MATERNAL DEPRESSIVE SYMPTOMS AND PARENTING IN EARLY CHILDHOOD: MODERATION BY MARITAL QUALITY AND CHILD NEGATIVE EMOTIONALITY

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A significant body of research has established an association between maternal depressive symptoms and parenting. The current study tested the possible moderating role of marital quality and child negative emotionality (NE) from 9 to 27 months among a sample (n = 561) of adopted children and their mothers. Although the data revealed direct associations between depressive symptoms, marital quality, child NE, and parenting behavior, moderation was not evident with the exception of two marginal trends. We found no evidence that marital quality moderated the association between maternal depressive symptoms and warm parenting and only weak evidence that marital quality moderated the association between depressive symptoms and harsh parenting. Similarly, we found no evidence that child NE moderated the association between maternal depressive symptoms and warm parenting and only weak evidence that child NE moderated the association between depressive symptoms and harsh parenting. The direction of effects for marginal moderated trends was unexpected and counter to our hypotheses. Theoretical relevance and implications for clinical practice are discussed.

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1.0 INTRODUCTION

A significant body of research has established an association between maternal depressive symptoms and parenting. Maternal depressive symptoms have been linked to reductions in positive, sensitive parenting, and increases in harsh, negative parenting (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). In addition to direct associations between maternal depressive symptoms and child problem behavior not accounted for by parenting (Shaw et al., 2009; Shelleby & Shaw, 2014), parenting low in sensitivity and high in harshness has been linked to a variety of negative child outcomes, including lower levels of social competence, academic achievement, and emotion regulation abilities, as well as elevated levels of internalizing and externalizing behavior problems (Belsky & Fearon, 2002; Leerkes, Blankson, & O'Brien, 2009; Dishion et al., 2008). Research has typically found that maternal depression, both clinically elevated and sub-clinical levels, is associated with the greatest changes in maternal parenting during early childhood and, relatedly, that the association between maternal depression and negative child outcomes tends to be stronger in early childhood relative to later in childhood and adolescence (Goodman et al., 2011; Lovejoy et al., 2000). Therefore, advancing our understanding of the nature of the association between maternal depressive symptoms and parenting in early childhood is important because of consistent associations with child outcomes during this time.

Maternal depression does not affect parenting behavior uniformly, as some mothers manage to parent sensitively despite their elevated symptoms of depression (NICHD Early Child Care Research Network, 1999). Given that significant variability exists in the relation between maternal depression and parenting, it is likely that other contextual factors in mothers' lives moderate the strength of this association. The present study seeks to explore two possible moderators of this association: marital quality and child temperament, specifically child negative emotionality.

Marital quality has been found to be associated with both positive (e.g., sensitive, warm) and negative (e.g., harsh, rejecting) dimensions of parenting (Erel & Burman, 1995; Planalp, Braungrat-Rieker, Lickenbrock, & Zentall, 2013; Rhoades et al., 2011). Just as the marital relationship has been theorized to influence the quality of parents' interactions with children, both theory and empirical evidence suggest that marital quality may affect the strength of the association between maternal depression and parenting. For example, it is possible that mothers who have warm, supportive partners who are available to help maintain routine and regularity in the household may more likely prevent their depressive symptoms from spilling-over and adversely affecting their parenting behavior (Belsky, 1984). Conversely, for mothers in marriages characterized by high levels of hostility, depressive symptoms may be exacerbated and significantly reduce parenting quality. The present study seeks to extend current research by testing whether marital quality moderates the magnitude of associations between maternal depressive symptoms and both warm and harsh parenting.

Another factor that has been directly linked to both parenting and maternal depression and also may moderate the strength of the association between maternal depressive symptoms and parenting is child temperament, specifically child negative emotionality (Cutrona, 1986;

Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma, 2007). The adoption design of the Early Growth and Development Study (EGDS) will allow the exploration of how genetic contributions of the birth mother may relate to adoptive mother parenting, as expressed by individual differences in child negative emotionality (i.e., difficultness). Theoretically, a child with higher levels of negative emotionality may require greater patience, energy, and resources from his or her mother compared to a child who is more affectively regulated (Belsky, 1984). In this context, maternal depressive symptoms may be more strongly associated with more harsh and less supportive parenting. The present study will examine links between birth mother negative emotionality and child negative emotionality and the possible moderating role of child negative emotionality in the association between maternal depressive symptoms and parenting.

Due to the existence of the strong relationships among maternal depressive symptoms, parenting, and child outcomes, deepening our understanding of the conditions under which maternal depressive symptoms are associated with greater disruptions in parenting is important with regard to reducing and preventing negative child outcomes. The primary aims of the present study are to investigate whether marital quality and child negative emotionality each moderate the strength of the association between symptoms of maternal depression and observed levels of harsh and warm parenting between 9 and 27 months.

1.1 MATERNAL DEPRESSION

Major depression affects between 6% and 17% of women at some point during their lifetime, and rates of elevated depressive symptoms—as opposed to clinical disorder—are even higher (Goodman, 2007). Both clinical and subsyndromal depression are more prevalent in women

than in men, at a rate of one-and-a-half to three times higher (Kessler, 2006). Mothers tend to report higher levels of depressive symptoms compared to women without children (Kessler, 2006; Cowan & Cowan, 1992) and, furthermore, at least two studies have found that levels of depression tend to be higher among women with young children compared to women with school-age children (Reuben & Shaw, in press; Shaw, Bell, & Gilliom, 2000). Although paternal depression and its effects on parenting and child adjustment should not be overlooked, maternal depression is most frequently studied, partly because women are more often primary caregivers for their children, and also due to the higher rates of depression in women compared to men beginning in adolescence (Shaw, Connell, Dishion, Wilson, & Gardner, 2009).

The relatively high rates at which women with young children experience recurring symptoms of depression is cause for concern based on extensive research linking maternal depression to a number of negative child outcomes. As both clinical depression and elevated levels of depressive symptoms have been similarly linked to both child and parenting outcomes (e.g. Goodman, 2007; Lovejoy et al., 2007), the term 'maternal depression' will be used in this document to refer either to clinical or subsyndromal depression, unless otherwise noted. Maternal depression is a non-specific risk factor for children, with research demonstrating that children who are raised by depressed mothers are not only more likely to experience depression and other emotional problems themselves (e.g., anxiety), but are also more likely to have an insecure attachment style and are at risk for disruptive behavioral problems (Bagner, Pettit, Lewinsohn, & Seeley, 2010; Campbell et al., 2004; Campbell et al., 2009; Goodman, 2007; Nicholson, Deboeck, Farris, Boker, & Burkowski, 2011; Zahn-Waxler, Denham, Iannotti, & Cummings, 1992). A meta-analysis of 193 studies found a significant association between maternal depression and higher levels of child internalizing, externalizing, and general

psychopathology, as well as higher levels of negative affect and behavior and lower levels of positive affect and behavior, compared to children of mothers who were not depressed (Goodman et al., 2011).

Although maternal depression is associated with negative outcomes throughout childhood and adolescence, research indicates that maternal depression is more consistently associated with child functioning in early childhood, particularly during infancy (Goodman et al., 2011). This is likely because young children spend so much time with their mothers and are more psychologically and physically dependent on them relative to later developmental periods. Research has increasingly focused on identifying potential mechanisms through which maternal depression is associated with negative child outcomes, especially in the infancy and early childhood period. Evidence has been found for a variety of possible mechanisms, including impaired parenting, genetic transmission, observational learning, and continued exposure to stressful environments (Hammen, Hazel, Brennan, & Najman, 2012; Lovejoy Graczyk, O'Hare, & Neuman, 2000; Shelleby & Shaw, 2014). Parenting behavior has been particularly well studied in this context, and found to be a robust mediator of links between maternal depression and child adjustment.

1.2 MATERNAL DEPRESSION AND PARENTING BEHAVIOR

Maternal depression and parenting likely influence one another reciprocally, with some studies finding parenting to be associated with subsequent changes in maternal depression (Lagacé-Séguin & d'Entremont, 2006). Because of current interest in exploring models through which maternal depression may eventually affect child adjustment, in line with such models as Conger

and colleagues' Family Stress Theory (e.g. Conger & Elder, 1994; Conger et al., 1994), the focus of the present study will be on associations between maternal depression and subsequent parenting. Maternal depression has been consistently associated with lower levels of positive, sensitive parenting, and higher levels of harsh, negative parenting (Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007; Cohn, Campbell, Matias, & Hopkins, 1990; Hoffman, Crnic, & Baker, 2006; Lovejoy et al., 2000; McCullough & Shaffer, 2014). In turn, parenting low in sensitivity and high in harshness has been linked to a variety of negative child outcomes, including lower levels of social competence, academic achievement, and emotion regulation skills, and elevated levels of internalizing and externalizing problems, particularly in early childhood (Belsky & Fearon, 2002; Leerkes, Blankson, & O'Brien, 2009, Dishion et al., 2008). In fact, several, but not all studies (see Shelleby & Shaw, 2014 for review of notable exceptions for families living in poverty), have found parenting to mediate associations between maternal depression and later child outcomes (e.g., NICHD ECCRN, 1999).

