REDEFINING EARLY CHILD NEGLECT: SUBTHRESHOLD PATHWAYS TO
NON-OPTIMAL DEVELOPMENT

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Abstract

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Subthreshold neglect is defined as the absence of positive parenting behaviors that eventually results in delayed child development. The present study tested several competing models of maternal support and infant development in a sample of 508 mothers at high and low risk for child neglect based on their age and educational levels. Infants demonstrated significantly delayed development at both 12 and 24 months of age in social-emotional competence, the absence of social-emotional problems, cognitive development, and language development. Problems in these areas were then related to maternal social-emotional, cognitive-language, and responsive supports in a model comparison approach. Results revealed that a restricted model of subthreshold neglect fit the data best. The absence of responsive support at 8 months predicted social-emotional problems and the absence of cognitive-language support predicted language delays at 12 months. The absence of responsive support at 8 months also predicted deficiencies in social-emotional competence at 24 months. Conversely, responsive support predicted language delays at 12 months. Social-emotional, cognitive, and language development at
12 months predicted corresponding development at 24 months. The findings suggested that the effects of early subthreshold neglect were immediate, but that early-appearing problems resulting from subthreshold neglect may lead to trajectories of adverse child development over time.
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Low levels of child maltreatment often remain unnoticed. Although the public image of maltreatment is typically characterized by a child who has been severely beaten, molested, or starved, milder forms of abuse or neglect by are also inappropriate and unacceptable, such as verbally berating a child or failing to take a child to the doctor when they need medical treatment (USDHHS ACF, 2003). All established forms of maltreatment share a common feature: they have a clear and demonstrated threat for severe harm to a child’s development (USDHHS ACF, 2003). But what about other potentially harmful parental behaviors that are more subtle or commonly practiced?

The distinction between maltreating and non-maltreating behaviors is often difficult to determine, particularly in cases of potential child neglect. For instance, when an impoverished mother does not provide her infant with toys or other stimulating objects, does that constitute neglect? Although developmental needs are not being met, the mother is clearly not intending to hurt her baby. This more subtle form of child neglect, while not constituting a criminal offense, may still have deleterious effects on a child’s development. In order to capture this milder form of neglect, the present study introduces the concept of subthreshold neglect, defined as the harmful developmental effects resulting from the absence of positive maternal parenting. For example, a mother who rarely speaks to her infant or consistently ignores the child’s signals may be exhibiting subthreshold neglect if these behaviors result in the child’s poor functioning in
any domain of development. The specific aim of the present research was to test a model of parenting factors that might comprise subthreshold neglect. Specifically, this project investigated the impact of lack of maternal support for children’s social-emotional development, lack of maternal support for children’s cognitive and language development, and lack of overall responsiveness on infants’ developmental outcomes at 12 months of age.

Child Neglect and Its Impact on Development

Unlike child abuse, which involves the commission of negative parenting behaviors, child neglect, the absence of positive parenting behaviors, is hard to describe and has often been overlooked. Nevertheless, the effective prevention of early developmental delay relies upon knowledge of which parenting behaviors are essential to adequate development and understanding how the absence of those behaviors can impede child growth (Borkowski, Smith, & Akai, 2007). Within five years of the federal adoption of the Child Abuse Prevention and Treatment Act in 1974, neglect was formally included as a serious form of maltreatment. Since that time, the documented and projected incidence of neglect has far exceeded the occurrences of all other forms of maltreatment (e.g. USDHHS ACF, 2001).

Infants are the age group most likely victimized by child neglect. These very young children (birth to age 3) have the highest number of child maltreatment reports (USDHHS, 2006), and they also have the highest mortality rate resulting from neglect (Connell-Carrick & Scannapieco, 2006). Most child neglect rates have been estimated based on substantiated reports from child protective service agencies (CPS); however, it
is unlikely that CPS rates capture the full extent of child victimization that occurs, including unreported, uninvestigated, or unsubstantiated instances of neglect (Tyler, Allison, & Winsler, 2006).

Neglect during infancy can have particularly negative consequences for trajectories of child development. Neglected children showed troublesome social and emotional adaptation by exhibiting withdrawn, isolated behavior as well as problems with agency and emotion regulation (Hildyard & Wolfe, 2002). A review of negative outcomes resulting from child neglect (Hildyard & Wolfe, 2002) demonstrated that children often experienced low self-esteem, poor self-representations, and negative affect. Compared to nonmaltreated children, neglected children also exhibited more aggressive, uncooperative, and noncompliant behavior. Beyond these deficiencies, additional problems were seen in neglected infants and preschoolers, including poor coping skills, negativistic attitudes, and pathological symptoms. Maltreated children in this review had more trouble discriminating others’ emotions, and they showed more hopelessness in stressful situations than nonmaltreated children (Hildyard & Wolfe, 2002).

Investigators have further examined the contribution of maltreatment timing to the aforementioned outcomes (Manly, Kim, Rogosch, & Cicchetti, 2001). The results showed that neglect during the infant-toddler period predicted children’s externalizing behavior and fights whereas neglect during the preschool period related to children’s internalizing behavior, characterized by increased withdrawal and low ego resiliency (Manly et al., 2001). Retrospective analyses of maltreatment reports have reached the same conclusions; children who were younger than 1 year old when the first report of
maltreatment was made to a protective agency were likely to experience later externalizing problems and poor adaptive functioning (English et al., 2005).

The consequences of child neglect are not limited to social-emotional development. Research has also revealed problems in neglected infants’ cognitive development and language development. For example, children neglected early in life experienced cognitive deficiencies with low and rapidly-declining IQ scores as well as difficulties engaging in age-appropriate play. As neglected infants and preschoolers got to kindergarten, they showed the lowest levels of academic achievement and the poorest performance on standardized tests of intellectual functioning. The children who were neglected early also struggled to adequately develop both expressive and receptive language compared to nonmaltreated children at the same ages (Hildyard & Wolfe, 2002). In sum, negative consequences from early neglect have been demonstrated across children’s social, emotional, cognitive, and language trajectories.

Neglect researchers are particularly worried that parenting deficiencies during infancy may indicate the beginning of a pattern of poor parent-child interaction that may continue throughout a child’s development. For example, mothers identified as “at risk” for poor parenting were likely to remain in a low parenting-ability category or to decline in parenting ability over time in the absence of intervention (Guttentag, Pedrosa-Josic, Landry, Smith, & Swank, 2006). Feldman (2007) has explained that optimal functioning relies on a trajectory of mother-child synchrony that develops in an observable way when infants are about 3 months old. Less-than-optimal parenting during infancy can compromise the dyadic synchrony and subsequently prompt a greater likelihood of child dysregulation across the lifespan (Feldman, 2007). Furthermore, neglect during infancy
has been correlated with other forms of maltreatment as children age (Manly et al., 2001). Hence, particular concern is warranted regarding the potential for a maladaptive trajectory of parent-child relations.

**Defining child neglect.** From a legal standpoint, child neglect refers to parental failure to provide for a child’s needs in a way that constitutes a crime. Accordingly, establishing a legal case of neglect depends on documenting actual harm or potential harm to a child (Dubowitz et al., 2005). In these situations, law enforcement and the court systems are concerned with finding evidence to demonstrate that neglect has occurred with the goal of eventual prosecution (Sedlak et al., 2006). In other words, the substantiation of neglect is the primary purpose for neglect definitions in legal situations. Overloaded CPS agencies (USDHHS, 2003) are especially likely to make substantiating neglect a key objective during instances when the alleged perpetrator is the child’s caretaker (Sedlak et al., 2006).

In contrast, the objective of researchers in defining neglect is to understand the absence of parenting behaviors that lead to diminished child outcomes, without prioritizing substantiation. In fact, one comparison of behavioral outcomes for children with unsubstantiated reports of maltreatment, children with substantiated reports of maltreatment, and children with no reports of maltreatment found that child outcomes from birth to age 4 did not differ for children with substantiated and unsubstantiated reports. The same pattern occurred for outcomes of children ages 4 – 8 (Hussey et al., 2005). Thus, any indication of maltreatment or suggested maltreatment could be consequential for child development. Furthermore, because the records of most substantiated maltreatment reflected a very small percentage of actual exposure to a lack
of adequate parenting (e.g. Swahn et al., 2006) investigators would be wise to consider
the wide range of subtleties in parenting behavior that could influence child outcomes
and trajectories.

Although researchers are not constrained to consider neglect in terms of
prosecutable behaviors, debate remains in the research community regarding the best way
to define child neglect. One ongoing point of contention concerns whether neglect should
be considered as a single global construct or as separate subtypes of neglect. Investigating
this matter, Dubowitz, Pitts, & Black (2004) used CPS reports to investigate whether
aggregating components into a general neglect construct was as effective as splitting
neglect into psychological, physical, and emotional subtypes for understanding the
behavioral outcomes of neglect. At age 5, the correlations between neglect subtypes and
child behavior were stronger and had larger effects than those between general neglect
and child outcomes. Associations between particular subtypes and specific behavioral
outcomes at age 6 were also found, implicating the usefulness of separating neglect into
subtypes (Dubowitz et al., 2004). Conversely, results of a subsequent study found that
neglect subtype was not necessarily more useful in relating neglect to child outcomes
(Dubowitz, Pitts, et al., 2005). In this study, the authors compared incidents coded as
broad distinctions (general neglect and caregiver absence) to incidents coded as neglect
subtypes (food, medical, clothing, shelter, hygiene, sanitation, supervision, environment,
and substitute care). The classifications were then related to 10 outcomes on the Child
Behavior Checklist, Trauma Symptom Checklist for Children, and Vineland Adaptive
Scale – Screener. Results showed that general neglect was moderately correlated with
neglect subtypes, and any subtype only explained a very small percentage of the variance
in child functioning. Accordingly, no clear “winner” between general neglect and neglect subtypes was supported by these studies (Dubowitz, Pitts, et al., 2005).

Commonly-recognized subtypes of neglect include: physical neglect, medical neglect, inadequate supervision, environmental neglect, emotional neglect, educational neglect, and drug-exposure or addiction in newborns (USDHHS, 2006). Although each category of neglect can apply to infants, two of these categories, emotional neglect and educational neglect, are particularly hard to directly observe for children less than 1 year old. During early infancy, characteristics of emotional neglect might include inadequate nurturing, lack of affection, or isolation; a characteristic of educational neglect might include inattention to special needs based on developmental delay (USDHHS, 2006). Establishing several times when a parent has isolated a child who is only a few months old or has left a yet-undiagnosed developmental delay untreated is nearly impossible for infants. Therefore, confirming the presence of neglectful behavior becomes a very complex issue for children who are very young, and it makes sense for researchers to consider a wide spectrum of parenting behaviors whose absence may negatively impact child development.

*MATERNAL RISK CHARACTERISTICS AND CHILD NEGLECT.* Most child victims of neglect (87%) have been maltreated by a parent, and the perpetrators of maltreatment are most often mothers (USDHHS, 2006). The level of risk for neglectful behaviors is particularly high in mothers who are very young, impoverished, and undereducated (Lounds, Borkowski, & Whitman, 2006). Adolescent mothers, for instance, had lower intelligence scores, lower amounts of social support from romantic partners, and lower cognitive readiness to parent than adult mothers both prenatally and when children were 6 months
old (Whitman, Borkowski, Keogh, & Weed, 2001). Specifically, teenaged mothers had higher levels of stress at 6 months, and higher stress related to poorer parenting attitudes, parenting styles, and knowledge about child development as well as poorer ratings of mother-infant interaction (Whitman et al., 2001). The combination of deficient parental readiness and unrealistic expectations for children may present a particular susceptibility for maltreatment behaviors in adolescent parents (Schatz, 2006).

A portion of the risk for inadequate parenting found in adolescent mothers has been attributed to a lack of educational attainment (Murphey & Braner, 2000; Whitman et al., 2001). In fact, low levels of educational attainment (usually less than high school completion) have been associated with high levels of risk for child neglect during infancy in both adolescent and adult mothers; in a population-based study of Vermont residents, mothers without high school completion were 4.8 times more likely to have an incident of substantiated abuse or neglect than mothers who had completed high school (Murphey & Braner, 2000). For infants reported to CPS agencies, 1.2% of children with verified cases of neglect by 1 year of age had mothers with less than a high school education in comparison to 0.6% of verified cases for children with more educated mothers (Wu et al., 2004). Similarly, a review of child neglect research revealed that child neglect was directly associated with maternal education, and zip codes with the highest neglect rates also had high dropout rates (Schumacher, Smith Slep, & Heyman, 2001).

