# THE ROLE OF MATERNAL VERBAL CO-CONSTRUCTION SKILLS IN ATTACHMENT RELATIONSHIPS DURING EARLY CHILDHOOD

by

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*Dedicated to my advisor and my collogues who devoted much time into this project*

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# ABSTRACT

Past parent-child attachment studies mainly focused on behavioral exchanges during the early years without exploring the role played by verbal exchanges. During the transition to early childhood, developing cognitive and language abilities provide a new window to examine the influence of mother-led verbal communication skills about attachment-related events, and whether those skills contribute to child attachment security. This study investigates maternal verbal communication skills (i.e., co-construction skills), their relationships with maternal sensitivity and child attachment security, and whether maternal co-construction skills add unique information to the prediction of child security. Fifty-four mother-child dyads participated in the current study. Maternal co-construction skills were assessed via a joint storytelling task; transcriptions were created and then coded using a set of three scales. Maternal sensitivity and attachment security were assessed using the Maternal Behavior with Preschoolers Q-set (MBPQS) and Attachment Q-set (AQS), respectively. Structural equation modeling was used to address the questions posed. Results indicated that maternal co-construction is not related with maternal sensitivity, though some maternal co-constructive abilities were associated with sensitivity; maternal co-construction was not a significant correlate of child attachment security at 2-3 years of age. Overall, results from this current study extend those of former research on maternal verbal co-construction skills and their relationship with mother-child attachment relationships, demonstrating that maternal language input may not start to play an important role in secure base behavior (i.e., security) until children are older. Verbal abilities were argued to be an important part in parent-child relationships and may influences child attachment longitudinally not concurrently at the beginning of early childhood.

# INTRODUCTION

Using control system theory, Bowlby (1969/1982, 1973, 1988) proposed that infants put together an attachment behavioral system that includes cognitive and emotional components. During infancy, attachment representations are predominantly sensory-motor and are typically assessed using behavioral observations (e.g., the Strange Situation Procedure and Attachment Q-Set). Beyond infancy, with the development of language, communication abilities, and cognitive capacities, representations continue to be internalized; the mental affect-laden structure referred as "Internal Working Model" of relationships (Bowlby, 1980) is expanded and elaborated, and starts guiding attachment-related behavior, affect, and cognition through childhood, adolescence and even adulthood. A large amount of research is in line with the notion that early childhood attachment experiences and their representations influence development across many domains (Cassidy & Shafer, 2008; Dykas & Cassidy, 2011). Despite their central role in attachment theory and individual development, we know little about the social/relational processes by which attachment behavioral organization and internal working models continue to be elaborated beyond infancy during early childhood, when children's cognitive and communication skills begin to bloom.

The aim of this project to expand the study of preschoolers' attachment behavioral system by focusing on the functional use of maternal language (i.e., maternal co-construction skills) when participating in mother-child affect oriented conversations. Specifically, I am interested in studying whether maternal verbal communication about attachment-related issues is an important factor in the organization of a child's attachment behavior (i.e., secure base behavior) in early childhood at 2-3 years of age. I will address three research questions: first, are

maternal verbal co-construction skills associated with mothers' quality of care as conceptualized in the attachment literature (i.e., sensitivity); second, do those co-construction skills contribute to children's organization of attachment behaviors during mother-child interactions; third, do maternal co-construction skills contribute any unique information to child attachment security beyond any contributions from maternal sensitivity.

In what follows, I succinctly review the secure base phenomenon and sensitivity constructs which play central roles in the current study, past studies on parent-child language communication, the relationship between parent-child language communication and parent-child attachment, and last, I will review a recently proposed hypothesis about the relation between maternal verbal co-construction skills and their potential connection to child security.

# LITERATURE REVIEW

## The Secure Base and Sensitivity Constructs

The secure base phenomenon is at the center of research on attachment relationships (Waters & Cummings, 2000) and plays a key role in this proposal. The secure base construct was coined by Ainsworth (1967) based on her observations of infants interacting with their mothers in rural Uganda. She noticed that infants would make little excursions into their environment away from mothers, checking on and/or going back to mothers periodically, especially if an alarming event, from the child's point of view, occurs (e.g., a new person coming close to the infant). The secure base phenomenon has been defined as the apparently purposeful balance between exploring away from and going back to an attachment figure. Such balance is context sensitive and is influenced by the history of interactions between the child and an attachment figure (Posada et al., 1995). In other words, the secure base phenomenon refers to a child's use of her/his attachment figures as a haven of safety towards whom s/he looks for proximity, and as a base from which s/he explores the environment.

In describing the development of children's attachment to their main caregivers, Bowlby (1982, 1988) argued that by the end of the first year, children have developed an emotional bond (i.e., attachment) to their main caregivers and have put together an attachment behavioral system that is evident in children's secure base behavior exhibited in their interactions with attachment figures. Individual differences in how children organize their secure base behaviors (i.e., balance between proximity seeking and exploration away across contexts) have been interpreted as indicators of attachment (in)security.

Individual differences in attachment security are hypothesized to form and develop through the history of child-caregiver interactions (Bowlby, 1969/1982). Ainsworth's naturalistic observations in Uganda and Baltimore (Ainsworth, 1967; Ainsworth et al., 1978/2015) provided initial evidence about the development of the child-mother attachment bond, and more specifically, the secure base phenomenon. She documented the appearance of behaviors that promote proximity to a caregiver, such as differential smiling, crying, seeking out the caregiver through locomotion, and greeting during the first year. Her descriptions remain core characteristics of secure base behaviors in naturalistic observational studies.

Furthermore, Ainsworth's research showed that the ability to use caregivers as a secure base is determined by the quality of caregiving behaviors (i.e., sensitivity; Ainsworth et al., 1974; Bowlby, 1988; Bowlby, 1991; Marvin & Britner, 2008; Thompson, 2000; Waters & Cummings, 2000; Waters et al., 1991). Based on her findings and naturalistic observations conducted during infants' first year of life, Ainsworth and colleagues (1978/2015) characterized sensitive caregivers as those who are aware of their children's signals and needs, interpret them accurately (based on the child's reactions), and respond to those signals and needs promptly and appropriately. These characteristics became the core features of caregiving sensitivity in parent-child attachment studies (e.g., Pederson & Moran, 1995, 1996; Posada et al., 2007, 2016, 2018).

During the past 4 decades, attachment researchers have consistently demonstrated that the quality of care, conceptualized as parental sensitivity, is significantly related to children's attachment security (De Wolff & van IJzendoorn, 1997; Verhage et al., 2016). Briefly, all those caregiving qualities defined as sensitivity are essential components in predicting infant security.

Research on the development of child-parent attachment relationships during the preschool years is scant (Posada & Waters, 2018). We know less about the social processes through which those relationships are maintained and elaborated. As children develop from infancy into early childhood, their advancing cognitive and language abilities provide them with new "tools" to understand and organize their experiences, knowledge, and behaviors about parent-child relationships. Notably, the growing use of language during early childhood affords parents an important avenue to guide their children's organization of attachment-related information and attachment behaviors. In brief, the dyadic process initiated in infancy continues during the preschool years, but now, with children's developmental transformations, it becomes increasingly representational as new lines of communication are established and verbalizations become gradually more relevant in parent-child exchanges.

In this project, I will investigate mother-child exchanges focusing on maternal verbal communication skills during mother-child interactions (i.e., maternal co-construction skills) and their relationships with child attachment security and maternal sensitivity. I focus on early childhood, a time of burgeoning cognitive and language abilities, when parent-child verbal interaction plays an increasingly important role in parent-child relationships. Specifically, I propose to examine the interplay between maternal verbal communication skills (i.e., co-construction skills), maternal quality of caregiving behaviors (i.e., sensitivity), and children's organization of secure base behavior (i.e., security) in 2-3-year-olds.

## The Importance of Language in Parent-Child Exchanges during Early Childhood

Most developmental skills begin first on an interpersonal plane, in interaction between parents and children; this is the core idea articulated by Vygotsky and his sociocultural theory

(Vygotsky, 1978). Social interaction, especially language interaction is viewed as a mechanism, or more appropriately described as a central process in development. Through language, children engage in adult-guided activities, gain access to the mental world and become part of the community of minds; they discover how minds interact, that beliefs can be changed, desire can be created, and emotions can be invoked in linguistic exchanges. As Nelson and Fivush (2004) stated:

> "There is now abundant evidence that the way in which parents, and especially mothers, structure conversations about past events with their preschool children has strong and enduring influences on how children come to construct their narrative life stories." (p. 497).

The emerging representational and language abilities during the preschool years equip children with new means to interact, exchange information, and behave with others. Also, these abilities provide a new window for parents to help their children navigate their social and relational world. More specifically, as attachment relationships are concerned, the development of language is an important factor when considering the potential role played by maternal verbal skills in the association between sensitivity and security during early childhood. With more advanced language skills, verbal communication gradually becomes one of the main mediums through which parents and children express and respond to emotion, intent, needs and goals. Thus, verbal communication is an important factor to consider when studying parent-child relationships and the role it may play in shaping children's representational structures and behavioral organization (Waters & Cummings, 2000).

With language playing an expandingly important role in children's life during early childhood, parents initially serve as the organizers of caregiver-child verbal interactions. Through the toddlerhood and preschooler years, caregivers continue to provide most of the

content and structure for these conversations though children increase their participation in verbal exchanges with age (Eisenberg, 1985; Fivush, 2001; Harley & Reese, 1999; Hudson, 1990).

Language provides a strong support in young children's organizing information and recalling, which they use to guide their behaviors subsequently. For example, children showed better performance in recalling events with maternal verbal help (e.g., Ratner, 1984; Rogoff, 1990). Further, representations of events were found to be constructed through conversations with people, mostly with parents (e.g., Fivush et al., 2006). These findings suggest that language helps children better store and manipulate information acquired in their exchanges with their environment, especially exchanges that involve daily interactions with their caregivers. It is suggested that communicative verbal exchanges with parents may help children better understand the time sequence of (attachment-related) events (e.g., separation-getting upset-reunion-being comforted-having fun together), emotion, and causality. Thus, parental verbal communication is likely to influence the ways children organize their attachment knowledge and behaviors.

## Maternal Language Use during Dyadic Exchanges at Early Childhood

Mothers are usually the main caregivers and spend more time with their children (e.g., Sayer et al., 2004; Craig, 2006). Mother-led verbal communication has captured researchers' attention with a major focus on maternal reminiscing; namely, mother-initiated dialogues about shared past events with their children (e.g., Fivush et al., 2006; Fivush & Fromhoff, 1988; Fivush, 2007; Nelson & Fivush, 2004) and how these dialogues contribute to children's socioemotional and cognitive development (e.g., Fivush et al., 2006). Maternal reminiscing with

their children starts at about 18-20 months of age. At this age, children provide little information and rely on their caregivers to provide most of the content and context for these conversations (Eisenberg, 1985; Harley & Reese, 1999; Hudson, 1990).

Research findings show that mothers have diverse reminiscing styles. The major individual differences on maternal reminiscing style reported are along the dimension of elaboration (Fivush & Fromhoff, 1988; Fivush, 2007; Nelson & Fivush, 2004). All mothers use elaborations, but they differ on the extent to which they elaborate, and the strategies they use for this purpose. Mothers who demonstrate a high elaborative style are defined by the extent of adding new information to the ongoing conversations through questions, statements, or feedback (Fivush et al., 2006). Highly elaborative mothers talk frequently about the past and discuss events in richly embellished ways, they continue to question their children about the past, give more and more details about what occurred with each question, even when their children do not recall any information. In contrast, less elaborative mothers ask fewer and more redundant questions, repeat the same questions over and over in an effort to prod their children to produce specific details about what occurred (Nelson & Fivush, 2004).

Common strategies adopted by highly elaborative mothers include the use of open-ended questions (e.g., *wh-* and *how* questions; Fivush & Wang, 2005; Reese & Brown, 2000) and elaborative statements in which the mother provides declarative comments that contain new information about the event (Reese & Brown, 2000; Coppola et al., 2014). Less elaborative mothers use close-ended questions that ask their children to either confirm or deny a piece of information provided by mother (e.g., *"Is it right?"*; Schröder et al., 2013; McDonnell et al., 2016); repetition in which a mother states the exact content of their previous utterance but

provides no new information (Reese et al., 1993; Wang et al., 2000); deflection in which mother asks the children to take the turn in talking but provides no new information, like "*What happened?*", "*Tell me more*" (Bauer et al., 2007).

Besides actively adding new information, highly elaborative mothers also provide a great deal of evaluative feedback to their children. They use evaluative language to encourage their children's participation and convey that their statements are valued (Fivush et al., 2006). Evaluative language provides explicit information about why an event was interesting, self-defining, emotional, and meaningful; it provides an opportunity to explore the more emotional and subjective aspects of an event. A variety of evaluative devices found adopted by mothers includes intensification ("It was *really* cold"), emphasis ("It *never* stopped"), confirmation ("*right*", or "*very good*"), modification ("It was a *bad* movie"), providing information about internal states ("*I was sad*"), and marking particular parts of an event as most important or meaningful in conversations or narratives (Haden et al., 1997; Haden, 1998; Wang et al., 2000).

Importantly, during the joint reminiscing process, highly elaborative mothers were found to adopt multiple strategies to establish a *shared narrative environment* with their children. Empirical findings show that highly elaborative mothers demonstrate a sense of story in their content of conversations (Nelson & Fivush, 2004). These mothers continue to tell another piece of the story until the entire episode is put together, even though their children contribute little to the emerging narratives. On the contrary, less elaborative mothers tend to repeat the same questions over and over and then simply switch topics when their children do not recall any information. There is not a clear sense of story in their reminiscing dialogues. By the end of the preschool years, highly elaborative mothers and their children are able to co-construct rich

stories of a shared experience, they weave in details and embellishments about what occurred, and create a coherent and complex shared narrative. However, for children with less elaborative mothers, the conversations remain in a question-and-answer format, with little attention to create a shared story of a shared past event (Nelson & Fivush, 2004).

Considering the different narrative environment provided by highly elaborative and less elaborative mothers, naturally, researchers questioned whether such joint conversational environment affects children's developmental outcomes. Past studies reported that maternal reminiscing style is important in predicting child social cognition and social-emotional development across multiple domains. In general, maternal elaborateness is associated with child advanced understanding of mind (e.g., Reese & Cleveland, 2006), advanced emotional understanding and mental state language (Rudek & Haden, 2005), more effective coping strategies and fewer behavioral problems during adolescence (Fivush & Sales, 2006; Sales & Fivush, 2005), and more coherent and consistent self-concept in later development (Welch-Ross et al., 1999; Bird & Reese, 2006).