When considering associations between maternal depression and parenting, consistent relationships have been established with some variation by child's age and the type of parenting dimension studied. For example, in a meta-analysis of 46 studies linking maternal depressive symptoms to observations of parenting, consistent associations were found, but were strongest for negative parenting (e.g. harsh, rejecting, d = .40), moderate for disengaged parenting (d = .29) and small for positive parenting (d = .16; Lovejoy et al., 2000). Additionally, effect sizes were stronger for mothers of infants compared to mothers of older children (d = .47 for infants vs. .19 for later childhood). Theoretically, it follows that maternal depression might have a greater effect on parenting and subsequent child behavior during early childhood relative to later developmental periods because of the greater physical and psychological demands of rearing

infants and toddlers versus school-age children (Shaw & Bell, 1993). Additionally, child behavior has been shown to be more malleable during early versus later childhood (Reid, 1993). Therefore, advancing our understanding of what conditions might moderate the magnitude of the association between maternal depression and parenting in early childhood is important because of consistent associations between maternal depression and parenting, and between parenting and child outcomes during early childhood, and because understanding the predictors of parenting during this time may also increase our ability to intervene with families. As significant variability exists in the relation between maternal depression and parenting across variations in children's developmental status, it is likely that other child and contextual factors moderate the strength of this association. Two factors which may moderate the association between maternal depression and parenting are the quality of mothers' marital relationship, and temperamental characteristics of the child, specifically child negative emotionality.

1.3 MATERNAL DEPRESSION AND PARENTING: MODERATION BY MARITAL QUALITY

Marital quality has been found to be associated with both positive (Planalp, Braungrat-Rieker, Lickenbrock & Zentall, 2013) and negative (Rhoades et al., 2011) dimensions of parenting. Although reciprocal effects are likely to occur between marital quality and parenting, according to the 'spillover hypothesis,' parents who have happy, supportive marriages are more available to respond to their children with warmth and sensitivity. Conversely, parents in marriages characterized by high levels of negativity and hostility may become emotionally drained and

irritable, decreasing their ability to respond sensitively to their child (Easterbrooks & Emde, 1994). The spillover hypotheses is supported by a meta-analysis of 68 studies, which found a moderate effect (d = .46) of marital quality on parent-child relationship quality (Erel & Burman, 1995). A variation of the spillover hypothesis may also apply to the effect of marital quality on mothers' psychological functioning, as poor marital quality has been found to be subsequently associated with higher levels of maternal depression (Mamun et al., 2009).

Beyond a main effect of marital quality on parenting and maternal depression, however, theory and empirical evidence also support the possibility that marital relationship quality may moderate the association between maternal depression and parenting. According to Belsky's (1984) process model, parenting is influenced by parent and infant characteristics, as well as the broader context in which the parent-child relationship is embedded. In the context of Belsky's model, it is possible that mothers who have warm, supportive partners that are available to help maintain routine and regularity in the household, and possibly serve as a model for positive parenting, may more likely prevent their depressive symptoms from spilling-over and adversely affecting their parenting behavior. Conversely, for mothers in marriages characterized by high levels of hostility, depressive symptoms may be exacerbated and reduce parenting quality.

Although no research to our knowledge has tested whether marital quality may moderate the relationship between maternal depression and parenting, a recent study did find evidence for marital quality moderating the effect of trait negative affect on parenting behavior (Jessee et al., 2010). For mothers who scored high on negative affect (assessed prenatally), observations of high marital quality at child age 3.5 months were positively associated with increases in observed maternal sensitivity from 3.5 to 13 months, while observations of low marital quality were associated with decreases in sensitivity across the same time period. Interestingly, no effect

of marital quality on parenting was found for mothers who were low on trait negative affectivity, indicating that mothers high on this trait may be especially sensitive to the contributions of their marital relationship as it relates to their parenting behavior. Although there are some similarities between trait negative affect and maternal depression, it remains to be determined whether the effect of maternal depression on maternal parenting is likewise moderated by marital quality. Overall, then, both theory and prior research support the exploration of marital quality—both in terms of support and hostility—as it relates to maternal depression and parenting.

1.4 MATERNAL DEPRESSION AND PARENTING: MODERATION BY CHILD NEGATIVE EMOTIONALITY

When researchers began studying temperament in the mid-20th century, temperament was understood as children's susceptibility to emotions, and individual differences in the types of emotions children expressed (Valentine, 1951). Although emotional expression continues to be an important component, the definition of temperament has been refined over the past several decades, and there is general consensus that temperament refers to biologically-based differences in reactivity and behavioral style that are detectable beginning in very early childhood (Sanson, Hemphill, & Smart, 2004; Rothbart & Derryberry, 1981). Although such behavior styles undergo change as a result of interactions with parents and close others, temperament is considered to be more a product of biology and found to be moderately to strongly heritable (Zeanah & Fox, 2004). For example, in a study of negative reactivity in monozygotic and dizygotic twins, 77% of the variance was explained by genetic factors (Bokhorst et al., 2003).

Three broad factors of temperament have been especially well-studied in infancy and

early childhood (Rothbart, 2011). These are surgency (a measure of approach behavior), effortful control (a measure of attentional focusing and inhibitory control), and negative emotionality (Ahadi et al., 1999). All three factors have demonstrated high levels of heritability and have been linked to later child behavioral outcomes (Rothbart, 2011). The third of these factors, negative emotionality, has been particularly studied in relation to both child internalizing and externalizing behavior problems (Rothbart & Bates, 2006; Waldman, Singh, & Lahey, 2006).

Negative emotionality (NE), a core component of temperament, refers to a child's tendency to react to environmental stressors with high levels of emotionality, including irritability, anger, sadness, and fear (Rothbart & Bates, 1998; Paulussen-Hoogeboom, Stams, Hermanns, Peetsma, & Wittenboer, 2008). NE likely shapes the way that children respond to stressors in their environment, which increases their risk for problems involving emotion regulation (Rothbart & Bates, 2006). Indeed, beginning in early childhood, higher levels of NE have been associated with increased risk for later internalizing and externalizing problems (Rothbart & Bates, 1998; Sanson et al., 2004). Additionally, children high on NE may place an added burden on their caregivers, making them more difficult to parent sensitively compared to children who are easier to soothe (Chess & Thomas, 1984). Again, research has found associations between higher levels of NE in early childhood and parent behavior, including increased levels of maternal depressive symptoms (Cutrona, 1986) and decreased warm and increased harsh parenting (Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma, 2007).

In addition to direct associations between child NE and both maternal depressive symptoms and parenting behavior, NE may moderate the magnitude of the association between maternal depressive symptoms and maternal parenting. Again, within the context of Belsky's

model on the determinants of parenting, a child with higher levels of NE would likely require greater patience, energy, and resources from his or her mother compared to a child who is more affectively regulated. In this context, maternal depressive symptoms may be more strongly associated with more harsh and less supportive parenting.

No studies have examined child NE as a moderator of maternal depressive symptoms and parenting during early childhood. Prior research has, however, explored relationships among these variables, and indicated the importance of child temperament as it relates to maternal depression, parenting, and child outcomes. Jesse and colleagues (2010) found that child surgency and NE assessed at age 5 and measured using multiple informants and methods, were found to moderate the association between maternal depressive symptoms and child conduct problems, such that in the context of higher surgency and NE, maternal depressive symptoms were more strongly associated with child conduct problems. Findings from Jessee et al. (2010), albeit not including parenting as a dependent variable, suggest that children with high NE might amplify relations between maternal depression and other family interactions, including parenting.

1.5 CHILD NEGATIVE EMOTIONALITY AND PARENTING USING AN ADOPTION DESIGN

Although it makes theoretical sense that child NE may exacerbate the parenting difficulties of a depressed mother, it is possible that high NE in the child may be the result of prior problematic parenting or genetic continuity in NE. As the rearing environment of adopted children is independent of the genetic contributions they received from their birth parents, the use of an adoption design increases our ability to separate properties of the child from properties of his or

her environment. Prior work with adoptive samples has found linkages among birth mother characteristics, child behavior, and adoptive mother parenting. Ge and colleagues (1996) conducted a study of 41 families of adolescent children who had been adopted at birth. Birth mother substance abuse and antisocial behavior were associated with higher levels of adoptive mother harsh parenting and lower levels of adoptive mother nurturant parenting, and this association was mediated by antisocial and hostile behaviors of adopted children. Results of this study are consistent with an understanding of child temperament as a precipitant of changes in parenting behavior.

The present study benefits from using an adoption design, which will allow the exploration of how genetic contributions of the birth mother may interact with adoptive mother depressive symptoms, as expressed by individual differences in child NE. Prior research with the Early Growth and Development Study (EGDS) sample has found that both birth mother antisocial behavior and depressive symptoms are related to negative emotional and behavioral outcomes among adopted children (Kerr et al., 2013; Pemberton et al., 2010). The present study will examine links between birth mother NE and child NE to better understand whether potential child NE moderation on the association between adoptive mother depressive symptoms and parenting is due to genetic contributions from birth mothers.

In considering links between NE in birth mothers and their adopted children, it is worthwhile to consider the stability of temperament over time and the relationship between early child temperament and adult personality. Although temperament has been presumed to be relatively stable across development, there is some evidence that it may not be as stable as once thought, especially during periods of rapid change, such as in infancy and early childhood (Roberts & DelVecchio, 2000). Rothbart (2011) cites evidence that temperamental measures of

NE in infancy were predictive of self-reported measures of NE in adulthood, providing some evidence of the stability of NE over time (Bohlin & Hagekull, 2008). It is also important to consider whether measures of temperament in infancy capture the same construct as measures of temperament in adulthood. Rothbart and colleagues have argued that temperament is a subdomain of personality, which shapes individual differences on standard personality measures such as the Big Five and Five Factor Model (FFM; Evans & Rothbart, 2007; Rothbart, 2011). Rothbart's Adult Temperament Questionnaire (ATQ; Rothbart, Ahadi, & Evans, 2000), used to measure birth mother negative emotionality in this study, was carefully designed to capture adult temperament, rather than more general measures of adult personality. Still, it is important to acknowledge that NE as measured by the ATQ has been significantly linked to the personality trait of neuroticism on both the Big Five and the FFM (Rothbart, 2011).

