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Predicting Emotion Regulation in Early Childhood: The Impact of Maternal Well-Being, Infant Crying, and Dyadic Mutuality

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PREDICTING EMOTION REGULATION IN EARLY CHILDHOOD:

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For my family

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ABSTRACT

Learning adaptive emotion regulation skills in early childhood has been identified as fundamental to social competence, academic success, and psychological well-being. Because children learn to regulate their emotions through interactions with their caregivers, dyadic mutuality between the mother and infant may influence child emotion regulation capacity more than maternal behavior alone. To better understand the impact of maternal well-being and infant crying on the development of emotion regulation, parenting stress, maternal self-efficacy, maternal depression, and infant crying were examined with dyadic mutuality in the parent-child interaction to predict emotion regulation capacity.

A racially and socioeconomically diverse community sample of 149 mother-infant pairs was assessed from 6 months to 24 months postpartum. Mothers reported on maternal well-being and infant crying at six months postpartum and child internalizing symptoms, externalizing symptoms, and negative emotionality at 24 months postpartum. Dyadic mutuality in the parent-child interaction was measured by observer ratings at 6 months postpartum. Multiple linear regression analyses revealed that, when combined with dyadic mutuality, parenting stress, infant crying (amount and maternal perception), and maternal depression predicted child emotion regulation. Interaction terms were then added to the models to test whether early maternal and infant risk factors would moderate the relationship between dyadic mutuality and later child emotion regulation skills. The

interaction terms were not significant, indicating that the main effects models best represent these data. Finally, forward selection model building was used to create a simple model to predict each emotion regulation variable. The best fit model to predict internalizing symptoms contained parenting stress alone. Parenting stress and perception of crying as problematic predicted negative emotionality. Parenting stress, maternal perception of infant crying as problematic, and dyadic mutuality were found to best predict externalizing symptoms. Parenting stress was the strongest, most consistent predictor of child emotion regulation at 24 months. The impact of parenting stress on challenges with emotion regulation in early childhood highlights the importance of reducing levels of parenting stress, especially during the postpartum period. Home visiting programs that offer support and education in the postpartum period can help reduce parental stress and improve parental perceptions and parent-child interactions.

CHAPTER I

INTRODUCTION

Five chapters comprise this document. The present chapter contains the

background and significance of the problem and the research questions. Chapter II

includes a review of the literature relevant to the present study, with sections on the

development of emotion regulation, parent-child interaction, maternal well-being (i.e.,

parenting stress, maternal depression, and maternal self-efficacy), and infant crying.

Chapter III presents the research methods, including a description of sample, research

design, instruments, and data analysis. Chapter IV describes the results of the study.

Chapter V presents a discussion of the findings, limitations, and implications.

Background and Significance

In the context of educational reform, a renewed interest in child outcomes has

recently been reflected in the popular media. In searching for the factors that predict

children's success, in school and in life beyond school, Tough (2012) finds that certain

"non-cognitive skills" appear to be most influential, one of these being self-regulation.

Self-regulation in early childhood has been found to predict not only academic success,

but also better psychological adjustment, better relationships and social skills (e.g., more

appropriate emotional responses), fewer crimes, better personal finances, better physical

health, healthier eating habits, and less substance abuse (Moffitt et al., 2011; Tangney,

Baumeister, & Boone, 2004). In Walter Mischel's well-known "marshmallow tests"

conducted in the late 1960s at Stanford University, children were given the option to eat

one marshmallow or wait until the experimenter returned and then receive two marshmallows. Children who could not wait for the experimenter to return and ate the marshmallow—that is, displayed low levels of behavioral self-regulation—were found to later develop more behavior problems, obtained lower SAT scores, had more attentional difficulties, and struggled in relationships more than those who could wait (Mischel, Rodriguez, & Shoda, 1989). These "delay of gratification" studies have demonstrated that learning to self-regulate in the first few years of life appears to be a key factor in predicting later outcomes.

Self-regulation contains four components: controlling one's thoughts, emotions, impulses, and performance (Baumeister, Heatherton, & Tice, 1994). Self-regulation of emotions is a major task of life, a skill with which many adults are at least occasionally unsuccessful. "Emotion regulation" is the term used to describe this management of emotions, which consists of modifications in physical, behavioral, and cognitive processes in response to changes in emotion (Spinrad, Stifter, Donelan-McCall, & Turner, 2004). Emotion regulation begins to develop in infancy and ability continues to expand and strengthen during early childhood.

Previous research has found some associations between early emotion regulation capacities and later child outcomes. Ability to regulate emotions in early childhood has been found to predict empathy and prosocial behavior (Panfile & Laible, 2012). Poor emotion regulation skills have been found to relate to difficulty in social interactions (Calkins, Coplan, Fox, & Rubin, 1995; Eisenberg, Fabes, Guthrie, & Reiser, 2002; Fabes & Eisenberg, 1992; Gottman, Katz, & Hooven, 1996; Shonkoff & Phillips, 2000),

conduct disorders (Cole et al., 1994; Mullin & Hinshaw, 2007), depression and anxiety (Bowie, 2010; Campbell-Sills & Barlow, 2007; Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996), and vulnerability to psychopathology (Cole & Hall, 2008; Rutter, 1991). Challenges with emotion regulation also increase risk for developing attention deficit disorder (Barkley, 1997; Cole, Zahn-Waxler, & Smith, 1994) and problems with cognitive development (Hay, 1997), such as memory impairment (Gross, 2002). Learning emotion regulation in early childhood appears to affect multiple areas of development.

Because adaptively regulating one's emotions is such a crucial skill to develop, the factors that help or hinder children's acquisition of these skills has been of great interest. Maternal behavior and the interactions between mothers and infants have been studied extensively in the search for the early influences on emotion regulation. One consistent finding is that mothers' reactions to children's emotions are important in the development of emotion regulation skills. Children learn to regulate their emotions largely through interactions with their caregivers (Eisenberg et al., 1998; Fabes, Leonard, Kupanoff, & Martin, 2001; Mirabile et al., 2009). A responsive caregiver is necessary for infants to develop the capacity to regulate themselves (Bridges & Grolnick, 1995; Kopp, 1989).

The importance of parent-child interactions has also been emphasized in the conversation on home visiting programs. The Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program, which is part of the Patient Protection and Affordable Care Act (commonly referred to as "ObamaCare"), has led to a discourse on

the goals and outcomes of home visiting programs. "Positive parenting practices" is one of the eight outcome domains reviewed by the Home Visiting Evidence of Effectiveness (HomeVEE) used to determine which programs should be considered evidence-based home visiting programs (U.S. Department of Health and Human Services, Administration for Children and Families, 2012). Facilitating responsive interactions is a facet of positive parenting practices, and home visitors aim to improve parent-child interactions in a variety of ways, depending on the program. For example, in the evidence-based home visiting program Healthy Families America, services are initiated during pregnancy or just after birth, placing home visitors in a position to promote responsive parent-child interactions from the start: "Through role play and modeling, home visitors can help parents learn how to touch, hold, soothe, and communicate with their babies in ways that promote healthy development" and "increase sensitivity, responsiveness, and nurturing towards their children" (Prevent Child Abuse America, n.d.).

Parent-child interactions are the context in which children learn emotion regulation skills (Eisenberg et al., 1998; Fabes, Leonard, Kupanoff, & Martin, 2001; Mirabile et al., 2009). The significance of parent-child interactions raises the question, are there mother-infant pairs for whom a high-quality parent-child interaction is even more important, having an even greater impact on the child's later emotion regulation? Children of mothers experiencing challenges with their postpartum functioning, for example, may especially benefit from positive parent-child interactions. Previous research on parent-child interactions has tended to focus on maternal behavior, yet the other partner in the interaction also participates. Children bring their own behavioral and

biological propensities, including temperament and neurological vulnerabilities, as well as behavior already learned in their life thus far. Infant crying reflects both biological predispositions and behavioral patterns and is relevant to the development of emotion regulation. Research on infant crying has examined associations between excessive crying and threats to maternal well-being, especially depression, parenting stress, and maternal self-efficacy. The next step is to uncover whether these maternal factors and infant factors increase or reduce the influence of the parent-child interaction on the child's development of emotion regulation skills.

If home visiting programs can help improve parent-child interactions, researchers should aim to understand which factors increase the impact of the parent-child interaction on child development. Until home visiting services can be offered to all families, services should at least be targeted to families who are experiencing these risk factors. With a better understanding of the effects of maternal well-being, infant crying, and the parent-child interaction on child outcome in the domain of emotion regulation, interventions may be better able to target the families who are most in need.

Theoretical Framework

Difficulty with emotion regulation in early childhood has been found to predict later mood disorders and challenges with behavior, social interactions, attention, and memory (Barkley, 1997; Bowie, 2010; Calkins et al., 1995; Campbell-Sills & Barlow, 2007; Cole et al., 1996; Cole, Zahn-Waxler, et al., 1994; Eisenberg et al., 2002; Fabes & Eisenberg, 1992; Gottman et al., 1996; Gross, 2002; Hay, 1997; Mullin & Hinshaw, 2007; Rutter, 1991; Shonkoff & Phillips, 2000). Due to the increased risk for

maladaptive child outcomes in the presence of emotion regulation deficits, the factors

that contribute to developing adaptive emotion regulation skills are of interest. Infants

and children primarily learn emotion regulation through interactions with their parents

(Eisenberg et al., 1998; Fabes, Leonard, Kupanoff, & Martin, 2001; Mirabile et al.,

2009). Synchronous interactions containing contingent behavioral responses are

fundamental to the child's emotional development (Field, 1994; Stern, 1977), and infants

of parents who respond contingently in parent-child interactions tend to demonstrate

more effective emotion regulation (Conradt & Ablow, 2010; Haley & Stansbury, 2003;

Kogan & Carter, 1996; Mills-Koonce et al., 2007; Moore et al., 2009; Propper et al.,

2008).

  If specific components parent-child interactions are early predictors of emotion

regulation capacity, then risk factors that can both hinder the development of emotion

regulation and affect the impact of the parent-child interaction should be identified.

Maternal postpartum well-being and infant crying should be explored as potential

predictors of the child's emotion regulation capacity. When mothers experience threats

to their well-being, they may have difficulty responding to their infants' signals (Cohn &

Tronick, 1983; Field, 2000). In addition, persistent infant crying may also impact the

development of emotion regulation.

  Although various aspects of maternal postpartum functioning may be associated

with the parent-child interaction, a body of research has found that parenting stress is a

strong predictor of both child and parent behavior. High levels of parenting stress have

been found to predict intrusive maternal behavior and less engagement in parent-child

interactions (Calkins, Hungerford, & Dedmon, 2004; Farmer & Lee, 2011). In addition, Roberts (1989) found that parenting stress predicts child behavior, mediated by the parent-child interaction. Farmer and Lee (2011) concluded that parenting stress was the "catalyst" that directly affected both maternal depression and parent-child interaction. However, Huang, Costeines, Kaufman, and Ayala (2014) found that maternal depression mediates the relationship between parenting stress and child outcome. These contradictory findings raise many questions.

The impact of parenting stress and other aspects of maternal well-being, along with infant crying and the parent-child interaction, on emotion regulation in early childhood is not yet well understood. The central goal of this study was to provide a better understanding of the influence of maternal well-being, infant crying, and the parent-child interaction on emotion regulation, in addition to understanding the relationship between parenting stress, maternal depression, maternal self-efficacy, infant crying, and the parent-child interaction. Hence, the present study was based upon two main research questions:

1. Are parenting stress, maternal depression, low maternal self-efficacy, excessive infant crying, and maternal perception of infant crying as problematic risk factors for challenges with emotion regulation in early childhood, while dyadic mutuality in the parent-child interaction promotes child emotion regulation?

2. Do early risk factors (parenting stress, maternal depression, low maternal self-efficacy, and infant crying) moderate the relationship between dyadic mutuality in the parent-child interaction and later child emotion regulation skills, in that a

synchronous parent-child interaction is a stronger predictor of child emotion

regulation skills in the face of these risk factors?

CHAPTER II

REVIEW OF RELATED LITERATURE

In the present chapter, research studies that are relevant to the research questions of the present study will be reviewed. First, the development of emotion regulation in the first years of life will be reviewed with a focus on the role of individual differences in emotion regulation and on the context in which they develop. Child-related and mother-related factors that hinder or promote the development of emotion regulation will be reviewed. Some of the risk factors that may be associated with the child's emotion regulation capacity include excessive infant crying and parenting stress. Research on the child outcomes associated with early emotion regulation capacities will be considered including outcomes related to mental health, development and learning. The chapter concludes with an evaluation of the findings, highlighting the need for further research on the role of the parent-child interaction and the factors that impact the development of emotion regulation skills.

Emotion Regulation

Learning to modulate one's emotions is a major task in socioemotional development. One definition of emotion regulation that is both accurate and relevant is one provided by Eisenberg and Spinrad (2004): "[emotion regulation is] the process of initiating, avoiding, inhibiting, maintaining, or modulating…internal feeling states…and/or the behavioral concomitants of emotion… [to adapt socially or achieve] individual goals" (p. 338). Emotions are the result of assessing a situation in terms of

one's own goals, which then motivate behavior (Frijda, 1986). Because emotions "make us feel like *doing* something" (Gross & Thompson, 2007, p. 5) but we do not always respond according to our emotional impulses, there must be another step in between the emotional experience and the response where we "decide" whether the response toward which we are driven is desirable or not. In this model of emotion regulation, known as the "modal model," attention is followed by appraisal, resulting in a response (Thompson, 2007).

While some researchers favor a one-factor approach of emotion regulation, claiming that emotion and its regulation are inseparable because all emotion is regulated (e.g., Campos et al., 2004), many maintain that emotion regulation contains two factors (e.g., Cole, Martin, & Dennis, 2004; Ekman, 1993; Gross & Thompson, 2007). In the two-factor approach of emotion regulation, emotion occurs instantaneously, and then is adjusted. According to this viewpoint, emotions are reactions, while regulation is the management of the emotional reaction. This perspective allows for the potential of one to experience unadulterated emotions before they are regulated. The two-factor approach is sensible both conceptually and experimentally, allowing for separate measurement of the emotion experience and emotion regulation.

Gross (1998; 2002) has proposed that the emotion regulation process consists of various strategies. One strategy is suppression, which is inhibiting one's display of emotion (Gross, 2002). Other strategies used to decrease negative (or increase positive) emotional arousal include cognitive reappraisal, which involves changing one's perception of a situation; attentional deployment, which is intentionally directing one's

attention; and selecting or modifying the situation to decrease potential undesirable emotional arousal (Thompson, 2007). Gross (1998) has also distinguished between problem-focused coping and emotion-focused coping. The former attempts to resolve the problem that is the source of the distress, while the latter focuses on diminishing the negative emotion. Although he did not specify whether the problem- or emotion-focused coping strategy more successfully reduces negative emotion, Gross (2002) did note that reappraisal has been found to be more effective than suppression because reappraisal decreases both the emotional impact of the situation and the expression of emotion.

Development of Emotion Regulation

Because emotions require management from birth, developmental researchers have studied infants' and toddlers' regulatory strategies, examining the ways in which these skills develop and change with age. Early attempts at emotion regulation are thought to be primarily physiological and about managing state of arousal (Calkins & Hill, 2007; Kopp, 1982). In the first three months of life, infants' emotion regulation strategies are mainly comprised of sucking—including non-nutritive sucking (Gunnar, Fisch, & Malone, 1984)—hand-to-mouth movement, and head-turning (Calkins & Hill, 2007; Kopp, 1989). Newborn infants use reflexive signaling, usually crying, to regulate themselves, which can occur regardless of caregiver intervention (Rothbart, Ziaie, & O'Boyle, 1992). Different perspectives on the functions of crying exist, such as crying as a release of tension to the overloaded nervous system (Brazelton, 1990), or as a communicative signal that evolved from more primitive physiological functions of the larynx (Hofer, 2002). Crying in the newborn may serve as an internal physiological

regulator or a signal to elicit care, or possibly both. As Barr elucidates, crying can be viewed as a sign, a symptom, and a signal (Barr, Hopkins, Green, & Wolke, 2000). As the newborn develops, physiological functions and communicative abilities change, so crying behavior and function also change.

