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The goal of this study was to examine the extent to which maternal depressive symptoms over the first year of life is linked with internalizing and externalizing behaviors in childhood through insensitive maternal behaviors (unresponsive and overtly negative parenting behaviors). The present study utilized a multi-method approach for examining psychopathology trajectories for infants. In addition, the extent to which these paths were moderated by infant temperament (high negative emotionality) was also examined. Maternal depressive symptoms were assessed prenatally and when infants were 6 months old. Maternal parenting behaviors (unresponsive and overtly negative behaviors) were observed at 6 months of age, and infant temperament (negative emotionality) was measured through observation and mother report when infants were 6 months old. Mothers reported on infant's behavior problems (internalizing and externalizing behaviors) when infants were 2 years old. A direct path was significant between maternal depressive symptoms and internalizing behaviors, but was not explained by maternal parenting behaviors. Temperament was not found to be a moderator in this path analyses, however, a direct link from infant temperament to both insensitive maternal behaviors was found to be significant. Results suggest that maternal depressive symptoms while parenting leave infants at risk for later psychopathology.

EXAMINING PARENTING PATHWAYS LINKING MATERNAL DEPRESSIVE SYMPTOMS TO CHILDREN'S INTERNALIZING AND EXTERNALIZING BEHAVIOR PROBLEMS

by

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_____
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To my wonderful, sweet children Anja Corley and Kai Linton Norcross, and to my husband William Norcross. Your patience and support has made this possible. Thank you for believing in me. And to my parents Ingalill and Gunnar Linton. Thank you for encouraging me to always follow my dreams.

APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Infants whose mothers have depressive symptoms in their first year of life are more likely to be exposed to environmental stressors that may compromise their emotional and social development, compared with infants whose mothers do not have depressive symptoms throughout the first year of life (Goodman & Gotlib, 1999; Hart, Jones, Field, & Lundy, 1999; Kim-Cohen, Moffitt, Taylor, Pawlby, & Caspi, 2005). Maternal depressive symptoms are associated with later child psychopathology, including internalizing and externalizing behaviors (Sellers et al., 2014), which begins in either early childhood or adolescence (Moffitt, 2003), and can extend throughout adulthood. Strong evidence suggests psychopathology can begin in the first years of life, and has implications for economic, social and emotional well-being throughout the lifespan (Decuyper et al., 2014; Herpers, Scheepers, Bons, Buitelaar, & Rommelse, 2014; Moffitt, 2003). Thus, identifying early predictors of psychopathology is critically important to enhance screening, prevention, and intervention efforts.

Maternal insensitivity and compromised maternal mental health, particularly depressive symptoms, have been implicated as precursors of child psychopathology (Goodman et al., 2011; Sellers, et al., 2014). Infant temperament, particularly negative emotionality, which may influence how children react to adversity and environmental

stressors, has also been linked with negative child outcomes (Chang, Shelleby, Cheong &Shaw, 2012; Crockenberg, 1981; Kochanska et al., 1998; Mesman et al., 2009; Rothbart & Bates, 2006). Research has indicated that both child factors and contextual factors interact to predict subsequent outcomes (Degnan, Calkins, Keane, & Hill-Soderlund, 2008; Sameroff, 2000; Zeanah, 2000). Individuals vary in how they react and respond to environmental stressors, where some infants are more vulnerable than others to their environment, possibly due to infant characteristics, while others are relatively resilient to those same environmental stressors. The goal of the proposed project was to examine the extent to which maternal depressive symptoms over the first year are linked with internalizing and externalizing problems among 2 year olds through two types of insensitive parenting behaviors, overtly negative and unresponsive parenting. In addition, the extent to which these paths are moderated by infant temperamental reactivity was examined.

Conceptual Model of Psychopathology Risk

Research indicates that early psychopathology has multiple determinants including contextual, genetic, psychological, and biological factors (Cicchetti, 2010). Developmental psychopathology unfolds throughout the lifespan, therefore it is important to understand evolving individual risk factors that may lead to adaptive or maladaptive outcomes (Cicchetti, 2010; Sroufe, 1990; Sroufe, 1997). According to Cicchetti (2010), developmental psychopathology focuses on the range between adaptive and maladaptive behaviors. Therefore, understanding normative cognitive, social and emotional development is essential in order to understand deviations of these developmental

processes. Sameroff and Emde (1989) suggest that most disorders in infancy are relationship disorders rather than individual disorders, further supporting the importance of parenting behaviors for later child adjustment. Because of the rapid pace of development in early infancy, and infants' dependency on adult caregiving, family factors during infancy may provide clear predictions of risk for the development of later child maladaptation (Lyons-Ruth, Zeanah, Benoit, Madigan, & Mills-Koonce, 2014).

In the proposed project, I focus on the development of young children's internalizing and externalizing behaviors. Internalizing behaviors are defined as disturbances in behavior and emotions that are directed towards the self (Cicchetti, 2010). Indicators for young children include cognitive and emotional vulnerabilities such as decreased interest in play, social withdrawal, anxiety, poor self-esteem, separation insecurity from mother, somatic complaints, and expression of fear and sadness (Bayer, Sanson, & Hemphill, 2006). Externalizing behaviors are disruptive problems that are considered to be under controlled behaviors. These behavioral maladaptations are reflected outward from the child towards others, reflect adverse and harmful reactions from the child to the environment, and are a major risk for later psychopathology, such as delinquency, crime, conduct problems, hyperactivity, and aggression (Choe, Olson, & Sameroff, 2013; Liu, 2004; Shaw, Owens, Giovannelli, & Winslow, 2001). Indicators for young children include defiance, physical aggression, high activity level, and impulsivity (Lorber, Del Veccio, & Smith-Slep, 2014).

In this project, I draw from Goodman and Gotlib's conceptual model (1999) to provide a developmental perspective as to how mothers' histories of depressive

symptoms are linked with children's early internalizing and externalizing symptoms. Goodman and Gotlib (1999) laid out four mechanisms by which risk for the development of psychopathology may be transmitted from depressed mothers to their children, including: (a) heritability of depression; (b) innate neuroregulatory dysfunction; (c) exposure to negative maternal behaviors, emotions and cognitions; and (d) the stressful context of these children's lives. Because some children may be at greater risk than others for the development of psychopathology, this model suggests three main moderating factors, including: (a) father's involvement; (b) characteristics of the child; and (c) intensity and timing of the maternal depression. Goodman and Gotlib (1999) discussed that these developmental mechanisms and moderating factors may contribute differently for different child-mother dyads, and that the interactions of these factors need further exploration. In the current project, I focus on mechanism 3, exposure of infants to negative maternal behaviors, emotions and cognitions, as well the moderating factor of child characteristics, specifically temperamental reactivity. In the following sections, I elaborate on these pathways and summarize the relevant literature.

Links Between Maternal Depressive Symptoms and Maternal Behaviors

Maternal Depressive Symptoms and Compromised Parenting. Maternal depressive symptoms reflect an emotional disturbance, and are characterized by withdrawn affect, impatience, unpredictability, labile mood (ups and downs), frustration, anxiety, anger, fatigue, and irritability (Azaka & Raeder, 2013; Sellers et al., 2014; Vando, Rhule-Louie, McMahon, & Speiker, 2008). Episodes of depression that occur within a year of a child's birth are referred to as postpartum depression (Yawn, Bertram,

Kurland, & Wollan, 2015). Post partum depression occurs in about 13% of mothers (Field, 2010; Horowitz, Murphy, Gregory, & Wojcik, 2010), and another 30.6% experience elevated symptoms that do not meet diagnostic criteria, but may undermine functioning (Horowitz & Goodman, 2004). The postpartum period is a time of transition for new mothers and elevated depressive symptoms may make navigating this transition more difficult. In particular, postpartum depression symptoms are linked with difficulty coping with stressful and demanding tasks, such as caring for and meeting the basic needs of a newborn infant, and undermining the quality of parenting, which has long-term consequences for negative infant adaptation (Fisher, Brock O'Hara, Kopelman, & Stuart, 2015).

