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MATERNAL COGNITION AND STRUCTURING OF TODDLER ATTENTION

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by

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ABSTRACT

Maternal sensitivity in the home, maternal behaviors that structured toddler attention skills in the laboratory, and the complexity with which mothers conceptualized their toddlers were examined in 120 mother-child dyads when children were 18 and 24 months old. Maternal structuring behaviors were coded during a laboratory reading and wait task. The goals of the study were to demonstrate that maternal structuring of child attention was an element of maternal sensitivity (as rated in the home and in the lab) during the toddler years, and to explicate the specific behavioral strategies mothers used to structure their toddlers' attention. Further, it was predicted that maternal conceptual complexity would relate to such high quality maternal structuring strategies. Results indicated that maternal structuring of child attention focusing was an element of sensitivity (as rated in the home and in the lab) within both tasks, and that redirection of child attention was negatively associated with sensitivity in the reading task. The quality of structuring in the lab was also positively associated with encouragement of attention distraction in the 18 and 24 month wait task. In regards to the specific strategies mothers used to accomplish this structuring, in the reading task when children were 18 and 24 months old, greater maternal use of her positive emotion and physical movement were related to independent ratings of maternal sensitivity. In the wait task when children were 18 and 24 months old, greater maternal use of her positive emotion was associated with sensitivity. The quality of maternal structuring within both tasks was also related to greater use of positive emotion in both tasks at both ages and greater physical movement in the 24 reading task. Additionally, structuring quality was associated with greater language in the 18 month reading task. Within the 18 month time point, conceptual complexity predicted greater sensitivity and higher quality structuring, significantly in the reading task and marginally in the wait task. Results were

discussed in regards to implications for the design of interventions designed to improve maternal sensitivity with toddlers.

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INTRODUCTION

The study of competent parenting is a focus of early childhood research and mental health intervention because of the highly accepted notion that parents play a key role in shaping child developmental outcomes. Despite this high level of interest, however, it is not yet clear what concrete parenting behaviors are the best predictors of specific childhood outcomes of interest. Theory and evidence suggest that high quality parenting be conceptualized not as a single behavioral quality, but as the co-occurrence of basically independent aspects of parenting (MacDonald, 1992; Keller, Lohaus, Volker, Cappenberg, & Chasiotis, 1999; Teti & Huang, 2005; Davidov & Grusec, 2006), and that each aspect is likely related differently to child outcomes. For instance, parental warmth is hypothesized to relate to child compliance and internalization of adult value structures (MacDonald, 1992), while maternal responsiveness has been found to link with child emotion regulation outcomes above and beyond maternal warmth (Davidov & Grusec, 2006; Feng, Shaw, Skuban, & Lane 2007). Additionally, for clinical purposes it is would be particularly useful to understand specific, behavioral aspects of sensitive, competent parenting, as this would allow for the identification of the “teachable units” for intervention. Finally, as those components of sensitive, competent parenting are identified, it will be beneficial to understand their correlates and predictors, including aspects of maternal cognition that support or contribute to parenting competence. As a result, there is a call for specification of the behaviors involved in competent parenting (Lamb, 1987; Meins, Fernyhough, Fradley, & Tuckey, 2001; Berlin, Ziv, Amaya-Jackson, & Greenberg, 2005).

The present study addressed this gap in the literature by focusing on the specific parenting behaviors that are associated with sensitive parenting in the context of parental

promotion of toddler self-regulation. The value of focusing on the child's development of self-regulation is that it permitted an assessment of specific parenting behaviors. Further, the development of self-regulation is viewed as central to children's social competence and self-regulatory difficulties are associated with child psychopathology (Cole, Michel, & Teti, 1994; Eisenberg, Smith, Sadovsky, & Spinrad, 2004). Although there is agreement that environmental input is critical in this development, that parents contribute to both the neurophysiological and behavioral aspects of early child self-regulation (Eisenberg, Cumberland, & Spinrad, 1998; Hart, Gunnar, & Cicchetti, 1995), and that parental sensitivity and child self-regulation are correlated (see Crockenberg & Leerkes, 1999, Eisenberg, Cumberland, & Spinrad, 1998; Morris, Silk, Steinberg, Myers, & Robinson, 2007, for reviews), the mechanisms that account for this relation have not yet been articulated. This limits prediction models of child outcomes. Clinical intervention also requires a more "operational" analysis of how parents promote self-regulation in young children, an area that is currently not well understood (Landry, Smith, Swank, Miller-Loncar, 2000; Crockenberg & Leerkes, 2004). As a result, the identification of specific behaviors associated with sensitive parenting when promoting child self-regulation is needed both for basic knowledge and for application to parent training interventions.

To identify competent parenting behaviors within the context of parental promotion of toddler self-regulation, this project focused on maternal encouragement of child attention skills through the strategic use of her emotion, physical movement and language. Parental support of child self-regulation has long been regarded as a key component of sensitivity (Ainsworth et al., 1978; Belsky, 1984; Maccoby & Martin, 1983) and maternal encouragement of child attention is considered to be an important contributor to positive socio-emotional development (Dunham & Dunham, 1995; Raver, 1996). During toddlerhood, due to the child's rapidly expanding

cognitive and physical repertoire, parents begin to socialize their children in ways that promote a child's ability to conform to social standards (Brownell & Kopp, 2007), including self-regulation (Kopp, 1982). Also due to the child's increased abilities, and resulting desire for independence, toddlerhood creates unique challenges for parents. As a result, supporting the child's appropriate use of attention by strategically adjusting parenting strategies (i.e. emotion, physical movement, and language) when the child's attention moves away from a desired activity define competent parenting during this developmental stage.

The behaviors associated with parental sensitivity in any given context are likely governed by a variety of individual characteristics of the parent, including emotional and cognitive processes (Dix, Gershoff, Meunier, & Miller, 2004). Given this, depicting the behaviors related to sensitivity also has the implication of improving prediction models of the determinants of competent parenting: once component parenting behaviors are identified, the parental characteristics that predict each component can be specified. This project examined the role of an aspect of parenting cognition, i.e., conceptual complexity, in predicting the sensitive components of parenting purported to promote self-regulation in young children. Mothers with more complex conceptualizations possess richer understanding of their children's behaviors and personality, and as a result these mothers are more able to perceive child cues, adjust their behavior appropriately in the moment of interaction, and possess a larger repertoire of parenting behaviors. That is, mothers who think complexly about their toddlers will utilize structuring strategies more often and will maintain the use of sensitive structuring strategies over time because they are better equipped to adjust their parenting according to the changing developmental needs of the child.

Research on parental cognitions has largely focused on attitudes, knowledge, or attributions (see Holden & Buck, 2002; Luster & Okagaki, 2005, for review), aspects of parental cognition that fail to reliably predict parenting behaviors (Miller, 1988; Kochanska, 1990; Luster & Okagaki, 2005). This may be because traditional measures of beliefs and attitudes only assess a small aspect of cognition (Sameroff & Feil, 1985), suggesting the need to examine the structure of parental cognitions that underlie parental behavior. Notably, existing attempts to measure such structure are overly general. Parental cognitions and behavior should be more strongly related when we assess aspects of parental thinking that pertain to a *particular* son or daughter, as parents are likely to access these thoughts to guide their moment to moment interaction with their child. Such pairing of parental thought about a specific child with their behavior when interacting with that child corresponds with Kochanska's (1990) proposition that cognition and behavior are more strongly related when the specificity of each is appropriately matched. Moreover, it is important to assess these cognitions in ways that can be feasibly implemented in clinical practice such that unrealistic training, assessment, or coding time demands are not placed on the practitioner. Such provisions are important because in treatment settings it is often the case that one must change the lens through which parents view their children before one can intervene to change parents' behaviors (Azar, 1997; Azar, Nix, & Makin-Byrd, 2005; Bugental et al., 2002; Azar, Reitz, & Goslin, 2008).

In sum, the proposed research tests the hypotheses that maternal structuring of child attention is related to maternal sensitivity, and that maternal strategic use of emotion, physical movement, and language to accomplish this structuring are the operationalized behaviors involved in this aspect of sensitive parenting of toddlers. Additionally, the degree to which a mother thinks complexly about her toddler predicts the degree to which mothers utilize the

structuring strategies demonstrated to be components of sensitivity, as well as the stability of structuring strategy use as children grow.

BACKGROUND

Specifying Competent Mothering

Identifying and operationalizing behaviors associated with sensitive, competent parenting is desirable for various reasons. First, such work will have important implications for parenting research; for example, the debate regarding the components of sensitivity largely began because of inconsistent relations among adult attachment status, parenting quality, and child attachment status (DeWolff & Van Ijzendoorn, 1997; Berlin et al., 2005). Although it is commonly maintained that this “transmission gap” exists because of non-specific conceptualizations of competent parenting, research is just beginning to address this issue by developing more micro-analytic analyses of mother-child interaction (e.g., Cassidy, Woodhouse, Cooper, Hoffman, Powell, & Rodenberg, 2005).

A second advantage of investigating the specific features of sensitive parenting is that effective clinical interventions aimed at promoting parenting competence require clearly operationalized behaviors to teach. Given that conceptual and empirical positive associations between competent parenting and child self-regulation exist, it is time for research to identify the specific parenting behaviors that purportedly account for these relations. Third, describing the component behaviors involved in sensitive parenting will improve models pertaining to the determinants of parenting. Specifically, sensitivity is driven by a complex set of parental characteristics that govern how parents interpret events, set goals for interactions, and respond to their children (Dix, 2000). Given that sensitivity likely comprises component behaviors, they are likely regulated by different cognitive processes (Dix, Gershoff, Meunier, & Miller, 2004). More detailed examinations of the relations among specific aspects of competent parenting and parental characteristics could improve our ability to predict and influence parenting behavior.

Let us consider well-accepted notions of the behavioral aspects of sensitivity and how these are instantiated in interaction with a child. A sensitive mother's behavior creates a warm, positive emotional climate for the child through physical affection or display of positive emotion. She also responds promptly to child cues, appropriately altering the nature or intensity of her behavior to support the child's goals and well-being. She encourages the child's exploration of their environment while simultaneously serving as a secure base and source of comfort. In the case of toddlers, in particular, a sensitive mother provides instrumental support to help the child accomplish a goal while also providing the child with sufficient autonomy.

That is, as noted, maternal sensitivity likely involves various dimensions that are differentially related to child outcomes, which necessitates a more nuanced conceptualization of competent parenting. As a result, global assessments of parenting that aggregate behaviors have been recognized as insufficient for the prediction of various child outcomes (Lamb, 1987; MacDonald, 1993). It is known, for example, that sensitivity conceptualized as a general quality is related to the quality of child self-regulation (see Crockenberg & Leerkes, 1999, Eisenberg, Cumberland, & Spinrad, 1998; Morris, Silk, Steinberg, Myers, & Robinson, 2007, for reviews), but this relation does not indicate what it is about sensitive parenting that directly contributes to the child's self-regulation. In regard to the need for specifying the nature of sensitive responding that promotes child self-regulation in particular, there is a small but growing literature attempting to address this need.

For instance, Davidov and Grusec (2006) demonstrated that micro-coded maternal responsiveness to child distress in early school age children related to children's ability to regulate negative affect above and beyond the variance explained by maternal warmth. Feng and colleagues (2007) found that micro-coded maternal responsiveness to children's positive affect

was associated with children's reduction in negative affect expression over time, but that maternal general warmth was not related to children's later expression of negative affect. Studies such as these highlight that dimensions of parenting currently conceptualized under the umbrella of 'sensitivity' likely have differential implications for child self-regulation, depending on the outcome of interest. The next section will review theoretical rationale for the link between maternal behavior and child self-regulation, with a focus on the role of maternal behavior that encourages the development of child attention skills. This project builds upon previous work by concentrating on maternal strategic use of behaviors as components of sensitivity that are intended to structure toddler acquisition of attention skills.

Parenting and Child Self-Regulation

The timing and nature of sensitive parents' responses to child cues have been argued to be hallmarks of competent parenting, particularly in infancy, because they provides the child with a coherent and temporally coherent base around which the child learns to organize his or her behavior, providing the context for attachment security (e.g., Ainsworth et al., 1978; Teti & Candelaria, 2002) and socio-emotional development (Cohn & Tronick, 1988; Dunham & Dunham, 1995). Early mother-child interactions provide children with necessary practice in using skills associated with self-regulation (see Cole et al., 1994; Landry et al., 2000 for examples). Developmental models of emotion regulation highlight that maternal support encourages key self-regulatory skills by modeling and prompting the use of developmentally appropriate regulatory strategies (Kopp, 1982), and by providing organizing feedback to children about their performance (Carver, 2004).

Attachment Theory

Attachment theory (Bowlby, 1969) asserts that infants are biologically predisposed to maintain proximity with the attachment figure and that to accomplish this goal children develop behavioral strategies that are contingent on parental behavior (Cassidy, 1994; Main, 1990). In other words, children adapt to repeated and daily parenting behaviors with behavioral patterns that maintain the attachment relationship, and it is from these daily experiences that children's internal working models form (Bowlby, 1969); within this early relationship children learn how to interpret the meaning of events, people and objects (i.e. through social referencing) and how to regulate their behavior in relation to others (Barrett & Campos, 1987; Eisenberg et al., 1998). These parent-child relationship factors are built upon moment to moment guidance by the caregiver that helps to regulate the child's emotional and behavior expression across contexts and relationships.

In regard to children's self-regulation, the sensitive mother perceives, accepts, and responds to the child's affective and behavioral cues, giving the sense that a variety of emotions and behaviors are acceptable and can be shared in social relationships. Children who expect that their emotional signals will be responded to regularly and sensitively are more likely to express emotions directly and freely, and to seek out parental assistance and support (Cassidy, 1994). As a result, children have ample opportunity to learn self-regulation strategies from the skilled parent. Children also learn that emotions are a useful method of communication, and parents' effective help in regulating the children's emotions imparts to children a sense of efficacy about modulating affective states (Bell & Ainsworth, 1972). Furthermore, the experience of negative emotion comes to be associated with the parent's ameliorative response, making negative affect seem less frightening and more tolerable to the child (Kopp, 1989; Cassidy, 1994). These repeated experiences come together to contribute to children's ability to experience the full range

of emotion without suppression, to effectively utilize emotional expressions to convey socially appropriate meaning to others, and to learn effective self-regulation strategies from the parent. Indeed, attachment status has been repeatedly linked with the quality of child emotional and behavioral regulation (e.g., Cassidy, 1994; Fagot & Pears, 1996; Thompson et al., 1995; Vondra, Shaw, Swearingen, Cohen & Owens, 2001; Smith, Calkins, & Keane, 2006).

Although developmental models of self-regulation and attachment theory highlight the role that parental sensitivity plays in the development of children's regulatory capacities, the specific mechanisms and behaviors through which parents promote positive child outcomes are not well articulated. Additionally, attachment theory largely concentrates on the quality of mother-child interaction during the first year of life and within threatening or fearful situations when the attachment system is activated (MacDonald, 1992). It is likely that sensitive and high quality parenting differs in presentation according to the child's developmental level (e.g. increasing attentional and linguistic ability) and contextual goals (e.g. independent self-regulation as opposed to security). As a result, there is a need to identify the specific parenting behavior involved in competent parenting throughout the toddler and preschool years, especially given that this a time in development is marked with dramatic gains in self-regulatory capacities. The majority of the work examining specific maternal behaviors that purportedly encourage self-regulation has been conducted within infancy. This includes the degree of synchronous social behavior in mother-infant face-to-face interactions (e.g., Cohn & Tronick, 1988; Tronick, 1989). However, this literature will not be reviewed here because it is outside the scope of the current project. Specific to the current topic of maternal encouragement of child attention skills is the literature pertaining to the joint attention shared in mother-infant dyads. This work offers the opportunity to consider how knowledge gained about competent parenting practices with infants

can inform the identification of parenting behaviors associated with the promotion of toddler self-regulation, as well as what gaps remain to be addressed by the current project.

Joint attention

As children develop cognitively, it appears important that parents interact with them in ways that link their emerging executive functions with self-regulation strategies to support the development of cognitive and social competence (e.g., Bornstein & Tamis-LeMonda, 1989; Landry et al., 2000; Landry, Miller-Loncar, Smith, & Swank, 2002). Recent research has examined behavioral mechanisms in the context of mother-infant joint attention and its influence on socioemotional development (Morales, Mundy, Crowson, Neal, & Delgado, 2005). Joint attention is defined as parental and child use of communication (e.g., verbalization, pointing, and gaze) to initiate and sustain coordinated periods when parent and child attention is focused on the same stimulus or behavior (Moore & Dunham, 1995). The ability to participate in joint attention typically emerges in children between the ages of 9 and 12 months (see Flom & Pick, 2003). High levels of joint attention and dyadic reciprocity of attention in parent-infant interaction has been regarded as a form of coregulation (Fogel, 1993) that supports children's later development of self-regulation and social skills (Raver, 1996). Related but distinct from theories about dyadic synchrony, the contribution of joint attention to self-regulation is attributed to two possibilities: 1) that shared interest teaches children that their behavior has a regulatory effect, that is, alters the parent's state (Adamson & Bakeman, 1991), and 2) that parental support of attentional shifting to modulate emotion becomes internalized by children (Kopp, 1989; Raver, 1996). Joint attention in mother-infant dyads has been associated with later language development (Tomasello & Farrar, 1986), and the ability to infer the intentions of others (Tomasello, 1995). Difficulty in establishing joint attention is present among autistic children (Mundy, Sigman, &

Kasari, 1990). Interestingly, cross-sectional studies have demonstrated that toddlers who spent more time in joint focus with mothers during free play were better able to use self-directed regulatory strategies in a distressing situation (Raver, 1996; Morales et al., 2005).