Specifically, in social cognitive development, maternal reminiscing style is related to children's autobiographical memory and narrative memories (e.g., Waters et al., 2019; Nelson & Fivush, 2020; Fivush, 1991; Haden et al., 1997; Peterson & McCabe, 1992). For example, Waters and colleagues (2019) reported that maternal reminiscing style predicts child narrative memory concurrently and longitudinally. Also, mothers who adopt more elaborative strategies (e.g., use more orienting information, and ask more questions or provide information about when and where the event occurred) have children who produce more detailed and coherent narratives about the past (Haden et al., 1997; Peterson & McCabe, 1992); mothers who use more evaluative

strategies (e.g., evaluating emotional reactions and subjective stance of events) have children who include more evaluation in their own narratives later in life (Fivush, 1991; Haden et al, 1997). Even before children can fully participate in producing narratives, children of highly elaborative mothers indicate more interests and attention in reminiscing by confirming or repeating what the mother said (Harley & Reese, 1999).

## Maternal Language and Mother-Child Attachment Relationships

Although much of the work on maternal language is focused on the mnemonic consequences of maternal reminiscing, some researchers have proposed that maternal reminiscing is likely to be related to mother-child attachment relationships. Fivush and Vasudeva (2002) argued that the function of reminiscing is not only memory, but also the formation and maintenance of social-emotional bonds. In considering the social-emotional purpose of joint reminiscing, some researchers have investigated the associations between reminiscing and child attachment security. Indeed, research findings support such claim.

Mother-child dyads with securely attached children engage in open communication and integrate negative experiences with more positive ones (Bretherton, 1990; Main et al., 1985). Child security is associated with maternal elaborateness during reminiscing. Mothers of securely attached children were more elaborative during emotional talk with their 4-year-old children (Fivush & Vasudeva, 2002). In the same line, other studies suggest that mothers of securely attached children elaborate on past emotional experiences during reminiscing to a greater extent compared with mothers of insecurely attached children (e.g., Laible, 2004; Oppenheim et al., 1997). Furthermore, empirical evidence shows that mothers of securely attached children use more references to feelings when reminiscing about past emotional experiences (Laible &

Thompson, 2000; Raikes & Thompson, 2006), and are more likely to discuss negative emotions compared with mothers of insecurely attached children (Laible, 2004/2011).

Also, mothers of securely attached children show increasing use of elaboration over time (Newcombe & Reese, 2004) and are more likely to adjust to children's growing memory abilities over time by increasing their levels of elaborateness (Reese & Farrant, 2003). Mothers of insecurely attached children do not accommodate to children's increased responding during reminiscing (Newcombe & Reese, 2004).

Finally, use of evaluative language during reminiscing has been found to be significantly associated with child attachment security. Mothers of securely attached children increased the use of evaluative language during the preschool years, and their children also showed higher use of evaluative language compared to insecurely attached children as they grow older (Newcombe & Reese, 2004). In sum, parental elaborateness, emotional discussion and evaluative language use during reminiscing are reported to be associated with child attachment security (e.g., Adams et al., 1995; Bost et al., 2006; Coppola et al., 2014; Fivush et al., 2000; Fivush & Vasudeva, 2002; Haden et al., 1997; Newcombe & Reese, 2004; Reese & Farrant, 2003).

Because of the associations reported between maternal reminiscing style (i.e., elaborateness) and child attachment security, and because parental sensitivity is causally related to child security during infancy (Bakermans-Kranenburg et al., 2003), questions about the relations between maternal use of language and sensitivity arise. Are the two constructs related? Does each contribute uniquely to explaining security during early childhood, or is maternal elaborateness during reminiscing "simply" a developmentally appropriate manifestation of sensitivity during early childhood?

Sensitive mothers are attentive and appropriately responsive to children's needs and signals, and thus, may respond verbally in a more elaborative style compared with less sensitive mothers when reminiscing with their children. Moreover, it has been argued that sensitive parents adjust their contributions to their children's ability to engage in reminiscing conversations (Fivush et al., 2006). Research on this issue is scant and only a very limited number of studies have examined the association between maternal reminiscing and caregiving quality. Reese and colleagues reported that maternal sensitivity during infancy is the strongest predictor of mother-child reminiscing elaborateness about negative events at 3.5 years of age (Reese et al., 2019). Fondren and colleagues (2020) found that maternal sensitivity moderates the effect of maternal elaborative reminiscing on child language among maltreated 3-7 years old children. The scarcity of research on this issue calls for further study that is not limited to reminiscing style (i.e., elaborateness) and that, in addition, includes concurrent assessment of the constructs to explore their overlap and uniqueness, if any.

### Mother-Child Co-construction of Attachment-related Events during Early Childhood

As introduced earlier, maternal reminiscing plays an important role in helping children build understanding of their social world, emotions and attachment-related situations (e.g., Hsiao et al., 2015; Oppenheim et al., 2007; Thompson et al., 2003). Besides maternal sensitivity, maternal language may also play an important role in the development of children's attachment relationships and their attachment behavioral system[1]. However, previous studies on maternal language mostly focused on reminiscing about past events, without exploring other forms of mother-child conversations. Mother-child dyads not only discuss events of the past, but also talk

[1] Maternal language is argued to play a role in the structure of both internal representations and behavioral organization. Here, however, I am focused on the latter.

about expectations for future events, what to anticipate, how to respond, and potential emotions children might experience. Thus, attachment researchers (Posada & Waters, 2018) have suggested that not only reminiscing, but also mother-led joint discussions about attachment events may be important as attachment security is concerned.

Research presented in the previous section suggests that attachment figures use language that helps children understand and regulate emotions, and organize behaviors related to attachment events (e.g., separation, reunion, daily interactions). However, as pointed out by Lu, Posada, Trumbell, & Anaya (2018), past studies on parental talk and children's attachment security mainly used frequency counts of emotional words and/or elaborative strategies (e.g., open-ended questions; evaluative words; Fivush & Vasudeva, 2002; Laible, 2004) and few of them examined the structure of the conversations and the reasons why reference to feelings itself would be related to children's sense of security (Oppenheim et al., 2007).

To address pending questions about how maternal verbal communication contributes to the development of children's organization of secure base behavior, Posada and Waters (2018) suggested that maternal verbal input provides children with information about parent-child interactions. Specifically, those authors argued that discussions or conversations about attachment-related events provide children with information about the availability and response of attachment figures (e.g., Posada & Waters, 2018; Lu et al., 2018). Further, they suggested that these conversations offer an explanatory framework for such events and their accompanying emotions. As a result, maternal verbal exchanges are likely to influence both the content and organization of attachment related information and ultimately, children's secure base behavior and feelings of security.

Grounded on the notion that the developmentally ongoing parent-child co-determination process initiated in infancy is elaborated as children grow up, Posada and Waters (2018) proposed that such co-construction process expands to become increasingly verbal-representational during early childhood. The non-verbal, behavioral building blocks remain in play, but now new lines of communication enrich parent-child interactions and their secure base partnership. Based on previous findings and addressing research gaps, they proposed that parental verbal skills that play a significant role in children's organization of secure base behavior and feelings of security are concerned with caregivers' ability to (1) create a collaborative conversation/discussion atmosphere, a shared narrative environment, when talking about attachment-related issues, (2) promote children's elaboration during these discussions, and (3) support children's understanding of experiences by building causal links among critical aspects of attachment-related events. Such skills were termed "parental co-construction skills."

To date, one study has examined the relationships among maternal sensitivity, maternal co-construction skills, and child attachment security (Lu et al., 2018). In a longitudinal study, Lu and colleagues found that maternal sensitivity was significantly associated with maternal co-constructive skills at 3.5 years, and in turn, their skills at 3.5 years significantly predicted children's secure base behavior (i.e., security) concurrently and longitudinally at 5.5 years. In a second study, Apetroaia & Waters (2018) reported that maternal co-construction skills were significantly associated with children's secure base narrative representations at 4-5 years of age. They did not however, assess child secure base behavior, or maternal sensitivity. Thus, although exciting, findings concerning verbal co-construction skills are preliminary, requiring confirmation and further exploration using different samples that include a broader age range (e.g., children at different ages from the ones studied). In the current study, I investigate the

associations among mothers' co-construction skills, maternal sensitivity, and child security (inferred from the organization of child secure base behavior) in young preschoolers (2-3 years).

# RESEARCH QUESTIONS AND HYPOTHESE

Based on the previous considerations that underscore the (1) relevance of parents' role in helping children organize information, regulate emotion, and guide behaviors during attachment-related experiences, and (2) increasing importance of parent-child verbal communication in children's social cognition, and more specifically in children's attachment relationships during early childhood, the current study aims to answer the following questions: 1) Are maternal verbal co-construction skills associated with maternal sensitivity early in the preschool years (2-3 years)? 2) Do maternal verbal co-construction skills predict child attachment security early when children are 2-3 years old? 3) Do maternal co-constructive skills add unique information to the prediction of child security, above and beyond any contributions of maternal sensitivity?

Based on the literature and rationale presented, it is hypothesized that (1) maternal verbal co-construction skills are positively associated with maternal sensitivity early in the preschool years. Further, it is expected that (2) maternal co-constructive skills predict child attachment security at 2-3 years of age, and that (3) those skills add unique information to the prediction of child security after considering any contributions of maternal sensitivity at 2-3 years of age.

# METHOD

## Participants

This study is part of a larger research project on child-mother and child-father relationships. Flyers were posted in community preschools; recruitment information was also posted on local websites. 75 families with children 2-3 years old from the Greater Lafayette area were recruited for the Mother, Father, Toddler Study (IRB:1505016087). All recruited families completed the first section of this study (home visit and park visit), 59 out of 75 families completed all visits in current study. 13 families dropped out and didn't participate in the lab visit, and 3 families were excluded because the child refused to participate in the Joint-Story Telling task. In addition, 5 families were excluded for using non-English in the Joint-Story Telling Task. Thus, 21 families with missing data on the co-construction task were excluded for analysis, the final sample size is 54.

Among the 54 families, half of the sample was female (n=27), child age ranged from 23 to 37 months, with a mean at 29.1 months old. Children were 70.4% Caucasian (n=38), 1.9% African American (n=1), 1.9% Hispanic (n=1), 5.6% Asian (n=3), 18.5% were mixed race or ethnicity (n=10), and 1 family didn't answer. More than half of the children's primary caregiver was mother (63%, n=34), 3.7% of children's primary caregiver was father (n=2), 33.3% used both mother and father as primary caregiver (n=18). The majority of children were in good health (94.4%, n=51), 3 children had mild health conditions (5.6%). Less than half of the children were in daycare (n=22, 40.7%). For children who were in daycare, the mean hours per week was 29.64, ranging from 2-50 hours per week. Number of siblings ranged from 0 to 5, with

a mean of 1.4, and for children who had siblings, their order of birth ranged from 1 to 6, with a mean of 2.4. Almost all children were their mother's biological child, 1 child was adopted.

Mothers' age ranged from 23 to 46 years, with a mean age of 31.9 years. The majority of mothers were Caucasian (n=41), 7.4% were Hispanic (n=4), 1.9% African American (n=1), 9.3% Asian (n=5), and 5.6% were of mixed ethnicity (n=3). Maternal education ranged from 12-20 years, with a mean of 16 years. 44.4% (n=24) were stay-at-home mothers, 16.7% (n=9) worked half-time, and 38.9% (n=21) worked full-time. Almost all mothers were married (n=53); 1 mother cohabitated with her partner. The mean years of marriage was 7.5 years, ranging from 2.5-17 years. Family annual income ranged from U$9,000-220,000, with a mean income of U$64,700

**Table 1**

*Description of Demographical Variables*

| | N | Min | Max | Mean | SD |
|---|---|---|---|---|---|
| Child's Age(month) | 54 | 23.00 | 37.00 | 29.1481 | 4.03011 |
| Number of Siblings | 54 | 0.00 | 5.00 | 2.3947 | 1.35000 |
| Child's Birth Order | 54 | 1.00 | 6.00 | 1.3704 | 1.44333 |
| Mother's Age | 54 | 23.00 | 46.00 | 31.8519 | 5.21394 |
| Mother's Education | 54 | 12.00 | 20.00 | 15.9352 | 1.93295 |
| Years of Marriage | 54 | 2.50 | 17.00 | 7.5000 | 3.83381 |
| Family Income | 54 | 9,000 | 220,000 | 64,700 | 43,156.00 |

## Procedures

Families who were interested in the study contacted researchers through the email/phone number on the flyer. Detailed information about the study and procedures were explained to families. If the family still showed interest in participating, an initial home visit was scheduled.

The study included three visits for the mother, one home visit, one park visit, and one lab visit. Home and park visits were scheduled first, and the lab visit was scheduled as the last visit for this study. Home and park visits lasted around 90 minutes each; the lab visit lasted around 2 hours.

Family demographic information was obtained at the start of the home visit. During home visits, mothers and children were instructed to interact as they usually would on a daily basis; after about one hour, they were instructed to read a book together that was brought by the researchers. Three or four assistants observed mother-child interactions and after the visit, both mother's and child's behaviors were described independently by trained observers using the Maternal Behavior with Preschoolers Q-set (MBPQS) and the Attachment Q-Set (AQS), respectively. During the 90-minute park visit, mothers and children were instructed to play freely as they usually would and, as for the home visit, both mother and child's behaviors were observed and described by trained observers. Observers of maternal behavior were different from observers of child behavior. The lab visit lasted around 2 hours. Dyads first were instructed to complete a joint story telling task. In this task, each mother-child dyad was given four wordless books (except for the title for each book) and instructed to make up a story together based on the pictures in the books. Transcripts of maternal verbalizations were created and used to assess verbal co-construction skills.

When dyads completed the joint story telling task, they were instructed to play freely for 12-15 minutes; toys were provided for the free play. Subsequently, several child assessments were administered, while the mother was instructed to fill in a series of questionnaires. Mothers

were paid U$20 after each visit and children were given a book at the end of the lab visit as a token of appreciation for their participation.

## Measures

***Maternal Sensitivity***. Maternal caregiving behavior was described using the MBPQS (Posada et al., 2007) by trained observers both at home and at park. The MBPQS is a 90-item Q-set (Appendix A) that allows researchers to describe caregiving behavior germane to security outcomes in naturalistic settings during early childhood. Empirical support for the reliability and validity of the MBPQS has been reported (Posada et al., 2007, 2016, 2018). The MBPQS was completed after each visit by one or two observers who sorted the items along a continuum from least characteristic to most characteristic using a distribution of nine piles with 10 items each. Following Q methodology, observers first sorted the 90 items into three piles: characteristic, neither characteristic nor uncharacteristic, or uncharacteristic. The three piles were then subdivided into nine piles of 10 items each, ranging from 1 (most uncharacteristic) to 9 (most characteristic). The pile number in which items are placed determine the score for each item.