Low income levels can also present risks for child maltreatment. Of families with children under 4 years old investigated by CPS for child neglect, 78% earned less than $20,549 annually (Scannapieco & Connell-Carrick, 2005). The presence and duration of poverty has been shown to negatively impact parenting behavior (Evans, 2002), perhaps
by increasing the perceived demands of mothers. Although most poverty “spells” last for less than three years, it is common for low-income families to temporarily move just above the federal poverty line while still earning less than what most Americans consider to be sufficient to raise a child without considerable hardship (Duncan & Magnuson, 2003). Leinonen and her colleagues (2002) have carefully illustrated the path between low income level and uninvolved parenting. The results of their study showed that economic hardship produced both general pressures (like concerns about debt) and specific pressures (like buying fewer important purchases, such as food) for mothers. The specific pressures prompted both anxiety and depression; maternal anxiety was then associated with a noninvolved style of parenting (Leinonen, Solantaus, & Punamaki, 2002).

**Subthreshold Child Neglect**

An area of neglect research that has been relatively unexplored is the investigation of instances when parents exhibit conduct that is symptomatic of neglect, but which is not severe enough to warrant a legal or clinical definition. Hines, Kaufman Kantor, and Holt (2006) have identified “the omission of ordinary parenting behaviors that are considered necessary for the development of healthy, happy children” as *neglectful behaviors* (p. 620). For instance, a scenario in which a child was not given any food for a week would constitute neglect, whereas a situation illustrating neglectful behavior might be one where a parent fed the child regularly, but the child’s diet mostly contained foods with very little nutritional value. Thus, the lack of some parenting behaviors constituted problems which technically fall below the threshold for what is considered to be neglectful. We proposed,
however, that the omission of some positive parenting behaviors would consistently lead to poorer outcomes in child functioning. The purpose of this study was to identify whether some of these instances of subthreshold neglect existed based on a conceptual model of child functioning.

*Modeling Child Functioning in Relation to Maternal Parenting Behaviors*

The most important step in assessing subthreshold neglect is clarifying an accurate model of parenting behaviors and child functioning. Parenting behaviors (or the converse absence of parenting behaviors) cannot be considered neglectful, or even poor for that matter, if they do not consistently predict child development. Therefore, in establishing a conceptual model of child functioning in relationship to parenting, researchers must consider the specific maternal actions which support particular areas of development. This review discusses maternal support for children’s social and emotional development, maternal support for children’s cognitive and language development, and maternal responsiveness. Because the scope of this paper is limited to the areas of infant development that are largely influenced by malleable maternal behaviors rather than genetic predisposition, we did not concentrate on support for children’s physical or motor development. In addition, this review concentrates on positive parenting behaviors which could negatively affect development through their absence (during instances of potential subthreshold neglect) as opposed to negative parenting behaviors, such as harsh, controlling, or intrusive actions.
Maternal support for social-emotional development. Optimal socioemotional development during infancy and early childhood is exemplified by children who are confident and secure in their environments. These children demonstrate empathetic and prosocial behavior as well as adequate regulation of their positive and negative emotions. Infants who are developing well are able to trust caregivers and other adults; however, they typically only form strong, lasting bonds with a small number of individuals (often their primary caregivers). Accordingly, infants with healthy social-emotional development have few internalizing, externalizing, or dysregulation problems and high levels of compliance with adult requests (Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004). In this manner, social-emotional development and behavior are inseparable, particularly during the first year of life, since regulatory strategies facilitate both adaptive behavior and positive adjustment (Calkins & Hill, 2007). Through supportive parent-child interactions, mothers assist babies in forming these secure attachments and strong regulatory systems (Ainsworth, 1979; Calkins & Hill, 2007) which safeguard children from developmental vulnerabilities to anxiety, withdrawal, aggression, defiance, or high levels of emotional reactivity. In particular, positive maternal behaviors such as warmth, positive affect, comfort, and guidance, have been associated with optimal social-emotional development during infancy.

To begin with, mothers must establish a warm, nurturing milieu in which development can thrive. Maternal warmth encompasses behaviors such as praise, affection, and general positive feelings about the child, and it is widely considered an important construct for child development (Linver, Martin, & Brooks-Gunn, 2004). As Baumrind (1996) has explained, the combination of warm, sensitive, and empathetic
parental behavior, along with appropriate limit-setting, encourages prosocial and compliant behavior in children. For instance, a recent study of preschoolers demonstrated that maternal warmth and child compliance were positively associated during a free play task (Dennis, 2006). Conversely, the absence of warmth and sensitivity behaviors in mothers has been related to defiance, aggression, and other externalizing behaviors in children (Baumrind, 1996).

Positive maternal affect has likewise been shown to be an important factor for social-emotional functioning during infancy. For example, in a study of positive parenting and children’s social-emotional development, mothers’ positive affect and admiration towards their offspring predicted children’s improved regulation of their own positive affect (Davidov & Grusec, 2006). Similarly, a still-face paradigm study illustrated how maternal affect impacted infants’ own affective responses (Legerstee & Markova, 2007). During the study, 3-, 6-, and 9-month-olds reacted more negatively through sad expressions, negative vocalizations, and gaze aversions and less positively through smiles and positive vocalizations to mothers with neutral expressions who were not interacting with them (the still face condition) than they did to typically-interacting mothers (Legerstee & Markova, 2007), emphasizing that the presence of maternal positive affect, rather than just the absence of negative affect, is important for children’s feelings of happiness and well-being. Another study of maternal positive affect found that smiling behavior during early infancy was significantly correlated with infants’ 12-month attachment security (Lohaus, Keller, Ball, Voelker, & Elben, 2004).

Mothers further promote socioemotional and behavioral growth through their comforting behaviors. Maternal comfort encompasses the actions involved in soothing
and reassuring babies during stressful situations. At 6 months, maternal comfort, also described as sensitivity to infant distress, was associated with secure attachment classifications at 15 months, although maternal sensitivity to infants’ nondistress signals did not have the same relationship with attachment outcomes (McElwain & Booth-LaForce, 2006). Thus, comforting behaviors may have a distinct connection with social-emotional development. Indeed, during middle childhood, maternal comforting and helping behaviors (response to distress behaviors) predicted improvement in children’s negative affect regulation; regulation then was shown to mediate the relationship between maternal comfort and children’s empathetic and prosocial behaviors (Davidov & Grusec, 2006). Children’s difficulties in regulating emotion have also contributed to maladaptive behavior patterns such as uncontrolled or inhibited emotional expression, problems with peer interaction, and trouble handling academic challenges (Calkins & Hill, 2007), emphasizing the need for maternal comfort actions.

Another maternal support for social-emotional development is behavioral guidance. Guidance involves modeling appropriate reactions, directing children’s attention, and utilizing informal limit-setting (by establishing routines and implementing consistent responses to infant actions) in order to socialize children’s behavior (Ramey & Ramey, 1999). Guidance can be viewed as positive support for specific child behaviors as opposed to harmful psychological control (Barber, 2002). Adequate amounts of parental behavior support have been related to increased compliance and competence. In contrast, low parental support for children’s appropriate behaviors has been associated with poor regulation and externalizing behaviors (Barber, 2002).
Maternal support for cognitive development and language development. In addition to social-emotional progress, infancy is also a period of rapid learning and advances in cognition. As children act upon objects in their environment, they are able to construct meaning about and relate with their immediate world (Piaget, 1954). Advances in cognitive development at this age include information processing abilities, such as acquiring memory and problem solving skills, as well as increasing understanding of numerical concepts, categorization, and generalization (Bayley, 1969; Bruner, 1964; Fagan, Holland, & Wheeler, 2007). Language is a very important indicator of cognitive growth; adequate language development signifies communication abilities, engagement with the social world, the internalization of thought, and the beginnings of symbolic representation (Berk & Winsler, 1995; Vygotsky, 1962). Consequently, cognitive development and language development are inextricably linked during the first year of life. Mothers can support infants’ emerging cognitive and language development by encouraging exploration, providing appropriate learning materials, becoming involved in learning, and using verbal language with their children.

Maternal encouragement of infant exploration is one mechanism to advance infant cognitive and language functioning. Piaget (1954) explained that infants use observation and experimentation to gradually develop knowledge about their universe. These investigative procedures, however, rely upon the child’s interactions with objects and people (Piaget, 1954). Consequently, infants’ exploration of their environments is essential for cultivating thinking processes. Exploration during the first year often consists of mouthing and object manipulation, and parents who encourage exploration promote children’s eventual understanding of conceptual relationships (Belsky & Most,
1982). For example, 10.5-month-old infants, who were not previously able to individuate two objects, were able to do so after being allowed to explore the objects tactile properties (Wilcox, Woods, Chapa, & McCurry, 2007). Another illustration of the importance of exploration was demonstrated in a recent study of infant word learning. Results indicated that 10-month-old infants were more likely to learn the words for environmental objects when the children found the object perceptually interesting, rather than when the objects were associated with social information (Pruden, Hirsh-Pasek, Golinkoff, & Hannon, 2006). Thus, infants must be allowed to explore and interact with their surroundings in order to have several occasions to discover personal interests which may expand their vocabularies and enhance their cognition.

Bradley and Corwyn (2005) have confirmed the importance of providing children with a stimulus-rich environment. Because mothers often create and maintain infants’ environments, they can support cognitive and language functioning by supplying adequate learning materials like toys and books. The availability of age-appropriate learning materials has been shown to stimulate intrinsic motivation for developing and mastering goals as well as focused attention on productive tasks (Bradley & Corwyn, 2005). Learning materials promote cognitive and language functioning by increasing attention; infant attention has been related to later intelligence scores as well as both receptive and expressive language scores. (Karass, Braungart-Rieker, Mullins, & Burke Lefever, 2002). Beyond improving attention, the presence of cognitively-stimulating materials at home has been found to mediate the relationship between family income and children’s pre-literacy outcomes during early childhood. For this reason, stimulating
materials have been deemed a form of parental investment in children’s development (Yeung, Linver, & Brooks-Gunn, 2002).

Mothers further invest in children’s cognitive and language development through their direct involvement in learning activities. Mothers provide stimulation for their child’s cognitive processes, both through supplying learning materials as well as through their supportive actions, such as maintaining or encouraging infant attention during play or other tasks (Herbert, Swank, Smith, & Landry, 2004; Karass et al., 2002). Maternal involvement in learning, or the encouragement of developmental advance, has been identified as a strong predictor of children’s cognitive functioning (Linver et al., 2004). For example, maternal involvement in play during infancy via behaviors that maintained attention predicted growth in children’s toy play skills and language skills; the changes in toy play skills were positively related to changes in language skills when outcomes were measured at 6, 12, 24, 42, and 54 months (Herbert et al., 2004). Likewise, maternal verbal encouragement of infant attention at 12 months was positively related to infant language scores at 12 months (Karass et al., 2002).

Related to involvement, mothers’ verbal input is also critical to infants’ cognitive and language development. Hart and Risley (1995) provided powerful evidence that the mere presence of parent utterances early in children’s lives improved expressive and receptive vocabularies as well as cognitive development, measured by IQ score at age 3. Furthermore, the richness of parental language was even more predictive of children’s later vocabulary growth than the amount of language provided (Hart & Risley, 1995). Early maternal language, in many forms, has impacted child language learning. For example, both deaf and hearing adults were measured on their learned language outcomes
in adulthood. Those with little spoken or signed language early in life showed lower performance on adulthood learned language, including ASL learning, than the persons who has been exposed to early language in some form (Mayberry, Lock, & Kazmi, 2002). Reading to infants is a common method mothers have used to create language-rich environments for their infants that have prompted better development. For example, mother-child book reading at 8 months predicted higher expressive language scores and total (including receptive and expressive) language scores at 12 months, after controlling for gender maternal education, and family education (Karass & Braungart-Rieker, 2005). Likewise, the frequency of early maternal book reading predicted infants’ vocabulary and comprehension scores at 14 months; by 24 months, reading to children several times a week also predicted children’s cognitive development scores (Raikes et al., 2006).

_Maternal support for all domains of development through responsiveness._ A more global dimension of parenting during infancy that has received a great amount of attention from researchers in fostering optimal child growth is maternal responsiveness. Responsive support behaviors have acquired several alternate names. Sensitivity is probably the most common alternate; however, the sensitivity that refers to recognizing and responding to child cues is distinct from the warm sensitivity discussed earlier that is characterized by affective tone. As such, all cue-driven sensitivity behaviors will be described as responsiveness in this review. The terminology refers to overall responsiveness; Landry, Smith, and Swank (2006) have established that only one general responsiveness factor exists based on the shared variance among its components. Although the names may vary, the major components of responsiveness include: noticing and correctly interpreting infant signals and quickly reacting to those signals in an...
appropriate, contingent fashion (Lohaus et al., 2004). All of these components have been shown to correlate strongly with one another across two time points (3 months and 12 months) during infancy (Lohaus et al., 2004).

