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This study examined maternal psychosocial characteristics, infant negative affect, and social support as predictors of breastfeeding initiation and duration while accounting for sociodemographic covariates. Prenatally, 237 women completed measures of coherence of mind with respect to attachment, emotion regulation, beliefs and emotions related to infant crying, and satisfaction with social support. At six months, social support and infant negative affect were assessed via mother report. Breastfeeding was assessed at six months and one year postpartum via mother report. Results indicated that coherence of mind positively correlated with breastfeeding attempts, initiation and duration; empathy in response to infant cries positively correlated with initiation; and anger in reaction to cries and controlling beliefs about cries were linked with shorter breastfeeding duration. Social support from partners at six months positively correlated with duration of breastfeeding; and unexpectedly, prenatal social support inversely related to breastfeeding initiation. An interaction was observed between infant negative affect and cry beliefs related to spoiling, such that negative affective infants with mothers who did not endorse the belief that responding to cries spoils infants, were breastfed for a longer amount of time than those with mothers who strongly believed responding to cries spoils infants. As a whole, these psychosocial and contextual variables predicted relatively little additional variation over and above the covariates. However, some of the findings are novel when compared to the prior literature and may have applied implications. These issues and more nuanced approaches to studying the predictors of breastfeeding are discussed.

PSYCHOSOCIAL PREDICTORS OF BREASTFEEDING  
INITIATION AND DURATION

by

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## CHAPTER I

### INTRODUCTION

Breastfeeding is recommended as the most nutritious food for infants by many leading health organizations such as the American Academy of Pediatrics (AAP; 2005), The World Health Organization (Horta, Bahl, Martinés, Victora & WHO, 2007; WHO, 2009), and Centers for Disease Control and Prevention (CDC, 2012; Shealy, Li, Benton-Davis, & Grummer-Strawn, 2005). The physical and emotional benefits of breastfeeding are abundant for both mother and child. For children who have been breastfed, risks of serious illnesses such as diabetes, meningitis, flu, diarrhea, ear infections, various types of childhood cancers, and even obesity in later life are lowered (Horta et al., 2007; DHHS, Office of the Surgeon General, CDC & Office on Women's Health, 2011; WHO, 2009). Mothers also benefit from the act of breastfeeding due to the lowered risks for breast cancer, ovarian cancer, and postpartum depression (DHHS et al., 2011; WHO, 2009).

Accordingly, it is recommended that infants be exclusively breastfed for their first six months of life, and that breastfeeding continue with proper solid food introduction throughout the first year of life or beyond (WHO, 2009). However, in many places of the world, and in the United States in particular, breastfeeding initiation and longevity rates are suboptimal (Jones, Kogan, Singh, Dee, & Grummer-Strawn, 2011). For example,



only 16.3% of infants born in the United States in 2009 were breastfed exclusively for six months of life, with some southern states reporting rates fewer than eight percent.

Furthermore, in the same year at least 23% of US infants were never breastfed, with some states reporting no breastfeeding initiation for nearly 50% of infants (CDC, 2012).

Previous research has identified many sociodemographic predictors of breastfeeding initiation and duration. For example mothers who are older, more educated, married, European American, return to work later and have higher household incomes are more likely to initiate and maintain breastfeeding compared to other mothers (DHHS, 2007; Ogbuanu, Glover, Probst, Liu, & Hussey, 2011; Scott, Binns, Oddy, & Graham, 2006).

Psychosocial predictors of breastfeeding have been less thoroughly researched, with the exception of depression and breastfeeding attitudes (Bai, Middlestadt, Peng, & Fly, 2010; Hatton, Harrison-Hohner, Coste, Dorato, Curet, & McCarron, 2005; Henderson, Evans, Straton, Priest, & Hagan, 2003; McCann, Baydar, & Williams, 2007; Scott et al., 2006).

The goal of this project is to identify additional psychosocial factors that may predict breastfeeding initiation and duration.

Breastfeeding is natural, and for many mothers and infants it is easy and enjoyable, especially after initiation (Bai et al., 2010; Else-Quest, Hyde, & Clark, 2003).

Mothers have noted the health and emotional benefits, as well as convenience of breastfeeding. For example, breastfeeding promotes bonding with baby, there is no need for the planning ahead required of bottle-feeding, and it is inexpensive (Brodrigg, Fallon, Hegney, & O'Brien, 2007; Shaker, Scott, & Reid, 2004). However, it is also true that breastfeeding is difficult for some women. For example, mothers report concerns that

breastfeeding may be inconvenient, stressful, or painful (Craig & Dietsch, 2010). Likewise, by some estimates as many as 83% of mothers report difficulties breastfeeding such as latch difficulties, pumping difficulties, and perceptions of insufficient milk supply (Colin & Scott, 2002; Odom, Li, Scanlon, Perrine, & Grummer-Strawn, 2013). Such beliefs and experienced difficulties may undermine breastfeeding initiation or duration, unless mothers have other strengths or supports that compensate for these stressors. In general, mothers' accurate detection of and response to infant hunger cues and willingness to share close proximity with a fussy infant are essential skills for successful breastfeeding (AAP, 2005). Thus, I focus on prenatal psychosocial factors that are likely to be related to these skills or to a mother's ability to handle stress and hence promote subsequent breastfeeding initiation and duration: maternal coherence of mind with respect to attachment, emotion regulation, beliefs about crying, emotional reactions to crying, and social support. Whether these maternal psychosocial factors moderate the relation between mothers' perceptions of infant negative affect, a dimension of temperament, and breastfeeding duration will also be examined. Researching these predictors could lead to novel approaches to promoting breastfeeding, and finer-tuned ability to identify mothers who are unlikely to initiate or maintain breastfeeding for the recommended amount of time and are thus in particular need of additional education, support, and intervention.

## CHAPTER II

### THEORETICAL MODEL AND REVIEW OF THE LITERATURE

Belsky (1984) developed an influential model for examining the processes that predict individual differences in parenting. Given that breastfeeding is a parenting behavior, this model is relevant to the investigation of factors that influence mothers' breastfeeding behavior. In this seminal model, Belsky notes that parental behavior is not determined by a single cause, rather, parenting is multiply determined by factors that fall under three broad domains: characteristics of parents, characteristics of infants, and elements of context.

According to this model, many maternal characteristics, such as developmental history, personality, physical health, and psychological well-being affect maternal behavior. For example, a mother who experienced negative parenting in childhood may subsequently experience elevated depressive symptoms, which in turn could make it difficult for her to provide her infant with the frequent intimate contact required by breastfeeding. Also, each individual infant has characteristics that can influence parental behavior. For instance, mothers may have difficulties breastfeeding infants who are frequently upset or difficult to soothe, because caring for such infants is known to be particularly stressful (Edhborg, Seimyr, Lundh, & Widström, 2000) which could lead to earlier termination of breastfeeding. Such an effect may be especially likely among

mothers who struggle to regulate their negative emotions, but less likely among mothers who have adequate social supports from friends and family. The latter example illustrates how the qualities and characteristics of mothers, infants, and contexts may have joint effects on breastfeeding behavior. In the following literature review, I provide theoretical rationale and empirical support justifying the consideration of these factors as predictors of mothers' breastfeeding attempts, successful initiation and duration.

### **Determinants of Breastfeeding**

#### **Mother Characteristics**

Belsky (1984) theorizes that of the three determinants of parenting (caregiver characteristics, child characteristics, and contextual factors), the personality and psychosocial functioning of the parent is the most crucial component. He declares that if one of the three components should remain intact while the others fail, parenting and hence child outcomes will be most favorable if the personality and psychosocial factors of the parent remain healthy (Belsky, 1984). Accordingly, I have chosen to investigate four mother characteristics which I posit will be related to breastfeeding initiation and duration: adult attachment status, emotional regulation, emotional reactions to infant crying, and beliefs about infant crying, all of which are likely to influence mothers' comfort with proximity to their infants (particularly when distressed), ability to read infant cues, and ability to manage stressful aspects of breastfeeding (e.g., tolerating hunger cries).

**Adult attachment status.** The term attachment refers to an affectionate bond formed with another person and a desire to maintain proximity to that person during

times of stress (Ainsworth, 1989; Bowlby, 1969). Bowlby (1969), the founder of attachment theory, proposed that bonds between infants and their caregivers are essential to infant survival. He stated that the desire for closeness to caregivers and caregivers' responses to their infants' proximity-seeking cues serve to form and maintain attachment bonds. Theoretically, people are molded by such relationships formed in early childhood, and these relationships serve as a basis for what people expect from future relationships, and have great influence on how they approach future interactions.

Essentially, children form an internal working model, or schema about self and other, in the context of their early relationships with their primary caregivers (Ainsworth, 1989; Bowlby, 1973). Individuals whose parents respond to their needs appropriately and consistently develop a secure working model in which they perceive that they are worthy of care and the world is a place in which they can expect their needs will be met. In contrast, individuals whose parents behaved insensitively or did not respond appropriately to their needs tend to form insecure internal working models that reflect negative perceptions of self and distrust of others to meet their needs. The internal working model then acts as a template for how to behave and what to expect from others in social situations.

In infancy and childhood, attachment statuses are classified based on patterns of behavior and tendencies common to specific attachment representations. Children who are securely attached feel comfortable trusting that loved ones will be supportive and tend to seek out and be easily soothed by the presence of attachment figures such as parents when faced with stressors (Ainsworth, Blehar, Waters, & Wall, 1978). In contrast,

insecurely attached children do not always trust their parents to meet their needs. Such infants may behave in an avoidant manner, acting as if they are indifferent to their parent's presence, or may act ambivalently by seeking proximity to their parent but continuing to be upset rather than soothed by that parent's presence.

As adults, people can be classified into attachment statuses by completing the Adult Attachment Interview (AAI; Main & Goldwyn, 1984-1998) or by completing self-report questionnaires. The AAI is considered the gold-standard tool for measuring attachment in adults. The AAI is a semi-structured clinical interview that requires adults to describe important caregivers and reflect on specific past experiences with those caregivers in detail. The interview transcripts are then rated according to participant reports of parental behavior and the quality or coherence with which they describe these experiences.

The three most common adult attachment statuses are secure-autonomous, insecure-preoccupied, and insecure-dismissing. Adults in the secure-autonomous category are able to clearly and objectively describe positive and negative past experiences in a calm, concise, and consistent manner, and they acknowledge the impact early caregivers have had in their lives. Insecure-dismissing adults tend to report having loving parents as children, but when asked to illustrate with concrete examples, these adults provide stories that conflict with a loving upbringing and may include instances of childhood rejection. They are many times uncomfortable with the content of the interview, struggle to recall meaningful events, and deny the importance of early relationships, or idealize experiences that were unpleasant. Insecure-preoccupied adults

are not coherent in their narratives and tend to be emotional when describing occurrences from childhood. They tend to recount early relationships passively, or in an actively angry manner. Often times they report relationships in which their parents relied on them for emotional support, or required them to take on caregiving roles as children (Crowell, Fraley, & Shaver, 1999).