The mean reliability of observers' descriptions was above .70 (ranged .70-.92). Observers' descriptions were averaged into a Q-composite description. For each mother, a sensitivity score was computed by correlating her composite Q-description with the sensitivity criterion sort that describes the prototypically sensitive mother. A sensitivity score expresses the degree of correspondence (i.e., correlation) between a mother's description and the MBPQS criterion sort (Posada et al., 2007). Each mother's sensitivity score was used for analysis.

***Child Security.*** Child secure base behavior was described using the AQS (Waters, 1995) by trained observers both at home and at park. The AQS is a 90-item Q-set (Appendix B) that

allows researchers to describe children's secure base behaviors in naturalistic settings during early childhood. Validity and reliability of the AQS have been reported in various studies (e.g., van IJzendoorn et al., 2004; Posada et al., 1999, 2013).

The AQS was completed after each visit by one or two observers, following the same procedures as those described for the MBPQS. Observers sorted the items along a continuum from least characteristics to most characteristic using the same distribution of nine piles with 10 items each. Observers sorted the 90 items into three piles first: characteristic, neither characteristic nor uncharacteristic, or uncharacteristic. The three piles were later subdivided into nine piles with 10 items in each pile, ranging from 1 (most characteristic) to 9 (least characteristic). The pile number in which items are placed determined the score for each item.

Mean reliability of observers' descriptions was > .70 (ranged .70-.93). Observers' descriptions were averaged into a Q-composite description. For each child, a security score was computed by correlating her/his composite Q-description with the security criterion sort that describes the prototypical securely attached child. A security score expresses the degree of correspondence (i.e., correlation) between a child's description and the AQS criterion sort (Waters, 1995). Each child's security score was used for analysis.

***Maternal Co-Construction Skills.*** A joint story telling task was used to assess mothers' verbal co-construction skills (Posada & Waters, 2018). In the task, mother-child dyads were instructed to make up four stories together using four wordless books with picture prompts (see Appendix C for an example). Each story has a title and depicts a typical mother-child relationship scenario: "Can't sit on mommy's lap" (distress & open-ended resolution); "Mom and child go to the beach" (exploration); "Mommy comes home from the city" (reunion at

return); “Mommy doesn’t help child when finger gets stuck” (distress & open-ended resolution). In each book, there is a mother character and a child character; the child’s gender was matched with the child character in the story books. Every mother was instructed to help the child construct a story using the picture prompts. The pictures imply a simple storyline framing a beginning, middle, and end, leaving the details and any resolutions of the story line open-ended. Mother-child interactions during the task were videotaped and then transcribed verbatim.

Maternal verbal co-construction skills (*Creating a co-constructive atmosphere*; *Encouraging content elaboration; Supporting an explanatory framework)* were assessed using a modified rating system due to methodological concerns. The assessment of maternal co-construction skills is new and, consequently, its validity and development require additional research. As described above, only two studies have employed it and although results are in the expected direction and support its use, further work is needed. Questions remain about whether the assessment is applicable with younger children, and whether the three components included are equally salient in their associations with other relevant variables (e.g., child security).

Also, those studies scored maternal verbal co-construction skills by averaging scores in the three scales subsumed into the overall concept. Thus, the three aspects of maternal co-construction were equally weighted in their models, which might not necessarily reflect their importance. Creating a co-constructive atmosphere, encouraging content elaboration, and supporting an explanatory framework might contribute differently to maternal co-construction skills. Finally, the scoring of maternal verbal co-construction skills in the two existing studies was based on three 7-points scales that require a configurational approach to rating, which involves weighing simultaneously several aspects of maternal verbal communication. This

process of integrating several pieces of information into a single score could be challenging and is likely to increase measurement error, as coders need extensive expertise in this kind of assessment.

The three scales for assessing maternal verbal co-construction skills (*Creating a co-constructive atmosphere; Encouraging content elaboration; Supporting an explanatory framework*) using several items for each domain (Appendix D). There were 11 items describing maternal ability on "*Creating a co-constructive atmosphere* ", 7 items describing "*Encouraging content elaboration*" and 7 items describing "*Supporting an explanatory framework*". Items were scored on a 7-point Likert scale from uncharacteristic to characteristic of mother's behaviors while completing the task. Two trained coders read the transcription first and scored the items, they then watched the recorded video and modified their scores if needed. Internal consistency between coders was calculated using Cronbach's alpha (alpha= .92). Item scores were compared and discrepancies 2 points or greater were discussed. Scores from the two coders were averaged as the final scores. Maternal scores on each of the three scales were calculated by averaging the composite item scores for each scale. Exploratory Factor Analysis (EFA) was conducted among all the items for each maternal co-construction skill scale. The covariance matrix and principal component extraction indicated that item 5 "*Answers to child questions*" of the "*Encouraging content elaboration*" scale should be excluded (communality loading= .342, correlation coefficients with other items ranged from .465-.527). Thus, item average scores were recalculated by excluding item 5 from the "*Encouraging content elaboration*" scale.

## Analysis Strategy

SPSS version 23 and R version 16 software were used in data analysis. Descriptive and correlational analyses were conducted first, then, structural equation model was adopted for data analysis.

First, descriptive analyses were conducted for maternal sensitivity, child attachment security, maternal co-construction skills (Creating co-construction atmosphere; Encouraging content elaboration; Supporting an explanatory framework), child characteristics (age, gender, race/ethnicity), mother characteristics (age, education, occupation, caregiving status), and family annual income.

Second, T-test and correlational analyses were conducted to identify potential covariates. Those analyses were conducted to determine whether there were significant gender and race/ethnicity differences on maternal sensitivity, child attachment security and the three maternal co-construction skills. Correlations were examined among maternal sensitivity, child attachment security, and maternal verbal co-construction skills and child age, maternal age, maternal education, and family income.

Third, structural equation model was used to answer the three research questions. A confirmatory factor analysis was conducted to build the measurement model for maternal co-construction skills. The three co-construction scales were used as items measuring the maternal verbal co-construction skills latent variables. The covariance between the latent co-construction variable and maternal sensitivity was examined to answer research question one, whether maternal sensitivity is associated with maternal co-construction skills. To answer research question two, path analysis was adopted to examine the relationships between maternal verbal

co-construction skills and child attachment security, with child attachment security as the final outcome. To answer research question three, a path model was used to examine whether maternal verbal co-construction skills add any unique contribution in predicting child security above and beyond maternal sensitivity.

# RESULTS

## Preliminary Analyses

Comparison between dyads who completed participation (n = 54) and those who did not (n = 21) on demographic and central variables in the study were examined using T-test and ANOVA. No significant differences were found on child age and gender, mother's age, maternal education, maternal occupation (e.g., full-time, part-time, stay-at-home mother), family annual income, race/ethnicity, primary caregiver (e.g., mother, father, both mother and father), childcare situation, and years of marriage. Further, no significant differences were found on maternal sensitivity scores. However, a significant difference was found on child attachment security ($t = -2.316$, $df = 73$, $p = .023 < .05$), and a marginally significant difference was also found on child birth order ($t = -1.776$, $df = 53$, $p = .082 < .1$). Children from families that didn't participate in lab visit were found to have lower attachment security scores (mean = .36, SD = .17) compared with children from families that participated in lab visit (mean = .46, SD = .16). Children who did not participate in the final lab visit (mean = 1.56, SD = .96) ranked lower on birth order compared with children who participated in the lab visit (mean = 2.36, SD = 1.46).

Normality was examined for maternal sensitivity, child attachment security, and the three scales assessing maternal verbal co-construction skills using Q-Q plots, histograms, skewness and kurtosis for normality checking. Outliers above or below three standard deviations were examined, 1 child attachment security outlier, 2 maternal sensitivity outliers, 2 maternal ECE (*Encourage content elaboration*) outliers and 1 maternal SEF (*Support explanatory framework)* outlier were discovered and winsorized. Descriptive statistics for the five variables of interest are reported below in table 2.

**Table 2**

*Description of Child Attachment Security, Maternal Sensitivity, and Maternal Verbal Co-construction Skills*

| Variables | Mean | SD | Min. | Max. | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| Csecurity | .4565 | .15868 | -.02 | .71 | -.590 | .064 |
| Msensitivity | .7233 | .13132 | .26 | .84 | -2.487 | 8.759 |
| CCA | 4.4442 | .64788 | 2.90 | 5.60 | -.627 | -.033 |
| ECE | 4.4715 | .81248 | 1.99 | 5.60 | -1.442 | 2.261 |
| SEF | 3.900 | .64123 | 1.85 | 5.23 | -.611 | 1.112 |

Note. Msensitivity indicates maternal sensitivity, Csecurity indicates child attachment security, CCA indicates maternal ability to create co-construction atmosphere, ECE indicates maternal ability to encourage content elaboration, SEF indicates maternal ability to support explanatory framework.

T-test were conducted on maternal sensitivity, child attachment security and the three maternal co-construction skills to examine any effects of gender, race/ethnicity (Caucasian vs Non-Caucasian, daycare (yes vs no), and main caregiver (only mother vs other). Results (see Tables 3-6) indicated that there were not significant differences ($p < .05$) for any of the variables considered. There were not significant gender differences on child attachment security (t-value = 1.537, p =.130), maternal sensitivity (t-value = -1.058, p =.295), or, the three maternal verbal co-construction skills, including creating a co-constructive atmosphere (t-value = -.482, p = .632), encouraging child elaboration (t-value = .266, p = .792), and providing an explanatory framework (t-value = .824, p = .414). No significant differences were found between Caucasian and non-Caucasian children on child attachment security (t-value = .575, p = .568), maternal sensitivity (t-value = -.358, p = .722), and the three co-construction scales (t-value = -.073; .612; -.231, p = .942; .543; .819). Also, there were not significant differences in day care experience (daycare vs. no daycare) on child attachment security (t-value = .351, p = .727), maternal sensitivity (t-value = -.622, p = .537), and the three verbal co-construction skills (t-value = -.325; -.644; -.980, p = .746; .522; .331, respectively). Finally, there were not significant differences in

main caregiver (only mother vs. other) on child attachment security (t-value = -.316, p = .753), maternal sensitivity (t-value = 1.06, p = .294), and three co-construction skills (t-value = .392; .371; .382, p = .696; .712; .704, respectively).

**Table 3**

*Means, and Standard Deviation of Sensitivity, Security and Co-construction skills by Child Gender*

| | N | Csecurity | | Msensitivity | | CCA | | ECE | | SEF | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Female | 27 | .49 | .13 | .70 | .15 | 4.40 | .63 | 4.50 | .76 | 3.86 | .69 |
| Male | 27 | .42 | .18 | .74 | .11 | 4.49 | .67 | 4.44 | .87 | 3.72 | .60 |

Note. Msensitivity indicates maternal sensitivity, Csecurity indicates child attachment security, CCA indicates maternal ability to create co-construction atmosphere, ECE indicates maternal ability to encourage content elaboration, SEF indicates maternal ability to support explanatory framework.

**Table 4**

*Means, and Standard Deviation of Sensitivity, Security and Co-construction skills by Child Race/ethnicity*

| | N | Csecurity | | Msensitivity | | CCA | | ECE | | SEF | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Caucasian | 38 | .45 | .16 | .73 | .13 | 4.44 | .64 | 4.42 | .88 | 3.80 | .62 |
| non-Caucasian | 15 | .48 | .16 | .71 | .13 | 4.43 | .71 | 4.57 | .63 | 3.75 | .73 |

Note. Msensitivity indicates maternal sensitivity, Csecurity indicates child attachment security, CCA indicates maternal ability to create co-construction atmosphere, ECE indicates maternal ability to encourage content elaboration, SEF indicates maternal ability to support explanatory framework.

**Table 5**

*Means, and Standard Deviation of Sensitivity, Security and Co-construction skills by Daycare Situation*

| | N | Csecurity | | Msensitivity | | CCA | | ECE | | SEF | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Yes | 22 | .45 | .16 | .74 | .12 | 4.48 | .73 | 4.56 | .76 | 3.89 | .63 |
| No | 32 | .46 | .16 | .71 | .14 | 4.42 | .60 | 4.41 | .85 | 3.72 | .65 |

Note. Msensitivity indicates maternal sensitivity, Csecurity indicates child attachment security, CCA indicates maternal ability to create co-construction atmosphere, ECE indicates maternal ability to encourage content elaboration, SEF indicates maternal ability to support explanatory framework.

**Table 6**

*Means, and Standard Deviation of Sensitivity, Security and Co-construction skills by Main Caregiver*

| | N | Csecurity | | Msensitivity | | CCA | | ECE | | SEF | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Only Mom | 34 | .46 | .17 | .71 | .15 | 4.42 | .69 | 4.44 | .87 | 3.76 | .70 |
| Other | 20 | .45 | .14 | .75 | .09 | 4.49 | .59 | 4.53 | .72 | 3.83 | .55 |

Note. Msensitivity indicates maternal sensitivity, Csecurity indicates child attachment security, CCA indicates maternal ability to create co-construction atmosphere, ECE indicates maternal ability to encourage content elaboration, SEF indicates maternal ability to support explanatory framework.

Also, correlational analysis indicated that child age and number of hours spent in daycare were marginally significantly related to child attachment security at $p < .1$ level. The older children were, the higher their security scores; also, the more hours per week children spent in daycare, the lower their security scores. Maternal education was significantly related to maternal sensitivity; mothers with more years of education scored higher on maternal sensitivity. Maternal age approached significance in relation to mothers' ability to create a co-constructive atmosphere and support an explanatory framework, both at $p < .1$ level, with older mothers tending to score

higher on those abilities. The number of siblings in the household was marginally significantly related to maternal ability to create a co-constructive atmosphere and support an explanatory framework, both at $p < .1$ level; suggesting that the more siblings the children have (more children in the household), the higher the mothers scores on those abilities. None of the demographic variables were found to be significantly related to maternal ability to encourage content elaboration.

As the central variables are concerned, the three maternal co-construction skills scales were found to be significantly related to each other (Table 7). Maternal sensitivity was significantly associated with child security and, also, it was significantly associated with two maternal co-construction scales (*Creating a co-construction atmosphere* and *Supporting an explanatory framework*); it was not significantly associated with *Encouraging content elaboration*. Mothers who were more sensitive had more securely attached children, and, also, they scored higher in their ability to create a co-construction atmosphere and support and explanatory framework when co-constructing attachment-related stories with their children. Child attachment security was not significantly related to the maternal verbal co-construction skills scales. Correlational analyses are presented in Table 7.

