as noted by Fivush, et al. (2006), is whether the family's broader ecological condition affects maternal verbal sensitivity. This study contributes to the literature by examining the effect of the mother's education, husband/partner relationships, and depressive symptoms on maternal verbal sensitivity. The findings showed that only maternal education covaried with maternal verbal sensitivity, suggesting that maternal verbal sensitivity is a trait related to education,

but not readily affected by contextual factors such as husband/partner relationships and depressive symptoms.

The other gap in the literature concerns the generalizability of maternal communication styles, since previous studies have relied on while middle-class samples. This study contributes to the literature by examining maternal verbalizations using a nationally representative probability sample to which some exclusion criteria were applied. Although the exclusion criteria were applied, the composition of the subsample was similar to national census report of 2001 (U. S. Census Bureau, 2002) in terms of ethnicity, families in poverty, and maternal education. It remains possible that the inconsistent findings regarding the effect of the child's sex and temperament on maternal verbal sensitivity may be attributed to the composition of the subsample. Consistent with literature (Reese, 2002), this study found that only the child's language and literacy ability was related to maternal verbal sensitivity. More evidence using diverse samples is required to draw any final conclusion about the effect of children's characteristics on maternal verbal sensitivity.

With regard to the context of mother-child communication, there is a debate about whether contexts of communication influence communication styles (Bost, et al., 2010; Curenton & Craig, 2009; de Rosnay & Hughes, 2006; Fivush e al., 2006; Howe, Rinaldi, & Recchia, 2010; Reese, Bird, & Tripp, 2007). The findings showed that elaborative communication was a distinctive feature of the verbally sensitive mothers even in the non-reminiscing context of dyadic book reading. Thus, this study suggests that contexts of communication do not influence maternal communication styles. Additionally, in an exploratory phase of the SEM in which a single verbalization, 'relating the story to the

child's experience,' was used instead of the classes, this verbalization was negatively associated with externalizing behaviors as rated by both mothers and ECEP. Thus, this study supports the notion that reminiscing and book-reading contexts offer an important opportunity for socio-emotional development. Further, the findings suggest that the dyadic book-reading context also allows for reminiscing by referring the story of the book to the child's experiences.

More attention to the associations between verbalization relating the story to children's experiences and children's socio-emotional functioning in various non-reminiscing contexts is recommended for future studies. One implication is that there is no clear basis from which to grasp what is in the child's mind, if mothers leave out the child's experiences during mother-child communication; by contrast, if mothers bring the child's experiences into the dyadic communication, mothers seem to be engaging their children at the mental level, learning about the children's perspective and subjective experiences.

Implications for Social Work Practice

The findings suggest that mothers with less than a college education are at risk of being less verbally sensitive; this indicates a focal point for preventive interventions. Given that a lack of maternal verbal sensitivity reflects a lack of capacity to refer to the child's point of view, bringing the child's experiences into the dyadic communication, interventions utilizing dyadic book reading may be effective. The concrete nature of the book-reading context may help less verbally sensitive mothers to make the references in bringing the child's experiences into the dyadic communication. De Rosnay and Hughes (2006) also claimed that during shared book reading, the explicit reference to the child's

experience may provide a clear basis from which to construct shared meaning. As such, a shared book-reading context would be useful for educating mothers about how to bring the child's world into communication and how to prompt the child to re-evaluate thoughts and feeling in accordance with his or her experiences. Intervention may involve social work practitioners in selecting appropriate books based on a comprehensive evaluation of the child's history, as well as prompting parents to adopt the habits of verbal sensitivity. Particularly for mothers whose children are at risk for or already manifest externalizing behaviors, dyadic book-reading contexts may be adopted as an intervention tool. Our findings showed that maternal verbal sensitivity was negatively associated with externalizing behaviors across settings, whether the mother or the ECEP was observing the child. Interventions adopting dyadic book reading may be applied to early school-aged children as well, although the evidence showed that maternal verbal sensitivity is most salient at preschool ages. This implication for intervention is made on the assumption that these children may not have had an opportunity to learn how to re-evaluate their own and others' thoughts, feelings, and possible responses to social demands.