Maternal depressive symptoms challenge the organization of the larger system of parenting, leading to inadequate emotional guidance, and inconsistent social interactions due to the mood instability of mothers with depressive symptoms (Wong et al., 2014). Mothers with depressive symptoms may focus on their own emotional and physical needs first, ahead of their infants' needs. When parenting shifts from child-oriented goals to parent-oriented goals, less adaptive parenting occurs (Cicchetti, 2010; Dix, Moed, & Anderson, 2014). Mothers with depressive symptoms may not be able to read their infant's cues due to distorted cognitions and greater focus on self, and may experience negative affect (e.g. hostility) towards their infant, both of which may weaken the quality of parenting (McCabe, 2013). Furthermore, maternal depressive symptoms are linked with lower maternal self-efficacy (i.e. confidence in self as a parent) which may

contribute to less maternal involvement in caretaking and lower quality parent-infant interaction (Leerkes & Crockenberg, 2002; Weaver, Shaw, Dishon, & Wilson, 2008).

Consistent with this view, a number of studies have demonstrated links between maternal depressive symptoms and maladaptive parenting. Parenting difficulties among mothers with heightened depressive symptoms include increased hostility, impaired emotional involvement, intrusiveness, irritability, rejecting a child's efforts to initiate interaction, harshness, and engaging in fewer positive exchanges (Goodman et al., 2011; Kim-Cohen et al., 2006; Letourneau, Salmani, & Duffett-Leger, 2010). Additionally, mothers with elevated depressive symptoms interact less with their infants during spontaneous play, make less eye contact, and engage in fewer positive exchanges with their infants, than mothers without elevated depressive symptoms (Field et al., 2007). In a meta-analytic review, Lovejoy, Graczyk, O'Hare, and Neuman (2000) found that compared to mothers without depression, mothers with depressive symptoms are less responsive to child behavior, including positive and negative behaviors, have poorer communication, and have more negative interactions with their infants.

In infancy, the quality of maternal behavior is often captured by the concept of sensitivity. Given the variability in how depressed mothers react to stress, cope with contextual demands, and access resources for coping with that demand (Wang & Dix, 2013), there is also variability in the parenting difficulties they demonstrate.

Subtypes of Insensitive Maternal Behaviors. Sensitive caregiving refers to the mother's ability to notice, understand, and respond consistently and appropriately to an infant's cues, in a manner that prioritizes the infant's needs (Ainsworth & Bell, 1970).

Sensitive mothers provide early supportive developmental experiences, including consistent, attentive responsiveness in parenting, which may foster optimal child development (Ainsworth & Bell, 1970; Belsky, 1981; Bowlby, 1988; Crockenberg & Leerkes, 2011; Kim & Kochanska, 2012; Leerkes, Blankson, & O'Brien, 2009, Lahey et al., 2008, Srouf & Waters, 1977). Although most researchers focus on the extent to which mothers are low or high on sensitivity, it is important to note that there are different styles of insensitive behavior, which may have different implications for child outcomes and for intervention efforts. In fact, maternal depressive symptoms have been linked with two distinct types of insensitivity: intrusive (overtly negative) or withdrawn (unresponsive) behaviors (Hart, Jones, Field, & Lundy, 1999; Wang & Dix, 2013). Identifying which type of insensitivity depressed mothers engage in may be important for understanding the impact on children's social and emotional outcomes.

Unresponsive parenting is defined as a type of insensitive parenting, characterized by indifference, limited responsiveness to infant cues, and a lack of interaction (Hart et al., 1999; Taylor, Eisenberg, Spinrad, & Widamann, 2013). Indicators include withdrawn affect, distracted actions, and limited responsiveness while the infant is offering bids to the mother for interaction. Symptoms of maternal depression, such as fatigue, withdrawn affect, and sadness, may contribute to this type of insensitivity (McCullough & Shaffer, 2014). A number of studies have demonstrated that heightened maternal depressive symptoms are in fact linked with maternal unresponsiveness (Field, 2010).

Overtly negative parenting is a second type of insensitive parenting, defined as controlling, harsh, and intrusive parenting, (Sellers et al., 2014; Taylor et al., 2013). Indicators consist of overly negative maternal behaviors such as speaking to an infant harshly, expressing negative affect towards the infant, intrusiveness (i.e. mothers forcing own agenda onto the infant), persistent ineffective behaviors (i.e. responding in the same manner when it is not effective and other responses are available), and mismatched affect behaviors (i.e. contradicting infant's feelings and laughing at infant when distressed). Symptoms of depression such as fatigue and irritability may prompt this type of negative responding. A number of studies have demonstrated that heightened maternal depressive symptoms are linked with these types of negative maternal behaviors (Field, 2010; Goodman et al., 2011; Rueger, Katz, Risser, & Lovejoy, 2011). Next, I describe how these types of insensitivity may contribute to infants' early psychopathology.

Maternal Behavior and Child Psychopathology

Insensitive parenting is linked to adverse child outcomes (Goodman et al., 2011). Infants depend on sensitivity, appropriate responding, and support from the caregiver in order to successfully regulate emotions, which promotes behavioral adaptation (Calkins & Leerkes, 2011; Haskett & Willoughby, 2006; Kim & Kochanska, 2012; Lahey et al., 2008; Sroufe, 1997). However, not much is known as to which type of insensitive parenting, unresponsive or overtly negative parenting, is linked to internalizing and externalizing behaviors (Collins, et al., 2000; Haskett & Willoughby, 2006). As elaborated below, there is reason to believe both types of insensitivity (unresponsive and overtly negative) could contribute to both types of child outcomes simultaneously.

Unresponsive Parenting. Unresponsive mothers engage in less infant-directed speech, are low energy, touch their infants less frequently, and engage in a less affectionate manner than more responsive mothers (Field, 2000). Consequences from unengaged, uninvolved and indifferent parenting may include the development of low self-esteem, feelings of emotional insecurity, sadness, and anxiety (Maughan, Cicchetti, Toth, & Rogosch, 2007). Further, infants begin to mimic their mothers' flat, withdrawn affect and engage less socially with others (Field, 2010). As such, infants whose mothers parent in a withdrawn, impassive manner, are at great risk for developing internalizing symptoms, compared to those infants whose mothers are not withdrawn or unresponsive (Luby, 2000; Sterba, Prinsein, & Cox, 2007). Likewise, infants with an insecure attachment to mothers (the pattern most strongly associated with a history of maternal non-responsiveness) display elevated internalizing symptoms compared to children with a secure attachment (Madigan, Atkinson, Laurin, & Benoit, 2012).

Emergence of externalizing behaviors, including aggressiveness and coerciveness, may occur due to unresponsive parenting (Lorber, Del Vecchio, & Smith-Slep, 2014). Infants whose mothers parent in an unresponsive manner may have difficulties regulating their emotions. Initially they may learn to suppress the expression of their negative emotions (Cassidy, 1994), but over time this pattern of over control may come at a cost physiologically that cannot be maintained (Hill-Soderlund et al., 2007; Shaw, Owens, Givanelli, & Winslow, 2001). As such, some infants of unresponsive mothers may shift to a pattern of emotion under-control over time, which leads to physical responses to social and emotional stressors, including reactive, aggressive, and impulsive behaviors.

Consistent with this view, infants with an avoidant attachment (characterized by a history of less responsive mothering) are somewhat more likely to have elevated externalizing symptoms than infants with a secure attachment (Fearon, Bakermans-Kranedburg, van IJzendoorn, & Roisman, 2010).