At around three months of age, the infant displays significant changes in almost every area, including electrical patterns of brain activity and regulation of visual attention, illustrating that for the infant's physiology, a shift occurs from mother-derived regulation to some capacity for self-regulation (Shonkoff & Phillips, 2000). Attentional deployment, attending to pleasant stimuli and not attending to aversive stimuli (e.g., by looking away or closing one's eyes), is an important emotion regulation strategy that develops during this time (Calkins & Hill, 2007; Rothbart et al., 1992). Gaze aversion allows the infant to modulate arousal when stimulation has risen above the optimal range (Stern, 1974) and reduce his or her elevated heart rate (Field, 1981). Infants can use gaze aversion, or disengagement, more successfully at 3-4 months of age because of developmental changes in the function of the attention systems in the brain (Rothbart et al., 1992). The posterior attention system, which is a relatively involuntary system that involves areas in the back of the brain that are associated with attentional mechanisms, begins to develop in the first months of life and promotes orientation toward meaningful stimuli (Rothbart et al., 1990). The functional improvements that develop in this attention system at 3-4 months of age allow infants to respond to joint attention and use attentional deployment to self-regulate (Mundy & Newell, 2007; Rothbart et al., 1992). Due to growth in the central nervous system, 3-month-olds are also more capable of

initiating social interactions (Emde, Harmon, & Gaensbauer, 1976). For example, the development of the social smile promotes positive social interactions with caregivers (Kopp, 1989) and begins to play a central role in establishing and maintaining relationships (Sander, 1976). Infants' ability to respond to joint attention at this age (Mundy & Newell, 2007) also encourages more social interactions. The length of time required to recover from distress decreases greatly between two and four months of age (Hembree, Huebner, & Izard, 1987). By four months of age, hand-to-mouth movements and non-nutritive sucking become more deliberate (Demos, 1986). At 3-4 months of age infants' self-regulatory behaviors are becoming more successful. Nevertheless, infants still need assistance with regulation, and relationships with caregivers are still critical. The infant depends upon a "self-regulating other" to provide appropriate and consistent responses to the infant (Stern, 1985). The caregiver's responses are teaching the infant how to self-regulate.

During the middle of the first year of life, infants are also becoming more aware of their various arousal states and the fact that states can be altered by themselves or by caregivers (Kopp, 1989). These newfound abilities, along with their increased interest in their bodies and the external world (Piaget, 1954), enable infants to use distraction as an emotion-regulation strategy. By six months of age, infants attempting to self-soothe will gaze away from their mothers more often than they gaze at their mothers (which is a shift from 3 months old, when they spend much of the time gazing at their mothers), and they attend to objects to visually distract themselves, including their hands and their surroundings (Mangelsdorf, Shapiro, & Marzolf, 1995; Toda & Fogel, 1993). Infants

grow more effective at soothing themselves, as self-regulatory behaviors become more successful by six months old (Tronick & Gianino, 1986). Toward the second half of the first year, infants use avoidance behaviors more frequently to soothe themselves, which is exemplified by 10-month-olds struggling to break free from an arm restraint more often than 5-month-olds (Stifter & Spinrad, 2002). Attentional capacity also continues to improve. When they are distressed, 9-month-olds are better able than 3- and 6-month-olds to shift and sustain their attention to objects (Gianino & Tronick, 1988). By 12 months of age, infants tend to use attention regulation, physical self-comforting, and their mother to help them cope (Parritz, 1996).

As children's cognitive, motor, and language capacities develop, their ability to regulate emotions improves (Campos et al., 2004; Cole et al., 2004; Kopp, 1989; Piaget, 1981). During the second year, the interplay of the emergence of representational thought and an improved recall memory (Piaget, 1954) engenders a sense of self-awareness and the realization that negative emotions have causes (Kopp, 1989). As a result, toddlers can regulate their emotions in new ways. They now understand that they have the ability to make themselves feel better or worse depending on what they do for themselves, and they can avoid or change situations that cause emotional distress (Kopp, 1989). Additionally, representational thought and recall memory also allow toddlers to delay actions and obey parental demands (DeGangi, 2000). Toddlers gain the ability to internalize routines and requests, which allows for the meeting of social norms and parental expectations (Davies, 2004; DeGangi, 2000).

Compared with infants, the regulatory strategies used more often by toddlers include physical self-comforting behaviors and problem-focused behaviors, such as moving the stimulus, bringing their mothers to the stimulus, or asking their mothers about the stimulus (Parritz, 1996). During the second year children's desire to control the situation increases. Mangelsdorf et al. (1995) found that 18-month-olds are more likely than 12-month-olds to try to direct their interactions with strangers. Not only are toddlers learning to control their environments (and those in them), but behavioral self-control also begins to develop at 18 months (Davies, 2004; DeGangi, 2000). By 24 months, children's emotion regulation strategies are increasingly related to mothers' strategies (Tonyan, 2002). Twenty-four-month-olds also seek help from their mothers much more quickly than 18-month-olds when faced with a problem, using positive attention as a "social tool" to try to achieve their goals (Van Lieshout, 1975).

Toddlerhood contains new challenges in emotion regulation, as well. In the first two years of life, connections between neurons are rapidly forming, called "synaptogenesis," and the maximum density of synapses in the prefrontal cortex is reached at about two years of age (Huttenlocher & Dabholkar, 1997). Because the prefrontal cortex is responsible for decision-making and behavioral control (Yang & Raine, 2009) and toddlers have an overabundance of synapses in this brain region, resulting in inefficient use of the prefrontal cortex, it makes sense that toddlers would not be proficient at behavioral regulation. Toddlers are still learning to control their impulses, and this ability improves greatly by the time they reach 36 months (Davies, 2004).

Toddlers are also working to reconcile their desire for independence with the yearning for parental closeness (Lieberman, 1993). These often conflicting urges can sometimes lead to behavior that can be confusing to parents, such as asking to be picked up and immediately struggling to get down (Lieberman, 1993). During this period, children are still seeking assistance from their parents to help soothe them, such as physical comfort (Bridges & Grolnick, 1995), but they are learning how to use a variety of regulatory strategies to manage their own emotions. Toddlers are able to physically comfort themselves, distract themselves, and use symbolic self-soothing (Bridges & Grolnick, 1995). Symbolic thought, which can be observed in toddlers' symbolic play, is essential for language development, and it is also functional for emotional development (Davies, 2004). Toddlers can distort reality through play (Davies, 2004; Erikson, 1950; Stern, 1985). This allows the toddler to relieve anxiety by "playing it out," just as adults relieve anxiety by "talking it out" (Lieberman, 1993, p. 136). The use of transitional objects can comfort toddlers because of their ability to give meaning to symbols, as the transitional object represents the attachment relationship to the child (Davies, 2004).

Emotion regulation is an aspect of regulation that becomes more easily observed during this period. Externalizing behaviors, such as peer aggression, defiance, and high activity, may present when toddlers lack emotion regulation skills (Child Mind Institute, 2013). Through tantrums, however, toddlers learn coping skills (Lieberman, 1993), including play, self-stimulation, and regulation through their attachment relationships (Davies, 2004). They learn cooperation and compromise through these episodes of negativism (Lieberman, 1993). Toddlers begin to be able to tolerate not getting their way

with an explanation from their parents that they can understand (Lieberman, 1993). The emotional development of toddlers is also displayed by their empathy towards others, sometimes even expressing concern for their dolls and stuffed animals (Shonkoff & Phillips, 2000; Stern, 1985). Caregivers can appeal to this empathy when attempting to prevent or terminate behavior that is hurtful to others, but it is more effective if they are specific, such as saying, "Let Tommy have a turn," rather than, "It is good to share" (Lieberman, 1993).

Because of the developmental shift in cognitive and physiological abilities in early childhood, emotion regulation strategies become more varied and complex by preschool age. Physical self-comforting behaviors, such as clasping of hands, hair, face, feet, or sucking of fingers or thumb, are preferred by infants over other emotion regulation strategies and are associated with a decrease in negative arousal for infants, as well (Stifter & Braungart, 1995). While preschoolers also physically comfort themselves, they do not merely more effectively use the same emotion regulation strategies that infants use or use sophisticated forms of the same strategies. Preschoolers are capable of more complex emotion regulation strategies (Stansbury & Sigman, 2000). An increasing sense of self-awareness (Kagan, 1998) and the development of theory of mind (Wellman & Estes, 1986) during the preschool period provide the skills necessary for more cognitively-orientated emotion regulation strategies. Theory of mind is one person's understanding of another's mental state (Wellman, 1990), or the ability to take the perspective of someone else. Developing theory of mind allows preschoolers to engage in cognitive reappraisal, which is redefining the situation or stimulus so that it appears

less distressing (Kochanska, 1994; Stansbury & Sigman, 2000), an emotion regulation strategy that has been demonstrated to be quite effective for adults (Webb, Miles, & Sheeran, 2012). Cognitive reappraisal includes self-directed statements such as, "I'm a big girl," indicating a cognitive shift to attempt to deal with the situation (Bridges & Grolnick, 1995). The level of cognitive development achieved in preschool allows for new abilities and the internalization of regulatory strategies (Kochanska, 1994).

The ability to regulate emotions is related to the abilities to soothe oneself physiologically and focus attention (Gottman et al., 1996), which depend on the development of certain brain regions. Intentionally regulating emotional arousal, for instance, has been found to be a function of changes in amygdala activation (Schaefer et al., 2002). Because the prefrontal cortex affects the amygdala, the development of the prefrontal cortex may also be an important factor in the development of emotion regulation (Goldsmith & Davidson, 2004). Additionally, voluntary emotion regulation processes may become increasingly automatic as one gains familiarity with contexts, thus growing more successful with experience (Goldsmith & Davidson, 2004).

The study of emotion regulation is of interest to child development researchers not only because learning to manage one's emotions is an important aspect of child development, but also because it has the potential to explain how and why emotions organize other psychological processes and the harmful consequences that can result from emotion regulation deficits (Cole et al., 2004). In addition to affecting one's emotional experiences and displays, emotion regulation also relates to other aspects of social development. Effective emotion regulation predicts empathy and prosocial

behavior in children (Panfile & Laible, 2012). In fact, emotion regulation was found to mediate the relationship between attachment security and empathy, thus securely attached children tend to empathize more with others because of their emotion regulation skills (Panfile & Laible, 2012). When children cannot effectively regulate their emotions, they tend to have difficulties in social interactions (Calkins et al., 1995; Eisenberg et al., 2002; Fabes & Eisenberg, 1992; Gottman et al., 1996; Shonkoff & Phillips, 2000). Poor emotion regulation skills are also associated with an increased risk for developing attention deficit disorder (Barkley, 1997; Cole, Zahn-Waxler, & Smith, 1994), behavioral disorders (Cole et al., 1994; Mullin & Hinshaw, 2007), and symptoms of depression and anxiety (Bowie, 2010; Campbell-Sills & Barlow, 2007; Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996). Difficulty with regulating emotions has been linked to later problems with cognitive development, as well (Hay, 1997), such as memory impairment (Gross, 2002). Furthermore, ineffective emotion regulation early in life leads to vulnerability to psychopathology (Cole & Hall, 2008; Rutter, 1991).

Individual Differences in Emotion Regulation

A growing number of emotion regulation strategies become available to children as they develop, yet the types of strategies remain the same. Physical self-comforting and stimulus avoidance, for example, are two types of strategies. One might assume that self-regulatory strategies are a function of temperament, and individuals tend toward the same kind of strategy to regulate themselves throughout development. Yet not much individual stability in the strategies for emotion regulation has been found, except for using oral self-soothing, such as thumb sucking (Rothbart et al., 1992). Certainly

individual differences in emotion regulation exist, but variation may lie in individual capacity to self-regulate and effectiveness of the strategy employed, rather than the types of strategies.

Because emotion regulation is essentially a neuropsychological process, researchers have been investigating which areas of the brain are responsible for certain emotion regulatory functions. In an experiment where adult females were exposed to unpleasant pictures and then were either instructed to inhibit negative emotions or allowed to decide for themselves whether to inhibit negative emotions, brain scans revealed that different parts of the brain were activated in the two situations: deciding to inhibit negative emotions for themselves resulted in activation in the dorso-medial prefrontal region, an area of the brain previously linked with inhibiting movement, while instructions to inhibit negative emotions did not activate that brain region (Kühn, Haggard, & Brass, 2013). Because the brain region activated when participants decided for themselves to regulate their emotions is associated with inhibiting movement, the authors theorized that controlling one's emotions and controlling one's behavior involve overlapping mechanisms (Kühn et al., 2013).

Studies observing individuals with brain damage have revealed informative findings about the function of specific brain regions and how they affect emotion regulatory capacity (Beer & Lombardo, 2007, Table 4.1). For example, Rinn (1984) found that damage to the basal ganglia, located in the forebrain, is associated with impairment in producing facial expressions. Understanding the deficits in emotion

regulation that result from damage to certain brain regions allows us to infer which emotion regulatory functions require which brain regions to function properly.

Individual differences in physiological regulation may also provide insight into individual differences in emotion regulation. The autonomic nervous system controls involuntary functions of internal organs, and research measuring cardiac vagal tone, an index of autonomic regulation, has revealed that there is variation in neural regulation of autonomic state. Vagal tone reflects one's ability to increase heart rate during situations that require active coping and slow down the heart during situations that do not present a challenge (Porges, 2007). Individual differences in vagal tone have been associated with a number of regulatory behavior in infancy (Kagan, Snidman, Arcus, & Reznick, 1994; Richards & Cameron, 1989; Stifter, Fox, & Porges, 1989). Vagal tone has been shown to be an indicator of approach (Richards & Cameron, 1989), expressivity (Stifter et al., 1989), soothability, and attention span (Huffman et al., 1998) in infants. Moreover, differences in autonomic regulation are associated with typical and atypical development (Porges, 1996). Poor vagal tone in infancy predicted behavioral problems at 3 years old (Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996) and 4.5 years old (Dale et al., 2011). It is important to keep in mind, however, that developmental outcome results from biology interacting with the environment (Kagan et al., 1994). Biological vulnerabilities increase risk for developmental challenges, yet an environment that promotes positive relationships and adaptive skills can reduce biological risks (Shonkoff & Marshall, 2000). Successful early childhood interventions illustrate the potential

influence of the environment on child outcomes by buffering the impact of existing biological vulnerabilities (Porges, 1996; Shonkoff & Marshall, 2000).

In addition to brain imaging and physiological research, biology can provide insight into individual differences in emotion regulation through the study of genetics. Genes impact various biological functions that are relevant to emotion regulation. Differences in personality and affective expression can be linked to genetic variation in neurotransmitters and anatomy (Hariri & Forbes, 2007). For example, the genes DRD2 and DRD4 have been found to increase risk for impulsivity and lower behavioral control (Noble et al., 1998). Similarly, the characteristics of dominance, novelty seeking, and reward sensitivity, typically found in extraverts, are thought to be related to the neurotransmitter system of dopamine (Hariri & Forbes, 2007). Although studies searching for genetic bases for specific behaviors have been conducted for decades, findings have been generally inconsistent, highlighting the fact that genes only provide a predisposition or susceptibility to personality and certain illnesses or disorders (Hariri & Forbes, 2007). Genes always interact with the environment, and the environment can act as a buffer and protect the individual from developing a condition or exacerbate one's risk, increasing the probability of developing a condition.

Parent-Child Interaction and Emotion Regulation

A large component of parenting is guiding children's emotion experiences (Thompson, 1994). Parents' reactions to their children's emotions, their communication about emotion, and their emotional expressivity and competence all contribute to the socialization of children's emotion regulation (Eisenberg et al., 1998). Children tend to

utilize emotion regulation strategies similar to those used by their mothers[1] (Calkins &
Johnson, 1998; Mirabile et al., 2009), yet mothers' reactions to children's emotions have
been found to impact children's development of self-regulation more than mothers'
expressions of emotions (Spinrad, Stifter, Donelan-McCall, & Turner, 2004). Parents
who sensitively respond to their children by anticipating transitions, redirecting attention,
and promptly responding to distress promotes the children's ability to independently
manage negative emotions (Thompson, 1998).

      Children learn to regulate their emotions primarily through interactions with
their parents (Eisenberg et al., 1998; Fabes, Leonard, Kupanoff, & Martin, 2001; Mirabile
et al., 2009). Infants of mothers who display responsive, contingent behaviors in parent-
child interactions tend to demonstrate more effective emotion regulation (Conradt &
Ablow, 2010; Haley & Stansbury, 2003; Kogan & Carter, 1996; Mills-Koonce et al.,
2007; Moore et al., 2009; Propper et al., 2008). To observe how an infant reacts in a
stressful situation and how he or she self-regulates after the stressful situation is over,
researchers use the Still-Face Paradigm (Adamson, Als, Brazelton, Tronick, & Wise,
1978; Cohn & Tronick, 1983) where the mother plays normally with an infant, then looks
at the infant but maintains flat affect, not responding to the infant for two minutes. After
the 2-minute period of the mother maintaining the "poker face," she is encouraged to
interact with and respond to her infant. This reunion episode demonstrates the co-
regulatory process that occurs between the mother and infant, as well as how quickly and

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[1]Because the large majority of research on parent-child interactions and parental responsiveness
has studied mothers, many of these findings are referring to the mother assuming she is the primary
caregiver. The current paper will discuss mothers specifically, while acknowledging that mothers are not
always the primary caregiver.

effectively the infant can return to a calm state. During the reunion episode, infants were better able to regulate themselves physiologically (Conradt & Ablow, 2010; Haley & Stansbury, 2003; Moore et al., 2009) and behaviorally (Haley & Stansbury, 2003; Kogan & Carter, 1996) when their mothers demonstrated high responsiveness.