It is important to note that self-report measures of adult attachment are frequently used in research, but have been criticized (Crowell & Treboux, 1995; Sperling, Foelsch, & Grace, 1996). In particular, there is concern that self-reports may be particularly poor at capturing dismissing individuals, as they would be likely to endorse overly positive statements (Gjerde, Onishi, & Carlson, 2004). Theoretically, these attachment classifications or styles are associated with patterns of behavior driven by the internal working models people carry with them from childhood into adulthood. And in fact, research based on both types of measures has shown evidence that people whose parents responded sensitively to their needs in childhood are more likely to be classified as secure-autonomous as adults or to self-report low levels of attachment avoidance and anxiety (Crowell, et al., 1999).

Of most relevance to the current project, adult attachment status has been linked with differences in adults' parenting behavior, affect regulation, and beliefs. Specifically, adults classified as insecure or who self-report more attachment anxiety and avoidance have reported experiencing more negative emotions in response to infant cries (Groh & Roisman, 2009), are less skilled at regulating their own negative emotions (Kobak, 1999), struggle to identify infant distress cues accurately (Leerkes & Siepak, 2006; Scharfe,

2012), and feel less comfortable with emotional and physical intimacy (Bartholomew, 1990). Some of these attachment-linked factors are likely to deter mothers from breastfeeding. For example, it seems likely that individuals who are uncomfortable with physical intimacy would struggle with the frequent skin-to-skin contact that is involved with breastfeeding. Also, anxiety in response to infant cries may interfere with let-down or make struggles to latch-on particularly difficult to tolerate. Such “failures” seem especially likely to promote termination among insecurely attached women who tend to have negative views of their own competence. Thus, I hypothesize that mothers with an insecure coherence of mind with respect to adult attachment will be less likely to initiate breastfeeding and will breastfeed for a shorter duration than mothers with a secure adult attachment status.

This hypothesis is supported by results from a recent study of over four hundred women in which the relation between prenatal attachment representations and breastfeeding duration was examined (Scharfe, 2012). Women with approach-oriented attachments (most similar to secure-autonomous) were more likely to breastfeed, and to continue breastfeeding through difficulties, than mothers with insecure attachment representations (Scharfe, 2012). A drawback to this study is that the measurement of attachment style used was the Relationship Scales Questionnaire, which is a self-report measure of attachment. In contrast, an earlier study found no significant relationship between exclusive breastfeeding and secure attachment, although this study was conducted with a much smaller sample ( $n= 60$ ) and also used a self-report measure of attachment (Akman et al., 2008). To my knowledge, there is no published study that has



utilized the AAI when examining links between attachment coherence of mind and breastfeeding. Use of the “gold standard” measure of adult attachment is a strength of the proposed project.

**Maternal emotional regulation.** Emotion regulation is a term that describes peoples’ awareness of and acceptance of their own emotions, as well as the ability to control emotional reactions in order to behave in situationally appropriate ways (Gratz & Roemer, 2004). This includes the ability to perform purposeful and non-impulsive behaviors (e.g. breastfeeding an infant) in the face of negative emotions (Gratz & Roemer, 2004). Becoming a new parent is an emotional time usually filled with great joy, but also stresses (Belsky & Kelly, 1994). In short, it is a time with many opportunities warranting emotional regulation. Mothers need to be able to regulate their own emotions in order to respond appropriately to their infants (Dix, Gershoff, Meunier, & Miller, 2004; Mills-Koonce et al., 2007). Crying, which is one way infants communicate hunger, can be considered a stress-inducing stimulus to those witnessing the cries, including the mother (Soltis, 2004; Wells, 2003). In the face of an infant emitting a stress-inducing hunger cry, a mother must be able to regulate her reactions in a manner that enables her to be willing to bring the crying infant to her and breastfeed. Also, consider that infant cries are often just one of many stressors mothers face simultaneously.

The inability to regulate one’s emotions when stressed has a broad range of potential consequences, particularly for parents and breastfeeding mothers. Inadequate regulation processes could disrupt the harmony of parent child interactions by fostering parental overreaction or inappropriate laxness at the infant’s expense (Dix, 1991).

Specifically, lack of regulation may hinder the dyadic process of breastfeeding. For instance, breastfeeding difficulties may arise if overly emotional mothers do not have patience to help infants latch properly, or are too overwhelmed to decipher infant cues. Thus, it is hypothesized that mothers with greater skill regulating their emotions prenatally will be more likely to attempt and initiate breastfeeding, and breastfeed their infants for a longer duration than mothers with low emotion regulation abilities.

To my knowledge, no study to date has specifically examined the link between mothers' emotion regulation and breastfeeding behavior. However, research has shown that mothers who are more anxious are less likely to breastfeed (Forster, McLachlan, & Lumley, 2006; Lonstein, 2007) and that high anxiety is associated with shorter breastfeeding duration than low levels of anxiety (Clifford, Campbell, Speechley, & Gorodzinsky, 2006; Lonstein, 2007). Despite the lack of research on emotion regulation in regards breastfeeding, there is accumulating evidence that mothers' emotion regulation abilities are linked to other parenting behaviors. For example, Mills-Koonce and colleagues (2009) found that mothers with high levels of cortisol (a hormone indicative of stress) enacted fewer negatively intrusive behaviors towards their six-month-old infants if the mothers also displayed lower respiratory sinus arrhythmia (RSA), an indicator of physiological regulation (Mills-Koonce et al., 2009). Also, Lorber and O'Leary (2005) found that mothers who were highly aroused as evidenced by electrodermal activity and poorly regulated as indicated by RSA during a stressful interaction with their toddler engaged in more harsh discipline.

More recently, Lorber (2012) found an inverse relation between the use of mothers' self-reported cognitive reappraisal techniques in everyday life, a dimension of emotion regulation, and over-reactive discipline when parenting toddlers. In other words, when mothers feel negative emotions and are able to pause and think about the situation in a less negative framework, they parent more appropriately. In this way, mothers who are skilled at emotion regulation may still become irritated by a cry, but are also able to take a moment to consider that the infant is trying to communicate an unmet need, thus relaxing themselves adequately to effectively breastfeed the infant. Such studies linking emotion regulation to parenting behaviors provide a basis for the hypothesis that mothers who are able to calm themselves in spite of stressful situations may be more likely to breastfeed their infants for a longer duration of time (in months) than mothers who are less skilled at regulating their own emotions. It may be that adaptive emotion regulation during times of stress helps mothers reflect on and proactively act on their parenting goals (i.e., breastfeeding) more effectively.

**Maternal emotional reactions to infant cries.** Another maternal characteristic that may influence breastfeeding behavior is emotional reactions to infant cries. Given that crying is a salient infant hunger cue, an integral factor of whether infants' hunger needs are met may be mothers' reactions to cries. Emotional responses to infant crying range from empathy for infants to self-focused anxiety and irritation (Leerkes, 2010), and the nature of these emotional reactions can facilitate or hinder sensitive parenting. Positive reactions, like empathy, which prioritize infants' well-being and desires are termed *infant-oriented*, and are often associated with more positive parent-child

interactions (Dix et al., 2004). Reactions to infants that are negative, such as feelings of anger or anxiety toward the given infant, are considered *mother-oriented* and tend to make interactions between parent and child more negative (Dix et al., 2004). Mothers who feel more infant-oriented concern have been found to feel fewer negative emotions towards their young children, display more supportive parenting, and engage in more cooperative behaviors with their young children than parents who feel negative, mother-oriented emotions (Dix et al., 2004). Also, Leerkes (2010) examined emotional reactions to crying in her study of predictors of maternal sensitivity using a similar procedure as will be used for the current study. It was found that mothers' prenatal, mother-oriented, negative emotional reactions to videos of infant cries predicted lower maternal sensitivity to infant distress at six months. Conversely, infant-oriented empathy in response to distress measured at six-months postpartum was significantly associated with more sensitive behavior towards mothers' own infant at six months of age. It may be that mothers who have more infant-oriented concern or empathy will be more willing to breastfeed when their child is crying due to a desire to help the infant. Whereas, mother-oriented reactions to cries may lead to frustration or anger toward the infant, which could hinder the dyadic breastfeeding process.

Thus, mothers who feel empathy and concern when infants cry may be more likely to want to breastfeed than mothers who are irritated or angered by the crying. Mothers who experience mother-oriented emotional reactions to crying may be more likely to remove themselves from the infants' proximity, delay responding, or initiate breastfeeding in a harsh or intrusive manner, all of which may undermine breastfeeding

success and promote earlier termination of breastfeeding. Likewise, mother-oriented anxiety in response to crying may cause mothers to be tense during breastfeeding, which could make the experience less pleasant and effective (O'Brien, Buikstra, Fallon, & Hegney, 2009). Not only could mother-oriented emotional reactions to crying dissuade mothers from bringing infants to the breast when hungry, but conversely, such reactions might motivate mothers to breastfeed their infant with the lone goal of terminating the crying because it is aversive, rather than meeting the infants' needs, whatever those needs may be. Mothers who genuinely empathize when an infant cries may be better able to discern a hunger cry from other reasons for crying, such as frustration or fatigue, for instance. In these ways, being more attuned to infants' needs could facilitate breastfeeding interactions. Therefore, it is expected that mothers who have more empathic reactions to crying will be more likely to attempt to breastfeed, successfully initiate breastfeeding, and to breastfeed longer than mothers with more mother-oriented reactions to crying (i.e., anger and anxiety).

**Maternal beliefs about infant cries.** Prenatal beliefs mothers have about crying are expected to influence how they respond to infant cries once their own children are born. Cry beliefs consists of overall values and goals about how crying should be handled. Mothers have a range of beliefs about infant cries and appropriate outcomes of crying. Similar to emotional reactions to crying, mothers' beliefs about crying can be grouped into two categories: infant-oriented beliefs, and mother-oriented beliefs (Leerkes, 2010). Infant-oriented beliefs reflect a prioritization of the infant's needs and positive, flexible attitudes about crying. Examples include the belief that crying is an infant's way

of communicating an unmet need such as hunger, that it is important for a mother to meet her infant's needs, that responding to cries is a way to teach emotional regulation, and that responding quickly helps the infant to feel safe and learn to trust others (Leerkes, Parade, & Burney, 2010). In contrast, mother-oriented beliefs prioritize the wishes of the parent above those of the infant. Common mother-oriented beliefs are that crying should be minimized because it is irritating or embarrassing, that infants cry in an effort to manipulate mothers, and that responding to infant cries will cause the infant to become spoiled (Leerkes et al., 2010). I hypothesize that mothers who hold more infant-oriented beliefs about crying will be more likely to breastfeed their infants and to do so longer than mothers with mother-oriented or negative beliefs about crying.