Overtly Negative Parenting. Mothers who engage in overtly negative parenting tend to exhibit harsh control, engage in invasive interactions, are emotionally negative, over-reactive, and controlling compared to mothers who are not overtly negative (Chang, Schwartz, Dodge, & McBride-Chang, 2009). Such behaviors may be frightening or anxiety provoking for infants, and could instill feelings of inadequacy, all of which could increase infants' internalizing symptoms. Consistent with this view, maternal negative control is associated with the development of internalizing behaviors, including feelings of inadequacy and anxiety, which inhibits skills needed to master social and environmental experiences (Feng, Shaw, & Moilanene, 2011). Likewise, infants with a disorganized attachment (characterized by a history of severe, inconsistent mothering) are more likely to have elevated externalizing symptoms than infants with an organized attachment (Fearon, Bakermans-Kranedburg, van IJzendoorn, & Roisman, 2010).

Overtly negative maternal behaviors may also put infants at risk for externalizing behaviors. When mothers engage in aggressive, impatient, intrusive behaviors, infants may begin to model these behaviors. Such maternal behaviors may also increase infant frustration, which has been linked with elevated externalizing symptoms, including impulsiveness and defiance within infants as they seek to assert their own will (Calkins, 2002; Haskett & Willoughby, 2006). Consistent with this view, infants with disorganized

attachment to their mothers (characterized by extremely negative early parenting experiences) are more likely to have elevated externalizing symptoms than infants with an organized attachment (Fearron, Bakermans-Kranenberg, van IJzendoorn, Lapsley, & Roisman, 2010). Child characteristics, such as temperament, may also influence parenting and affect child outcomes.

Child Temperament as a Moderator

The maternal-child relationship consists of a bidirectional, on-going interaction, where each partner has influence on the other. As such, child characteristics can influence maternal behavior. Child temperament is defined as constitutionally based, individual differences in reactivity and self-regulation (Rothbart, 1981). Temperament is a function of genetic, environmental, and biological factors, and is stable over time. One aspect of reactivity that is frequently studied in relation to parent-child relations is infant negative emotionality. Infants who are high in negative emotionality express negative emotions frequently and intensely, are easily distressed, and demonstrate difficulty being soothed (Chang, Shelleby, Cheong, & Shaw, 2012; Rothbart, 2011). Infants who are high in negative emotionality may be more difficult to care for and may be more dependent on sensitive caregiving than other infants (Crockenberg & Leerkes, 2006; Rothbart & Derryberry, 1981). As such, infant negative emotionality may moderate the links between maternal depressive symptoms and both unresponsive and overtly negative maternal behavior, and the links between maternal behavior and infant psychopathology.

To elaborate, a number of authors have argued that infants high in negative emotionality are more difficult to parent which may prompt less sensitive caregiving

(Crockenberg & Leerkes, 2003). Infant negative emotionality may prompt unresponsiveness via learned helplessness in which mothers begin to withdraw from their infants when they believe their efforts to intervene are unsuccessful at soothing their infants (Leerkes & Crockenberg, 2002; Rothbart, 1986). Alternatively, infant negative emotionality may prompt overtly negative responses because infant crying is aversive, and mothers with elevated depressive symptoms tend to make more negative attributions about why infants are crying (Leerkes et al., 2015), which may prompt more negative responding. Thus, women with elevated depressive symptoms and infants high on negative emotionality are at dual risk for compromised parenting. As such, the positive links between maternal depressive symptoms and both a) unresponsive parenting and b) overtly negative parenting may be exacerbated among women who are caring for a temperamentally reactive infant. Consistent with this view, a number of studies have demonstrated interactions between maternal risk factors (e.g. depressive symptoms, low maternal self-efficacy, low social support, and negative social cognition) and infant negative emotionality in relation to compromised parenting (Crockenberg & Leerkes, 2003).

Likewise, infant negative emotionality may moderate links between insensitive parenting and child outcomes via dual risk (Chang, 1997). Dual risk, also known as diathesis-stress, is a theoretical perspective that explains relations between risk factors and adaptation (Monroe & Simons, 1991). Dual risk perspective suggests poor environmental experiences, such as insensitive parenting, are more likely to negatively impact infants who carry vulnerability factors, such as difficult temperament, but not

impact those individuals who lack such vulnerability factors. This perspective is consistent with Goodman and Gotlib's (1999) emphasis on infant vulnerabilities as factors that influence their sensitivity to negative features of maternal depressive symptoms. Thus, maternal sensitivity and infant negative emotionality may interact to predict social and emotional functioning in infants. Temperamentally negative infants are more dependent on caregiving assistance for regulating their emotions, therefore, maternal sensitivity is imperative for their healthy social and emotional development (Leerkes, Blankson, O'Brien, 2009). In the absences of sensitive maternal responsiveness, temperamentally reactive infants are at greatest risk for emotional dysregulation, behavior problems, and social incompetence (Crockenberg, 1981, Mesman et al., 2009). Consistent with this view, children are at greater risk of elevated internalizing and externalizing symptoms when they are high in negative emotionality and experience insensitive maternal care, than if only one of these risk factors is present (Crockenberg & Leerkes, 2006; Crockenberg, Leerkes & Barrig Jo, 2008).

The Proposed Study

Internalizing and externalizing behaviors occurring early in childhood are serious public health issues, and have long-term consequences for individuals and society. Therefore, the goal of the proposed study was to examine the effects of early maternal depressive symptoms, assessed prenatally and at 6 months, on negative infant internalizing and externalizing behaviors at age 2, through a moderated mediation path analysis (see Figure 1). Two distinct mediated pathways from maternal depressive symptoms to outcomes were examined via overtly negative parenting and unresponsive

parenting assessed at 6 months. Infant negative emotionality, assessed at 6 months, was examined as a moderator of both paths from depressive symptoms to parenting, and the paths from parenting to infant outcomes. Maternal demographic characteristics and maternal depressive symptoms at 2 years (concurrent to the outcomes) were considered as possible covariates.

The Following Hypotheses Were Tested

Hypothesis 1. Maternal depressive symptoms will be positively associated with maternal unresponsive behavior and overtly negative behavior when infants are 6 months of age based on prior literature (Hart, Jones, File, & Lundy, 1999), and with infant's internalizing and externalizing behaviors at 2 years of age.

Hypothesis 2. Overtly negative and unresponsive maternal behaviors will each be positively associated with internalizing and externalizing behaviors at 2 years of age because over time, insensitive maternal behaviors may undermine infant social and emotional development. Based on prior literature, the association between maternal negative behavior and externalizing behaviors in infants may be stronger (Wang, Christ, Mills-Koonce, Garrett-Peters, & Cox) than the association between unresponsive maternal behaviors and internalizing symptoms (Hummel & Kiel, 2015).

Hypothesis 3. Early maternal depressive symptoms will be indirectly associated with internalizing and externalizing behaviors at 2 years of age through two mediating pathways, overtly negative and unresponsive maternal behaviors. Based on limited literature examining this mediated process, the hypothesis stands based on the notion that

maternal depressive symptoms will be positively associated with internalizing and externalizing behaviors through insensitive maternal parenting behaviors.

Hypothesis 4. Infant temperament (infant negative emotionality) will moderate the indirect effect from maternal depressive symptoms to infant outcomes at both the a and b paths such that the indirect pathway will be stronger among dyads with infants high on negative emotionality than among dyads with infants low on negative emotionality

CHAPTER II

METHOD

Participants

Participants were drawn from a larger sample of 259 primiparous mothers and their infants participating in a study about the antecedents of maternal sensitivity. The full sample included 123 African American, 128 European American, and 8 biracial mothers. Mothers ranged from 18 years to 44 years (Mean = 25 years). Approximately 27% had a high school diploma or less, 27% had attended but not completed college, and 46% had a 4-year college degree. Total annual family income ranged from poverty (less than $2000) to over $100,000 (Median = $35,000). The majority of mothers (71%) were married or living with their child's father, 11% were in a relationship with the child's father but not living with him, and 18% were single. Infant gestational age ranged from 35 to 43 weeks (Mean = 39.5) and no infants were reported to have serious health or developmental problems; 129 (51%) were female and 125 (49%) were male.