Maternal responsiveness can even buffer the impact of genetic risk on emotion regulation (Propper et al., 2008). Certain genes, DRD2 and DRD4, have been linked to impulsivity and lower behavioral control (Noble et al., 1998), placing one at risk of poor regulatory capacity. In response to maternal separation, infants with the DRD2 risk gene demonstrated difficulty physiologically regulating; however, maternal sensitivity moderated this association by reducing the infant's risk (i.e. improving physiological regulation) over time (Propper et al., 2008). Thus, infants with the genetic risk who experienced sensitive maternal caregiving were eventually able to physiologically regulate themselves as well as the infants without the genetic risk. Caregiver responsiveness to the needs of their infants appears to foster the development of adaptive methods to regulate themselves when experiencing physiological stress (Derryberry & Rothbart, 1985).

Maternal responsiveness has been linked with the development of emotion regulation skills in early childhood (Cole, Michel, & Teti, 1994). Halligan and colleagues (2013) found that maternal responsiveness was associated with child emotion regulation at 12 weeks, 18 months, and 5 years of age, concurrently and prospectively. For toddlers, maternal responsiveness and positive guidance has been associated with the child's use of adaptive regulating behaviors, such as distraction and mother-oriented

behaviors (Calkins & Johnson, 1998; Graziano, Calkins, & Keane, 2011). Maternal intrusiveness or over controlling behaviors have been linked with lower sustained attention at age 2 (Graziano et al., 2011), which is associated with emotion regulation capacity (Gottman et al., 1996). Due to the increase in language and cognitive capacities, toddlerhood seems to be a key period in the development of emotion regulation ability (Kopp, 1989).

To obtain a more global rating of maternal responsiveness, some researchers who study parent-child interactions have created composite scores of the maternal behaviors that reflect responsiveness. For example, using the qualitative ratings for parent-child interaction developed for the National Institute of Child Health and Human Development Study of Early Child Care (NICHD Early Child Care Research Network, 1997; Owen, 1992), Moore at al. (2009) aggregated the scores of the subscales for sensitivity, positive regard, stimulation, animation, and detachment (reverse scored) to create a composite score of maternal responsiveness. Maternal responsiveness to infant signals has been found to predict later attachment status (Donovan, Leavitt, Taylor, & Broder, 2007; George, Cummings, & Davies, 2010; NICHD Early Child Care Research Network, 1997), child attentional skills (Gartstein, Crawford, & Robertson, 2008; Healey, Gopin, Grossman, Campbell, & Halperin, 2010), child behavior/compliance (Donovan et al., 2007; NICHD Early Child Care Research Network, 1998), and self-control (NICHD Early Child Care Research Network, 1998), as well as promoting language development in children (Carpenter, Nagell, Tomasello, Butterworth, & Moore, 1998; Laakso, Poikkeus, Katajamäki, & Lyytinen, 1999; Nelson, Carskaddon, & Bonvillian, 1973;

Tamis-LeMonda, Bornstein, Baumwell, & Damast, 1996). Maternal responsiveness appears to be a key factor in nurturing skills that are necessary for developing emotion regulation capacity.

Dyadic Mutuality

Synchronous, responsive interactions between the parent and child are key for the child's emotional development and the parent-child relationship (Stern, 1977). Dyadic mutuality describes the reciprocal, responsive, and synchronous behavior that occurs between a parent and infant (Deater-Deckard & Petrill, 2004; Owen, 1992). This feature of parent-child interactions is typically most apparent during short, playful interactions, often referred to as a "dance" due to its rhythmic, responsive nature (Ainsworth, Bell, & Stayton, 1974; Beebe, 1982; Brazelton, Koslowski, & Main, 1974; Fogel, 1993; Stern, 1977; Tronick, 1989). Sander (1976) refers to the caregiver-child interaction that is observable by the middle of the first year as a "reciprocal exchange," which is a "stimulus-response alternation, back and forth, between mother and child" (p. 136). In these interactions, the parent serves as the infant's external source of regulation (Haley & Stansbury, 2003; Stern, 1985). The caregiver modifies the interactions with the infant by initiating exchanges in a more apparent way now, taking turns with infant (Sander, 1976). The persistence of reciprocal exchanges (Sander, 1976) with a "self-regulating other" (Stern, 1985) facilitates the parent-child relationship. The importance of dyadic mutuality in the parent-infant interaction has been demonstrated in various populations, including high-risk, low-income families, as well as white, middle-class families (Raver, 2004).

Parent-infant exchanges are not all perfectly coordinated; plenty of mismatches occur, but the infant has the coping mechanisms at 6 months to repair these mismatches (Tronick & Gianino, 1986b). This phenomenon of "mismatch and repair" was demonstrated by Tronick and Gianino (1986a) when they found that typical mother-infants pairs were out of sync about 70% of the time. Infants used predominantly effective coping strategies, which began to stabilize at about six months of age, to repair the mismatches (Tronick & Gianino, 1986a). The success of the repair depends not only on the strategy used in each context, but is also a function of the emotional availability of the mother and her ability to act as co-regulator, for a mother who fails to respond to her infant's bids for help regulating—due to depression, for example—leads to poorly coordinated interactions (Tronick & Gianino, 1986b). The potential impact of depression on the parent-child interaction will be explored further in the following section.

Constructs similar to dyadic mutuality that contain many of the same features have been studied in previous research. Kochanska (2002) coined the term "mutual responsive orientation" to refer to parental and infant dyadic functioning. The aspects measured in mutual responsive orientation are the following: (a) smooth, synchronous, coordinated routine; (b) mutual cooperation and receptivity; (c) connectedness; (d) harmonious communication; and (e) emotional ambiance (Kochanska, Aksan, Prisco, & Adams, 2008). Others have created composite scores to capture this construct: in one study, dyadic mutuality was represented by combining parent responsiveness to child, child responsiveness to parent, dyadic cooperation, and dyadic reciprocity/joint attention (Deater-Deckard & Petrill, 2004). In a review on dyadic synchrony, Harrist and Waugh

(2002) outlined three features that create a synchronous interaction: shared attentional

focus, coordination or matching, and contingency. Shared attentional focus is when the

parent and child are looking at the same object or acting together on the same focus

(Camaioni, Aureli, Bellagamba, & Fogel, 2003). Matching of emotional expression, or

imitation (Field, 1977), is a salient aspect of an interaction with high dyadic mutuality

(Brazelton, Yogman, Als, & Tronick, 1979). Finally, contingency is behavioral

responding that is predictable over time (Beebe et al., 2008). Beebe et al. used the term

"interactive contingency" to refer to the predictability of each partner's behavior from

that of the other over time.   Contingent responsiveness in parent-child interactions are

thought to create a sense of self-efficacy in the infant (Brazelton et al., 1974) and foster

social (Legerstee & Varghese, 2001; Tarabulsy, Tessier, & Kappas, 1996), emotional

(Kochanska & Coy, 2002), and moral (Kochanska, 2002) development. Although each

of these terms has a distinct definition, many of these terms are used interchangeably

with "dyadic mutuality," sharing the core features of synchrony and responsiveness.

Dyadic mutuality in parent-child interactions becomes the foundation for the

child's future capacity for intimacy, symbol use, empathy, perspective taking (Feldman,

2007), and internalization of parental values and rules (Kochanska, 1997). Research

examining the influence of dyadic mutuality in infancy on self-regulation in early

childhood is sparse. Dyadic mutuality has been linked with fewer child behavior

problems in older children (Deater-Deckard & Petrill, 2004). For younger children, Kim

and Kochanska (2012) found that mutual responsive orientation between the mother and

child at 15 months predicted effortful control, defined as "the capacity to suppress a

dominant response and perform a subdominant response" (p. 1277), in the child at 25 months. Effortful control is related to self-regulated compliance (Kopp, 1982). Furthermore, infant temperament was found to moderate the relationship between dyadic synchrony in infancy and self-regulation at two years, with stronger associations between synchrony and self-regulation for more difficult infants (Feldman & Greenbaum, 1999; Kim & Kochanska, 2012b). Dyadic mutuality in interactions may be especially important for some parent-infant dyads.

Due to the consistent nature of dyadic mutuality longitudinally in parent-child dyads (Kochanska & Aksan, 2004), an assessment of the parent-child interaction at one point in time is often used to represent the pattern of behavior between the parent and child. To measure dyadic mutuality and other aspects of the parent-child interaction, researchers have observed parent-child interactions and coded them with scales developed for this purpose in certain contexts. Dyadic mutuality has been measured in parent-child interactions during feeding sessions (e.g., Karger, 1979), clean-up tasks (e.g., Kim & Kochanska, 2012), and free-play sessions (e.g., NICHD Early Child Care Research Network, 1997). In the qualitative ratings for parent-child interaction developed for the NICHD Study of Early Child Care (NICHD Early Child Care Research Network, 1997; Owen, 1992), dyadic mutuality is one of the constructs scored. Dyadic mutuality in parent-child interactions has also been measured using microanalysis, which is computerized coding of the parent's and child's behaviors second-by-second, sometimes observing several behaviors per second (Gordon & Feldman, 2008; Hedenbro, Shapiro, & Gottman, 2006; Tronick & Reck, 2009). Microanalysis allows researchers to

use computers to measure behaviors that the naked eye would typically be unable to observe, such as detecting a brief moment of mirroring between the parent and child.

It is noteworthy that most of the research on parent-child interactions has studied Western populations. Parenting practices and values vary among Western cultures, but potentially more problematic is using a Western lens to measure parenting behavior in cultures where the method is inappropriate. For example, in a study examining the cross-cultural validity of an observational maternal responsiveness coding scale, maternal responsiveness was found to predict more consistent parenting and fewer child behavior problems in Euro-Canadian mothers but was associated with more child behavior problems and not with consistent parenting in East Asian immigrant mothers (Chan, Penner, Mah, & Johnston, 2010). Hence, it is unclear whether the tool was not appropriately measuring maternal behavior in each culture or similar parenting behaviors impact children in different ways in different cultures. When systematically considering the parenting styles of various cultures, two styles of parenting (distal and proximal) have been associated with the orientation of the culture towards individualism or collectivism (Keller et al., 2004). In order to learn about parenting behaviors and practices in a culture, the method used in the research should be based on a culture-specific approach that would determine the normative behaviors within the culture and provide an understanding of the beliefs and values underlying those practices (Jackson, 1993). The current understanding of the role of maternal responsiveness in the development of the parent-child relationship suggests that responsiveness by at least one primary caregiver may be important to children in all cultures, but additional research is needed to

understand how to validly measure responsiveness across different cultures. Dyadic mutuality takes into account both the parent and the infant's behavior, thus dyadic mutuality may be a more appropriate construct to measure across cultures. Nevertheless, the impact of dyadic mutuality on child outcome may differ depending on the family's culture (Ispa et al., 2004). Research testing the psychometrics of measures of dyadic mutuality must be implemented in various cultures to discover whether these measures are valid across cultures.

Parent-Child Interaction and Maternal Well-Being

Because responsive behavior by the mother has been found to promote adaptive emotion regulation in children, it is worthwhile to examine the factors that predict maternal behavior in interactions. Maternal well-being is one contributing factor to the mother's capacity to respond to her child. A mother's mental health and stress levels affect her behavior and capacities. Obstacles to well-being that are not uncommon for mothers—especially mothers of infants—are depression, parenting stress, and low maternal self-efficacy. Whether and how these facets of well-being impact the mother's contribution to the mother-child interaction are of great interest.

Maternal Depression

The prevalence of postpartum depression is estimated to be between 13% (O'Hara & Swain, 1996) and 19% (Gavin et al., 2005), based on meta-analyses of a number of relevant studies. Because emotion regulation develops in the context of mother-infant interactions (Field, 1994), maternal depression can compromise the mother-infant relationship and the infant's development (Field, 2000; Tronick & Reck, 2009; for a

review, see Murray & Cooper, 1997). A meta-analysis on postpartum depression and infant-mother attachment found that children of depressed mothers were less likely to form secure attachment relationships with their mothers and were at increased risk for disorganized attachment (Martins & Gaffan, 2000). The Still Face Paradigm (described on page 22) has been utilized in research studies to observe how a depressed caregiver might affect both the caregiver's and the infant's behavior in the interaction. Depression diminishes a mother's ability to engage in interactions with her infant and respond to her infant's signals (Bettes, 1988; Cohn & Tronick, 1983; Field, 2000; Murray & Cooper, 1999; Murray, Stanley, Hooper, King, & Fiori-Cowley, 1996; Tronick & Weinberg, 1997). Depressed mothers have difficulty responding contingently to their infants: they tend to look away from their infants more and behave more intrusively when interacting with their infants than non-depressed mothers (Cohn & Tronick, 1989). Depression appears to affect maternal responsiveness in mother-infant interactions.

A meta-analysis investigating the relationship between maternal depression and parenting behavior found a strong association between depression and irritable and hostile parenting behavior toward the child, with larger effect sizes for mothers of infants than mothers of toddlers and preschoolers (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Maternal depression may have a greater impact on infants than older children due to infants' limited ability to self-regulate (Kopp, 1989). When infants are distressed, they require assistance from a caregiver to help them regulate their emotions. As they grow older, infants are capable of more internal emotion regulation, and the use of the caregiver to help regulate becomes more of a self-initiated emotion regulation strategy

with less supplementation required from the caregiver (Bridges & Grolnick, 1995;

Tronick & Gianino, 1986b). Thus, in regards to the development of emotion regulation,

the well-being of the caregiver may be most critical during infancy.

Not only does the mother's behavior tend to change when she is depressed, but

the behavior of the infants of depressed mothers differs from that of infants of non-

depressed mothers, as well. Infants of depressed mothers tend to show more negative

affect, less responsiveness, and more dysregulation (Field, 1984, 2000; Murray &

Cooper, 1999; Paris, Bolton, & Weinberg, 2009; Tronick & Reck, 2009), even when

interacting with a stranger (Field et al., 1988). Depression may influence the flexibility

of the interaction, leading to increased negativity in the child (Lunkenheimer, Albrecht,

& Kemp, 2013). In mother-infant interactions, infants of depressed mothers also tend to

spend more time avoiding their mothers than infants of non-depressed mothers (Cohn,

Matias, Tronick, & Connell, 1986; Field, Healy, Goldstein, & Guthertz, 1990). Maternal

depression has been found to predict challenges with joint attention with the infant

(Raver & Leadbeater, 1995). Furthermore, infants' regulatory strategies vary depending

on the mothers' depression status. Infants of depressed mothers tend to use self-directed

soothing strategies during a stressful event, presumably because their attempts at

initiating interactions with their mothers have repeatedly not been responded to (Manian

& Bornstein, 2009; Tronick & Gianino, 1986b). Infants of depressed mothers are more

likely to struggle with emotion regulation because they are deprived of a consistent

external regulator of stimulation who models emotion regulation for them (Feldman,

2007; Field, 1984) and helps them to establish behavioral and physiological organization (Field, 1994).

Maternal depression can potentially create disruptions in the mother-child interaction (Papoušek & Papoušek, 1997). Depressed mothers tend to be less responsive and less sensitively attuned to their infants than nondepressed mothers (Bettes, 1988; Cohn & Tronick, 1983; Field, 2000; Murray & Cooper, 1999; Murray et al., 1996; Tronick & Weinberg, 1997). Depressed mothers typically touch their infants less often and the touching tends to be more functional and less affectionate (Feldman, 2007; Field, 1994). Mothers with depressive symptoms have been found, generally, to have two different interaction styles, an overstimulating or intrusive style and an understimulating or withdrawn style (Cohn, Matias, Tronick, Connell, & Lyons-Rutz, 1986; Field, Healy, Goldstein, & Guthertz, 1990; Jones et al., 2001). Interestingly, depressed, intrusive mothers can recognize their behavior as overstimulating more often than depressed, withdrawn mothers can recognize their behavior as understimulating (Cohn & Tronick, 1989). Nevertheless, both intrusive and withdrawn interaction styles can interfere with the mother-infant dyad achieving dyadic mutuality in their interactions.