The literature has established the effects of maternal support through responsiveness on children’s social-emotional development. For instance, a thorough meta-analysis of 81 intervention studies found that the effectiveness of an intervention in increasing maternal responsiveness was related to the effectiveness of the intervention in improving mother-infant attachment security. In the past, correlations between the two variables have been moderately strong; the findings from this study suggested that a causal relationship existed between responsiveness and attachment (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). Additionally, increases in responsiveness have further been associated with children’s cooperation across social, disciplinary, and other interactive contexts during the first year of life (Landry et al., 2006; Kochanska, Aksan, & Carlson, 2005). Beyond immediate outcomes, researchers have established effects of maternal responsiveness during infancy on social-emotional development over time. For example, maternal responsiveness during infancy was negatively correlated with middle childhood behavior problems in a very high-risk sample; mothers scoring in the lowest quartile of responsiveness had children who were most likely to be diagnosed with disruptive behavior disorder (Wakschlag & Hans, 1999). Likewise, maternal responsiveness during infancy predicted continued responsiveness in adolescence, which was concurrently related to adolescent social development (Jaffari-Bimmel, Juffer, van Ijendoorn, Bakermans-Kranenburg, & Mooijaart, 2006).
Maternal support through responsiveness during infancy has also been shown to shape children’s cognitive and language development. At 6 and 10 months, infants scored higher on the Bayley mental development index at 36 months when mothers had higher responsiveness ratings (Lemelin, Tarabulsy, & Provost, 2006). Moreover, when mothers had high levels of psychosocial risk, maternal responsiveness mediated the relationship between risk and cognitive development (Lemelin et al., 2006). More specifically, Landry et al. (2006) have suggested that responsiveness promoted independent problem-solving by increasing children’s goal-directed and functional play behaviors. Contingent responsiveness from mothers has also been associated with language advances. Maternal responsive behaviors have affected growth in expressive language, shown by early word use (Landry et al., 2006) as well as growth in receptive language, demonstrated by phrases understood by children and vocabulary comprehension (Paavola, Kunnari, & Moilanen, 2005). Hence, one can conclude that maternal support through responsiveness affects all areas of development during infancy.

Review Summary

In short, researchers must consider the positive maternal supports that have been shown to influence development when developing a comprehensive model of potential subthreshold neglect and child development. For instance, warmth (e.g. Linver et al., 2004), positive affect (e.g. Legerstee & Markova, 2007), comfort (e.g. McElwain & Booth-LaForce, 2006), and guidance (e.g. Ramey & Ramey, 1999) have illustrated maternal support for children’s social and emotional development. Likewise, the encouragement of exploration (e.g. Wilcox et al., 2007), provision of learning materials
(e.g. Bradley & Corwyn, 2005), involvement in learning (e.g. Karass et al., 2002), and use of verbal language (e.g. Hart & Risley, 1995) have demonstrated maternal support for cognitive and language development. Finally, the recognition of and contingent reactions to infant cues (e.g. Landry et al., 2006; Lohaus et al., 2004) have showed support for all types of development through maternal responsiveness.

When maternal supports are lacking in such a way that adequate child growth is compromised, the absence of essential parenting behaviors can be considered neglectful behaviors (Hines et al., 2006). In the past, the term child neglect has referred to substantiated legal violations used to prosecute offenders (Sedlak et al., 2006), who have most often been the children’s mothers (USDHHS, 2006); however, the concept of neglect and its subtypes are difficult to clearly define (Dubowitz et al., 2004; Dubowitz, Pitts, et al., 2005) and the poor outcomes resulting from neglect (Hildyard & Wolfe, 2002) have also been seen in children with unsubstantiated reports of maltreatment (Hussey et al., 2005). Correspondingly, when researchers have the goal of preventing developmental delays, as opposed to the legal goal of prosecuting perpetrators, they must investigate *subthreshold neglect* to evaluate less obvious absences in parenting behaviors that still consistently impair children’s development. This goal can be achieved by developing a more complex conceptual model of child functioning that considers distinct ways in which the absence of particular maternal behaviors during infancy affects children’s social-emotional, cognitive, or language development.
The present study identified specific areas of subthreshold neglect, such as lack of support for social-emotional development, lack of support for cognitive-language development, or lack of maternal support through responsiveness, by comparing conceptual models of child development that address how these factors impacted the social-emotional, cognitive, and language development of infants. In past research, specific maternal supports for social-emotional development and cognitive-language development as well as maternal responsiveness have been considered in isolation from one another, as independent predictors of single domains of development. This type of narrow methodological approach has ignored the intertwined nature of development, where multiple processes often operate in combination. In contrast, the current study simultaneously addressed several relationships among maternal parenting supports and children’s development.

The current investigation used structural equation modeling to examine potential pathways from maternal supports at 8 months of age (social-emotional support, cognitive-language support, and maternal responsiveness) to infants’ social-emotional competence, absence of social-emotional problems, cognitive development, and language development at 12 months of age.

In order to capture a wide range of maternal behaviors, participants in the present research were drawn from the Parenting for the First Time Study, a longitudinal, multi-site investigation of parenting among high-resource adult mothers, low-resource adult
mothers, and teenaged mothers. Risk characteristics in this study included young age at birth, low income levels, and/or low educational attainment (e.g., Lounds et al., 2006). Studying a sample with and without identified risk characteristics was advantageous because it captured a wide range of maternal behaviors as well as developmental outcomes. This was particularly salient since Straus and Kantor (2005) have emphasized the need to investigate a broad spectrum of parental actions when trying to detect low levels of neglectful behaviors.

Based on the developmental literature, it was proposed that the absence of maternal support for social-emotional development, demonstrated by low levels of warmth, positive affect, comfort, and guidance, would predict poor social-emotional competence and social-emotional problems. In addition, findings from the literature implied that the absence of maternal support for cognitive-language development, shown by low encouragement of exploration, insufficient provision of learning materials, low levels of involvement, and low levels of general verbalness, would predict poor cognitive development, as measured by low mental development scores, as well as poor language development, measured by problematic auditory comprehension and inadequate expressive communication. Results of developmental research have also suggested that the absence of maternal responsiveness would predict delayed social-emotional, cognitive, and/or language development. These relationships are illustrated in the restricted model shown in Figure 1. This combination of pathways has not previously been tested empirically.
Figure 1. Theoretical Model Based on Literature Relating Maternal Parenting to Child Development (Restricted Model)

The present study hypothesized that when several support factors and developmental outcomes were considered together, child functioning would operate in an even more complex fashion than described by the restricted model suggested above. Thus, a more comprehensive model of child functioning is presented in Figure 2, positing that all three parenting predictors (social-emotional support, cognitive-language support, and support through responsiveness) would affect all four areas of child outcomes.
(social-emotional competence, absence of social-emotional problems, cognitive development, and language development). In other words, the current investigation conjectured that the full model would provide the best explanation of how types of subthreshold neglect impact domains of child development. Specifically, the present study compared the hypothesized full model, containing all associations between maternal supports and child outcomes (see Figure 2), to more restrictive models, including the one suggested by the literature (see Figure 1). Since these competing models have not been previously tested, it is difficult to anticipate which indicators of parenting would have the strongest relationships with development. The present study, however, provided a unique opportunity to carefully examine the strength of associations among a range of maternal behaviors sometimes occurring at subthreshold levels of neglect and related developmental outcomes during infancy.
Figure 2. Alternate Theoretical Model Relating Maternal Parenting to Child Development (Full Model)
METHOD

Participants

The sample for the present study consisted of 508 mothers and their infant children (51% boys and 49% girls) who participated in the Parenting for the First Time Project, a prospective longitudinal study following mothers and first-born children from pregnancy through age 3. Participants were recruited from hospitals, health clinics, social service agencies, and school-aged mothers’ programs in four cities: Birmingham, AL (31%), Washington, DC (25%), Kansas City, KS (23%), and South Bend, IN (21%). Mothers were oversampled for demographic risk characteristics: 58% were adolescents at the time of the child’s birth ($M_{age \; at \; birth} = 18.3$, $SD = 1.2$); 26% were adults with lower education levels ($M_{age \; at \; birth} = 26.2$, $SD = 3.2$); and the remaining 16% were adults with higher education levels of at least 2 years beyond high school ($M_{age \; at \; birth} = 28.4$, $SD = 4.2$). The inclusion of high-risk dyads allowed an increased probability of capturing a wide range of parenting behaviors and child outcomes. When children were 12 months old, many families were living at or near poverty, with two-thirds reporting annual incomes below $20,000 (43% below $10,000) and only 14% reporting annual incomes of more than $35,000. Children in the sample had diverse racial and ethnic backgrounds: 61% of children were African-American, 14% European-American, 14% Multi-Ethnic, and 10% Latino. Roughly 8% of mothers reported that Spanish was their primary language.
Design and Procedures

Participants in the study were given information about the Parenting for the First Time study from their healthcare or social service provider; interested parties filled out a contact information form and were screened via telephone by a project representative. After enrolling in the study, mothers completed a face-to-face interview during their third trimester of pregnancy to report their demographic and other background information. The prenatal interview also helped interviewers gain rapport with mothers. The prenatal interview was typically conducted in the laboratory; however, in some instances where mothers could not come to the laboratory (i.e. the pregnant mother was on bedrest), the interview was conducted in a location of the mother’s choosing, usually at home.

Tables 1 and 2 contain information about the assessment batteries when children were 8 and 12 months old. When infants were 8 months of age, interviewers came to homes and observed the interactions between the parent and the target infant. At the same time, mothers reported on their own behavior and attitudes, the child’s behavior and routines, and aspects of the home environment. Specifically, observed levels of warmth, positive affect, comfort, and guidance directed toward the target child indicated maternal support for children’s social and emotional development. Interviewers also evaluated whether mothers encouraged exploration, provided appropriate learning materials, became involved in learning, and verbally expressed language to measure their support of children’s cognitive and language development. Observed ratings of maternal responsiveness were also collected with three related measures: contingent responsiveness, recognize and respond, and responsivity.
TABLE 1
MEASURES OF MATERNAL SOCIAL-EMOTIONAL SUPPORT, COGNITIVE-LANGUAGE SUPPORT, AND RESPONSIVE SUPPORT AT 8 MONTHS

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>Description of Subscale</th>
<th>Coding Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social-Emotional Support</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Warmth & Sensitivity: *Mother-Infant Observation* | Parent demonstrates engaging and nurturing behavior toward child | 1 = almost none  
2 = < half  
3 = half warm, half neutral or mostly warm  
4 = >half  
5 = almost always, no neg. behavior |
| Positive Affect: *Mother-Infant Observation* | Parent smiles or laughs | 1 = 0 smiles  
2 = 1-2 smiles  
3 = 3-4 smiles  
4 = 5-6 smiles  
5 = 7+ smiles |
| Comfort: *Parenting Essentials* | Parent comforts child during times of distress | -1 = omission or potentially harmful  
0 = neither harmful nor beneficial  
1 = appropriate amounts of pos. behavior |
| Guide Behavior: *Parenting Essentials* | Parent uses actions to guide and limit child behavior in socially-appropriate ways | -1 = omission or potentially harmful  
0 = neither harmful nor beneficial  
1 = appropriate amounts of pos. behavior |
| Acceptance: *HOME Inventory* | Parent tolerates less-than-optimal child behavior and avoids undue restriction and punishment | Sum of 8 items scored as 0 or 1  
(0 = item is not true or absent,  
1 = item is true or present) |
| **Cognitive-Language Support** | | |
| General Verbalness: *Mother-Infant Observation* | Parent speaks, reads, or otherwise conveys language to the child | 1 = virtually no talking  
2 = majority not talking  
3 = half time talking  
4 = majority talking  
5 = nearly continuous talking |
| Encourage Exploration: *Mother-Infant Observation* | Parent encourages child to explore his or her surroundings | -1 = omission or potentially harmful  
0 = neither harmful nor beneficial  
1 = appropriate amounts of pos. behavior |
| Language Stimulation: *Parenting Essentials* | Parent communicates with child through sounds, songs, gestures, or words | -1 = omission or potentially harmful  
0 = neither harmful nor beneficial  
1 = appropriate amounts of pos. behavior |
| Learning Materials: *HOME Inventory* | Parent provides appropriate play and learning materials capable of stimulating child’s development | Sum of 9 items scored as 0 or 1  
(0 = item is not true or absent,  
1 = item is true or present) |
### TABLE 1 (continued).