For example, mothers who hold infant-oriented beliefs about crying may be more likely to breastfeed despite perceived personal inconvenience given the known physical and emotional benefits for infants. Additionally, mothers who believe that cries are manipulative and should be ignored or that they must teach their young infant to minimize crying may be unlikely to feed on demand and more likely to create a rigorous feeding schedule, which has been known to undermine breastfeeding success, contributing to earlier cessation of breastfeeding (DiGirolamo & Grummer-Strawn, 2008; Merten, Dratva, & Ackermann-Liebrich, 2005). To my knowledge, no prior studies have directly tested the proposition that prenatal beliefs about crying predict shorter breastfeeding duration. However, previous research has found that infant-oriented beliefs about crying are associated with prompt and sensitive responses to crying (Haltigan et al, in press; Leerkes, 2010; Zeifman, 2003). Likewise, other types of parental beliefs are

consistently related to relevant parenting behaviors. For example, hostile attributions and negative assumptions about child behavior and misbehavior have been associated with more harsh discipline (Pinderhughes, Dodge, Bates, Pettit, & Selli, 2000; Dix, 1993).

Moreover, parental attitudes (which reflect beliefs, in part) about breastfeeding are associated with breastfeeding initiation and termination. For example, women who agree that breastfeeding provides infants with protection from certain diseases and perceive breastfeeding as the most nutritious food for infants are likely to initiate and continue breastfeeding longer than women who do not agree with such statements (McCann et al., 2007). Additionally, women who perceive breastfeeding to be embarrassing, too time consuming, and who have concerns about milk leakage or having to buy breastfeeding-specific clothes are less likely to initiate breastfeeding (McCann et al., 2007). Though not directly tested in the studies mentioned, attitudes of embarrassment and perceived hindrance to the mother seem to reflect mother-oriented reasons for not breastfeeding, whereas attitudes geared toward the benefits for the infant are infant-oriented.

While parental characteristics are a critical component of Belsky's model, he also emphasized the importance of the broader context in which parenting occurs, and argued that contextual factors are inextricably linked to parent and child functioning.

### **Contextual Factor-Social Support**

Social support, or lack thereof, can be a salient source of encouragement or stress in the lives of new parents. It is important to note that social support is a broad term that could be conceptualized in many different ways. In this project, I will focus on

emotional and instrumental support mothers perceive from people in their lives rather than informational or professional support. Consolation when upset and validation from loved ones are examples of emotional support; whereas, instrumental support could be having help with errands or other tasks, or simply spending time together (Cutrona & Suhr, 1992; Shakespeare-Finch & Obst, 2011). Belsky (1984) illuminated the influence of social support for parenting by drawing attention to the following findings. Mothers who feel supported by their friends and family have been found to be less restrictive and authoritarian (Colletta, 1979) and practice more stimulating parenting behaviors even in the face of a stressful situation, such as an infant in the intensive care unit (Pascoe, Loda, Jeffries, & Easp, 1981). In line with these positive influences for other parenting behaviors, maternal social support prenatally is expected to predict breastfeeding attempts, initiation, and duration, and social support at six months postpartum is expected to predict increased duration.

During the transition to parenthood, general social supports may be particularly important for breastfeeding behavior. When a mother decides to breastfeed, she is committing herself to a parenting behavior that is sometimes perceived as time consuming and difficult (Colin & Scott, 2002). This can seem a daunting endeavor, one that could be supported or hindered by the people of importance in the new mother's life. Examples of the instrumental and emotional support breastfeeding women may desire are help with housework, meal preparation, bathing baby, backrubs, compliments, and verbal praise (Tohotoa, Maycock, Hauck, Howat, Burns, & Binns, 2009).



Prolific research has provided evidence that breastfeeding-specific support from loved ones and medical professionals increases breastfeeding initiation and duration (Grassley, 2010; Lewallen, Dick, Flowers, Powell, Zickefoose, Wall, & Price, 2006; Raj & Plichta, 1998). Time and time again, research has indicated that women who feel supported in their decision to breastfeed, especially by their own mothers, partners, and health care providers, tend to breastfeed longer (Grassley, 2010; Thulier & Mercer, 2009). However, in contrast to social support for breastfeeding, global emotional and instrumental support have been sparsely studied in relation to breastfeeding. Some studies, such as one by Isabella and Isabella (1994), measure breastfeeding support but do so with measures that capture support for breastfeeding and parenting more generally. Isabella and Isabella found that mothers were more likely to breastfeed their infants exclusively when they felt more emotional support from their mothers and husbands. Also, emotional support and instrumental support have been linked with fewer depressive symptoms (Logsdon, McBride, & Birkimer, 1994; Westdahl, Milan, Magriples, Kershaw, Rising & Ickovics, 2007) and smoother transition to parenthood (Belsky & Rovine, 1984; Cutrona, 1984), both of which have been associated with ease of breastfeeding (Deave, Johnson, & Ingram, 2008; Hatton et al., 2005).

In sum, breastfeeding is perceived as a time consuming and difficult responsibility by some mothers; thus, emotional support and instrumental support for other caregiving tasks from people in mothers' environments are expected to have a direct positive influence on the initiation and duration of breastfeeding. Along with this contextual influence of social support and the many maternal characteristics discussed, individual

differences among infants may impact the way they are parented (Belsky, 1984) and the process of breastfeeding.

### **Infant Characteristics- Negative Affect**

When examining predictors of parenting behaviors, such as breastfeeding, it would be remiss not to consider the qualities infants themselves bring to the table and the role they play in influencing parents' behavior. Temperament is a construct that has been widely studied by developmental scholars, and describes a person's general reactivity in everyday life. In other words, infants differ behaviorally, attentionally, and emotionally in how they react to stimuli from their environment (Putnam & Stifter, 2008). Although a number of distinct temperament dimensions have been proposed, infant negative affect has been demonstrated to be particularly important in relation to parenting behavior (Crockenberg & Leerkes, 2003). The term *negative affect* refers to the intensity, frequency, and duration with which infants express fear, anger, and sadness. For instance, negative affect is reflected in how disturbed infants become when faced with novel people or situations, how easily they settle down after having been upset, or whether they are tearful at the loss of a toy or at the end of the day (Garstein & Rothbart, 2003; Rothbart, 1981). Research has shown that individuals who are high in negative affect tend to be distressed much of the time, even during situations that others may not consider stressful (Watson & Clark, 1984). Infants who are high in negative affect are frequently fussy and may make more bids for attention than infants who are low in negative affect.

When researchers first began investigating infant negative affect as a predictor of parenting, it was assumed that it would exert an adverse effect on maternal behavior because infants who are more irritable demand more from mothers and may provide less reinforcement, eroding mother confidence and behavior over time (see Crockenberg & Leerkes, 2003). However, based on a thorough review of the literature, Crockenberg (1986) noted that the results were mixed with infant negative affect being unrelated to, positively related to, and negatively related to parenting across studies. Based on the pattern, she asserted that the extent to which infant negative affect exerts an adverse effect on parenting is dependent on the presence or absence of other stressors or supports (Crockenberg, 1986; Crockenberg & Leerkes, 2003). A similar pattern is apparent across the studies linking temperament to breastfeeding.

Research suggests that mothers might find it unpleasant to breastfeed an infant who is frequently fussy, or perceive that fussy infants are unsatisfied with breastfeeding (Lothian, 1995; Niegel, Ystrom, Hagtvet, & Vollrath, 2008). Some studies note that more irritable, difficult, or negative infants tend to be breastfed for a shorter duration and are less likely to be exclusively breastfed than less irritable, difficult or negative infants (Niegel et al., 2008; Vandiver, 1997; Wasser et al., 2011). Yet, other studies report negligible links between temperament and breastfeeding (Niegel et al., 2008) or the opposite pattern (Lauzon-Guillain et al., 2012).

From Crockenberg's (1986) perspective, it would be expected that high perceived infant negative affect would only be linked with shorter duration of breastfeeding among mothers whose own characteristics or lack of social support inhibit them from coping

effectively with the behavior of infants with high negative affect. Thus, I hypothesize that high infant negative affect will only be associated with shorter breastfeeding duration among mothers who are insecurely attached, have difficulty regulating their own emotions, have negative emotional reactions to infant cries, hold mother-oriented beliefs about crying, or who are not satisfied with the social support they receive from friends and family.

To further explain, mothers with insecure attachment styles who have infants with high negative affect might be uncomfortable with the intimacy of breastfeeding or have trouble accurately reading infant cues, which may undermine breastfeeding. In contrast, secure mothers of high negative affect infants would be less likely to attribute infant cries to relationship difficulties and more comfortable with proximity to their crying infants which would buffer them from negative effects of high infant negative affect on breastfeeding. Also, mothers with difficulty regulating their emotions may not be able to calm themselves enough to breastfeed their crying infant, whereas mothers who are skilled at regulating their emotions may successfully overcome their negative reactions and relax in order to breastfeed. And, mothers who have more mother-oriented responses to crying, such as becoming angry with the infant for crying, might reject a fussy baby rather than breastfeed. But, infant-oriented emotions could be associated with longer breastfeeding rates, even of infants with negative affect, because these feelings would likely be compassionate in nature and driven by desires to help the infant feel more comfortable when upset. Furthermore, mothers who prioritize mother-oriented beliefs about crying might hold the opinion that responding to an infant who is frequently fussy

will cause the infant to become overly dependent on her. Conversely, mothers who have more infant-oriented beliefs about crying could be apt to interpret infant negative affect as a cue for mothers to help meet the fussy infants' needs. Finally, low amounts of social support could contribute to mothers feeling too overwhelmed to appropriately respond to a frequently fussy infant, but mothers with adequate support may be shielded from the difficulty of infant negative affect due to relief and energy that emotional and instrumental support may provide.

### **The Proposed Study**

#### **Research Questions and Hypotheses**

**Research Question 1.** Do mothers' personal characteristics (coherence of mind with respect to attachment, emotion regulation, emotional reactions to crying, and beliefs about crying) assessed prenatally, predict breastfeeding attempts, initiation, and duration?

**Hypothesis 1.** Mothers who are more coherent in the manner with which they describe attachment relationships, have better emotion regulation skills, fewer negative emotional reactions to crying, and more infant-oriented beliefs about infant crying in the third trimester of their pregnancy will be more likely to attempt to and successfully initiate breastfeeding and maintain breastfeeding for a longer amount of time than other mothers.

**Research Question 2.** Will mothers' perceptions of social support pre and postnatally be related to breastfeeding attempts, successful initiation and duration?

**Hypothesis 2a.** Mothers who feel more satisfied with the social support they receive from loved ones prenatally will be more likely to attempt breastfeeding, successfully initiate, and breastfeed their infants for a longer amount of time.

**Hypothesis 2b.** More satisfaction with social support from loved ones at six-months postpartum will be associated with increased breastfeeding duration.

**Research Question 3.** Is infant negative affect at six months of age associated with how long infants are breastfed? Furthermore, coherence of mind with respect to attachment, emotion regulation, emotional reactions to crying, beliefs about crying, and satisfaction with social support moderate the link between infant negative affect and breastfeeding duration?