1.6 PRESENT STUDY

Maternal depression has been consistently associated with higher levels of harsh parenting and lower levels of warm parenting, yet depressive symptoms do not affect the parenting behavior of all mothers uniformly (Lovejoy et al., 2000). As strong relationships exist among maternal depressive symptoms, parenting, and child outcomes, especially during early childhood, exploration of the conditions under which maternal depressive symptoms are associated with more significant disruptions in parenting may increase our ability to reduce and prevent child emotional and behavioral problems. Little research, however, has explored child and contextual factors which may moderate the association between depressive symptoms and parenting. Moreover, because of the use of non-genetically-informed research designs, even less research in

this area has been able to parse genetic from environmental influence in examining moderators of the association between maternal depression and parenting.

Using a genetically-informed sample, the present study sought to fill gaps in the literature by testing two potential moderators of the association between maternal depressive symptoms and parenting during early infancy and the toddler period using a large sample of children who were adopted domestically in the first weeks of life and prospectively followed through age 7. Using observations of both parenting and marital hostility, this study investigated whether marital quality and child NE each moderated the association between symptoms of maternal depression and harsh and warm parenting across three time points in early childhood.

Based on theory and existing literature, primary study hypotheses were:

1. Moderating role of marital quality: Marital quality was expected to moderate the relationship between maternal depressive symptoms and parenting, such that high marital hostility was expected to amplify the magnitude of the association between depressive symptoms and parenting (higher harshness, lower warmth), and high marital support was expected to attenuate the magnitude of associations between depressive symptoms and both harsh and warm parenting.

2. Moderating role of child NE: Child NE was expected to moderate the relationship between maternal depressive symptoms and parenting, such that high child NE was expected to amplify the magnitude of associations between maternal depressive symptoms and subsequent parenting (higher harshness, lower warmth).

3. Moderating role of birth mother NE. It was expected that birth mother NE would also moderate the magnitude of associations between maternal depressive symptoms and parenting in a similar manner as is described in Hypothesis 2. As an exploratory aim, we planned to correlate

birth mother NE with child NE to examine the possibility that moderation of birth mother NE on the association between maternal depressive symptoms and parenting was mediated by child NE.

2.0 METHOD

2.1 PARTICIPANTS

Participants for this study were 561 adoptive families recruited as part of the Early Growth and Development Study, an ongoing, multisite, longitudinal sample of adopted children, adoptive parents, and birth parents (Leve et al., 2007). Recruitment of this sample took place from 2003 to 2010, through rolling enrollment at adoption agencies in the Mid-Atlantic, West/Southwest, and Pacific Northwest (N = 45 agencies in 15 states). Adoption agencies reflected the variable adoption philosophies of the United States, and included public, private, religious, and secular, and both open and closed adoption. Adoptive parents and their infants were eligible to participate if: a) their adoption was domestic, b) the infant was placed within 3 months postpartum (with the vast majority adopted in the first 3 weeks of life), c) the adoptive parents were non-relatives of the infant, d) the infant had no known major medical conditions, and e) the adoptive parents could read and speak English at the eighth grade level. Comparisons of demographic information between families who participated in EGDS (N = 561 families) and those who did not (N = 2,391 families available for analysis) revealed that participating birth parents and adoptive parents were somewhat younger than eligible families who did not participate. As these differences are minor, the EGDS sample appears to be representative of the target population.

The majority of birth mothers who participated in the study were Caucasian (70.1%; African American = 13.3%; Hispanic/Latino = 6.7%; Multi-ethnic = 4.9 %, Other = 5.0%). Birth mothers were an average of 24 years (SD = 6.0 years) at the birth of the adoptive child. The median annual household income for birth mothers was less than $15,000 per year. Roughly half (54.7%) of birth mothers completed high school or earned a high school equivalency degree.

In contrast to birth mothers, adoptive families in this sample were well-resourced and low-risk. Generally speaking, adoptive mothers in this sample were markedly less ethnically-diverse, older, more affluent, and more-well educated than birth mothers. The majority of adoptive mothers are also Caucasian (91.8%; African-American = 3.9%; Hispanic/Latino = 2.0%; Multi-racial = 0.9%; Other = 1.4%). The mean age of adoptive mothers at the time of the child's birth was 37.4 years (SD = 5.6 years) and of adoptive fathers was 38.3 years (SD = 5.8 years). The median annual household income for adoptive parents was >$100,000 per year. Most adoptive mothers (78.8%) reported earning at least a 4-year college degree, with 37% of those also attending graduate school. Similarly, 32% of fathers reported earning a graduate degree. The majority of adoptive parents were married (91.1%) at the time of the child's birth.

Just over half of adoptive children participating in the study were male (57.2 %). The majority of children were Caucasian (55.6%; Multi-racial =19.3%; African American = 13%; Latino = 10.9%). The median age of placement for adopted children was 2 days (M = 6.2, SD = 12.45; range = 0-91 days). See Leve at al., 2013 for additional details regarding study methods.

2.2 PROCEDURE

In-home assessments were conducted with adoptive parents when children were approximately 9, 18, and 27 months old. In-person assessments were conducted with birth parents at approximately 4- and 18-months postpartum, most often in the mothers' home. Interviewers conducting the in-person assessments had completed ≥40 hours of training. During assessments, parents returned completed survey materials that had been mailed to them, participated in computer-assisted interviews, and adoptive parents engaged in a variety of interactions and standardized tasks with their infants. Assessments lasted from 2 to 4 hours, and were videotaped for later coding.

2.3 MEASURES

2.3.1 Maternal depressive symptoms.

Adoptive mother depressive symptoms were measured at 9, 18, and 27 months using the Beck Depression Inventory (BDI; Beck & Steer, 1993). The BDI is well-established and widely-used and measures feelings, cognitions, and physical symptoms related to depression (Beck, 2009). Mothers rated the intensity with which they had experienced 20 depressive symptoms on a scale from 0-3. The suicidal ideation item was not administered to minimize the likelihood that clinical follow-up would be needed (Leve et al., 2010). Internal consistencies for the BDI depression factor were $\alpha = .71$, $\alpha = .79$, and $\alpha = .84$ at 9, 18, and 27 months, respectively.

2.3.2 Observations of marital quality.

During the 9 month assessment, adoptive mothers and fathers participated in a 20-minute marital interaction task. Parents were instructed to discuss a series of topics regarding their relationship. Topics included: what they enjoy doing together, how they met, and what they find the most frustrating about each other and about the relationship. Topics were designed to elicit both positive and negative emotions.

Trained research assistants coded the marital interaction task using the Iowa Family Interaction Rating Scales—Marital Interaction Code (Dogan et al., 2004; Melby et al., 1990). The present study used two scales from the coded observations: the hostility scale and the warmth/support scale. The marital hostility scale measures the degree to which each parent displays behavior that is critical, angry, disapproving, or rejecting toward his or her partner. It includes non-verbal communication (e.g., contemptuous facial expressions, threatening body posture), emotional expression (e.g., sarcastic tone of voice, actively ignoring the other), and content of expression (e.g., critical remarks). The marital warmth/support scale assesses the degree to which each parent expresses liking, care, concern, appreciation, and support for his or her partner. It includes non-verbal communication (e.g., affectionate touch, smiles), support (e.g., encouragement, praise), pro-social behavior (e.g., sensitivity, cooperation), and content (e.g., statements of empathy and affirmation).

Scores on hostility and warmth/support scales ranged from 1-9. Parents were scored individually on hostility and warmth, and scores for each scale were averaged by dyad to better capture the overall functioning of the marital relationship. As observational measures of marital warmth and hostility were only moderately correlated ($r = -.38$), separate analyses were used to test for moderation by marital warmth and moderation by marital hostility. The codes from the

marital interaction task have demonstrated satisfactory reliability in past research, and have been significantly associated with survey-report ratings of marital hostility and quality by self and spouse (Melby, Conger, Ge, & Warner, 1995). Inter-rater reliability for this sample was in the moderate range (Warmth/Support ICC = .62; Hostility ICC = .63).

2.3.3 Parent report of marital quality.

During the 18 month assessment, the Behavior Affective Rating Scale (Melby, Conger, Ge, & Warner, 1995) was used to assess both marital hostility and marital warmth. Using a 7-point likert scale, both parents were asked to report how often in the last year their partner expressed certain emotions or behaviors. The hostility scale included items such as: 'Get angry at you; Criticize you or your ideas; Insult or swear at you; Boss you around a lot.' The warmth/support scale included items such as: 'Listen carefully to your point of view; Help you do something that was important to you; Act loving and affectionate toward you; Ask you for your opinion about an important matter.' Each scale included 13 items (AM Warmth $\alpha = .91$, AM Hostility $\alpha = .89$; AF Warmth $\alpha = .92$ AF Hostility $\alpha = .91$). Adoptive mother and adoptive father scores were significantly correlated (Warmth/Support, $r = .69$, $p < .01$; Hostility, $r = .66$, $p < .001$). Given that scores on the warmth and hostility scales were significantly correlated (AM, $r = -.62$, $p < .001$; AF, $r = -.60$, $p < .001$), warmth and hostility scores were aggregated such that higher scores represented higher levels of warmth relative to hostility. Scores were then averaged by dyad to create a composite.

2.3.4 Birth mother NE.

At 18-months postpartum as part of a questionnaire packet, birth mothers completed the Adult Temperament Questionnaire Short Form (ATQ; Rothbart, Ahadi, & Evans, 2000) as measure of their proneness to negative emotional expression. The ATQ uses 77 items to measure adult temperament in a variety of domains. The current project used four subscales that comprise negative affect (fear, sadness, discomfort, and frustration; $\alpha = .81$).