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>Description of Subscale</th>
<th>Coding Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognitive-Language Support</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involvement: HOME Inventory</td>
<td>Parent is actively involved in child’s learning and provides stimulation for increasingly mature behavior</td>
<td>Sum of 6 items scored as 0 or 1 (0 = item is not true or absent, 1 = item is true or present)</td>
</tr>
<tr>
<td><strong>Responsive Support at 8 Months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contingent Responsiveness: Mother-Infant Observation</td>
<td>Parent responds appropriately and sensitively to child cues</td>
<td>1 = almost completely uninvolved 2 = &lt; half 3 = half (consistently moderately flexible) 4 = mostly flexible with 1 or 2 neg. behaviors 5 = almost always responsive and flexible</td>
</tr>
<tr>
<td>Recognize &amp; Respond: Parenting Essentials</td>
<td>Parent adequately recognizes and responds to child cues</td>
<td>-1 = omission or potentially harmful 0 = neither harmful nor beneficial 1 = appropriate amounts of pos. behavior</td>
</tr>
<tr>
<td>Responsivity: HOME Inventory</td>
<td>Parent responds to child’s behavior with verbal, tactile, and emotional reinforcement for desired behavior and free communication</td>
<td>Sum of 11 items scored as 0 or 1 (0 = item is not true or absent, 1 = item is true or present)</td>
</tr>
</tbody>
</table>
TABLE 2
MEASURES OF CHILD DEVELOPMENT AT 12 MONTHS

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>Description of Subscale</th>
<th>Scoring Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social-Emotional Competence Scale: Brief Infant-Toddler Social and Emotional Assessment</td>
<td>Child testing of competencies including: compliance with adult expectations, play behavior, interactions with peers, attention skills, mastery motivation, and emerging empathy</td>
<td>Sum of 11 maternal ratings scored as 0-2 (0= not true/rarely, 1=somewhat true/sometimes, 2=very true/often) Subtotals in Normal Range ≥12</td>
</tr>
<tr>
<td>Social-Emotional Problems Scale: Brief Infant-Toddler Social and Emotional Assessment</td>
<td>Child testing of problems including: externalizing, internalizing, dysregulation, atypical, and maladaptive behaviors Note: Problems Scale reverse scored to reflect an absence of social-emotional problems</td>
<td>Sum of 31 maternal ratings scored as 0-2 (0= not true/rarely, 1=somewhat true/sometimes, 2=very true/often) Subtotals in Normal Range ≤-13 when reverse scored</td>
</tr>
<tr>
<td>Mental Development Index: Bayley Scales of Infant Development - II</td>
<td>Interviewer testing of child competencies including: sustained attention, purposeful manipulation, imitation, comprehension, expressive language, and problem solving</td>
<td>Sum of items scored as 1 or 0 (1 = present, 0 = absent) where number of items varies depending on child’s age and ability level. Standardized $M = 100$ (SD = 15)</td>
</tr>
<tr>
<td>Total Language Score: Preschool Language Scale - IV</td>
<td>Interviewer testing of how much language child understands and how well child communicates to others</td>
<td>Sum of items scored as 1 or 0 (1 = present, 0 = absent) where number of items varies depending on child’s age and ability level. Standardized $M = 100$ (SD = 15)</td>
</tr>
</tbody>
</table>
When children were 12 months old, mothers and infants visited the laboratory at their site. Mothers, again, reported on their own behavior and attitudes as well as aspects of the children’s daily functioning, while their children were directly tested by assessors on measures of their social-emotional functioning, cognition, and language emergence. Detailed descriptions of each outcome measured at 1 year of age are provided in Table 2.

**Observational Ratings of Parenting Behaviors**

*Infant/Toddler Home Observation for the Measurement of the Environment Inventory ratings.* The quality of the child’s home environment was assessed using the Infant/Toddler Home Observation for the Measurement of the Environment Inventory (IT-HOME; Caldwell & Bradley, 2001). During this semi-structured interview, assessors either directly observed or asked mothers about a series of items that were coded as either 0 (absent) or 1 (present) on several subscales representing dimensions of parenting. Interviewers in this study reached a minimum of 90% agreement with a master coder, and coordinators at each site were directly trained by one of the authors of the IT-HOME. This measure has good reliability (Bradley & Caldwell, 1984) and is well-established as a measure of stimulation in the home environment for children from birth through 36 months (Bradley, Mundfrom, Whiteside, Casey, & Barrett, 1994; Whiteside-Mansell, Pope, & Bradley, 1996). In the current project, Cronbach’s alpha of .58 was found for three of the variables in the IT-HOME: learning materials, involvement, and responsivity. In the present study, learning materials and involvement were included as indicators of cognitive/language support; responsivity was included as an indicator of support through responsiveness.
Mother-Infant Observation Ratings. Interactions between mothers and infants on several parenting dimensions were evaluated in families’ homes during the Mother-Infant Observation. Mothers were asked to do what they would normally do on a typical day while their infants were awake and not eating. The mother-infant interactions lasted about 30 minutes; each interaction began with a 2-minute adjustment period followed by four 5-minute observational segments of maternal behavior. Immediately after each observational segment, raters spent 2 minutes coding behavior. Interviewers reached a minimum of 80% agreement with a master coder for every dimension of maternal parenting for both on-site and videotaped interactions. During each observational segment, interviewers rated maternal behaviors on 5-point Likert-type scales of warmth and sensitivity, positive affect, general verbalness, and contingent responsiveness using a modified version of a coding system developed by Landry, Smith, Miller-Loncar, and Swank (1997). Using the original system, an internal consistency coefficient of .81 was found, with reliabilities ranging from .80 to .84 (Hammond, Landry, Swank, & Smith, 2000). General verbalness was not part of the original rating system; this dimension was added for the purposes of the Parenting for the First Time study. Including this variable, Chronbach’s alpha was .85 for the four variables in the present study. General verbalness indicated maternal cognitive/language support whereas warmth and positive affect indicated socioemotional/behavioral support. Additionally, contingent responsiveness served as an indicator of maternal responsive support.

Parenting Essentials ratings. After four decades of investigating the consequences of parenting behavior for young children, Ramey and Ramey (1999) established that seven areas of parenting behaviors were “essential” for positive child
development. Based on these ideas, observational measures of four parenting areas, the Parenting Essentials, were designed for the purposes of this study: (1) comforting infants during times of distress, (2) guiding infant behavior in socially-appropriate ways, (3) encouraging infants to explore their surroundings, and (4) adequately recognizing and responding to children’s cues. Raters coded each area of maternal behaviors as -1 (omission of behaviors or potentially harmful to the child), 0 (neither harmful nor beneficial), or 1 (demonstrating appropriate amounts of positive behaviors). Prior to conducting assessments, interviewers were certified by two experts who judged their ability (via tape-recorded practice interviews) to develop rapport with participants, ensure interview completeness, follow-up with additional questions when necessary, and avoid leading participants toward particular responses. Interviewers also reached a minimum of 80% agreement with a master coder for every dimension of maternal parenting. Cronbach’s alpha of .48 was found for comfort, guide behavior, encourage exploration, and recognize and respond variables in the present study. Comfort and guide were included as indicators of socioemotional/behavioral support, encourage exploration was included as an indicator of cognitive/language support, and recognize and respond was included as an indicator of support through maternal responsiveness.

Measures of Child Development

Bayley Mental Development Index. The mental development index of the BSID-II (Bayley, 1993) was administered as an indicator of children’s cognitive development. The mental development index has a standardized mean of 100 and a standard deviation of 15. The mental development index includes items measuring sustained attention,
purposeful manipulation of objects, imitation, comprehension, expressive language, and problem solving; delays in these basic skills reflect early developmental problems. Coefficient alphas have ranged from .78 to .92, and test-retest reliability for the mental development index was .83 (Bayley, 1993).

**Brief Infant-Toddler Social and Emotional Assessment.** Children’s socioemotional development at 12 months was assessed using the Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan & Carter, 2006). The BITSEA is a 42-item parent-report screening tool designed to identify social and emotional problems and competencies in 12- to 36-month olds. Items evaluate a wide range of social-emotional problems including externalizing, internalizing, dysregulation, atypical, and maladaptive behaviors. The BITSEA also addresses socioemotional competencies with items measuring compliance with adult expectations, play behavior, prosocial interactions with peers, attention skills, mastery motivation, and emerging empathy. For each item, mothers responded to statements about their children’s behaviors on a 3-point scale (0=not true/rarely, 1=somewhat true/sometimes, 2=very true/often). The BITSEA has been demonstrated to have good test-retest reliability with scores on the problems and competence scales ranging from .80 to .92. In terms of interrater reliability, interclass coefficients were in the good-to-excellent range with values from .58 to .78 (Briggs-Gowan & Carter, 2006). There was also strong support for the construct and discriminate validity of the measure (Briggs-Gowan & Carter, 2006; Briggs-Gowan, et al., 2004). Both problems and competence subscales of the BITSEA were included in the present study as indicators of children’s social-emotional development.
Preschool Language Scale Total Score. Additionally, the total language score of the Preschool Language Scale-IV (PLS-IV; Zimmerman, Steiner, & Pond, 2002) was included as an indicator of children’s language development. The PLS-IV has been standardized for use with children from birth to 7 years of age and provides language scores for both auditory comprehension and expressive communication, which are combined to create a total language score. The measure has also been established as a good diagnostic tool for identifying language delay (Zimmerman & Castilleja, 2005; Zimmerman et al., 2002). Internal consistency coefficients for 1- to 5-year-olds ranged from .72 to .97. Test-retest stability ranged from .82 to .97.
RESULTS

Descriptive Data

Prior to inclusion in the model, the descriptive properties of all variables were examined. Table 3 contains the mean, standard deviation, range, skew, and kurtosis for each variable in the three latent predictor constructs that comprised the full and restricted structural models. Variables with extreme properties such as very high or low means, low variability, or very high skew or kurtosis values were excluded from the investigation and were not presented in Table 3. The shaded cells in the Table 3 denote the variables (acceptance and language stimulation) that remained under consideration due to their acceptable properties, but were not included in the final analyses due to poor fit in the measurement models for each latent construct.

Examination of the means presented in Table 3 suggested that, in most cases, the means fell toward the middle of the possible values, with reasonably-sized standard deviations. The responsivity variable (part of the responsive support construct), and the learning materials variable (part of the cognitive-language support construct), had means that appeared slightly higher than average. The minimum and maximum values reported in Table 3 indicated that the full possible range of scores was used in all cases, with the exception of the responsivity variable, which had no scores of 0 or 1. Accordingly, the skewness and kurtosis for each variable were also presented. In general, a variable is not considered to be extremely skewed unless the skew and kurtosis values are greater
### TABLE 3

DESCRIPTIVE INFORMATION FOR MANIFEST INDICATORS REPRESENTING MATERNAL SOCIAL-EMOTIONAL SUPPORT, COGNITIVE-LANGUAGE SUPPORT, AND RESPONSIVE SUPPORT AT 8 MONTHS