The analytic sample of this study included 190 dyads who provided complete data at 6 months and 2 years postpartum. Key reasons for attrition or missing data include infant mortality (2 cases), withdrawing from the study (9 cases), moving from the area and not being able to return for behavioral observations (19 cases), and failure to schedule or complete data collection after several efforts to schedule (40 cases). Mothers in the analytic sample were significantly older (t (256) = -3.5, $p < .001$) and more

educated (t (255) = -4.4, $p < .001$), had higher incomes (t (240) = - 1.7, $p < .05$), and had infants with lower negative emotionality (t (228) = 2.05, $p < .05$), in comparison to women not included in the analytic sample. There were no group differences on infant gender, maternal race, depressive symptoms at any time point, or maternal behavior at 6 months.

Procedure

Mothers were recruited from prenatal birthing classes, obstetric practices, breastfeeding class provided by the Special Supplemental Nutrition Program for Women Infants and Children (WIC), and community flyers. Questionnaires to assess demographics and depressive symptoms were sent in the mail to each qualifying mother following a recruitment phone call. Each mother was instructed to return completed questionnaires during an interview which occurred 6 to 8 weeks before their scheduled due dates in the university laboratory. Informed consent was obtained during this visit. Mothers and infants visited the research laboratory for videotaped observations of mother-infant interaction when infants were 6 months of age. Mothers completed a measure of depressive symptoms before the visit. When children were two years old, mothers completed a measure of depressive symptoms and a measure of infant behavior before the visit. Upon completing each wave of data collection, mothers received a small gift and financial compensation ranging from $50 (prenatal wave) to $120 (2 year wave). The university's institutional review board approved all procedures.

Measures

Demographics. During the prenatal period, mothers reported their age, education, marital status, and family income on a measure designed for this study. In an attempt to reduce the data, an exploratory factor analysis was run including marital status, maternal education, and income-to-needs ratio (the ratio of reported income to the federal poverty guideline for poverty based on family size). A single factor with an Eigen value of 2.57 that accounted for 64.28% of the variability emerged. Factor loadings ranged from .40 to .75. Thus, the measures were standardized and averaged together to create a single composite reflecting socio-economic status.

Center for Epidemiological Studies- Depression Scale (CES-D). The CES-D (Radloff, 1977) is a 20 item self-report questionnaire that was completed prenatally, when the infant was 6 months of age, and when the infant was two years of age. This scale consists of a checklist of cognitions, moods, and feelings that are associated with depressive symptoms, and is designed for use with community samples. The CES-D demonstrates convergent validity with the Research Diagnostic Criteria, a standard psychiatric interview, and with the Beck Depression Inventory (Spitzer, Endicott, & Robins, 1978). In other studies, the CES-D has correlated with parenting behaviors (Crockenberg & Leerkes, 2003; Milan, Kershaw, Lewis, Westdahl, Rising et al., 2007). Participants rated how they felt within the last two weeks by using a 4-point scale that ranges from 0 (never/rarely) to 3 (most of the time). Items on this sale are summed to create a global measure of depressive symptoms with a range from 0-60. Higher scores represent higher levels of depressive symptoms, with clinical significance for depression

beginning with scores that are 16 or higher. Internal consistency reliability at each time point was as follows: Cronbach's Alpha = .87 (prenatal), .90 (6months), and .87 (2 year). The continuous score was used in the current study. In this sample 31.4%, 19.1%, and 19.2% were classified as depressed prenatally, at 6 months, and at 2 years postpartum respectively. Depressive symptoms prenatally and at 6 months postpartum correlated significantly ($r = .42$, $p < .001$), and thus were averaged to create a measure of average depressive symptoms across the early postnatal period. Depressive symptoms at 2 years was used as a covariate to ensure any association between early maternal depressive symptoms and child behavior problems was not merely an artifact of concurrent maternal depressive symptoms.

Emotion Eliciting Tasks at 6 Months of Age. During the 6-month laboratory visit, infants and mothers participated in a free play procedure followed by 3 stress inducing tasks while being video recorded. The first distress task was an arm restraint task to elicit frustration that lasted 4 minutes, and the second was a novelty task to elicit fear that also lasted 4 minutes (Leerkes, Supple, O'Brien, Calkins, & Haltigan (2014). The third stressful task was the Still Faced Procedure that lasted 6 minutes (Tronick, Als, Adamson, Wise, & Brazelton, 1978).

The arm restraint task consisted of infants being strapped in a car seat while an experimenter gently held the infant's arms down and did not interact with the infant. The novelty task consisted of infants sitting in a car seat, tucked into a table, while a remote controlled truck approached the infant two times. A Plexiglas barrier prevented the truck from touching the infant. The truck vibrated, had blinking lights and loud sirens. After

these two approaches, the truck became silent and still for 1 minute in front of the infant. For both the restraint and novelty tasks, mothers were instructed to sit next to their infants without interacting and to have a neutral face for the first minute, and then they could interact with the infant in any way they chose for the next 3 minutes. A large basket of age appropriate toys and books were available within mothers' reach. The only limitation was to leave the infant in the car seat throughout the 4 minutes and not to touch the experimenter or novelty toy unless they wanted to end the activity.

During the still face task, infants remained in the car seat, and mothers' chairs were placed in front of infants such that they were eye level with one another, but sitting a few feet apart. First, mothers were instructed to interact with their infant for two minutes as they usually would. Next, they were asked to briefly look away from the infant, and then look back to the infant with a neutral face for 2 minutes. Finally, the mothers were instructed to look away and then back again at their infant and to interact and play with their infant as they normally would for 2 minutes (re-engagement phase).

Observed Maternal Behavior. Maternal behavior during the mother involved portions of the limitations and novelty task and the re-engagement phases of the still face were coded from digital media files using INTERACT 9 (Mangold, Arnstorf, Germany). Event based continuous coding was used such that once a behavior was coded it remained active until a different behavior was coded. Twelve mutually exclusive maternal behaviors were coded as described in Leerkes (2010). These include: negative behaviors (mothers direct negative affect towards their infants or discipline infant); intrusive behaviors (mothers forcing own agenda onto the infant); mismatched affect (laughing

while infant is distressed); withdraw (move or walk away from infant or end interaction abruptly); distracted from infant (engaging in activities that are not connected to parenting or the task such as filing nails, reading, looking around the room); persistent ineffective (using the same ineffective behavior when other options exist, for example, soothing infant in same manner without altering the behavior even when it is not working); monitoring (watching infant without interacting); task focused (drawing the infants' attention toward the stressful task, for example, pointing at the truck); calming contact (providing verbal or physical soothing techniques); supportive contact (maintaining infants focus on the task while providing calming contact); non task focused engagement with the infant (playing and interacting with infant); and routine care (engaging in normal care activities, such as wiping tears away from infant's face or straightening clothing). The percentage of time mothers engaged in each behavior during each task was calculated. For inter-rater reliability, 34 cases were chosen at random and double coded; inter-rater reliability for these videos was kappa = .76.

For the current study, two insensitive parenting composites was created, unresponsive parenting and overtly negative parenting, that map onto the withdrawn and intrusive styles that often characterize maternal behavior among depressed mothers (Maughan, Cicchetti, Toth, & Rogosch (2007). Unresponsive parenting was the sum of monitoring, withdraw, and distracted maternal behaviors. Overtly negative was the sum of intrusive, mismatched affect, persistent ineffective, and negative maternal behaviors. Scores were averaged across the three tasks, such that high scores indicate a higher

proportion of time engaged in unresponsive or overtly negative behaviors across all 3 distress-inducing tasks.

Infant Temperament. Infant's negative emotionality was assessed at 6 months via rating by trained observers and maternal report as described below.