Study Limitations

There were several limitations to this study. Using secondary data limited the way certain concepts were studied because the construction of these measures depended on what was available in the data. For example, children's socio-emotional functioning could not be fully investigated as a multi-dimensional phenomenon. The instruments used in this study did not provide information on internalizing behaviors, limiting the available dimensions to social competence and externalizing behaviors. With regard to

the Reading Aloud Profile−Together (RAPT) coding scheme, it was originally designed to capture the parent-child dyad's behaviors related to the major domains of early literacy development (Najarian, Snow, Lennon, & Kinsey, 2010) rather than the parent-child dyad's communication styles. Thus, the verbalization items used in this study were not comprehensive enough to investigate maternal verbal sensitivity more fully. However, a rationale for using the RAPT items was provided by the fact that some of the domains, such as comprehension/higher-order thinking, are closely related to maternal verbal engagement with the child at a mental level.

In addition, using secondary data limited the study design. The literature (Shin, 2007; Vaughn, et al., 2006; Dykas, et al., 2006) suggests that a mother's mental representation of her own childhood attachment experiences is an important correlate of maternal verbal sensitivity. However, this study could not include it because the data did not provide information of the mother's own attachment representations or her own childhood relationship with her parents.

Implications for Future Research

Critical areas for future research include children's mental representation of social relationships, as well as mothers' representations of attachment with their own parents. First, children's mental representation of social relationships would allow examining the theoretical notion that children's earlier internal working models of social relationships could be modified by maternal verbal sensitivity. Furthermore, examining the effect on maternal verbal sensitivity of a mother's representation of her own childhood attachment, or at least mothers' relationship history with her own parent would fill the gap in the literature of mother-child communication.

Future research is also needed to on how maternal husband/partner relationships may influence the child's socio-emotional functioning. Our counterintuitive findings suggest that children of mothers in happy husband/partner relationships are more susceptible to maternal verbal sensitivity than those of mothers in less happy or no husband/partner relationships.

Further research is also needed to determine how the sex of the child may influence the child's social competence – especially, how boys' social competence is developed in the context of the dyadic reading. Our findings suggest that maternal verbal sensitivity is more beneficial for girls than boys in terms of their social competence. Perhaps a study of father-child communication could elucidate the sex difference.

Experimental intervention studies involving the features of maternal verbal sensitivity in dyadic book-reading contexts are needed in order to determine the supposed efficacy of utilizing the concept of maternal verbal sensitivity in the dyadic book-reading context.

Finally, future research could be extended by using autoregressive models or growth curve models, given that early childhood involves dynamic developmental changes over time, which involve parental verbal sensitivity and children's socio-emotional functioning.

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APPENDIX

Appendix A: Percentage of Cases Imputed for Each Item and Variables Used for ICE[a]

Item	Non-missing (frequency)	Missing (frequency)	Variables used for imputation
TAS (Toddler Attachment Sort-45) security score	97.30 (324)	2.70 (9)	TAS dependency scores; socioeconomic quintile at the 2-year data collection point; and maternal praising for children's effort and maternal explanatory verbal style during the 9-month mother-child interactions
Reading score	97.60 (325)	2.40 (8)	Child's age at the preschool data collection point; socioeconomic quintile at the preschool data collection point; and maternal stimulation of cognitive development during mother-child interactions at the 2-year data collection point
Social competence rated by mothers			
Comforts others	99.40 (331)	.60 (2)	Tries to understand others[b]; comforts others[b]; and stands up for others[b]
Stands up for others	97.90 (326)	2.10 (7)	
Externalizing behaviors rated by mothers			
Difficulty concentrating or staying on task	99.70 (332)	.30 (1)	Overly active[b]; difficulty concentrating or staying on task[b]; angry[b]; temper tantrums[b]; and physically aggressive[b]

Appendix A (continued): Percentage of Cases Imputed for Each Item and Variables Used for ICE[a]

Item	Non-missing (frequency)	Missing (frequency)	Variables used for imputation
Social competence rated by early care/education providers[c]			
Tries to understand others	96.40 (321)	3.60 (12)	Tries to understand others[d]; comforts others[d]; and stands up for others[d]
Comforts others	96.10 (320)	3.90 (13)	
Stands up for others	96.70 (322)	3.30 (11)	
Externalizing behaviors rated by early care/education providers[c]			
Overly active	96.40 (321)	3.60 (12)	Overly active[d]; difficulty concentrating or staying on task[d]; disrupt other child's actives[d]; restless/fidgety[d]
Difficulty concentrating or staying on task	96.40 (321)	3.60 (12)	
Disrupt other child's actives	96.40 (321)	3.60 (12)	
Restless/fidgety	96.40 (321)	3.60 (12)	
Husband/partner relationship satisfaction[e]	88.47 (253)	11.53 (33)	Five categories of child race/ethnic background (i.e., White, African-American, Hispanic, Asian, and Other); and stability of the presence of father figures