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Skew</th>
<th>SE</th>
<th>Kurt.</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social-Emotional Support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warmth &amp; Sensitivity: Mother-Infant Observation</td>
<td>399</td>
<td>3.81</td>
<td>1.06</td>
<td>1.00 – 5.00</td>
<td>-.75</td>
<td>.12</td>
<td>-.25</td>
<td>.24</td>
</tr>
<tr>
<td>Positive Affect: Mother-Infant Observation</td>
<td>399</td>
<td>2.81</td>
<td>1.07</td>
<td>1.00 – 5.00</td>
<td>.17</td>
<td>.12</td>
<td>-.87</td>
<td>.24</td>
</tr>
<tr>
<td>Comfort: Parenting Essentials</td>
<td>356</td>
<td>.58</td>
<td>.59</td>
<td>-1.00 – 1.00</td>
<td>-1.11</td>
<td>.13</td>
<td>.22</td>
<td>.26</td>
</tr>
<tr>
<td>Guide Behavior: Parenting Essentials</td>
<td>357</td>
<td>.04</td>
<td>.63</td>
<td>-1.00 – 1.00</td>
<td>-.03</td>
<td>.13</td>
<td>-.44</td>
<td>.26</td>
</tr>
<tr>
<td>Acceptance: HOME Inventory</td>
<td>402</td>
<td>5.79</td>
<td>1.46</td>
<td>0.00 – 8.00</td>
<td>-1.20</td>
<td>.12</td>
<td>1.99</td>
<td>.24</td>
</tr>
<tr>
<td><strong>Cognitive-Language Support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Verbalness: Mother-Infant Observation</td>
<td>399</td>
<td>2.86</td>
<td>1.17</td>
<td>1.00 – 5.00</td>
<td>.09</td>
<td>.12</td>
<td>-1.13</td>
<td>.24</td>
</tr>
<tr>
<td>Encourage Exploration: Mother-Infant Observation</td>
<td>353</td>
<td>.59</td>
<td>.60</td>
<td>-1.00 – 1.00</td>
<td>-1.17</td>
<td>.13</td>
<td>.35</td>
<td>.26</td>
</tr>
<tr>
<td>Language Stimulation: Parenting Essentials</td>
<td>354</td>
<td>.60</td>
<td>.59</td>
<td>-1.00 – 1.00</td>
<td>-1.18</td>
<td>.13</td>
<td>.38</td>
<td>.26</td>
</tr>
<tr>
<td>Learning Materials: HOME Inventory</td>
<td>406</td>
<td>7.04</td>
<td>1.50</td>
<td>1.00 – 9.00</td>
<td>-1.00</td>
<td>.12</td>
<td>1.23</td>
<td>.24</td>
</tr>
<tr>
<td>Involvement: HOME Inventory</td>
<td>406</td>
<td>4.12</td>
<td>1.58</td>
<td>0.00 – 6.00</td>
<td>-.44</td>
<td>.12</td>
<td>-.82</td>
<td>.24</td>
</tr>
<tr>
<td>Contingent Responsiveness: <em>Mother-Infant Observation</em></td>
<td>398</td>
<td>3.81</td>
<td>1.12</td>
<td>1.00 – 5.00</td>
<td>-7.22</td>
<td>.12</td>
<td>-.49</td>
<td>.24</td>
</tr>
<tr>
<td>Recognize &amp; Respond: <em>Parenting Essentials</em></td>
<td>353</td>
<td>.32</td>
<td>.65</td>
<td>-1.00 – 1.00</td>
<td>-.44</td>
<td>.13</td>
<td>-.72</td>
<td>.26</td>
</tr>
<tr>
<td>Responsivity: <em>HOME Inventory</em></td>
<td>405</td>
<td>9.27</td>
<td>1.83</td>
<td>2.00 – 11.00</td>
<td>-1.37</td>
<td>.12</td>
<td>2.00</td>
<td>.24</td>
</tr>
</tbody>
</table>
than an absolute value of 2 when centered around 0 (Tabachnick & Fidell, 2001). All of
the variables in Table 3 were within an adequate range. Cumulatively, the results shown
in Table 3 suggested that normal univariate distributions were possible for each variable
although it would be misleading to state that the variables on three- or five-point scales
were distributed normally. Although normal univariate distributions can be helpful during
modeling, structural equation modeling relies on the assumption that latent constructs
have an approximate multivariate normal distribution (Bollen, 1989; Tabachnick &
Fidell, 2001). Normal univariate distributions are necessary for normal multivariate
distributions; however, multivariate distributions are not necessarily normal because of
normal univariate distributions.

In addition to the manifest predictor variables, the descriptive properties of the
manifest outcome variables representing child development at 12 months were also
examined. The means, standard deviations, ranges, skewnesses, and kurtoses for the
manifest variables representing development are detailed in Table 4. No variables had
extreme or unexpected properties, and all four indicators of development (social-
emotional competence, the absence of social-emotional problems, cognitive
development, and language development) were retained for further analyses. At 12
months of age, the group mean for each developmental outcome fell within the normal
range, with the exception of the absence of social-emotional problems mean, which was
in the problematic range. On the BITSEA Problems Scale, nearly half (48%) of children
at one year of age demonstrated social-emotional problems based on established cutoffs
for potential delay (Briggs-Gowan & Carter, 2006).
**TABLE 4**

DESCRIPTIVE INFORMATION FOR MANIFEST VARIABLES REPRESENTING CHILD DEVELOPMENT AT 12 MONTHS

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Skew</th>
<th>SE</th>
<th>Kurtosis</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social-Emotional Competence Scale:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Brief Infant-Toddler Social and Emotional Assessment</em></td>
<td>435</td>
<td>14.90</td>
<td>3.32</td>
<td>3.00 – 22.00</td>
<td>-.18</td>
<td>.12</td>
<td>-.25</td>
<td>.23</td>
</tr>
<tr>
<td>Social-Emotional Problems Scale:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Brief Infant-Toddler Social and Emotional Assessment</em></td>
<td>435</td>
<td>-13.72</td>
<td>6.76</td>
<td>-45.00 - -1.00 (reverse)</td>
<td>-.86</td>
<td>.12</td>
<td>1.50</td>
<td>.23</td>
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<tr>
<td>Mental Development Index:</td>
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<tr>
<td><em>Bayley Scales of Infant Development - II</em></td>
<td>382</td>
<td>86.58</td>
<td>4.75</td>
<td>70.00 – 98.00 (raw)</td>
<td>-.56</td>
<td>.13</td>
<td>1.13</td>
<td>.25</td>
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<tr>
<td></td>
<td></td>
<td>93.58</td>
<td>12.20</td>
<td>60.00 – 123.00 (standard)</td>
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<tr>
<td>Total Language Score:</td>
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<tr>
<td><em>Preschool Language Scale - IV</em></td>
<td>341</td>
<td>99.53</td>
<td>14.17</td>
<td>64.00 – 139.00 (standard)</td>
<td>.10</td>
<td>.13</td>
<td>-.25</td>
<td>.26</td>
</tr>
</tbody>
</table>
Signs of delay were also seen for children in other areas of development, despite average group means. For instance, 16% of children showed a delay in social-emotional competence on the BITSEA Competence Scale (Briggs-Gowan & Carter, 2006). Likewise, 8% of children demonstrated a cognitive delay on the Bayley Mental Development Index (Bayley, 1993), and 16% of children exhibited a language delay on the Preschool Language Scale Total Score (Zimmerman et al., 2002). Figure 3 illustrates the number of areas (social-emotional competence, absence of social-emotional problems, cognitive development, and language development) in which children performed below average. It should be emphasized that 74% of children were not performing within an average range at 1 year of age on at least one measure of development, and 9% of children evidenced delays in either three or four areas of development at 1 year of age.

![Figure 3. Percentage of Children with Potential Delays in Areas of Social-Emotional Competence, Absence of Social-Emotional Problems, Cognitive Development, and Language Development at 12 Months](image-url)
Approaches for Testing Model Fit

The statistical software Mplus (Muthen & Muthen, 2001) was employed to evaluate all models in the present study. When testing a particular model, Mplus generates several fit indices which indicate that the parameters in the model-implied covariance matrix are probable given the actual variances and covariances observed in the data. One of these goodness-of-fit indicators is the chi-square ($\chi^2$) likelihood ratio test. The likelihood ratio test compares the specified model to a saturated model where the degrees of freedom = 0. If the $\chi^2$ difference test was significant, it would imply a rejection of the notion that the specified model fits better than the saturated model in the population. Accordingly, a good fit is usually indicated by a non-significant $\chi^2$ value and a $\chi^2$/df ratio close to 1.0 (Bentler, 1990; Satorra & Saris, 1985). Even in some cases where the $\chi^2$ statistic yields a significant result, however, a $\chi^2$/df ratio less than 2.00 typically suggests a reasonable goodness-of-fit (Nasser & Wisenbaker, 2003).

The likelihood ratio test can be complemented with another indicator, the comparative fit index (CFI). The CFI is also a $\chi^2$-distributed fit statistic that does not have a downward bias in the case of smaller sample sizes. Because the $\chi^2$ distribution for the CFI is noncentral, again, CFI values closest to 1.0 represent better-fitting models (Bentler, 1990). Finally, the root mean square error of approximation (RMSEA) also gauges model fit. Excellent model fit is indicated by an RMSEA value very close to 0, good fit is suggested by a value less than .05, and acceptable fit is represented by values between .05 and .08 (MacCallum, Browne, & Sugawara, 1996).

Using multiple fit indices (although Bentler has suggested no more than two in addition to the likelihood ratio test) is helpful in arriving at a general conclusion about
model fit since the indicators are not exact (Bentler, 2007). For instance, Yuan (2005) has illustrated that while RMSEA is arguably the most stable fit statistic, its stability may be an artifact of its uncontrollable properties, such as its square root. It is important to note that fit indices are approximate and do not preclude the existence of several equal or better-fitting models (Bentler, 2007). Beyond reporting the fit indices in the present study, the model evaluation also includes an examination of parameter estimates and standard errors. In a model that fits well, the parameter estimates are significant at the $\alpha < .05$ level and the standard errors are small.

As is the case in most studies with high-risk populations, missing data existed in the sample. Missing data compromises the sample size, which is an important concern in structural equation modeling because the sampling distributions of the fit statistics vary with sample size (Tanaka, 1987). Using a maximum likelihood estimator is one method to address the problem of missing data since the maximum likelihood procedure is somewhat robust to relatively smaller sample sizes if the skewness and kurtoses are not too large (Bollen, 1989). In addition, the most suitable alternative to maximum likelihood, weighted least squares, requires listwise deletion of all cases that are missing any values. In contrast, the maximum likelihood estimator takes advantage of all available information from all cases (Bollen, 1989). In all structural models in the study, a full information maximum likelihood estimator (FIML) was utilized to maximize the information available from the collected data. Use of the maximum likelihood procedure was possible in these analyses because all variables were treated as continuous.
Measurement Models

Before testing the full model with all latent predictor constructs (social-emotional support, cognitive-language support, responsive support) and manifest outcome variables (social-emotional competence, absence of social-emotional problems, cognitive development, and language development), the properties of the measurement model for each latent construct were examined. The correlations for the best-fitting constellations of variables in each area are shown in Table 5. The original hypothesized model of social-emotional support at 8 months was assessed using five indicators: warmth and sensitivity, positive affect, comfort, guide behavior, and acceptance. The acceptance variable was excluded from the measurement model for the social-emotional support construct due to a poorer goodness-of-fit than was found with the remaining four indicators. As Table 5 illustrates, all of the remaining indicators were significantly correlated with one another, and the fit of the measurement model for social-emotional support was excellent, $\chi^2/df = 0.45, p = .64$, CFI = 1.00, and RMSEA = 0.00.

Similar to the social-emotional support construct, the latent cognitive-language support construct was also originally measured with five indicators at 8 months: involvement, general verbalness, encourage exploration, language stimulation, and learning materials; however, to achieve a better fit, the language stimulation variable was excluded from the cognitive-language support construct. Table 5 displays the correlations for the remaining four variables, which comprised the best-fitting constellation of indicators of cognitive-language support. As shown, all four manifest indicators in the factor were significantly correlated with one another, except for the association between
TABLE 5

CORRELATIONS AMONG MANIFEST VARIABLES REPRESENTING MATERNAL SOCIAL-EMOTIONAL SUPPORT, COGNITIVE-LANGUAGE SUPPORT, AND RESPONSIVE SUPPORT AT 8 MONTHS

<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
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<th>11</th>
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<tbody>
<tr>
<td>1. Warmth &amp; Sensitivity</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>2. Positive Affect</td>
<td>0.60**</td>
<td>1.00</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3. Comfort</td>
<td>0.25**</td>
<td>0.16**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. Guide Behavior</td>
<td>0.24**</td>
<td>0.13*</td>
<td>0.12*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5. General Verbalness</td>
<td>0.67**</td>
<td>0.60**</td>
<td>0.19**</td>
<td>0.11*</td>
<td>1.00</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. Encourage Exploration</td>
<td>0.10</td>
<td>0.14*</td>
<td>0.22**</td>
<td>0.14**</td>
<td>0.10</td>
<td>1.00</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7. Learning Materials</td>
<td>0.20**</td>
<td>0.16**</td>
<td>0.13*</td>
<td>0.16**</td>
<td>0.21**</td>
<td>0.18**</td>
<td>1.00</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>8. Involvement</td>
<td>0.36**</td>
<td>0.26**</td>
<td>0.19**</td>
<td>0.20**</td>
<td>0.33**</td>
<td>0.21**</td>
<td>0.45**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Contingent Responsiveness</td>
<td>0.83**</td>
<td>0.48**</td>
<td>0.27**</td>
<td>0.26**</td>
<td>0.57**</td>
<td>0.17**</td>
<td>0.28**</td>
<td>0.39**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Recognize &amp; Respond</td>
<td>0.29**</td>
<td>0.28**</td>
<td>0.20**</td>
<td>0.20**</td>
<td>0.25**</td>
<td>0.35**</td>
<td>0.17**</td>
<td>0.23**</td>
<td>0.37**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>11. Responsivity</td>
<td>0.51**</td>
<td>0.45**</td>
<td>0.19**</td>
<td>0.15**</td>
<td>0.52**</td>
<td>0.20**</td>
<td>0.20**</td>
<td>0.44**</td>
<td>0.40**</td>
<td>0.31**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: Correlations among indicators within latent constructs are in bold.
*p < .05; **p < .01
general verbalness and encourage exploration \((r = .10)\). The resulting measurement model had an excellent fit, \(\chi^2/df = 0.78, p = .45, \text{CFI} = 1.00, \text{RMSEA} = 0.00\).