However, interactions between mothers and toddlers, compared to mothers and infants, require examination of new ways that mothers encourage the child to focus and shift attention. Whereas joint attention work focuses mainly on the amount of time the dyad spend focusing on the same object or behavior, successful self-regulation calls for various types of attentional control, including focusing and sustaining as well as redirecting or shifting attention. Research suggests that parental encouragement of these different forms of attention is related to later positive outcomes throughout childhood. For instance, mothers' encouragement of child attention was related to toddler and preschooler abilities to maintain focused attention during play (Landry & Chapieski, 1988; Findji, 1993), child cognitive and social skill development (Bornstein & Tamis-LeMonda, 1989; Landry, 1985; Landry et al., 2000), and academic achievement (Coates & Lewis, 1984). However, missing is a more nuanced and specific look at *how* mothers support *various* types of child attention, a gap that the current study addressed.

Maternal Structuring of Toddler Attention

Because behavior is goal driven and influenced by situational demands, the specific behaviors a parent chooses depend on the context of the mother-child interaction (Van Egeren, Barratt, & Roach, 2001). As a result, to identify maternal behaviors related to sensitivity, one must appreciate the different goals and demands that dyadic tasks involve. This study examined the degree to which mothers structure their toddler's attentional abilities, as well as the behavioral strategies mothers use to accomplish this goal, because attentional abilities are considered instrumental in self-regulatory behavior and social competence (e.g., Kopp, 2002).

During infancy, attention orientation influences infants' arousal and distress levels (Harman, Rothbart, & Posner, 1997). Around the shift from infancy to toddlerhood, children begin to display a "persistent task approach," (Messer, 1995) which involves the ability to shift attention between subcomponents of a task while maintaining awareness of the final goal (Banerjee & Tamis-LeMonda, 2007). This transition reflects that infants and toddlers begin to move from a stimulus-driven use of their attention to a more controlled use of attention (Rothbart, Posner, & Boylan, 1990). Beginning in the third year of life and continuing into early childhood, the executive attention system develops that allows children the voluntary control of their attention that aids self-regulation (Posner & Rothbart, 1998). Given the significant changes in attentional control that occur in the toddler and preschool years, studying how mothers foster such control in the toddler years is critical. Specifically, during this time mothers are both providing practice for the child to use newly developing attentional abilities such as shifting attention between subcomponents of a task, and providing support before the executive attention abilities are fully evident, likely enhancing the child's development of self-regulated behavior.

Further, successful self-regulation calls for various types of attentional control (Rueda, Posner, & Rothbart, 2005), such as the abilities to focus and sustain attention as well as to redirect or shift attention, and the aspect of attentional control important to success depends largely on task demands. For example, attention focusing and refocusing is required in tasks in which success is based on maintaining attention, e.g., learning new material. Attentional focusing involves the ability to maintain attention on a stimulus long enough to accomplish the task at hand and, if attention drifts or wanes, to reorient to the task. Indeed, these skills aid in regulating social interaction (Kopp, 2002) and contribute to teacher and peer perceptions of child social competence (Eisenberg et al., 1993; Raver, Blackburn, Bancroft & Torp, 1999).

In contrast, other goals are best met when one can shift attention away from a desired object. Classic work by Mischel and colleagues, for example, demonstrated that the ability to distract from a temptation enhances delay of gratification, and this skill in the preschool years predicts successful adaptation in adolescence and adulthood (e.g., Mischel, Shoda, & Rodriguez, 1989). Attentional distraction involves the ability to limit the information one processes, such as when babies look away from overly stimulating social interaction, which plays a role in children's regulation (Thompson, 1994). Generally speaking, poor attentional control in children is associated with various problematic child outcomes, including externalizing behavior problems (Hart, Keller, Edelstein, & Hofmann, 1998; Eisenberg et al., 2001) and peer rejection (Wilson, 2003). Given the significance of attentional control for children's development, it is important to examine how sensitive parents behave when toddlers' attentional control is taxed. The current study examined specific behaviors mothers used to structure child attention focusing, redirection, and distraction in two tasks that placed different demands on the child's attention.

To adequately study parenting during the toddler period, the unique aspects of this age period must be recognized (Brownell & Kopp, 2007). Beginning with the emergence of walking and followed by burgeoning language and cognitive abilities, toddlers increasingly assert their independence, which places new and potentially taxing demands on parents (Schoppe-Sullivan, Mangelsdorf, Frosch, & McHale, 2004). To successfully structure a toddler's attentional skills, the sensitive parent must utilize a variety of techniques that address the child's shifting needs in different situations. As mentioned, mothers must follow the child's lead to support children's focusing of attention, redirect the child's attention when it inappropriately drifts from a task goal, and instruct the child in the use of distraction when the task goal requires the child to wait or cope with a frustration. Mothers *must also* vary the frequency and intensity of behavioral

strategies to structure the child's development of these attention skills, including maternal variation in her emotion, physical movement, and language. These demands placed on parenting in toddlerhood create the need to provide depictions of sensitivity that include a focus on the component maternal structuring behaviors that assist the child in the acquisition of the key developmental skill of self-regulated attention. The current study explored the relations among sensitivity and component maternal structuring strategies.

Under current investigation were mothers' *strategic* use of emotion (positive and negative), physical movement, and language to harness child attention to promote self-regulation. A distinction is made within this project between mothers' general exhibition of these behaviors, and mothers' intentional use and variation of these communication modalities to gain and sustain her child's attention, the latter being the current focus. An example of emotion designed to capture a child's attention includes sudden display of positive emotion to signal to the child that the book the child is ignoring is very interesting and fun to read. Alternatively, a mother may inflect negative emotion while stating, "oh no, what happened to the boy (gasp), oh my," to encourage the child to redirect their attention back to the book. In regards to physical movement, a mother may point to the toy with which she wishes her child to play, and then demonstrate the toy's function. During the laboratory tasks under current investigation, mothers spoke to their children often. However, maternal use her language was only coded when mothers used verbal input to structure the child attention, such as saying, "look here" or "try this." Given this, future reference to maternal strategic use of emotion, language, and physical movement pertains only to the degree mothers exhibited these behaviors with the clear purpose of harnessing the child's attention, rather than the degree mothers simply exhibited these behaviors during communication (e.g. maternal expressiveness).

Previous work has demonstrated the significance of each of these maternal structuring strategies. Mothers and children have demonstrated extreme sensitivity to and awareness of each other's communication via vocal and physical movement (Cohn & Tronick, 1988). Furthermore, mothers' physical movements and emotional expression enhance infant attention to a task by facilitating turn-taking and reinforcing infants' spontaneous actions (Mayer & Tronick, 1985; Nwokah & Fogel, 1993). The literature on "motherese" suggests that the use of exaggerated positive intonation when talking to an infant maintains infant attention (Fernald, 1985) and is associated with competent parenting (Bettes, 1988). For young school-aged children, maternal verbalizations that rely on children's capacity for self-regulation and that focus children's attention, support learning and are linked with children's ability to display better independent planning and problem-solving (Gauvain & Rogoff, 1989; Hess & McDevitt, 1984; Landry, 1995; Tomasello & Farrar, 1986). This competent harnessing of child attention appears to contribute to child regulation during interaction, as maternal use of vocalizations, positive affect, and touch correlate negatively with infant distress (Crockenberg & Leerkes, 2004). The current project extended these findings by simultaneously examining each of these maternal structuring strategies (i.e. emotion, physical movement, and language) to determine the individual role each of these structuring strategies played in mother-toddler interactions when children were 18 and 24 months old. Previous work that has created composites of maternal behavior across methods of communication has likely obscured the role each communicative strategy plays in children's development (Van Egeren et al., 2001).

Examining the specific and well-operationalized behaviors mothers utilize to effectively encourage children's attentional skills has important clinical implications given that child acquisition of self-regulation is associated with social competence and less optimal development

in this area is associated with behavioral problems and pathology (e.g., Cole, Michel, & Teti, 1994; Eisenberg et al., 2004). Although the goal in clinical settings when working with parents is to increase the sensitive behaviors they exhibit toward their child, it is only possible to accomplish this goal if component, concrete, and teachable sensitive behaviors are identified within the literature. Currently, the specific behaviors parents use to structure self-regulation are not yet understood (Landry et al., 2000; Crockenberg & Leerkes, 2004).

Parental Characteristics that Predict Sensitive Structuring

Although the consequences of sensitive, competent parenting for child development are well established, the processes that support such parenting are not well understood (Dix et al., 2004). As mentioned previously, sensitivity is driven by a complex set of parental characteristics that regulate how parents interpret events, set goals for interactions, and respond to their children (Dix, 2000). If the behaviors currently conceptualized under the umbrella of ‘sensitivity’ entail a set of separate components, they are likely governed by different cognitive processes (Dix et al., 2004). As a result, the planned work to identify components of competent parenting has implications for understanding the determinants of competent parenting. To that end, the current project examined links between maternal cognition and structuring of child attention.

Maternal Cognition and Parenting Behavior

Cognition can be defined as a stable pattern of thought that assists individuals in making sense of their surroundings to organize behavioral responses (Newberger, 1980). Given the dynamic nature of parent-child interactions, there is significant cognitive demand placed on a parent, particularly if the parent is responding competently to the child’s needs (Tarabulsky et al., 1996). Due to this, the task of linking maternal cognitions with behavior is not a new endeavor (Holden & Buck, 2002; Teti & Gelfand, 1997). However, the majority of research on parenting

cognitions has focused on beliefs and attitudes (see Holden & Buck, 2002; Luster & Okagaki, 2005, for reviews). Despite the logic that parenting cognitions should predict parenting behavior, reliable relations were not often shown (Miller, 1988; Kochanska, 1990; Luster & Okagaki, 2005). To explain this, several reasons have been suggested. First, the pairing between the specificity of the content of parental thought and the parental behavior studied was not well matched (Kochanska, 1990). Situation-specific cognitive processes are the most likely to strongly affect parenting behaviors because cognitive processes within the moment of parenting serve to organize child behaviors and parental appraisals (Dix, 2000). Second, traditional measures of beliefs and attitudes only assess a small aspect of cognition, and methods examine the multifaceted aspects of cognition have been recommended (Sameroff & Feil, 1985). To address these points, it is necessary to look beyond the content of maternal thoughts to the underlying structure of their cognition, as the structure of cognition is purported to generalize beyond specific circumstances and capture nuances of maternal cognition that content alone cannot depict (Sameroff & Feil, 1985; Newberger, 1980; Slade, 2006).

A breadth of literature exists linking various cognitive constructs to parenting behaviors and child outcomes. To situate the current study within the extant literature, Table 1 provides a sampling of the major research topics and authors within the parental cognition literature. One approach to conceptualizing parental cognition is the social information framework, which considers the content, structure, process and products of parental cognition (Azar, 2003; Azar & Weinzierl, 2005). Table 1 is organized according to this framework. For brevity, the remainder of this review will include work within the second element – structure – as it is most relevant to the current project.

Structure of Maternal Cognition

The structure of parental cognitions refers to *how* parents are thinking, as opposed to *what* they are thinking or the content of thought. The social information framework concentrates on the structure of schemas to illustrate the ways in which schemas can vary in level of differentiation, flexibility, and complexity. Schemas are cognitive scripts that serve to organize experience and guide individuals when responding to various stimuli or within various situations (Mandler, 1979). They act as filters to determine to which cues in the stimulus and context the parent must attend. General schemas can exist for parenting and children (e.g. good parents provide structure for their children; children should pay attention to their parents), but parents may also have specific schemas for their family and children (e.g. our family sticks together through hard times; my child is an extrovert.). The quality of specific schemas regarding a child is determined by the complexity and differentiation with which the parent views the child. As seen in the social psychology literature, the differentiation and complexity in an individual's self-schema is associated in improved coping abilities, and can prevent threats to one aspect of the self (e.g. negative feedback at work) from spilling over into other aspects of one's life, allowing one to continue to perceive positive self-relevant information despite the presence of stress (Lineville, 1985). Thus, the complexity and differentiation of a parent's thoughts about a specific child's traits and behaviors allow the parent to perceive a wide range of child cues to enhance the likelihood of the parent behaving sensitively toward their child.

The examination of the structure (i.e. complexity) of parental schemas rather than only the content, allows for a more sophisticated understanding of maternal cognition. Additionally, information regarding structure is purported to be generalizable across a variety of parenting situations because it is not closely tethered to one topic or one specified aspect of parenting (e.g. parental beliefs about discipline to discipline practices). At the same time, the aspect of maternal

cognition most situation-specific to mother-child interactions may be mothers' conceptualization of their specific child (i.e. thoughts and information about the child's personality and behavioral patterns). The structure and complexity of this conceptualization is a tool mothers actively draw upon in the moment of interacting with their child to inform decisions about how to best respond to the child's needs; more complex representations of the child should equip the parent with a larger repertoire of parenting behaviors from which to choose when children do not comply with parental directives.

Complexity of maternal cognition. As such, maternal conceptual complexity is hypothesized to contribute to mothers' ability to utilize sensitive structuring strategies. The construct of conceptual complexity has been informed by various literatures within psychology (i.e. developmental, clinical, social, and cognitive); answering the call for developmental science to incorporate methods across disciplines (Sigel, 1986; Goodnow, 1988; Miller, 1988). As first described by Nix (1998), conceptual complexity involves the degree of sophistication of maternal description of her particular child. Akin to concepts within social psychology, such as Lineville's (1985) concept of self-complexity, the more child-relevant categories of descriptors or concepts a parent can provide when describing their child, the more complex understanding they have (Nix, 1998). Conceptual complexity is also related to the concept of psychological mindedness (Appelbaum, 1973), which is defined as, "a person's ability to see relations among thoughts, feelings and action, with the goal of learning the meanings and causes of his experiences and behaviors" (Appelbaum, 1973, p. 36). Congruent with theories on expertise (see Farrington-Darby & Wilson, 2006 for review), mothers demonstrate complex thinking about their child when they recognize categories among pieces of information and have information organized into a coherent and useful structure.

Parents with more complex conceptualizations elaborate on concepts provided, choose descriptors that are highly specific to their child, and include descriptors that span a variety of domains (Nix, 1998). As such, conceptual complexity is a part of a long-established application of Piagetian type analysis of thought – including the work of Kohlberg and Gilligan – that has formed the field of social cognition (Sameroff & Feil, 1985). In immature stages, individuals take only limited amounts of information into account and process information in simplistic ways. As individuals move into more mature stages, thinking becomes more comprehensive, differentiated, flexible, and conducted from multiple perspectives (Newberger, 1980; McDaniel & Lawrence, 1990).

Previous work, such as that of Sameroff and Feil (1985), has rated parents on the complexity of parental theories of general child development, which has repeatedly demonstrated relations with parental behaviors. For instance, maternal complexity when children were 12 months old was related to the degree of cognitive stimulation in the home environment at 36 months (Benasich & Brooks-Gunn, 1996), and complexity when children were 12 months old predicted mothers' warm sensitivity at 24 months (Miller-Loncar, Landry, Smith, & Swank, 2000). However, complexity as defined by Sameroff and Feil (1985) may be highly bound by socio-economic status. For instance, only 3% of a low SES sample was able to achieve the highest levels of complexity in Sameroff & Feil (1985). This may be because parents are rated on the complexity with which they conceptualize theories of *child development in general*, which is likely to be highly confounded with access to education. The current project seeks to identify an aspect of maternal cognition that predicts clinically meaningful individual differences in parenting within an economically strained, at-risk sample. The complexity with which parents think about their *own child* may be a more appropriate point of assessment because of its high

degree of relevance to parenting and because of its greater independence from other indices of risk. It is possible that mothers think complexly about their children, are experts on their kids if you will, in less advantaged circumstances, and that this expertise with one's child contributes to sensitive structuring of child attention.

These sentiments were mirrored by Newberger (1980) in her measure of parental awareness, as she found other measures of complexity did not discriminate behaviors among lower functioning mothers. Parental awareness is defined as the knowledge system that parents use to organize child responses to create policies for parental behavior (Newberger, 1980). Indeed, complexity was lower in parents with abuse histories than matched controls (Newberger & Cook, 1983), and it predicted parenting behavior above and beyond education and occupation (Dekovic & Gerris, 1992). Although Newberger's approach to studying maternal cognition influenced the current work significantly, the current measure of conceptual complexity possesses important differences.