Several interventions have the potential to improve interactions between depressed mothers and their children. Brief mood inductions to decrease depressive symptoms (e.g., presenting photographs of happy faces to trigger a positive mood) and the use of substitute caregivers, such as nursery school teachers and fathers, have been shown to benefit mother-infant interactions (Field et al., 2000). Treatment that addresses the mother-infant relationship and the mother's depression has been shown to result in

more positive mother-infant interactions and a reduction in maternal depressive symptoms (Clark et al., 2008). One study demonstrated a decrease in depressive symptoms following treatment for depression through medication and support sessions, which was associated with improvement in the mother-child interactions and the infants' quality of play (Goodman, Broth, Hall, & Stowe, 2008). On the other hand, a review of a number of treatment-outcome studies on depressed mothers and their infants found that targeting the mother's depressive symptoms alone may not be enough to buffer the impact of negative effects on the child, while treatment aimed at improving the mother-infant relationship (e.g., infant-parent psychotherapy, parent-child interaction therapy, and home-based interventions) demonstrates the most promising outcomes for the child (Nylen, Moran, Franklin, & O'Hara, 2006). Because the most effective treatment is likely to depend on a number of factors, these conflicting findings reveal a need for further research to better understand which treatment of depressed mothers and their infants is most successful under which conditions.

Despite the wealth of research demonstrating an association between maternal depression and parent-child interaction, there have been some inconsistent findings. Depression lasting two months was not associated with the quality of the parent-child interaction, but more negative interactions were found in mothers and infants when depression lasted through 6 months postpartum (Campbell, Cohn, & Meyers, 1995). Short-lived depression may have little effect on the parent-child interaction (Campbell & Cohn, 1997). However, other studies have found that experiencing postpartum depression at all during the first year of the infant's life can impact future parent-child

interactions and child outcomes, even when the depressive symptoms are no longer present (e.g., Stein et al., 1991). Although the length of time the mother exhibits depressive symptoms may influence its impact on the child and the parent-child relationship, the duration of depression required for a lasting impact on the parent-child interaction or child outcomes is not yet known. Surprisingly, Farmer and Lee (2011) did not find a direct link between maternal depression and the quality of the parent-child interaction. However, the data were collected when the children were 3 years old, and the parent-child interaction was measured by mother report of frequency of engaging in positive activities with her child (Farmer & Lee, 2011). Mantymaa et al. (2006) also did not find an association between maternal mental health and maternal behavior in the mother-infant interaction at two months. In this study, more valid methods were used; maternal mental health was assessed with a clinical diagnostic interview and the interaction was measured using observation.

Maternal depression has been found to predict emotion regulation challenges and social and behavioral problems in preschool age children (Mistry, Biesanz, Taylor, Burchinal, & Cox, 2004; West & Newman, 2003; Xin et al., 2008). Thus, maternal depression may directly influence child emotion regulation. Longitudinal studies that examine maternal depression, the parent-child interaction in infancy, and child emotion regulation are rare. Furthermore, the conflicting findings in the research on maternal depression and the mother-infant interaction suggest these factors may have a more complicated relationship, and other factors may play a role.

Parenting Stress

In addition to depression, the level of stress around parenting that a mother experiences is also connected to the parent-child interaction. Parenting stress has been linked to negative parenting behavior and dysfunctional parent-child interactions (Belsky, 1984; Roberts, 1989; Xu et al., 2005). Power-assertive parenting strategies have been associated with experiencing parenting stress (Oburu & Palmérus, 2003; Xu et al., 2005). Even in families with secure mother-child attachments, introducing parenting stress can lead to less responsive parenting (Belsky & Fearon, 2002). The various aspects of parenting stress that are often measured are stress around the parenting role, stress from the child's behavior, and stress from the parent-child interaction, which are also the three subscales of the Parenting Stress Index Short Form (PSI/SF; Abidin, 1990), a tool that is often used by researchers and clinicians to measure parenting stress. Intrusiveness, which is an interactional style driven by the parent's agenda, was correlated with parenting stress around the child's behavior (i.e., PSI/SF Difficult Child Subscale), and maternal responsiveness was negatively correlated with parenting stress around the child's behavior (Calkins et al., 2004). Maternal parenting stress has been referred to as "the most important predictor of children's behavior problems" (Holden & Ritchie, 1991, p. 323). One study found that parenting stress during the first three months postpartum had no impact, yet parenting stress when the child was 2 years old predicted internalizing behavior problems at age 5 (Mäntymaa et al., 2012). However, Mäntymaa and colleagues (2012) did not measure parenting stress at any point between the newborn period and 2 years, and they did not incorporate the parent-child interaction into their

models predicting child emotion regulation. Parenting stress has been found to mediate poverty and parenting behavior, which predicts child social-emotional competence (Gershoff, Raver, Aber, & Lennon, 2007). Parenting stress has also been found to mediate the association between community violence and child impulse control deficits (Sharkey, Tirado-Strayer, Papachristos, & Raver, 2012). Roberts (1989) found that the relationship between parenting stress and child behavior is mediated by parent-child interactions. Thus, parenting stress may affect the parent-child interaction, which may predict the child's emotion regulation skills.

Research has found associations between parenting stress and both maternal depression and parent–child interaction (Farmer & Lee, 2011; Milgrom, Ericksen, McCarthy, & Gemmill, 2006). Depressed mothers report higher levels of parenting stress and a more dysfunctional mother-infant interaction (Milgrom et al., 2006). Belsky (1984) theorized that maternal mental health mediates the relationship between parenting stress and parenting behavior, implying that parenting stress alone is not enough to impact parents' behavior. However, findings on the relationship between parenting stress and maternal mental health have been inconsistent. While a wealth of research has observed the impact of maternal depression on parenting behavior (see section III.A. above), other studies found no association between maternal mental health and parenting behavior, but they did find that parenting stress predicted maternal behavior (e.g., Calkins et al., 2004; Farmer & Lee, 2011). Farmer and Lee (2011) concluded that parenting stress was the "catalyst" that directly impacted maternal depression and parent-child

interaction. These contradictory findings make it difficult to understand specifically how parenting stress and depression relate to parenting behavior.

Interestingly, in a study comparing types of treatment for depressed mothers and their children, treatment designed to improve parent-child interaction decreased parenting stress, while treatment focusing on improving maternal depression did not impact parenting stress (Milgrom et al., 2006). However, causality cannot be determined from these correlational studies; depression could be altering the mother's perception of her child and herself as a parent, impacting her parenting stress. Additionally, negative mother-infant interactions may be intensified when mothers are stressed and depressed (Coyl, Roggman, & Newland, 2002). One recent study found that maternal depression mediates the relationship between parenting stress and child outcome (Huang et al., 2014). Further research is necessary to determine the directionality of the relationship between parenting stress and maternal depression and the ways in which these two factors affect the parent-child interaction.

Maternal Self-Efficacy

Maternal self-efficacy, which is a mother's belief in her ability to successfully care for her child (Teti & Gelfand, 1991), is another factor that may relate to parenting stress, depression, and the parent-child interaction. The concept of self-efficacy can be attributed to Bandura (1977), as he described the impact of one's sense of self-efficacy on behavior, and vice versa, the impact of successful or failed experiences on one's feelings of self-efficacy. Teti and Gelfand (1991) were interested in learning more about the role of self-efficacy as it applies to parenting, referred to as "parenting self-efficacy" or

"maternal self-efficacy." Maternal self-efficacy has been found to be negatively

associated with maternal depression, demonstrated by a reduction in maternal self-

efficacy as depression levels rise (Caldwell, Shaver, Li, & Minzenberg, 2011; Cutrona &

Troutman, 1986; Haslam, Pakenham, & Smith, 2006; Holland et al., 2011; Leahy-

Warren, McCarthy, & Corcoran, 2012; Teti & Gelfand, 1991; Weaver, Shaw, Dishion, &

Wilson, 2008). This association has been replicated across a number of studies with

ethnically and geographically diverse families, yet appears to partially depend on the

family's culture and infant age; no association between depression and maternal self-

efficacy was found in immigrant Vietnamese mothers in Korea (Choi et al., 2012), and in

Latina mothers in the U.S. depression predicted maternal self-efficacy at 12 months

postpartum but not six months postpartum (Huynh-Nhu Le & Lambert, 2008). Cutrona

and Troutman (1986) found that social support served as a buffer against depression, and

this association was mediated by maternal self-efficacy; however, the sample in their

study was well-educated, and they found a correlation between the number of years of

education and maternal self-efficacy. It is possible that the association between maternal

self-efficacy and depression varies by socioeconomic status and across cultures due to the

differences in expectations of mothers and their roles in their families and in society and

the varying levels of social support received by mothers. Economic hardship was found

to decrease maternal self-efficacy, for example, for African American families but not

Caucasian families, although depression was similarly associated with maternal self-

efficacy for both racial groups (Elder, Eccles, Ardelt, & Lord, 1995). The factors that

influence maternal self-efficacy may vary depending on the family's socioeconomic status and culture.

Maternal self-efficacy is also related to infant behavior, in that maternal self-efficacy is negatively associated with infant distress (Cutrona & Troutman, 1986; Leerkes & Crockenberg, 2002; Troutman, Moran, Arndt, Johnson, & Chmielewski, 2012) and parental perception of difficult infant temperament (Fulton, Mastergeorge, Steele, & Hansen, 2012; Teti & Gelfand, 1991). Because maternal self-efficacy is the result of successful or failed experiences as they relate to parenting (Bandura, 1977), it follows that caring for an infant who is difficult to soothe might cause a parent to feel unsuccessful at parenting. Interestingly, Troutman et al. (2012) found that maternal self-efficacy increases between 8 and 16 weeks of age for mothers of irritable infants. The authors concluded that this unexpected increase in maternal self-efficacy may have been due to the decrease in infant distress during this time and the enhanced sense of accomplishment associated with successfully soothing their irritable child (Troutman et al., 2012), as experiencing success in difficult situations can improve self-efficacy (Bandura, 1997). However, inability to soothe an irritable infant predicts reduced levels of maternal self-efficacy (Fulton et al., 2012; Leerkes & Crockenberg, 2002; Troutman et al., 2012; Verhage, Oosterman, & Schuengel, 2013).

But does maternal self-efficacy impact parenting behavior? Maternal self-efficacy has been found to relate to maternal sensitivity (Leerkes & Crockenberg, 2002; Teti & Gelfand, 1991). In a treatment-outcome study examining the impact of home-based dyadic therapy for mothers with postpartum depression and their infants, mothers

whose maternal self-efficacy improved during the treatment also showed an increase in sensitivity and responsiveness in their interactions with their infants (Paris, Bolton, & Spielman, 2011). Not only is an increase in maternal self-efficacy associated with increased maternal behavioral competence, but maternal self-efficacy actually mediated the relationship between maternal behavioral competence and other factors—maternal depression and perceptions of infant temperament (Teti & Gelfand, 1991). Leerkes and Crockenberg (2002) found that maternal self-efficacy moderated the impact of infant temperament/behavior on maternal sensitivity; thus, high levels of infant distress predicted less sensitive maternal behavior when maternal self-efficacy was low (or very high, which may indicate a defensive response pattern or an unrealistic sense of control over their infant's behavior). As Teti and Gelfand (1991) stated, "Maternal self-efficacy was the factor most directly and unambiguously related to parenting behavior" (p. 927). Maternal self-efficacy may be a crucial factor in predicting parenting behavior.

Infant Crying and Maternal Perceptions

Infant Crying

The first few months of a newborn's life revolve around managing state of arousal (Kopp, 1982). When an infant cries excessively it is often quite stressful for the entire family, as it is the most prevalent complaint to pediatricians by parents with young infants (Barr et al., 2000; Forsyth, Leventhal, & McCarthy, 1985). In many cultures, infant crying tends to increase during the first weeks of life, peaking at around six weeks of age when infants typically cry an average of over two hours per day (Barr, Konner, Bakeman, & Adamson, 1991; Brazelton, 1962; Hunziker & Barr, 1986; St. James-

Roberts, Bowyer, Varghese, & Sawdon, 1994). Crying is considered excessive when the infant cries at least three hours per day at least three days per week, referred to as the "rule of 3s" (Wessel, Cobb, Jackson, Harris, & Detwiler, 1954). Prevalence rates of excessive crying, or "colic," during early infancy are generally estimated at around 15% to 20% (St. James-Roberts, Hurry, Bowyer, & Barr, 1995; Weissbluth, 1984; Wurmser, Laubereau, Hermann, Papoušek, & von Kries, 2001), but estimates vary greatly, depending on the definition (Reijneveld, Brugman, & Hirasing, 2001). If the strict "rule of 3s" criteria are used, requiring the infant to cry for more than three hours per day for more than three days per week for more than three weeks, the prevalence rate is only about 2%, whereas if the criteria are that the infant cries for more than three hours per day for three days in a week, the prevalence rate jumps to almost 13% in the first month (Reijneveld et al., 2001).

Maternal perception of the amount of crying is another way to determine if an infant is an excessive crier. Almost 18% of mothers reported that their 1-month-old infants "cried a lot" (Reijneveld et al., 2001), which reveals that the infant's crying likely exceeds the mother's expectations of the amount s/he would cry, but does not provide any insight as to the mother's reaction to the crying. Asking if parents were upset by their infants' crying in the past week—20% of mothers with infants 1-3 months old reported they were—or if they sought help for infant crying—21% of mothers reported they did in the first three months (St. James-Roberts & Halil, 1991)—provides a better understanding of the impact of the crying on the mother. Parental perception of infant crying can indicate the extent to which the crying has affected the family.

In most cases, the cause for excessive crying is unknown (McGlaughlin & Grayson, 2001). Pediatricians often advise parents to wait it out, because early excessive crying is usually not indicative of a medical or parenting problem (Brazelton, 1962) and the crying typically begins to decrease, or resolve, at around three months of age (Barr, 1998). This normalizing of excessive crying may reduce parents' feelings of self-blame, but it may also minimize the potential negative effects of infant crying on the family (Maxted et al., 2005). In addition, a considerable proportion of infants continue to cry excessively beyond three months of age (Papoušek & von Hofacker, 1998; Wurmser et al., 2001). Persistent excessive crying that does not resolve at the age indicated by the pediatrician may add to parents' concern and distress. Moreover, infants whose excessive crying persists past the first few months are at increased risk for behavioral problems, developmental delay, and sleep disorders (DeGangi, Breinbauer, Roosevelt, Porges, & Greenspan, 2000; Hemmi, Wolke, & Schneider, 2011; Papoušek & von Hofacker, 1998; Rautava, Lehtonen, Helenius, & Sillanpaa, 1995). Persistent excessive crying may indicate an underlying regulatory issue.

Infant Crying and Maternal Well-Being

In research examining the association between maternal mental health and excessive crying in infancy, increased levels of depression, anxiety, and distress have been found in mothers of excessively crying infants (Austin, Hadzi-Pavlovic, Leader, Saint, & Parker, 2005; Cutrona & Troutman, 1986; DeGangi et al., 2000; Edhborg, Seimyr, Lundh, & Widstrom, 2000; Humphry & Hock, 1989; Maxted et al., 2005; McMahon, Barnett, Kowalenko, Tennant, & Don, 2001; Miller, Barr, & Eaton, 1993;

Papoušek & von Hofacker, 1998; Pinyerd, 1992; St. James- Roberts, Conroy, & Wilsher, 1998). Excessive infant crying has also been found to relate to low parenting self-efficacy (Maxted et al., 2005; Papoušek & von Hofacker, 1998; Stifter & Bono, 1998). In addition, mothers of infants who cry excessively are more likely to show multidimensional psychological distress (Pinyerd, 1992).

Levels of parenting stress or stress around their infants' crying behavior tends to be higher among mothers with excessively crying infants (Asnes & Mones, 1983; Beebe, Casey, & Pinto-Martin, 1993; Humphry & Hock, 1989; Wake et al., 2006). For example, Miller et al. (1993) found that from prepartum to postpartum, distress levels increased for parents of excessively crying infants, while distress levels decreased for parents of low crying or typically crying infants. Furthermore, elevated levels of parenting stress have been found years after the excessive crying resolved (DeGangi et al., 2000; Korja et al., 2014; Stifter, 2001). In one study that followed premature infants and their parents, the amount of crying at five months of corrected age was associated with parenting stress levels when the child was 2 and 4 years old (Korja et al., 2014). Families with excessively crying infants are also at higher risk for parental anxiety and family conflict (Papoušek & von Hofacker, 1998; Räihä, Lehtonen, & Korvenranta, 1995). The parenting partners' relationship is affected by the crying (Papoušek & von Hofacker, 1998; Rautava et al., 1995), adding another layer of tension to the household.