Note. [a] Imputation by Chained Equations; [b]Rated by mothers; [c]Ten out of missing cases were imputed by mean substitution; [d]Rated by early care/education providers; [e]Percentages were calculated, based on mothers in marital/romantic relationship excluding 47 mothers not in relationship.

Appendix B: Factor Loadings of Child Measures

Table B1

Factor Loadings for the Rotated Factors of Socio-emotional Functioning Reported by Mothers

	Factor Loading		Uniqueness
	1	2	
Tries to understand others	-.09	**.65**	.57
Comforts others	-.04	**.60**	.64
Stand up for others	-.00	**.66**	.56
Overly active	**.45**	.04	.79
Difficulty concentrating	**.43**	-.11	.81
Angry	**.74**	.02	.45
Temper tantrums	**.72**	.00	.48
Physically aggressive	**.52**	-.21	.69
Eigenvalue	1.74	1.28	

Note. The first factor indexes externalizing problems and the second factor indexes social competence; Log likelihood = -29.09; Achwarz's BIC = 145.30; AIC = 88.18.

Table B2

Factor Loadings for the Rotated Factors of Socio-emotional Functioning Reported by ECEP

	Factor Loading		Uniqueness
Item	1	2	
Tries to understand others	.41	**.78**	.22
Comforts others	.38	**.77**	.26
Stand up for others	.41	**.83**	.14
Overly active	**.86**	.42	.09
Difficulty concentrating	**.85**	.42	.11
Disrupt other child's actives	**.72**	.51	.22
Restless/fidgety	**.87**	.41	.06
Eigenvalue	3.23	2.66	

Note. The first factor indexes externalizing problems and the second factor indexes social competence; Log likelihood = -19.60; Achwarz's BIC = 114.71; AIC = 65.20; ECEP = early care/education providers.

Table B3

Factor Loadings for the Factor of Child Temperament

	Factor Loading	Uniqueness
Item	1	
Frequently irritable or fussy	.41	.61
Easily from a whimper to an intense cry	.38	.69
Demands attention and company	.41	.60
Needs a lot help to fall asleep	.86	.81
Unable to wait for food or toys	.72	.70
Overall difficulty to raise for the average parents	.87	.57
Eigenvalue	2.03	

Appendix C: Descriptives of the 28-item Maternal Verbalizations (Unweighted *n* = 333, Weighted *N* = 2,207,339)

Item	Freq.	%	*SE*	Weighted %	Liniearlized *SE*
BR capturing the child's attention					
Yes	261	78.38	.02	79.36	.03
No	70	21.02	.02	19.59	.03
Not Ascertained	2	.60	.00	.01	.01
BR directing the child to the features of the book					
Yes	255	76.58	.02	77.52	.03
No	76	22.82	.02	21.42	.03
Not Ascertained	2	.60	.00	.01	.01
BR reminding the child of other similar books					
Yes	53	15.92	.02	15.44	.03
No	278	83.48	.01	83.51	.03
Not Ascertained	2	.60	.00	1.05	.01
BR noting different letters or letter sounds					
Yes	6	1.80	.01	1.05	.00
No	325	97.60	.01	98.11	.01
Not Ascertained	2	.60	.00	.84	.01
BR responding to the child's questions					
Yes	15	4.50	.01	4.24	.01
No	316	94.90	.01	94.71	.02
Not Ascertained	2	.60	.00	1.05	.01
BR asking close-ended questions					
Yes	145	43.54	.03	43.97	.04
No	186	55.86	.03	54.98	.04
Not Ascertained	2	.60	.00	1.05	.01
BR asking open-ended questions					
Yes	9	2.70	.01	3.20	.01
No	322	96.70	.01	95.75	.01
Not Ascertained	2	.60	.00	1.05	.01
BR relating the story to the child's experiences					
Yes	17	5.11	.01	7.25	.02
No	314	94.29	.01	91.70	.02
Not Ascertained	2	.60	.00	1.05	.01
DR acting parts of the book					
Yes	155	46.55	.03	48.27	.04
No	177	53.15	.03	51.68	.04
Not Ascertained	1	.30	.00	.00	.00