Observed Infant Temperament. Infant affect was continually rated using event based coding from the videotapes of the arm restraint, novelty (truck), and still face tasks using INTERACT 9 (Mangold, Arnstorf, Germany). Infant emotionality was rated on a 7 point scale adapted from Braungart-Rieker and Stifter (1996) based on infants' facial expressions, body tension, and vocalizations. This scale ranges from (1) high positive affect (intense laughing or squealing) to (7) high negative affect (intense wails, screams, or sobs), with a rating of 4 reflecting neutral affect. For this coding system, 34 videotapes were double coded for inter-rater reliability, with a weighted kappa = .76. Coders were blind to other data, and cases were selected at random for inter-rater reliability. The mean level of affect was calculated for each task, where a high score indicates higher infant negative affect.

Infant Behavior Questionnaire- Revised Very Short Form (IBQ-RVSF). The IBQ-RVSF (Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014), is a shortened version of the Infant Behavior Questionnaire-Revised, a commonly used parent-report measure of infant temperament (IBQ-R; Garstein & Rothbart, 2003). The 12-item negative affect broadband scale of the IBQ-RVSF, which includes items assessing proneness to fear, frustration, and sadness, was used in this study, and items in this scale are rated on a scale of 1 (never) to 7 (always). There is strong empirical support for the

validity of the IBQ- RVSF with test-retest reliability highly similar to those of standard forms averaging .72 and ranging from .54 to .93 (Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014; Parade & Leerkes, 2008). Convergent validity of the IBQ-RVSF with observational measures of temperamental reactivity were comparable to those observed for the standard IBQ-R scales and suggest that the IBQ-RVSF is a valuable tool for examining infant temperament.

In an attempt to reduce the data, an exploratory factor analysis was run including maternal reported negative affect and mean affect during the 3 distress eliciting tasks. A single factor with an Eigen value of 1.7 that accounted for 41.93% of the variability emerged. Factor loadings ranged from .40 to .75. Thus, the measures were standardized and averaged to yield a multi-method measure of infant negative emotionality in which high scores indicate higher levels of infant negative emotionality when infants were 6 months old.

Brief Infant Toddler Social Emotional Assessment (BITSEA). Mothers completed the BITSEA (Briggs-Gowan, Carter, Irwin, Wacthel, & Cicchetti, 2004) when infants were 2 years of age. The BITSEA is a 42-item measure that assesses toddler behavior problems and social and emotional competency. Thirty-one items contain questions about problem behaviors, and each item is scored on a 3-point scale ranging from 0 for not true or rarely true to 2 for often or very true. Following revised scoring suggestions by Briggs-Gowan et al. (2013), 14 items reflecting internalizing were averaged (Cronbach's Alpha = .70; e. g., seems very sad, unhappy, or withdrawn; seems nervous or fearful; and avoids physical contact) and 7 items reflecting externalizing were

averaged (Cronbach's Alpha = .59; e.g., is destructive; hits, shoves or bites other children; purposely tries to hurt you; runs away in public places). In prior research, these subscales showed convergent validity with the internalizing and externalizing subscales of the CBCL (Briggs-Gowan, et al., 2013).

CHAPTER III

RESULTS

Preliminary Analysis

Preliminary analyses were conducted to examine the distributions of all study variables. Descriptive statistics were calculated for all major variables and are displayed in Table 1. Potential covariates (SES, race, infant gender, and maternal depressive symptoms at two years) were identified by examining their correlations with the outcome variables internalizing behaviors and externalizing behaviors, and the predictor variables maternal depressive symptoms, overtly negative parenting, unresponsive parenting, and infant temperament. Infant gender was unrelated to all variables and was considered no further. Correlations among all major variables and the remaining covariates are displayed in Table 2.

African American mothers and mothers with lower SES reported higher depressive symptoms, and rated their children higher on externalizing and internalizing behaviors, which supports the need to control for these covariates in the larger path model. Internalizing and externalizing behaviors correlated positively, thus in hypothesis testing, I control for comorbidity by controlling for internalizing when predicting externalizing and vice versa. As predicted, early maternal depressive symptoms were positively correlated with unresponsive maternal behavior and both externalizing and internalizing behaviors. However, maternal depressive symptoms were not associated

with overtly negative parenting. Temperament was positively correlated with overtly negative parenting but not with internalizing or externalizing behaviors. Lastly,nonresponsive parenting was positively correlated with both internalizing and externalizing behaviors, and overtly negative parenting was positively correlated with internalizing but not externalizing behaviors.

Hypothesis Testing

All continuous variables used to create interaction terms were centered. Two path models were run, one for each dependent variable, in SPSS through Hayes PROCESS macro 2.13.2 (Hayes, 2014). Within the PROCESS macro, model 58 was chosen. Model 58 allows for up to 10 mediators to operate in parallel, in this case there were two (unresponsive and overtly negative maternal behavior), as well as one proposed moderator (infant temperament). In these models, early maternal depressive symptoms was the independent variable, maternal unresponsive and overtly negative behaviors were the mediators, and infant temperament was the moderator. Maternal race, SES, depressive symptoms at 2 years and the other behavior problem score were entered as covariates. I tested conditional indirect effects using bootstrapping procedures. Unstandardized indirect effects were computed across 1,000 bootstrapped samples as was the bias corrected bootstrap confidence interval for indirect effects. The 95% confidence interval was computed by determining the indirect effects at the 2.5^{th} and 97.5^{th} percentiles. If the confidence interval spans zero, the conditional indirect effect is not significant. Results from the path model for each dependent variable are displayed in Figures 2 and 3 and are discussed below.

Predicting Internalizing Behaviors. As illustrated in Figure 2, independent of covariates, maternal depressive symptoms had a significant positive direct effect on internalizing behaviors. Maternal depressive symptoms was positively associated with unresponsive parenting, but was not significantly associated with overtly negative parenting. Overtly negative parenting was positively associated with internalizing behaviors, but no significant link was found between unresponsive parenting and internalizing behaviors. Contrary to the hypothesis, temperament did not moderate the relationship between maternal depressive symptoms and maternal behaviors, nor maternal behaviors and internalizing behaviors. As such, there were no conditional indirect effects of early maternal depressive symptoms on toddler internalizing through maternal behavior at various levels of infant temperamental negativity. However, significant direct effects of temperament were found with both maternal behaviors, such that mothers of more temperamentally negative infants engaged in more overly negative behavior and less unresponsive behavior.

Predicting Externalizing Behaviors. As illustrated in Figure 3, the results for predicting externalizing behaviors were primarily contrary to the hypothesis. Given the first half of the model is identical to that described above, I only focus on associations involving externalizing in this section. There was no significant direct effect between maternal depressive symptoms and externalizing behaviors. Contrary to the hypothesis, there were no significant links between either of the maternal behaviors and externalizing behaviors. In addition, infant temperament did not moderate the links between maternal

behavior and externalizing behaviors. Thus, there was no evidence of moderated mediation in the path analysis.

CHAPTER IV

DISCUSSION

Internalizing and externalizing behaviors occurring early in childhood are serious public health issues, and have long-term consequences for individuals and society. Identifying early predictors of child psychopathology is imperative for improving screening and intervention efforts. Therefore, the goal of this project was to examine the extent to which maternal depressive symptoms over the first year is linked with internalizing and externalizing problems among 2 year olds through two types of insensitive parenting behaviors, overtly negative and unresponsive parenting. Infant temperament was examined as a moderator of the paths between depressive symptoms and both insensitive parenting paths, and the paths from insensitive parenting to both infant outcomes.

Links Between Maternal Depressive Symptoms and Parenting

Consistent with the hypothesis, and prior research (Williams et al., 2009), maternal depressive symptoms were linked with more unresponsive parenting behaviors. Unresponsive maternal behaviors, including limited responsiveness to infant cues, a lack of interaction, withdrawn affect, and distracted actions likely stem from the symptoms of depression. That is, mothers with depressive symptoms are more likely to focus on their own needs than their infants' (Dix, Moed, & Anderson, 2014). This undermines the quality of parenting, leading to less adaptability, and an inability to cope with stressful

and demanding tasks, such as caring for and meeting basic needs of infants. In contrast, maternal depressive symptoms were not significantly associated with overtly negative behavior. Symptoms of depression include sadness, flat affect, and withdrawn behaviors, as well as hostility and indifference. Presumably, irritability may be more strongly linked with negative behavior than other symptoms of depression (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Perhaps the mothers in this study experience relatively lower irritability than mothers in other studies and thus depressive symptoms were not linked with negative maternal behaviors. It would be useful in future research to consider the nature of endorsed symptoms and their links with parenting.