Previous studies have demonstrated an association between maternal depression and excessive infant crying (Howell, Mora, & Leventhal, 2006; Miller et al., 1993; Papoušek & von Hofacker, 1998; Vik et al., 2009; Wake et al., 2006). Temperamental

difficulty in infants has been found to be associated with increased depression in mothers (Austin et al., 2005; Cutrona & Troutman, 1986; Edhborg et al., 2000; Maxted et al., 2005; McGrath et al., 2008). In the studies that assess infant behavior exclusively by parent report, causality cannot be determined: it is unclear whether the mother's depressive symptoms increase the infant's irritability, or if the infant's irritability leads to maternal depression. The depression could also be causing the mother to perceive her child as more difficult. Some studies, however, measured infant behavior using infant observation by a researcher and found higher rates of irritability in infants of depressed mothers (e.g., Ayissi & Hubin-Gayte, 2006; Cutrona & Troutman, 1986; Murray et al., 1996), indicating that the association between maternal depression and infant irritability is not solely due to the mother's perception of the infant. Murray et al. (1996) assessed mothers and infants 10 days postpartum, before the onset of depressive symptoms usually occurs, and then again at eight weeks postpartum. They found that infant irritability and poor motor behavior strongly predicted later maternal depression, suggesting that the infant's difficult temperament contributes to depressive symptoms in the mother. Some women are more susceptible to experiencing postpartum depression; a history of psychopathology is one of the strongest predictors of developing postpartum depression (O'Hara & Swain, 1996). A mother with a history of depression who also has an excessively crying infant has two risk factors against her, increasing the odds of her developing depression. Yet, as Pauli-Pott, Mertesacker, Bade, Bauer, and Beckmann (2000a) noted, "We must bear in mind the possibility that the infant experience in interacting with a more depressive and at the same time less responsive mother might be

the cause of the high infant negative emotionality" (p. 35). Regardless of which came first, the maternal depression is likely to perpetuate the infant's irritability, as maternal distress and depression disrupts the coordination of mother-child interactions and can be detrimental to the mother-child relationship (Field et al., 1988; Papoušek & von Hofacker, 1998; Tronick & Reck, 2009). Additionally, an irritable or difficult infant will probably exacerbate the mother's depression.

Although a number of studies have found that infants of depressed mothers were more irritable, some studies did not find an association between maternal depression and infant negative emotionality (e.g., Boyd, Zayas, & McKee, 2006; Pauli-Pott, Mertesacker, & Beckmann, 2004). The inconsistent findings suggest that the association between maternal depression and infant crying may be more complicated, and other factors may play a role. Further research is needed to explore the relationship between infant crying and maternal depression.

Because excessive crying generally begins to resolve when infants reach three months of age (Barr, 1998), much of the research that has examined the factors associated with excessive crying assessed maternal well-being and family functioning during the first few months of life. In addition to the fact that excessive crying persists beyond three months of age for some infants (Papoušek & von Hofacker, 1998; Wurmser et al., 2001), there is reason to believe that when the excessive crying stops, the mothers' stress and mental health do not necessarily immediately improve. Previous research indicates that parenting stress and psychological symptoms linger, even years after the period of

excessive crying had ended (e.g., Degangi et al., 2000; Korja et al., 2014; Papoušek & von Hofacker, 1998; Stifter, 2001).

Research on outcomes of families with an excessively crying infant has been inconsistent. Following up with families two years (Räihä, Lehtonen, Korhonen, & Korvenranta, 1997) and three years (MacKenzie & McDonough, 2009) later, some studies have found no differences between families with excessively crying infants and families with low crying infants. Mothers and their previously excessively crying infants were found to have similar attachment classifications at 18 months as control mothers and infants (Stifter & Bono, 1998), and maternal sensitivity has not been found to differ between mothers of excessively crying infants and typically crying infants (Stifter & Spinrad, 2002). However, children who were treated for persistent crying as infants were more likely to meet criteria for a mental disorder 5-8 years later (Brown, Heine, & Jordan, 2009). Additionally, male infants with a history of excessive crying were found to have a lower level of emotion regulation at five and ten months than previously typical criers (Stifter & Spinrad, 2002). Persistent criers and their parents have also been found to show increased risk for problems in the parent-child relationship (DeGangi et al., 2000; Maldonado-Durán & Sauceda-Garcia, 2002; Papoušek & von Hofacker, 1998). The impact of parental perceptions of infant crying ranges from dissatisfaction with the arrangement of family responsibilities and amount of leisure time (Rautava et al., 1995) to increased risk for child abuse (Zeskind & Shingler, 1991). Higher levels of depression were found in mothers with infants who were previously excessive criers four months after the excessive crying had resolved (Vik et al., 2009). Mothers with previously

excessively crying infants also report feeling less competent as parents (Stifter & Bono, 1998). Excessive crying in infancy may have influential and lasting effects on the family (Gilkerson and Gray, in press).

Maternal Perception of Infant Crying

Postpartum depressive symptoms and parental distress have been found to be associated with the mother's negative perception of her infant's crying or temperament (Mäntymaa et al., 2006; Orhon, Ulukol, Soykan, 2007). If a mother perceives her infant's crying to be problematic or upsetting, a violation of her expectations regarding infant crying is implied. This raises the question: from where do parental expectations around infant crying originate? Parental beliefs and expectations are created by their personal experiences, advice from others, and cultural biases (Leavitt, 2001). Expectations of duration and timing of infant crying has cultural and historical roots relating to causes of infant crying. Lummaa (2003) highlights four hypotheses on why human infants cry: (1) crying is a sign of distress due to physical separation from the caregiver; (2) crying reduces infanticide by indicating vigor of the infant; (3) crying is a means to manipulate parents to provide more care; and (4) crying increases the interval between births and decreases the likelihood of sibling competition. Depending on one's culture and personal experiences, parents' understanding and perceptions of crying may reflect one or more of these hypotheses. Crying when separated from one's mother, for instance, would be advantageous for infant survival in certain cultures and historical periods. However, infant behaviors that are adaptive in certain social and historical contexts may become maladaptive when conditions change (LeVine et al., 1996; Small,

1998). Infant cries are adaptive to signal a need for care, but excessive crying is maladaptive (Small, 1998); long bouts of crying do not promote the infant's survival, especially when the caretaker delays responding due to the inability to differentiate when the crying signals a specific need or not. In many African cultures crying is perceived as a sign of a physical problem signaling the need for an immediate response (LeVine et al., 1996; Moscardino, Nwobu & Axia, 2006; Winn, Morelli, & Tronick, 1989). On the other hand, in Japan crying is believed to be necessary to create the mother-child bond early and avoid the infant's natural tendency toward independence (Yunus, 2005). Thus, depending on if a mother interprets an infant's cry as indicative of a physical problem or a necessary sign of communication that results in a mother-infant bond, she will expect a different amount of crying and the crying will affect her differently. Parental ethnotheories on infant crying are embedded in cultural values and familial experiences, leading to varying perceptions of and reactions to infant crying.

In the research on parental perceptions around infant crying, the reasons behind parents' expectations and perceptions are not typically explored. Yet, it is useful to remember that various factors influence one's perception of infant crying, so perceptions may not always correspond with objective measures of crying. MacKenzie and McDonough (2009) found that parental perception of the infant's crying as a problem was not related to the actual amount of crying, but was related to parenting stress, anxiety, and adjustment, as well as child behavior problems in toddlerhood. Similarly, Pauli-Pott, Becker, Mertesacker, and Beckmann (2000b) found that mothers who had sought help for their infant's crying but whose infants were not crying excessively,

according to Wessel et al.'s (1954) criteria, were more nervous and angry than mothers who had not sought help for their infants' crying. Help-seeking mothers also felt more rejected by their infants and believed that their infants were more dissatisfied with them. Pauli-Pott et al. (2000b) suggested that a negative maternal perception of the infant's crying, rather than the actual amount of crying, might underlie or perpetuate the mother's negative perception of her child. Perception of infant crying has also been linked to maternal self-efficacy, in that a more negative perception of the infant's cries was associated with a larger decrease in maternal self-efficacy when attempting to soothe the infant (Verhage et al., 2013). The same has been found for fathers, as well: the father's perception of the crying as problematic was more strongly associated with his experiencing depressive symptoms than the amount of crying (Katch, 2012). As far as the risks associated with infant crying, "the actual duration of crying at a given moment seems to be less relevant than the parent's perception of the crying of their infant in the long term" (Reijneveld et al, 2004, p. 1342). Parental perception of infant crying may play a greater role in child and family outcomes than the amount of infant crying, per se.

Negative representations of the infant have been linked to less sensitive maternal behavior (Dollberg, Feldman, & Keren, 2010; Rosenblum, McDonough, Muzik, Miller, & Sameroff, 2002; Sokolowski, Hans, Bernstein, & Cox, 2007); therefore, high levels of infant negative affectivity may present a challenge in establishing synchronous interactions with parents. Some studies have found that negative representations of the infant are associated with more intrusive behavior by the mother (Dollberg et al., 2010), some found more passive maternal behavior (Sokolowski et al., 2007), and some found

more rejecting behavior (Rosenblum et al., 2002), depending on the mothers' representations of their infants. Highly irritable infants may motivate mothers to try harder to engage their infants, resulting in more intrusive behavior (Calkins et al., 2004). Problems perceived by parents in the first few months of infancy may impact parents' long-term perceptions of their children (Forsyth et al., 1985). Parents' perceptions of their excessively crying infants as "difficult" (Lehtonen, 2001) and "intense" (Neu & Keefe, 2002) can remain after the crying has resolved, with some parents perceiving their children as more vulnerable, even 3.5 years later (Forsyth & Canny, 1991).

In addition to the infant's characteristics, a mother's representations of her child can depend on maternal characteristics and expectations. Researchers have used the Working Model of the Child Interview (WMCI) to better understand parents' subjective narratives when they describe their relationship with their infants (Zeanah & Benoit, 1995). Using the WMCI, depressed mothers are more likely to have distorted representations of their children (Rosenblum et al., 2002; Wood, Hargreaves, & Marks, 2004). Maternal representations of their children are also a function of the mother's own attachment history (Fonagy & Target, 2005). Negative maternal representations infants have predicted less sensitive maternal behavior (Dollberg et al., 2010; Rosenblum et al., 2002; Sokolowski et al., 2007). Furthermore, children of mothers with balanced representations of them demonstrate better emotion regulation capacity in the Still Face Paradigm: they show more positive affect, more attention-seeking behavior, and more contact maintenance compared to children whose mothers had disengaged or distorted representations (Rosenblum et al., 2002). This association is mediated by maternal

affective displays, as mothers with balanced representations also showed more positive affect (Rosenblum et al., 2002). Maternal representations seem to be associated with both the mother's and the child's behavior.

These findings imply that early negative perceptions of the child may lead to disrupted parent-child interactions. It is also possible that lasting negative perceptions of the child may be a result of negative parent-child interactions. Despite uncertainty of the cause, there is strong evidence that negative perceptions of the child coincide with difficulties in the parent-child interaction, which may further parent–infant relationship difficulties (Rautava et al., 1995). Associations have been found among maternal representations, parent-infant interactions, and the child's ability to self-regulate (Dollberg et al., 2010). Previous research has found links between infant crying and maternal depression, stress, and self-efficacy (Cutrona & Troutman, 1986; DeGangi et al., 2000; Edhborg et al., 2000; Humphry & Hock, 1989; Maxted et al., 2005; Miller et al., 1993; Papoušek & von Hofacker, 1998; St. James- Roberts et al., 1998; Stifter & Bono, 1998), yet the mother's perception of the infant's behavior may be the underlying factor related to maternal well-being.

Conclusion

In this review, the parent-related factors and child-related factors related to the development of emotion regulation have been examined. Difficulty with emotion regulation in early childhood has been found to predict later mood disorders, behavior problems, difficulty with social interactions, and attention and memory problems (Barkley, 1997; Bowie, 2010; Calkins et al., 1995; Campbell-Sills & Barlow, 2007; Cole

et al., 1996; Cole, Zahn-Waxler, et al., 1994; Eisenberg et al., 2002; Fabes & Eisenberg, 1992; Gottman et al., 1996; Gross, 2002; Hay, 1997; Mullin & Hinshaw, 2007; Rutter, 1991; Shonkoff & Phillips, 2000); therefore, the factors that contribute to developing adaptive emotion regulation skills were of interest. Beginning in infancy, children learn emotion regulation largely through interactions with their parents (Eisenberg et al., 1998; Fabes, Leonard, Kupanoff, & Martin, 2001; Mirabile et al., 2009). Synchronous interactions containing contingent behavioral responses are fundamental to the child's emotional development and promote a positive parent-child relationship (Field, 1994; Stern, 1977). Infants of parents who respond contingently in parent-child interactions tend to demonstrate more effective emotion regulation (Conradt & Ablow, 2010; Haley & Stansbury, 2003; Kogan & Carter, 1996; Mills-Koonce et al., 2007; Moore et al., 2009; Propper et al., 2008).

Because positive parent-child interactions are early predictors of emotion regulation capacity, some risk factors that may be associated with both the parent-child interaction and the development of emotion regulation were explored. Maternal well-being was found to impact the parent-child interaction. When the mother's well-being is compromised, the mother-infant interaction tends to be jeopardized as well. Depression, for example, reduces the mother's ability to contingently respond to her infant's signals (Cohn & Tronick, 1983; Field, 2000). When infants are distressed, they require assistance from a caregiver to help them regulate their emotions, as they are limited in their ability to internally regulate their emotions (Bridges & Grolnick, 1995). Thus, in

regards to the child's development of emotion regulation, the well-being of the caregiver may be most influential during infancy.

Excessive or persistent crying, a risk factor that is not uncommon in infancy, was also found to impact the parent-child interaction. Maternal depression and parenting stress tend to be higher and maternal self-efficacy tends to be lower in mothers of excessively crying infants (Austin et al., 2005; Cutrona & Troutman, 1986; DeGangi et al., 2000; Edhborg et al., 2000; Humphry & Hock, 1989; Maxted et al., 2005; McMahon et al., 2001; Miller et al., 1993; Papoušek & von Hofacker, 1998; Pinyerd, 1992; St. James- Roberts et al., 1998). Researchers have attempted to untangle the "chicken or egg" phenomenon with excessive infant crying and maternal well-being, investigating which is the root cause. The mother's perception of the crying as problematic or upsetting has been found to more strongly predict maternal well-being than the actual amount of crying (MacKenzie & McDonough, 2009). Consequently, parents' perceptions of infant cries may be the key in understanding the potential effect of excessive infant crying on the parent-child interaction.

Maternal perception of infant crying, maternal depression, parenting stress, and maternal self-efficacy have all been identified as risk factors for the decreasing the quality of the parent-child interaction. Studies have examined some of these variables in conjunction with one another, but no comprehensive longitudinal study had been conducted that followed infants and parents to observe how these early risk factors affect the development of the child's emotion regulation capacity, with a focus on the

potentially moderating role of these risk factors on the association between the parent-child interaction and child emotion regulation.

Learning to regulate emotions and respond appropriately and adaptively to emotional experiences is a major developmental task. Because learning to self-regulate in early childhood has been linked to a multitude of promising outcomes, many schools have implemented social and emotional learning (SEL) programs, such as Social, Emotional, and Cognitive Understanding and Regulation (Bailey et al., 2012) and Incredible Years, which aims to help children understand and recognize feelings and manage anger (Webster-Stratton & Taylor, 2001). However, because effect sizes for even the strongest of interventions are modest, experts recommend embedding social and emotional skills development into their curriculum and linking it to academic achievement (Jones & Bouffard, 2012). Furthermore, SEL training should be integrated into administrator and teacher training so that daily adult-student interactions in school will model social and emotional skills (Jones & Bouffard, 2012).

Emotion regulation is such an essential skill to develop that it should be fostered as early as possible. In order to provide interventions that could improve emotion regulation skills for families at risk of difficulty in this area, both the factors that increase risk for emotion regulation challenges and the factors that promote successful emotion regulation need to be identified. Nurturing emotion regulation skills from infancy would not only improve child outcomes, but it would also lighten the burden on society. As Moffitt et al. (2011) highlighted, "Interventions addressing self-control might reduce a panoply of societal costs, save taxpayers money, and promote prosperity."