Mainly, conceptual complexity is continuously rated from open-ended, non-structured questions to mothers. This decision reflects the assumption that the vast majority of mothers can generate answers for detailed questions about their child. However, the responses mothers spontaneously generate are the thoughts they naturally hold, rather than those constructed by psychologists (Miller, 1988). Given this, it is theorized that spontaneously generated information is more likely to be what mothers access when interacting with their child, making it more predictive of parenting behavior. These assumptions are supported by research on attitude accessibility within social psychology, in that attitudes most easily generated are most predictive of behavior (e.g., Kokkinaki & Lunt, 1997). Furthermore, maternal responses to specific questions that they have not thought about before are not likely to be predictive of parenting

behavior. For instance, Sigel et al. (1986) reported in their study of parental thoughts on how children learn, that parents often said they “had never given a moment’s thought” to some of the questions they were being asked. Use of naturally generated maternal narratives is a way to avoid such results, and offer important contributions to the study of mother-child relationships (Benoit, Zeanah, Parker, Nicholson, & Coolbear, 1997). It is hypothesized that mothers able to freely access a complex description of their child are more likely to address childrearing situations competently because they have more relevant information from which to draw in the moment. This greater understanding of the child is thought to contribute to more complex mothers possessing larger behavioral repertoires, allowing them to sensitively structure their toddlers’ attention.

The Clinical Applications of Maternal Conceptual Complexity

This project does not discount the influence that the content in of maternal cognitions has on maternal behavior. Indeed, the content of parental expectations (e.g., degree of developmental sensitivity) and attributions (e.g., degree of hostility) of child behavior is an important determinant of parenting quality, and has been demonstrated to predict parenting behavior (e.g., Barnes & Azar, 1990; Dadds, Mullins, McAllister, & Atkinson, 2003; Dopke & Milner, 2000; Haskett, et al., 2003; Lawrance & Twentyman, 1983). However, conceptual complexity of maternal thought is considered to be an important point of entry in clinical intervention because complexity will allow mothers to participate in the hypothesis testing, consideration of child perspective, and flexibility of thought needed to produce clinical change in the content of cognitions and ultimately parenting behaviors. As a result, independent from the content of parental cognition, the structure of thought is regarded as an important component needed for clinical change to occur. Indeed, such observation and hypothesis testing are central

aspects of parenting interventions that include cognitive elements (e.g., Azar & Twentyman, 1984; Azar, 1997; Forsterling, 1985; Slade, 2006), as cognitively based parenting interventionists propose that it is necessary to intervene with underlying cognitions to produce generalized and sustained behavioral changes in parents. A small but growing literature has begun to demonstrate that the inclusion of cognition elements in parenting interventions produces better parenting outcomes compared to behavioral, psychodynamic, or family therapy methods alone (e.g., Azar & Twentyman, 1984; Bugental et al., 2002; Cohen et al., 1999; Kolko, 1996; Sander et al., 2004).

Additionally, the assessment of conceptual complexity is brief, and easily implemented in a clinical setting, especially given that a parental description of their child is commonly a part of existing clinical intake interviews. This sets conceptual complexity apart from other related measures of maternal cognition that will be discussed in greater detail within the next section. Establishing the link between conceptual complexity and sensitive maternal behaviors would be an important contribution to clinical science, as reducing complex research methods to the necessary clinical components is highly regarded as an important task to bridge the gap between research and practice (e.g., Kazdin, 2003). As a result, this project applies a scientific approach to evaluate the possible importance of conceptual complexity in an effort to tap into the online cognitions of mothers that shape their behavior in the moment of interacting with their child.

The Structure of Cognition Studied within Attachment

Conceptual complexity is related to basic research and pilot clinical intervention work within the attachment literature; many attachment researchers have shifted their attention away from attachment related behaviors to the study of attachment relevant representations of the self and others because these cognitive representations are assumed to guide behavior (Slade, Belsky,

Aber, & Phelps, 1999). Most relevant to the current discussion are the work related to the Parent Development Interview (Aber, Slade, Berger, Bresgi, & Kaplan, 1985), the Working Model of the Child Interview (Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994), and reflective functioning (Fonagy, Steele, Moran, Steele, & Higgitt, 1991). The section below will discuss the overlap among these attachment concepts and approaches to measurement, and those involved in conceptual complexity, as well as the important differences among them and the unique contributions that conceptual complexity may offer. Please refer to Figure 1 for a visual representation of the current interpretation of the interrelations discussed below. Generally speaking, conceptual complexity as an explicit component of the Working Model of the Child Interview coding and reflective functioning. However, complexity may be uniquely involved in clinical change, that is sensitive to individual differences in cognition within diverse samples of mothers, and that involves a clinically feasible assessment method.

The Parent Development Interview (PDI) is a measure of parents' cognitive representation of the parent-child relationship by dimensionally assessing the degree to which parents flexibly and coherently describe their own and their child's emotional experiences during moments of interaction (Slade et al., 1999). Similar to work within expressed emotion (Brown, Birley, & Wing, 1972), maternal descriptions are coded along three dimensions – joy/pleasure, guilt/separation distress, and anger – which have been found to be related to parenting behavior (e.g., Slade et al., 1999). The three scales within the PDI are more oriented toward coding the content of the parental description than the structure of it. In contrast, conceptual complexity specifically concentrates on the structure of maternal descriptions because of the potential generalizability of this structure across a variety of parenting behaviors, the potential importance complexity plays during parenting intervention, and because of the hypothesized links between

complexity and sensitivity – mothers with more complex conceptualizations of the child have a greater understanding of the child and larger behavior repertoire from which to pull when responding to the child's cues.

The Working Model of the Child Interview (WMCI; Zeanah et al., 1994) is a method of classifying parents' representations of the parent-child relationship and of their young children as individuals. Based on Main's system for classifying adult attachment (Main et al., 1985), there are three possible characterizations of caregiver representations determined by consideration of the complexity and coherence of maternal descriptions of the child – balanced, disengaged, and distorted (Benoit, Zeanah, Parker, Nicholson, & Coolbear, 1997). Work with the WMCI has found that maternal classification is related to children's strange situation classification in non-clinical samples (Zeanah & Benoit, 1995; Benoit, Parker, & Zeanah, 1997; Crawford & Benoit, 2009), to maternal reaction time to emotional stimuli (Atkinson, Leung, Goldberg, Benoit, Poulton, et al., 2009), parenting behaviors (Benoit et al., 1997; Crawford & Benoit, 2009), and to clinical status of infants (Benoit et al., 1997).

Despite the promising findings using the PDI and WMCI, the major disadvantage to this type of work assessing maternal representations is that it is a highly time-consuming and expensive endeavor (Rosenblum, Zeanah, McDonough, & Muzik, 2004), calling into question whether the PDI and the WMCI are practical and sustainable. Work has begun to reduce the burden associated with transcribing and coding the WMCI by attempting to code reliably directly from videotaped interviews (Rosenblum et al., 2004). However, the clinical feasibility of these methods is not yet established, which has limited research examining WMCI relations with clinically relevant outcomes. In comparison, the assessment of conceptual complexity is quite brief, as the complexity of five minute maternal descriptions have predicted maternal behavior

(Cole & Reitz, 2005), and is accomplished via open-ended maternal descriptions of the child already collected in most intake interviews. These factors make conceptual complexity a highly relevant clinical construct, which is critical because it is necessary to integrate psychological science with practice by identifying clinically useful and practical constructs. Further, the categorical classification systems involved in the WMCI, compared to continuous ratings, are not as sensitive to cognitive or behavioral change as a result of intervention and reduce data analysis flexibility (Quay, 1986; Slade et al., 1999), limiting its usefulness in testing the effectiveness of treatments to alter maternal representations.

A third and most promising line of attachment cognition research examines the role of maternal reflective functioning in regulating parenting behavior and acting as a conduit for clinical change. Reflective functioning is defined as the ability to recognize, contemplate, reason about one's own and other's mental states (Fonagy et al., 1991). Similar to how I hypothesize that conceptual complexity is a mechanism for clinical change, attachment researchers regard reflective functioning as "potent catalyst for change" in parent-child relationships (Slade, 2006; pg. 642) and preliminary evidence suggests that changes in reflective functioning accounts for treatment gains (Schechter, Myers, Brunelli, Coates, Zeanah, Davies, et al., 2006; Schechter & Willheim, 2009; Suchman, DeCoste, Legow, & Mayes, 2008).

Enhancing parental reflective functioning involves helping the parent to think about the child in "increasingly complex and sophisticated ways" (Slade, 2006, pg. 642). As such, one might say that the complexity of maternal thought is at the core of reflective functioning (see Figure 1).

Reflective functioning considers the parent's capacity to contemplate how parental emotions and thoughts influence the child's emotions and thoughts directly, as well as how parental emotions interact with the child's to influence the parent-child relationship. Included in

this capacity is the parent's ability to recognize how their own relationship history affects their current reactions to the child. In this way, reflective functioning can be considered a broader measure of maternal cognition that encompasses a wider range of content that extends beyond maternal thoughts about the child. Although this additional content is certainly useful for the clinician and parent to be aware of and utilize in a treatment setting, how mothers think specifically about their child is the most salient or immediately needed information for treatment, providing rationale for honing in on this component of maternal thought. Further, comprehensive and lengthy treatments that intervene on multiple levels within parents (i.e. current thoughts and relationship as well as thoughts and feelings regarding relationship history) may not be possible within a community setting. Also, the explicit attention allocated to the projections and identifications of parents onto the child stems from a psychoanalytic framework (Slade, 2006), which may not be ecumenically useful to clinicians working from a range of orientations.

Additionally, reflective functioning programs seek to increase parents' thinking about the internal experience of the child rather than the child's behavior or personality. Researchers and clinicians who measure reflective functioning agree that parents possess widely varying abilities to understand how their own thoughts and feelings relate to their child's internal experiences (Slade, 2006), as such understanding requires a nuanced grasp of psychological processes. Ratings of conceptual complexity attend to this aspect of maternal thought, but it is also possible for mothers to obtain high scores by solely conceptualizing the child's behavior and personality, which could be considered to be more concrete and easily graspable concepts than children's and parents' mental states and feelings. By including elements of maternal thought that vary in their

level of sophistication, conceptual complexity includes a wider range that may include a type of “good enough” parental cognition (Winnicott, 1986).

As a result, the present study used the construct of conceptual complexity as a potentially sensitive measure of maternal cognition that can be utilized within high-risk samples. Support for this premise was found for the current sample; conceptual complexity predicted maternal sensitivity among mothers who were not highly verbal (Cole & Reitz, 2005). Also, Nix (1998) found lower complexity predicted child behavior problems in a low-income, urban sample above and beyond word number. Interestingly, although reflective functioning programs have been criticized for their potential inaccessibility or non-usefulness for parents with difficult relationship histories (e.g. Shulman, 2006), the influence of maternal verbal ability has not been explicitly discussed or tested, which again calls its appropriateness for high-risk samples into question. The present study seeks to address this gap by testing whether conceptual complexity predicts parenting behavior above and beyond maternal verbal IQ.

HYPOTHESES

Hypothesis 1: Maternal sensitivity relates positively to the frequency of maternal structuring of child attention skills (i.e. attention focusing, redirection, and distraction). Specifically, in the reading task, sensitivity relates positively to attention focusing and redirection. In the wait task, sensitivity relates positively to attention distraction and focusing. A sub-aim is to describe how sensitive mothers accomplish such structuring by investigating whether or not maternal sensitivity positively relates to mothers using all the structuring strategies (i.e., maternal emotion, physical movement, and language) under consideration.

Support of child acquisition of a skill has also long been regarded as a key component of sensitivity (e.g., Ainsworth et al., 1978; Belsky, 1984). Further, there is a burgeoning literature demonstrating important connections between children's attentional ability, self-regulation development, and psycho-social outcomes (e.g., Hart et al., 1998; Eisenberg et al., 1993; 2001; Kopp, 2002; Raver et al., 1999). As a result, it is expected that competent mothers encourage these skills more often than less competent mothers. This study examined parenting of 18 and 24 month olds because of the significant attentional and self-regulation skill development that occurs by the third year of life (Ruff & Rothbart, 1996; Kopp, 1989; 2002), making maternal structuring of these skills in anticipation of this development particularly important during toddlerhood.

However, it was expected that depending on the task, given the differential demands placed on the dyad, sensitive mothers would not encourage all child attention skills equally. Specifically, this study observed mother-toddler interactions in the laboratory during two tasks: reading task and wait task. In the reading task it was anticipated that maternal sensitivity would be related to the frequency of maternal focusing and redirection of attention because this task

required children to sustain their attention on a story for a five minute period. In contrast, it was anticipated that in the wait task maternal sensitivity would be related to the frequency of maternal distraction and focusing of attention because this task required children to not touch the desired present and play with the boring toy for a seven minute period or until the mother completed her work.

As explained above, depicting the component, teachable behaviors associated with sensitivity is desirable to improve prediction models of child development and the determinants of parenting (Lamb, 1987; Meins et al., 2001; Berlin et al., 2005; MacDonald, 1992; Teti & Huang, 2005; Davidov & Grusec, 2006), and will have important clinical implications. This study attempts to identify the behaviors mothers strategically utilize to harness their toddlers' attention.

Due to the unique demands of toddlerhood, including their assertion of their independence through use of their rapidly expanding cognitive and behavioral repertoires, competent parenting during this developmental stage involves the use of multiple behavioral strategies. As a result, it is hypothesized that sensitive mothers will *strategically* utilize their emotion, physical movement, and language more often and more intensely to promote the highly developmentally salient task of attentional control in their toddlers. Previous research indicates the importance of these specific maternal behaviors in gaining infants' attention (Cohn & Tronick, 1988; Fernald, 1985; Mayer & Tronick, 1985; Nwokah & Fogel, 1993), in assisting the child in self-regulation (Crockenberg & Leerkes, 2004), in supporting learning and more independent planning and problem-solving (Gauvain & Rogoff, 1989; Hess & McDevitt, 1984; Landry, 1995; Tomasello & Farrar, 1986), and in demonstrating competent parenting (Bettes, 1988). The current study extended this work by simultaneously examining these structuring

strategies within mother-toddler interactions to test whether each of these behaviors are equally related to sensitivity in the context of harnessing toddlers' attention. Evidence that these maternal behaviors are components of sensitivity will inform the design of clinical interventions aimed at improving parenting practices during the toddler years.

Hypothesis 2a: Maternal conceptual complexity positively predicts the component maternal behaviors that comprise sensitivity, above and beyond maternal verbal IQ. Mothers' conceptualization of their specific child, or the thoughts and information about the child's personality and behavioral patterns mothers possess, is the aspect of maternal cognition suggested to be most specific to mother-child interactions. The complexity of this conceptualization is a tool mothers likely actively draw upon in the moment of interacting with their child to inform decisions about how to best respond to the child's needs. This is because conceptual complexity is coded from open-ended maternal descriptions of the child, that presumably tap schemas mothers naturally hold about their children (Benoit et al., 1997; Sigel et al., 1986; Miller, 1988) and that are, as a result, most predictive of behavior (Kokkinaki & Lunt, 1997). Further, mothers who think complexly about their child, due to their greater understanding of the child and ability to process child information efficiently, are said to have a greater repertoire of behavior to choose from when responding to the child's needs (Nix, 1998). Findings within social, cognitive, and developmental psychology literatures support this hypothesized relationship, as it has been demonstrated that complexity of thought predicts general human and, specifically, parenting behavior (e.g., Lineville, 1985; Ceci & Liker, 1986; Appelbaum, 1974; Miller-Loncar et al., 2000; Newberger, 1980; Sameroff & Feil, 1985). Given this, conceptual complexity is hypothesized to positively predict the component structuring behaviors that comprise sensitivity.

It is possible that a relation between conceptual complexity and structuring strategies is merely due to maternal intelligence. Verbal IQ might be especially important as complexity might reflect general verbal ability rather than a knowledge base specific to one's own child. Although conceptual complexity is assumed to be related to maternal verbal ability, it is expected to predict parenting above and beyond verbal ability indices. This assertion is based on previous findings. For instance, Crockett's Role Category Questionnaire, commonly used within social psychology research to assess cognitive complexity, has repeatedly been free from confounding influences as verbal intelligence, verbal fluency, and IQ (see Burleson, Waltman, & Samter, 1987, for a review). Additionally, Nix (1998) found that when the number of words used in parents' descriptions of children was controlled, relations between complexity and child internalizing and externalizing problems increased. Finally, preliminary findings with the current sample indicate that conceptual complexity predicts global ratings of maternal sensitivity above and beyond maternal verbal IQ (Cole & Reitz, 2005).

Hypothesis 2b: Conceptual complexity is not related to a global measure of maternal positive affect, emphasizing the unique relation complexity has with aspects of maternal sensitivity. The complexity of maternal conceptualizations of their children is said to be specifically related to maternal sensitivity because greater understanding of the child and ability to process child information efficiently provides complex mothers with a greater repertoire of behavior to choose from when responding to the child's needs (Nix, 1998), allowing them to behave more competently. Given that conceptual complexity does not measure the content or emotional valence of maternal descriptions (i.e. mothers can have very complex negative conceptualizations), it is not expected to be related to the level of positive affect mothers express during interaction with their children. The absence of this relation will reinforce that complexity

of maternal thought about the child is not related to various measures of quality parenting, but that is uniquely related to the nuanced and dyadically coordinated behavior involved in sensitivity.