Responsive support included three indicators: contingent responsiveness, recognize and respond, and responsivity. As described earlier, the responsivity variable had some relatively undesirable properties (high mean, larger kurtosis), but the indicator was retained in the analyses because the properties were still within acceptable limits. As Table 5 shows, all of the indicators of this latent construct were significantly correlated with one another. This measurement model could not be tested independently because the model was perfectly identified with only three indicators. Instead, a measurement model including all three latent predictors was tested and is illustrated in Figure 4.

In the combined measurement model, the errors from all three latent predictors were allowed to correlate with one another. The correlations of the errors of the three latent predictor constructs were all highly correlated with each other. In fact, two of the three standardized correlation estimates among support constructs were greater than 1.00 (the third was also quite high at .92), suggesting some linear dependency between the factors. These results suggest that the three latent predictors may be tapping some of the same underlying variance, and that perhaps a simpler model is needed. Because all of the factors correlated near 1.00, suggesting that they may be measuring the same thing, a one-factor model was tested to determine if a more parsimonious representation of the data would fit better than the three-factor solution. The one factor model did not fit as well, \(\chi^2/df = 2.60, p < .001, \text{CFI} = 0.97, \text{RMSEA} = 0.07\). A likelihood ratio test comparing the fits of the one- and three-factor solutions found a significant difference in favor of the three factor solution, \(\chi^2 = 19.96, df = 3.00, p < .001\).
Figure 4. Measurement Model for Latent Predictor Constructs

Note. For ease of interpretation, non-significant pathways are presented as dotted lines; negative pathways are presented as dashed lines; correlations among errors are presented as curved arrows; path loadings are standardized; $f$ denotes fixed path; $^*p < .05$; $^{**}p < .01$, $^{***}p < .001$
The errors of the manifest variables from the same measures were also allowed to correlate with one another (for example, all HOME items were allowed to correlate with all other HOME items) in the three-factor model. This analysis is referred to as a correlated uniqueness model, and it has been contrasted with a correlated trait – correlated method model (e.g. Lance, Noble, & Scullen, 2002). In the alternate correlated trait – correlated method model, the methods would be considered additional latent variables onto which the errors of the manifest variables would load in addition to the loadings onto the maternal support latent predictors. In this multitrait multimethod data, each measure (Mother-Infant Observation, Parenting Essentials, or HOME Inventory) would be considered a method and each area of maternal support (social-emotional support, cognitive-language support, or responsive support) would be considered a trait. Although both methods have advantages and disadvantages, a relevant benefit of the correlated uniqueness model is that with small sample sizes and small numbers of traits and methods, the correlated trait – correlated method model is less likely to converge properly than the correlated uniqueness model, especially when factor correlations are equal (Lance et al., 2002). As mentioned earlier and as illustrated in Figure 4, the correlations between the maternal support factors were all high, and quite close to 1.00. Hence, the correlated trait – correlated method model did not converge, while the correlated uniqueness model did. Although the $\chi^2$/df ratio was somewhat high at 2.16, the CFI of 0.98 and RMSEA of 0.06 suggested that the overall fit of the correlated uniqueness measurement model was adequate for the three latent predictors of maternal support.
Testing a Conceptual Model of Children’s Functioning with Structural Equation Modeling

As stated earlier, the present study used structural equation modeling (SEM) to test a theoretically-driven model of early parenting and children’s developmental functioning. In essence, SEM is a multiple regression analysis which can simultaneously examine the relationships between latent predictors and outcomes. Each latent construct, or factor, is a theoretical variable that represents the underlying multivariate distribution of the factor’s observed indicators, or manifest variables. During model testing, the relationships between multiple latent constructs or between latent constructs and manifest variables are of primary interest. Examining several goodness-of-fit indices along with the model’s parameter estimates helps interpret those relationships (Bollen, 1989).

During model testing, SEM imposes a particular structure on the variances and covariances of all the variables within the model. To create such a structure, the researcher using SEM selects the particular relationships between variables that he or she presumes are important and specifies the model according to these relationships (Bollen, 1989).

The current project used a model comparison procedure to elucidate the paths that signified the presence of subthreshold neglect within the context of overall development. The previous literature has suggested that maternal social-emotional support predicts social-emotional development, cognitive-language support predicts cognitive development and language development, and responsive support predicts social-emotional, cognitive, and language development (see Figure 1). The present study, however, asserts that multiple areas of child development are even more entangled than
suggested by single-outcome studies, with all maternal supports predicting all developmental outcomes. It was therefore hypothesized that the full model (see Figure 2) would best explain the complex nature of these relationships.

In the full model, social-emotional support was hypothesized to impact social-emotional development as well as cognitive development and language development. Similarly, cognitive-language support was hypothesized to affect cognitive development and language development as well as social-emotional development. Furthermore, responsive support was expected to predict all areas of development. In sum, the full model did not restrict relationships and all latent predictors were expected to be associated with all developmental outcomes. Based on previous empirical findings, it was expected that if the full model had a good fit, the path between social-emotional support and social-emotional competence as well as the path between social-emotional support and the absence of social-emotional problems would reveal the strongest relative relationships. Likewise, it was anticipated that the path between cognitive-language support and cognitive development as well as the path between cognitive-language support and language development would have the strongest relative relationships.

**Restricted model.** The restricted model suggested by the literature was tested first. This recursive model had no feedback loops (Bollen, 1989). As described above, two paths were specified between maternal social-emotional support at 8 months and child social-emotional development at 12 months. To clarify, the relationships were unconstrained between maternal support and social-emotional competence, measured by the BITSEA Competence Scale (Briggs-Gowan & Carter, 2006), as well as between maternal support and the absence of social-emotional problems, measured by the
BITSEA Problems Scale (Briggs-Gowan & Carter, 2006). The paths between social-emotional support and cognitive development and between social-emotional support and language development were constrained to 0. Paths were also specified between cognitive-language support at 8 months and cognitive development at 12 months, measured by the BSID-II Mental Development Index (Bayley, 1993), as well as between cognitive-language support at 8 months and language development at 12 months, measured by the PLS-IV Total Language Score (Zimmerman et al., 2002). In the restricted model, the paths between cognitive-language support and social-emotional competence and between cognitive-language support and social-emotional problems were constrained to 0. In contrast, the paths were unconstrained between maternal responsive support at 8 months and all four developmental outcomes at 12 months. In the manifest indicators of the predictor constructs, the errors of all subscale indicators from the same measure were allowed to correlate with one another. In addition, the errors of the three latent predictor factors were allowed to correlate with one another since one area of parenting is likely to relate to other areas of parenting. Similarly, the errors of the four manifest outcome variables were allowed to correlate with each other since one area of development is likely to relate to other areas of development.

The restricted model was found to have a good overall fit, $\chi^2/df = 1.59$, $p < .01$, CFI = 0.98, RMSEA = 0.04. The standardized regression coefficients are shown in Figure 5. Results of the restricted model found that maternal responsive support at 8 months was positively associated with an absence of social-emotional problems at 12 months, $\beta = .48$, $p < .05$. Responsive support at 8 months, however, was negatively associated with language development at 12 months, $\beta = -.45$, $p < .05$. The restricted model also showed
that cognitive-language support at 8 months was positively associated with language
development at 12 months, $\beta = .36$, $p < .05$. No other significant relationships emerged
between 8 month parenting and 12 month child development. Much like the measurement
model alone, the errors of the three latent predictor constructs were all highly correlated
with each other, suggesting some linear dependency.

*Full model*. Next, the full model with no unconstrained paths was tested. Again,
errors of the subscale indicators derived from the same measure were allowed to
corrrelate, errors of the latent factors were allowed to correlate, and errors of the
developmental outcomes were allowed to correlate with one another. The full model also
had a good fit, $\chi^2/df = 1.66$, $p < .01$, CFI = 0.97, RMSEA = 0.04. The standardized
estimates are shown in more detail in Figure 6. In the full model, only maternal
responsive support at 8 months was positively associated with the absence of children’s
social-emotional problems at 12 months, $\beta = .45$, $p < .05$. Again, the latent factors were
highly intercorrelated, with some standardized estimates greater than 1.00.

The full model involved the same latent and manifest variables as the restricted
model, but had a fewer number of paths constrained to 0. Thus, the two were considered
nested models, a requirement for comparing structural fit (Bollen, 1989) Contrary to our
hypothesis, however, the more complex full model did not fit significantly better than the
restricted model, as indicated by an evaluation of each model’s $\chi^2$ statistic and degrees of
freedom. Because the full and the restricted models had statistically equivalent fit, $\chi^2 =
2.44$, $df = 4.00$, $p > .05$, it was concluded that the more parsimonious restricted model
was a better representation of the data.
Figure 5. Restricted Model Relating Maternal Parenting at 8 Months to Child Development at 12 Months.
Figure 6. Full Model Relating Maternal Parenting at 8 Months to Child Development at 12 Months
Extending the Model Comparison to 24 Months

Although the restricted model had a good fit, only a few direct paths emerged between potential areas of subthreshold neglect and child development. These direct paths were the positive associations between maternal parenting at 8 months and child development at 12 months. A post-hoc analysis was then performed with the consideration that subthreshold neglect may take longer than four months to influence development because the parenting behaviors are more subtle and because of the nature of cumulative risk. Thus, a similar model comparison between the hypothesized restricted model and a more complex full model was examined in structural models that extended developmental outcomes to children’s second year. In the following structural equation models, the effects of maternal parenting at 8 months of age on children’s developmental outcomes at both 12 and 24 months of age were investigated.

The same measures of child development were used to assess children’s development at both 12 months and 24 months; however, the items are 24-months were age-appropriate, and thus, varied slightly from the items at 12 months. A complete description of the outcome measures can be seen in Table 6. Each developmental outcome variable at 12 months (social-emotional competence, the absence of social-emotional problems, cognitive development, and language development) was highly correlated with its corresponding measurement at 24 months ($r = .25 - .52$). All of the correlations among the manifest variables representing child development at both times are shown in Table 7.
### TABLE 6

**MEASURES OF CHILD DEVELOPMENT AT 24 MONTHS**

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>Description of Subscale</th>
<th>Scoring Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social-Emotional Competence Scale:</strong></td>
<td>Child testing of competencies including: compliance with adult expectations, play behavior, interactions with peers, attention skills, mastery motivation, and emerging empathy.</td>
<td>Sum of 11 maternal ratings scored as 0-2 (0= not true/rarely, 1=somewhat true/sometimes, 2=very true/often). Subtotals in Normal Range ≥15 for girls and ≥14 for boys.</td>
</tr>
<tr>
<td><strong>Brief Infant-Toddler Social and Emotional Assessment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social-Emotional Problems Scale:</strong></td>
<td>Child testing of problems including: externalizing, internalizing, dysregulation, atypical, and maladaptive behaviors. Note: Problems Scale <em>reverse scored</em> to reflect an absence of social-emotional problems.</td>
<td>Sum of 31 maternal ratings scored as 0-2 (0= not true/rarely, 1=somewhat true/sometimes, 2=very true/often). Subtotals in Normal Range ≤-14 for girls and ≤-15 for boys when reverse scored.</td>
</tr>
<tr>
<td><strong>Brief Infant-Toddler Social and Emotional Assessment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mental Development Index:</strong></td>
<td>Interviewer testing of child competencies including: sustained attention, purposeful manipulation, imitation, comprehension, expressive language, and problem solving.</td>
<td>Sum of items scored as 1 or 0 (1 = present, 0 = absent) where number of items varies depending on child’s age and ability level. Standardized M = 100 (SD = 15)</td>
</tr>
<tr>
<td><strong>Bayley Scales of Infant Development - II</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Total Score:</strong></td>
<td>Interviewer testing of how much language child understands and how well child communicates to others.</td>
<td>Sum of items scored as 1 or 0 (1 = present, 0 = absent) where number of items varies depending on child’s age and ability level. Standardized M = 100 (SD = 15)</td>
</tr>
<tr>
<td><strong>Preschool Language Scale - IV</strong></td>
<td></td>
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</table>
### TABLE 7
CORRELATIONS AMONG MANIFEST VARIABLES REPRESENTING CHILD DEVELOPMENT 
AT 12 MONTHS AND 24 MONTHS