**Hypothesis 3.** Infant negative affect will be associated with shorter breastfeeding duration, but this effect will be moderated by maternal psychosocial characteristics and satisfaction with social support. Specifically, infant negative affect will be inversely associated with breastfeeding duration among mothers who are incoherent when describing past attachment relationships, have more emotion regulation difficulties, more negative emotional reactions to crying, mother-oriented beliefs about crying, and those who are less satisfied with their social support. Infant negative affect will not be inversely associated with breastfeeding duration among mothers with coherency of mind regarding attachment, few emotion regulation difficulties, empathetic emotional reactions to crying, infant-oriented beliefs about crying, and mothers who are more satisfied with the social support they receive.

## CHAPTER III

### METHOD

#### **Participants**

The sample for this study was drawn from 259 primiparous mothers participating in a larger longitudinal study of the predictors of maternal sensitivity. Twenty mothers were not included in the current sample because they did not provide breastfeeding information at either 6 or 12 months postpartum, primarily because they had moved to a different city or could not be contacted. Two infants deceased shortly after birth and their mothers did not participate thereafter. The total sample for the current report consisted of 237 mothers. A series of t-tests and chi-square tests indicated that the continuously participating mothers did not significantly differ from the 22 mothers that were not included in terms of ethnicity, age, education, partner status, income-to-needs ratio, adult coherence of mind with respect to attachment, difficulties with emotion regulation, beliefs about infant crying, emotional reactions to infant crying, and social support. At recruitment (during pregnancy) mothers' ages ranged from 18 to 44 years of age ( $M = 25$  years). At this time, 25.3% of mothers reported a high school education or less, 32.1% reported some college, and 42.6% reported a four-year college degree or higher. Yearly family income varied from poverty to over \$100,000 (median = \$35,000). Household income-to-needs ratio was utilized in the current study (family income divided by the

poverty level for that particular family size). For the current sample, the mean prenatal income-to-needs ratio was 2.51 ( $SD = 1.99$ ). Approximately 50% of the sample had an income-to-needs ratios of five or greater (considered high income).

Of the participants, 118 were European American, 108 were African American, 7 were both European and African American, and 4 were African American and another ethnicity. Due to the few numbers of mixed ethnicity participants, ethnicity was made into a dichotomous variable of European American or African American/Mixed Ethnicity (1 = *European American*, and 0 = *African American or Mixed Ethnicity*). Eighty-one percent of mothers were dating, living with, or married to the infant's father. All infants were full term and healthy, and 51% were female.

### **Procedure**

Participants were recruited from childbirth classes, obstetric practices, prenatal breastfeeding classes, Women Infants and Children (WIC), and by means of flyers and presentations given by research staff members. Women who signed consent forms and who self identified as either African American or European American, 18 or older, fluent in English, and pregnant with their first child were included in the study. Once enrolled, mothers were mailed questionnaire packets that included measures of emotion regulation, beliefs about infant crying, and social support. Mothers came to the laboratory during their third trimester, and during this visit they completed questionnaire packets and participated in two interviews.

First, mothers were administered the AAI, which lasted about an hour. After completing the AAI, mothers then watched four one-minute video clips of infants crying



loudly and were interviewed about their emotional reactions. At the end of this visit, participants received a small gift and \$50.

Then, when each participants' infant was six-months-old, and again when they were one-year-old, mothers and their infants were invited to the laboratory again. During these two visits, mothers and infants participated in a 30-minute to one hour long observation session, followed by an hour-long interview with the mother as part of the larger study. At this time, mothers completed questionnaires that included items about breastfeeding. After visits, mothers were compensated \$50 and a small gift at six months, and \$100 and a small gift at one-year.

### **Measures**

#### **Adult Attachment Interview (AAI; Main, Goldwyn, & Hesse, 2003-2008)**

During the prenatal visit to the laboratory, the pregnant mothers were administered the AAI. This semi-structured interview is used to assess mothers' attachment statuses and coherence of mind in regards to their primary caregivers from childhood. Mothers were asked to give descriptions and specific examples of meaningful events from childhood interactions with their primary caregivers. Coherence of mind with respect to attachment describes the ability to consistently provide and explain narratives about the past in an organized manner. This was scored on a nine-point scale (1 = *not at all coherent* to 9 = *very coherent*), and it is the primary score that differentiates secure individuals from insecure individuals. Scores above a five generally indicate attachment security. Trained coders rated each transcript by the standard coding system for the AAI developed by Main and Goldwyn, and the interclass correlation

was .75,  $p < .001$  (Main, Goldwyn, & Hesse, 2003-2008). Coherence of mind with respect to attachment has demonstrated predictive validity with parenting behavior and parental responsiveness (van Ijzendoorn, 1995).

### **Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)**

Participants completed the DERS prenatally. The 36 items in the DERS are designed to measure emotion regulation difficulties regarding six subscales (each of which consists of six items). Nonacceptance items represent a tendency towards reactions to distress that are nonaccepting, or negative secondary responses to negative emotions. For example, “When I’m upset, I become angry with myself for feeling that way” ( $\alpha = .83$ ). Goal items reflect the ability to concentrate and accomplish tasks despite negative emotions, such as “When I’m upset, I can still get things done” ( $\alpha = .86$ ). Impulse items reflect ability to stay in control of one’s actions in the face of negative emotions, such as “When I’m upset, I have difficulty controlling my behaviors” ( $\alpha = .80$ ). Awareness items represent one’s ability to acknowledge emotions, for example, “When I’m upset, I take time to figure out what I’m really feeling” ( $\alpha = .73$ ). Strategies items represent belief that not much can be done to regulate negative emotions, for example, “When I’m upset, I believe there is nothing I can do to make myself feel better” ( $\alpha = .83$ ). Finally, clarity items reflect how unaware or unclear participants are about the emotions they experience, such as, “I have difficulty making sense out of my feelings” ( $\alpha = .74$ ). Participants reported how often each item applied to them on a scale (1 = *almost never* to 5 = *almost always*). The average of the six subscales was calculated to yield a total score ( $\alpha = .91$ ). Higher scores indicated greater difficulties with emotion regulation (Gratz &

Roemer, 2004). In previous research, scores on this scale have been correlated with personality traits highly stable over time. For instance, anger has been correlated with neuroticism and aggression and positive emotion scales have correlated with extraversion as measured by the Eysenck Personality Questionnaire Dimension (Izard et al. 1993) This pattern verified the validity of using this as a measure of trait-like emotional experiences.

### **Emotional Reactions to Crying – video ratings**

After completing the AAI during the prenatal laboratory visit, mothers viewed four clips of infants crying loudly. Two of the clips displayed cries of fear and two clips displayed cries of anger; one of each was African American and European American. After watching each of these videos, mothers rated how strongly they felt 17 different emotions (1 = *not at all* to 4 = *very strongly*). Then, mothers were asked why they felt each emotion. Trained coders scored whether the mothers' responses were mother-oriented or infant-oriented based on Dix et al.'s (2004) scoring system. Infant-oriented explanations of emotions revealed sympathy, empathy, or pride regarding the infant's behavior, concern for the infant, or a desire to help the infant. Mother-oriented responses are self-focused and include negative reactions to the crying infants or statements that concern the mother and not the infant. An example of an infant-oriented response is, "I was anxious because I felt like someone should be helping the baby. I felt bad for him." A mother-oriented response could be, "I was irritated because the crying was so shrill and I just wanted it to stop." Forty transcripts were double-coded and the Kappas for classifying emotions as mother-oriented or infant-oriented ranged from .65 – 1.0 (mean kappa = .85). These data were combined to yield three scores for each clip by averaging

the extent to which mothers rated specific emotions that were later coded with a specific orientation: *empathy* (infant-oriented empathy, sympathy, sad;  $\alpha = .87$ ), *anger* (mother-oriented anger, irritation, frustration, annoyed, disgusted;  $\alpha = .79$ ), and *anxiety* (mother-oriented anxious, concerned, nervous, worried;  $\alpha = .75$ ). Empathy, anger, and anxiety scores were significantly correlated across clips (range of  $r$ 's for parallel emotions across clips was .46 - .66, all  $p$ 's  $< .01$ ). Thus, emotional reaction scores were averaged across all clips yielding three final scores with good internal reliability: *empathy* ( $\alpha = .87$ ), *anger* ( $\alpha = .79$ ), and *anxiety* ( $\alpha = .75$ ). In prior research using this system, empathy predicted higher maternal sensitivity and mother-oriented anger and anxiety predicted low maternal sensitivity (Leerkes, 2010).

### **Infant Crying Questionnaire (ICQ; Haltigan et al., 2012)**

Mothers completed this questionnaire prenatally to assess the general beliefs they had about infant crying. Mothers rated on a five-point scale how frequently they agreed with the 39 different phrases related to infant crying and how often they thought they would aim to achieve certain outcomes when their own infant was crying (1 = *never* to 5 = *always*). This measure consists of five subscales. Two of the subscales, *attachment* and *crying as communication* are considered “infant-oriented.” Higher scores on these subscales reflect a concern for infant well-being and the belief that crying is an adaptive means of communication. An example of an attachment item is, “How I respond when by baby cries will make my baby feel safe and secure” ( $\alpha = .83$ ), and an example of a *crying as communication item* is, “When my baby cries, I think my baby is trying to communicate with me,” ( $\alpha = .74$ ). The last three subscales are considered mother-

oriented: *spoiling*, *directive control*, and *minimization*. These reflect a prioritization of the mother's needs above concern for the well-being of the infant. *Spoiling* items reflect a belief that responding to a crying infant will spoil the infant or cause the infant to be more dependent than the mother desires, such as, "When my baby cries, I will let baby cry it out so he/she doesn't get too dependent on me" ( $\alpha = .70$ ). *Directive control* items emphasize parent-directed, firm control of infant crying, rather than an effort to scaffold self-regulation or other long-term skill acquisition. For example, "I will teach my baby that crying doesn't get you what you want" ( $\alpha = .75$ ). *Minimization* items reflect the belief that crying is a hindrance to the parent, unnecessary, and manipulative, for example, "When my baby cries I want to make baby stop quickly, crying is a nuisance" ( $\alpha = .76$ ). Haltigan et al., 2012, have demonstrated predictive validity for this measure in relation to maternal sensitivity and child behavior problems.

**Social Support Questionnaire – short form (SSQ-Short; Sarason, Sarason, Shearin, & Pierce, 1987)**

Mothers completed the SSQ-Short prenatally to assess their satisfaction with the amount and quality of emotional support they received from others. Modified from the original 6-item measure, the SSQ-Short form is a 12-item measure of satisfaction with overall support from people in the participants' lives. Six of the items inquire about how satisfied mothers are with the amount of support they receive from others, for example, "How satisfied are you with the number of people you can count on to console you when you are very upset?" ( $\alpha = .93$ ). The other six items address how satisfied mothers are with the ways others support them, such as, "How satisfied are you with the way people

in your life console you when you are upset?" ( $\alpha = .92$ ). Mothers rated how satisfied they were (1 = *very dissatisfied* to 6 = *very satisfied*). Participants received two scores, one for availability of support and one for type of support. The two correlate highly ( $r = .843, p < .001$ ) and were averaged to form a single measure in which higher scores reflect more satisfaction with social support.