CHAPTER III

METHODOLOGY

This chapter will describe the sample of participants who participated in the study, the research design, the instrumentation, and the statistical techniques that were used to examine the data to address the research questions under investigation. First, do parenting stress, maternal depression, maternal self-efficacy, amount of infant crying, maternal perception of infant crying as problematic and dyadic mutuality in the parent-child interaction predict emotion regulation capacity in early childhood? Second, does dyadic mutuality moderate the impact of maternal well-being and infant crying on child emotion regulation? A quantitative longitudinal study aimed to address these questions.

Sample

The participants in this study were families recruited for the Fussy Baby Study, a collaborative research project between faculty from the University of Illinois at Chicago, Erikson Institute, and the University of Chicago, funded by the National Institutes of Health. Potential participants were recruited from the Chicago area through pediatric practices and community-wide advertisements across a range of media (e.g., *Chicago Parent* magazine, *Chicago Reader*, fliers at child care centers, list-serve internet resources—*Craig's list*), and through the Fussy Baby Network at Erikson Institute. Infants were considered eligible to be screened for recruitment to the study if they presented to a pediatric practice during the one- or two-month "well-child visit" or if

referred through advertisements and other clinical settings to the research study during the first 10 weeks of life.

Entry and Exclusion Criteria

Infants and their mothers were recruited when infants were between 6 and 10 weeks of age. Participants were asked to participate in developmental assessments and experimental laboratory sessions when the infants were 6, 12, and 24 months of age. Participating mothers were English-speaking and at least 18 years of age. Infants included in the study were healthy (birth weight of at least 2,500 grams), full term (born at or after 37 weeks gestation), and born without significant birth complications. Participants were excluded if they had a neurological disorder (e.g., cerebral palsy, hydrocephaly, seizures, blindness) or a genetic disorder (e.g., Down syndrome, Fragile-X-syndrome).

<div align="center">

Procedures

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Families who agreed to participate in the study ($N = 149$) were mailed packets containing questionnaires about the family and the infants and asked to complete the materials and mail them back in the return envelope. When the infants were 6 to 10 weeks, 3 months, and 6 months of age, mothers were asked to complete daily diaries of their infants' behavior to record the infants' crying behavior, as well as measures on their stress levels and mental health symptoms.[2] Mothers and infants were asked to participate in laboratory sessions when the infant was 6 months, 12 months, and 24 months of age.

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[2]The questionnaires measuring maternal well-being (PSI, EPDS, MEQ) were added in a later amendment, resulting in only a small proportion of the sample completing the 6-10 week and 3-month measures. Thus, only the 6-month data for these variables were used in the analyses.

For the laboratory sessions, the mothers were asked to bring their infants into the Brain-Body Center at the University of Illinois at Chicago where a play room with a video camera and an adjacent observation room were designed for administering and recording developmental assessments and research with infants and children. Compensation in the form of 50 dollars cash was provided to mothers when they completed each research session.

Instrumentation

Demographic Questionnaire

In the first packet they received, mothers were asked to complete a demographic questionnaire (see Appendix A). This form contained items asking for the following information for both the primary and secondary caregivers: relation to the child, occupation, level of education, and whether or not they are a student or employee of UIC. Race and ethnicity of the mother and child were also asked. Additional questions about the household included the age and gender of all individuals living at the child's current residence, whether the household income was above or below $50,000 and whether or not they received public assistance at the time.

Baby Cry Diary

Mothers were asked to complete cry diaries (see Appendix B) based on Barr's Baby Day Diaries (Barr, Kramer, Boisjoly, McVey-White, & Pless, 1988) where they tracked their infants' behavioral patterns for three consecutive days when the infants were 6 to 10 weeks, 3 months, and 6 months of age. Studies report moderate to strong correlations between diary measures of crying/fussing and audio recordings (Barr et al.,

1988; St. James-Roberts et al., 1995). The diaries consisted of four, 6-hour "time-ruler" bars, corresponding to the morning (6 a.m.-noon), afternoon (noon-6 p.m.), evening (6 p.m.-midnight), and night (midnight-6 a.m.), broken down into 15-minute intervals. Mothers were instructed to code the infants' predominant behavior for each 15-minute period over three days, writing the letter representing one of the following six categories of infant behavioral state: "C" for crying, "F" for fussing, "U" for unsoothable crying, "S" for sleeping, "E" for eating, and "A" for awake-content. The number of minutes of fussing and crying were summed at each data collection time and divided by three to provide a mean number of minutes of fussing/crying per day. The number of minutes of fussing/crying at 6 months of age was used in the analysis to represent the amount of infant crying.

Crying Patterns Questionnaire

The Crying Patterns Questionnaire (CPQ; see Appendix C) is a parent-report questionnaire consisting of various questions about the infant's crying and the soothing strategies used by the parent (St. James-Roberts & Wolke, 1988). The CPQ includes an item to assess parental perception of infant crying: "Are you finding your baby's crying to be a problem or upsetting?" If the parent responded "yes," the mother was considered to perceive the infant crying as "problematic," whereas those who responded that they were not finding their infants' crying to be a problem comprised the control group. The maternal perception of infant crying at six months postpartum was used in the analysis.

Parenting Stress Index

Mothers were asked to complete the Parenting Stress Index (PSI; Abidin, 1983; see Appendix D), a 120-item self-report instrument designed to measure the relative degree of stress in a parent-child system and to identify the sources of distress. The three areas of stress that are assessed by the PSI are the characteristics of the child, characteristics of the parent, and situational-demographic life stress. The Child Domain is measured in the following six subscales: Distractibility/Hyperactivity, Adaptability, Reinforces Parent, Demandingness, Mood, and Acceptability. The Parent Domain consists of seven subscales: Competence, Isolation, Attachment, Health, Role Restriction, Depression, and Spouse. The PSI yields a Child Score, Parent Score, and a Total Stress Score, which is the sum of the Child Score and the Parent Score. The PSI has been validated to measure and predict the child's current and future emotional and behavioral adjustment, as well as parenting behavior.

Edinburgh Postnatal Depression Scale

Mothers were asked to complete the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987; see Appendix E), a 10-item scale that is commonly used in research and clinical practice as a screening tool to identify symptoms of depression in the postnatal period and to identify women who should be offered a referral for follow-up evaluation. The scale instructions ask the mothers to recall how they have been feeling in the past seven days. Some of the items include, "I have been able to laugh and see the funny side of things" and "I have been so unhappy that I have had trouble sleeping" with a likert-type scale of four responses ranging from "Most of the

time" to "Hardly ever." Scores can range from 0 to 30. The EPDS is appropriate for use with mothers up to one year post-partum.

Maternal Self-Efficacy Questionnaire

Mothers were asked to complete the Maternal Self-Efficacy Questionnaire (MEQ; (Teti & Gelfand, 1991; see Appendix F), which was used to assess their sense of parenting competence, or parenting self-efficacy. This 10-item questionnaire, developed for mothers with infants aged birth to 13 months, has been widely used in infant research. This measure addresses mothers' feelings of efficacy in relation to specific domains of infant care, as well as one item assessing feelings of efficacy as a parent in general. Items are scored (and subsequently averaged) as 1 = *not good at all*, 2 = *not good enough*, 3 = *good enough*, 4 = *very good*, for a total score of 10 to 40.

Parent-Child Interaction Coding

At the 6-month laboratory session, the mother was asked to place the infant in a high chair and interact/play with her child as she normally would for 10 minutes.[3] Mother-child interactions were rated with the same coding system used by the National Institute of Child Health and Human Development Study of Early Child Care (NICHD Early Child Care Research Network, 1997; Owen, 1992; see Appendix G). Six subscales of maternal behavior were coded (sensitivity/responsiveness, intrusiveness, detachment, positive regard, negative regard, and stimulation of cognitive development) and three subscales of child behavior were coded (child positive mood, child negative mood, and

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[3]Because physiological data were also collected during this interaction, the mother was asked not to pick up her child. If the child were to become upset and the mother picked up the child, the researcher stopped the session until the child was calm.

child sustained attention) on a scale from 1 to 5, indicating the degree to which the behavior characterized the interaction. Dyadic mutuality of the mother-child interaction was also coded on a scale of 1 to 5. As is stated in the coding manual, "This scale assesses the synchrony of the interaction and the degree of shared experience between parent and child. Essentially we are interested in the behaviors that reflect intimacy and coordination in the dyad" (Owen, 1992, p. 17).

Coding the videos required at least three viewings. During the first viewing, the coder decided if the frequency and intensity of the behavior was average, below average, or above average. The coder decided on a rating during the second viewing, and the third viewing was to check scores. A coder was trained to reliability by a master coder until intra-class correlation coefficients of .75 or greater were established and maintained, which is considered excellent agreement (Cicchetti, 1994). Any videos in which the coders had a 2-point difference were scored together by both coders to create a master code and entered as a consensus. Then a replacement video was double-coded to use as a reliability check. Because a subset of randomly-selected participants was double-coded by the master coder and the author and the reliability of these ratings was intended to generalize to the participants rated solely by the author, a single-measures intra-class correlation was used (Hallgren, 2012). Coder intra-class correlations for the parent-child interaction ratings are displayed in Table 1 ($M = .83$).

Table 1. Intra-Class Correlation Coefficients for Parent-Child Interaction Ratings
($n = 114$)

	ICC
Maternal responsiveness	.84
Maternal intrusiveness	.87
Maternal detachment	.85
Maternal positive regard	.77
Maternal negative regard	.90
Maternal stimulation of cognitive development	.88
Child positive mood	.87
Child negative mood	.78
Child sustained attention	.75
Dyadic mutuality	.78

Infant-Toddler Social and Emotional Assessment

When their children were 24 months of age, mothers were asked to complete the

Infant-Toddler Social and Emotional Assessment (ITSEA; Carter, Briggs-Gowan, Jones,

& Little, 2003; Carter & Briggs-Gowan, 2006; see Appendix H). The ITSEA contains

169 items comprised of four domains: Internalizing, Externalizing, Dysregulation, and

Competence. Each domain contains subscales (e.g., Negative emotionality within the

Dysregulation domain; Aggression/defiance within the Externalizing domain). Items are

rated on the following 3-point scale: (0) Not true/rarely, (1) Somewhat true/sometimes,

and (2) Very true/often. A "No opportunity" code allows parents to indicate that they have not had the opportunity to observe certain behaviors (e.g., behavior with peers in daycare).

The ITSEA domains have demonstrated acceptable internal consistency (Cronbach's alpha = 0.80 to 0.90) and test-retest reliability (intra-class correlation = 0.82 to 0.90), as well as validity relative to observational measures and other parent-report checklists (see (Briggs-Gowan & Carter, 1998). The ITSEA has been nationally standardized (Carter & Briggs-Gowan, 2006) and yields T scores for the four domains and scaled scores for the subscales grouped by age (within six months) and sex. The Externalizing and Internalizing domains and the Negative Emotionality scale will be used in the analysis as dependent variables to represent aspects of challenges with emotion regulation.

Data Analysis

Data were stored and analyzed in the Statistical Package for the Social Sciences (SPSS) software, versions 17.0 through 22.0. A p-value of .05 was used to determine statistical significance for all analyses, since .05 is agreed upon as a reasonable level of significance, feasible to achieve in realistic sample sizes and a sufficient amount of power to detect relatively small effect sizes (Fisher, 1925).

Descriptive Statistics and Data Preparation

First, descriptive statistics were calculated to provide means, frequencies, standard deviations, and ranges for each dependent and independent variable and for all potential analytic covariates to verify plausibility of data.

Missing data. Two maternal well-being measures (MEQ and EPDS) were added

to the protocol in subsequent amendments, resulting in systematic missing data for all

participants who enrolled in the study before those measures were approved by the

Institutional Review Boards. For the EPDS, data were missing for 63.1% ($n = 94$) of the

sample, 51.0% ($n = 76$) of the sample were missing data for the MEQ, and 21.5% ($n =$

32) were missing data for the PSI. Due to the longitudinal design of the study, a large

time commitment was requested of participants and many participants missed at least one

data collection period. Videos of the 6-month mother-infant interaction were missing for

23.5% ($n = 35$) of the sample, either due to technical error with the video or the

participant missing the laboratory session, resulting in missing data for dyadic mutuality.

Over a third of the sample (37.6%, $n = 56$) missed the 24-month laboratory session,

causing this notable proportion of missing data for the outcome variables of child

internalizing symptoms, externalizing symptoms, and negative emotionality on the

ITSEA.

Comparison of group means found that participant mothers with missing data for

dyadic mutuality tended to have lower educational attainment than those with data, $t(139)$

$= 3.02$, $p = .003$, and those with missing data for the ITSEA tended to be younger, $t(132)$

$= 2.33$, $p = .022$, less educated, $t(139) = 3.09$, $p = .002$, and reported fewer depressive

symptoms, $t(53) = 3.15$, $p = .003$. Data were not missing completely at random, and

because case deletion implicitly assumes that the missing cases are like a random

subsample, case deletion in this sample could have resulted in biased estimates (Little &

Rubin, 1987). Multiple imputation was recommended to replace missing data for the

variables of interest (A. Carter, personal communication, January 30, 2014). In multiple

imputation continuous variables are modeled with a linear regression, and categorical

variables are modeled with a logistic regression, and each model uses all other variables

in the dataset as main effects. Statisticians have divergent approaches to selecting the

number of imputations appropriate for certain datasets, and in the past Rubin's (1987)

formula was typically utilized. The current recommendation, however, is to use the

number of imputations comparable to the percentage of cases that are incomplete

(Allison, 2001; Carter, 2014; Graham, Olchowski, & Gilreath, 2007). Because 75% of

cases ($n = 113$) were incomplete, 75 imputations were used in the present multiple

imputation, which resulted in 130 complete cases (see Table 2).

Table 2. Original and Imputed Sample Sizes

	N Original	N Imputed
Parenting stress (PSI)	117	13
Maternal depression (EPDS)	55	75
Maternal self-efficacy (MEQ)	73	57
Amount infant crying, 6 months	116	14
Perception of infant crying as problematic	116	14
Dyadic mutuality	114	16
Internalizing (ITSEA)	93	37
Externalizing (ITSEA)	93	37
Negative Emotionality (ITSEA)	93	37

Distribution. Because a normal distribution of data is preferred for regression

analysis, skewness and kurtosis was checked for each continuous variable. Using an

absolute value of 1 as the criterion, both skewness and kurtosis were found in the scores

on the ITSEA externalizing domain (skewness = 1.14, kurtosis = 1.37) and ITSEA

negative emotionality scale (skewness = 1.27, kurtosis = 1.66) and in amount of infant

crying at six months (skewness = 1.15, kurtosis = 1.23). Due to the moderate positive

skewness of the scores, square root transformations were conducted to create a normal

distribution of scores for these variables (Tabachnick & Fidell, 2007, p. 89). Then

normalcy was rechecked, and the distributions were normal for the transformed variables

externalizing symptoms, negative emotionality, and amount of infant crying at six

months, which were used in the analyses.

To check for univariate outliers, all continuously scaled variables were

standardized into z scores. Any observations with a standardized score above 3.29 (p

< .001, two-tailed) would be considered outliers and would be removed from the dataset

(Tabachnick & Fidell, 2007), yet none of the variables contained outliers. Then

histograms were plotted for each variable. To identify multivariate outliers, a

Mahalanobis distance was computed for each observation, which is evaluated as $\square^2$ with

the degrees of freedom equal to the number of variables using a criterion of $p < .001$

(Tabachnick & Fidell, 2007). No multivariate outliers among the cases were found.

All continuous independent variables were centered by replacing each score with

its difference from the mean. Centering the variables reduces the probability of

multicollinearity occurring when an interaction of independent variables is included in

the regression equation, as well as allowing for easier interpretation of the regression coefficients (Aiken & West, 1991). Due to the sensitivity of multivariate tests to extremely high correlations among independent variables, multicollinearity was evaluated using a variance proportion of .50 as the diagnostic criterion. No two variables were multicollinear. Bivariate correlations of all continuous variables were also conducted to evaluate multicollinearity, and no correlations indicated multicollinearity (i.e., $r < .60$).