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<td>1. 12-Month Social-Emotional Competence</td>
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<td>2. 12-Month Absence of Social-Emotional Problems</td>
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<tr>
<td>3. 12-Month Cognitive Development</td>
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<td>.01</td>
<td>1</td>
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</tr>
<tr>
<td>4. 12-Month Language Development</td>
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<td>.07</td>
<td>.19**</td>
<td>1</td>
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<tr>
<td>5. 24-Month Social-Emotional Competence</td>
<td>.42**</td>
<td>.07</td>
<td>.16**</td>
<td>.06</td>
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<tr>
<td>6. 24-Month Absence of Social-Emotional Problems</td>
<td>.03</td>
<td>.52**</td>
<td>.03</td>
<td>.02</td>
<td>.14**</td>
<td>1</td>
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<td>7. 24-Month Cognitive Development</td>
<td>.17*</td>
<td>.15*</td>
<td>.25**</td>
<td>.22**</td>
<td>.20**</td>
<td>.16*</td>
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<tr>
<td>8. 24-Month Language Development</td>
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<td>.19**</td>
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</table>

Note: Correlations between corresponding 12-month and 24-month outcome variables are in bold.
*p < .05; **p < .01
Prior to conducting the extended model comparison, the properties of each 24-month variable were examined. Table 8 shows the descriptive information for the children’s developmental outcomes. The group means and standard deviations for each outcome signified scores for the group as a whole that fell within typically-developing limits. The ranges also demonstrated that sufficient variability existed for all four outcomes (social-emotional competence, the absence of social-emotional problems, cognitive development, and language development). Finally, reasonably small skew and kurtosis values suggested distributions that were not extreme and were therefore acceptable for inclusion in the analyses.

Much like the results when children were 12 months of age, the group means at 24 months were within the expected ranges for each outcome, but significant numbers of children were still experiencing delays in each area based on the established cutoffs. Most notably, by the time children were 2 years old, 57% of the sample exhibited social-emotional problems, measured by the BITSEA Problems Scale (Briggs-Gowan & Carter, 2006). Almost one-third of children (31%) showed signs of language delay on the Preschool Language Scale Total Score (Zimmerman et al., 2002). Furthermore, 25% of children exhibited cognitive delay, demonstrated by below-average scores on the Bayley Mental Development Index (Bayley, 1993), and 23% demonstrated delays in social-emotional competence on the BITSEA Competence Scale (Briggs-Gowan & Carter, 2006). For every outcome, the percentage of children exhibiting potential delay increased substantially from 12 months to 24 months, indicating a decline in overall functioning between ages 1 and 2. For instance, the percentage of children with delays in social-emotional competence increased from 16% at 12 months to 23% at 24 months, and the
### TABLE 8

DESCRIPTIVE INFORMATION FOR MANIFEST VARIABLES REPRESENTING CHILD DEVELOPMENT

AT 24 MONTHS

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Skew</th>
<th>SE</th>
<th>Kurtosis</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social-Emotional Competence Scale: Brief Infant-Toddler Social and Emotional Assessment</td>
<td>364</td>
<td>16.14</td>
<td>3.15</td>
<td>4.00 – 22.00</td>
<td>-.72</td>
<td>.13</td>
<td>.56</td>
<td>.26</td>
</tr>
<tr>
<td>Social-Emotional Problems Scale: Brief Infant-Toddler Social and Emotional Assessment</td>
<td>361</td>
<td>-13.72</td>
<td>6.77</td>
<td>-42.00 - -1.00 (reverse)</td>
<td>-.58</td>
<td>.13</td>
<td>.50</td>
<td>.26</td>
</tr>
<tr>
<td>Mental Development Index: Bayley Scales of Infant Development - II</td>
<td>263</td>
<td>132.90</td>
<td>9.78</td>
<td>102.00 – 148.00 (raw)</td>
<td>-1.27</td>
<td>.15</td>
<td>.61</td>
<td>.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>97.62</td>
<td>17.12</td>
<td>54.00 – 130.00 (standard)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Language Score: Preschool Language Scale - IV</td>
<td>286</td>
<td>92.66</td>
<td>14.26</td>
<td>50.00 – 132.00 (standard)</td>
<td>.10</td>
<td>.13</td>
<td>-.25</td>
<td>.26</td>
</tr>
</tbody>
</table>
percentage of infants with significant amounts of social-emotional problems grew from 48% to 57%. In addition, the percentage of language delays nearly doubled, from 16% to 31%, while the percentage of cognitive delays more than tripled, from 8% at 12 months to 25% at 24 months. The frequencies and percentages of children demonstrating delays at both 12 and 24 months of age are juxtaposed in Table 9.

Cumulatively, most children at 24 months were experiencing a delay in at least one area. Figure 7 illustrates the number of areas (social-emotional competence, absence of social-emotional problems, cognitive development, and language development) in which children showed signs of delay during testing. Specifically, by the time children were 24 months of age, 85% were performing below average in at least one area of development. Moreover, 36% of 2-year-old children experienced delays across multiple domains, with 12% of children performing below average in three or four areas of development.

**Extended restricted model.** Using the same latent predictor constructs at 8 months, the same manifest outcomes at 12 months, and the corresponding manifest outcomes at 24 months, an extended restricted model was tested. Very similar to the 12-month restricted model, the extended restricted model examined only the pathways suggested by the single-outcome studies in the extant literature. For instance, paths were specified between maternal social-emotional support at 8 months and the two social-emotional outcomes at 12 months (social-emotional competence and the absence of social-emotional problems). The same paths were specified between maternal social-emotional support at 8 months and the two social-emotional outcomes at 24 months. In the restricted model, the paths between social-emotional support and cognitive development
TABLE 9

FREQUENCIES AND PERCENTAGES OF CHILDREN PERFORMING BELOW AVERAGE ON INDICATORS OF CHILD DEVELOPMENT AT 12 MONTHS AND 24 MONTHS

<table>
<thead>
<tr>
<th>Subscale: Measure</th>
<th>12 Month Delay</th>
<th>24 Month Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Frequency</td>
</tr>
<tr>
<td>Social-Emotional Competence Scale: Brief Infant-Toddler Social and Emotional Assessment</td>
<td>435</td>
<td>69</td>
</tr>
<tr>
<td>Social-Emotional Problems Scale: Brief Infant-Toddler Social and Emotional Assessment</td>
<td>435</td>
<td>208</td>
</tr>
<tr>
<td>Mental Development Index: Bayley Scales of Infant Development - II</td>
<td>382</td>
<td>30</td>
</tr>
<tr>
<td>Total Language Score: Preschool Language Scale - IV</td>
<td>341</td>
<td>55</td>
</tr>
</tbody>
</table>
as well as the paths between social-emotional support and language development were constrained to 0 at both 12 and 24 months. Likewise, the paths between maternal cognitive-language support at 8 months and the two social-emotional outcomes at both time points were constrained to 0. Maternal cognitive-language support was, however, allowed to associate with children’s cognitive development at 12 months and 24 months; the paths were also unconstrained between cognitive-language support and language development at both 12 and 24 months. The paths between responsive support at 8 months and all outcome variables at both 12 and 24 months were unconstrained.

Like the previous models, the errors of all manifest predictor subscale indicators derived from the same measure were allowed to correlate with each other, and the errors of the latent predictor factors were allowed to correlate with each other. In addition, the
errors of all manifest outcome variables at 12 months were permitted to correlate with each other. Furthermore, in the extended model, the errors of all manifest outcome variables at 24 months were allowed to correlate with each other.

The extended restricted model, shown in Figure 8, was found to have a good overall fit, $\chi^2/df = 1.53$, $p < .001$, CFI = 0.97, RMSEA = 0.03. Results of the extended restricted model found that maternal responsive support at 8 months was positively associated with an absence of social-emotional problems at 12 months, $\beta = .49$, $p < .05$. Responsive support at 8 months, however, was negatively associated with language development at 12 months, $\beta = -.50$, $p < .05$. In addition, cognitive-language support at 8 months was positively associated with language development at 12 months, $\beta = .40$, $p < .05$. These relationships were analogous to the pathways found in the initial restricted model. Again, the latent predictors were very highly correlated, indicative of possible linear dependence between factors. Much like the 12-month model, no other significant relationships emerged between 8 month parenting and 12 month child development. One positive association emerged between maternal responsive support at 8 months and social-emotional competence at 24 months, $\beta = .41$, $p < .05$. No other significant relations emerged between 8 month parenting and 24 month development.

**Extended full model.** After testing the extended restricted model, the extended full model was then analyzed. The full model specified the same paths as the restricted model; however, the paths that had been constrained to 0 were freed. More explicitly, the full model specified additional paths between maternal social-emotional support at 8 months and cognitive development at 12 months as well as 24 months. The full model
Figure 8. Extended Restricted Model Relating Maternal Parenting at 8 Months to Child Development at 12 and 24 Months

Note. For ease of interpretation, non-significant pathways are presented as dotted lines; negative pathways are presented as dashed lines; correlations among errors are presented as curved arrows; path loadings are standardized; *p < .05; **p < .01, ***p < .001
also specified additional paths between maternal cognitive-language support at 8 months and the two measures of social-emotional development at both 12 months and 24 months. All of the other unconstrained paths and correlations in the full model were the same as those in the extended restricted model.

The extended full model did fit well, $\chi^2/df = 1.57, p < .001$, CFI = 0.97, RMSEA = 0.03, and the standardized estimates of the model are shown in Figure 9. In the extended full model, only one relationship was found between 8-month maternal support and 12-month child development; no relationships were found between 8-month maternal support and 24-month child development. However, results indicated that, much like the original models, the extended full model did not fit significantly better than the extended restricted model, $\chi^2 = 2.14, df = 4.00, p > .05$, suggesting that the more parsimonious restricted model was a more appropriate representation of the data.

*Modified extended restricted model.* One path between maternal support at 8 months and child development at 24 months had emerged in the extended restricted model. This model was then modified to determine whether the relationship between responsive support and social-emotional competence was direct or indirect. Thus, the restricted model was modified to include the direct paths between 12-month outcomes and 24-month outcomes. These modifications were added to the paths already specified between parenting support at 8 months and child development at both 12 and 24 months. More explicitly, social-emotional competence at 12 months was expected to predict social-emotional competence at 24 months, the absence of social-emotional problems at 12 months was expected to predict the absence of social-emotional problems at 24
Figure 9. Extended Full Model Relating Maternal Parenting at 8 Months to Child Development at 12 and 24 Months
months, cognitive development at 12 months was expected to predict cognitive
development at 24 months, and language development at 12 months was expected to
predict language development at 24 months. All other paths were the same as the
extended restricted model. Figure 10 depicts the modified version.

The modified extended restricted model also had a good overall fit, $\chi^2/df = 1.57, p < .001$, $CFI = 0.96$, $RMSEA = 0.03$. Indeed, the likelihood ratio test comparing the
modified extended restricted model (see Figure 10) to the extended restricted model (see
Figure 8) indicated that the fit of the modified model including indirect paths was
significantly better than the same model without these paths, $\chi^2 = 22.87$, $df = 12.00, p < .05$. Results of the modified model found that
maternal responsive support at 8 months was positively associated with an absence of
social-emotional problems at 12 months, $\beta = .58$, $p < .05$. Again, responsive support at 8
months was negatively associated with language development at 12 months, $\beta = -.62$, $p < .05$, while cognitive-language support at 8 months was positively associated with
language development at 12 months, $\beta = .53$, $p < .05$.

The corresponding measures of child development were highly related between
the 12- and 24-month collection points. For example, child social-emotional competence
at 12 months was positively related to child social-emotional competence at 24 months, $\beta
= .38, p < .001$. The same positive association was found between the absence of social-
emotional problems at 12 months and the absence of social-emotional problems at 24
months, $\beta = .46, p < .001$. Similar strong relationships were found for both cognitive and
language development. Cognitive development at 12 months was positively related to
cognitive development at 24 months, $\beta = .25, p < .001$, and language development at 12
months was positively associated with language development at 24 months, $\beta = .26, p < .001$.