Hypothesis 3: The complexity of maternal cognitions about her specific child will positively predict the stability of maternal use of sensitive structuring strategies because a complex view of one's child assists mothers in being aware of and adjusting their parenting according to the changing developmental needs of the child to maintain sensitive structuring behaviors over time. Lawful discontinuities in sensitive parenting likely occur as children present new challenges. The task of adapting to children's changing needs and behavior may be more difficult for some parents than others, resulting in a lack of stability in competent parenting over time (Teti & Huang, 2005). Indeed, mean levels of maternal sensitivity, measured by global ratings during naturalistic home visits, decreases in the current sample between the child ages of 18 to 42 months (Crnic, Reitz, & Cole, under revision). It is asserted here that maternal conceptual complexity will predict mothers' ability to alter their structuring techniques in relation to the child's increasing attentional and self-regulatory competencies; maternal conceptual complexity will predict stability in the level of sensitive structuring strategies mothers utilize. This relation is expected because mothers with complex understandings of their children are likely to draw upon their differentiated and detailed information to detect and appreciate the child's changing needs, allowing them to appropriately adapt their parenting over time. Extant longitudinal relations support this possibility – maternal complexity about child development when children were 12 months old was related to the quality of the home environment at 36 months (Benasich & Brooks-Gunn, 1996), and complexity when children were 12 months old

predicted mothers' warm sensitivity at 24 months (Miller-Loncar, Landry, Smith, & Swank, 2000).

METHODS

Participants

This project will be conducted with archival data collected as a part of a longitudinal study that examined the development of emotion regulation in a population of typically developing children between the ages of 18 months and 6 years. Families were recruited through community outreach and birth announcements. The study focused on families with restricted income: household annual income that ranged from just above the U.S. government's definition of poverty but below or near the national median income based on family size. Families reside in rural areas and semi-rural towns. These economically strained families were studied because they share the demographic characteristics of families receiving psychological services for their children at our regional community mental health center (i.e., the families in the current sample were not selected because they receive mental health services, but because they match the demographic characteristics of the majority of family who are seen at Penn State's psychological clinic). There is less known about these economically strained, rural families when compared to studies of advantaged or very poor families, despite the fact that they represent ~ 85% of the families receiving medical assistance for child mental health services. Understanding how parents socialize self-regulation in this understudied population, and the aspects of parental cognition that contribute to this type of competent parenting, therefore, have clinical relevance. The present study sample included 120 families who participated in the 18-month home and laboratory visit.

Mothers were 30.45 years old on average ($SD = 5.29$) at 18 months. Given the geographical location, 98% of mothers classified themselves as Caucasian, while the remaining (2%) identified as being African-American, Latina, or of mixed race (Asian- and Euro-

American). Two percent of mothers did not complete high school, 19% finished high school, 15% participated in vocational school, and 64% of mothers took some college courses. Twenty-eight percent of mothers described themselves as unemployed or homemakers, 32% worked part-time, and 40% worked full-time.

Fathers were on average 33 years old ($SD = 6.19$) at time of entry into the study. Of the 118 families in which fathers were active participants in their children's lives, 98% identified as Caucasian and the rest identified as African-American, Latino or Asian descent. Four percent of fathers did not complete high school, 32% completed high school, 10% participated in vocation school, and 54% took some college courses. Most fathers worked full time throughout the study (range 92-96%).

Sixty-four boys and 56 girls comprised the sample. Ninety-four percent of mothers identified their children as White, with 6% of the children African-American, Latino-, or Asian-American. Forty-five percent of children were the first-born, 38% were second-born, and 17% were third-born or later. Average household annual income at 18 months was \$40,655 ($SD = 14,996$). Average family size at the study's outset was 3.9 ($SD = .91$) individuals. Family size increased slightly over time (30 month $M = 4.0$, $SD = .94$; 42 month $M = 4.2$, $SD = 1.0$), which reflected the birth of children. Despite the fact that marital status was not an inclusion criterion, 98% of the children were reared by parents who were married or cohabitating at the initial data collection point of 18 months of child age. This pattern was highly stable at both 30 and 42 months (96% at each time point).

Procedures

For the larger study from which data will be drawn, families were assessed every six months from child age 18 through 48 months, and then one year later when children were 5 years old. Assessments involved a variety of approaches that included parent interviews, self-report questionnaires, and behavioral observations in both home and lab-based contexts. Data for the current study consisted of the naturalistic home observation of parenting when children were 18 months old, parent-child interaction during two laboratory procedures when children were 18 and 24 months old, and parent self-report questionnaire and measure when children were 18 and 24 months old.

Lab Procedures

Reading Task

During the laboratory visits mothers and children participated in a variety of tasks designed to assess children's emotional and cognitive functioning, and the quality of mother-child interactions. The current study examined mother-child interactions during a reading task in which mothers were given wordless books and instructed to read to their child for 5-minutes. Mothers and children were able to choose from a selection of three books, and could freely switch among the books throughout the 5-minutes. All the books featured a boy, a dog, and frog who participated in various adventures together (e.g. fishing, going to a fancy dinner). The books were colorfully illustrated and mothers were able to create their own stories based on the content of the pictures.

This task was chosen for several reasons. First, it requires the child to *focus* their attention on one activity. Second, it is ecologically valid, as most mothers read to their children at some point in time, making mother-child behaviors exhibited in this task more likely to reflect

a pattern of behaviors that occur in contexts other than a laboratory setting. Additionally, most young children do not inherently want to read and/or are not able to complete this task on their own – a wide range of individual differences in children’s attentional abilities can be witnessed in this task – thereby creating a situation where mothers must utilize their knowledge about the child to help the child comply with or accomplish the task. Finally, literature on literacy and school-readiness emphasizes the importance of parents reading to their children for the development of reading ability (Dieterich et al., 2006; Landry et al., 2002), making the process of how mothers promote early literacy skills an important area of parenting behavior to understand. The 18 and 24 month reading tasks were coded for maternal structuring behaviors used in the current analyses.

Wait Task

Mother-child interactions were also examined during a task designed to elicit child frustration, in which the child must wait to open a desired wrapped present until the mother has completed her paperwork (Carmichael-Olson, Greenberg, & Slough, 1985). Mothers were previously familiarized with the procedure. As the assistant left the room, the mother said, “This is a surprise for you but you have to wait until after I finish my work to open it.” Mothers were told to do or say what they would typically do to complete the work. While the mother is working (the wait lasts for 7 minutes), the child is given a boring toy with which they can play. Compared to the reading task, the wait task resulted in less mother-child interaction because of the demands of the task: child waits while mother completes work. Also in contrast to the reading task, successful completion of the wait task requires the child to *distract* their attention away from the desired present.

Examining the manner with which mothers structure their children's attentional skills within both contexts, a task that requires focusing and one that requires distraction, allowed for better examination of sensitive structuring strategies that foster child self-regulation. Analyses will be conducted such that the two tasks are examined separately to allow for consideration of how maternal behaviors may vary across task demands.

Home Procedures

Naturalistic Parenting

The current study will use data regarding global ratings of maternal sensitivity and positive affect from the 18 month home visit. During this time point, single observers (trained graduate and advanced undergraduate students) visited the home at a time convenient for the family and when all members of the household would be present. Upon the observer's arrival, both parents were provided with a brief measure of daily stresses, which they were asked to complete and return during a subsequent lab visit. Following this, the child and parent observations were conducted. The observer was instructed to follow the child of interest across the observation period, but to try to be as unobtrusive as possible. Observers were asked not to communicate with the children or parents, but rather to blend as much as possible into the background.

Measures

Laboratory Measures

Maternal Verbal IQ

Mothers were administered the WAIS Vocabulary Subtest (Wechsler, 1997) at 24 months. This was used as a control variable to assess whether conceptual complexity predicts maternal behaviors above and beyond verbal ability. Although this data was collected at one

point in time and not concurrently with other measures, it is not considered problematic because intelligence is a highly stable trait in adulthood.

This subtest was chosen as a control variable for several reasons. First, the Vocabulary Subtest of the WAIS has been demonstrated to be the subtest that relates most strongly with the general intellect score when the entire test is administered, making it the best short-form proxy of “*g*” (Sattler & Ryan, 2009). Second, the assessment of maternal conceptual complexity relied heavily on mothers’ verbal abilities, as it was a written task. Given this, it was necessary to rule out whether any significant effects found could be better accounted by a more general verbal ability. Third, although verbal ability or IQ cannot be increased as a result of clinical intervention, it is possible that maternal conceptual complexity may be malleable to intervention (e.g., Schechter et al., 2006; Schechter & Willheim, 2009; Suchman et al., 2008). By parsing out the effects of general intellect, the clinical significance of the current findings was increased. For related reasons, maternal education status or academic functioning were not chosen as control variables, as these are also trainable intellectual qualities. Rather, the current study sought to demonstrate that conceptual complexity predicts parenting behavior above and beyond stable, intellectual ability, so that future projects can test and demonstrate that complexity is an aspect of cognition relevant to parenting that can be altered through intervention.

Maternal Conceptual Complexity

Maternal conceptual complexity was coded from mother’s open-ended, written descriptions of their children during the 18 month laboratory visit, called the My Child Essay. Mothers were provided with paper, given 5 minutes to complete the task, and simply instructed to describe their child in their own words. These essays were coded with Nix’s (1998) conceptual complexity coding system. This involved identification of each category of

descriptor the mother provided, and any elaborations or specific examples mothers provided for each category. Responses were converted into table format such that each category and relevant elaborations could be visually represented and distinguished from one another. See Figure 2 for an example. From these tables, the number of categories provided, the degree of new information contributed by elaborations, and the distinctiveness of the description were rated to determine a score of complexity. Complex essays included clearly differentiated descriptors from a variety of categories (including both traits and behaviors of the child), and elaborations that clarified the mother's description such that the reader was easily able to imagine what this child was like. Complex descriptions demonstrated breadth (differentiation) and depth (elaboration) of maternal understanding of her child. Coding reliability was established in conjunction with the creator of the scale from 15% of the sample to yield and intra-class correlation of .90.

Maternal Structuring

Two teams of undergraduate research assistants, trained by the first author, coded maternal structuring from video records of lab-based reading and wait tasks. In each instance, reliability was established in relation to the master coder, the first author. The first team consisted of 3 assistants who coded the 18 month reading task. The second team consisted of 2 assistants who coded the 24 month reading task, and the 18 and 24 month wait tasks. To shorten the amount of training time necessary to establish reliability with the master coder, the second team coded as a pair. This was helpful because the coding system required the coders to rate a variety of maternal and child behaviors, and having two coders work simultaneously reduced the cognitive demand on the individual. Once reliability was established, the master coder continued to provide weekly supervision to the teams and intermittently doubled coded tapes to prevent

observer drift. Reliability was established from 15% of the sample. Given that some of the coding decisions were categorical in nature, while others were ordinal or continuous, Cohen's Kappa values and intra-class correlations, respectively, were computed depending on the nature of the data, and are listed at the end of each section below that describe each aspect of the structuring coding system. Please see Figure 3 for a copy of the coding sheet and the Appendix for the complete coding manual, as these aids may be helpful in processing the large amount of information presented below.

Structuring was assessed based on the presence of 7 qualities every 15 seconds. First, coders determined whether or not maternal structuring occurred, i.e. whether mothers harnessed children's existing attentional skills in the service of self-regulation. The coding teams highly agreed with the master coder regarding whether structuring occurred, as reliability calculations yielded a Kappa value of .94.

Child attentional skills structured. If structuring occurred, the coder next described which child attentional skills the mother encouraged. These included *focusing, redirecting, and/or distraction*. When mothers structured child focusing they behaved in ways that supported the child in maintaining attention on a stimulus to which they are already attending. For instance, the child may have been looking at the book and the mother asked the child questions about the pictures or pointed to the characters and labeled their actions. When mothers structured child redirection they behaved in ways that encouraged the child to reorient to the task at hand once they have lost attention. For instance, the child may have been attending to the book, but then walked away to look at something else in the room. In reaction, the mother called the child back over with exaggerated inflection (e.g. surprise) as though the child was missing an exciting part of the story. When mothers structured child distraction they behaved in ways that

supported the child in switching their attention away from an activity. For instance, the child may have wanted to play with the surprise in the wait task, and the mother verbally suggested and physically demonstrated to the child how they could engage in a game with another toy instead. Maternal encouragement of each skill is simply marked present or absent and more than one attentional skill can be structured within any given 15-second epoch. The coding teams agreed with the master coder regarding which child attention skills the mother structured, as reliability calculations yielded a Kappa value of .81.

Maternal structuring strategies. Third, coders described the frequency and intensity with which mothers used their own *emotion* (both positive and negative emotion), *physical movement*, and *language* in their structuring bid (3-point scale; 0= does not use it, 2= used it almost constantly or intensely). Examples of maternal use of emotion include when mothers either positively or negatively inflected the tone of their voice when telling the story to indicate there is content to which the child must attend, or when mothers excitedly explained a possible distraction to the child to make the activity appear more enticing. Examples of maternal use of physical movement include when mothers pointed to pictures in the book to draw the child's attention to the story, when they acted out parts of the story, or when they demonstrated how the child could play with another toy as a distraction from the prize in the wait task. Examples of maternal language use include when mothers verbally explained a possible distraction for the child to execute, or when they labeled characters or objects within the story book to facilitate child focusing on the story. Reliability estimates yielded intra-class correlations of: .82 for positive emotion, .91 for negative emotion, .86 for physical movement, and .90 for language.

Maternal structuring quality. Fourth, the coders described the quality or degree of sensitivity with which mothers executed the structuring bid. Structuring quality mainly reflects

the degree to which mothers structured contingently on the child's needs within the epoch, and the degree of developmental sensitivity the mother displayed while doing so. Quality is comprised of maternal behavior that is contingent to her child cues (i.e. reacting to child behavior and emotions), is timed according to the child's interest level and behavior throughout the epoch, and is consistent with her child's developmental level (e.g. pace and content of her speech). Quality is rated on a 5-point scale (0= structuring did not occur; 2= contingent but not developmentally sensitive; 4= exceptionally well-timed, elaborate, and consistently developmentally appropriate). Reliability estimates yielded an intra-class correlation of .84.

Maternal structuring success. Finally, the child's response to maternal bids were rated on a 5-point scale (0= child resisted mother's bid, 1=child ignored the mother's bid, 2= child attempted but failed to successfully complete the behavior the mother tried to structure, 3= child successfully exhibited the desired skill but was a passive participant in the interaction, 4= child successfully exhibited the skill and was an active participant in the interaction). The child's level of responsiveness to maternal structuring, or the success of the structuring bid, was coded at the end of each epoch. Reliability estimates yielded an intra-class correlation of .91.

Home Measures

Maternal Sensitivity & Positive Affect

As described previously among the procedures, ratings of maternal sensitivity and positive affect were rated during a naturalistic home observation of the family using the Home Observation Coding System (Belsky et al., 1995). It is important to note that the lab and home ratings were conducted by independent observers. During the home visit, four separate observation periods of 10 minutes each were rated and from these ratings a mean value was created. Five minutes between each of the observation periods were scheduled to allow the

observer to complete the rating scales for each parent, the child, and different dyadic pairs for the previous 10 minute period.

Observers, graduate students and an advanced undergraduate student, were trained by Keith Crnic, a PI on the project, on videotaped sessions of home interactions and by conducting live home observations with an experienced coder until acceptable levels of reliability were established. Reliability criteria for training were defined as a minimum of 70% exact agreement and 95% agreement within one scale point (against a master coder) on the 5-point rating scales. To ensure cross-rater reliability and to avoid observer drift, consensus ratings were regularly conducted on videotaped home observations. Reliability was calculated from 7% of the home visits: 70% of ratings were an exact match and 98% were within one-point.

Sensitivity reflected that the parent has a child-centered awareness and behavioral attunement to the child's needs, moods, interests, and capabilities, and that this awareness guides the interaction. This was rated on a 5-point scale (1= not at all characteristic; 5= highly characteristic). Positive affect reflected the degree to which mothers exhibited verbal or non-verbal expressions of positive regard or warmth toward the child. This included behaviors such as praise of the child, smiling at the child, or physical affection directed at the child. Positive affect was also rated on a 5-point scale (1= not at all characteristic; 5= highly characteristic).

To inform a discussion of component behaviors of sensitivity, home sensitivity ratings were related to the frequency with which mothers encouraged children's attention skills, and the frequency/intensity with which mothers utilized each structuring strategies to do so.