Appendix C (continued): Descriptives of the 28-item Maternal Verbalizations

Item	Freq.	%	*SE*	Weighted %	Liniearlized *SE*
DR expanding on the story or on the child's comments					
Yes	206	61.86	.03	64.66	.03
No	126	37.84	.03	35.29	.03
Not Ascertained	1	.30	.00	.00	.00
DR highlighting new vocabulary					
Yes	39	11.71	.02	11.04	.02
No	293	87.99	.02	88.92	.02
Not Ascertained	1	.30	.00	.00	.00
DR directing the child's attention to illustrations					
Yes	281	84.38	.02	83.91	.03
No	51	15.32	.02	16.04	.03
Not Ascertained	1	.30	.00	.05	.00
DR asking close-ended questions					
Yes	263	78.98	.02	79.24	.03
No	69	20.72	.02	20.72	.03
Not Ascertained	1	.30	.00	.04	.00
DR asking open-ended questions					
Yes	92	27.63	.02	30.80	.03
No	240	72.07	.02	69.15	.03
Not Ascertained	1	.30	.00	.05	.00
DR relating the story to the child's experience					
Yes	114	34.23	.03	36.22	.03
No	218	65.47	.03	63.73	.03
Not Ascertained	1	.30	.00	.05	.00
DR asking the child to recall the story					
Yes	32	9.61	.02	10.87	.02
No	300	90.09	.02	89.08	.02
Not Ascertained	1	.30	.00	.05	.00
DR responding to the child's questions/comments					
Yes	143	42.94	.03	45.06	.04
No	189	56.76	.03	54.89	.04
Not Ascertained	1	.30	.00	.05	.00
DR Commenting on letters and sounds					
Yes	3	.90	.01	.35	.00
No	329	98.80	.01	99.60	.00
Not Ascertained	1	.30	.00	.05	.00

Appendix C (continued): Descriptives of the 28-item Maternal Verbalizations

Item	Freq.	%	*SE*	Weighted %	Liniearlized *SE*
DR asking the child join in the reading					
Yes	31	9.31	.02	10.37	.02
No	301	90.39	.02	89.58	.02
Not Ascertained	1	.30	.00	.05	.00
AR asking if the child liked the book					
Yes	109	32.73	.03	33.70	.03
No	191	57.36	.03	56.67	.03
Not Ascertained	33	9.91	.02	9.62	.02
AR asking the child to recall the story					
Yes	21	6.31	.01	5.52	.01
No	279	83.78	.02	84.86	.02
Not Ascertained	33	9.91	.02	9.62	.02
AR responding to the child's questions/comments					
Yes	8	2.40	.01	2.27	.01
No	292	87.69	.02	88.11	.02
Not Ascertained	33	9.91	.02	9.62	.02
AR relating the story to the child's experiences					
Yes	33	4.20	.01	4.48	.01
No	286	85.89	.02	85.90	.02
Not Ascertained	14	9.91	.02	9.62	.02
AR asking open-ended questions					
Yes	4	1.20	.01	1.38	.01
No	296	88.89	.02	89.00	.02
Not Ascertained	33	9.91	.02	9.62	.02
AR answering the child's questions					
Yes	8	2.40	.01	2.27	.01
No	292	87.69	.02	88.11	.02
Not Ascertained	33	9.91	.02	9.62	.02
AR reviewing vocabulary in the book					
Yes	0	.00	NA	.00	NA
No	300	90.09	.02	90.37	.02
Not Ascertained	33	9.91	.02	96.23	.02
AR expanding on child's comments about the book					
Yes	13	3.90	.01	3.15	.01
No	287	86.19	.02	87.23	.02
Not Ascertained	33	9.91	.02	9.62	.02

Appendix C (continued): Descriptives of the 28-item Maternal Verbalizations

Item	Freq.	%	*SE*	Weighted %	Liniearlized *SE*
AR summarizing the story with the child's involvement					
Yes	5	1.50	.01	2.05	.01
No	295	88.59	.02	88.33	.02
Not Ascertained	33	9.91	.02	9.62	.02
AR summarizing the story without the child's involvement					
Yes	7	2.10	.01	2.05	.01
No	293	87.99	.02	88.33	.02
Not Ascertained	33	9.91	.02	9.62	.02

Note. BR = Before Reading; DR = During Reading; AR = After Reading.