### **The Social Support Questionnaire (Leerkes & Crockenberg, 2002)**

Six-months postnatally, mothers completed this eight-item measure to assess their satisfaction with the social support they receive from partners and other loved ones regarding parenting. Items address how satisfied mothers are with the quality and amount of parenting-related help, support, and feedback they receive. Mothers rated each of four items on a five-point scale ranging from (1 = *very dissatisfied*, to 5 = *very satisfied*) separately for partners and for others. Responses were averaged to create composites for satisfaction with partner support ( $\alpha = .93$ ) and others support ( $\alpha = .82$ ). Higher scores reflect more satisfaction with social support. In prior research, this measure buffered mothers of temperamentally reactive infants from experiencing low maternal self-efficacy (Leerkes & Crockenberg, 2002).

### **The Infant Behavior Questionnaire – Revised Very Short Form (IBQ – RVSF; Putnam, Helbig, Gartstein, & Rothbart, 2012)**

Mothers completed the IBQ-RVSF when their child was six-months old. This questionnaire is a shorter version of the Infant Behavior Questionnaire-Revised (IBQ-R; Gartstein & Rothbart, 2003), a parental-report measure of infant temperament. Use of this maternal report of infant affect is based on the view that maternal perceptions are

ultimately more relevant to breastfeeding than are “objective” ratings of infant behavior. Although the IBQ-RVSF consists of three broad scales, only the negative affect scale was used in this study given the goals. The negative affect scale consists of 12 items, such as “When tired, how often does your baby show distress?” and “When your baby wanted something, how often did s/he become upset when s/he could not get what s/he wanted?” ( $\alpha = .74$ ). Mothers rated items on a scale from (1 = *never* to 7 = *always*). Convergent validity for the IBQ-RVSF has not been established; however, the IBQ and IBQ-R long forms on which it is based have each demonstrated convergent validity with observed temperament and father reports of temperament (Parade & Leerkes, 2008; Rothbart, 1981).

### **Breastfeeding Initiation and Duration**

Finally, during the six-month and one-year laboratory visits, mothers reported if they had ever breastfed their infant, and if so, how long they breastfed. From these items, I created three variables to serve as the primary dependent variables: whether mothers attempted breastfeeding, whether they successfully initiated breastfeeding, and breastfeeding duration. The first variable indicates whether the participant attempted to breastfeed (0 = *never breastfed* and 1 = *attempted breastfeeding*). Attempts at breastfeeding (has the infant ever been breastfed) is the most common measurement of initiation. However, research has shown that a more meaningful indicator of breastfeeding initiation than whether a mother has ever breastfed is whether she breastfed for at least two weeks. Physiological processes of the induction of lactation, occurring within the first week postpartum and resulting in mature production of milk around two

weeks postpartum, are critical for successful breastfeeding initiation (Nommsen-Rivers, Chantry, Peerson, Cohen, & Dewey, 2010). Therefore, in this study, successful breastfeeding initiation is conceptualized as having breastfed for at least two weeks (0 = *did not initiate* and 1 = *successfully initiated*). Breastfeeding duration is a continuous variable ranging from 0 to 13 months because all infants were at least 13 months old at the one-year visit to the laboratory when duration of breastfeeding was reported. In past research it has been found that mother-report is a valid measure of breastfeeding initiation and duration if asked within three years after weaning (Li, Scanlon, & Serdula, 2005). Though there may be some participant recall error, a strength of this project is that duration of breastfeeding was reported at six months and one year after birth. To assess reliability of the mothers' retrospective self-reports about breastfeeding, I compared their report at each of the two time points they were asked about breastfeeding by calculating a chi square for the question "*Did you ever breast feed?*" and calculating a correlation between the duration they reported at each time. The chi square results indicate that mothers were consistent when asked if they ever breastfed at six months postpartum and at one year postpartum ( $\chi^2(1) = 180.725, p < .001$ ), and the correlation between mothers' reports of how long they breastfed were strongly correlated at each time as well ( $r = .86, p < .001$ ).

### **Potential Covariates**

Based on prior research, infant gender, maternal age, maternal body mass index (BMI), household income-to-needs ratio, education, partner status, minority status, plans to return to work after childbirth, employment status at six months postpartum, and



depressive symptoms were considered as potential covariates. Age, household income-to-needs ratio, education, partner status (0 = *no partner in the home*, 1 = *married or lives with partner*) and minority status (0 = *African American or Mixed* and 1 = *European American*) were measured prenatally via demographic questionnaires. Maternal employment (0 = *not employed*, 1 = *employed part-time*, and 2 = *employed full time*) and infant gender were recorded via a demographic questionnaire when infants were six-months of age (1 = *male*, and 2 = *female*).

Research has shown that higher maternal BMI negatively influences initiation and duration of breastfeeding, and is therefore included as a potential covariate (Krause, Lovelady, & Østbye, 2011; Nommsen-Rivers, 2010). Participants' height and weight information were first collected at one-year postpartum and used to calculate BMI (weight in pounds, multiplied by 703, divided by height in inches squared). According to the CDC, a BMI under 18.5 is considered underweight, 18.5 – 24.9 is considered normal weight, 25.0 – 29.9 is considered overweight, and 30 or above is considered obese. Depressive symptoms were measured prenatally by the Depression Scale from the Center for Epidemiological Studies (CES-D; Radloff, 1977). This measure is a 20-item checklist of moods, feelings, and thoughts associated with depressive symptoms, such as "I have felt depressed," and "I have felt that people dislike me." Mothers indicated how often they felt each of the 20 ways within the past week on a scale from (1 = *never* to 4 = *most of the time*), ( $\alpha = .87$ ). Higher scores indicate more depressive symptomology.

## CHAPTER IV

### RESULTS

#### **Analysis Plan**

The data were analyzed in multiple steps. To begin, distributions were examined and missing data were identified. Then, descriptive statistics were generated for all key variables. Next, potential covariates (infant gender, maternal age, household income-to-needs ratio, education, partner status, minority status, prenatal plans to return to work after childbirth, employment status at six months postpartum, and depressive symptoms) were correlated with breastfeeding attempts, initiation and duration and the predictor variables to determine which should be used as covariates. Partial correlations between hypothesized predictors and the outcome variables, partitioning out covariates, were conducted to test the main effects posited in hypotheses one and two. Finally, in order to test the proposed interaction between infant negative affect and maternal psychosocial predictors, a series of linear regressions were computed.

#### **Preliminary Analyses**

Only 3.8% of data were missing, and these data were missing completely at random ( $\chi^2(343) = 385.45, ns$ ). Thus, single imputation was conducted within SPSS using a fully conditional specification model, meaning that missing values on any variable were predicted one at a time from all other variables (demographics, independent

and dependent variables). Then, distributions were examined and no univariate or multivariate outliers were identified. Next, means, ranges, and standard deviations were computed for all variables and can be seen in Table 1. Most mothers attempted to breastfeed (88%) and successfully initiated breastfeeding (86%), and the mean breastfeeding duration was nearly five months. Of all mothers, 38.7% were still breastfeeding when their child was six months old and 17.7% were still breastfeeding when their child was one year old. Most mothers (66.2%) scored below the clinical level of depressive symptoms, below 16, on the CES-D measure of depressive symptoms. Concerning maternal body mass index, 8% were underweight, 30% of mothers were of normal weight, 24.4% were overweight, and 39.6% were obese.

Next, possible covariates were identified by examining simple correlations between outcome variables and infant gender, and the following maternal variables: age, education, ethnicity, body mass index, depressive symptoms, partner status, employment status at six months postpartum, and household income-to-needs ratio. These correlations are displayed in Table 2. Age, level of education, partner status, ethnicity, and income to needs ratio were all significantly correlated with both breastfeeding initiation and breastfeeding duration (all  $p \leq .001$ ). Depressive symptoms correlated with breastfeeding attempts ( $p \leq .05$ ), initiation ( $p \leq .01$ ), and duration ( $p \leq .001$ ). Body mass index and employment status at six months correlated with breastfeeding duration ( $p \leq .05$  and  $p \leq .01$ , respectively). Neither infant gender nor prenatal plans to return to work after childbirth were significantly correlated with breastfeeding attempts, initiation, or duration and were therefore not included as covariates.

In an effort to reduce the number of covariates in subsequent analyses, a principle components factor analysis was conducted to determine if household income-to-needs ratio, partner-status, minority status, age, and education level, all common indicators of sociodemographic risk, could be reduced to a single factor. The results indicated these variables loaded on a single factor, which was named sociodemographic status, with an Eigenvalue of 3.02 that accounted for 60.33% of the variability. Factor loadings ranged from .66 to .86 (absolute values). Thus, these variables were standardized (except for minority status) and averaged such that a high score indicates higher sociodemographic status. As seen in Table 2, this composite variable correlated more strongly with breastfeeding initiation and duration than individual sociodemographic variables. Therefore, the sociodemographic status composite, depressive symptoms, and body mass index were all entered as covariates in further analyses. When breastfeeding duration was the outcome of interest, employment status at six months was also entered as a covariate. For correlations between these covariates and the independent variables, please see Table 3. It can be seen in Table 3 that the sociodemographic status composite, body mass index, and depressive symptoms correlate with many of the major predictor variables, further underscoring the importance of using them as covariates to ensure that observed associations between predictors and breastfeeding outcomes are not an artifact of these covariates.

### **Breastfeeding Attempts and Initiation**

Simple correlations were calculated in order to test the hypotheses that mothers prenatal psychosocial characteristics and social support would be positively correlated

with breastfeeding attempts, successful initiation, and duration (see Table 4). First, correlations were examined between predictor variables and breastfeeding attempts and initiation. Next, partial correlations were computed to determine if these associations were significant beyond the influence of sociodemographic status, body mass index, and depressive symptoms. Results indicated prenatal coherence of mind with respect to attachment was positively correlated with breastfeeding attempts ( $r = .26, p \leq .001$ ). This association remained significant after partialing covariates ( $r = .16, p \leq .01$ ). Consistent with hypothesis, coherence of mind also correlated positively with successfully initiating breastfeeding ( $r = .22, p \leq .001$ ). In partial correlations with covariates added, this association dropped to trend level ( $r = .13, p \leq .10$ ). Also as expected, there was a significant positive correlation between empathy in response to infant cries and breastfeeding initiation ( $r = .14, p < .05$ ); however, this association was no longer significant when covariates were added in partial correlations. Contrary to prediction, emotion regulation difficulties, angry and anxious responses to infant cries, and beliefs about crying were unrelated to breastfeeding attempts and successful initiation.

Additionally, it was hypothesized that mothers with more social support would be more likely to initiate breastfeeding. Results indicated that prenatal social support was correlated with breastfeeding attempts and initiation over and above the influences of covariates; however, contrary to prediction, these associations were negative ( $r = -0.17, p < .01$  and  $r = -0.18, p < .01$ ). This implies that mothers who reported more social support prenatally were slightly less likely to initiate breastfeeding than mothers who reported less social support, but only after covariates were controlled.