RESULTS

Data Reduction

Values for each 15 second epoch were summed and averaged across epochs to create the variables used in the analyses. Specifically, frequency counts were created to index how often mothers encouraged each attention skill across each task, and how intensely/often mothers utilized each of the structuring strategies to do so. The ratings for the quality of maternal structuring were summed and divided by the number of epochs the mother structured, to create a value that represented the mean maternal structuring quality when structuring occurred. To track child success after maternal structuring, the 5-point scale was dummy coded into successful versus not successful (using a score of 3 as the cut-off). The occurrence of success was then summed and divided by the number of times mothers initiated structuring, to create a percentage of time children were successful in response to maternal structuring. For the home visit codes (maternal sensitivity and positive affect), mean values were created across the 6 coding epochs.

Descriptive Statistics

Descriptive statistics of the variables used in analyses are provided in Table 2. Examination of the mean values across tasks revealed that in the reading task, mothers primarily focused their children's attention, followed by redirected attention (18 months: $t(117) = 11.80, p < .01$; 24 months: $t(119) = 19.58, p < .01$), which became less frequent between 18 and 24 months of age ($t(117) = 11.02, p < .01$). Not surprisingly, mothers rarely needed to distract their children's attention from the books (e.g. look at posters because child lost interest in reading). To structure child attentional skills, mothers used most of the strategies tracked – positive

emotion, physical movement, and language – but rarely used negative emotion (p values of paired t-tests comparing negative emotion to each other strategy were all $< .01$). Children were generally responsive to maternal structuring attempts; child success proportions were $M = .66$, $SD = .23$ at 18 months, and $M = .84$, $SD = .22$ at 24 months, marking a significant improvement in child success over the 6 month period ($t(117) = 8.7$, $p < .01$).

In the wait task, at both ages, mothers structured children's attention less often than in the reading task probably because mothers had to complete work while supporting their child's waiting (18 months: $t(115) = 13.44$, $p < .01$; 24 months: $t(117) = 13.83$, $p < .01$). Mothers mostly tried to switch the child's focus of attention (distracting), followed by trying to sustain the child's attention on the distraction. Not surprisingly, mothers rarely redirected children's attention to the delay object. To structure child attention, mothers used most of the strategies observed – positive emotion, physical movement, and language – but rarely used negative emotion (p values of paired t-tests comparing negative emotion to each other strategy were all $< .01$). Children were responsive to maternal structuring attempts about a third of the time, as child success proportions were $M = .34$, $SD = .27$ at 18 months, and $M = .39$, $SD = .30$ at 24 months, which did not differ over the 6 month period ($t(114) = 1.61$, $p = .11$). There were significant differences in child success between the reading and wait tasks, with children generally being more successful in the comparatively less stressful reading task (18 months: $t(114) = 10.57$, $p < .01$; 24 months: $t(117) = 14.58$, $p < .01$).

Hypothesis 1

Maternal sensitivity relates positively to the frequency of maternal structuring of child attention skills (i.e. attention focusing, redirection, and distraction). Specifically, in the reading task, sensitivity relates positively to attention focusing and redirection. In the wait task,

sensitivity relates positively to attention distraction and focusing. A sub-aim is to describe how sensitive mothers accomplish such structuring by investigating whether or not maternal sensitivity positively relates to mothers using all the structuring strategies (i.e., maternal emotion, physical movement, and language) under consideration.

Due to developmental improvements in goal-directed attention during this age period, it was expected that sensitive mothers encourage attention skills in their children more often than less sensitive mothers. However, it was anticipated that maternal sensitivity would be related to different child attentional skills in each task. Specifically, sensitivity should predict the frequency of maternal *focusing* and *redirection* of child attention in the reading task and the frequency of maternal *focusing* and *distraction* of child attention in the wait task. As cited earlier, previous research indicates the importance of the structuring strategies under investigation in gaining infant attention, in assisting child self-regulation, in supporting child autonomy in planning and problem-solving, and in parenting competence. The current study extended previous work by examining these maternal behaviors with toddlers, by linking maternal structuring behaviors with independent ratings of sensitivity in the home as well as ratings of maternal sensitivity while structuring child attention in the lab, and by *simultaneously* examining the relation of maternal sensitivity to a number of structuring strategies.

Given this, tests of this hypothesis involved two main steps. First, the relations among maternal sensitivity independently assessed in a home visit and maternal structuring behaviors in standardized laboratory observations were examined. The instructions to the mothers for the home visit were for the family to act as they typically would. Given this, there was a wide variety of parent-child activities observed (e.g., meal time, family play, child play with peers while mother looked on, etc). Although mothers occasionally structured child attention within

these contexts, this specific aspect of parenting was not a focus of the home observations. In contrast, the laboratory tasks asked the mother to read with the child (reading task, which called upon the child to attend to the book) or to work while the child waited to open a gift (wait task, which called upon the child to turn attention away from the gift and the mother).

To provide a stringent test of the hypothesized relations, this first analysis of relations between maternal sensitivity in the home and maternal structuring did not take into account the quality (i.e. sensitivity) with which maternal structuring behaviors in the lab were administered. This approach also provided initial validation of the structuring coding system by demonstrating whether structuring behaviors were related to independent ratings of sensitive parenting.

The second analysis of relations between maternal sensitivity and maternal structuring was done *within* the standardized laboratory task. That is, further analyses were conducted to examine whether mothers who were judged to be sensitive in the context of a laboratory observation engaged in particular structuring behaviors. This approach described the behaviors of mothers who displayed sensitivity in two specific, standardized contexts involving toddler attention. This description sought to contribute to the literature by identifying the maternal behaviors that comprise sensitivity when structuring toddlers' attention skills.

Maternal Sensitivity in the Home

Links with encouragement of child attention skills. First, zero-order correlations were examined to test the presence of predicted relations between independent global ratings of maternal sensitivity during the home visit at child age 18 months and the frequency of maternal structuring of child attention focusing, redirection, and distraction during the laboratory reading and wait tasks at child ages 18 and 24 months. Results indicated partial support for Hypothesis 1 (see Tables 3 & 4).

In the reading task, as predicted, maternal sensitivity during the 18 month home visit was modestly associated with the frequency of maternal encouragement of child attention focusing at both 18 and 24 months, $r = .21, p < .05$; $r = .18, p < .05$, respectively. In addition, and unexpectedly, maternal sensitivity was inversely related to maternal encouragement of child attention redirection in the reading task; the correlations were of small magnitude, $r = -.15, p < .06$ at 18 months and $r = -.16, p < .05$, at 24 months. As anticipated, maternal sensitivity and maternal distraction of child attention were not related in the reading task at either age ($r = .05, p = .31$; $r = .11, p = .12$, respectively).

In the wait task, as predicted, maternal sensitivity was modestly associated with the frequency of maternal encouragement of attention focusing at 18 months ($r = .25, p < .01$) but this did not reach significance at 24 months ($r = .14, p = .07$). Unexpectedly, maternal sensitivity was not related to the frequency of maternal encouragement of distraction at either time point ($r = -.02, p = .40$; $r = .01, p = .48$, respectively), although a child's ability to switch attention away from a desired object is a developmental goal. As anticipated, maternal sensitivity was not related to the frequency of maternal encouragement of redirection of child attention in the wait tasks at either age (There was a very low occurrence of maternal redirection to the desired present. As a result of this restricted range, r could not be estimated at 18 months; $r = -.07, p = .22$, at 24 months).

Links with structuring strategies. To understand whether maternal sensitivity related equally to each of the maternal strategies for structuring child attention under examination, zero-order and canonical correlations were conducted. Zero-order correlations examined the relations between maternal sensitivity (during the 18 month home visit) and each individual structuring

strategy at each age point and in each task (see Tables 5 & 6) and canonical correlations were used to assess the relative strength of any associations.

For the reading task, maternal sensitivity was modestly related to two of four strategies, positive emotion and physical movement, at both 18 months ($r = .35, p < .01$; $r = .22, p < .05$, respectively), and 24 months ($r = .20, p < .05$; $r = .22, p < .01$, respectively). Negative emotion and language were not related at either time point (18 month $r = .07, p = .23$; $r = .10, p = .14$, respectively. 24 month $r = -.12, p = .10$; $r = .05, p = .28$, respectively).

For the wait task, maternal sensitivity modestly related to maternal use of her use of positive emotion at 18 months ($r = .21, p = .01$) and 24 months ($r = .23, p < .01$). In contrast to the reading task, maternal sensitivity was not related to maternal use of physical movement at either age point ($r = .14, p = .09$; $r = .01, p = .46$, respectively). At 24 months, maternal sensitivity was additionally related to maternal use of language ($r = .16, p < .05$) and inversely related to maternal use of negative emotion ($r = -.18, p < .05$).

Canonical correlations were used to compare the relative strength of relations between each strategy and sensitivity after variance explained by other structuring strategies was controlled. Again, maternal sensitivity at the 18 month home visit was used to simultaneously predict structuring strategies. This further addressed the aim of identifying the behaviors that are components of maternal sensitivity in the specific context of structuring toddler attention. Canonical loadings (L) were interpreted because they are more stable than canonical weights and are less subject to effects of multicollinearity (see Table 7 for canonical correlation data).

For the reading task, the canonical correlations at both 18 and 24 months indicated that maternal use of positive emotion and physical movement were related to maternal sensitivity (18 months: $L = .97, p < .01$; $L = .61, p < .05$, respectively; 24 months: $L = .69, p < .05$; $L = .77, p$

< .05, respectively). In other words, even when considered simultaneously, the findings replicated the zero-order correlations findings. At 18 months, the canonical correlation equaled .36, indicating that the structuring strategies shared 12.90 percent of variance with maternal sensitivity measured at 18 months. At 24 months, the canonical correlation equaled .28, indicating that the structuring strategies shared 7.8 percent of variance with maternal sensitivity measured at 18 months.

For the wait task, maternal use of positive emotion at 18 months was related to maternal sensitivity ($L = .82, p < .05$). The canonical correlation equaled .25, indicating that the structuring strategies shared 6.25 percent of variance with maternal sensitivity measured at 18 months. At 24 months, maternal use of positive emotion was also related to maternal sensitivity ($L = .84, p < .01$). Once positive emotion was considered as a structuring strategy, the relations for maternal use of negative emotion and language (which were significant in the zero-order correlations) approached but did not reach significance ($L = .36, p = .10$; $L = .39, p = .08$, respectively). The canonical correlation equaled .45, indicating that the structuring strategies at 24 months shared 18.08 percent of variance with maternal sensitivity measured at 18 months.

Maternal Sensitivity when Structuring in the Lab

This second set of analyses addressed the relation between structuring and maternal sensitivity within the standardized laboratory tasks. First, it is noteworthy that zero-order correlations indicated that maternal sensitivity based on the home observation was related to the quality of maternal structuring in the lab, for the reading task at both ages and for the wait task at 24 months. Specifically, at 18 and 24 months, maternal sensitivity was related to the quality of structuring in the reading task ($r = .31, p < .01$; $r = .38, p < .01$, respectively), and at 24 months

to the quality of structuring in the wait task ($r = .27, p < .01$). Maternal sensitivity was not related to structuring quality in the 18 month wait task ($r = .09, p = .18$).

Concurrent links with encouragement of child attention skills. For the reading task, zero-order correlations (see Table 8) indicated that the quality of structuring was, as expected, related to the frequency of maternal focusing of child attention on the books at 18 and 24 months ($r = .42, p < .01$; $r = .56, p < .01$, respectively). Contrary to expectation, but consistent with the findings when maternal sensitivity in the home was examined, the quality of maternal structuring was inversely related to the frequency of maternal redirection of child attention in the 18 and 24 month reading tasks ($r = -.21, p < .01$; $r = -.49, p < .01$, respectively).

In the wait task (see Table 9), as expected, the quality of maternal structuring was positively related to the frequency of encouraging the child to distract from the gift at 18 and 24 months ($r = .39, p < .01$; $r = .30, p < .01$, respectively), and to the frequency of focusing of child attention on an alternative activity; this approached significance at 18 months and was significant at 24 months ($r = .14, p = .07$; $r = .21, p < .05$).

Concurrent links with structuring strategies. As hypothesized, zero-order correlations (see Tables 10 & 11) indicated that maternal strategic use of positive emotion, physical movement, and language were consistently related to the quality of structuring at both ages and for both tasks. Specifically, in the reading task, the significant relations were as follows during the 18 and 24 time points, respectively: positive emotion, $r = .61, p < .01$; $r = .55, p < .01$; for physical movement $r = .33, p < .01$; $r = .40, p < .01$; and for language $r = .59, p < .01$; $r = .20, p < .05$. In the wait task, the significant relations were as follows during the 18 and 24 time points, respectively: positive emotion, $r = .47, p < .01$; $r = .47, p < .01$; for physical movement $r = .30, p < .01$; $r = .15, p < .05$; and for language $r = .36, p < .01$; $r = .27, p < .01$. Contrary to expectation,

but consistent with relations found when maternal sensitivity in the home was examined, structuring quality was inversely related to maternal strategic use of negative emotion although this relation only reached significance in the 24 month wait task ($r = -.22, p < .01$).

As a final step in describing how mothers who were sensitive in the lab structured their children's attention, linear regression analyses were conducted. These analyses described the degree to which each specific structuring strategy accounted for variance in the quality which mothers structured, after the variance explained by the other structuring strategies was controlled (see Table 12). Structuring quality was the dependent variable and structuring strategies were simultaneously entered as predictor variables.

For the reading task, at 18 months the results differed from the previously reported findings. Although maternal use of positive emotion was a significant predictor, maternal strategic use of language was also significant. At 24 months, the regression results were consistent with the relations between maternal sensitivity in the home and structuring behavior in the lab; structuring sensitivity was positively predicted by maternal strategic use of positive emotion and physical movement.

In the wait task, sensitivity was predicted by maternal use of positive emotion at both 18 and 24 months. However, at 18 months maternal use of her language was also a significant predictor. Finally, at 24 months maternal use of negative emotion was inversely related to structuring quality.

Hypothesis 2a

Maternal conceptual complexity positively predicts the component maternal behaviors that comprise sensitivity, above and beyond maternal verbal IQ.

To test this, maternal verbal IQ score was entered on the first step of a regression analysis and maternal conceptual complexity at 18 months was entered on the second step. These variables were used to predict the structuring strategies that were positively related to independent ratings of maternal sensitivity: maternal strategic use of her positive emotion and physical movement (raw scores were summed) in the reading task, and maternal strategic use of her positive emotion in the wait task. These analyses tested the hypothesis that conceptual complexity explains unique variance in the behavioral components of sensitivity within context of structuring, apart from the variance explained by maternal verbal IQ.

Examination of zero-order correlations (Table 13) revealed two modest relations among the predictor and outcome variables: conceptual complexity was positively related to the 18 month reading task composite of maternal use of positive emotion and physical movement ($r = .19, p < .05$), and maternal verbal IQ was positively related to the same 18 month reading task composite ($r = .20, p < .05$). Maternal verbal IQ and conceptual complexity were also positively related to each other ($r = .35, p < .01$). Given the correlation results, it was not surprising that neither conceptual complexity nor verbal IQ predicted the sensitive structuring strategies (see Table 14).

As conceptual complexity did not predict maternal structuring strategies use, a follow up analyses was conducted to test whether conceptual complexity predicted the sensitivity of maternal structuring during the 18 month lab tasks. In this case, conceptual complexity was a significant predictor of structuring quality in the reading task, above and beyond the variance explained by maternal verbal IQ. When predicting to the sensitivity of structuring in the 18 month wait task, maternal verbal IQ was not a significant predictor but conceptual complexity was a marginally significant predictor (see Table 14).

Hypothesis 2b

Conceptual complexity is not related to a global measure of maternal positive affect, emphasizing the unique relation complexity has with aspects of maternal sensitivity.

A canonical correlation was conducted in which maternal conceptual complexity at 18 months predicted maternal positive affect and sensitivity from the 18 month home visit (including maternal verbal IQ as a control variable). This approach allowed for the direct comparison of maternal sensitivity and positive affect, providing for a test of the unique relation that conceptual complexity has with maternal sensitivity. As expected, maternal verbal IQ and maternal sensitivity were positively related to conceptual complexity ($L = .85, p < .01$ & $L = .65, p < .01$ respectively), but, the global rating of maternal positive affect during the home visit was not (see Table 15). These results support the hypothesis, as conceptual complexity appears to have a unique relation with sensitivity that did not account for another positive aspect of parenting behavior.

It should be noted, however, that the zero-order correlation between maternal sensitivity and positive affect was strong ($r = .77, p < .01$; see Table 16), which raises the problem of multicollinearity. Although .80 is one of the generally accepted threshold above which predictor variables should not correlate (Tabachnick & Fidell, 2007), given the strength of the current correlation in question, two separate regression equations were estimated for sensitivity and positive affect separately. This provided a basis to compare the results generated in the two approaches as a means of addressing whether the results of the canonical correlation were due to multicollinearity. In each regression, maternal verbal IQ score was entered in the first step and conceptual complexity on the second step. The results do not provide evidence that the canonical correlation findings were due to multicollinearity (see Table 17). Conceptual

complexity predicted maternal sensitivity above and beyond maternal IQ, but it did not predict maternal positive affect. Given the consistency in the results across these two methods, support of the original hypothesis was found.