Appendix D: Diagnostic Plots of Residuals against the Fitted Values

Figure D1

Child Social Competence Reported by Mothers

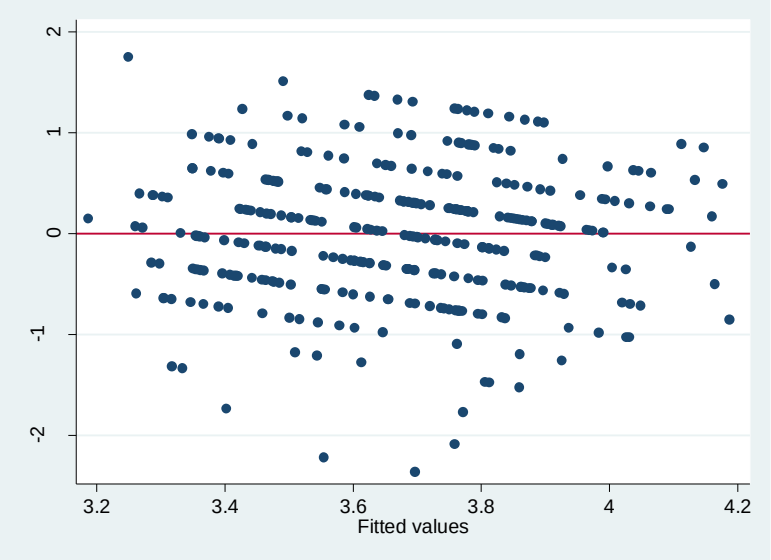


Figure D2

Child Externalizing Behaviors Reported by Mothers

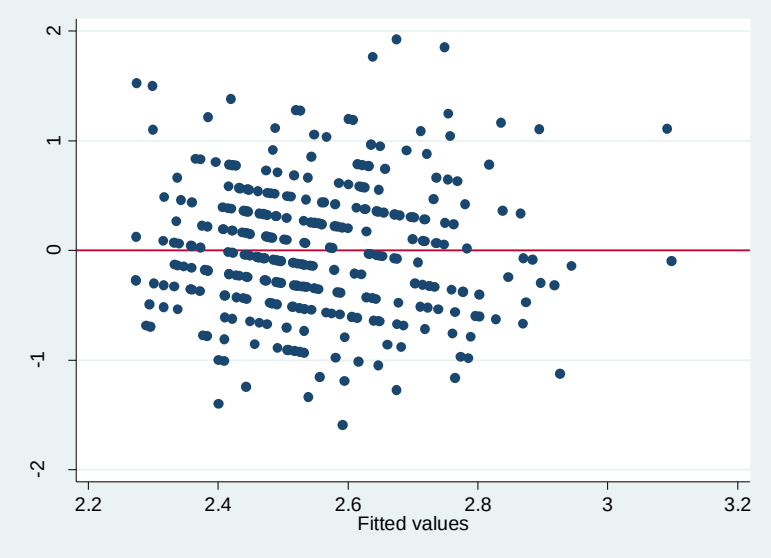


Figure D3

Child Social Competence Reported by Early Care/Education Providers

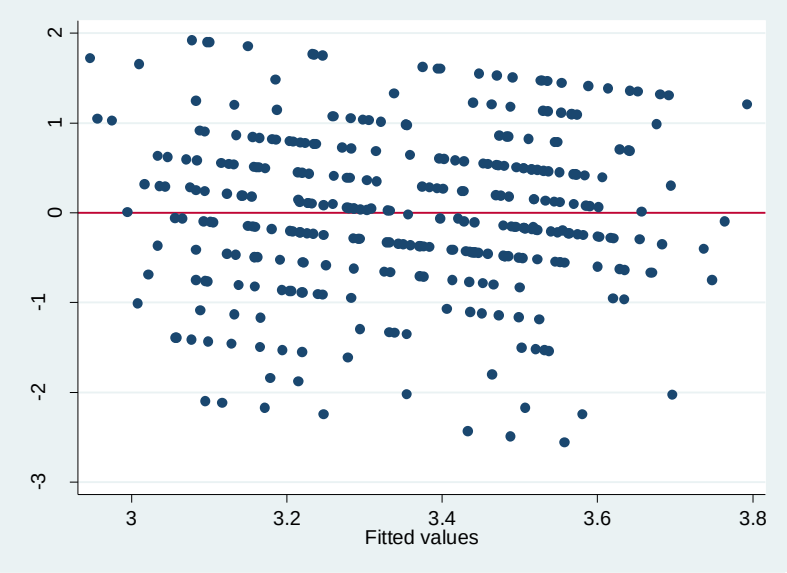
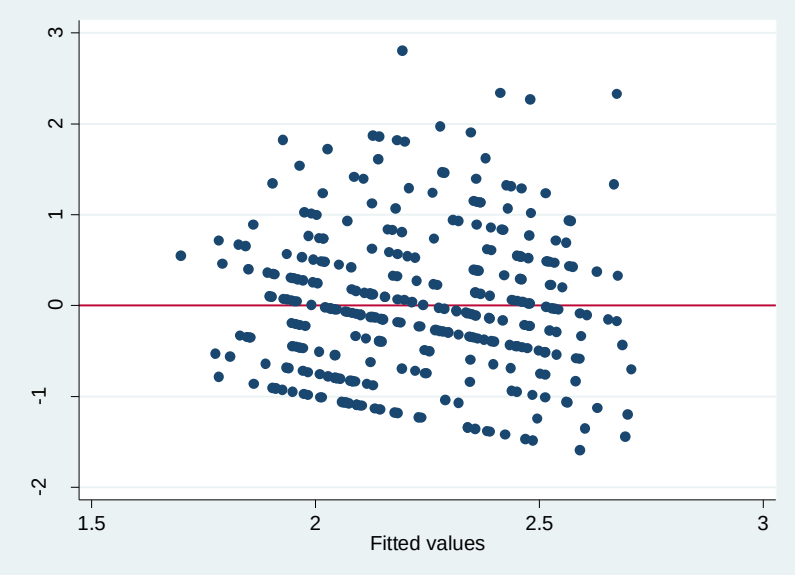


Figure D4

Child Externalizing Behaviors reported by Early Care/Education Providers



CURRICULUM VITAE

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Education

2012 **Ph.D. in Social Work**, Rutgers University, New Brunswick, NJ, USA

2002 **M.A. in Psychology**, Boston University, Boston, MA, USA

2000 **M.A. in Child Psychology & Education**, Sung-Kyun-Kwan University, Seoul, Korea

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Publications

Peer-reviewed journal articles

Baer, J. C., **Kim**, **H**. **M**., & Wilkenfeld, B. F. (in press). Is it generalized anxiety or poverty?: An examination of poor mothers and their children. *Families in Society*.