**Table 7**

*Correlations of Demographic and Model Variables*

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.Msensitivity | - | | | | | | | | | |
| 2.Csecurity | .45** | - | | | | | | | | |
| 3.Cage | .00 | .31* | - | | | | | | | |
| 4.Mage | .09 | .13 | .12 | - | | | | | | |
| 5.Meducation | .35** | .10 | .04 | .10 | - | | | | | |
| 6.Income | .16 | -.11 | .00 | .30** | .41** | - | | | | |
| 7.Sibling | -.01 | .12 | .06 | .48** | -.24* | -.05 | - | | | |
| 8.Daycare | .01 | -.44* | -.23 | -.32 | -.03 | .25 | -.45 | | | |
| 9.CCA | .31** | .20 | .18 | .24* | .16 | .24 | .24* | -.30 | - | |
| 10.ECE | .16 | .07 | .15 | .22 | .15 | .23 | .22 | -.24 | .91** | - |
| 11.SEF | .33** | .19 | .20 | .26* | .07 | .26 | .26* | -.04 | .59** | .65** |

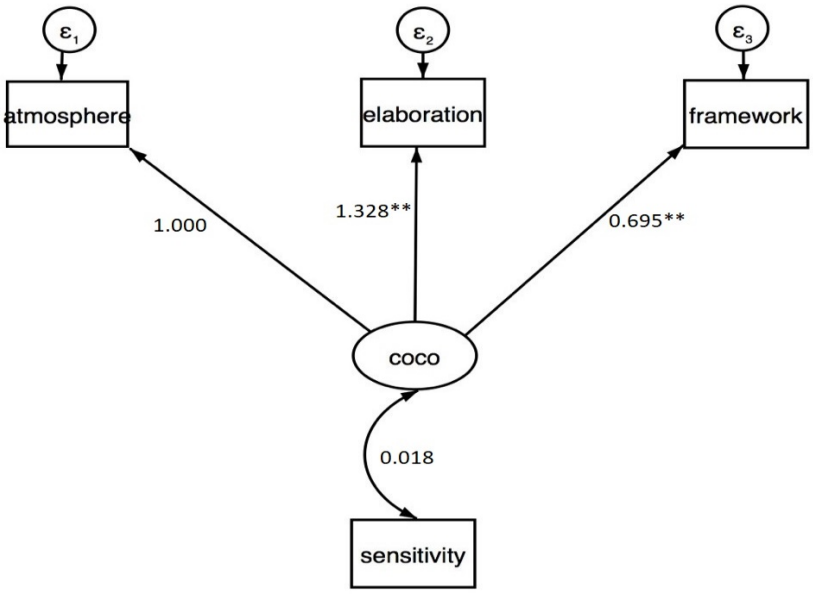
Note. Msensitivity indicates maternal sensitivity, Csecurity indicates child attachment security, Cage indicates child age in months, Mage indicates mother age in years, Meducation indicates maternal education in years, Income indicates family annual income in thousand dollar, Sibling indicates the number of child's siblings within the household, Daycare indicates number of hours in daycare per week, CCA indicates maternal ability to create co-construction atmosphere, ECE indicates maternal ability to encourage content elaboration, SEF indicates maternal ability to support explanatory framework. *p<.1, **p<.05, N=54.

## Main Analysis

A measurement model was estimated using the three scale means employed to assess maternal verbal co-construction skills (i.e., *Creating a co-constructive atmosphere*, *Encouraging content elaboration*, and *Supporting an explanatory framework*) as items to measure the latent variable "maternal co-construction skills." The factor loading for "Creating a co-constructive atmosphere" was constrained to 1, with the other two factor loadings unconstrained.

Based on the maternal co-construction skills measurement model just presented, three structural equation models were conducted to answer the research questions. Model 1 examined the covariance between the latent variable "maternal co-construction skills" and maternal sensitivity, and results are reported in Figure 5. Model fit showed $\chi^2$- = 138.675 (*df* = 6), *p* = .001, *CFI* = .914, *TLI* = .741, *RMSEA* = .325. Maternal sensitivity was not significantly related

to the latent variable maternal co-construction skills (*beta* = .018, *p* = .224). Research hypothesis 1 was not supported.

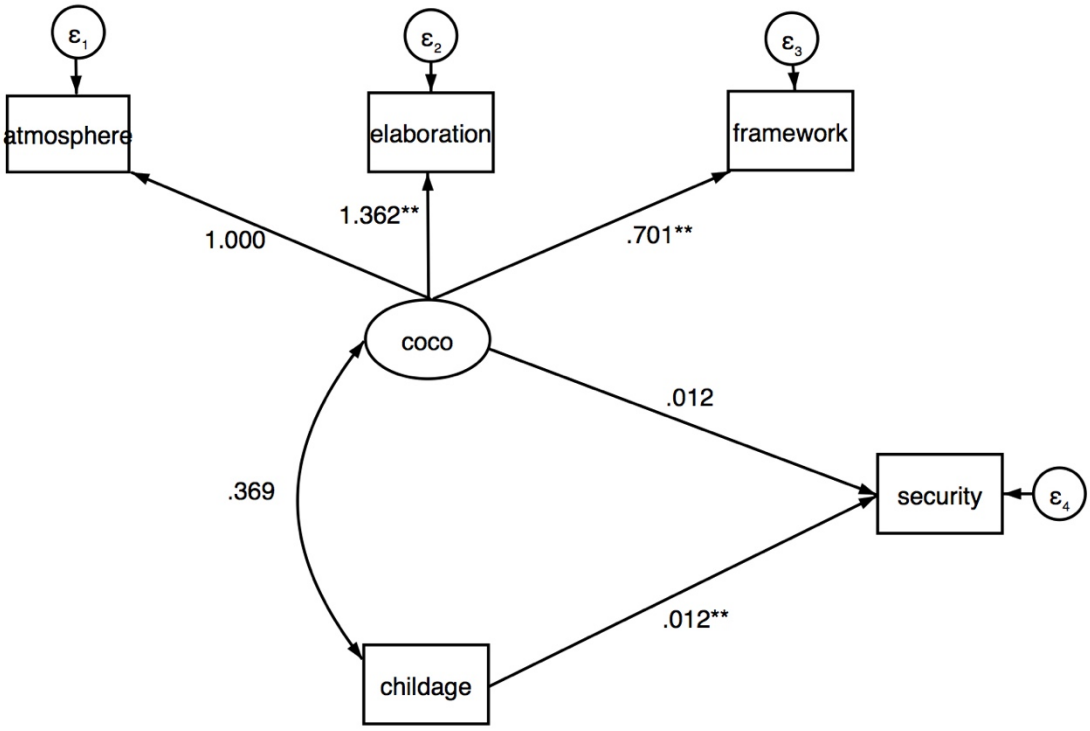



Note. CFI=.914, TLI=.741, RMSEA=.325, $\chi^2$-value=138.675 (df=6), p=.001, *p<.1, **p<.05

**Figure 1.** *Covariance Analysis for Maternal Sensitivity and Co-construction (Model 1)*

Model 2 examined the relationship between the latent variable "maternal co-construction skills" and child attachment security, using child security as the outcome, maternal co-construction skills and child age as the predictors. Covariance between latent co-construction variable and child age was examined but showed to be nonsignificant. Model 2 fit indexes showed $\chi^2$-value = 139.672, *df* = 10, *p* = .000, *CFI* = .958, *TLI* = .917, *RMSEA* = .141. Results indicated that maternal co-construction skills do not significantly predict child attachment security (*b* = .008, *p* = .834); thus, hypothesis 2 is not supported. Model 2 is reported in Figure 2.

**Figure 2**

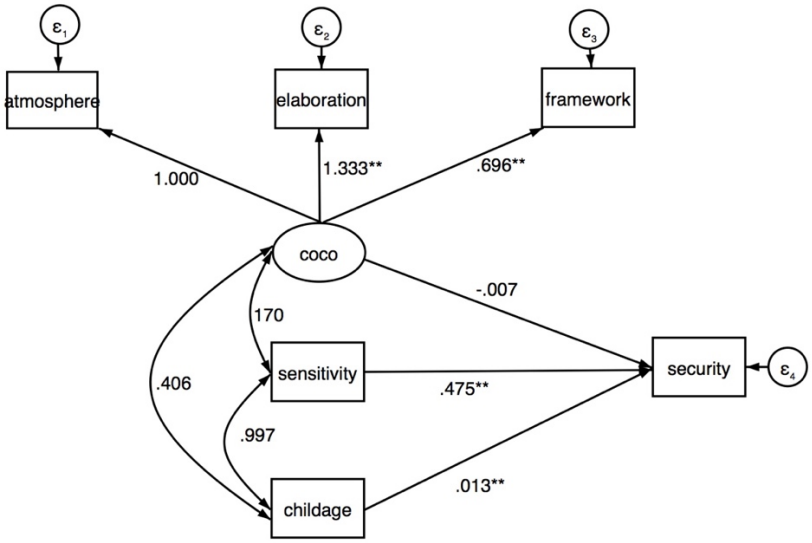



Note. $\chi^2$-value=139.672, df=10, p=.000, CFI=.960, TLI=.901, RMSEA=.154, *p<.1, **p<.05

**Figure 2.** *SEM of Maternal Co-construction in Predicting Child Security (Model 2)*

Model 3 addresses the third research question: do maternal co-construction skills add unique information to the prediction of child security, above and beyond any contribution of maternal sensitivity. Maternal co-construction skills, child age, and maternal sensitivity were used as predictors in this model to predict child attachment security, while maternal sensitivity and maternal co-construction was hypothesized to be related. Model indexes showed *CFI* = .925, *TLI* = .860, *RMSEA* = .160, $\chi^2$= 163.343 (*df* = 10), *p* = .00. Results indicated that maternal sensitivity significantly predicted child attachment security (*b* = .475, *p* = .000), child age was

also significant in predicting child attachment security ($b$ = .013, $p$ = .006). Covariances among predictors were controlled for. Model result indicated that maternal co-construction skills did not add any unique information to the prediction of child security ($b$ = -.007, $p$ = .818). Hypothesis 3 is not supported. Model 3 is reported in figure 3.




Note. $\chi^2$=163.343, df=15, p=.000, CFI=.922, TLI=.805, RMSEA=.189, *p<.1, **p<.05

**Figure 3.** *Full SEM Model (Model 3)*

However, low model fit indexes were shown in all three models, suggesting that models didn't not reproduce the mother-child attachment and co-construction data well, and that the variances in child attachment security cannot be fitted by proposed models ideally. Though all three hypotheses were not supported, it is possible that the proposed models are mis-specified, that variances on child attachment security were not well measured and explained by the proposed models.

# DISCUSSION

The purpose of the current study was to examine the role of maternal language input (i.e., maternal verbal co-construction skills) on mother-child attachment relationship among 2.5-year-old children. Specifically, this study aimed to answering three research questions: 1) Are maternal verbal co-construction skills associated with maternal sensitivity early in the preschool years (2-3 years)? 2) Do maternal verbal co-construction skills predict child attachment security early when children are 2-3 years old? 3) Do maternal verbal co-constructive skills add unique information to the prediction of child security, above and beyond any contributions of maternal sensitivity? Full SEM indicated that maternal co-construction skills were not significantly related to maternal sensitivity and did not significantly contribute information to the prediction of child secure base behavior (i.e., security) among 2-3 years old children. Although a significant association was not detected between maternal verbal co-construction skills and maternal secure base support behavior (i.e., sensitivity) using SEM, two of the maternal verbal co-constructive skills (*Creating co-constructive atmosphere* and *Supporting an explanatory framework*) were found to be significantly related to maternal sensitivity. Overall, results from this current study extend those from former research on maternal verbal co-construction skills and their relationship with mother-child attachment relationships, demonstrating that maternal language input may not start to play an important role on children's secure base behavior (i.e., security) until children are older (e.g., 4 years; Liu et al., 2018).

## Maternal Verbal Co-construction Skills and Maternal Sensitivity

Though a significant relationship between maternal co-construction skills and maternal sensitivity was not detected using Structural Equation Model, correlational analyses revealed

significant associations between 2 of the 3 component variables studied. Specifically, maternal sensitivity and mothers' verbal skills in creating a co-constructive atmosphere and supporting the creation of an explanatory framework during joint story-telling task were related. Mothers who showed higher sensitivity while interacting with children in naturalistic settings (e.g., home and playground) were found to score higher on their abilities to create a co-constructive atmosphere and support an exploratory framework when telling attachment related stories. However, maternal verbal ability to encourage content elaboration during a joint story-telling task was not found to be related to maternal sensitivity, though the confirmatory factory model showed high inter-consistency among the three scales. Such findings in conjunction with those reported by Liu and colleagues (2018) may suggest the potentially growing relationship between maternal sensitivity and the way mothers talk to their children about attachment-related events as children grow older. As argued in the literature review, research on maternal sensitivity and maternal language use is limited. Even though original attachment researchers argued for the importance of open communication in parent-child attachment relationships (e.g., Bowlby, 1969; Bretherton, 1990), there is a very limited number of studies on the issue. To the best of my knowledge, only three studies have examined the relationship between maternal sensitivity and maternal language (Lu et al., 2018; Reese et al., 2019; Foldren et al., 2020). Lu and colleagues (2018) reported a significant relationship between maternal verbal co-construction skills and maternal sensitivity among 3.5-year-old children; Reese and colleagues (2019) found maternal sensitivity to be the strongest predictor of maternal elaborative reminiscing among 26-month-old children; and Foldren and colleagues (2020) found that maternal sensitivity moderates the effect of maternal elaborative reminiscing on child language among maltreated 3-7 years old children. The current study and Reese et al's study were both conducted on similar age groups, and both studies

revealed the significant relationship between maternal sensitivity and maternal language use (i.e., *Creating a co-constructive atmosphere*; *Supporting an explanatory framework*) during mother-child interaction, suggesting that language communication may not only be an important aspect of parent-child interaction, but also a part of parental sensitivity. Parents who are more attentive and more responsive to child needs, and who are more accurate in interpreting those needs, are likely to be more able to focus on child communications and signals during conversations. Sensitive parents in the current study were also more attentive and skillful in creating a co-constructive atmosphere for children to join in attachment-related verbal exchanges, and in providing emotional references and an overall framework that made it easier for their children to comprehend the story being put together. Importantly, both Lu et al and Reese et al's articles found an effect size close to the correlational effect size found in the current study.

It is also important to note that the maternal ability to encourage content elaboration (ECE) has the highest factor loading among the three co-construction scales in the co-construction latent measurement model, and maternal ECE was the only scale that wasn't significantly related to maternal sensitivity. Though the internal consistency among the three scales was high, it is possible that the heavy loading of maternal ECE led to the nonsignificant results about the association between the latent variable "maternal verbal co-construction skills" and maternal sensitivity.