Pathways to Internalizing Behaviors

Consistent with prediction, and Goodman et al.'s (2011) meta-analysis, elevated maternal depressive symptoms were linked with children's elevated internalizing symptoms. Counter to prediction and prior research (Kujawa, Dougherty, Durbin, Laptook, Torpey, & Klein, 2014), in the current study, this effect was not mediated by either of the examined maternal parenting behaviors. Conditions for indirect effects were not met for unresponsive maternal behavior because, although depressive symptoms predicted greater unresponsive behavior, unresponsive behavior was not linked with internalizing in this sample. There were three maternal behaviors that contributed to the unresponsive maternal behavior composite: withdrawal, distraction, and monitoring behaviors. Infants may be offering bids for interaction with their mothers, however, mothers with depressive symptoms may be sitting, monitoring, watching their infants, or looking away when their infants are seeking interaction. In the frustration and fear-

eliciting tasks, there were no other competing demands for mothers. It seems likely that withdrawal from the infant and distraction are consistently maladaptive in this context since there were no other competing demands for mothers. But, monitoring was the most frequent of the three behaviors, and monitoring, that is watching without intervening, may only be maladaptive when infants are signaling mothers that they need assistance by fussing or looking toward the mother. Monitoring may be adaptive when infants are calm or expressing interest in the task. The coding system does not tease this apart, which may have undermined the likelihood of observing a link between unresponsive maternal behavior and child outcomes.

Likewise, conditions for indirect effects were not met for overtly negative behavior because as described above, maternal depressive symptoms were unrelated to overtly negative maternal behavior. However, overtly negative maternal behavior at 6 months was linked with toddlers' heightened internalizing symptoms at 2 years, but no other significant association was found. Aggressive, invasive parenting may undermine the emotional adjustment and regulation strategies of infants (Calkins, Propper, Mills-Koonce, 2013; Propper, Willoughby, Halpern, Carbone, & Cox, 2006). Infants need appropriate responding and emotional support to successfully regulate emotions, which leads to behavioral adaptation and adjustment. When parental interactions are hostile and potentially fear inducing, infants may become anxious and withdrawn.

Thus, the observed maternal behaviors did not explain the link between mothers' depressive symptoms and children's later internalizing symptoms. Three alternative explanations for the link between maternal parenting behaviors and internalizing

symptoms exist. First, depressive symptoms are heritable (Ferentinos et al., 2015; Jacobs, Orr, Gowins, Forbes, & Langenecker, 2015; Nivard et al. 2015), therefore infants of mothers with elevated depressive symptoms may have inherited a genetic propensity to internalizing symptoms. Second, the results could be a function of prenatal exposure to maternal depressive symptoms (Diego et al., 2004; Marcus et al., 2011). While pregnant, mothers with depressive symptoms are known to have elevated cortisol levels, indicating stress and arousal (Field, Hernanzez-Reif, & Diego, 2011). Maternal prenatal depressive symptoms are linked with fetal cortisol exposure, which is linked with non-normative functioning in the Hypothalamic-Pituitary Axis, demonstrated by elevated Adrenocorticotrophic hormone levels (Marcus et al., 2011) and with greater frontal EEG asymmetry (Diego et al., 2004) in infants at birth. Therefore, chronic fetal exposure to elevated cortisol levels may affect infant attention and arousal states, ability to habituate, and interrupt other aspects of neurobehavioral functioning, leading to aversive child outcomes. Lastly, it may be the case that unmeasured aspects of maternal behavior contribute to these findings. For example, mothers with depressive symptoms may touch and hold their infants less or may be more tense when doing so (Field, 2007). These subtle variations in parenting quality are difficult to observe, but they may affect infant stress arousal and regulation via the synchrony of bodily rhythms between mother and infant (Feldman, 2007). It has been proposed that this may in turn contribute to maladaptive infant outcomes (Leerkes, Su, O'Brien, Calkins, & Supple, in press).

Pathways to Externalizing Behaviors

Contrary to prediction and prior research (Mantymaa et al., 2012; Shaw, Owens, Giovannellli, & Winslow, 2001), maternal depressive symptoms, maternal unresponsiveness, and overtly negative behavior were not significantly associated with child externalizing at 2 years in the path model. The results of this study need to be interpreted with caution, as externalizing disorder consist of various types, including Aggression, Attention-Deficit-Hyperactive-Disorder, Oppositional Defiance Disorder, and Conduct Disorder. The BITSEA is too short a measure to tease out specific types of externalizing behaviors. It could be that the proposed model is more relevant to a subset of specific externalizing symptoms than to a broad array of externalizing symptoms.

Alternatively, it is possible that prior reported associations between maternal depressive symptoms and externalizing behavior are actually a function of the shared variance between internalizing and externalizing (Mantymaa et al., 2011). I covaried internalizing symptoms when predicting externalizing symptoms in contrast to previous research. Thus, results indicate that maternal depressive symptoms, maternal unresponsiveness, and maternal negative behaviors are not linked with pure externalizing symptoms. However, not much is known about the etiology of co-occurring externalizing and externalizing behaviors (Edwards, & Hans, 2015). In future research, it may be useful to consider a person-oriented approach and identify children with consistently low symptoms, those with elevated internalizing only, elevated externalizing only, and comorbid symptoms to determine if each profile or class has unique predictors. Such an approach would be useful given not much is known about the etiology of co-

occurring externalizing and internalizing behaviors (Edwards & Hans, 2015), but it would require a larger sample.

The lack of a direct link between maternal depressive symptoms and toddler externalizing behaviors, in contrast to the findings for internalizing symptoms, may be in part due to the unlikeliness of genetic transmission of cross-domain symptoms. That is, toddler externalizing symptoms are likely to be higher among children whose mothers have elevated externalizing symptoms, not internalizing symptoms such as depression (Jacobs, Orr, Gowins, Forbes, & Langenecker, 2015).

The Role of Temperament

It was hypothesized that infant temperament would moderate the indirect effects of maternal depressive symptoms to infant outcomes, such that the indirect pathways would be stronger among the mother-infant dyads with infants high on negative emotionality. However, temperament did not act as a moderator in this path analysis. That is, contrary to prior research, temperament did not exacerbate links between maternal depressive symptoms and insensitive maternal behaviors (Edwards & Hans, 2015), nor the links between insensitive maternal behaviors and child outcomes (Hart, Jones, Field, & Lundy, 1999). However, main effects of temperament on maternal behavior were observed in the path model, such that mothers of more temperamentally reactive infants engaged in more overtly negative maternal behavior and less non-responsive behavior. That depressive symptoms were linked with more overtly negative behavior is consistent with prior research linking depressive symptoms to insensitivity (Kochanska & Kim, 2014). Infants who cry frequently may elicit maternal distress and

undermine a mother's ability to self-regulate in the moment, which may contribute to the use of negative behaviors, such as agitation or anger. The temperamental negativity was also linked with less unresponsiveness during distress-eliciting tasks is consistent with research demonstrating that mothers of infants high in negative emotionality demonstrate different patterns of responsiveness from mothers with infants who are low in negative emotionality (van den Bloom & Hoeksma, 1994). Specifically, mothers of irritable infants respond at a comparable rate to infant distress signals but respond less frequently to positive signals when compared to mothers of infants low on irritability (perhaps because they need respite). Given the nature of the observational tasks, it is not surprising that I observed a high rate of responsiveness among mothers of reactive infants.