2.3.5 Child NE.

Child NE was measured at the 9-month assessment using adoptive mother and father report on an abridged version of the 6-month Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979), and during the 18-month assessment using adoptive mother and father report on an abridged version of the 13- month ICQ. The ICQ consists of 24-items, which parents rated on a 7-point scale, with 7 indicating a very difficult temperament. The current project used the sum of 6 items which comprise the fussy-difficult scale (AM, $\alpha = .81$; AF, $\alpha = .82$) at 9 months, and the sum of 6 items which comprise the fussy-difficult-demanding scale (AM, $\alpha = .82$; AF, $\alpha = .82$) at 18 months. Adoptive mother and adoptive father reports of child fussiness were correlated at both time points (9 months, $r = .68$, $p < .001$; 18 months, $r = .64$, $p < .001$), and were averaged by dyad to compute each child's NE score.

2.3.6 Observations of maternal parenting.

Adoptive maternal parenting behavior was observed during a 3-minute mother-child teaching task, administered at the 18 month assessment. Mother-child dyads were provided with two puzzles for the child to solve: placing four rings on a pole and putting together an airport puzzle. Mothers were encouraged to let children to solve the puzzles on their own, but could offer help as they saw fit. Experimenters left the room during the interaction, and the task was video recorded for later coding.

Parenting behavior was coded by trained research assistants who were blind to study hypotheses using the Iowa Family Interaction Rating Scales (Melby et al., 1990). The present study used the scales for maternal warmth/support and maternal hostility as measures of parenting behavior. The maternal warmth scale measures the degree to which the mother has a favorable reaction to, takes interest in, and enjoys being with her child. It includes non-verbal communication (e.g., kissing, eye contact), emotional expression (e.g., laughing, smiling), responsiveness (e.g., showing interest), and content (what mother actually says to child). Maternal harsh parenting was captured using the hostility scale, which measures the degree to which the mother displays angry, critical, disapproving, or rejecting behavior toward her child. It includes non-verbal communication (e.g., angry facial expressions, threatening body posture), emotional expression (e.g., denying needs, sarcastic tone of voice), and content of expression. As a preliminary dataset was used in analyses for the present study, reliability has not yet been established. However, ICCs for maternal warmth/support and maternal hostility at 9 months, using the same coding system, are .85 and .55.

2.3.7 Parent report of maternal parenting.

During the 27 month assessment, mothers and their partners filled out a questionnaire to measure mothers' warmth and hostility toward her child (Iowa Youth and Families project family interaction rating scales; Melby & Conger, 2001). Adoptive parents each completed the 9-item questionnaire by rating aspects of warmth (e.g., act loving and affectionate toward [child]; 4 items) and hostility (e.g., shout or yell at [child] because you were mad at him/her; 5 items) displayed toward the target child within the past month. Parents used a 7-point scale to respond to each question. Mothers and fathers reported on mothers' parenting behavior, and because they were significantly correlated (warmth, $r = .90$; hostility, $r = .74$), were averaged to generate a composite (warmth, $\alpha = .93$; hostility, $\alpha = .89$).

2.3.8 Demographics.

Basic demographic information was collected from parents at the 9 month assessment, including child sex, parent age, family income, openness of adoption, and obstetric complications. Obstetric complications were considered as a covariate because of their potential effects on child NE. Obstetric complications were reported on by birth mothers when children were 4 months old. Birth mothers used a pregnancy screener and calendar method to report on complications during pregnancy (e.g., illness), labor and delivery (e.g., cord complications), and the neonatal period (e.g., prematurity). Openness of adoption was included to control for similarities between adoptive parents and birth parents which may result from knowledge and contact among families.

2.4 DATA ANALYTIC PLAN

To assess the study's primary hypotheses, analyses were conducted using OLS multiple regression in SPSS. To rule out potential "third variable" explanations, in all analyses the following covariates were considered: openness of adoption, child sex, parent age, family income, and obstetric complications. Covariates were entered prior to the entry of primary independent variables (i.e., maternal depressive symptoms) and moderating variables (e.g., marital quality, child temperament, birth mother temperament) in regression equations. To test for moderation of marital quality or child/birth mother negative emotionality on warm and harsh parenting, independent variables were entered hierarchically, with covariates entered in Step 1, maternal depressive symptom scores entered in Step 2, the moderator variable (marital quality or child/birth mother NE) entered in Step 3, followed by the given interaction term (e.g., depressive symptoms * marital quality) in Step 4. Significant interaction terms were probed by assessing overall model fit and the beta values of the interaction terms, and then plotting the interactions (without covariates) and examining the values of the simple slopes, as described in Cohen, Cohen, West & Aiken (2003). Independent variables were centered before interaction terms were probed. As warm and harsh parenting were found to be only moderately correlated in the current sample ($rs_{18mo} = .01$, $rs_{27mo} = -.36$, $p < .01$), separate analyses were conducted for warm and harsh parenting.

3.0 RESULTS

3.1 DESCRIPTIVE STATISTICS AND UNIVARIATE CORRELATIONS

Descriptive statistics and bivariate correlations among primary study variables are reported in Tables 1 and 2, respectively. Both the BDI and the ICQ (to measure child NE) have been commonly used in other studies, which facilitates comparison to other samples. Adoptive mothers in this sample had mean score of 3.64 (SD = 3.26) on the BDI at 9 months, and a mean score of 3.81 (SD = 3.83) on the BDI at 18 months. This is well below the cutoff score of 10 that Beck suggested was indicative of mild depression (Beck & Beamesderfer, 1974). Therefore, adoptive mothers in this sample were generally reporting very low levels of depressive symptoms. Adoptive children's scores on the difficultness factor of the ICQ at 9 months (M = 16.27, SD = 4.58) and 18 months (M = 28.92, SD = 6.24) were similar to those reported in a normative community sample (M6mo = 17.77, SD = 5.88, M13mo = 28.64, SD = 6.24; Bates, 1992). Maternal depressive symptoms, marital quality, and child NE at 18 months were all correlated with both harsh and warm parenting at 27 months, in expected directions. However, none of the predictor variables at 9 months were correlated with either harsh or warm parenting at 18 months. As adequate variability existed in the distribution of warm parenting scores at 18 months, we continued with moderation analyses as planned, despite the lack of bivariate correlations between predictor and outcome variables. However, as examination of the harsh

parenting data at 18 months revealed that 99% of the videos had a score of "1" on the 9-point hostility scale, this observed measure of harsh parenting was not used in analyses. Birth mother NE was not related to adoptive parent reports of child NE at 9 or 18 months.

Bivariate correlations among primary study variables and proposed covariates are presented in Table 3. To simplify the models we computed, only covariates that were significantly correlated with independent or dependent variables were included in regression equations.

Table 1. Descriptive Statistics for Primary Study Variables

Measure	Range	Mean	SD
Report			
Adoptive Mother BDI (9 mo.)	0-17	3.64	3.26
Marital Quality (9 mo.)	-28-49.5	25.95	12.46
Child NE (9 mo.)	6.5-34.0	16.27	4.58
Adoptive Mother BDI (18 mo.)	0-25	3.81	3.83
Marital Quality (18 mo.)	-40.5-48.5	22.31	13.92
Child NE (18 mo.)	12.5-48.5	28.92	6.24
Birth Mother NE (18 mo.)	1.62-6.19	3.98	.74
Warm Parenting (27 mo.)	16-28	25.55	2.42
Harsh Parenting (27 mo.)	5-19.5	8.68	2.47
Observational			
Marital Warmth (9 mo.)	1-9	6.89	1.53
Marital Hostility (9 mo.)	1-7	1.43	.85
Warm Parenting (18 mo.)	3-9	6.37	1.19
Harsh Parenting (18 mo.)	1-3	1.01	.14

Table 2. Variable Correlations

	1	2	3	4	5	6	7	8	9	10	11	12
1. AM BDI (9 mo.)	-	-	-	-	-	-	-	-	-	-	-	-
2. Marital Warmth (9 mo.)	.02	-	-	-	-	-	-	-	-	-	-	-
3. Marital Hostility (9 mo.)	.05	-.39**	-	-	-	-	-	-	-	-	-	-
4. Marital Quality (9 mo.)	-.23**	.35**	-.29**	-	-	-	-	-	-	-	-	-
5. Child NE (9 mo.)	.13**	.00	-.04	-.12*	-	-	-	-	-	-	-	-
6. AM BDI (18 mo.)	.62**	.01	.11*	-.22**	.09	-	-	-	-	-	-	-
7. Marital Quality (18 mo.)	-.21**	.30**	-.26**	.87**	-.10*	-.29**	-	-	-	-	-	-
8. Child NE (18 mo.)	.09*	-.03	.02	-.15**	.63**	.11*	-.14**	-	-	-	-	-
9. Birth Mother NE (18 mo.)	.01	.00	-.01	-.03	.07	.03	-.05	.01	-	-	-	-
10. Warm Parenting (18 mo.)	-.04	.01	.02	.02	-.06	.01	.00	-.10	.02	-	-	-
11. Harsh Parenting (18 mo.)	.09	.01	.10	-.07	-.03	.03	-.06	-.03	.05	.01	-	-
12. Warm Parenting (27 mo.)	-.11*	.07	-.03	.22*	-.23**	-.14**	.19**	-.24**	.05	.10	.02	-
13. Harsh Parenting (27 mo.)	.17**	-.02	.05	-.21**	.20**	.23**	-.14**	.24**	-.04	-.04	.08	-.36**

Note. $*p < .05$, $**p < .01$.