### Maternal Co-construction and Child Attachment Security

Notably, this study did not reveal an association between children's attachment security and maternal language input among 2-3 years old children. The absence of an association may not be surprising, given that past research has mainly been conducted with older preschoolers.

This may suggest that the effect of maternal language input on child attachment security is a developmental and age-sensitive process. The link between attachment security and verbal communication was suggested based on both Vygotsky's social-cultural theory and Bowlby's explicit theory about parent-child communication processes. In Bowlby's original work, he noted the importance of open and fluent communication between parent-child in the formation of attachment relationships and internal working models (i.e., representations of attachment figures, self, and the attachment relationship; Bowlby, 1969). After Bowlby, Bretherton argued that secure attachment relationships are associated with more open and fluent parent-child communication, which culminate in children's attachment-related representations, and parent-child communication was hypothesized to guide children's behaviors towards attachment figures (Bretherton, 1990; 1991; 1993; 1996).

Several studies established the relationship between maternal verbal communication and child attachment security among older preschoolers. For example, Fivush and Vasudeva (2002) found the association between maternal elaborateness and child attachment security among 4-year-olds, which is in line with Laible's (2004/2011) findings among 3-5- and 4.5-years old children. In the same line, Laible and Thompson (2000) found an association between maternal references to feelings and child attachment security in 4-year-olds. Finally, Etzion-Carasso and Oppenheim (2000) found a relationship between attachment security in 1-year-olds and maternal communication openness when children were 4 years old. Research on maternal verbal co-construction skills is new and scant. Thus, only one study (Lu et al., 2018) has investigated the relation between such skills and child security and with older preschoolers (i.e., 3.5-5.5 years old children). Those researchers reported a significant relationship between the constructs.

To my knowledge, the only published article that did not reveal a significant association between maternal language input and child attachment security was a longitudinal study in which child attachment security was assessed at 15 months of age and maternal reminiscing was assessed when children were 26 months old (Reese et al., 2019). That study and the current one are the only studies conducted with children younger than 3 years of age, suggesting that the effect of maternal language on child attachment security might be developmentally sensitive, and maternal verbal skills may not start influencing child attachment behavior until later years.

If that is the case, it is possible that such a developmentally sensitive effect is based on children's cognitive development. As argued by Piaget, children symbolic representations begin to show in earnest at roughly 24 months old (Piaget, 1967), and the ability to use representational thoughts is closely connected to childrens' use of language (Piaget & Inhelder, 1969). Though language was found to be a strong support to help young children recall information, developmental cognitive psychologists have found that children cannot benefit from verbal description of events in memory recall at 24 months of age; it is not until about 36 months of age that verbal clues can activate event memories (e.g., Hudson & Shapiro, 1991; Hudson & Sheffield, 1998). What is more, though parents generally start reminiscing with children at about 18-20 months of age, children won't provide much information in reminiscing until 12 months later, and their contribution tends to be fragmentary and brief (Eisenberg, 1985; Hudson, 1990; Fivush, 2001). Thus, attachment related information provided by parents may not be related to children's secure base behavior until later in the preschool years.

## Limitations and Future Directions

Findings from the current study are based on a small sample recruited from the Great Lafayette area, with some of the participating families being graduate students from a local university; this led to the above average maternal education, but below average family income. Thus, conclusions from the current study may be more applicable to educated middle-class families; and social economic status from the current sample may not be representative of the overall US population. Significant difference was found on child attachment security between participants included for data analysis and participants excluded for data analysis. The mean child attachment security of excluded participants was lower compared with included participants; thus, the exclusion of partial data may lead to the under-representation of current dataset. Moreover, the path effect sizes between latent maternal co-construction and child attachment security in proposed models (model 2 and model 3) were low, the covariance between latent maternal co-construction and maternal sensitivity was small (model 1 and model 3), also suggesting the current theoretical models didn't fit the data well.

Additionally, the small sample (N=54) reduced statistical power. Only 54 out of 75 families had maternal co-construction data, which decreased the probability of finding significant differences (if they were present). Thus, a larger sample with a more diverse social and economic range, and race/ethnicity background is recommended for future studies.

The measurement of maternal verbal co-construction skills is another potential limitation in the current study. Both the joint story-telling task and the co-construction coding scheme were modified due to age considerations. In the original joint story-telling task, the four attachment-related stories were presented on four panels that are placed facing the mother-child dyad;

however, in the modified task, the four stories were presented on wordless books that were given to the mother-child dyad directly. What is more, the original co-construction coding scheme consisted of three scales that measure the overall maternal ability on creating a co-constructive atmosphere, encouraging content elaboration, and supporting explanatory framework, while the current coding scheme broke each scale into several items, and the overall scale scores were the average of items within the scale. It is possible that the measurement modification affected our findings compared to those of Lu and colleagues (2018), in which both the original task and coding scheme were used. Thus, it is suggested that more research is conducted to examine the reliability and validity of the modified task and coding scheme.

Besides measurement modification as a potential limitation, it is also suggested that the environment of maternal co-construction data collection is another potential influencing factor. Both maternal sensitivity and child attachment security scores were collected in naturalistic settings (e.g., home and park), while the maternal co-construction data was obtained in a laboratory setting. The daily mother-child verbal interaction happens in naturalistic settings and knowing that they were being filmed may have influenced mother's participation in the joint story-telling task. Thus, it is suggested that future studies consider collecting maternal co-construction skills data in naturalistic settings as well.

Further, the influence of maternal verbal co-construction skills on child attachment security might be developmentally sensitive and, also, it is possible that child characteristics influence the way mothers co-construct with their children. For example, child temperament was found to be related to maternal elaborative reminiscing (e.g., Bird et al., 2006; Lewis, 1999). Thus, it is possible that child characteristics such as temperament play roles in the dyad's co-

constructive process; mothers may put more effort and adopt more strategies to co-construct with children who are more interested, persistent, sociable, and active, and thus child characteristics may moderate how maternal verbal skills affect child attachment security as outcome. Therefore, it is suggested that future studies include variables concerned with child characteristics such as temperament, verbal ability, and memory, as well as maternal characteristics such as verbal ability, depression, and attachment security to examine their potential influences. Lastly, it is also possible that the link between attachment security and maternal verbal co-construction skills is a reciprocal-influence process, such that securely attached children are more open and willing to participate in joint storytelling, ask more questions, and respond to mothers more frequently and positively, resulting in mothers putting more efforts in joint co-construction process. Thus, longitudinal factor-actor model designs need to be considered in the future to examine the bi-directionality of mother-child exchanges.

Finally, although the current study did not find gender differences or race/ethnicity differences in maternal co-constructive skills, cultural and contextual differences may moderate the influence of parental verbal input as illustrated by previous findings. Thus, Fivush and colleagues (2003) found that parents were more elaborative with daughters as compared with sons (e.g., Fivush et al., 2003). Yet, Melzi and Fernandez (2004), found that Peruvian middle-class mothers were more elaborative with sons as compared with daughters. Also, Western middle-class mothers have been found to be more elaborative compared with mothers from non-Western culture (e.g., Hayne & Macdonald, 2003; Mullen & Yi, 1995; Leichtman et al., 2003; Wang, 2001). Considering the small sample size and reduced diversity of the participating dyads in the current study, future studies with larger and more diverse samples are recommended.

# CONCLUSION

The main aim of this study was to examine the role of maternal language input in the mother-child attachment relationship early in the preschool years (e.g., 2-3 years old). Findings replicated the significant association between maternal sensitivity and the organization of children's secure base behavior. Also, results suggested that early in the preschool years, the latent variable assessing maternal language input is not related to maternal sensitivity or attachment security. Yet, findings also indicate that mothers' verbal skills in creating a co-constructive atmosphere and providing explanatory frameworks during attachment-related conversations may warrant further study. The use of longitudinal designs and larger and more diverse groups is also necessary to investigate the developmental relevance of maternal co-constructive skills.

# REFERENCES


Adams, S., Kuebli, J., Boyle, P., & Fives, R. (1995). Gender differences in parent–child conversations about past emotions: A longitudinal investigation. *Sex Roles, 33*, 309–323.

Ainsworth, M. D. S. (1967). *Infancy in Uganda: infant care and the growth of love*. Johns Hopkins Press.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. F. (1974). Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), *The integration of a child into a social world* (pp. 99–135). Cambridge University Press.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation.* Lawrence Erlbaum.

Apetroaia, A., & Waters, H. S. (2018). Intergenerational transmission of secure base script knowledge: The role of maternal co-construction skills. *Monographs of the Society for Research in Child Development*, *83*(4), *91-105.*

Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological bulletin*, *129*(2), 195–215.

Bauer, P. J., Burch, M. M., Van Abbema, D. L., & Ackil, J. K. (2007). Talking about twisters: Relations between mothers' and children's contributions to conversations about a devastating tornado. *Journal of Cognition and Development, 8*(4), 371–399.

Bird, A., & Reese, E. (2006). Emotional reminiscing and the development of an autobiographical self. *Developmental Psychology, 42*(4), 613–626.

Bird, A., Reese, E., & Tripp, G. (2006). Parent–child talk about past emotional events: Associations with child temperament and goodness-of- fit. *Journal of Cognition and Development*, *7*, 189–210.

Bost, K. K., Shin, N., McBride, B. A., Brown, G. L., Vaughn, B. E., Coppola, G., Verissimo, M., Menteiro, L., Korth, B. (2006). Maternal secure base scripts, children's attachment security, and mother-child narrative styles. *Attachment & Human Development, 8*(3), 241-260.

Bowlby, J. (1969/1982). *Attachment and loss: Vol. 1. Attachment*. New York, NY: Basic Books.

Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation*. New York, NY: Basic Books.

Bowlby, J. (1980). *Attachment and loss: Vol. 3. Loss*. New York, NY: Basic Books.

Bowlby, J. (1988). *A secure base: Parent-child attachment and healthy human development.* Basic Books.

Bowlby, J. (1991). Ethological light on psychoanalytical problems. In P. Bateson (Ed.), *The development and integration of behavior: Essays in honor of Robert Hinde* (pp. 301–313). Cambridge University Press.

Bretherton, I. (1990). Open communication and internal working models: Their role in the development of attachment relationships. In R. A. Thompson (Ed.), *Nebraska Symposium on Motivation: Vol. 36. Socioemotional development* (pp. 59–113). Lincoln: University of Nebraska Press.

Bretherton, I. (1991). Pouring new wine into old bottles: The social self as internal working model. In M. R. Gunnar & L. A. Sroufe (Eds.), *Self-processes and development* (pp. 1–41). Lawrence Erlbaum Associates, Inc.

Bretherton, I. (1993). From dialogue to internal working models: The co-construction of self in relationships. In C. A. Nelson (Ed.), *Memory and affect in development* (pp. 237–263). Lawrence Erlbaum Associates, Inc.

Bretherton, I. (1996). Internal working models of attachment relationships as related to resilient coping. In G. G. Noam & K. W. Fischer (Eds.), *Development and vulnerability in close relationships* (pp. 3–27). Lawrence Erlbaum Associates, Inc.

Coppola, G., Ponzetti, S., & Vaughn, B. E. (2014). Reminiscing style during conversations about emotion-laden events and effects of attachment security among Italian mother–child dyads. Social Development, 23(4), 702–718.

Cassidy, J., & Shaver, P. R. (Eds.). (2008). *Handbook of attachment: Theory, research, and clinical applications (2nd ed.).* The Guilford Press.

Craig, L. (2006). Does father care mean fathers share?: A comparison of how mothers and fathers in intact families spend time with children. *Gender & Society, 20*(2), 259–281.

De Wolff, M, S., & van IJzendoorn, M, H. (2006). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development*, *68*(4), 571-591.

Dykas, M. J., & Cassidy, J. (2011). Attachment and the processing of social information across the life span: Theory and evidence. *Psychological Bulletin, 137*(1), 19-46.

Eisenberg, A. (1985). Learning to describe past experience in conversation. *Discourse Processes*, *8*, *177*–204.

Etzion-Carasso, A., & Oppenheim, D. (2000). Open mother–preschooler communication: Relations with early secure attachment. *Attachment & Human Development*, *2*(3), 347–370.

Fivush, R., & Fromhoff, F. A. (1988). Style and structure in mother-child conversations about the past. *Discourse Processes, 11*(3), 337–355.

Fivush, R. (1991). Gender and emotion in mother-child conversations about the past. *Journal of Narrative & Life History*, *1*(4), 325–341.

Fivush, R., Brotman, M., Buckner, J. P., & Goodman, S. (2000). Gender differences in parent–child emotion narratives. *Sex Roles*, *42*, 233–254.

Fivush, R. (2001). Owning experience: The development of subjective perspective in autobiographical memory. In C. Moore & K. Lemmon (Eds.), *The self in time: Developmental perspectives* (pp. 35–52). NJ: Erlbaum.

Fivush, R., & Vasudeva, A. (2002). Remembering to relate: Socioemotional correlates of mother-Child reminiscing. *Journal of Cognition and Development*, *3*(1), 73-90.

Fivush, R., Hazzard, A., Sales, J., Sarfati, D., & Brown, T. (2003). Creating coherence out of chaos? Children's narratives of emotionally positive and negative events. *Applied Cognitive Psychology*, *17*(1), 1-19.

Fivush, R., & Wang, Q. (2005). Emotion talk in mother-child conversations of the shared past: The effects of culture, gender, and event valence. *Journal of Cognition and Development, 6*(4), 489–506.

Fivush, R., Reese, E., & Haden, C. A. (2006). Elaborating on elaborations: Role of maternal reminiscing style in cognitive and socioemotional development. *Child Development, 77*(6), 1568–1588.

Fivush, R., & Sales, J. M. (2006). Coping, attachment, and mother-child narratives of stressful events. *Merrill-Palmer Quarterly, 52*(1), 125–150.

Fivush, R. (2007). Maternal reminiscing style and children's developing understanding of self and emotion. *Clinical Social Work Journal, 35*(1), 37–46.

Fondren, K., Speidel, R., McDonnell, C. G., & Valentino, K. (2020). Elaborative reminiscing and child receptive language in the context of maltreatment: The moderating role of maternal sensitivity. *Child Maltreatment*, *25*(4), 478–487.

Haden, C., Haine, R., & Fivesh, R. (1997). Developing narrative structure in parent–child reminiscing across the preschool years. *Developmental Psychology, 33,* 295–307.

Haden, C. A. (1998). Reminiscing with different children: Relating maternal stylistic consistency and sibling similarity in talk about the past. *Developmental Psychology, 34*(1), 99–114.

Harley, K., & Reese, E. (1999). Origins of autobiographical memory. *Developmental Psychology*, *35*, 1338–1348.

Hayne, H., & MacDonald, S. (2003). The socialization of autobiographical memory in children and adults: The roles of culture and gender. In R. Fivush & C. A. Haden (Eds.), *Autobiographical memory and the construction of a narrative self: Developmental and cultural perspectives* (pp. 99–120). Lawrence Erlbaum Associates Publishers.