Other moderating factors besides temperament may influence the links between maternal depressive symptoms, maternal behaviors and child outcomes. These include duration and timing of maternal depressive symptoms, as well as other infant characteristics besides negative emotionality, such as self-regulatory abilities. According to Goodman et al. (2011), not many moderating factors between maternal depressive symptoms and parenting, or between insensitive behaviors and child outcomes, have been identified, and further examination of this issue is needed to identify the dyads that are at greatest risk for maladaptive outcomes over time.

Strengths, Limitations, and Directions for the Future

A number of strengths and limitations of the study warrant comment. First, that the community sample is diverse with respect to race and socio-economic status is a

strength compared to much of the prior literature. The use of a community sample is important because even non-clinical levels of depressive symptoms may undermine parenting and child outcomes (Field, 2010), but results may have been stronger in a high risk or clinical sample. In Goodman et al.'s (2011) meta-analytic review, for child externalizing behaviors, no effect size difference were found for clinical samples versus community samples, however, for internalizing behaviors, effect sizes were significantly larger for clinical versus community samples.

Second, maternal depressive symptoms were assessed via maternal report on the CES-D, which focuses on symptoms over the last two weeks. Although reports were gathered twice and averaged over time, this approach does not fully address the chronicity with which mothers experienced and infants were exposed to depressive symptoms during the first 6 months. More frequent self-reports or clinical interviews that take into account the history of depressive symptoms would be useful in future research of this type. In addition, mothers were not asked to report a diagnosis of Major Depressive Disorder (MDD), or if they were taking medications or seeking treatment for MDD. Mothers who may be medicated or in therapy for MDD may not have had current symptoms of depression, and reported accordingly, or treatment may moderate links between depressive symptoms and outcomes.

Third, the tasks during which maternal behaviors were observed were brief and designed to elicit infant distress. On the one hand, this creates a challenging context for mothers, which may have elicited a broader range of insensitive behaviors than would be observed in free play or non-arousing tasks, which may be a strength. On the other hand,

the brevity of these tasks (3 minute truck task, 3 minute arm restraint, and 2 minutes still-face re-engagement = 8 minutes total) and the demand characteristics may undermine the ability to capture mothers' typical behavior. Regardless, that specific types of insensitive maternal behavior were carefully coded is a strength. There are multiple ways in which mothers behave insensitively, and the two under consideration (unresponsive and overtly negative behavior) demonstrated a different pattern of associations with maternal depressive symptoms and child outcomes, indicating the importance of a nuanced approach to coding maternal behavior rather than relying solely on global indicators of sensitivity. Parenting behaviors in this study were based on observational coding at one time point. Parenting effects may have been strengthened if parent-infant interactions were coded across two or more time points. Of note, some mothers may engage in both types of insensitive parenting behaviors, alternating between overtly negative behaviors and unresponsiveness, whereas others may behave in a characteristically unresponsive or characteristically negative manner. These patterns may have different implications for child outcomes. For example, infants exposed to a blend of unresponsive and negative maternal behavior may be at greatest risk for externalizing symptoms (Goodman et al., 2011), although post-hoc analyses in this sample did not support that argument.

Fourth, it is important to acknowledge that relying solely on maternal report of child outcomes is not ideal because shared method variance between mother reports of depressive symptoms and the outcome. Maternal depressive symptoms may affect how mothers complete the BITSEA in several ways. First, depressive symptoms may alter feelings mothers have towards their infants. This may be due to negative attributions

toward infants, creating a bias towards negativity. Second, mothers with depressive symptoms may be unaware of infant cues and infant behavior, creating inconsistent and inaccurate responses when reporting on infant behavior. This may be due to a lack of attachment and boding with their infants, leading to a detached relationship between mother and infant. Lastly, mothers with depressive symptoms may be more likely to project their negative affect behaviors onto their infants, creating responses that do not accurately depict infant behavior, and are based solely on mothers own negative affect, compared to mothers without depressive symptoms. Controlling for concurrent depressive symptoms at age 2 years may have reduced these concerns somewhat. However, collecting reports from alternative caregivers and direct observations of child behavior would be stronger approaches. That I used a multi-method measure for infant temperament composed of maternal reports and direct observation is a strength in contrast to much prior research, which has relied solely on maternal reports.

Fifth, maternal psychopathology as a single determinant of parenting behaviors may not be adequately conceptualizing comorbid maternal psychological characteristics, including maternal personality, or comorbid psychopathology behaviors, such as anxiety (McCabe, 2014). This study does not address comorbid maternal psychopathological characteristics or behaviors.

Sixth, this study does not address father involvement. Goodman et al.'s (2011) meta-analysis suggests father involvement may act as a moderator between maternal depressive symptoms and child outcomes. Fathers who do not have depressive symptoms may buffer the effects of maternal depressive symptoms on child outcomes by

exposing infants to warm and consistent responsiveness. Goodman et al. (2014) examined father involvement, specifically perceived responsibility, accessibility and engagement with infants, resulting in father involvement acting as a buffer model to maternal depressive symptoms in the first 6 months of life, and having spill-over effects continuing well into the second half of the infant's first year of life.

A strength of this current study was that it tested a complex moderated mediation path model using the Hayes (2014) PROCESS macro, as well as using recommended bootstrapping procedures. Most studies run each path separately, but this regression analysis method allowed for the entire path model to run simultaneously for each outcome. It was hypothesized that a mediating effect of insensitive parenting between maternal depressive symptoms and negative infant outcomes was to be moderated by infant temperament. Further examination of these study variables is needed in order to better understand relationships and effects of these parenting and infant variables on negative infant outcomes.

Implications for Practice

Given the link between maternal depressive symptoms and child internalizing behaviors, early screening and detection of mothers who have depressive symptoms is imperative for reducing depressive symptoms, which may enhance the mother-infant relationship, leading to a reduction of negative child outcomes. Relationships between infants and mothers are bidirectional, therefore intervening between infants high in negative emotionality and mothers with insensitive parenting behaviors should improve interaction between mother-infant dyads. Mothers of infants with high negative

emotionality may benefit from education and support to help them respond appropriately to infant distress.

Conclusion

In the current study, I examined maternal behaviors (unresponsive and overtly negative behaviors) as possible mediators of the relationship between maternal depressive symptoms and two dependent variables, child externalizing and internalizing behaviors, and considered temperament as a moderator of the mediated relationship. Results indicated there were no indirect effects within the path model. A significant direct effect was found between maternal depressive symptoms and infant internalizing behaviors, and mothers with depressive symptoms behave in a more withdrawn and impassive manner, infants are more likely to respond by adopting these same withdrawn behaviors. Direct effects were found between infant temperament and the two negative mothering behaviors, overtly negative and unresponsive parenting. These results indicate that certain infants (those high in negative emotionality) are at greater risk for receiving negative maternal behaviors based on their own behaviors. The results from the current study suggest that maternal depressive symptoms and negative maternal parenting behaviors are associated with infant internalizing symptoms, however, the mechanisms explaining these associations need further exploration to better understand developmental pathways for prevention, intervention, and screening.