Postmus, J. L., Plummer, S., McMahon, S., Murshid, N. S., & **Kim**, **M**. **S**. (2012). Understanding economic abuse in the lives of survivors. *Journal of Interpersonal Violence, 27*, 411-430.

Book chapters

Oh, D., Murata, A., **Kim**, **H**. **M**., Murata, M., & Jones-Rooy, A. (in press). East Asian definitions of war, torture, and terrorism. In K. Malley-Morrison, S. McCarthy, and D. Hines (Eds.), *International handbook on war, torture, and terrorism* (chapter 10). New York, NY: Springer Publishing Company.

Kim, **H**. **M**., Lee, H. H., You, N. Cho, D. Y. , Koo, B. S., Murata, A., & Jones-Rooy, A. (in press). Views on national security in East Asia. In K. Malley-Morrison, S. McCarthy, & D. Hines (Eds.), *International handbook on war, torture, and terrorism* (chapter 20). New York, NY: Springer Publishing Company.

Hoshino-Browne, E., Villamil, A. N., Wu, T., **Kim**, **H**. **M**., Stone, A., Murata, A., Murata, M., & Jones-Rooy, A. (in press). Perspectives on invasion in East Asia. In K. Malley-Morrison, S. McCarthy, & D. Hines (Eds.), *International handbook on war, torture, and terrorism* (chapter 31). New York, NY: Springer Publishing Company.