Hypothesis 3

The complexity of maternal cognitions about her specific child will positively predict the stability of maternal use of sensitive structuring because a complex view of one's child assists mothers in being aware of and adjusting their parenting according to the changing developmental needs of the child to maintain sensitive structuring behaviors over time.

This hypothesis examined stability in maternal sensitivity when structuring over time. To examine this aspect of structuring, a transactional approach was adopted that took into account child effects, as children are regarded as active participants within mother-child interactions (Bell, 1968). The hypothesis predicted that mothers who have complex conceptualizations of their child recognize developmental change in their child to maintain stable levels of sensitive structuring across both age points. Given this, a few analytical steps were required to fully address these components.

First, using descriptive and correlational analyses, the stability of the quality of structuring was examined between the child ages of 18 and 24 months (see Tables 2 & 18). For the reading task, the sensitivity of structuring means increased as a function of child age (18 month $M = 2.59$; 24 month $M = 3.15$; $t(117) = -10.15, p < .01$). For the wait task, the sensitivity of structuring did not change between child ages 18 and 24 months (18 month $M = 2.40$; 24 month $M = 2.44$; $t(114) = -.95, p = .35$). Correlations between the sensitivity of structuring across age points (within task) indicated the 18 month quality predicted the 24 month scores, reading task $r = .42, p < .01$ and wait task $r = .30, p < .01$.

As noted, because the child's behavior in these different tasks might influence the degree to which maternal behavior changes or remains stable, further analyses were conducted that incorporated the child's behavior. To account for the non-independence of maternal and child measures, the Actor-Partner Interdependence Model was used (APIM; Cook & Kenny, 2005). Of interest were the actor effects, which in this case are defined as the stability in mother sensitive structuring between 18 and 24 months, and the partner effects, which in this case are defined as the influence of the child's behavior at 18 months (i.e. child response to maternal structuring) on maternal structuring quality at 24 months. This type of analysis allowed for the examination of the stability of maternal structuring while controlling for child effects, as it is possible that children who shift and focus their attention effectively more often are easier for mothers to interact with, which would contribute to maternal sensitivity in this context. The APIM model uses a regression approach. To test the question of stability independent of child effects, two regressions were estimated (one for the reading task and one for the wait task) with the sensitivity of maternal structuring at 24 months as the dependent variable. The sensitivity of maternal structuring at the 18 month lab visit was entered into the first step, and the percent of time the 18-month-old complied with mother's direction was entered into the second step.

The percent of time the 18-month-old child complied with maternal structuring efforts during the 18 month reading task explained significant variance in maternal sensitive structuring during the 24 month reading task such that children who complied more often tended to have mothers who increased in their structuring sensitivity across the 6 month period. In contrast, child behavior within the 18 month wait task did not predict the sensitivity of structuring in the 24 month wait task. Maternal sensitivity in structuring at the 18 month lab visit was a significant predictor of her sensitivity at 24 months for both tasks (see Table 19 for regression results).

To test the expectation that conceptual complexity predicts stability in the sensitivity of maternal structuring over time, difference scores were created to represent the degree of each mother's change or stability. Specifically, 24 month structuring sensitivity was subtracted from the 18 month value. This was done for the reading and wait tasks separately to yield two difference scores that were examined in separate regression analyses. A positive value reflected a reduction in sensitivity over time and a negative value reflected an increase in sensitivity over time. Regardless of whether the value of the difference score was positive or negative, greater values reflected more change in maternal behavior and smaller values reflected more stability in maternal behavior over time. It was hypothesized that complexity would negatively predict the value of the change scores (or positively relate to greater stability in maternal behavior). The difference scores were included the dependent variables, with maternal verbal IQ (step 1) and conceptual complexity (step 2) used as the independent variables. Contrary to this hypothesis, conceptual complexity and maternal verbal IQ were not significant predictors of this stability for either the reading or wait tasks (see Table 19).

DISCUSSION

The current project had two main objectives. The first was to address the need to identify operationalized behaviors sensitive mothers utilize when interacting with their toddlers so that this knowledge can be applied to teaching maternal behaviors in clinical practice as well as to informing parenting theory (Berlin et al., 2005; Davidov & Grusec, 2006; Keller et al., 1999; MacDonald, 1992; Meins et al., 2001; Teti & Huang, 2005; Lamb, 1987). The context of maternal promotion of toddler self-regulated attention was chosen for examination because attentional control has been found to be a critical skill involved in multiple aspects of social and academic competence (Hart et al., 1998; Eisenberg et al., 2001; Wilson, 2003). More sensitive mothers were expected to promote these skills in their young children more often than less sensitive mothers. The extent to which mothers utilized their emotion, physical movement, and language to structure children's attention were considered behavioral strategies that comprise sensitive parenting in this important developmental context. The findings suggest relations among independent ratings of maternal sensitivity in the home and maternal encouragement of toddler attention in laboratory tasks, although the magnitude of the relations was generally modest. Within task, concurrent relations between maternal sensitivity when structuring and the frequency of maternal encouragement of child attention, and maternal behavioral strategies were more robust. The findings are a first step toward greater specification of the structuring strategies of sensitive mothers of toddlers.

The second main objective was to demonstrate that the complexity with which mothers conceptualized their toddlers was a predictor of sensitive structuring, concurrently and over time. The results in this area were mixed. Although complexity predicted global indices of maternal

sensitivity in two different contexts—in the natural setting of home and when structuring in the lab—it did not predict the specific structuring strategies under examination.

Maternal Structuring of Child Attention and Sensitivity

Links with Independent Ratings of Sensitivity

Given that successful self-regulation calls for various types of attentional control (Rueda et al., 2005) and that the attention skill important to success depends largely on task demands, the current study examined maternal structuring of child attention focusing, redirection, and distraction within two laboratory tasks (reading and wait task) chosen to require different attentional skills from children. As expected, mothers who demonstrated greater sensitivity during a naturalistic home observation also encouraged their toddlers to focus their attention more often than less sensitive mothers during two laboratory tasks. This was an expected relation because the importance of maternal support of child attention focusing has repeatedly been demonstrated (Bornstein & Tamis-LeMonda, 1989; Coates & Lewis, 1984; Findji, 1993; Landry, 1985; Landry & Chapieski, Raver, 1996), and therefore purported to be an aspect of sensitive parenting.

This finding is particularly interesting, however, within the context of the wait task. Specifically, for a child to successfully negotiate the demands of this situation (i.e. to not touch a wrapped present and to play with a boring toy instead) shifting attention away from the delay object has been shown to be an effective strategy (Mischel et al., 1989). However, in this delay of gratification context, maternal structuring of the child's ability to distract was not associated with independent ratings of sensitivity in the home. Rather maternal effort to help a child focus attention was associated with maternal sensitivity. Mothers were regarded as focusing their child's attention when the child responded successfully to a maternal bid to distract (e.g. played

with the boring toy), and the mother followed this with another behavior to support the child focusing on the distraction (e.g., saying, “yeah, that’s right, see how far you can throw it.”).

This finding is likely because the demand characteristics of the task may have led most mothers, regardless of their level of sensitivity to their child, to encourage their toddlers to distract themselves with the boring toy. All mothers were instructed by the examiner to verbally prohibit their child not to touch the present and to wait until the mother was done with her work. To accomplish this, most mothers also encouraged their children to distract themselves by playing with the boring toy instead, and relied upon this strategy throughout the rest of the task. Given this, it was not the attention shifting but the mother’s efforts to support the child’s new focus of attention that was related to sensitivity. It is as though more competent mothers went above and beyond the situation requirements to truly assist their child in being successful at a task that was rather challenging for such young children.

As anticipated, the reading task provided a different view of maternal structuring and its relation to sensitivity. However, contrary to prediction, maternal sensitivity was negatively related to redirection of child attention in the reading task. This was surprising because 18 and 24 month olds as a group have difficulty focusing on book reading for 5 minutes (Banerjee & Tamis-LeMonda, 2007), although there are individual differences in this ability. It was expected that more sensitive mothers would recognize when their children’s attention was shifting from the book and, because of the importance of joint attention and reading (Dieterich et al., 2006; Landry et al., 2002), attempt to help their children use their own attentional control skills to redirect attention back to the book. Two possible explanations were generated for this unanticipated finding.

First, it may be that toddlers are too young to benefit from this type of structuring and therefore it is not yet a sensitive behavior. Executive control of attention, which allows children voluntary, self-directed command of their attention, is believed to generally emerge around 30 months of age (Posner & Rothbart, 1998). Given this, it is possible that rather than redirecting the child's attention, following the child's lead and providing enhancement of the child's focus of attention may be more appropriate at this young age, which was linked with maternal sensitivity in the current sample and has been demonstrated to be effective with infants within the joint attention literature (e.g., Fogel, 1993; Raver, 1996). The current study replicated and extended findings within the infancy literature by demonstrating the continued importance of this type of maternal support in toddlerhood. Planned future studies with the current sample will seek to clarify this finding by examining the effect of maternal encouragement of young children's redirection verses focusing on children's later regulatory outcomes.

A second possibility is that less sensitive mothers have a history with their child of not properly supporting the child's attentional development, and, as a result, less sensitive mothers have children who are less attentive during a reading task and who require maternal redirection more often. Alternatively, children who are biologically less attentive, either due to temperamental factors or neurological deficits, may be harder to parent, and, as a result, less attentive children evoke less sensitive responses from their mothers. Future work will also include the modeling of the quality of maternal structuring over time and its relation with improvements in child self-regulation, while accounting for child characteristics including temperament and executive functioning.

Links with Sensitivity while Structuring

This study also examined the relations among the frequency of encouragement of child attention skills and the quality of maternal structuring in the lab tasks to accomplish the sub-goal of describing how sensitive mothers behaved while structuring toddler attention. Ratings of maternal sensitivity within the home were done within a heterogeneous naturalistic context that included many instances of mother-child interaction that did not involve maternal structuring (e.g., meal time, free-play, daily chores and routines). As a result, this study made the additional contribution of illustrating what sensitivity looks like within the highly specific context of structuring toddler attention. Interestingly, the link between structuring of child attention focusing and sensitivity was also supported when the relations among structuring quality within the lab tasks and encouragement of child attention skills were examined. This serves to reinforce the importance of this maternal behavior throughout infancy and now toddlerhood.

Additionally, correlations that examined the relations among attention skills and structuring quality revealed a negative and substantial relation between the quality of structuring and the frequency mothers redirected their toddlers' attention during the reading task. This was also consistent with the findings based on independent home ratings of sensitivity. This finding helps to contextualize the previously discussed inverse relation, as it appears likely that the quality with which mothers administered their structuring attempts affected whether children sustained attention on the books, and thus the frequency with which mothers needed to redirect the child. The previously discussed explanations for this negative relation also remain likely.

Although the frequency of maternal distraction of child attention within the wait task was not related to home visit ratings of sensitivity, distraction was positively related to coders'

impressions of the sensitivity with which mother administered structuring within the lab. This was not surprising given that the same coders rated both behaviors, and they were likely to have an expectation that a sensitive mother in the wait task would assist the child by encouraging them to play with the boring toy. Interestingly, maternal focusing of toddler attention was also related to coders' impressions of the quality of maternal structuring. Again, it appears that mothers who structured sensitively went above and beyond the task demands by further encouraging their children's distraction away from the wrapped present and onto an alternative activity.

How Sensitive Mothers Accomplished Structuring

Once the modest relations between maternal sensitivity in the home and the overall frequency of structuring were established, the next aim of the current study was to identify the specific behavioral strategies sensitive mothers utilize to harness their children's attention. To adequately study parenting during the toddler period, it must be recognized that this developmental stage is unique in many aspects (Brownell & Kopp, 2007; Schoppe-Sullivan et al., 2004), and as a result, requires mothers to vary the frequency and intensity of behavioral strategies they use to structure the child's development of attention skills. Under investigation were relations among sensitivity and mothers' strategic use of her emotion (positive and negative), physical movement, and language when harnessing child attention to promote self-regulation, and the stability of these structuring strategies over a six month period. These maternal structuring strategies were selected because of their previously demonstrated communicative functionality, and positive relations with desirable parenting quality and child outcomes (Cohn & Tronick, 1988; Mayer & Tronick, 1985; Nwokah & Fogel, 1993; Fernald, 1985; Bettes, 1988; Crockenberg & Leerkes, 2004). Recall from the introduction, that the presence of these behaviors was not coded when mothers simply displayed these modes of

communication, but rather when they executed them with the clear purpose of harnessing the child's attention, therefore, making them strategic in nature. The current project extended previous work by simultaneously examining these maternal structuring strategies relations with maternal sensitivity to determine the unique and individual role these behaviors played in dictating the quality of mother-toddler interactions.

Ratings of maternal sensitivity were linked with a number of the structuring strategies across age points and tasks, demonstrating that these behaviors are indeed components of a previously diffuse construct. However, the relations varied depending on whether sensitivity was rated independently within the home visit, or simultaneously during the lab tasks, child age and, structuring context.

Specifically, greater sensitivity (independently rated) was associated with greater strategic use of positive emotion and physical movement in the reading tasks, and with greater strategic use of positive emotion in the wait tasks. It was noteworthy that mothers' non-verbal structuring strategies were consistently related to sensitivity, as these may be more effective behaviors at capturing 18- and 24-month-old's attention because of children's limited linguistic sophistication at this age. This is related to work with infants, where it is indicated that exaggerated tones of voice and inflection are effective in engaging infants in interaction and are associated with high quality parenting (Fernald, 1985). The current findings point to this aspect of dyadic communication as continuing to be important for children throughout toddlerhood, which is a contribution to the understanding of sensitive maternal behavior not previously established within this age range.

In addition to this finding coinciding with, and extending, the infant language development literature, it may also be relevant to work linking maternal depression with poor

child regulatory outcomes. Face-to-face interactions between mothers and infants have been studied to inform the mechanisms through which maternal depression diminishes mothers' ability to respond sensitively to their children and hinders children's emotion regulation development, as it is in this context that mothers externally regulate the infant's immature emotional systems. There is clear evidence that infant behavior during face-to-face interactions is determined by the quality of maternal behavior (Field, 1980; Tronick, 1982), especially maternal affect (Cohn & Tronick, 1983), and that depressed mothers display less positive and more negative affect when interacting with their infants (Cohn, Matias, Tronick, Connell & Lyons-Ruth, 1986; Cohn & Tronick, 1989; Field et al., 1988; 1990).

The current study examined dyadic interactions between mothers and toddlers within the context of maternal structuring of child attention to increase understanding of the behavioral mechanisms through which maternal sensitivity promotes children's development of self-regulation, as attention skills appear to play an important role in emotion regulation outcomes (Kopp, 2002). In both contexts of supporting young children's self-regulation, it appears that maternal use of positive affect to engage her child is a key part of sensitive parenting, and one notably that is impaired in mothers with psychopathology. Maternal strategic positive emotion may uniquely assist children throughout infancy *and* toddlerhood in acquiring the emotional and attentional regulation skills that culminate to influence a host of child outcomes. As a result, the current study extends extant work with mother-infant dyads, and provides a contribution to multiple literatures pertaining to the identification of the specific mechanisms that influence children's self-regulatory outcomes.

That physical movement in the reading task was a component of sensitivity makes sense when one considers that this took the form of mothers using their movement to illustrate the

content of their speech, which provided particularly rich and sensitive input to the children. An example of this behavior is a mother saying, “See the frog? He is on the boy’s head!” while pointing to her head. By 24 months, in the wait task, maternal sensitivity was positively related with maternal use of her language, presumably because by that age, and in a task that relied upon repeated maternal verbal instructional support for the child to be successful (e.g. “remember, you can’t touch the prize until mommy is done”), children are better able to take advantage of the linguistic input.

When examining how mothers structured sensitively in the laboratory tasks, another layer of information was added. Specifically, the quality with which mothers structured was also consistently related maternal use of positive emotion, across tasks and age points, highlighting the importance of positive emotion in competent parenting of young children. However, quality of structuring was also positively related to mothers’ strategic use of language to harness the child’s attention in the 18 month reading task. Initially this finding appeared contradictory to the above interpretation that non-verbal structuring strategies were more sensitive for children within this young age range. However, it was rare for mothers to structure without speaking to their children; recall that mothers administered these strategies in conjunction with one another, such that mothers coupled the use of their positive emotion with the use of their language. Given this, this finding may reflect that more sensitive mothers utilized their positive emotion to support their children’s attention development, and spoke to their children more often while doing so than less sensitive mothers. Indeed, maternal strategic displays of positive emotion and use of language were highly correlated with one another in the 18 month reading task.