Hsiao, C., Koren-Karie, N., Bailey, H., & Moran, G. (2015). It takes two to talk: Longitudinal associations among infant-mother attachment, maternal attachment representations, and mother-child emotion dialogues. *Attachment & Human Development*, *17*(1), 43–64.

Hudson, J. A. (1990). The emergence of autobiographic memory in mother– child conversation. In R. Fives & J. A. Hudson (Eds.), *Knowing and remembering in young children* (pp. 166–196). Cambridge University Press.

Hudson, J. A., & Shapiro, L. R. (1991). From knowing to telling: The development of children's scripts, stories, and personal narratives. In A. McCabe & C. Peterson (Eds.), *Developing narrative structure* (pp. 89–136). Lawrence Erlbaum Associates, Inc.

Hudson, J. A., & Sheffield, E. G. (1998). Déjà vu all over again: Effects of reenactment on toddlers' event memory. *Child Development*, *69*(1), 51–67.

Laible, D. J., & Thompson, R. A. (2000). Mother–child discourse, attachment security, shared positive affect, and early conscience development. *Child Development, 71*(5), 1424–1440.

Laible, D. (2004). Mother-child discourse in two contexts: Links with child temperament, attachment security, and socioemotional competence. *Developmental Psychology*, *40*(6), 979–992.

Laible, D. (2011). Does it matter if preschool children and mothers discuss positive vs. negative events during reminiscing? Links with mother-reported attachment, family emotional climate, and socioemotional development. *Social Development*, *20*(2), 394–411.

Leichtman, M. D., Wang, Q., & Pillemer, D. B. (2003). Cultural variations in interdependence and autobiographical memory: Lessons from Korea, China, India, and the United States. In R. Fivush & C. A. Haden (Eds.), *Autobiographical memory and the construction of a narrative self: Developmental and cultural perspectives* (pp. 73–97). Lawrence Erlbaum Associates Publishers.

Lewis, K. D. (1999). Maternal style in reminiscing: Relations to child individual differences. *Cognitive Development*, *14*, 381–399.

Lu, T., Posada, G., Trumbell, J. M., & Anaya, L. (2018). Maternal sensitivity and co-construction skills: Concurrent and longitudinal association with preschoolers' secure base behavior. *Monographs of the Society for Research in Child Development*, *83*(4), 74-90.

Main, M., Kaplan, K., & Cassidy, J. (1985). Security in infancy, childhood and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development, 50*(1/2), 66–104.

Marvin, R. S., & Britner, P. A. (2008). Normative development: The ontogeny of attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 269–294). The Guilford Press.

McDonnell, C. G., Valentino, K., Comas, M., & Nuttall, A. K. (2016). Mother-child reminiscing at risk: Maternal attachment, elaboration, and child autobiographical memory specificity. *Journal of Experimental Child Psychology*, *143*, 65–84.

Melzi, G., & Fernández, C. (2004). Talking about past emotions: Conversations between Peruvian mothers and their preschool children. *Sex Roles: A Journal of Research*, *50*(9-10), 641–657.

Mullen, M. K., & Yi, S. (1995). The cultural context of talk about the past: Implications for the development of autobiographical memory. *Cognitive Development*, *10*(3), 407–419.

Nelson, K., & Fivesh, R. (2004). The Emergence of autobiographical memory: A Social cultural developmental theory. *Psychological Review*, *111*(2), 486–511.

Nelson, K., & Fivush, R. (2020). The Development of autobiographical memory, autobiographical narratives, and autobiographical consciousness. *Psychological Reports*, *123*(1), 71–96.

Newcombe, R., & Reese, E. (2004). Evaluations and orientations in mother-child narratives as a function of attachment security: A longitudinal investigation. *International Journal of Behavioral Development*, *28*(3), 230-245.

Oppenheim, D., Nir, A., Warren, S., & Emde, R. N. (1997). Emotion regulation in mother-child narrative co-construction: Associations with children's narratives and adaptation. *Developmental psychology*, *33*(2), 284–294.

Oppenheim, D., Koren-Karie, N., & Sagi-Schwartz, A. (2007). Emotion dialogues between mothers and children at 4.5 and 7.5 years: Relations with children's attachment at 1 year. *Child Development*, *78*(1), 38-52.

Peterson, C., & McCabe, A. (1992). Parental styles of narrative elicitation: Effect on children's narrative structure and content. *First* Language, *12*, 299 –321.

Piaget, J. (1967). *On the development of memory and identity*. Worcester, Clark University Press.

Piaget, J., & Inhelder, B. (1969). *The psychology of the child*. New York, NY: Basic Books.

Posada, G., Gao, Y., Wu, F., Posada, R., Tascon, M., Schöelmerich, A., Sagi, A., Kondo-Ikemura, K., Haaland, W., Synnevaag, B., & Schoelmerich, A. (1995). The secure-base phenomenon across cultures: Children's behavior, mother's preferences, and experts' concepts. *Monographs of the Society for Research in Child Development*, *60*(2-3), 27–48.

Posada, G., Jacobs, A., Carbonell, O. A., Alzate, G., Bustamante, M. R., & Arenas, A. (1999). Maternal care and attachment security in ordinary and emergency contexts. *Developmental Psychology, 35*(6), 1379–1388.

Posada, G., Kaloustian, G., Richmond, M, K., & Moreno, A, J. (2007). Maternal secure base support and preschoolers' secure base behavior in natural environment. *Attachment & Human Development*, *9*(4), 393-411.

Posada, G., Lu, T., Trumbell, J., Kaloustian, G., Trudel, M., Plata, S., Peña, P., Perez, J., Tereno, S., Dugravier, R., Coppola, G., Costantini, A., Cassiba, R., Kondo-Ikemura, K., Noblega, M., Haya, M. I., Pedraglio, C., Verissimo, M., Santos, A. J., Monteiro, L., & Lay, K. L. (2013). Is the secure base phenomenon evident here, there, and anywhere? A cross-cultural study of child behavior and experts' definitions. *Child Development*, *84*, 1896-1905.

Posada, G., Trumbell, J., Noblega, M., Plata, S., Peña, P., Carbonell, O. A., & Lu, T. (2016). Maternal sensitivity and child secure base use in early childhood: Studies in different cultural contexts. *Child Development*, *87*(1), 297–311.

Posada, G. E., Trumbell, J. M., Lu, T., & Kaloustian, G. (2018). The organization of attachment behavior in early childhood: Links with maternal sensitivity and child attachment representations. *Monographs of the Society for Research in Child Development*, *83*(4), 35–59.

Posada, G., & Waters, H. S. (2018). Measures: Secure base behavior, co-construction, and attachment scripts. *Monographs of the Society for Research in Child Development*, *83*(4), 22-34.

Raikes, H. A., & Thompson, R. A. (2006). Family emotional climate, attachment security and young children's emotion knowledge in a high-risk sample. *British Journal of Developmental Psychology*, *24*(1), 89–104.

Ratner, H. H. (1984). Memory demands and the development of young children's memory. *Child Development*, *55*(6), 2173–2191.

Reese, E., Haden, C. A., & Fivush, R. (1993). Mother-child conversations about the past: Relationships of style and memory over time. *Cognitive Development, 8*(4), 403–430.

Reese, E., & Brown, N. (2000). Reminiscing and recounting in the preschool years. *Applied Cognitive Psychology, 14*(1), 1–17.

Reese, E., & Farrant, K. (2003). Social origins of reminiscing. In R. Fives & C. A. Haden (Eds.), *Autobiographical memory and the construction of a narrative self: Developmental and cultural perspectives* (pp. 29–48). Lawrence Erlbaum Associates Publishers.

Reese, E., & Cleveland, E. S. (2006). Mother-child reminiscing and children's understanding of mind. *Merrill-Palmer Quarterly*, *52*(1), 17–43.

Reese, E., Meins, E., Fernyhough, C., & Centifanti, L. (2019). Origins of mother-child reminiscing style. *Development and Psychopathology*, *31*(2), 631–642.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context.* Oxford University Press.

Rudek, D. J., & Haden, C. A. (2005). Mothers' and preschoolers' mental state language during reminiscing over time. *Merrill-Palmer Quarterly*, *51*(4), 523+.

Sales, J. M., & Fivush, R. (2005). Social and emotional functions of mother-child reminiscing about stressful events. *Social Cognition*, *23*(1), 70–90.

Sayer, L., Bianchi, S., & Robinson, J. (2004). Are parents investing less in children? Trends in mothers' and fathers' time with children. *American Journal of Sociology*, *110*(1), 1-43.

Schröder, L., Keller, H., Kärtner, J., Kleis, A., Abels, M., Yovsi, R. D., Chaudhary, N., Jensen, H., & Papaligoura, Z. (2013). Early reminiscing in cultural contexts: Cultural models, maternal reminiscing styles, and children's memories. *Journal of Cognition and Development*, *14*(1), 10–34.

Thompson, R, A. (2000). The legacy of early attachments. *Child Development*, *71*(1), 145-152.

Thompson, R. A., Laible, D. J., & Ontal, L. L. (2003). Early understanding of emotions, morality, and self: Developing a working model. *Advanced Child Developmental Behavior*, *31*, 137-171.

van IJzendoorn, M. H., Vereijken, C. M., Bakermans-Kranenburg, M. J., & Riksen-Walraven, J. M. (2004). Assessing attachment security with the Attachment Q Sort: Meta-analytic evidence for the validity of the observer AQS. *Child Development*, *75*(4), 1188–1213.

Verhage, M. L., Schuengel, C., Madigan, S., Fearon, R., Oosterman, M., Cassibba, R., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2016). Narrowing the transmission gap: A synthesis of three decades of research on intergenerational transmission of attachment. *Psychological Bulletin*, *142*(4), 337–366.

Vygotsky, L. S. (1978). *Mind and society.* Harvard University Press.

Wang, Q., Leichtman, M. D., & Davies, K. I. (2000). Sharing memories and telling stories: American and Chinese mothers and their 3-year-olds. *Memory*, *8*(3), 159–177.

Wang, Q., & Fivush, R. (2005). Mother–child conversations of emotionally salient events: Exploring the functions of emotional reminiscing in Euro- pean-American and Chinese families. *Social Development*, *14*, 473–495.

Waters, E., Kondo-Ikemura, K., Posada, G., & Richters, J. E. (1991). Learning to love: Mechanisms and milestones. In M. R. Gunnar & L. A. Sroufe (Eds.), *The Minnesota symposia on child psychology, Vol. 23. Self-processes and development* (pp. 217–255). Lawrence Erlbaum Associates.

Waters, E. (1995). Appendix A: The Attachment Q-Set (Version 3.0). *Monographs of the Society for Research in Child Development*, *60*(2/3), 234-246.

Waters, T. E. A., Camia, C., Facompré, C. R., & Fivush, R. (2019). A meta-analytic examination of maternal reminiscing style: Elaboration, gender, and children's cognitive development. *Psychological Bulletin*, *145*(11), 1082–1102.

Welch-Ross, M. K., Fasig, L. G., & Farrar, M. J. (1999). Predictors of preschoolers' self-knowledge: Reference to emotion and mental states in mother–child conversation about past events. *Cognitive Development*, *14*(3), 401–422.

# APPENDIX A. MATERNAL BEHAVIOR WITH PRESCHOOLER Q-SET

1. Notices when her child smiles and/or vocalizes.
2. Unaware of child's signs of distress.
3. Participates in play with child, e.g., plays in the sand, runs with child.

   *Low: Supervises only; sits on the sidelines.*
4. Initiates approach and physical contact does not always wait for child to do it.

   *Low: Child is the main initiator of close interactions.*
5. Interactions with child occur almost exclusively at a distance.

   *Low: Appropriate balance between interactions at a distance and in close physical. contact.*
6. Interactions appropriately vigorous and exciting as judged from child's response.

   *Low: Interactions are not exciting enough or too overwhelming.*
7. Responds only to frequent, prolonged, or intense signals (e.g., mom only responds when child increases or maintains signals).
8. When child wants to do something mom doesn't want, she skillfully directs child's attention toward a different activity.

   *Low: Not skillful at re-directing child; leads to unnecessary conflict.*
9. Responds consistently to child's signals.
10. Greets or acknowledges child when re-entering a room.
11. Doesn't prepare or negotiate departure time. Mom is abrupt.

    *Low: Skillful in preparing child for and negotiating departure time.*
12. When participating in activities with child, mom determines content and pace of activities.

    *Low: Lets him/her lead and organize the activities.*

13. Is irritated by demands of child (note information from interview including caregiving demands).
14. Scolds child.
15. Makes child feel s/he is successful in solving tasks or doing activities.

    *Low: Is indifferent or negative regarding child's accomplishments.*
16. Enjoys physical contact with child.

    *Low: Awkward and ill at ease during intimate interactions with child.*
17. Doesn't interact much with child.

    *Low: Frequently interacts with child.*
18. Considers child needs when structuring the environment.
19. Perceives child's negative behavior as rejection of her--takes misbehavior personally.
20. Encourages child to interact/play with other children.

    *Low: Seems unwilling or indifferent in getting her child to interact/play with other. children.*
21. When child returns to her, mother is unresponsive or business like in acknowledging child's returns.

    *Low: Mom is affectionate with him/her.*
22. Pushes child into activities he/she doesn't want to do.

    *Low: Suggests and encourages but does not force child into activities.*
23. Frequently uses verbal prohibitions (e.g., "no" or "don't").
24. Is knowledgeable/insightful about child's behavior.

    *Low: Child's behavior doesn't match mother's descriptions, or these do not add much to. observer's understanding of child.*
25. Idealizes child--does not acknowledge negative aspects.

26. Critical when describing child to observer.
27. Responds to ordinary bids for attention, i.e., when child is not upset (vocalizations, smiles, reaches).
28. Is over-controlling, intrusive, in interactions with child, e.g., provides excessive instructions, or physically re-orients child.

    *Low: Provides assistance when necessary. Physical interventions are smooth.*
29. Harsh affect in interactions with child.

    *Middle: Flat affect in interactions.*

    *Low: Mother interacts warmly with child.*
30. Mother behaves as a part of a team, exchanges with child are harmonious.

    *Low: Not smooth in exchanges with child, is abrupt, creates unnecessary conflict.*
31. When child expresses positive affect, mother joins in.

    *Low: Unresponsive to child's expressions of positive affect.*
32. Provides age-appropriate toys.
33. Doesn't seem genuinely into child's play.

    *Low: Seems interested/amused by child's play.*
34. Praises child for things he/she does.