Table 3. Bivariate Correlations among Primary Study Variables and Covariates

	Child Gender	AM Age	Adoption Openness	Income	Obstetric Complications
1. AM BDI (9 mo.)	-.03	.10*	.07	-.07	-.06
2. Marital Warmth (9 mo.)	-.02	-.01	.05	.02	-.03
3. Marital Hostility (9 mo.)	.00	.03	-.06	.00	.00
4. Marital Quality (9 mo.)	-.01	-.18**	.02	.04	-.05
5. Child NE (9 mo.)	-.07	.00	.01	-.11*	-.06
6. AM BDI (18 mo.)	-.06	.05	.09*	-.08	-.05
7. Marital Quality (18 mo.)	.01	-.18**	.00	.03	-.10*
8. Child NE (18 mo.)	-.06	.07	.06	.02	-.03
9. Birth Mother NE (18 mo.)	.06	.10*	.12*	-.05	.16**
10. Warm Parenting (18 mo.)	-.07	.04	.09	.07	.07
11. Harsh Parenting (18 mo.)	.06	.01	.10	-.04	.07
12. Warm Parenting (27 mo.)	.07	-.05	-.04	.07	.05
13. Harsh Parenting (27 mo.)	-.05	-.06	-.12*	-.02	-.07

Note. $*p < .05$, $**p < .01$.

3.2 MODERATION BY MARITAL QUALITY

To test the hypothesis that higher levels of marital hostility would increase the strength of the association between maternal depressive symptoms and higher harsh parenting and lower warm parenting, and that higher levels of marital support would decrease the strength of the association between maternal depressive symptoms and parenting, a series of hierarchical regressions was performed, examining data between 9 and 18 months, and between 18 and 27 months (see Figure 1). After entering parent age as a covariate, the first model used 9 month maternal depressive symptom scores to predict 18 month warm parenting, moderated by 9 month observations of marital warmth and marital hostility. To increase methodological consistency across analyses (i.e., integrating observational and questionnaire measures), a follow-up model was computed, identical to the model just described except that parents reports of marital quality—computed the same way as the 18-month marital quality report measure—were substituted for observed measures in assessing moderation. For models tested using 9-month maternal depressive symptoms and 18-month parenting, neither the model using the 9-month measure of observed marital warmth nor the model using observed marital hostility as a moderator was significant. Coefficients and model fit statistics are presented in Table 4. Substituting parents' reports of marital quality for the observed measures of marital quality did not substantially improve fit, and the model remained non-significant.

To test the same model later in development, we used maternal report of depressive symptoms at 18 months, parents' reports marital quality at 18 months (with higher scores reflecting higher levels of warmth relative to hostility), and parents' report of maternal warm parenting at 27 months, as well as correlated covariates (parent age, adoption openness, obstetric complications). This yielded a significant overall model, but marital quality failed to moderate

the association between maternal depressive symptoms and maternal warm parenting from 18 to 27 months. It is worth noting, however, that marital quality was a significant positive predictor of maternal warm parenting controlling for maternal depressive symptoms at 18 months. Coefficients and model fit statistics are presented in Table 5.

Using the same procedures but substituting harsh parenting for warm parenting as the dependent variable at 27 months (see Table 5), again the overall model was significant, and marital quality was a marginally significant moderator of the association between maternal depressive symptoms and harsh parenting ($p = .051$). Surprisingly, the direction of this moderation differed from our hypothesis—the association between maternal depressive symptoms and harsh parenting was strongest for mothers with the highest levels of marital quality ($B = .20$, $SE = .05$, $p < .001$). For mothers with the lowest levels of marital quality, the association between depressive symptoms and harsh parenting was non-significant ($B = .06$, $SE = .04$, $p = .14$; see Figure 2).

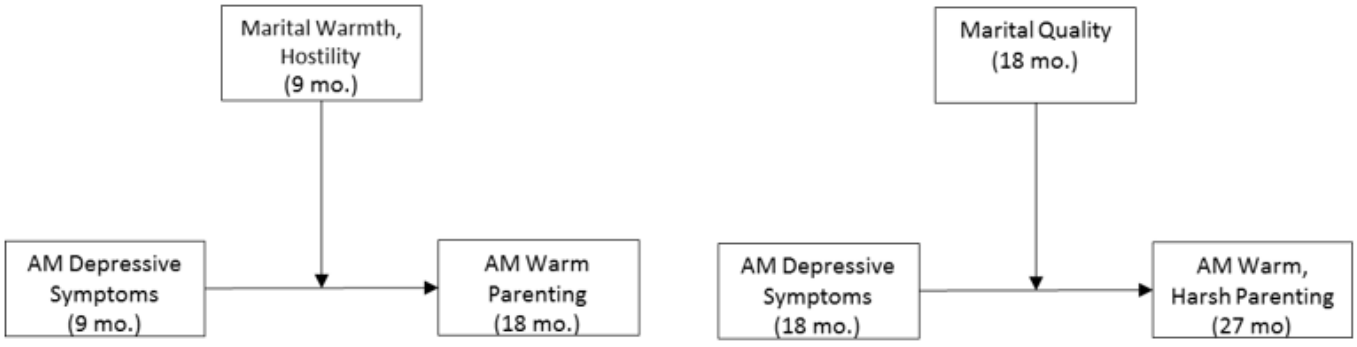

Figure 1. Moderation by Marital Quality

Table 4. Regression: Depressive symptoms (9 mo.) predicting warm parenting (18 mo.) moderated by marital warmth (9 mo.) and marital hostility (9 mo.), respectively

	Marital Warmth			**Marital Hostility**		
	B(SE)	**β**	**R^2 Change**	**B(SE)**	**β**	**R^2 Change**
Constant	6.12(.63)			6.13(.54)		
AM Age	.01(.01)	.03	.00	.01(.01)	.03	.00
CES-D	-.02(.03)	-.06	.00	-.02(.03)	-.06	.00
MQ	.00(.05)	.00	.00	-.02(.11)	-.01	.00
Interaction	.00(.00)	.04	.00	.01(.01)	.05	.00
F	.23			**F**	.26	
R	.06			**R**	.06	
R^2	.00			**R^2**	.00	

Table 5. Depressive symptoms (18 mo.) predicting warm parenting (27 mo.) and harsh parenting (27 mo.) moderated by marital quality (18 mo.)

	Warm Parenting			Harsh Parenting		
	B(SE)	**β**	**R^2 Change**	**B(SE)**	**β**	**R^2 Change**
Constant	25.03			8.79(.12)		
Openness	-.03(.13)	-.01	.01	-.35(.13)**	-.13	.03*
AM Age	-.01(.02)	-.01		-.05(.02)*	-.10	
Obstetric	.13(.09)	.07		-.10(.10)	-.05	
CES-D	-.07(.05)	-.11	.02*	.14(.04)**	.20	.04**
MQ	.03(.01)*	.15	.03**	-.02(.01)*	-.13	.01*
Interaction	.00(.00)	.05	.00	.00(.00)$^+$	.10	.01$^+$
F	3.50**			**F**	6.00**	
R	.22			**R**	.29	
R^2	.05			**R^2**	.09	

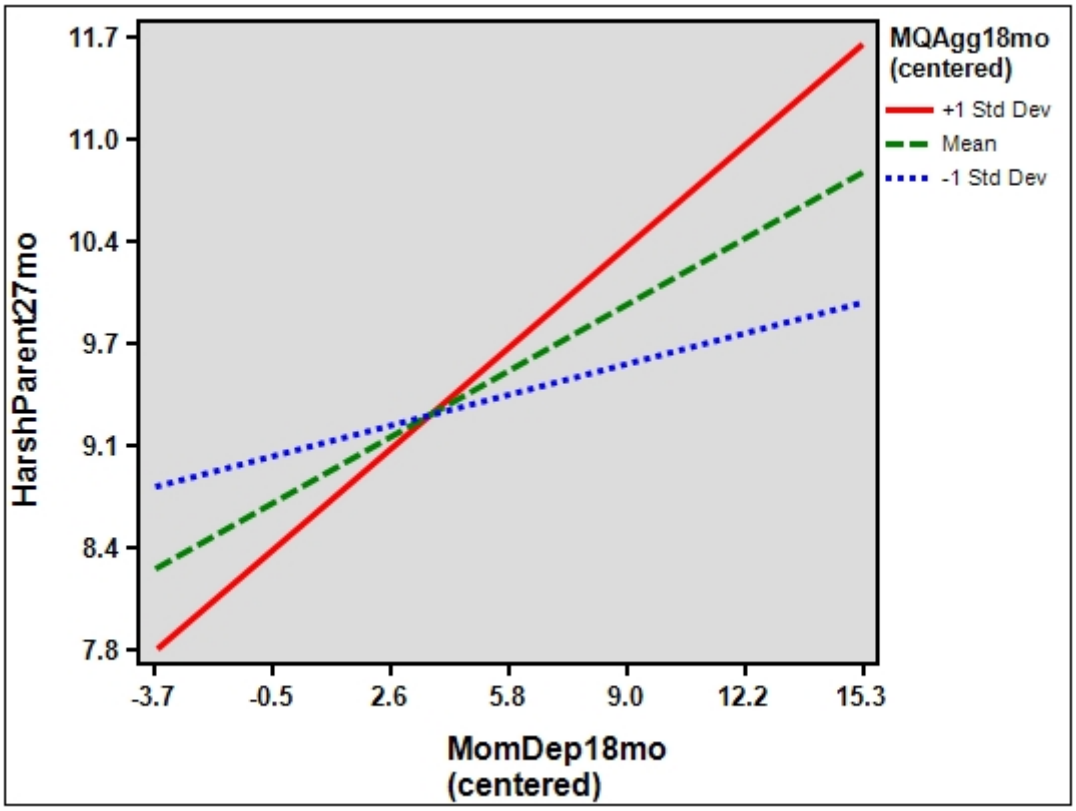

Figure 2. Moderating role of martial quality on the association between adoptive mother depressive symptoms and adoptive mother harsh parenting

3.3 MODERATION BY CHILD NEGATIVE EMOTIONALITY

To test the hypothesis that high levels of child NE would increase the strength of the association between maternal depressive symptoms and higher harsh parenting and lower warm parenting, a

series of hierarchical regressions was computed examining data between 9 and 18 months and between 18 and 27 months, as shown in Figure 3. After parent age was entered as a covariate, the first model used 9-month maternal depressive symptom scores to predict 18-month observations of warm parenting, moderated by 9-month adoptive parent report of child NE. The overall model was not significant, and there were no significant direct or interactive effects Coefficients and model fit statistics are presented in Table 6.