### **Breastfeeding Duration**

Simple and partial correlations were calculated to examine the relations between prenatal maternal psychosocial characteristics, social support, infant negative affect, and breastfeeding duration. Maternal coherence of mind with respect to attachment was positively correlated with breastfeeding duration ( $r = .22, p \leq .001$ ). When covariates were included in partial correlations this association was no longer significant. Prenatal emotion regulation difficulties were inversely associated with breastfeeding duration at a trend level, as expected. Prenatal anger in response to infant crying was inversely associated with duration at trend level over and above controls such that angry reactions were associated with fewer months of breastfeeding ( $r = -0.13, p < .10$ ). Contrary to my hypothesis, prenatal beliefs that responding to cries promotes mother-infant attachment was inversely correlated with breastfeeding duration, but at trend level only ( $r = -.11, p \leq .10$ ), and this association was non-significant when the covariates were controlled. Consistent with prediction, prenatal beliefs regarding controlling infant cries correlated negatively with duration of breastfeeding before adding covariates ( $r = -.22, p \leq .001$ ). Contrary to prediction, the remaining variables were not significantly correlated with breastfeeding duration: empathy and anxiety in response to infant cries, beliefs about crying related to spoiling the infant, minimizing cries, or viewing cries as communication.

It was also hypothesized that social support at six months postpartum would predict longer breastfeeding duration. As expected, social support from partners was significantly associated with breastfeeding duration in the simple correlations ( $r = 0.15, p$

< .05), but not after accounting for covariates. Social support from people other than the partner was not associated with breastfeeding duration.

Also, mother reported infant negative affect at six months was inversely associated with breastfeeding duration at trend level ( $r = -0.12, p < .10$ ), but not when covariates were partialled.

### **Negative affect interactions**

Next, it was proposed that the association between infant negative affect and breastfeeding duration would be moderated by maternal characteristics and social support. It was hypothesized that high ratings of infant negative affect would predict fewer months of breastfeeding when mothers also had less positive characteristics and were less satisfied with their social support, and that high infant negative affect would not predict fewer months of breastfeeding if mothers had more positive characteristics and were more satisfied with their social support.

A series of multiple regressions were calculated following guidelines laid out by Whisman and McClelland (2005). Continuous predictor variables (maternal coherence of mind, difficulties with emotion regulation, emotional reactions to crying, beliefs about crying, social support, and infant negative affect) were centered by subtracting the mean from participants' scores so that the mean became zero, and then each was multiplied separately with infant negative affect to create interaction terms. In each model, breastfeeding duration was the dependent variable. The covariates (sociodemographic status, body mass index, depressive symptoms, and employment status at six months) were entered in the first step of the regression. In the second step, infant negative affect,

one of the proposed moderators (maternal attachment status, emotion regulation, emotional reactions to crying, beliefs about crying, social support), and the interaction term between negative affect and the selected moderator were entered as predictors. Because prenatal maternal anger in response to crying was correlated with breastfeeding duration at tend level independent of the covariates, it was also entered as a predictor to see if it and any identified interactions were significant independent of one another. A total of 12 regressions were calculated. Significant interactions were plotted and simple slopes between negative affect and the outcome was calculated at high (+1SD) and low (-1SD) values of the moderator variables (Whisman & McClelland, 2005).

A significant interaction was found predicting breastfeeding duration between infant negative affect and maternal beliefs about crying related to spoiling ( $\beta = -.12, p < .05$ ). Of the 12 tested interactions with infant negative affect, this was the only interaction that was statistically significant, and therefore may have been found by chance (please see Table 5). As illustrated in Figure 1, the relation between infant negative affect and breastfeeding duration was negative for mothers with high beliefs about spoiling ( $\beta = -.10, ns$ ). In contrast, the relation between infant negative affect and breastfeeding duration was positive for mothers with low beliefs about spoiling ( $\beta = .14, p < .10$ ). This suggests that mothers who did not believe that responding to infant cries would spoil their child tended to breastfeed for a longer duration if they had more negative infants; whereas, mothers who believed responding to cries would spoil their child breastfed for a shorter amount of time if they had more negative infants. In addition, maternal anger in response to cries was a significant predictor of breastfeeding duration



independent of other predictors ( $\beta = -.11, p < .05$ ). The entire model accounted for 28% of the variability in breastfeeding duration, with the majority of this (26%) explained by sociodemographic status.

## CHAPTER V

### DISCUSSION

Improving breastfeeding outcomes is important in order to promote health and wellbeing. Thus, there is a need for predictors of breastfeeding initiation and duration to be better understood through research. Drawing from Belsky's (1984) model of the determinants of parenting, the goal of this study was to examine the extent to which prenatal maternal psychosocial characteristics, social support as an aspect of context, and infant negative affect predict breastfeeding initiation and duration. Until now, characteristics of mothers beyond depression and breastfeeding attitudes have been under researched. The results presented in this study suggest that certain psychosocial characteristics of mothers, even some characteristics that are present prior to giving birth, impact breastfeeding once infants are born. However, these effects were small and often not independent of sociodemographic factors.

#### **Prenatal Maternal Psychosocial Characteristics**

According to Belsky's model (1984), maternal characteristics are one source of influence on parenting. Some hypothesized associations between maternal psychosocial characteristics and breastfeeding initiation and duration were significant before considering the influence of sociodemographic status, body mass index, depressive symptoms, or employment status at six months post-partum.

### **Coherence of mind**

First, coherence of mind with respect to attachment was significantly correlated with breastfeeding initiation and breastfeeding duration before accounting for covariates. As predicted, and consistent with similar findings by Sharfe (2012), mothers with a more coherent state of mind with respect to attachment were more likely to initiate breastfeeding and breastfed for a longer duration than mothers with a less coherent state of mind with respect to attachment. Neither of these findings were statistically significant after controlling for covariates, although the association between coherence and initiation remained at a trend level. Interestingly, coherence of mind was significantly related to breastfeeding attempts, and remained so even after controlling for covariates. These results indicate some connection between mothers' internal working models or their attachment coherence, and whether or not they attempt to breastfeed their infants. The fact that this was only significant for breastfeeding attempts after accounting for the influence of covariates indicates that attachment insecurity, characterized by low coherence, primarily operates as a deterrent to considering breastfeeding. Perhaps this is due to maternal discomfort with physical proximity or intimacy (Bartholomew, 1990) particularly when infants are distressed, given cries upset insecurely attached individuals more than securely attached individuals (Groh & Roisman, 2009).

### **Difficulties with emotion regulation**

A negative trend-level association was observed between difficulties in emotion regulation and breastfeeding duration, suggesting that mothers who have more difficulty controlling their own emotions in the face of stress (such as a fussy infant) breastfeed for

a shorter amount of time. Life with a new infant is commonly a juxtaposition of joyfulness and stress (Belsky & Kelly, 1994). Mothers' own emotion regulation skills have been found to impact parenting abilities and disrupt the harmony of parent child interactions (Dix, 1991). More skilled maternal emotion regulation is necessary for mothers to respond sensitively to infants (Meunier, & Miller, 2004; Mills-Koonce et al., 2007). In relation to breastfeeding, mothers without the ability to adequately regulate emotional reactions to infant cries or frustrating latch processes are likely to have a more difficult time being patient or positive about the breastfeeding experience. These mothers may become overwhelmed, and may turn to bottle-feeding sooner than mothers who are able to remain calm in the face of stress. However, the association between difficulties with emotion regulation and breastfeeding did not remain significant after controlling for sociodemographic status, body mass index, depressive symptoms, and employment status.

### **Emotional reactions to cries**

Consistent with expectation, mothers' prenatal emotional reactions to infant crying were linked with breastfeeding to some extent. Specifically, empathic emotional reactions to crying were associated with breastfeeding initiation. This finding was consistent with the hypothesis that mothers with more infant-oriented reactions to crying would be more likely to initiate breastfeeding. In previous literature it has been found that mothers who have infant-oriented reactions to cries, rather than mother-oriented, are more sensitive and have more cooperative interactions with their infants (Dix et al., 2004; Leerkes, 2010). In light of this, it seems that mothers who feel empathetic concern for infant cries are more likely to want to breastfeed than mothers who may be irritated or

angered by crying. However, the association did not remain significant above the influence of controls.

Similarly, it was expected that mothers with self-focused emotional reactions to infant cries would be less likely to breastfeed. Supporting this hypothesis, it was found that maternal anger in reaction to infant crying was linked with shorter duration of breastfeeding independent of covariates and the one significant interaction effect.

Mothers who feel angry in response to infant cries may prefer to distance themselves from the upsetting sound of crying, or even approach the breastfeeding process with frustration and impatience with the infant. Such behaviors are likely to hinder breastfeeding because breastfeeding requires cooperation between mother and infant (O'Brien, Buikstra, Fallon, & Hegney, 2009).

### **Beliefs about cries**

It was hypothesized that mothers with more infant-oriented beliefs and fewer mother-oriented beliefs about crying would breastfeed for a longer amount of time because these mothers are more likely to view crying as communication rather than manipulation and may practice breastfeeding friendly behaviors such as feeding on demand. Consistent with this hypothesis, mothers who endorsed beliefs that indicate they want to control their child's crying, rather than use sensitive approaches to teach self-soothing, breastfeed for a shorter amount of time. Directive control beliefs about cries indicate that the mother desires to be in control, and believes her child should conform to her wishes. It could be that mothers who score high on directive control beliefs are less inclined to feed on demand, and prefer to feed on a schedule set by the mothers, which

has been known to decrease breastfeeding success (DiGirolamo & Grummer-Strawn, 2008; Merten, Dratva, & Ackermann-Liebrich, 2005). However, this association was not significant beyond covariates.

### **Social Support**

Another integral concept from Belsky's (1984) determinants of parenting model is the impact of context on parent-child relationships. One of many contextual factors that affect families is social support, or lack of social support. Currently, some surprising results were revealed, some of which conflict with hypotheses, but may point to more intricate social support processes. The social support measure utilized in this study captured mothers' general satisfaction with parenting-specific (but not breastfeeding-specific) support received, in this case from partners. Although breastfeeding is usually soothing and comforting, it does take time and energy from mothers, and it makes sense that breastfeeding would be made easier with more parenting support from partners such as praise and assistance with other infant care tasks. In line with this hypothesis, it was found that social support from partners at six months postpartum correlated positively with breastfeeding duration, as expected. However, this was observed before considering sociodemographic status, body mass index, depressive symptoms, and employment status.