    *Low: Doesn't notice or point out success.*
35. Points to and identifies interesting things in child's environment.
36. Builds on the focus of child's attention.
37. Verbally prepares child for outing (e.g., trip to park). Talks about fun things they may do, or exciting things that might happen. Involves child in preparations.

    *Low: Doesn't prepare child. Child is merely taken along.*

38. Displays affection by touching.

    *Middle: No expressions of affection.*

    *Low: Affection expressed in non-physical ways.*

39. Doesn't structure child's activities in ways that guarantee success.

    *Low: Sets up child for success.*

40. Is two steps ahead of child, anticipates potential conflictive situations and does something to prevent escalation.

    *Low: Let's child get into conflictive situations. Needs to intervene to re-orient child's. activities.*

41. Trips to park have to be cut short because child is thirsty, hungry, bored, soiled.

    *Low: Anticipates child's needs, e.g., brings some toys, a snack, a sweater, a diaper.*

42. Alert to safety issues, e.g., explains or warns child about how to go down the slide, checks equipment for safety; if child picks up something, mom checks it.

    *Low: Does not seem concerned about safety issues.*

43. Teaches child names of objects, labels activities; is instructive.

    *Low: Does not label objects and activities for child.*

44. When child shows her something he/she is playing with, mom asks about it, comments positively on it, encourages child to do something with it.

    *Low: Doesn't seem interested, tells child to go and play with it or not to (e.g., "leave it. aside").*

45. When helping child, mother doesn't solve problems for child, but paces him through solutions.

    *Low: Either provides unhelpful clues, or solve problem for child.*

46. Unnecessarily tells child what to do.

    *Low: Mother uses questions or presents options as means of guidance.*

47. Mother suggests activities that are not enticing to child or doesn't suggest activities.

    *Low: Suggests imaginative or engaging activities.*

48. Mother lets child get appropriately dirty and messy.

    *Low: Bans child from activity or interferes when child is getting messy.*

49. Realistic expectations regarding child's self-control.

50. Mother seems uncomfortable with child distancing from her. Doesn't let child move away without calling her/him back quickly.

    *Low: Let's child move away a safe distance.*

51. Smoothly facilitates explorations away from and returns to her.

    *Low: Not interested or affectionate when child returns; not encouraging of child going back out.*

52. Makes sure that child explores available toys or activities (including peers).

    *Low: Let's child stay on one activity/toy, become bored, or wander around.*

53. Well resolved interaction with child -- interaction ends when child is satisfied (also consider termination of ongoing interactions that child is enjoying).

54. Interactions with child are object-oriented (e.g., with toys, food).

55. When accidents occur, mother immediately goes to child to check what happened.

    *Low: Doesn't go to child immediately; dismisses importance of incident without checking; asks child not to cry and to keep playing.*

56. When child cries or signals, mother delays in responding or checking what's going on.

    *Low: Responds or checks with child promptly.*

57. When child is disappointed/upset, mom either ignores or is not skillful in calming child down and getting him back to play.

    *Low: Quickly able to calm child down and re-orient him/her to activities.*

58. Mother frequently complies with child's wishes.

    *Low: Actively opposes child's wishes.*

59. If afraid/shy of something (e.g., visitor, animal, activity), mom calms child down and explains that nothing is going to happen, “it's okay honey" or "mom is with you" or picks up the child.

    *Low: Either doesn't attempt to re-assure child or attempts are negative or inept.*

60. Mother is critical/annoyed with child; "you are clumsy, I told you not to…"

    *Low: Patient and understanding.*

61. Seems to be aware of child even when not in the same room or area.

62. If child is crying or upset because of accident, mom holds child until he calms down and is ready to get down.

    *Low: Puts him down too soon or takes too much time in contact as indicated by child's behavior.*

63. Over-reacts or becomes distressed if child engages in mildly risky or unsafe behavior.

    *Low: Keeps calm and gets child out of trouble.*

64. Responds promptly to child's signals (vocalizations, smiles, reaches).

65. Is strict and rigid when rules are broken.

    *Low: Flexible and understanding when rules are broken.*

66. Mother tells child not to do something and then lets him get away with it.

    *Low: Enforces rules she sets.*

67. When setting rules and prohibiting an activity to child, explains reasons.

    *Low: Tells child what rules are without reasoning.*

68. In limit setting, mother negotiates with child until a mutually satisfying solution is achieved.

    *Low: Sets limits unilaterally, child has no input.*

69. Overwhelmed by caretaking demands.

70. Responds harshly to risky or unsafe behavior, reprimands or punishes child.

    *Low: Mom behaves in a firm and understanding way and clearly explains limits/rules.*

71. Follows or moves to a better location to supervise/monitor as child moves from place to place.

    *Low: Doesn't keep track of child's whereabouts.*

72. Able to keep track of child despite competing demands, e.g., observer talking to her, other moms, other events.

    *Low: Often distracted by other demands.*

73. Level of supervision is sensitive to circumstances and context.

    *Low: Supervision is inappropriate.*

74. Mother is hovering, e.g., gets into child's activities even when it is not necessary.

    *Low: Balanced in her role as supervisor of and participant in child's activities.*

75. Attempts to involve child in games or activities that are obviously beyond the child's current capability.

76. Mother's responses to child's initiations (e.g., proximity seeking, smiles, outstretched arms, vocalizations) are incomplete or unsatisfying at times.

    *Low: Child's initiations are always responded to in a complete and satisfying manner.*

77. Often uses a sibling or TV to keep the child occupied.

78. Minimizes importance of child's cues; mother fails to see things from child's point of view.

    *Low: Child cues are given appropriate weight; mother is empathetic.*

79. Accepts child's expression of negative emotion.

    *Low: Seems uncomfortable, or annoyed, or tries to cut off expression of negative. feelings.*

80. Seldom speaks to child directly.

81. Mother expresses to child that she is having a good time.

    *Low: It shows through that mom is not enjoying herself.*

82. Models different feelings/emotions the child may be going through, e.g., child coming down the slide, mom says "weee" or child climbs and mom says "up-up".

    *Low: Doesn't model emotional reactions.*

83. Leaves the room without any sort of signal or explanation to the child, e.g., "I'll be back in just a minute."

84. Doesn't let emotional states (positive or negative) disorganize child' behavior; provides boundaries.

    *Low: Let's child become disorganized because of his emotional states, e.g., too. rambunctious, too frustrated.*

85. Interpretation of child's cues seems biased or un-objective.

    *Low: Cues are interpreted based on child's needs at that time, or knowledge of child.*

86. Asks or talks with child about his/her feelings or experiences during play.

    *Low: Doesn't attend to the emotional component of play.*

87. Expressive during interaction with child.

    *Low: Flat affect during interaction with child.*

88. Mother is always accessible to the child.

*Low: Often inaccessible to child.*

89. Preoccupied with interview activity and thus misses signals/opportunities for interaction.

90. If not within 6 to 8 feet, mother maintains active contact by talking with child.

*Low: Allows child to get far away without maintaining communication.*

# APPENDIX B. ATTACHMENT Q-SET

1. Child readily shares with mother or lets her hold things if she asks to.

   *Low: Refuses.*

2. When child returns to mother after playing, he is sometimes fussy for no clear reason.

   *Low: Child is happy or affectionate when he returns to mother between or after play times.*

3. When he is upset or injured, child will accept comforting from adults other than mother.

   *Low: Mother is the only one he allows to comfort him.*

4. Child is careful and gentle with toys and pets.

5. Child is more interested in people than in things.

   *Low: More interested in things than people.*

6. When child is near mother and sees something he wants to play with, he fusses or ties to drag mother over to it.

   *Low: Goes to what he wants without fussing or dragging mother along.*

7. Child laughs and smiles easily with a lot of different people.

   *Low: Mother can get him to smile or laugh more easily than anyone else.*

8. When child cries, he cries hard.

   *Low: Weeps, sobs, doesn't cry hard, or hard crying never lasts very long.*

9. Child is lighthearted and playful most of the time.

   *Low: Child tends to be serious, sad, or annoyed a good deal of the time.*

10. Child often cries or resists when mother takes him to bed for naps or at night.

11. Child often hugs or cuddles against mother, without her asking or inviting him to do so.

    *Low: Child doesn't hug or cuddle much, unless mother hugs him first or asks him to give her a hug.*

12. Child quickly gets used to people or things that initially made him shy or frightened him.

    *Middle if never shy or afraid.*

13. When the child is upset by mother's leaving, he continues to cry or even gets angry after she is gone.

    *Low: Cry stops right after mom leaves.*

    *Middle if not upset by mom leaving.*

14. When child finds something new to play with, he carries it to mother or shows it to her from across the room.

    *Low: Plays with the new object quietly or goes where he won't be interrupted.*

15. Child is willing to talk to new people, show them toys, or show them what he can do, if mother asks him to.

16. Child prefers toys that are modeled after living things (e.g., dolls, stuffed animals).

    *Low: Prefers balls, blocks, pots and pans, etc.*

17. Child quickly loses interest in new adults if they do anything that annoys him.

18. Child follows mother's suggestions readily, even when they are clearly suggestions rather than orders.

    *Low: Ignores or refuses unless ordered.*

19. When mother tells child to bring or giver her something, he obeys. (Do not count refusals that are playful or part of a game unless they clearly become disobedient.)

    *Low: Mother has to take the object or raise her voice to get it away from him.*

20. Child ignores most bumps, falls, or startles.

    *Low: Cries after minor bumps, falls, or startles.*

21. Child keeps track of mother's location when he plays around the house. Calls to her now and then. Notices her go from room to room. Notices if she changes activities.

    *Low: Doesn't keep track.*

    *Middle if child isn't allowed or doesn't have room to play away from mom.*

22. Child acts like an affectionate parent toward dolls, pets, or infants.

    *Low: Plays with them in other ways.*

    *Middle if child doesn't play with or have dolls, pets, or infants around.*

23. When mother sits with other family members or is affectionate with them, child tries to get mom's attention for himself.

    *Low: Lets her be affectionate with others. May join in but not in a jealous way.*

24. When mother speaks firmly or raises her voice at him, child becomes upset, sorry, or ashamed about displeasing her. (Do not score high if child is simply upset by the raised voice or afraid of getting punished.)

25. Child is easy for mother to lose track of when he is playing out of her sight.

    *Low: Talks and calls when out of sight. Easy to find; easy to keep track of what he is playing with.*

    *Middle if never plays out of sight.*

26. Child cries when mother leaves him at home with babysitter, father, or grandparent.

    *Low: Doesn't cry with any of these.*

27. Child laughs when mother teases him.

    *Low: Annoyed when mother teases him.*

    *Middle if mother never teases child during play or conversations.*

28. Child enjoys relaxing in mother's lap.

    *Low: Prefers to relax on the floor or on furniture.*

    *Middle if child never sits still.*

29. At times, child attends so deeply to something that he doesn't seem to hear when people speak to him.

    *Low: Even when deeply involved in play, child notices when people speak to him.*

30. Child easily becomes angry with toys.

31. Child wants to be the center of mother's attention. If mom is busy or talking to someone, he interrupts.

    *Low: Doesn't notice or doesn't mind not being the center of mother's attention.*

32. When mother says "No" or punishes him, child stops misbehaving (at least at that time). Doesn't have to be told twice.

33. Child sometimes signals mother (or gives the impression) that he wants to be put down, and then fusses or wants to be picked right back up.

    *Low: Always read to go play by the time he signals mother to put him down.*

34. When child is upset about mother leaving him, he sits right where he is and cries. Doesn't go after her.

    *Low: Actively goes after her if he is upset or crying.*

    *Middle if never upset by her leaving.*

35. Child is independent with mother. Prefers to play on his own; leaves mother easily when he wants to play.

    *Low: Prefers playing with or near mother.*

    *Middle if not allowed or not enough room to play away from mother.*

36. Child clearly shows a pattern of using mother as a base from which to explore. Moves out to play; returns or plays near her; moves out play again, etc.

    *Low: Always away unless retrieved, or always stays near.*

37. Child is very active. Always moving around. Prefers active games to quiet ones.
38. Child is demanding and impatient with mother. Fusses and persists unless she does what he wants right away.
39. Child is often serious and business like when playing away form mother or alone with his toys.

    *Low: Often silly or laughing when playing away from mother or alone with his toys.*

40. Child examines new objects or toys in great detail. Tries to use them in different ways or to take them apart.

    *Low: First look at new objects or toys is usually brief. (May return to them later however.)*

41. When mother says to follow her, child does so. (Do not count refusals or delays that are playful or part of a game unless they clearly become disobedient.)
42. Child recognizes when mother is upset. Becomes quiet or upset himself. Tries to comfort her. Asks what is wrong, etc.

    *Low: Doesn't recognize; continues play; behaves toward her as if she were okay.*

43. Child stays closer to mother or returns to her more often than the simple task of keeping track of her requires.

    *Low: Doesn't keep close track of mother's location or activities.*

44. Child asks for and enjoys having mother hold, hug, and cuddle him.

    *Low: Not especially eager for this. Tolerates it but doesn't seek it, or wiggles to be put down.*

45. Child enjoys dancing or singing along with music.

    *Low: Neither likes nor dislikes music.*

46. Child walks and runs around without bumping, dropping, or stumbling.

    *Low: Bumps, drops, or stumbles happen throughout the day (even if no injuries result).*

47. Child will accept and enjoy loud sounds or being bounced around in play, if mother smiles and shows that it is supposed to be fun.

    *Low: Child gets upset, even if mother indicates the sound or activity is safe or fun.*

48. Child readily lets new adults hold or share things he has, if they ask to.

49. Runs to mother with a shy smile when new people visit the home.

    *Low: Even if he eventually warms up to visitors, child initially runs to mother with a fret or a cry.*

    *Middle if child doesn't run to mother at all when visitors arrive.*

50. Child's initial reaction when people visit the home is to ignore or avoid them, even if he eventually warms up to them.

51. Child enjoys climbing all over visitors when he plays with them.

    *Low: Doesn't seek close contact with visitors when he plays with them.*

    *Middle if he won't play with visitors.*

52. Child has trouble handling small objects or putting small things together.

    *Low: Very skillful with small objects, pencils, etc.*

53. Child puts his arms around mother or puts his hand on her shoulder when she picks him up.

    *Low: Accepts being picked up but doesn't especially help or hold on.*

54. Child acts like he expects mother to interfere with his activities when she is simply trying to help him with something.

    *Low: Accepts mother's help readily, unless she is in fact interfering.*

55. Child copies a number of behaviors or ways of doing things from watching mother's behavior.

    *Low: Doesn't noticeably copy mother's behavior.*

56. Child becomes shy or loses interest when an activity looks like it might be difficult.

    *Low: Thinks he can do difficult tasks.*

57. Child is fearless.

    *Low: Child is cautious or fearful.*

58. Child largely ignores adults who visit the home. Finds his own activities more interesting.

    *Low: Finds visitors quite interesting, even if he is a bit shy at first.*

59. When child finishes with an activity or toy, he generally finds something else to do without returning to mother between activities.