To test the same model later in development—with adoption openness as a covariate—we used maternal report of depressive symptoms at 18 months, 18-month adoptive parent report of child NE, and parent reports of maternal warm parenting at 27 months. The overall model was significant, but child NE did not moderate the association between maternal depressive symptoms and maternal warm parenting (Table 7). Child NE was, however, a significant negative predictor of warm parenting, controlling for 18-month maternal depressive symptoms.

Using the same procedures but substituting harsh parenting for warm parenting at 27 months, again the overall model was significant, and child NE was a marginally significant predictor of the association between maternal depressive symptoms and harsh parenting (Table 7). In line with our hypothesis, the association between maternal depressive symptoms and harsh parenting was significant when child NE was at the mean ($B = .12$, $SE = .03$, $p < .001$) or one standard deviation above the mean ($B = .18$ $SE = .05$, $p < .001$). In contrast, for mothers with children reported low on NE (one standard deviation below the mean), the association between maternal depressive symptoms and harsh parenting was not significant ($B = .06$, $SE = .05$, $p = .28$; see Figure 4). Additionally, both maternal depressive symptoms and child NE were significant positive predictors of maternal harsh parenting controlling for one another.

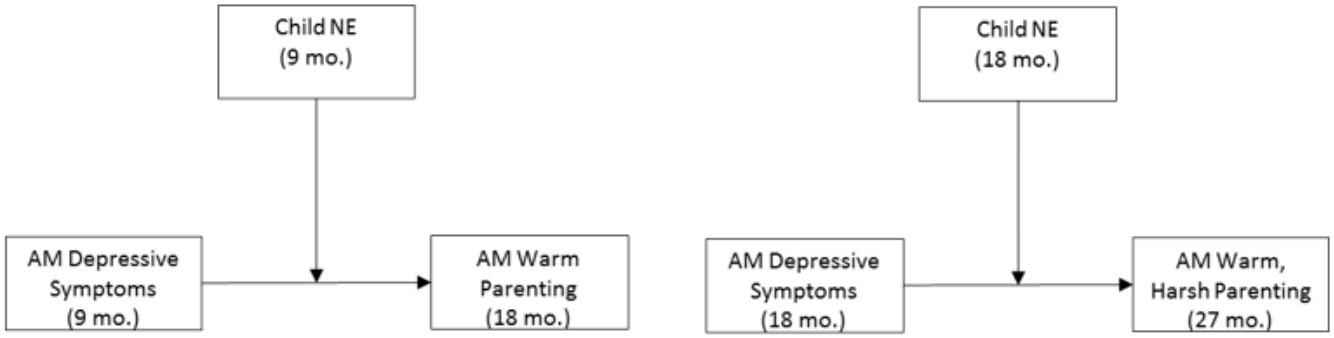

Figure 3. Moderation by child negative emotionality

Table 6. Regression: Depressive symptoms (9 mo.) predicting warm parenting (18 mo.) moderated by child negative emotionality (9 mo.)

	B(SE)	β	R^2 Change
Constant	6.65(.66)		
AM Age	.01(.01)	.02	.00
CES-D	-.06(.08)	-.15	.00
Child NE	-.03(.03)	-.11	.00
Interaction	.00(.00)	.15	.00
F	.46		
R	.08		
R^2	.01		

Table 7. Regression: Depressive symptoms (18 mo.) predicting warm parenting (27 mo.) and harsh parenting (27 mo.) moderated by child negative emotionaliy (18 mo.)

	Warm Parenting			Harsh Parenting		
	B(SE)	**β**	**R^2 Change**	**B(SE)**	**β**	**R^2 Change**
Constant	28.74(.82)			8.70(.12)		
Openness	-.02(.13)	-.01	.00	-.38(.13)**	-.14	.02*
CES-D	-.18(.17)	-.26	.02**	.13(.03)**	.18	.05**
Child NE	-.10(.03)**	-.26	.05**	.09(.02)**	.22	.05**
Interaction	.00(.01)	.17	.00	.01(.01)$^+$	.08	.01$^+$
F	7.70**			**F**	12.01**	
R	.27			**R**	.34	
R^2	.07			**R^2**	.11	

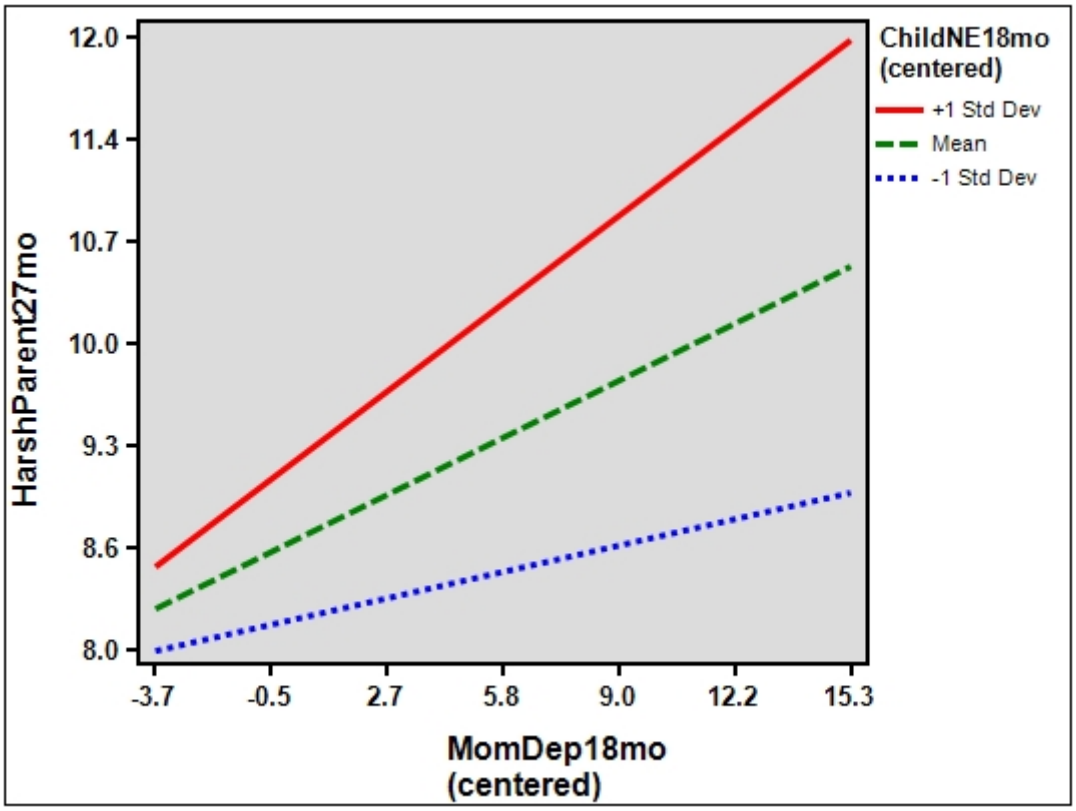

Figure 4. Moderating role of child negative emotionality on the association between adoptive mother depressive symptoms and adoptive mother harsh parenting

3.4 MODERATION BY BIRTH MOTHER NEGATIVE EMOTIONALITY

To test the hypothesis that high levels of birth mother NE would increase the strength of the association between maternal depressive symptoms and higher harsh parenting and lower warm parenting, a series of hierarchical regressions was computed examining data between 9 and 18 months, and between 18 and 27 months (see Figure 5). After entering correlated covariates (parent age, adoption openness, obstetric complications), the first model used maternal report of depressive symptoms at 9 months to predict observations of warm parenting at 18 months,

moderated by birth mother self-report of NE at 18 months. The overall model was not significant, and there were no direct or interactive effects. Coefficients and model fit statistics are presented in Table 8.

Using correlated covariates (parent age, adoption openness), maternal report of depressive symptoms at 18 months, birth mother self-report of NE at 18 months, and parental report of warm parenting at 27 months to test the same model at a later developmental period yielded a non-significant model, with no direct or interactive effects (Table 9).

Using the same procedures, but substituting harsh parenting for warm parenting at 27 months, the overall model was significant, but birth mother NE did not moderate the association between adoptive mother depressive symptoms and harsh parenting (Table 9).