A surprising unexpected result was that social support measured prenatally significantly correlated with breastfeeding attempts and initiation in an inverse manner after accounting for sociodemographic status, body mass index, and depressive symptoms. This suggests that the more social support mothers felt from loved ones, the less likely they were to attempt and successfully initiate breastfeeding. Although these finding

contradict the proposed hypotheses, unforeseen social support processes that impact critical early breastfeeding behaviors may be at work. It could be that mothers with satisfactory social support felt discouraged from attempting and initiating breastfeeding if their support network perceived breastfeeding as difficult or frustrating for the mothers. Social support figures may have demonstrated their support (albeit, not breastfeeding-specific support) by quickly encouraging them to switch to an “easier” method of feeding at the first sign of difficulty breastfeeding. Evidence that grandparents’ and partners’ negative attitudes about breastfeeding predict breastfeeding behavior are consistent with this interpretation (Rempel & Rempel, 2004; Scott & Mostyn, 2003). Furthermore, in prior research, social support *specific to breastfeeding* has been linked with more breastfeeding initiation and longer duration (Clifford & McIntyre, 2008; Ekström, Widström, & Nissen, 2003). It would be useful to know the extent to which global social support and breastfeeding specific support are related. Unfortunately, the measures are not available to do so in this study.

Although breastfeeding-specific support has been thoroughly researched in past literature, more general social support for parenting such as that measured here has been less studied in relation to breastfeeding. Previous literature has found that social support is related to other parenting behaviors, and the correlation between social support and breastfeeding duration found in this study supports these findings. Mothers who report more support from friends and family have been found in previous literature to practice more stimulating parenting in the face of stress (Pascoe et al., 1981), and be less restrictive and authoritarian (Colletta, 1979). Predictors of breastfeeding initiation and

duration could be better understood if future research inquired about breastfeeding-specific support from partners and other loved ones, as well as global support for issues other than breastfeeding that may matter in breastfeeding mothers' lives.

### **Infant Negative Affect**

Infant negative affect was examined only in relation to breastfeeding duration because it was measured at six months postpartum. As predicted, there was a significant association between mother reported infant negative affect and the belief that responding to infant cries will result in spoiling. This was the only interaction that was significant of twelve that were tested. Thus, this singular interaction only provides limited support for the hypothesis that maternal characteristics moderate the relation between negative affect and breastfeeding duration and may in fact be a chance finding. Nevertheless, mothers who rated their infants high in negative affect, who also felt that responding to cries spoils infants, tended to breastfeed for a shorter amount of time. In contrast, mothers who were low in the belief that responding to cries spoils infants breastfed for a longer amount of time. High infant negative affect scores indicate that mothers perceive their infants to be frequently or easily upset.

Further, high spoiling beliefs scores reflect that mothers think responding to infant cries will cause the infant to become manipulative, or overly dependent. When infants who are frequently upset have parents who are disinclined to respond due to beliefs about spoiling, the outcome seems to be problematic, at least where breastfeeding is concerned. It may be that the affection that generally accompanies breastfeeding is seen as inappropriate in the eyes of mothers who believe infants should not be rewarded for



crying. These mothers may be switching to formula in favor of a less personal method of responding to hunger cries. Also, they may refuse to feed on demand, which can undermine the supply of breastmilk and lead to early termination of breastfeeding. Future studies could examine mother's reasons for weaning, and possibly beliefs about feeding on demand versus scheduled feeding, while taking into account beliefs about crying and infant temperament. On the other hand, mothers who perceive their infants as high in negative affect, but who do not endorse the belief that responding to cries leads to spoiling, seem to breastfeed longer. It could be that mothers who do not believe they will spoil their child by responding to cries breastfeed longer if their infant is frequently fussy because they feel that breastfeeding is comforting to the infant.

This is the first study to my knowledge that has specifically researched the interactions between infant negative affect, beliefs about crying, and breastfeeding. However, the premise of the interaction is consistent with Crockenberg's (1986) proposition that infant negative affect diminishes parenting in the presence of other stressors within the context. In this case, the belief that responding to cries will spoil infants operates as a stressor to the breastfeeding mother-infant dyad in the context of high negative affect infant temperament.

### **A Closer Look at the Covariates**

An important implication of this study is the reconfirmation that sociodemographic factors are extremely salient in mothers' lives. Much prior literature has established the association of low breastfeeding rates with sociodemographic risks including minority status, maternal age, education, income, and marital status (CDC,

2006; Grossman, Larsen-Alexander, Fitzsimmons, & Cordero, 1989). The findings from this study clearly highlight these risks as well. In fact, as a set, the psychosocial and contextual variables predicted relatively little additional variation over and above the covariates. All covariates, sociodemographic status, body mass index, depressive symptoms, and returning to work, were associated with breastfeeding outcomes. In the case of sociodemographic status (maternal age, education, income, partner status, and ethnicity) the associations were robust for breastfeeding attempts, initiation and duration.

Of note, a series of post-hoc analyses demonstrated that the negative association between depressive symptoms and breastfeeding attempts, initiation, and duration was also non-significant after the sociodemographic covariates were controlled. This is interesting in light of the extensive literature arguing that depressive symptoms are an important predictor of breastfeeding (Dix et al., 2004; Hatton et al., 2005; Henderson et al., 2003). In fact, the simple associations between depressive symptoms and breastfeeding outcomes were of approximately the same magnitude as the simple associations between coherence and all three breastfeeding outcomes, between empathy and successful initiation, between both directive control beliefs, and partner support at six months, with breastfeeding duration. Also, each of these predictors of breastfeeding yielded significant effects over and above the effects of depressive symptoms. It was only when sociodemographic status was included that these effects were no longer significant. Depressive symptoms are only one psychosocial factor important to breastfeeding outcomes and it too is not independent of sociodemographic risk. Hence, the psychosocial factors examined in this study may deserve more attention in future

research, or at the very least, psychosocial factors other than depressive symptoms should be considered in the future.

The strong links between sociodemographic status and breastfeeding duration, which is associated with a host of adaptive outcomes, underscores the continued need to fight against poverty in our nation. Moreover, women need to be more supported in their daily lives of parenting and breastfeeding. In the United States, unpaid carework such as breastfeeding tends to go unnoticed because it is often conducted in private. However, breastfeeding is valuable work that takes time and energy for mothers to accomplish, and mothers need to be supported in doing so (Mulford, 2012). Despite the Surgeon General's call to action to support breastfeeding, breastfeeding is not supported in American communities or workplaces in ways that would allow these goals to be achieved. In this sample, breastfeeding duration was positively associated with employment at six months postpartum, contrary to expectation, but after controlling for education or income the correlation was no longer significant. Thus, the unexpected association occurred because women in this sample who worked at 6 months were more affluent. A different pattern would be expected among less affluent working women who may have lower status and less flexible jobs which are less conducive to breastfeeding (Kimbrow, 2006).

For example, many women do not have the authority or luxury of taking breaks during work to breastfeed or pump, and those who do often have difficulty finding satisfactory places to do so (Lubold & Roth, 2012). On top of these challenges, women have reported suffering pay discrimination due to breastfeeding, as well as social stigma,

and sexual harassment, (Lubold & Roth). All women who need and want to return to employment outside the home after the birth of a child should have more workplace support of breastfeeding, including lowered stigma, appropriate access to childcare, and calm, sanitary, locations to breastfeed within the workplace (Lucas & McCarter-Spaulding, 2012; Lubold & Roth).

Additionally, previous research has illuminated a negative association between obesity and breastfeeding, and current findings corroborate this association. In past research, not only are women with higher body mass indexes less likely to breastfeed and likely to breastfeed for a shorter duration, these women also tend to breastfeed less exclusively than women with more healthy body mass indexes (Krause et al., 2011). It has also been found that misconceptions about weight loss and breastfeeding may have a negative effect on breastfeeding outcomes for overweight women (Krause et al.). There was a significant connection between high body mass index and low education in the current sample. Given this association and the associations of body mass index with poverty and shorter breastfeeding duration, there is a clear need for more education and support for mothers with these risk factors. Indeed, breastfeeding education is always needed for health professionals, mothers, and for the general public, so that breastfeeding may become more accepted, supported, and promoted.

### **Strengths and Limitations**

The utilization of Belsky's determinants of parenting model (1984) is a strength of this study. This holistic and highly regarded model acknowledges that maternal characteristics, child characteristics, and characteristics of context are all influential for

parenting. The current study has demonstrated that social support and certain maternal psychosocial characteristics and child temperament factors may impact breastfeeding, though most results were modest in the context of larger sociodemographic covariates.

Furthermore, although many of the proposed effects were not confirmed, null findings are important contributions to the field of human development and family studies, and often point to important directions for future research. Considering this, the current study has many strengths. Participants may share some cultural context due to location, but within this location these mothers are a diverse group of women in terms of income, age, education, personalities, and life situations. Also, the breastfeeding rates observed at six months and one year are very similar to CDC reports of breastfeeding rates in the state from which this sample was drawn. According to the most recent Breastfeeding Report Card provided by the CDC, 38.3% of infants in North Carolina were still breastfeeding at six-months, and 20.8% were still breastfeeding at one year (CDC, 2012), as compared with 38.7% breastfeeding at six-months and 17.7% breastfeeding at one year in the current sample. In these respects, and considering the diversity of the sample, the results from this study are likely generalizable in regards to breastfeeding behavior.

Moreover, the methods utilized to capture psychosocial characteristics are well suited to the research goals in this study. For certain research questions, participant self-reports might be considered a weakness in methodology, but for the questions relevant to this study, self-reports are a strength. Mothers' own perceptions of their personalities, their contexts, and their children are believed to be the driving influence of breastfeeding

behaviors. The adult attachment interview (AAI) is a particularly well renowned measure that involves an extensive interview that gives insight into mothers' perceptions and acceptance of how they were parented as children. In previous research insecure coherence of mind measured by the AAI has been linked with parental responsiveness and other behaviors that may be involved with breastfeeding (van Ijzendoornvan, 1995). In this study it is notable that coherence with respect to attachment predicted breastfeeding attempts independent of covariates. Continued investigation of breastfeeding using this gold standard measure of attachment-related coherence should be considered for future research.

Despite these strengths, there were some methodological challenges for this study as well. The most evident challenge was the lack of in-depth, breastfeeding-specific measures. The only breastfeeding-specific measures available were questionnaire items asking mothers if they had ever breastfed, and if so for how long. Ideally, more thorough breastfeeding questions should be implemented to capture mothers' beliefs about breastfeeding, plans to breastfeed, difficulties and pleasures of breastfeeding, social support for breastfeeding, and so forth. It is also important that future research inquire whether mothers are, or have been, breastfeeding exclusively, and to be specific about conceptualizations of exclusivity. Further, whether mothers are breastfeeding their infants or feeding breast milk from a bottle should be recorded. This distinction is especially important when examining psychosocial and temperamental characteristics because the act of breastfeeding induces physiological changes for mother and baby that influence interpersonal relationships (Else-Quest et al., 2003). Another limitation to

consider is that mothers' body mass index was first recorded at one-year postpartum. Because data regarding BMI was not available prenatally, it is possible that some mothers were overweight before giving birth and lost weight after the birth of their infant. If this occurred, breastfeeding attempts and initiation might have been impacted negatively by higher BMI prenatally.

Finally, I have argued that the factors under consideration may affect breastfeeding outcomes because they help mothers cope with barriers to breastfeeding or breastfeeding difficulties, but no measure of perceived barriers to breastfeeding or breastfeeding difficulties were available. It may be the case that the independent variables considered in this study have limited main effects on breastfeeding outcomes but operate as buffers or dual risks in conjunction with breastfeeding difficulties.