Hoshino-Browne, E., Wu, T., Villamil, A. N., **Kim**, **H**. **M**., Murata, A., Murata, M., & Jones-Rooy, A. (in press). Perspectives on torture in East Asia. In K. Malley-Morrison, S. McCarthy, & D. Hines (Eds.), *International handbook on war, torture, and terrorism* (chapter 41). New York, NY: Springer Publishing Company.

Baer, J. C., & **Kim**, **M**. **S**. (2010). Ethnic differences in cultural and family processes in Mexican, Chicano, Cuban, Puerto Rican and Central South American families living in the United States. In J. K. Crennan (Ed.), *Race and ethnicity: Cultural roles, spiritual practices and social challenges* (pp. 335-348). Hauppauge, NY: Nova Science Publishers, Inc.

Kim, **M**. **S**., Wu, T., Park, I., & Jang, M. (2009). South Korea. In K. Malley-Morrison (Ed.), *State violence and the right to peace: An international survey of the view of ordinary people: Vol 4. Asia and Australia* (pp. 185-206). Santa Barbra, CA: Praeger Security International.

Jang, M., & **Kim**, **M**. (2004). Korea. In K. Malley-Morrison (Ed.), *International perspective on family violence and abuse* (pp. 301-319). Mahwah, NJ: Lawrence Erlbaum Associates.

Publications under Review

Peer-reviewed journal articles

Baer, J. C., & **Kim**, **H**. **M**. (2012). *Maternal sensitivity and toddler/preschooler behavior problems: A meta-analysis for evidence-based practice*. Manuscript submitted for publication.

Presentations at Professional Conferences

Baer, J., & **Kim**, **H**. **M**. (2012, June). *Latent classes of maternal verbalizations during shared book reading and preschoolers' socio-emotional functioning*. Abstract accepted for poster session presentation at the Head Start's 11th National Research Conference, Washington, DC.

Kim, **H**. **M**., & Baer, J. (2012, May). *A study of styles of maternal verbal sensitivity.* Manuscript accepted for paper presentation at the 2nd Conference on Psychology and Social Harmony, Shanghai, China.

Kim, **M**. **S**., & Baer, J. (2010, October). *Maternal sensitivity and toddler/preschooler behavior problems: A meta-analysis for evidence-based practice*. Poster session presented at the meeting of Council on Social Work Education, Portland, OR.

Baer, J., & **Kim**, **M**. **S**. (2010, January). *How numbers misbehave: Multivariate regressions and structural equation modeling*. Paper presented at the annual meeting of Society for Social Work and Research, San Francisco, CA.

Kim, **M**. **S**., & Warrener, C. D. (2009, November). *Parent and child perspectives of the adoption experience: Protective and risk factors*. Poster session presented at the annual meeting of Council on Social Work Education, San Antonio, TX.

Baer, J., & **Kim**, **M**. **S**. (2009, January). *Generalized anxiety disorder or poverty?: A study of poor mothers and their children*. Paper presented at the meeting of Society for Social Work and Research, New Orleans, LA.

Kim, **M**. **S**. (2008, October). *Roles of ecological stressors and parenting stress in maternal parenting involvement*. Poster session presented at the annual meeting of Council on Social Work Education, Philadelphia, PA.

Barbosa, M., Machado, C., Matos, R., **Kim**, **M**. **S**., & Wu, T. (2008, August). Moral disengagement in war and peace: Portugal, the United States, and Korea. In K. Malley-Morrison & M. Corgan (Co-chairs), *Moral disengagement and social injustice - war and peace.* Symposium conducted at the meeting of American Psychological Association, Boston, MA.

Kim, **M**. **S**., & Wu, T. (2008, August). Korean perspectives. In M. Salmberg (Chair), *International perspectives on reconciliation: Discussion*. Hospitality suite presentation conducted at the meeting of American Psychological Association, Boston, MA.

Kim, **M**. **S**. (2002, April). *Mother-child interaction and emotional understanding in children with pervasive development disorder*. Abstract accepted for paper presentation at the meeting of the National Technology and Social Science Association on Psychology on Action, Las Vegas, NV.

Kim, **M**. **S**., & Jang, M. (2002, March). Tolerance for child maltreatment within the family: Perspectives from the Republic of Korea. In K. Malley-Morrison (Chair), *Cross-cultural perspectives of family violence.* Symposium conducted at the meeting of Eastern Psychological Association, Boston, MA.