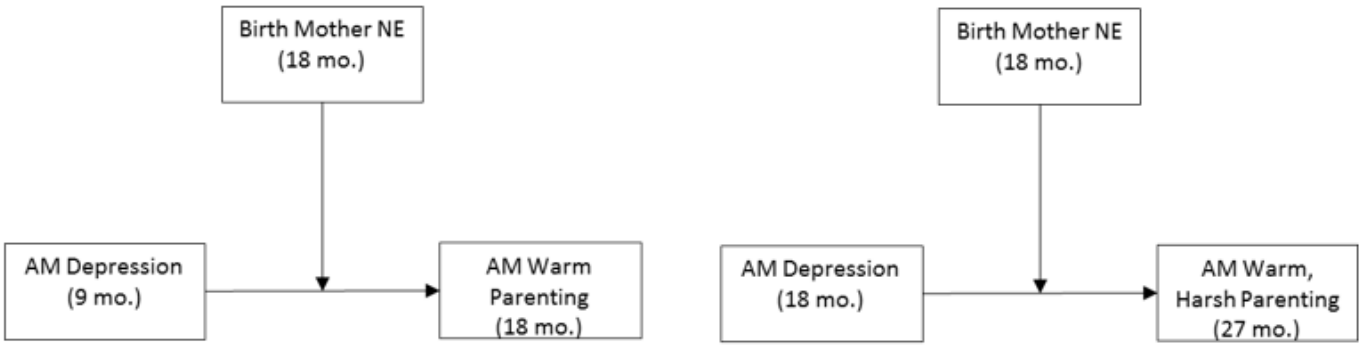

Figure 5. Moderation by birth mother negative emotionality

Table 8. Regression: Depressive symptoms (9 mo.) predicting warm parenting (18 mo.) moderated by birth mother negative emotionality (18 mo.)

	B(SE)	β	R^2 Change
Constant	5.91(.89)		
AM Age	.01(.02)	.05	.02
Openness	.14(.09)	.11	
Obstetric	.05(.06)	.06	
CES-D	-.02(.14)	-.06	.00
BM NE	.00(.17)	.00	.00
Interaction	.00(.03)	.00	.00
F	.78		
R	.14		
R^2	.02		

Table 9. Regression: Depressive symptoms (18 mo.) preditcing warm parenting (27 mo.) and harsh parenting (27 mo.) moderated by birth mother negative emotionality (18 mo.)

	Warm Parenting			Harsh Parenting		
	B(SE)	β	R^2 Change	B(SE)	β	R^2 Change
Constant	25.34(1.28)			10.62(1.37)		
AM Age	-.02(.02)	-.06	.01	-.03(.03)	-.06	.02**
Openness	-.08(.14)	-.03		-.43(.14)**	-.16	
CES-D	.08(.19)	.13	.02*	-.12(.23)	-.17	.07**
BM NE	.35(.26)	.11	.00	-.38(.28)	-.11	.00
Interaction	-.04(.05)	-.27	.00	.07(.06)	.45	.01
F	2.06^{+}			**F**	7.00**	
R	.17			**R**	.31	
R^2	.03			**R^2**	.09	

3.5 MEDIATED MODERATION

Testing of the hypothesis that moderation of birth mother NE on the association between maternal depressive symptoms and parenting would be mediated by child NE was contingent upon finding 1) a statistically significant correlation between birth mother NE at 18 months and adoptive-parent ratings of child NE at both 9 and 18 months, and 2) significant moderation of both birth mother NE and child NE on associations between maternal depressive symptoms and parenting. As neither of these requirements were met, we did not proceed with these analyses.

4.0 DISCUSSION

The present study was novel in examining the possible moderating role of marital quality and early child negative emotionality in predicting associations between maternal depressive symptoms and later maternal parenting. Although the data revealed some direct associations between depressive symptoms, marital quality, child NE, and parenting behavior, moderation was not evident with the exception of two marginal trends. Generally speaking, then, study hypotheses were not supported. Specifically, we found no evidence that marital quality moderated the association between maternal depressive symptoms and warm parenting and only weak evidence that marital quality moderated the association between depressive symptoms and harsh parenting. Similarly, we found no evidence that child NE moderated the association between maternal depressive symptoms and warm parenting, and only weak evidence that child NE moderated the association between depressive symptoms and harsh parenting. We found no evidence for direct or interactive effects of birth mother NE on adoptive mother parenting behavior, and thus did not test a mediated moderation model.

4.1 MODERATION BY MARITAL QUALITY

Overall, this study did not find support for the hypothesis that marital quality would moderate the association between maternal depressive symptoms and warm and harsh parenting. Between 9

and 18 months no significant associations were evident between maternal depressive symptoms and parenting or marital quality and parenting, whether marital quality was assessed observationally or by parents' report. The lack of significant associations could be due, in part, to the low variability in observed warm and harsh parenting, as well as in depressive symptoms. Adoptive parents in this sample tended to display high levels of warmth and very low levels of hostility in interacting with their children during the observations at 18 months. Additionally, relatively few mothers reported even mild depression at 9 months (M = 3.64, SD = 3.26; scores of 10-18 represent mild depression). Based on the low levels of variability in both predictor and outcome variables, it is not surprising that analyses failed to yield significant results.

Another possibility for the lack of significant associations may relate to the low-risk status of this sample. The majority of studies examining associations between depressive symptoms and parenting have been carried out with mothers who are experiencing a variety of risk factors (e.g., low-income, minority, single, history of mental health problems), in addition to their depressive symptoms (Campbell et al., 1992; Morgan, Shaw, & Forbes, 2014; Weaver et al., 2008). Studies such as the current one, examining relations between maternal depressive symptoms among a sample of well-off, well-educated, primarily white, stably married women are relatively rare (Campbell et al., 1992., Goodman et al., 1993) and may yield a different pattern of results compared to high risk samples. For example, Campbell and colleagues (1995) explored associations between clinical depression and mother-infant interactions among a sample of married, middle-class, first-time mothers. Among mothers with transient depression (i.e., lasting less than 6 months), no differences were found in positive or negative mother-child interaction across multiple contexts between depressed and non-depressed mothers. Only when depression persisted into the 6-month follow-up was there a decrease in positive mother-infant interactions

for depressed compared to non-depressed mothers. This finding contrasts with studies of higher-risk samples, which have found significant associations between transient, sub-clinical depressive symptoms and concurrent maternal parenting behavior (Lovejoy et al., 2000). Therefore, it is possible that depressive symptoms are more strongly linked to later parenting more reliably in the context of other acute and chronic stressors (e.g., those associated with poverty, recent parental separation, living with a parent with severe mental illness), which are more likely to be present in high-risk samples (Radke-Yarrow & Klimes-Dougan, 2002).

In contrast to findings from 9 to 18 months, associations among these variables from 18 to 27 months were somewhat stronger. Although we did not find evidence of moderation by marital quality on the association between depressive symptoms at 18 months and warm parenting at 27 months, parent report of marital quality at 18 months was a significant positive predictor of maternal warm parenting at 27 months (as reported on by parents), controlling for maternal depressive symptoms. These data suggest that marital quality is an important predictor of maternal warm parenting during the toddler period after accounting for maternal depression at 18 months. Indeed, when marital quality was entered into the model, maternal depressive symptoms were no longer a predictor of warm parenting, indicating that marital quality may be a more potent predictor of warm parenting than maternal depression during this time, at least among a sample of adoptive parents that have only modest rates of maternal depressive symptoms. Although little research has explored the relative impact of marital quality and maternal depressive symptoms, these findings corroborate past theory and studies indicating that marital quality is associated with parenting behavior, and parent-child relationship quality, more generally (Erel & Burman, 1995; Kouros et al., 2014; Planalp, Braungrat-Rieker, Lickenbrock & Zentall, 2013). That we found significant main effects on parenting at 27 months but not 18

months is somewhat puzzling, but may be due to the increased difficulty of parenting a two-year-old compared to an infant (e.g., Shaw & Bell, 1993), as discussed in more detail below.

In addition to finding a direct association between marital quality and subsequent harsh parenting, marital quality was a marginally significant moderator of the association between maternal depression and harsh parenting from 18 to 27 months, although not in the hypothesized manner. When the interaction was probed without covariates , the association between maternal depressive symptoms and harsh parenting was significant only when marital quality was at or above the mean; when marital quality was below the mean, the association between maternal depressive symptoms and harsh parenting was non-significant. This pattern of results seems counterintuitive, and should be interpreted with caution as the interaction was only marginally significant. Still, one possibility is that when mothers in high-quality marital relationships experience depressive symptoms, they are willing and able to rely on their spouses to take over the majority of parenting responsibilities. Although this may benefit the child, these mothers are then deprived of learning opportunities to resist harsh parenting even when they are feeling down and depressed. Therefore, these mothers may be less well-equipped to parent when they are depressed compared to modestly depressed mothers who do not feel they can rely on their spouse, and must "push through" the depressive symptoms and parent their child anyway.

4.2 MODERATION BY CHILD NEGATIVE EMOTIONALITY

Overall, the data did not support the hypothesis that child NE would moderate the association between maternal depressive symptoms and warm and harsh parenting. In fact, analyses between 9 and 18 months did not find evidence for any associations between maternal depressive

symptoms, child NE, and warm parenting. Low levels of variability in both maternal depressive symptoms at 9 months and in parenting behavior at 18 months likely contribute to the lack of significant results. Additionally, as mentioned for findings regarding depressive symptoms and marital quality, above, it is possible that the low-risk status of this sample relates to our inability to find evidence for moderation by child NE. Perhaps the mothers in this sample—being in fairly affluent, stable, two-parent families—were sufficiently well-resourced that their child's negative affect did not significantly impact their parenting, either directly or in interaction with their depressive symptoms, at least through infancy and the beginning of toddlerhood. This explanation is consistent with Crockenberg's (1986) theory that mothers of middle- to high-SES backgrounds are better able to adapt their parenting behavior to respond to difficult infants than are low-SES mothers, and has been supported empirically as well: a meta-analysis of 62 studies found stronger effects of child NE on parenting in low-SES compared to middle- or high-SES families (Paulussen-Hoogeboom, 2007).