Contrary to prediction, in the 24 month wait task, maternal sensitivity, in the home and in the lab, was associated with less maternal use of her negative emotion. This was unexpected

because maternal negative emotion in the context of structuring did not reflect maternal exasperation or irritation, but rather strategic use of negative emotion to harness the child's attention, such as deepening the voice to reiterate the rule about waiting to open the gift or displaying sadness to focus the child's attention on an element of the book's story (e.g., "oh no, the froggie is hurt!"). However, very little is understood about this aspect of parental communication. Due to toddler development of autonomy assertion, it seemed reasonable to assume that mothers might use negative emotion to convey limits and to focus attention. However, toddlers may not distinguish variations in maternal negative emotion, or they may be upset by maternal negative emotion, such that negative emotion is not a sensitive strategy at this age. It may also be that when mothers purposefully inflected a negative tone to gain their child's attention, they might have felt genuinely frustrated with the child. This appeared to occur mainly during the wait task as mothers had to accomplish two goals: supporting their child's ability to wait and finishing their paperwork for the examiner. Perhaps more sensitive mothers remained calmer in such a situation. Alternatively, maternal strategic use of her negative emotion may be related to other aspects of competent parenting, such as monitoring or limit setting.

The stability of maternal structuring across the 6 month time period was also considered. Examination of the mean levels of structuring quality revealed a significant increase within the reading task. In the wait task, maternal structuring quality exhibited stable levels as children aged. This is because children's success at attending to the reading task positively influenced mothers' sensitivity at the 24 month lab visit, but child behavior within the wait task did not influence the stability of maternal behavior in the wait task. This is likely because children exhibited significant improvement in their ability attend to the books during this 6 month time period, but they did not improve in their ability to distract themselves while their mothers

worked. Mothers likely responded to their children's increased interest in reading by increasing their structuring efforts, and held their efforts constant within the wait task because they recognized that this task continued to be difficult for their young child. The children provided the same stimulus for the mothers to respond (i.e. crying) and did not elicit more sensitive reactions from the mothers over time.

Aim 1 Conclusions

The first goal of the current study was to address the need to identify the operationalized behaviors associated with sensitivity. This was done by examining the relations among two ratings of maternal sensitivity (those collected independently within the home and the quality of structuring within the lab), with maternal structuring of child attention skills, including her strategic use of emotion, movement and language to accomplish this structuring. Relations were found to suggest that these parenting behaviors are aspects of independent ratings of maternal sensitivity, which provided tentative support for the study's hypotheses. The variance shared between maternal sensitivity in the home and structuring strategies was low (relations were more robust when ratings of maternal sensitivity within the lab tasks were examined). Interestingly, the percentage was the highest within the 24 month wait task. This may be because this was the most challenging task for both mothers and children. Specifically, analyses from another study with this sample revealed that at 18 months, children were slower to display negative emotion during the wait task than they were at 24 months. This appears to happen because it took 18 month olds longer to understand the demands of the task (i.e. that they had to wait to touch the present), which delayed them from experiencing and displaying the frustration that was common among children at both age points. This means that mothers had to address and tolerate more negative emotion during the 24 month wait task, and, as a result, this task may have provided the

best opportunity to observe truly sensitive maternal behaviors, whereas in the less demanding tasks, children of sensitive mothers may have generally behaved well and therefore did not require mothers to exhibit the full range of their parenting abilities to us.

Despite the limitations of this study's ability to fully address its first aim, a few factors highlight the contributions of the current study. First, previous work has demonstrated the importance of these specific maternal behaviors within the infancy literature. Further, extant studies have largely demonstrated the positive influence of global ratings of maternal structuring on child attention on pre-school and school-aged child outcomes (e.g., Bornstein & Tamis-LeMonda, 1989; Landry et al., 2000; 2002). This study extended the literature by examining the role of maternal structuring strategies within mother-toddler interactions, and by supplying the operationalization of the specific behaviors mothers exhibited while supporting their children's attention shifting and focusing, which has implications for the design of clinical intervention. Third, the current sample is a largely understudied population, as it was comprised of families who reside in rural and semi-rural areas and who are economically strained. This is in contrast to the characteristics of the samples generally studied within this subject area who tend to either be privileged university families or families who are poor but who reside in urban environments. Taken together, these factors suggest a need for replication of this study's findings, with recognition of the new information this study provides to field.

Relations between Maternal Conceptual Complexity and Sensitive Structuring

The second aim of the study was to examine the role of the complexity of maternal thoughts about her child in predicting sensitive structuring. This aim contributed to the overarching goal of deconstructing sensitivity because once component behaviors associated with sensitive parenting are identified, the parental characteristics that predict each component

can be specified (Dix et al., 2004). The focal predictor of the present study, conceptual complexity, was selected as an index of the depth and breath of a mother's understanding of her child, knowledge she may draw upon to interpret her child's behavioral cues and to vary her sensitive, responsive behaviors in different situations. Conceptual complexity was predicted to have a unique relation with maternal sensitivity and the components of structuring behavior, more so than another positive parenting behavior such as global provision of positive affect, because sensitivity requires a relatively high degree of contingency and flexibility in parenting that may rely on a well-differentiated and developed cognitive representation of the child. By eliciting mothers' understanding through written descriptions of their children, it could be argued that any effect of conceptual complexity is explainable by maternal verbal ability. As a result, maternal verbal IQ (as measured by vocabulary subset scores) was included as a control variable in all analyses involving conceptual complexity. Additionally, a goal of this project was to demonstrate that complexity predicted maternal behavior above and beyond the relatively unchangeable nature of intelligence, so that future work could demonstrate that complexity is changeable via intervention, as preliminary data suggests (e.g., Schechter et al., 2006; Schechter & Willheim, 2009; Suchman et al., 2008), and is an aspect of cognition that should be targeted within clinical contexts. Encouragingly, although maternal conceptual complexity and verbal ability were related to one another, considerable unshared variance remained.

The findings indicated that the complexity with which mothers described their children was specifically related to maternal sensitivity assessed in the home, and not global displays of warmth, even when maternal verbal ability was considered. Furthermore, maternal conceptual complexity predicted the quality of maternal structuring attempts in the lab, particularly when the mother was trying to structure her child's attentiveness to book-reading. These findings were

consistent with previous work that linked the complexity of maternal thought with maternal sensitivity (e.g., Dekovic & Gerris, 1992; Miller-Loncar et al., 2000). The current findings suggest that, as predicted, conceptual complexity has a unique relation with maternal sensitivity, as opposed to other aspects of competent parenting, because the complexity of a mother's cognitive structure of her child supports her ability to engage in the complex behaviors involved in sensitivity, but complexity does not take into account the content or emotional tone of maternal thoughts about her child, so it does not relate to global ratings of maternal positive affect.

However, conceptual complexity did not predict the sensitive structuring strategies composite, either concurrently or over time. Yet, mothers who had more complex descriptions of their children used more strategic positive emotion and physical movement in harnessing their children's attention for book-reading. Mothers' positive emotion while structuring differs from the global ratings of maternal positive affect in the home, mentioned in the previous paragraph, because positive emotion within the structuring context did not reflect maternal warmth toward the child but rather her *strategic* use of positive emotion to harness the child's attention. Given this, it appears that complexity supports mothers in their ability to use a repertoire of sensitive behaviors appropriately and in a timely manner, but it is not related to the general emotional climate of the interaction.

Aim 2 Conclusions

The findings provided some support for the hypothesized relation between maternal conceptual complexity and structuring, however, the relations were mixed. It is noteworthy that complexity was consistently related to maternal sensitivity. Although the hypotheses regarding relations between conceptual complexity and structuring strategies were not supported,

conceptual complexity was demonstrated to be a predictor of sensitive parenting behaviors, regardless of the context in which parenting was assessed. It appears to assist mothers in perceiving child cues and responding to them appropriately, including the child's need for support during challenging tasks. Complexity may capture characteristic qualities of the skill with which parents interact with their children rather than predict specific behaviors such as strategies used to structure children's attention. Recall that a purported advantage of complexity was that it is a generalizable aspect of cognition because it is not tethered to content. As a result, it might be a construct that predicts global behavior, rather than behavior specific to a context.

There are other possible explanations for the fewer than expected significant relations among maternal complexity and structuring strategy use. Mainly, complexity is only one aspect of maternal cognition, and as discussed at length within the cognitive literature, cognition is a multifaceted process that may need to be assessed by multiple methods (e.g. coupling measurement of content, such as expressed emotion or attributions, with measurement of complexity). Although the relatively brief assessment and coding of complexity is advantageous to researchers and clinicians, perhaps the methodology should be revised to parse out the multiple aspects within the definition of complexity by rating them separately, to create a more robust measure of the construct.

Finally, the current study sought to specify and predict the behavioral components of sensitivity for a variety of reasons, including the need to address the transmission gap within the attachment literature (i.e. if the behaviors involved in maternal sensitivity are better defined, the relation between maternal behavior and child attachment status will be stronger). However, recent work has proposed that to address this gap, cognitive constructs including reflective

functioning be used as moderators, such that child outcomes are more strongly related to maternal behavior when maternal reflective functioning is low (Fonagy, Baradon, Slead & Bland, 2007). Given the theoretical overlap between reflective functioning and conceptual complexity, perhaps complexity would have more predictive power when included as a moderator between the effects of maternal structuring on child regulatory outcomes.

Clinical Implications

The current examination of the specific and well-operationalized behaviors mother utilize to effectively encourage children's attentional skills has significant clinical implications. Mainly, it is known that children's acquisition of self-regulated attention is associated with social competence (e.g., Cole, Michel, & Teti, 1994; Eisenberg et al., 2004), and less optimal development in this area is associated with behavioral problems and pathology (Hart et al., 1998; Eisenberg et al., 2001) and peer rejection (Wilson, 2003). Further, it is known that mothers' encouragement of child attention predicts toddler and preschooler attention abilities (Landry & Chapieski, 1988; Findji, 1993), as well as child cognitive, academic, and social skill development (Bornstein & Tamis-LeMonda, 1989; Coates & Lewis, 1984; Landry, 1985; Landry et al., 2000). However, missing is a more nuanced and specific look at *how* mothers support child attention (Landry et al., 2000; Crockenberg & Leerkes, 2004), a gap that the current study addressed. This is needed because when one works clinically with parents the goal is to increase the sensitive behaviors parents exhibit toward their child. However, this is only possible to accomplish if component, concrete, and teachable behaviors are empirically supported as high quality parenting behaviors. The results of the current study suggest that teaching mothers to utilize their positive emotion, physical movement, and language to harness toddler's attention

focusing may increase mothers parenting competency and presumably lead to better outcomes for children's self-regulation capabilities.

Future Directions

As mentioned, the relations among conceptual complexity and maternal structuring strategies were not consistently in line with expectations. As a result, future work with this construct will involve revising the coding methods such that the various aspects of the definition of complexity are rated separately (e.g., descriptors on one scale, elaborations on another, coherence on another). Additional aspects of maternal thoughts will also be simultaneously rated to adequately capture the richness of maternal thought and to allow for a test of whether complexity adds unique variance to the prediction of parenting behaviors. The role that complexity may play as a moderator between maternal behavior and child outcomes will also be tested. However, these changes will be done with the explicit goal of maintaining conceptual complexity's clinical relevance by not overburdening the user with unrealistic assessment or coding demands.

It is also planned to continue coding maternal structuring at later age points within current sample so that the quality of maternal structuring and use of structuring strategies can be modeled over time. This will allow for longitudinal examination of its relation with children's development of self-regulation. As discussed earlier in relation to the unexpected finding that more maternal redirection of child attention in the reading task was associated with less maternal sensitivity, these longitudinal analyses will account for child characteristics including temperament and executive functioning, to increase our understanding of the transactional processes between mothers and children, and how such processes dictate maternal behaviors and child outcomes over time.

One of the many unanswered questions within the topic area of emotion regulation development is whether children benefit most from parenting behavior designed to increase self-regulation when children are in a positive state that allows them to be open and learn without distraction, or when they are in a negative state that brings the salience of learning about emotion regulation to the forefront. For instance, maternal responsiveness to children's *positive* affect has been associated with children's reduction in *negative* affect expression over time (Feng et al., 2007). The current project offers the opportunity to address this question by examining the effects of maternal structuring in the reading task, when children are generally positive and engaged, versus in the wait task, when children are challenged and often emotionally negative. Future work is planned to test the possible differential effects of maternal structuring in the reading versus in the wait task on child emotion regulation outcomes

Finally, the current project provided one way to examine the rich observational data available within this sample and with these variables. Future projects will include examining maternal use of strategies in combination with one another and in sequence with one another, as it is possible that some combination of strategies executed within a structuring epoch or the sequence with which mothers administer them is particularly sensitive. Sequential analyses will offer the advantage of studying maternal behavior in relation to and in reaction to child responsiveness to maternal structuring. Although the current analyses accounted for transactional influences by examining the bidirectional effects of indices of mother and child behavior averaged across the entire task, future analyses will describe the moment-to-moment transactional qualities of the interaction.

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APPENDIX

Table 1: Review of the Maternal Cognition Literature

Content & Structure of Maternal Schemas				Process of Maternal Thought		Products of Maternal Thought	
<i>Expectations of Child Ability</i>	Azar, 1996; Azar & Rohrbeck, 1986; Haskett, et al., 2003; Spieker et al., 2001; Azar et al., 1999; Barnes & Azar, 1990; Cowan, 2001; Keller et al., 2005	<i>Knowledge of Child Development</i>	Goodnow, 2002; Hess et al., 2004; Culp, Culp, Blankemeyer, & Passmark, 1998	<i>Flexibility</i>	Nayak & Milner, 1998; Robyn & Fremouw, 1996; Dillon, 2002	<i>Attribution of Childhood Injury or Physical & Mental Illness</i>	Morrongiello & House (2004); Peterson, et al., (1995); Hall & Marteau, 2003
<i>Expectation of Parent Control & Dominance</i>	Bugental, et al., 1989; Bugental et al., 1993; Bugental et al., 1996; Bugental & Happaney, 2004	<i>Maternal Self-Efficacy</i>	Gondoli & Silverberg, 1997; Haslam et al., 2006; Jones & Pritz, 2005; Kuhn & Carter, 2006; Teti et al., 1996; Teti & Gelfand, 1991; Kuhn & Carter, 2006	<i>Perspective Taking</i>	Corcoran & Mallinckrodt, 2000; Gerris et al., 1997; Gondoli & Silverberg, 1997	<i>Attribution of Negative Child Intent</i>	Plante & Graziano, 2002; Dadds, et al., 2003; ; Dixon et al., 2005; Dopke & Milner, 2000; Haskett, et al., 2003; Miller & Azar, 1996; Spieker et al., 2001; Mash et al., 1983; Reid et al., 1987
<i>Goals</i>	Dix, 1992; Dix et al., 2004; Hastings & Grusec, 1998	<i>Complexity</i>	Benoit et al., 1997; Dekovic & Gerris, 1992; Fonagy et al., 1991; Newberger, 1980; Sameroff & Feil, 1985; Slade et al., 1999	<i>Problem Solving</i>	Azar et al, 1984; Ross & Aday, 2006		

Table 2: Descriptive Statistics

	18 month Variables				24 month Variables				
	Min	Max	Mean	SD	Min	Max	Mean	SD	
Conceptual Complexity	1	5	2.79	.96					
18m									
Maternal WAIS	4	19	11.19	3.05					
Home Visit									
Maternal Sensitivity	1.33	5.00	3.32	.80					
Maternal Positive Affect	1.33	4.33	2.88	.70					
Reading Task					Reading Task				
Attention Focus	3	20	14.81	4.16	Attention Focus	3	20	16.5	4.47
Attention Redirection	0	17	6.55	4.13	Attention Redirection	0	14	2.73	3.51
Attention Distraction	0	5	.45	1.00	Attention Distraction	0	4	.13	.53
Positive Emotion	1	35	19.38	6.75	Positive Emotion	3	36	22.38	6.62
Negative Emotion	0	9	1.58	2.01	Negative Emotion	0	15	1.23	2.10
Physical Movement	5	37	22.11	6.02	Physical Movement	4	33	19.66	5.41
Language	2	35	18.32	6.94	Language	2	35	18.08	7.61
Quality	1.25	3.75	2.59	.49	Quality	1.35	4.0	3.05	.75
Child Success	.07	1.0	.67	.23	Child Success	.12	1.0	.84	.22
Wait Task					Wait Task				
Attention Focus	0	18	2.06	2.96	Attention Focus	0	15	1.56	2.52
Attention Redirection	0	0	0	0	Attention Redirection	0	2	.03	.21
Attention Distraction	0	19	5.05	3.66	Attention Distraction	0	22	4.36	4.05
Positive Emotion	0	47	8.58	7.90	Positive Affect	0	37	7.26	7.06
Negative Emotion	0	9	1.06	1.90	Negative Affect	0	26	1.44	3.22
Physical Movement	0	46	12.91	8.61	Physical Movement	0	45	10.76	8.68
Language	0	54	16.96	9.60	Language	1	58	14.52	9.55
Quality	1.50	3.37	2.40	.47	Quality	1.0	3.53	2.44	.50
Child Success	0	1.0	.34	.27	Child Success	0	1.0	.39	.30

Table 3: Zero-Order Correlations: 18 month Maternal Sensitivity with 18 month Child Attention Skills Structured

	18m Reading Task			18m Wait Task		
	Focus	Redirection	Distraction	Focus	Redirection	Distraction
Sensitivity	.21*	-.15 ⁺	.05	.26**	--	-.02

Note. ⁺ indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 4: Zero-Order Correlations: 18 month Maternal Sensitivity with 24 month Child Attention Skills Structured