Covariates

To determine potential covariates, a series of bivariate analyses will be conducted between each potential covariate and each dependent variable via Pearson's r correlations (for continuous variables) or analysis of variance (for categorical variables). Potential covariates include mother's age, race, education, household income, sex of the infant, birth order of the infant, breastfeeding status, and presence of a second caregiver. Child externalizing symptoms were higher, $t(1686) = 1.98$, $p = .048$, in families with an annual household income below \$50,000 ($M = .51$, $SD = .31$), compared with families with an annual household income above \$50,000 ($M = .39$, $SD = .23$). Neither internalizing symptoms nor negative emotionality differed by household income, $p > .50$. Due to the small frequency distributions of the racial groups Asian American/Pacific Islander ($n = 6$), Native American ($n = 3$), and Biracial/Mixed Race ($n = 1$), preventing examination of group differences, these three groups were collapsed into one racial group labeled

"Other."[4] Then an analysis of variance (ANOVA) was conducted to determine if any

differences in mean scores on the dependent variables were found between the racial and

ethnic groups (African American, Non-Hispanic White, Hispanic, and Other). One-way

ANOVA revealed no significant differences in group means for the dependent variables

between the four racial/ethnic groups, $F(3, 83) = 2.79$, $p = .10$. Furthermore, no group

differences were found in comparisons of the dependent variables for maternal age,

education, sex (infant), birth order (infant), breastfeeding status, or presence of a second

caregiver, $p > .05$. Hence, only household income was retained as a covariate for the

models predicting externalizing behavior. Theoretically, income is appropriate to include

in the models, as conditions of higher socioeconomic risk have been found to exacerbate

the effects of parenting behavior on child outcome (Raver, 2004). Regression analyses

were conducted excluding the covariate and again including the covariate to determine

the influence of household income on child externalizing symptoms.

Research Question 1

The goal of this research question is to examine the main effects of parenting

stress, maternal depression, maternal self-efficacy, amount of infant crying, perception of

infant crying as problematic and dyadic mutuality in the parent-infant interaction on child

emotion regulation. To understand the impact of each of these independent variables on

child emotion regulation, the main effect of each infant/maternal risk factor was tested

along with dyadic mutuality predicting each emotion regulation variable. Thus, for

research question 1, a series of 15 multiple regression analyses were conducted (see

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[4]Although combining these racial groups was necessary to conduct the analysis, this practice is not optimal, as it disregards differences between these groups.

Appendix I for summary of analytic plan). For each regression model, an R^2 value was used to determine model fit and beta weights were used to assess the contribution of each predictor variable to the regression. To predict child emotion regulation from dyadic mutuality in the parent-infant interaction and parenting stress, three main effects models were tested, entering dyadic mutuality and parenting stress at six months as predictors and internalizing symptoms, externalizing symptoms, and negative emotionality at 24 months as outcome variables. To predict child emotion regulation from dyadic mutuality in the parent-child interaction and maternal depression, three main effects models were tested, entering dyadic mutuality and maternal depression at six months as predictors and internalizing symptoms, externalizing symptoms, and negative emotionality at 24 months as outcome variables. To predict child emotion regulation from dyadic mutuality in the parent-child interaction and maternal self-efficacy, three main effects models were tested, entering dyadic mutuality and maternal self-efficacy at six months as predictors and internalizing symptoms, externalizing symptoms, and negative emotionality at 24 months as outcome variables. To predict child emotion regulation from dyadic mutuality in the parent-child interaction and amount of infant crying, three main effects models were tested, entering dyadic mutuality and amount of infant crying at six months as predictors and internalizing symptoms, externalizing symptoms, and negative emotionality at 24 months as outcome variables. To predict child emotion regulation from dyadic mutuality in the parent-child interaction and maternal perception of infant crying, three main effects models were tested, entering dyadic mutuality and maternal perception of infant crying as problematic at six months as predictors and internalizing symptoms, externalizing

symptoms, and negative emotionality at 24 months as outcome variables. Then the five

multiple regression models with externalizing symptoms as the outcome variable were

conducted again with the covariate (household income) included.

Research Question 2

The goal of this research question was to investigate whether early

infant/maternal risk factors (parenting stress, maternal depression, low maternal self-

efficacy, excessive infant crying, or perception of infant crying as problematic) would

moderate the relationship between dyadic mutuality in the parent-child interaction and

later child emotion regulation skills. The hypothesis for this research question posited

that when any of these infant/maternal risk factors are present, dyadic mutuality in the

parent-child interaction would be a stronger predictor of child emotion regulation skills.

In line with Raver's (2004) review that highlights that the presence of risk factors has

been found to exacerbate the effects of parenting on child outcome, the emotion

regulation of the children in the present study who were experiencing the aforementioned

infant/maternal risk factors may have been influenced more by the parent-child

interaction. To examine the unique contribution of the interaction of the independent

variables in predicting child emotion regulation, hierarchical multiple regression analyses

were performed.

Interaction terms were added to the model to incorporate the combined effect of

two independent variables (e.g., parenting stress and dyadic mutuality) on a dependent

variable (e.g., negative emotionality) beyond their separate main effects. First the

interaction terms were created using the crossproducts of the centered independent

variables. Thus, crossproducts of dyadic mutuality rating with each of the risk factors

(parenting stress score, maternal depression score, maternal self-efficacy score, amount

of infant crying, and problematic crying group) were computed. Since problematic

crying group was a dichotomous variable, either a "1" or "0" was multiplied with dyadic

mutuality rating to create the interaction term (Aiken & West, 1991), resulting in either

the dyadic mutuality rating or "0" for the interaction term for that model. In step 1 of

each model, the individual independent variables from research question 1 were added

(see Appendix I). In step 2, the interaction term for the two predictor variables were

added into each model. Any models with significant interaction terms that predicted

externalizing symptoms were conducted again with the covariate (household income)

included.

Model Building

Finally, the last step in the plan of analysis was to build a model that explained

the variance in the outcome variables with a small set of predictors. Because the order of

importance of the predictors was unknown, standard multiple regression models were

conducted. Forward selection procedures were used to add independent variables to the

model, recommended by Wilkinson and Dallal (1981) over stepwise selection. Forward

selection entails a linear regression analysis for each independent variable individually,

selecting the variable with the highest R^2, then adding each of the other independent

variables and selecting the second variable that increases the R^2 by the greatest amount,

and continuing until adding another variable does not significantly increase the R^2

(McDonald, 2009). The significance level used for the change in R^2 was $p < .15$, which

is a level commonly used for forward selection (McDonald, 2009). The models built using forward selection were developed to provide simple, yet comprehensive models predicting each of the three aspects of challenges with emotion regulation in early childhood.

CHAPTER IV

RESULTS

This chapter presents the results of the analyses conducted to examine the predictive relationship between aforementioned maternal and infant factors and child emotion regulation. The first section of Chapter IV begins with descriptive data characteristics of the sample. Next, descriptive statistics of the independent and dependent variables are presented, beginning with the maternal well-being variables, followed by the infant crying variables, and then the dependent variables that represent child emotion regulation. The second section of the chapter describes the findings that address research questions 1 and 2, examining the main effects and the interaction effects of the independent variables on the dependent variables. Finally, the chapter concludes with model building.

Descriptive Data Characteristics

Demographic

One hundred forty-nine mother-infant pairs participated in the study. Participant mothers ranged from 18 to 42 years of age ($M = 31.4$, $SD = 6.0$ years). Infants were born full term, from 37.0 to 41.5 weeks ($M = 39.3$, $SD = 1.3$ weeks), weighing from 89 to 150 ounces at birth ($M = 119.1$, $SD = 14.3$ ounces). Almost half of the infants were first born ($n = 72$, 48%), and 48% ($n = 72$) were female. The sample was racially and ethnically diverse, and participant mothers were generally highly educated, as over half of the sample had at least a college education. Although the mother (or foster mother, $n = 1$)

was asked to participate in the laboratory sessions with the infant, the mother was not always the primary caregiver: 93.3% ($n = 139$) of participating mothers were the primary caregivers, 2.0% ($n = 3$) of participating mothers reported that the father was the primary caregiver, and 1% ($n = 2$) identified another caregiver as the primary caregiver (grandmother, child care center). A majority of the participating families were two-parent households in which the other parent was the secondary caregiver ($n = 110$, 73.8%). Sociodemographic data are presented in Table 3.

Table 3. Frequency Distributions of Demographic Data of Sample

	N	%
Mother Education		
7-9 years of school	1	1
10-11 years of school	9	6
High school graduate	12	8
Some college	31	21
College graduate	30	20
Graduate/Professional degree	58	39
Mother Race/Ethnicity		
Non-Hispanic White	68	46
African American	53	36
Hispanic/Latino	10	7
Asian/Pacific Islander	6	4
Native American	3	2
Biracial/Mixed Race	1	1
Missing	10	7
Secondary Caregiver		
Co-parent	110	74
None	23	15
Other relative	7	5
Nanny/Child care center	3	2

Infant Race/Ethnicity		
Non-Hispanic White	61	41
African American	49	33
Hispanic/Latino	15	10
Asian/Pacific Islander	4	3
Native American	0	0
Biracial/Mixed Race	11	7
Missing	9	6
Annual Household Income		
Below $50,000	49	33
$50,000 or above	89	60
Missing	11	7
Family receives public aid?		
Yes	28	19
No	110	74
Missing	11	7

Maternal Well-Being

Mean scores on the maternal well-being variables were in the normal range and similar to previous studies. Descriptive statistics for the PSI, EPDS, and MEQ are presented in Table 4, comparing the imputed data with the original data. Parenting stress scores are considered in the normal range if they fall within the 15th to 80th percentiles (Abidin, 1995). The mean total score on the PSI in the current sample was the equivalent of the 28th percentile. Five percent of the sample ($n = 8$) scored in the high range (at or above the 85th percentile), 46.3% ($n = 69$) scored in the normal range (15th to 80th percentile), and 26.8% ($n = 40$) scored in the low range (below the 15th percentile).

Table 4. Descriptive Statistics of Imputed Variables

	Imputed Data			Original Data		
	N	*M*	*SD*	*N*	*M*	*SD*
Parenting stress (PSI)	130	197.12	37.82	117	197.73	37.49
Maternal depression (EPDS)	130	5.15	4.57	55	5.38	4.39
Maternal self-efficacy (MEQ)	130	35.90	3.45	73	35.94	3.34
Amount infant crying, 6 months	130	106.32	81.13	116	106.25	80.43
Dyadic mutuality	130	3.36	1.09	114	3.36	1.08
Internalizing (ITSEA)	130	.44	.18	93	.44	.18
Externalizing (ITSEA)	130	.43	.21	93	.43	.26
Negative Emotionality (ITSEA)	130	.45	.27	93	.46	.36

The mean score on the EPDS was similar to the mean score of 5.75 ($SD = 4.0$) found in a recent study on fathers of infants (Katch, 2012) and similar to the mean score reported by adolescent mothers three months postpartum, $M = 5.78$, $SD = 4.33$ (Anderson, 2010), which falls between the mean scores of 4.41 ($SD = 4.45$; Mason, Briggs, & Silver, 2011) and 6.99 (SD $= 5.24$; O'Hara et al., 2012) found in postpartum studies of adult mothers in similar non-clinical populations. Typically a clinical cutoff score of 13 or higher is used to represent clinical postnatal depression (Cox et al., 1987), yet the low number of participants who scored 13 or higher in this sample ($n = 7$, 5.3%)

prevented the use of the clinical cutoff for group comparison of depression. Instead, the

cutoff score of 10, which has been used to represent mild depression in other studies

(e.g., Katch, 2012), was used to compare "depressed" and "nondepressed" groups on the

other measures. The proportion of participants who reported symptoms indicating mild

depression in this sample ($n = 20$, 16.3%) matched the prevalence estimates of

postpartum depression (Gavin et al., 2005; O'Hara & Swain, 1996). Parenting stress was

higher for the depressed group, $t(500) = 4.02$, $p < .001$. No other significant differences

were found between these groups on any of the other independent or dependent variables,

$p > .05$.

The maternal self-efficacy mean score on the MEQ was similar to mean scores

reported in other non-clinical populations (e.g., $M = 36.80$, $SD = 4.42$ in Gonya, 2003).

A score of 30 represents responses of "good enough" to the parenting tasks, and a score

of 40 represents responses of "very good." Hence, the mean score signifies that on

average mothers responded "good enough" to about half of the items and "very good" to

about half of the items.

Infant Crying

The mean number of minutes of crying per day over three days at six months of

age represented the amount of infant crying. While the sample was a non-clinical

community sample, infants who cried excessively were over-sampled for this study.

Therefore, at 1 hour and 46 minutes, the average amount of infant crying at six months of

age was higher in this sample than some other community samples, yet not as high as a

clinical sample (see St. James-Roberts & Halil, 1991). In addition to amount of crying,

maternal perception of infant crying was examined. Participant mothers were asked whether or not their infant's crying was a problem or upsetting at six months postpartum. Sixteen participant mothers (12.1%) reported that they found their infants' crying to be a problem or upsetting at six months of age.

Parent-Child Interaction

Videos of interactions between mothers and their 6-month-old infants were coded, rating maternal behavior, infant behavior, and dyadic mutuality. Figure 1 displays the frequencies for each of the five ratings for dyadic mutuality. Although only dyadic mutuality ratings were used in the analyses, Table 5 presents the correlations between the maternal well-being variables and all of the parent-child interaction ratings. This correlational analysis demonstrates the relationship among the parent-child interaction ratings, such as the high correlation between maternal responsiveness and dyadic mutuality. In addition, the maternal well-being variables are included in this table to display the lack of association between them and the parent-child interaction ratings.

Child Emotion Regulation

The scores for internalizing symptoms, externalizing symptoms, and negative emotionality on the ITSEA were used to represent child emotion regulation challenges at 24 months. Mean scores are presented in Table 4. ITSEA raw scores in the internalizing and externalizing domains are translated into t-scores and percentile ranks. In the internalizing domain, t-scores ranged from 29 to 62 ($M = 44.1$, $SD = 8.1$) and percentile ranks ranged from the 10th to the 100th percentile ($M = 68.3$, $SD = 26.6$). In the externalizing domain, t-scores ranged from 33 to 77 ($M = 48.4$, $SD = 9.2$) and percentile

ranks ranged from the 2nd to the 100th percentile ($M = 56.8$, $SD = 28.3$). For the negative

emotionality scale, only raw scores are calculated. The mean for the negative

emotionality scale in the current sample was similar to means reported in previous studies

of non-clinical populations that used the ITSEA (e.g., Carter et al., 2003).
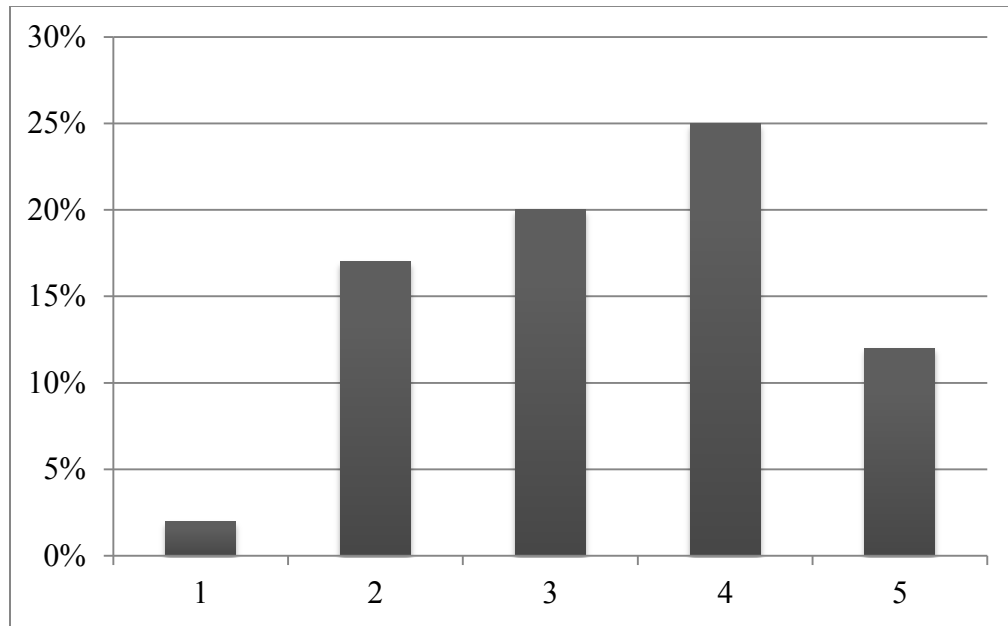
Figure 1. Distribution of dyadic mutuality ratings in the parent-child interactions ($n = 114$).

Research Questions 1 and 2: Predicting Child Emotion Regulation

First, Pearson's correlations were conducted to examine the relationship between

each of the continuous independent and dependent variables (see Table 6). The maternal

well-being variables were all significantly related in the expected direction: parenting

stress increased with depression, and maternal self-efficacy decreased with parenting

stress and depression. The three outcome variables of child emotion regulation were all

positively related, which has been found in prior research (e.g., Carter et al., 2003).