Only one significant relationship was found between 8 month parenting and 24 month development in the modified extended restricted model. Maternal responsive support at 8 months was positively related to social-emotional competence at 24 months, $\beta = .40, p < .05$, making the findings comparable to those of the extended restricted model, although the modified model fit significantly better, as described above. Thus, of the tested models, the modified extended restricted model was the best representation of the data, suggesting that parenting support had an immediate impact on children’s development, and that earlier development predicted subsequent development.
Note. For ease of interpretation, non-significant pathways are presented as dotted lines; negative pathways are presented as dashed lines; correlations among errors are presented as curved arrows; path loadings are standardized; $*$ denotes fixed path; $^* p < .05$; $^{**} p < .01$, $^{***} p < .001$

**Figure 10.** Modified Extended Restricted Model Relating Maternal Parenting at 8 Months to Child Development at 12 and 24 Months Including Indirect Paths from 12-Month Development to 24-Month Development
DISCUSSION

The primary objective of this study was to establish whether subthreshold child neglect occurred in a sample of mother-infant dyads at risk for poor parenting and developmental delays. Because subthreshold neglect was defined as the absence of positive maternal parenting behaviors that led to non-optimal child development, the first step in confirming the presence of neglect was to determine whether any children were actually experiencing developmental problems. If few children exhibited delays at 12 or 24 months, then the existence of positive linear relationships between parenting support and subsequent development would not necessarily suggest that neglect was occurring. The findings of this study, however, demonstrated that many children exhibited poor developmental outcomes, with nearly three-fourths of the sample demonstrating delayed performance in at least one area (social-emotional competence, the absence of social-emotional problems, cognitive development, or language development) by 1 year of age.

It is noteworthy that the maladaptive, dysregulated, internalizing, and externalizing problems demonstrated by more than half of children in this sample paralleled the social-emotional problems associated with child neglect that were laid out by Hildyard and Wolfe (2002), such as poor emotion regulation, withdrawal, and aggressive behavior. Neglected children have also been shown to have trouble cooperating with adults, relating well with peers, and discriminating the emotions of others (Hildyard & Wolfe, 2002); these deficiencies are analogous to the developmental
delays experienced by the infants in the current sample who lacked social-emotional competence in compliance, peer interaction, and emerging empathy. The previous findings showing that neglected children perform more poorly on standardized tests of intellectual functioning than their same-age peers (Hildyard & Wolfe, 2002) was also echoed by the results of the present study. Furthermore, past studies have shown that neglected children encountered problems with both expressive and receptive language (Hildyard & Wolfe, 2002). Similarly, infants in this sample exhibited language delays characterized by deficiencies in expressive communication and shortcomings in auditory comprehension.

Importantly, the percentage of children experiencing delays increased in all areas (social-emotional competence, the absence of social-emotional problems, cognitive development, and language development) from 12 to 24 months. By the time children reached 24 months, 85% were performing more poorly than their same-age counterparts in at least one area of development. Akai, Smith, Klerman, Keltner, and the Centers for the Prevention of Child Neglect (2007) have shown that the frequency and severity of children’s developmental problems increased from 12 to 24 months, and that most of these children were never detected as having developmental difficulties despite the legally-mandated assessment and intervention services that are guaranteed for children with demonstrated delays. The presence of troublesome performance in multiple areas of development implies that the significant linear relationships between parenting and child development indicated subthreshold neglect.
Modeling Subthreshold Neglect

A model comparison approach was used to determine the best representation of relationships between maternal behavior and child functioning. Although it was hypothesized that a full model allowing all paths between maternal support types at 8 months and developmental outcomes at 12 months would represent the data better than a more restricted model, this hypothesis was not supported. Instead, the more complex model had a statistically equivalent fit to the restricted model, making the simpler restricted model the preferable choice. The best-fitting model (the modified extended restricted model) specified that 8-month parenting supports related to 12-month child development, that 8-month supports related to 24-month development, and that 12-month development predicted 24-month development. Results suggested that the absence of early maternal responsiveness and the absence of early maternal support for cognitive and language development were areas of subthreshold neglect for mothers of children who were performing below average in social-emotional and language development.

Subthreshold responsive neglect. Calkins and Hill (2007) have argued that the support of caregivers, as demonstrated by the recognition of and contingent responses to infant signals impacts infant emotion regulation in two ways. First, responsive support fosters the physiological mechanisms that support children’s behavioral strategies. Second, consistently responsive maternal behaviors promote secure dyadic attachment relationships that reduce infant fear, negative arousal, and emotional reactivity during stressful situations and increase infant self-control outside of the immediate dyadic context (Calkins & Hill, 2007). The results of the present study showed that the absence of support through maternal responsiveness at 8 months increased the likelihood of
social-emotional problems at 12 months, even when levels of maternal social-emotional support and cognitive-language support were controlled. Hence, the evidence supported the hypothesis that maternal responsiveness was essential to infant development and that inadequate levels of responsive behavior, such as correctly recognizing infant cues and adequately responding to those signals in a timely manner, operated in a neglectful fashion that hindered optimal child development.

In particular, the children of mothers demonstrating low levels of responsive behavior, as described by Lohaus et al. (2004), displayed social-emotional problems such as dysregulation or maladaptive behavior at 12 months, even when the effects of other maternal supports were simultaneously considered. These findings confirmed and extended those of Landry and her colleagues (2006), who have shown that increases in responsiveness improved infant regulatory behaviors via the behavioral organization that resulted from contingent responsiveness.

The findings also showed that mothers who demonstrated insufficient amounts of responsiveness at 8 months had children with low levels of social-emotional competence at 24 months. These results are in line with and extend the findings of Kochanska et al. (2005), who demonstrated that low levels of responsive behavior lead to poor receptive cooperation with mothers, particularly when infants were anger-prone. A positive relationship between responsiveness and cooperation has likewise been found by Landry et al. (2006) in the context of an intervention designed to increase these types of cue-driven contingent behaviors. Analogous difficulties in compliance and other social-emotional skills were shown by the results of Landry’s study, and, again, demonstrated
the presence of subthreshold neglect since the absence of maternal responsiveness predicted non-optimal development in social-emotional competence.

*Subthreshold cognitive-language neglect.* The importance of maternal support for language development has been well-established in the literature. More explicitly, maternal involvement in learning activities (Herbert et al., 2004); verbal expressions such as talking, laughing, singing, or reading (Hart & Risley, 1995); the provision of learning materials like age-appropriate toys and books (Bradley & Corwyn, 2005); and the encouragement of child exploration (Pruden et al., 2006) have all been related to children’s expressive and receptive language skills during infancy. The results in the current study similarly showed that the absence of involvement, verbalness, the provision of learning materials, and encouraging exploration at 8 months significantly contributed to a maternal cognitive-language support construct that was related to delays in infant language development at 12 months. These findings upheld and extended previous research by demonstrating that this relationship still held in the context of other parenting factors and multiple areas of development. Because the relationships in the model were linear, and because some children were performing in delayed developmental ranges, it followed that an absence of maternal cognitive-language support predicted non-optimal language development and signified the presence of subthreshold neglect.

*Maternal responsiveness and 12-month language development.* In addition to the positive association between cognitive-language support and language development, the results of the modified extended restricted model revealed a negative relationship between responsive support at 8 months and language development at 12 months. This relationship suggested that when levels of social-emotional and cognitive-language
support were controlled, more maternal responsiveness led to poorer language development. This result directly contrasted with previous findings demonstrating that responsiveness promoted expressive language development (Landry et al., 2006) and receptive language development (Paavola et al., 2005). It is possible that in the context of other types of support, adequately recognizing infant cues and responding to them promptly led to deficient language development. Perhaps it was the case that mothers who were too quick in responding to infant needs did not provide enough opportunities for infants to gain experience vocalizing and gesturing or enough time for infants to process language in order to understand what was happening.

However, the high correlation between maternal responsive support and maternal cognitive-language support suggested otherwise. Since the latent constructs of responsive support and cognitive-language support shared much of the same variance, it seems improbable that one would negatively relate with language development while the other would positively relate with language development. Instead, it is more likely that a Type III error was occurring. This situation happens during instances of hypothesis testing when a two-tailed (non-directional) test is being used, but a directional solution is being imposed. There is a small probability (the probability of a Type III error) that one directional solution will be accepted when, in actuality, the solution in the other tail is actually correct (Kaiser, 1960; Leventhal & Huynh, 1996). The probability of a Type III error becomes even greater when the standard errors in the analyses are larger than would be expected (Leventhal & Huynh, 1996). This point is salient in the present study because of the possible multicollinearity of the responsive support and cognitive-language support constructs. In general, multicollinearity problems, which are likely to occur when
correlations are higher than about .90, inflate the standard errors of the regression coefficients (Tabachnik & Fidell, 2001). Therefore, the very high correlation between the two maternal support constructs may have increased the probability of a Type III error and the solution may have been a result in the wrong direction.

*Model Implications*

Dubowitz and his colleagues (2004; 2005) have demonstrated the usefulness of dividing the concept of neglect into distinct subtypes. The results of this study suggested the same conclusion: There was an important distinction between areas of subthreshold neglect, especially responsive and cognitive-language neglect, and their effects on differing developmental outcomes. Although the high correlations among constructs in the three-factor solution indicated that the constructs were all measuring the same variance (subthreshold neglect), the improved fit of the three-factor solution in comparison to the one-factor solution indicated that there was some unique variance in each area of maternal support. Furthermore, the resulting structural models based on the three-factor solutions subsequently provided additional information about the differential impact of particular types of subthreshold neglect on social-emotional and language development.

The high correlations among errors in the latent predictor factors also revealed additional information: Parents were typically supportive in all areas or lacking in support for all areas of parenting. For example, a mother who exhibited subthreshold responsive neglect was also likely to demonstrate subthreshold cognitive-language neglect. Multiple risks for child development are likely to have a cumulative effect, where adverse
outcomes are exponentially greater than the effects of a single adversity alone (Sameroff, Seifer, & McDonough, 2004). These findings suggested that infants of mothers with at least one parenting limitation had a greater probability of experiencing adverse development resulting from the cumulative effect of several parenting deficiencies.

**Strengths, Weaknesses, and Future Directions**

The results of the current study provided new understanding into a phenomenon that has not previously been explored: subthreshold neglect. The rich data available in the Parenting for the First Time project allowed for a thorough examination of subthreshold neglect across several areas of parenting. The multiple indicators of social-emotional, cognitive-language, and responsive support allowed a broader contextual approach to child functioning across social-emotional, cognitive, and language development than is typically possible given limited resources. Furthermore, including only observational measures was a beneficial approach to reduce reporter bias, a common problem in studies of infant development. The strategy also was advantageous for a sample that included participants with low literacy levels, who often have trouble understanding complex interview questions. Moreover, the makeup of sample was a particular strength of this study. Data from both high-risk and low-risk mothers offered a valuable opportunity to view a wide range of maternal behaviors as well as a wide range of developmental outcomes.

Despite the benefits of a structural modeling approach, only a few significant relationships emerged linking maternal support with child development in any of the models tested. Although the employment of a maximum likelihood estimator allowed the
use of all available data, the problem of “missingness” still might have limited the power of the analyses. Furthermore, the linear dependency of the latent predictors may have compromised the interpretability of the findings. It is also possible that the measurement of the subthreshold neglect indicators weakened the strength of the findings. For instance, the four Parenting Essentials indicators (comfort, guide behavior, recognize and respond, and encourage exploration) were all one-item subscales, coded across three points. Likewise, the Mother-Infant Observation subscales (warmth and sensitivity, positive affect, contingent responsiveness, and general verbalness) were also one-item subscales, coded across five points. Only the HOME Inventory subscales (responsivity, involvement, and learning materials) had several items with established psychometric properties. The lack of robustness of the parenting measures in the present study may have shrouded subtle effects from emerging. It should be emphasized, however, that no well-established measures of subthreshold neglect currently exist and that the present design established a new foothold in this emerging area of research.

Accordingly, the utilization of appropriate and robust measures of subthreshold neglect should be explored in future investigations. Because subthreshold neglect is not well-defined, this endeavor is likely to be challenging. Future research couched within a theory of subthreshold neglect must involve refining models of child functioning during infancy as well as extending development beyond infancy to include the dynamic components of growth over time. Only continued exploration of subthreshold neglect can improve our understanding of the complex relationships that lead to non-optimal development, and guide intervention efforts to prevent potential developmental delay occurring as early as the first year of life.
REFERENCES


determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130-149.