### **Directions for Future Research**

The lack of main effects over and above sociodemographic covariates suggests a more sophisticated or nuanced approach to identifying predictors of breastfeeding is warranted. First, though in this project race was used as a covariate, future studies could examine the possibility that maternal psychosocial factors, contextual factors, and infant temperament have different effects on breastfeeding outcomes for different racial groups. In other words, race should be examined as a moderator rather than treated as a covariate (Steinberg & Fletcher, 1998). Given that breastfeeding rates are lower among African American mothers in this and other samples (Grossman, 1989), this approach has the added advantage of yielding information that could be used to tailor breastfeeding promotion efforts specifically to African Americans. There are likely social and

historical reasons why certain groups of people have lower or higher rates of breastfeeding. For instance, years ago in the United States, African American women were sometimes forced or coerced into breastfeeding European American families' infants, often at the tragic expense of African American women's own children (Fentiman, 2012). Traumatic eras of the past such as these leave legacies that still influence perceptions of breastfeeding in different cultures, and could play a part in shaping some women's decisions to breastfeed (Fentiman).

Furthermore, though I examined an aspect of each of the three determinants of parenting described by Belsky (1984), the focus of this paper was maternal characteristics. It is important that future studies acknowledge more aspects of the influence of infant characteristics on breastfeeding, such as infant cooperation and latch, or other aspects of infant personalities. Contextual factors other than social support also need to be more thoroughly examined in relation to breastfeeding. For example, familial, community or cultural beliefs and attitudes about breastfeeding, as well as access to education are likely to influence mothers' ability and desire to breastfeed.

Moreover, it is quite possible that barriers to breastfeeding are amplified for mothers with difficulties with emotion regulation or who have insecure coherence of mind with respect to attachment that may already struggle with self-perception insecurities or embarrassment more than others. And, as mentioned, sociodemographic factors, treated as controls in the current study, were the most robust predictors of breastfeeding duration. It may be that the maternal characteristics considered here and social support buffer or exacerbate the extent to which sociodemographic risk is linked to



poorer breastfeeding outcomes. For example, low sociodemographic status mothers who are highly empathetic, have adequate emotion regulation, positive beliefs about crying, and social support may have more favorable breastfeeding outcomes than low sociodemographic status mothers without these positive personal and interpersonal supports in place. Especially, mothers with low sociodemographic status who are prone to anger and anxiety in response to crying, depressive symptoms, and negative beliefs about crying may have the worst breastfeeding outcomes due to multiple risk factors.

### **Conclusion**

Breastfeeding is related to many beneficial outcomes such as fewer serious illnesses for mothers and infants and lower rates of obesity (DHHS et al., 2011). Although it is clear that sociodemographic factors play a role in breastfeeding, it is important to identify maternal psychosocial factors, contextual characteristics, and infant characteristics that predict additional variation in breastfeeding outcomes. Such knowledge may be useful in identifying women at risk of not breastfeeding or early termination of breastfeeding, as well as helpful for creating breastfeed support. Although many of the results of the current study were non-significant, three unique findings emerged that were independent of the covariates. First, mothers with more coherent internal working models with respect to attachment were more likely to attempt breastfeeding. Thus, greater breastfeeding promotion efforts should be dedicated to women with insecure working models. Second, women who felt angry in response to infant crying breastfed for a shorter duration. Finally, mothers of highly negative infants that believed responding to cries could spoil their infants breastfed for a shorter amount

of time than mothers without such beliefs related to spoiling. Breastfeeding education programs may need to address reactions to and beliefs about crying in order to promote developmentally appropriate knowledge regarding infant cries. Ultimately, additional research is needed to identify the best approaches to encourage and support breastfeeding for mothers who face these unique barriers.

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APPENDIX A

TABLES

Table 1. Descriptive Statistics of Major Variables

(n = 237)	<i>M</i>	<i>SD</i>	Range
<i>Outcome Variables</i>			
Attempted Breastfeeding	88.20 <sup>a</sup>		
Breastfeeding Initiation	85.70 <sup>a</sup>		
Breastfeeding Duration (in months)	4.99	4.56	0.00 – 13.00
<i>Covariates</i>			
Sociodemographic Status	0.00	0.77	-1.36 – 1.67
Body Mass Index	29.44	7.42	14.90 – 52.86
Depressive Symptoms	13.72	8.60	0.00 – 42.00
Employment Status at Six Months	0.97	0.88	0.00 – 2.00
<i>Prenatal Predictor Variables</i>			
Attachment Coherence of Mind	5.35	1.43	2.00 – 8.00
Emotion Regulation Difficulties	1.89	0.42	1.12 – 3.07
Empathy in Response to Cries	2.17	0.61	1.00 – 3.83
Anger in Response Cries	1.10	0.16	1.00 – 2.00
Anxiety in Response to Cries	1.11	0.18	1.00 – 2.31
Spoiling Beliefs about Cries	2.56	0.74	1.00 – 4.67
Minimizing Beliefs about Cries	2.07	0.54	0.93 – 4.56
Attachment Beliefs about Cries	4.77	0.33	2.75 – 5.13
Directive Control Beliefs about Cries	3.40	0.62	1.50 – 5.00
Communication Beliefs about Cries	4.46	0.53	2.67 – 5.00
Social Support	4.84	0.97	1.17 – 6.00
<i>Six Month Predictor Variables</i>			
Social Support from Partner	3.88	1.29	1.00 – 5.19
Social Support from Others	4.24	0.80	1.29 – 5.58
Infant Negative Affect	3.48	0.94	1.25 – 6.50

Note: <sup>a</sup> Attempted Breastfeeding and Breastfeeding Initiation are reported as the percentages of women who attempted and initiated breastfeeding.

Table 2. Correlations of SES Covariates with Breastfeeding Outcomes

	Breastfeeding Attempts	Breastfeeding Initiation	Breastfeeding Duration
<i>Individual SES Covariates</i>			
Age	.25***	.28***	.42***
Highest Level of Education	.26***	.31***	.46***
Income-to-Needs Ratio	.24***	.26***	.44***
Partner in the Home	.31***	.27***	.37***
Ethnicity	.24***	.24***	.24***
<i>Composite SES Covariate</i>			
Sociodemographic Status	.34***	.36***	.50***
<i>Other Covariates</i>			
Body Mass Index	-.08	-.03	-.16**
Depressive symptoms	-.15*	-.17**	-.21**
Plans to return to work	-.03	-.01	.02
Employment Status at 6 mo.			.18**
Infant gender	-.05	-.04	-.07

Note: † $p \leq .10$ , \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

Table 3. Correlations of Covariates with Major Variables

	SES	BMI	Depressive Symptoms	Employment at 6 mo.	Plans to Return Work	Infant Gender
<i>Prenatal Predictor Variables</i>						
Attachment Coherence of Mind	.33***	-.19**	-.08	.15*	-.00	-.01
Emotion Regulation Difficulties	-.08	.01	.51***	.01	-.01	-.04
Empathy in Response to Cries	.15*	.08	-.06	-.06	.00	.03
Anger in Response Cries	.07	.03	.06	.09	-.01	-.07
Anxiety in Response to Cries	-.05	.04	.07	.02	.01	.09
Spoiling Beliefs about Cries	-.14*	.02	.11†	.15*	.04	-.02
Minimizing Beliefs about Cries	.05	.06	.20**	.06	.04	-.10
Attachment Beliefs about Cries	-.17**	-.04	-.10	-.08	.03	.04
Directive Control Beliefs about Cries	-.36***	.08	.09	-.10	.02	.05
Communication Beliefs about Cries	.10	-.03	-.08	.04	.05	.05
Social Support	.22***	-.08	-.42***	.03	.01	.01
<i>Six Month Predictor Variables</i>						
Social Support from Partner	.32***	-.22***	-.30***	.06	-.09	-.02
Social Support from Others	.00	.02	-.25***	.07	.01	.01
Infant Negative Affect	-.27***	.19**	.19**	-.07	.06	.02

Note: † $p \leq .10$ , \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

Table 4. Correlation of Predictor Variables with Outcome Variables

	Breastfeeding Attempts <sup>a</sup>		Breastfeeding Initiation <sup>a</sup>		Breastfeeding Duration <sup>b</sup>	
	Zero Order	Partial	Zero Order	Partial	Zero Order	Partial
<i>Prenatal Predictor Variables</i>						
Attachment Coherence of Mind	.26***	.16**	.22***	.13†	.22***	.07
Emotion Regulation Difficulties	-.02	.05	-.03	.05	-.13†	-.07
Empathy in Response to Cries	.12	.06	.14*	.08	.07	-.00
Anger in Response Cries	-.06	-.08	-.02	-.05	-.08	-.13†
Anxiety in Response to Cries	.03	.05	.06	.09	-.07	-.05
Spoiling Beliefs about Cries	-.00	.05	.01	.07	-.06	.01
Minimizing Beliefs about Cries	.05	.05	.06	.06	.06	.06
Attachment Beliefs about Cries	-.01	.05	-.04	.02	-.11†	-.05
Directive Control Beliefs about Cries	-.11	.02	-.10	.03	-.22***	-.05
Communication Beliefs about Cries	.09	.05	.07	.03	.05	-.00
Social Support	-.05	-.17**	-.04	-.18**	.05	-.10
<i>Six Month Predictor Variables</i>						
Social Support from Partner	--	--	--	--	.15*	-.03
Social Support from Others	--	--	--	--	-.03	-.06
Infant Negative Affect	--	--	--	--	-.12†	.03

Notes: <sup>a</sup> Sociodemographic status, body mass index, and depressive symptoms, are included as covariates in partial correlations.

<sup>b</sup> Sociodemographic status, body mass index, depressive symptoms, and employment status at six months are included as covariates in partial correlations.

† $p \leq .10$ , \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .



Table 5. Regression Coefficients for Multiple Regression Models Predicting Breastfeeding Duration

	Model 1			Model 2		
	B	SE B	$\beta$	B	SE B	$\beta$
Sociodemographic Status	2.78	.37	.47	2.90	.3	.49***
Body Mass Index	-.01	.04	-.02	-.01	.04	-.02
Depressive Status	-.03	.03	-.06	-.03	.03	-.05
Employment Status at Six Months	.05	.31	.01	.12	.32	.02
Prenatal Mother-Oriented Anger in Response to Cries				-3.15	1.59	-.11*
Prenatal Spoiling Cry Beliefs				.05	.36	.01
Infant Negative Affect				.09	.29	.02
Infant Negative Affect X Prenatal Spoiling Cry Beliefs				-.77	.37	-.12*
R-squared			.26***			.28***
Change in R-squared			.26***			.29†

Note: † $p \leq .10$ , \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

APPENDIX B

FIGURE

Figure 1. Interaction of Infant Negative Affect and Breastfeeding Duration, Moderated by Beliefs about Spoiling