Again, evidence for associations among these variables from 18 to 27 months was somewhat stronger. Although child NE did not moderate the association between maternal depressive symptoms and warm parenting, child NE was a significant negative predictor of warm parenting, controlling for maternal depressive symptoms. These data point to the important evocative role that a child's NE may play in reducing parenting quality, above and beyond mothers' symptoms of depression (Paulussen-Hoogeboom et al., 2008; Troutman et al., 2012).

Child NE also was a marginally significant moderator of the association between maternal depressive symptoms and harsh parenting. When the interaction was probed without covariates , the pattern of results was consistent with our hypothesis. Specifically, in the context of high child NE, the association between maternal depressive symptoms and harsh parenting

was the strongest; in the context of low child NE, the association between maternal depressive symptoms and harsh parenting was not significant. Although this effect was only marginally significant and, as such, should be interpreted with caution, this pattern of results is consistent with the notion that a child with higher levels of NE likely requires greater patience, energy, and resources from his or her mother compared to a child who is more affectively regulated, thus magnifying the impact of maternal depressive symptoms on harsh parenting (Chess & Thomas, 1984; Jesse et al., 2010). Finally, both maternal depressive symptoms and child NE were significant negative predictors of maternal harsh parenting, controlling for one another. This is consistent with past research demonstrating links between maternal depression and harsh parenting (Lovejoy et al., 2000; McCollough & Shaffer, 2014) and child NE and harsh parenting (Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma, 2007) in early childhood.

That we found direct effects and weak evidence of interactive effects of child NE at 27 months but not at 18 months is somewhat consistent with past literature. For example, Lee and Bates (1985) found that infant "difficultness" as assessed by the Infant Characteristics Questionnaire—the same measure used in this study—was associated with mothers' increased use of intrusive and controlling parenting at 24 months, but not at 6 or 18 months. Further analyses revealed that children high on difficultness at 24 months were more likely to engage in "mild trouble" behavior compared to other children in the study, and that mothers' harsh parenting was often in response to these behaviors. Among the current sample, then, it is possible that mothers were able to effectively regulate their parenting while their children were young, even when their children were temperamentally difficult. Once children in this study hit the "terrible twos," however, they likely required more active and discipline-based parenting than they did as infants, allowing more opportunities for harsh parenting (Shaw & Bell, 1993).

Again, as mothers in this sample were generally well-resourced, it is conceivable that their child's NE would not impact parenting until their child had greater physical mobility without concomitant increases in cognitive skills to make parenting more challenging.

4.3 MODERATION BY BIRTH MOTHER NEGATIVE EMOTIONALITY

This study did not find support for the hypothesis that birth mother NE would moderate the association between maternal depressive symptoms and parenting. Further, birth mother NE was not directly related to later parenting behavior at either time point. The correlation between birth mother NE and child NE in this sample was only r = .07, which is somewhat surprising, given that negative emotionality is considered to be moderately to strongly heritable (Rothbart, 2011; Zeanah & Fox, 2004). Other researchers have argued, however, that this facet of temperament is not as stable as once thought, and further, that measures of temperament—including negative emotionality—in infancy and measures of temperament in adulthood do not represent the same construct (Roberts & DelVecchio, 2000; Rothbart, 2011). Thus, we may not expect them to be correlated with one another. It is also important to note that we did not include a measure of birth father temperament in this study, meaning that we were, at best, capturing 50% of the child's inherited temperamental characteristics. Although it is conceivable that birth mother NE might impact adoptive mother parenting through a route other than child NE, based on the low correlation between birth mother and NE child NE, it is not shocking that birth mother NE was not related to adoptive mother parenting, either directly or interactively.

4.4 DIFFERENCES IN RESULTS BETWEEN 9-18 AND 18-27 MONTHS

A consistent theme that emerged from the data is that direct and interactive effects tended to be stronger for analyses conducted from 18-27 months than for analyses conducted from 9-18 months. One possibility for this pattern of results is that parent (maternal depression), child (temperament), and contextual (marital quality) influences on parenting are more salient once the child enters toddlerhood and parenting becomes more effortful and complex. The demands of parenting an infant are much different from those of parenting a walking, talking child who is beginning to test limits and assert autonomy (Fagot & Kavanagh, 1993). Thus, the child and contextual factors outlined in in Belsky's (1984) process model of parenting may have a more noticeable impact at 27 months than at 18 months.

Another possibility is that the differences in levels of significant results between these two time points have less to do with the child's different developmental status than differences in the measures used. Parenting at 18 months was measured using coded observations of mother-child interactions, while parenting at 27 months was measured using mothers' and fathers' reports of maternal parenting. The observational data yielded very little variability in either warm or harsh parenting, while the report measures yielded reasonable levels of variability. Unfortunately, we are unable to say whether this is due to true differences in levels of harsh and warm parenting at 18 versus 27 months or whether it is due to differences in observational versus report measures of parenting. It is most likely a combination of the two. However, as observational and report measures of parenting were not both available at a single time point in this study, we are unable to dissociate measurement variance from developmental timing.

It is also worth considering how the characteristics of this specific sample may have impacted the pattern of results. On average, adoptive mothers in this sample were around 38

years old (M = 37.4, SD = 5.6) at the birth of the adoptive child, which is markedly higher than the national average age of mothers giving birth in the U.S. (28 years; Centers for Disease Control, 2013). Based on the relative maturity of these mothers and that the adoption process is often difficult and drawn out, we can imagine that for mothers in this sample, the adoption of their child fulfilled a dream that had taken many years and a lot of struggle to reach fruition. Therefore, it is possible that the among these mothers the rewarding aspects of parenthood lessened the salience of stressors commonly found to impact parenting quality, such as depressive symptoms, a poor marital relationship, or difficult child temperament. It may not be until the second year of the child's life, when the newness of motherhood is beginning to wear off and the child is increasingly testing limits (Shaw & Bell, 1993), that these stressors begin to exert a noticeable impact on the parenting behavior of these mothers. These findings are also consistent with research demonstrating that even among non-adoptive samples, mothers report more pleasure in parenting during infancy compared to toddlerhood (Fagot & Kavanagh, 1993).

4.5 LIMITATIONS AND FUTURE DIRECTIONS

This study has a number of important strengths, such as utilizing a large, longitudinal sample; taking a family systems perspective by considering child, adoptive mother, and birth mother characteristics as well as contextual influences; and being novel in examining the moderating role of marital quality and child and birth mother negative emotionality on the association between maternal depressive symptoms and parenting. Still, there are several limitations that should be considered. First, adoptive families in this sample had limited socio-demographic and ethnic diversity, which impacts the generalizability of findings to more at risk or heterogeneous

samples. Additionally, given that levels of maternal depressive symptoms were mild, it is unclear whether the current findings would generalize to clinical populations where mothers are experiencing more severe symptoms. Future research would benefit from exploring moderation of the association between depressive symptoms and parenting among more diverse samples, both in terms of individual differences and contextual influences.

Second, although this study benefitted from using both observational and report measures to assess marital quality and parenting, due to the unavailability of both types of measures at each time point, it is unclear whether differences in results at 18 versus 27 months are due to "true" differences in the impact of predictor variables across time or are due to differences in the way these variables were measured. Observational parenting data at 27 months was collected for this sample, but has not yet been coded. If the associations found in this study at 27 months remain significant when an observational measure of parenting is substituted for the report measure, this would increase our confidence that differences in findings between 18 and 27 months are not simply the result of the method used for measuring parenting. Future work—ideally using both observations and parent-reports—is necessary to clarify this study's findings.

Third, in keeping with the majority of past literature, this study focused on depressive symptoms and parenting of mothers (Belsky & Barends, 2002; Phares et al., 2005). Past work has focused on mothers because women are more often primary caregivers, and also due to the higher rates of depression in women compared to men (Shaw et al, 2009). In line with Belsky (1984) and Bronfrenbrenner (1986), this study sought to capture the larger context in which parenting takes place. However, fathers are clearly an important part of this context, and should not be ignored (Lamb, 2004; Park & Buriel, 2006). Research has demonstrated significant associations between paternal depression and paternal parenting behavior (Wilson & Durbin,

2010), and recent research with this sample has found that even after controlling for the effects of maternal depressive symptoms, paternal depressive symptoms at 9 months were linked with higher levels of paternal harsh parenting 18 months and higher levels of child externalizing symptoms at 27 months (Taraban et al., 2015). Future research, therefore, would greatly benefit from the inclusion of fathers, and as the present sample has adequate data on fathers it presents a promising area for further exploration.

Finally, based on the null results for moderation found in this study, it is important to consider the "file drawer problem." We were unable to find any prior literature that tested whether marital quality, child NE, or birth mother NE moderated the association between maternal depressive symptoms and parenting. It is possible, however, that other such studies have been conducted but were never published, also due to non-significant findings. The difficulty of publishing and disseminating null results within the field is clearly a larger issue, but is nonetheless relevant to our interpretation of this study's findings. It is unclear whether the largely non-significant moderation findings in this study are due to characteristics of the sample, as discussed above, or whether this study's hypotheses regarding moderation do not accurately capture the way these constructs function within families. Because both theory and prior literature support the hypotheses advanced in this study, it seems worthwhile to continue to explore these hypotheses using different measures in a higher-risk sample. However, it is also important to make the current results available to the field, as non-significant findings can impact theory and clinical treatment as much as significant ones.

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