	24m Reading Task			24m Wait Task		
	Focus	Redirection	Distraction	Focus	Redirection	Distraction
Sensitivity	.18*	-.16*	.11	.14 ⁺	-.07	.01

Note. ⁺ indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 5: Zero-Order Correlations: Reading Task Structuring Strategies

	Pos Emotion	Neg Emotion	PM	Lang	Sensitivity	Complexity
Pos Emotion	---	-.02	.35**	.20*	.20*	.10
Neg Emotion	.08	---	.06	-.09	-.12	-.11
PM	.50**	.10	---	.11	.22**	.12 ⁺
Lang	.42**	-.02	.37**	---	.05	.08
Sensitivity	.35**	.07	.22**	.10	---	.26**
Complexity	.19*	-.07	.14 ⁺	.10	.26**	---

Note. Below the diagonal are 18 month intercorrelations and above the diagonal are 24 month intercorrelations
⁺ indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates division between age points

Table 6: Zero-Order Correlations: Wait Task Structuring Strategies

	Pos Emotion	Neg Emotion	PM	Lang	Sensitivity	Complexity
Pos Emotion	---	.04	.64**	.76**	.23**	.01
Neg Emotion	-.08	---	.39**	.18*	-.18*	-.04
PM	.54**	.14	---	.79**	.01	.00
Lang	.63**	.15	.89**	---	.16*	-.01
Sensitivity	.21*	-.15*	.12 ⁺	.14 ⁺	---	.26**
Complexity	.12	-.20*	.16*	.16*	.26**	---

Note. Below the diagonal are 18 month intercorrelations and above the diagonal are 24 month intercorrelations
⁺ indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates division between age points

Table 7: Canonical Correlations: Sensitivity Predicting Structuring Strategies

	Canonical Correlation	<i>F</i> value	<i>p</i>	Canonical Loadings	% Shared Variance
<u>18 m RT</u>	.36				12.90
Pos Emotion		<i>16.04</i>	<i>.01</i>	<i>.97</i>	
Neg Emotion		<i>.56</i>	<i>.45</i>	<i>.19</i>	
PM		<i>5.81</i>	<i>.05</i>	<i>.61</i>	
Lang		<i>1.14</i>	<i>.30</i>	<i>.27</i>	
<u>24 m RT</u>	.28				8.00
Pos Emotion		<i>4.75</i>	<i>.05</i>	<i>.69</i>	
Neg Emotion		<i>1.65</i>	<i>.20</i>	<i>-.41</i>	
PM		<i>5.94</i>	<i>.05</i>	<i>.77</i>	
Lang		<i>.33</i>	<i>.57</i>	<i>.19</i>	
<u>18 m WT</u>	.25				6.25
Pos Emotion		<i>5.32</i>	<i>.05</i>	<i>.82</i>	
Neg Emotion		<i>2.67</i>	<i>.10</i>	<i>-.59</i>	
PM		<i>1.77</i>	<i>.19</i>	<i>.48</i>	
Lang		<i>2.4</i>	<i>.12</i>	<i>.56</i>	
<u>24 m WT</u>	.43				18.08
Pos Emotion		<i>16.65</i>	<i>.01</i>	<i>.84</i>	
Neg Emotion		<i>2.76</i>	<i>.10</i>	<i>-.36</i>	
PM		<i>.03</i>	<i>.89</i>	<i>.04</i>	
Lang		<i>3.14</i>	<i>.08</i>	<i>.39</i>	

Note. Significant and marginally significant findings are in italics.

Table 8: Zero-Order Correlations: Within Time Point Relations between Quality of Maternal Structuring and Child Attention Skills in Reading Task

	18m Reading Task				24m Reading Task		
	Focus	Redirection	Distraction		Focus	Redirection	Distraction
Quality	.42**	-.21*	-.09	Quality	.56**	-.49**	-.05

Note. + indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 9: Zero-Order Correlations: Within Time Point Relations between Quality of Maternal Structuring and Child Attention Skills in Wait Task

	18m Wait Task				24m Wait Task		
	Focus	Redirection	Distraction		Focus	Redirection	Distraction
Quality	.14 ⁺	--	.39**	Quality	.21*	-.05	.30**

Note. + indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 10: Zero-Order Correlations: Within Time Point Relations between Quality of Maternal Structuring and Structuring Strategies in the Reading Task

	18m Reading Task				24m Reading Task				
	Positive Emotion	Negative Emotion	Physical Movement	Language	Quality	Positive Emotion	Negative Emotion	Physical Movement	Language
Quality	.61**	.14 ⁺	.33**	.59**	Quality	.55**	-.09	.40**	.20*

Note. ⁺ indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 11: Zero-Order Correlations: Within Time Point Relations between Quality of Maternal Structuring and Structuring Strategies in the Wait Task

	18m Wait Task				24m Wait Task				
	Positive Emotion	Negative Emotion	Physical Movement	Language	Quality	Positive Emotion	Negative Emotion	Physical Movement	Language
Quality	.47**	-.12 ⁺	.30**	.36**	Quality	.47**	-.22**	.15*	.27**

Note. ⁺ indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 12: Summary of Linear Regression Analyses: Structuring Strategies Predicting Structuring Quality

Variables	R ²	B	SE B	Beta	p
<u>Quality</u>					
<i>18m RT</i>	.52				.01
<i>Positive Emotion</i>		.03	.01	.46	.01
<i>Negative Emotion</i>		.03	.02	.12	.07
Physical Movement		-.01	.01	-.07	.37
<i>Language</i>		.03	.01	.42	.01
<i>18m WT</i>	.48				.01
<i>Positive Emotion</i>		.02	.01	.35	.01
Negative Emotion		-.03	.02	-.11	.19
Physical Movement		-.003	.01	-.05	.77
Language		.01	.01	.20	.30
<i>24 RT</i>	.37				.01
<i>Positive Emotion</i>		.04	.01	.46	.01
Negative Emotion		-.03	.02	-.09	.22
<i>Physical Movement</i>		.03	.01	.24	.01
Language		.01	.01	.07	.35
<i>24 WT</i>	.29				.01
<i>Positive Emotion</i>		.04	.01	.61	.01
<i>Negative Emotion</i>		-.03	.01	-.19	.05
Physical Movement		-.01	.01	-.08	.56
Language		-.01	.01	-.10	.52

Note. Significant and marginally significant findings are in italics.

Table 13: Zero-Order Correlations: Complexity and Verbal IQ with 18 month Sensitive Structuring Strategies and Quality

	Verbal IQ	18RT PE + PM	18WT PE	18RT Quality	18WT Quality
Complexity	.35**	.19*	.12	.26**	.21**
Verbal IQ	1.00	.20*	.10	.07	.14 ⁺

Note. ⁺ indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 14: Summary of Hierarchical Regression Analysis: Complexity and Verbal IQ Predicting Structuring Strategies and Quality

Variables	R ²	Change R ²	<i>B</i>	<i>SE B</i>	Beta	<i>p</i>
<u>18RT PE + PM</u>						
Step 1	.04	.04				.05
Verbal IQ			.54	.35	.15	.18
Step 2	.06	.02				.17
Complexity			1.60	1.14	.14	.17
<u>18WT PE</u>						
Step 1	.01	.01				.25
Verbal IQ			.19	.26	.07	.46
Step 2	.02	.01				.36
Complexity			.78	.83	.09	.36
<u>18RT Quality</u>						
Step 1	.06	.06				.01
<i>Verbal IQ</i>			<i>.03</i>	<i>.02</i>	<i>.17</i>	<i>.09</i>
Step 2	.09	.03				.05
<i>Complexity</i>			<i>.10</i>	<i>.05</i>	<i>.20</i>	<i>.05</i>
<u>18WT Quality</u>						
Step 1	.02	.02				.19
Verbal IQ			.01	.02	.06	.57
Step 2	.05	.03				.06
<i>Complexity</i>			<i>.09</i>	<i>.05</i>	<i>.19</i>	<i>.06</i>

Note. Significant and marginally significant findings are in italics.

Table 15: Canonical Correlations: Conceptual Complexity Predicting Maternal Sensitivity, Positive Affect, and Verbal IQ

	Canonical Correlation	F value	p	Canonical Loadings	% Shared Variance
<u>18 m Home Visit</u>	.40				16.30
Sensitivity		8.49	.01	.65	
Positive Affect		2.33	.13	.35	
Verbal IQ		15.65	.01	.85	

Table 16: Zero-Order Correlations: Maternal Conceptual Complexity, Sensitivity, Positive Affect, and Verbal IQ

	Complexity	Sensitivity	Positive Affect	Verbal IQ
Complexity	1.00	.26**	.14	.26**
Sensitivity	.26**	1.00	.77**	.27**
Positive Affect	.14	.77**	1.00	.26**
Verbal IQ	.26**	.27**	.26**	1.00

Note. + indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 17: Summary of Hierarchical Regression Analyses: Conceptual Complexity Predicting Maternal Sensitivity and Positive Affect, Separately

Variables	R ²	Change R ²	<i>B</i>	<i>SE B</i>	Beta	<i>p</i>
<u>Sensitivity</u>						
Step 1	.07	.07				.01
Verbal IQ			<i>.06</i>	<i>.03</i>	<i>.21</i>	<i>.05</i>
Step 2	.11	.03				.05
Complexity			<i>.16</i>	<i>.08</i>	<i>.19</i>	<i>.05</i>
<u>Positive Affect</u>						
Step 1	.07	.07				.01
Verbal IQ			<i>.06</i>	<i>.02</i>	<i>.24</i>	<i>.05</i>
Step 2	.07	.00				.54
Complexity			<i>.04</i>	<i>.07</i>	<i>.06</i>	<i>.54</i>

Note. Significant and marginally significant findings are in italics.

Table 18: Zero-Order Correlations: Structuring Quality across Time

	1	2	3	4
1. 18RT Quality	1.00	.42**	.32**	.25**
2. 24RT Quality		1.00	.03	.35**
3. 18WT Quality			1.00	.30**
4. 24WT Quality				1.00

Note. + indicates $p < .10$, * indicates $p < .05$, ** indicates $p < .01$, -- indicates value could not be estimated

Table 19: Summary of Hierarchical Regression Analyses: Stability over Time in Structuring Quality Accounting for Child Behavior

Variables	R ²	Change R ²	<i>B</i>	<i>SE B</i>	Beta	<i>p</i>
<u>Quality</u>						
<i>24RT</i>						
Step 1	.18	.18				.01
<i>18m Quality</i>			<i>.41</i>	<i>.12</i>	<i>.31</i>	<i>.01</i>
Step 2	.22	.04				.01
<i>18m Child Success</i>			<i>.64</i>	<i>.26</i>	<i>.23</i>	<i>.01</i>
<i>24 WT</i>						
Step 1	.09	.09				.01
<i>18m Quality</i>			<i>.34</i>	<i>.10</i>	<i>.32</i>	<i>.01</i>
Step 2	.09	.00				.62
18m Child Success			-.09	.18	-.05	.62

Note. Significant and marginally significant findings are in italics.

Table 20: Summary of Hierarchical Regression Analyses: Verbal IQ and Conceptual Complexity Predicting Difference Scores in Structuring Quality over Time

Variables	R ²	R ² Change	<i>B</i>	<i>SE B</i>	Beta	<i>p</i>
<u>Reading Task</u>						
Step 1	.01	.01				.27
Verbal IQ			.03	.02	.14	.17
Step 2	.02	.01				.33
Complexity			-.06	.06	-.10	.33
<u>Wait Task</u>						
Step 1	.00	.00				.99
Verbal IQ			-.002	.02	-.01	.93
Step 2	.00	.00				.83
Complexity			.01	.06	.02	.83

Note. Significant and marginally significant findings are in italics.

Figure 1: Overlap among Attachment-based Measure of Parenting Thought and Conceptual Complexity

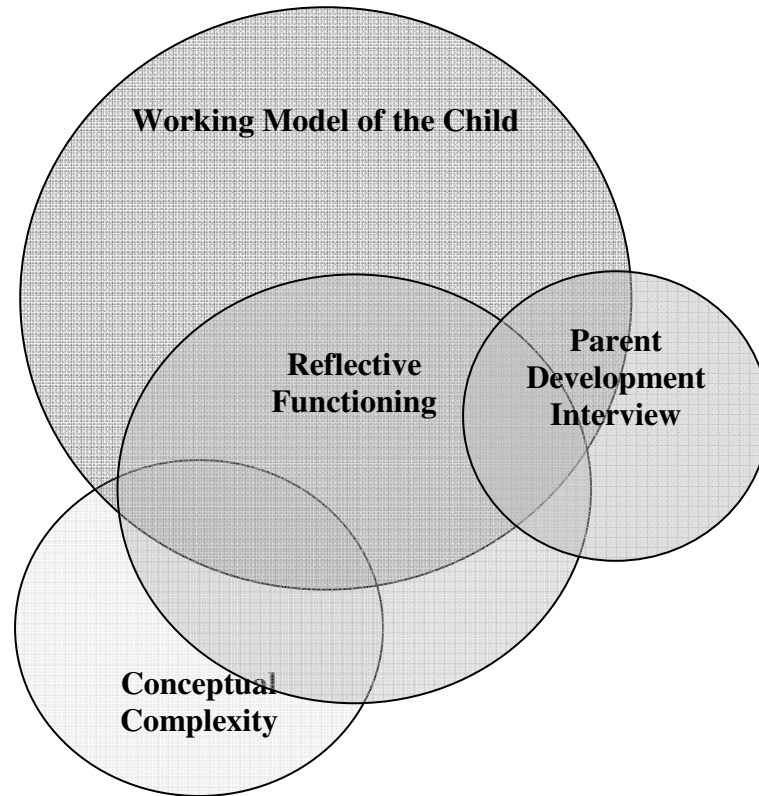


Figure 2: Example of Conceptual Complexity Scoring

Definition of a Score of 4. The parent describes the child at length, covering several different categories and providing some elaborations of those categories. The elaborations do seem to clarify what the parent is describing, rather than simply providing an example of it. The descriptions tend to focus most on the child’s behavior and tend not to include much about the factors that motivate and organize those behaviors.

“I feel my child is great, smart, beautiful, and funny. Everything he does is special. He is a good child; he loves to sit on our laps and talk, sing, play, read books, and watch TV. He loves to watch sports with ‘da da.’ He truly gets excited when sports are on TV. He is so pleasant, loves to give hugs and kisses. Very ‘boyish’ as well. Throws everything, runs and climbs. He is so cute we laugh at him all the time. He performs by dancing and singing, his favorite song is ‘Itsy Bitsy Spider.’ Although he doesn’t say a lot of words, he finds his own ways of communication. Having two older siblings, he doesn’t have to talk much. I feel he is smart, the things he knows and the way he communicates. He makes us laugh and he knows it, he continues the act when he realizes we’re laughing at him.”

Categories	Elaborations		
Great / good			
Smart			
Beautiful			
Funny	Continues behavior when others laugh		
Special			
Likes: Sit on laps, talk, sing, play, read, watch TV	Loves to watch sports with father.		
Affectionate	Gives hugs and kisses		
Boyish	Throws, runs, climbs		
Performs for others	Dances, sings	Has favorite song	
Communicates	Does not use many words		

This is a very good description. It contains many categories and some elaboration of those categories. This description would received a score of 5 except that the mother often makes claims without providing much detail about them. This has the effect of muddying the picture one can form of her child. The mother’s description also seems a little more disjointed than some of the best descriptions. She rarely uses broad personality characteristics in a way that is helpful. Often she uses words such as great, smart, and beautiful, without explaining exactly how they apply to her particular son.

Figure 3: Structuring Coding Sheet

Start Time:				Stop Time:			
Structuring?		1. Nothing		2. Directing		3. Structuring	
Child Skills		1. Attentional Focusing		2. Attentional Redirection		3. Distraction	
Strategies for Structuring 0 = does not use it; 2 = uses it almost constantly or intensely							
Emotion:							
Neg		0		1		2	
Pos		0		1		2	
Physical Movement		0		1		2	
Language		0		1		2	
Quality of Structuring		0. Did not occur		1. Minimal: poorly timed, brief or not enough support		2. Contingent but not developmentally sensitive	
						3. Moderate: elaborated, developmentally sensitive for most of the epoch	
						4. High: developmentally sensitive for entire epoch, especially synchronous with child, or creative	
Action Success							
0. Child resists mothers attempt to structure		1. Child does nothing		2. Child attempts the behavior but fails		3. Child successfully completes the behavior, but in a passive manner	
						4. Child completes the behavior and is an active participant in the interaction	

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Selected Manuscripts

Azar, S. T., Reitz, E. B., Goslin, M. C. (2008). Mothering. Thinking is part of the job description:

Application of cognitive views to parenting intervention and prevention. *Journal of Applied Developmental Psychology*, 29, 295-304.

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Crnic, K. A., Reitz, E. B. & Cole, P. M. (revision encouraged). Stress and the trajectory of parenting across the early preschool period. *Developmental Psychology*.

Selected Presentations

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