    *Low: When finished with an activity or toy, he returns to mother for play, affection, or help finding more to do.*

60. If mother reassures him by saying "It's ok" or "It won't hurt you," child will approach or play with things that initially made him cautious or afraid.

    *Middle if never cautious or afraid.*

61. Plays roughly with mother. Bumps, scratches, or bites during active play. (Does not necessarily mean to hurt mom.)

    *Low: Plays active games without injuring mother.*

    *Middle if play is never very active.*

62. When child is in a happy mood, he is likely to stay that way all day.

    *Low: Happy moods are very changeable.*

63. Even before trying thing himself, child tries to get someone to help him.

64. Child enjoys climbing all over mother when they play.

    *Low: Doesn't especially want a lot of close contact when they play.*

65. Child is easily upset when mother makes him change from one activity to another. (Even if the new activity is something the child often enjoys.)

66. Child easily grows fond of adults who visit his home and are friendly to him.

    *Low: Doesn't grow fond of new people very easily.*

67. When the family has visitors, child wants them to pay a lot of attention to him.

68. On the average, child is a more active type person than mother.

    *Low: On the average, child is less active type person than mother.*

69. Rarely asks mother for help.

    *Low: Often asks mother for help.*

    *Middle if child is too young to ask.*

70. Child quickly greets his mother with a big smile when she enters the room. (Shows her a toy, gestures, or says "Hi, Mommy.")

    *Low: Doesn't greet mother unless she greets him first.*

71. If held in mother's arms, child stops crying and quickly recovers after being frightened or upset.

72. If visitors laugh at or approve of something the child does, he repeats it again and again.

    *Low: Visitors' reactions don't influence child this way.*

73. Child has a cuddly toy or security blanket that he carries around, takes to bed, or holds when upset. (Do not include bottle or pacifier if child is under two years old.)

    *Low: Can take such things or leave them or has none at all.*

74. When mother doesn't do what child wants right away, he behaves as if mom were not going to do it at all. (Fusses, gets angry, walks off to other activities, etc.)

    *Low: Waits a reasonable time, as if he expects mother will shortly do what he asked.*

75. At home, child gets upset or cries when mother walks out of the room. (May or may not follow her.)

    *Low: Notices her leaving; may follow but doesn't get upset.*

76. When given a choice, child would rather play with toys than with adults.

    *Low: Would rather play with adults than toys.*

77. When mother asks child to do something, he readily understands what she wants. (May or may not obey.)

    *Low: Sometimes puzzled or slow to understand what mother wants.*

    *Middle if child is too young to understand.*

78. Child enjoys being hugged or held by people other than his parents and/or grandparents.

79. Child easily becomes angry at mother.

    *Low: Doesn't become angry at mother unless she is very intrusive, or he is very tired.*

80. Child uses mother's facial expression as a good source of information when something looks risky or threatening.

    *Low: Makes up his own mind without checking mother's expressions first.*

81. Child cries as a way of getting mother to do what he wants.

    *Low: Mainly cries because of genuine discomfort (tired, sad, afraid, etc.).*

82. Child spends most of his play time with just a few favorite toys or activities.

83. When child is bored, he goes to mother looking for something to do.

    *Low: Wanders around or just does nothing for a while, until something comes up.*

84. Child makes at least some effort to be clean and tidy around the house.

    *Low: Spills and smears things on himself and on floors all the time.*

85. Child is strongly attracted to new activities and new toys.

    *Low: New things do not attract him away from familiar toys or activities.*

86. Child tries to get mother to imitate him, or quickly notices and enjoys it when mom imitates him on her own.

87. If mother laughs at or approves of something the child has done, he repeats it again and again.

    *Low: Child is not particularly influenced this way.*

88. When something upsets the child, he stays where he is and cries.

    *Low: Goes to mother when he cries. Doesn't wait for mom to come.*

89. Child's facial expressions are strong and clear when he is playing with something.

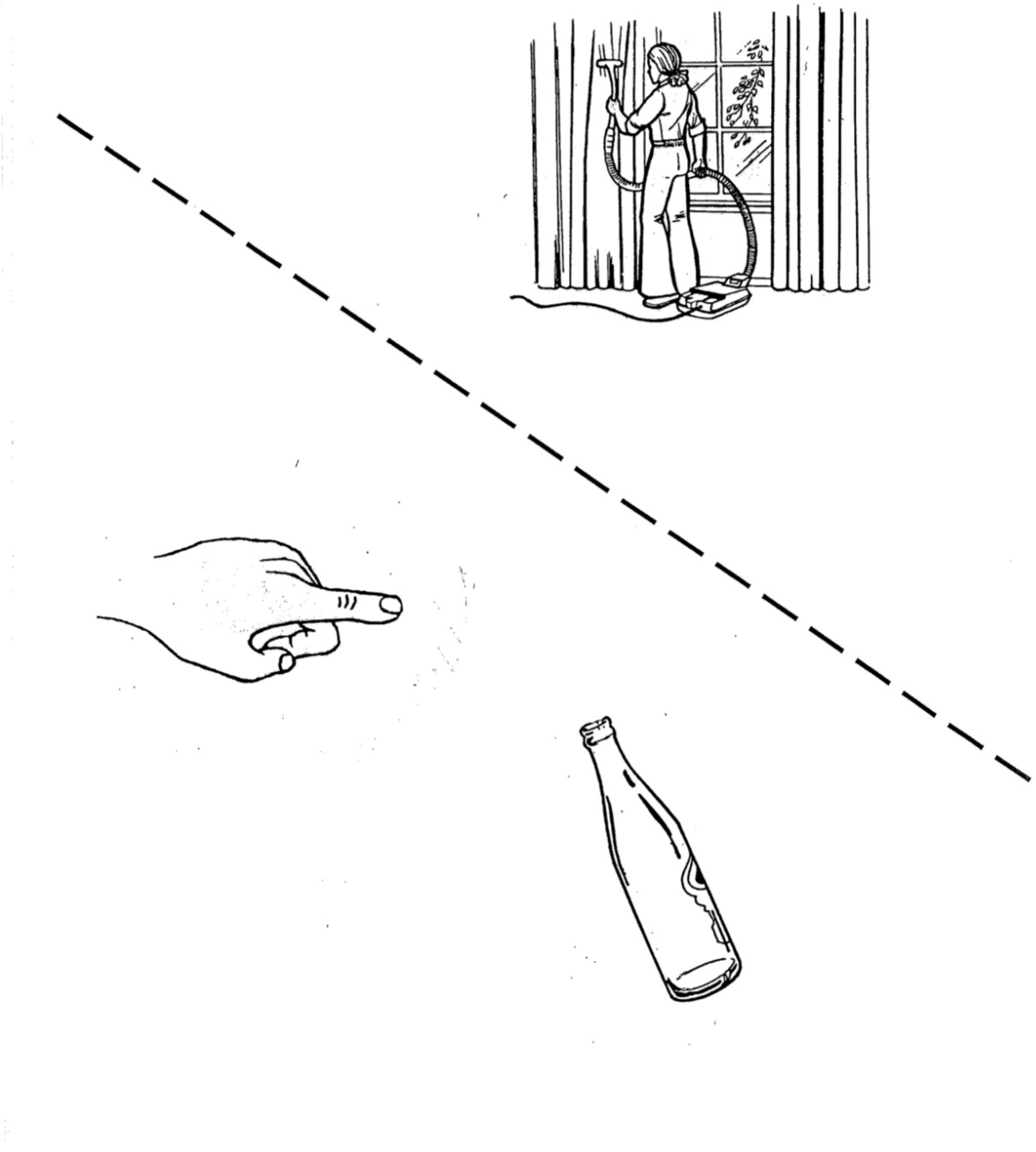
90. If mother moves very far, child follows along and continues his play in the area she has moved to. (Doesn't have to be called or carried along; doesn't stop play or get upset.)

    *Middle if child isn't allowed or doesn't have room to be very far away.*

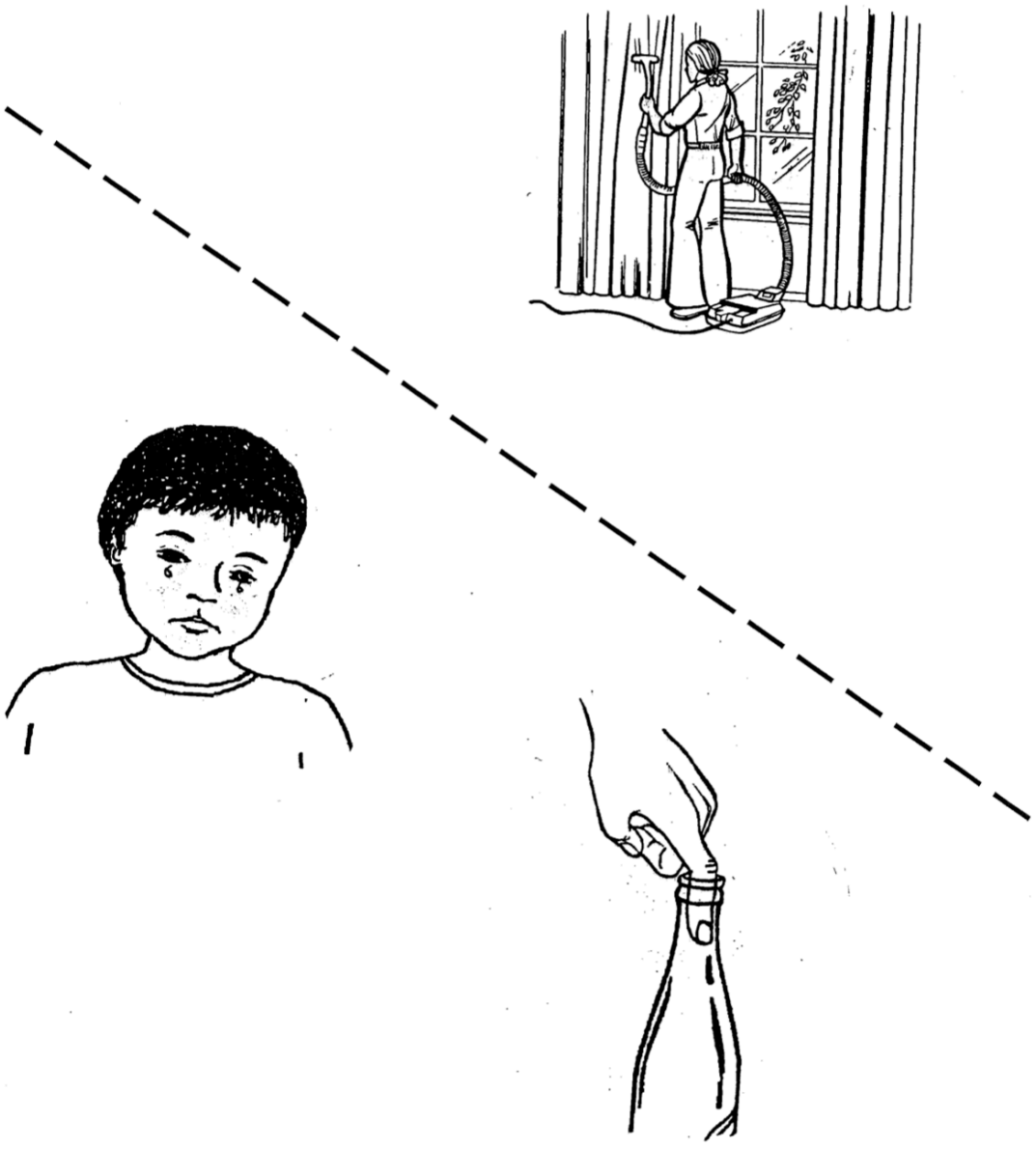
# APPENDIX C. EXAMPLE OF JOINT STORY TELLING

Jonny Gets His Finger Stuck Page 1

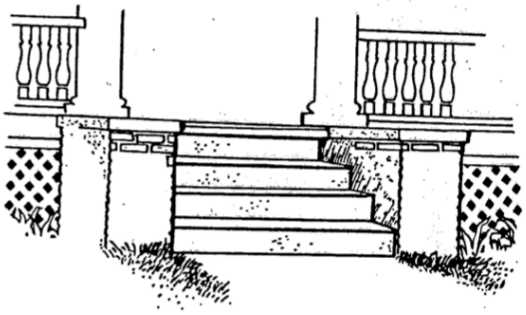
Example of Joint Story Telling: Jonny Gets His Finger Stuck Page 2



Example of Joint Story Telling: Jonny Gets His Finger Stuck Page 3



Example of Joint Story Telling: Jonny Gets His Finger Stuck Page 4



# APPENDIX D. CO-CONSTRUCTION CODING SCALES

***Creating a co-construction atmosphere***

1. Sets up the child to tell the story at beginning of task; describes to child what task is about.
2. Invites and motivates child into activity.
3. Tone of voice when talking to child is inviting.
4. Pays attention to child's behavior, body position and her own and makes adjustments conducive to "working" together.
5. Does not rush child, is patient.
6. Recognizes and encourages child-initiated story lines.
7. Allows the child to decide when to go into the next part or when the story is completed.
8. Allows child to contribute to/influence the story; to be "in charge," to lead; never takes over.
9. Follows her/his own line of thought.
10. Imposes her/his own story line onto child; corrects child often when child's version seems to deviate from parent's preferred story or her/his sense of what's appropriate.
11. Uses confirmation questions to convey her/his own story line.

***Encouraging content elaboration***

1. Uses open-ended prompts (score low if parents use a short answer, fill-in-the-blank, or yes/no format).
2. Encourages the child to take the initiative in filling in the details.
3. Comments and questions both confirm the child's statements and encourage elaboration of the child's story line.
4. Uses follow up questions that continue a line of inquiry, creating depth in the child's story line.

5. Replies to child's questions.
6. Questions seem to only seek affirmation from the child that parent's story is on target.
7. Probes persistently for details, but the goal is to fill in the details of the parent's view of the story, not to help the child's story line.

***Supporting an explanatory framework***

1. Asks for explanations in response to child's statements (why-type questions).
2. Helps build a causal framework for the events in the story; connects/interrelates the events.
3. Focuses on the character's intentions and feelings in an effort to build an explanatory framework, instead of just focusing on sequence of events.
4. Relates the story line to some experiences the child has had, bridging the story line to the child's own experiences.
5. Provides an overall framework at the end of the story to help the child "see" the overall story line.
6. Focuses on concrete aspects of the story, details, and specific events.
7. Moves quickly to the next detail or next event missing opportunities to interrelate event.