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APPENDIX A

TABLES

Table 1

Descriptive Statistics of Major Variables

Primary Variables	M	SD	Minimum	Maximum
Maternal Depression (prenatal & 6m)	12.26	7.89	.00	41.00
Unresponsive Parenting (6m)	18.64	11.96	.95	58.74
Overtly Negative Parenting (6m)	6.03	6.76	.00	37.71
Infant Temperament Composite (6m)	-.02	.63	-1.11	2.32
Temperament Observation	4.42	.42	3.47	5.67
Temperament IBQ	3.43	.95	1.25	6.50
Externalizing Behaviors (2y)	4.16	3.08	.00	17.00
Internalizing Behaviors (2y)	2.40	1.94	.00	9.0
Covariates				
Race (African American)	.51	NA	NA	NA
Socioeconomic Status	-.02	.81	-1.47	1.72
Maternal Depression (2y)	9.76	7.80	.00	43.00

Note: N =190; y = years, m = months; Infant Temperament Composite consists of IBQ and observed measure

Table 2

Correlations Among All Major Variables

Variables	1	2	3	4	5	6	7	8	9
1.Maternal Depression (prenatal & 6m)	--								
2.Unresponsive Parenting (6m)	.32**	--							
3.Overtly Negative Parenting (6m)	.06	.02	--						
4.Infant Temperament Composite (6m)	.10	-.05	.51**	--					
5.Internalizing Behaviors (2y)	.44**	.24**	.17*	.13	--				
6.Externalizing Behaviors (2y)	.30**	.20**	.04	-.03	.51**	--			
7.Race	-.29**	-.23**	-.06	-.23**	-.29**	-.18*	--		
8.Socioeconomic Status	-.39**	-.36**	-.13	-.19**	-.30**	-.15*	.58**	--	
9.Maternal Depression (2y)	.57**	.25**	.11	.06	.43**	.31**	-.17*	-.29**	

Note: N= 190; y = years, m = months; * = p < .05, ** = p<.01; Race: 0 = African American, 1 = European American; Infant Temperament Composite consists of IBQ and observed measures

APPENDIX B

FIGURES

Figure 1

Conceptual Representation of Moderated Mediation Path Model for Internalizing and Externalizing Behaviors

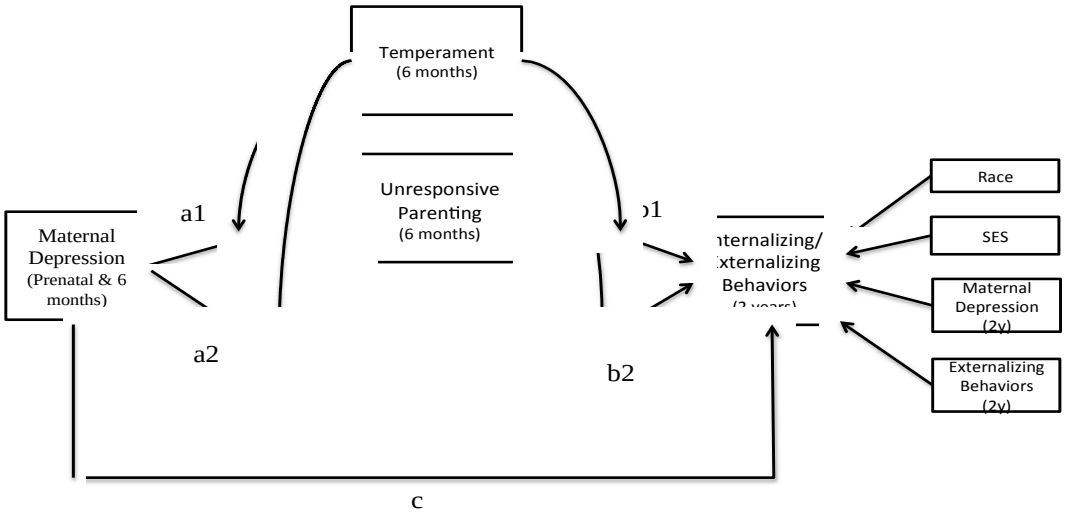
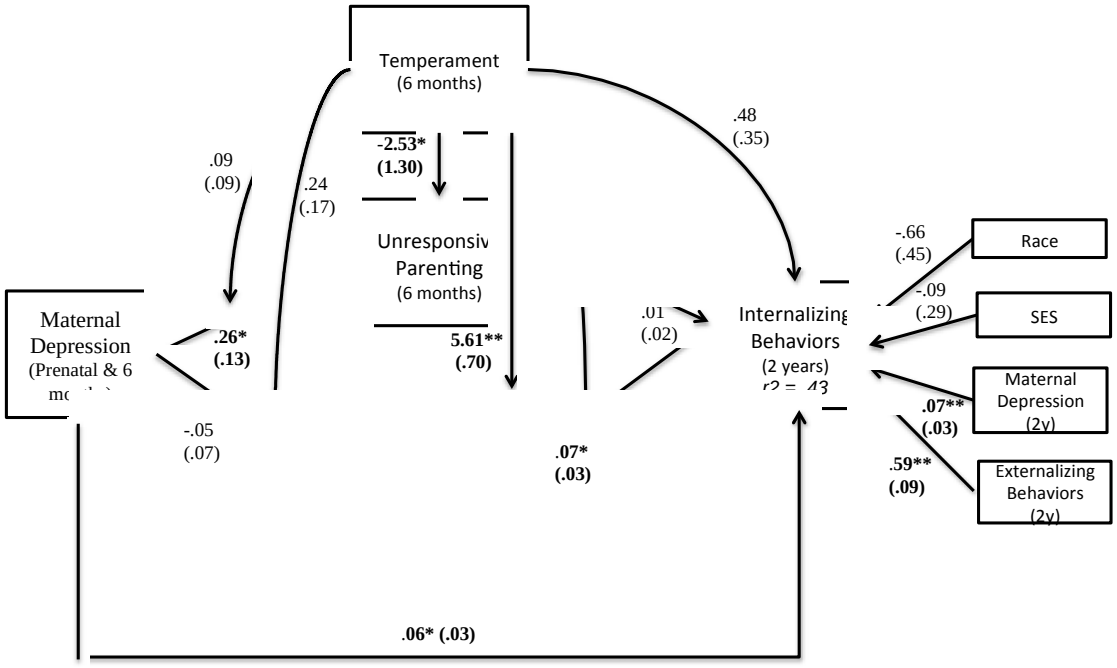


Figure 2

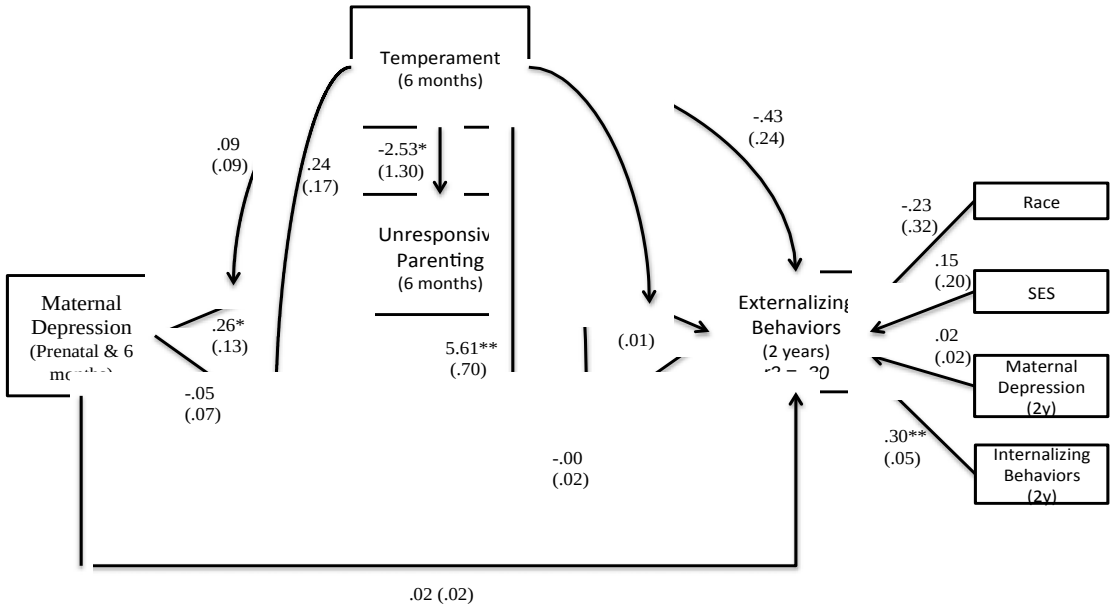
Statistical Representation of Moderated Mediation Path Model for Internalizing Behaviors



Notes: ** = p < .01; * = p < .05; Values are unstandardized betas; (Standard Error)

Figure 3

Statistical Representation of Moderated Mediation Path Model for Externalizing Behaviors



Notes: ** = p < .01; * = p < .05; Values are unstandardized betas; (Standard Error)