Table 5. Correlations Between Maternal Well-Being and Parent-Child Interaction Ratings (n = 114)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Parenting stress	--											
2. Maternal depression	.57***	--										
3. Maternal self-efficacy	-.47***	-.31*	--									
4. Maternal responsiveness	-.04	-.03	-.03	--								
5. Maternal intrusiveness	-.001	-.007	-.02	-.82***	--							
6. Maternal detachment	.16	.16	.008	-.55***	.25**	--						
7. Maternal positive regard	-.13	-.04	.09	.63***	-.43***	-.63***	--					
8. Maternal negative regard	.07	.08	-.14	-.30**	.31**	.12	-.37***	--				
9. Cognitive stimulation	-.06	.04	-.01	.27**	-.12	-.41***	.46***	-.45***	--			
10. Child positive mood	-.002	-.03	.13	.41***	-.37***	-.29**	.43***	-.12	.24*	--		
11. Child negative mood	.05	-.07	-.24*	-.31**	.27**	.27**	-.28**	.22*	-.14	-.51***	--	
12. Child attention	-.17	-.12	.14	.34***	-27**	-.27**	.22*	-.20*	.20*	.48***	-.38***	--
13. Dyadic mutuality	-.10	-.01	.06	.78***	-.62***	-.62***	.67***	-.20*	.31**	.66***	-.39***	.52***

*p < .05, **p < .01, ***p < .001

Table 6. Correlations Between Continuous Variables (N = 130)

	1	2	3	4	5	6	7
1. Parenting stress	--						
2. Maternal depression	.51***	--					
3. Maternal self-efficacy	-.47***	-.29*	--				
4. Amount infant crying	.27**	.05	-.05	--			
5. Dyadic mutuality	-.10	.01	.06	.04	--		
6. Internalizing	.24*	.18	-.17	.21	.04	--	
7. Externalizing	.35***	.24	-.15	.21	-.19	.32**	--
8. Negative emotionality	.45***	.30	-.26*	.24*	-.05	.33**	.58***

*p < .05, **p < .01.,***p < .001

Parenting stress and child negative emotionality increased with amount of infant crying at six months of age. To verify that both the parent and child domains of parenting stress were positively correlated with amount of crying, a correlational analysis was conducted, which found that both the parent domain ($r = .25$, $p = .007$) and the child domain ($r = .29$, $p = .001$) were significantly correlated with amount of infant crying. To compare means on the continuous variables between the problematic crying group and the control group, independent t-tests were conducted (see Table 7). Mother-infant dyads in which the mother perceived her infant's crying as problematic reported higher parenting stress, $t(3932) = 2.74$, $p = .006$, lower maternal self-efficacy, $t(276) = 3.43$, $p = .001$, higher externalizing behavior scores for the child, $t(406) = 2.17$, $p = .030$, and higher negative emotionality in the child, $t(336) = 3.10$, $p = .002$. Interestingly, the amount of infant crying did not differ between mothers who perceived their infants' crying to be a problem and those who did not, $t(2763) = 1.58$, $p = .113$.

To address research question 1, a series of 15 multiple linear regression analyses were conducted testing the main effect of each infant/maternal risk factor—parenting stress, maternal depression, maternal self-efficacy, amount of infant crying, and perception of infant crying as problematic—along with dyadic mutuality in the parent-child interaction predicting each emotion regulation variable—internalizing symptoms, externalizing symptoms, and negative emotionality.[5] Findings from these multiple regression analyses are presented in Table 8.

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[5]The transformed variables were used for externalizing symptoms, negative emotionality, and amount of infant crying in the regression analyses.

Table 7. Descriptive Statistics of Variables by Perception of Infant Crying as Problematic

	Crying problem (*n*= 16)		No crying problem (*n*= 114)		
	M	*SD*	*M*	*SD*	*t*
Parenting stress (PSI)	222.47	35.80	193.57	37.00	2.74**
Maternal depression (EPDS)	6.55	4.88	4.95	4.36	.90
Maternal self-efficacy (MEQ)	32.28	3.63	36.41	3.04	3.43**
Amount infant crying, minutes	138.87	63.83	101.76	82.77	1.58
Dyadic mutuality	3.25	1.03	3.38	1.09	.35
Internalizing (ITSEA)	.53	.19	.43	.17	1.47
Externalizing (ITSEA)	.60	.21	.40	.26	2.17*
Negative Emotionality (ITSEA)	.82	.32	.41	.32	3.10**

*p < .05, **p < .01, ***p < .001

Nine of the 15 main effects regression models were significant. Parenting stress and dyadic mutuality together contributed 6% (5% adjusted) of the variance in internalizing symptoms, 15% (14% adjusted) of the variance in externalizing symptoms, and 20% (19% adjusted) of the variance in negative emotionality. Maternal depression and dyadic mutuality together contributed 11% (9% adjusted) of the variance in externalizing symptoms and 11% (9% adjusted) of the variance in negative emotionality. Amount of infant crying and dyadic mutuality together contributed 9% (8% adjusted) of the variance in externalizing symptoms and 7% (5% adjusted) of the variance in negative emotionality. Finally, maternal perception of infant crying as problematic and dyadic

mutuality together contributed 10% (9% adjusted) of the variance in externalizing symptoms and 13% (11% adjusted) of the variance in negative emotionality. However, only one of models contained independent variables that both had a main effect on the dependent variable: amount of crying and dyadic mutuality both significantly contributed to the regression equation for predicting externalizing symptoms (see Table 8). Dyadic mutuality did not demonstrate a main effect in any of the other significant regression models.

Interaction terms were then added to the models in hierarchical regression analyses to address research question 2 and test whether early risk factors (parenting stress, maternal depression, low maternal self-efficacy, amount of infant crying, or perception of infant crying as problematic) would moderate the relationship between dyadic mutuality in the parent-child interaction and later child emotion regulation skills. The 15 multiple regression models conducted for research question 1 were tested again in step 1, with the addition of the interaction term for the two independent variables into each model in step 2 (see Table 9). None of the interaction terms in any of the models were significant. Thus, the independent variables do not indicate a moderation effect, and the main effects models represent the impact of the independent variables on the dependent variable.

Table 8. Maternal and Infant Factors Predicting 24-Month Emotion Regulation

		Internalizing[6]		Externalizing		Negative Emotionality	
		B	*SE B*	*B*	*SE B*	*B*	*SE B*
Model 1	Parenting stress	.001*	.000	.002***	.001	.003***	.001
	Dyadic mutuality	.010	.017	-.029	.018	.000	.025
	R^2	.06		.15		.20	
	F	4.36*		11.53***		16.19***	
Model 2	Maternal depression	.007	.005	.011~	.006	.017*	.008
	Dyadic mutuality	.006	.018	-.036~	.019	-.011	.027
	R^2	.04		.11		.11	
	F	3.07		8.10**		7.95*	
Model 3	Maternal self-efficacy	-.009	.007	-.008	.008	-.02*	.01
	Dyadic mutuality	.007	.018	-.035	.019	-.008	.027
	R^2	.04		.07		.08	
	F	3.04		4.87~		5.66~	
Model 4	Amount infant crying	.009	.005	.011*	.005	.016*	.007

[6]Internalizing behaviors, parenting stress, dyadic mutuality, maternal depression, and maternal self-efficacy were centered at their means. Externalizing symptoms, negative emotionality, and amount of infant crying were transformed (square root), then centered. Problematic infant crying was a dichotomous variable.

	Dyadic mutuality	.005	.017	-.037*	.019	-.013	.026
	R^2	.05		.09		.07	
	F	3.42		6.37*		4.58*	
Model 5	Problematic infant crying	.104	.071	.144*	.068	.284**	.092
	Dyadic mutuality	.007	.018	-.034	.019	-.008	.026
	R^2	.05		.10		.13	
	F	3.24		7.22*		9.06**	

$\sim p < .06$, *$p < .05$, **$p < .01$, ***$p < .001$

Table 9. Maternal and Infant Factors with Interaction Terms Predicting 24-Month Emotion Regulation

		Internalizing		Externalizing		Negative Emotionality	
		B	$SE\ B$	B	$SE\ B$	B	$SE\ B$
Model 1	Parenting stress	.001*	.000	.002***	.001	.003***	.001
	Dyadic mutuality	.010	.018	-.030	.018	-.001	.025
	Parenting stress x Dyadic mutuality	.000	.000	.000	.000	.000	.001
	R^2	.07		.16		.20	
	ΔR^2	.002		.01		.003	
	F	3.01		8.17***		10.89***	
	ΔF	.16		1.72		.45	
Model 2	Maternal depression	.007	.005	.011~	.006	.017*	.008
	Dyadic mutuality	.005	.018	-.037~	.019	-.011	.027
	Maternal depression x Dyadic mutuality	-.001	.004	.002	.005	-.001	.007
	R^2	.05		.12		.11	
	ΔR^2	.005		.01		.006	
	F	2.27		5.59*		5.66	

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	ΔF	.27		.68		.35	
Model 3	Maternal self-efficacy	-.009	.007	-.008	.008	-.020*	.010
	Dyadic mutuality	.007	.018	-.034	.019	-.008	.027
	Maternal self-efficacy x Dyadic mutuality	.003	.005	-.004	.006	.002	.008
	R^2	.05		.08		.08	
	ΔR^2	.004		.02		.003	
	F	2.33		3.66		3.97	
	ΔF	.29		1.85		.21	
Model 4	Amount infant crying	.009	.005	.011*	.005	.016*	.007
	Dyadic mutuality	.005	.017	-.037*	.019	-.013	.026
	Amount crying x Dyadic mutuality	.004	.005	-.001	.005	.000	.007
	R^2	.06		.09		.07	
	ΔR^2	.01		.004		.003	
	F	2.84		4.39*		3.18	
	ΔF	1.64		.49		.42	
Model 5	Problematic infant crying	.101	.072	.143*	.070	.277**	.094
	Dyadic mutuality	.012	.018	-.034	.019	.001	.027

Problem crying x Dyadic mutuality	-.051	.058	.003	.058	-.087	.083
R^2	.06		.10		.14	
ΔR^2	.01		.001		.02	
F	2.69		4.82*		7.15**	
ΔF	1.68		.17		2.00	

$\sim p < .06$, *$p < .05$, **$p < .01$, ***$p < .001$

The five main effects models predicting externalizing symptoms were conducted again with the addition of the covariate, household income, in hierarchical multiple regression analyses. Table 10 displays these models. In step 1, the two independent variables from the main effects models were added. In step 2, household income was added. Inclusion of the covariate did not significantly change the F-value in any of the models predicting externalizing symptoms. Furthermore, household income did not uniquely contribute to the regression equation in any of the models, indicating that the original main effects models excluding the covariate provide a good fit to the data.

Table 10. Hierarchical Multiple Regression Models Predicting 24-Month Externalizing Symptoms with Covariate

		B	$SE\ B$
Step 1	Parenting stress	.002**	.001
	Dyadic mutuality	-.024	.020
Step 2	Income	-.066	.044
	R^2	.18	
	ΔR^2	.02	
	F	8.55***	
	ΔF	3.47	
Step 1	Maternal depression	.011*	.006
	Dyadic mutuality	-.029	.021
Step 2	Income	-.073	.045
	R^2	.14	
	ΔR^2	.03	
	F	6.47**	
	ΔF	3.90	
Step 1	Maternal self-efficacy	-.010	.008
	Dyadic mutuality	-.027	.021
Step 2	Income	-.083	.047
	R^2	.10	
	ΔR^2	.04	
	F	4.50*	
	ΔF	4.63	

Step 1	Amount infant crying	.010~	.005
	Dyadic mutuality	-.033	.021
Step 2	Income	-.058	.045
	R^2	.11	
	ΔR^2	.02	
	F	5.00*	
	ΔF	2.45	
Step 1	Problematic infant crying	.169*	.071
	Dyadic mutuality	-.028	.020
Step 2	Income	-.082	.045
	R^2	.13	
	ΔR^2	.04	
	F	5.90**	
	ΔF	4.75	

$\sim p < .06, *p < .05, **p < .01, ***p < .001$

Model Building

After the independent variables that predicted the child emotion regulation variables were found, the goal was to fit a parsimonious model that could explain variation in each child emotion regulation variable with a small set of predictors. New models were built to predict internalizing symptoms, externalizing symptoms, and negative emotionality.

Forward selection consists of several linear regression analyses to find the independent variable that increases the R^2 the greatest amount until the addition of another variable does not significantly increase the R^2, using a predetermined p-value for F-change (McDonald, 2009). A significance of $p < .15$ was used in this analysis. The first model that was built predicted internalizing symptoms at 24 months of age (see Table 11.) Parenting stress was entered into the model first, $F(1, 128) = 7.85, p = .02$, accounting for 6% (5% adjusted) of the variance in internalizing symptoms. Parenting stress significantly predicted internalizing symptoms, $t(129) = 2.33, p = .02$. The variable

found to increase R^2 the greatest amount was maternal perception of infant crying as problematic, $F(2, 127) = 5.83$, $p = .02$, but the F-change did not meet the significance criteria of $p < .15$. Thus, it was excluded from the model. Including additional variables in the model did not increase the R^2; consequently, parenting stress was the only variable retained in the model, accounting for 6% (5% adjusted) of the variance in internalizing symptoms.

Table 11. Model Predicting Internalizing Symptoms

	B	SE B
Parenting stress	.001*	.000
R^2	.06	
F	7.85*	

A model was built to predict externalizing symptoms at 24 months of age (see Table 12). First, parenting stress was entered into the model, which was significant, $F(1, 128) = 18.39$, $p < .001$, accounting for 13% (12% adjusted) of the variance in externalizing symptoms. Parenting stress significantly contributed to the prediction equation, $t(129) = 3.67$, $p < .001$. Next, problematic infant crying was found to increase the R^2 the greatest amount and the F-change was significant ($p = .14$), so it was retained in the model, which accounted for 16% (14% adjusted) of the variance in externalizing symptoms, $F(2, 127) = 11.80$, $p < .001$. Problematic infant crying did not individually contribute to the regression equation, $t(128) = 1.46$, $p = .146$. Dyadic mutuality was the third and final variable added to the model, as it increased the R^2 a greater amount than

the remaining independent variables (p = .12), although it did not significantly contribute to the prediction equation, $t(129)$ = 1.43, p = .103. All additional variables exceeded the p-value limit. Together, parenting stress, problematic infant crying, and dyadic mutuality explained 18% (16% adjusted) of the variance in externalizing symptoms, $F(3, 126)$ = 9.46, p < .001. Only parenting stress significantly contributed to the regression equation in the final model, $t(72)$ = 2.99, p = .003.

Table 12. Model Predicting Externalizing Symptoms

	Model 1		Model 2		Model 3	
	B	$SE\ B$	B	$SE\ B$	B	$SE\ B$
Parenting stress	.002***	.001	.002***	.001	.002***	.001
Problematic infant crying			.10	.07	.10	.07
Dyadic mutuality					-.03	.02
R^2	.13		.16		.18	
ΔR^2			.03		.02	
F	18.39***		11.80***		9.46***	
ΔF			5.30		3.53	

*p < .05, **p < .01, ***p < .001

Finally, a model was built to predict negative emotionality at 24 months of age (see Table 13). Because parenting stress was consistently the strongest predictor, it was added first to the model, significantly contributing to the regression equation, $t(83)$ = 4.89, p < .001. Parenting stress explained 20% (19% adjusted) of the variance in negative emotionality, $F(1, 82)$ = 31.91, p < .001. Maternal perception of infant crying as

problematic (problematic infant crying) was added next to the model and significantly

contributed to the prediction equation, $t(128) = 2.22$, $p = .027$, as did parenting stress,

$t(128) = 4.02$, $p < .001$. No other independent variables had a p-value below the cutoff

of .15, thus no additional variables were added to the model. Problematic infant crying

and parenting stress combined explained 26% (25% adjusted) of the variance in negative

emotionality, $F(2, 127) = 22.76$, $p < .001$.

Table 13. Model Predicting Negative Emotionality

	Model 1		Model 2	
	B	*SE B*	*B*	*SE B*
Parenting stress	.003***	.001	.003***	.001
Problematic infant crying			.21*	.09
R^2	.20		.26	
ΔR^2			.06	
F	31.91***		22.76***	
ΔF			11.17*	

*$p < .05$, **$p < .01$, ***$p < .001$

Mediation

    Due to the associations between the maternal well-being variables and negative

emotionality, displayed in Table 6, the question of mediation arose. Linear regression

analyses demonstrated that maternal self-efficacy predicted negative emotionality, $F(1,$

$128) = 10.04$, $p = .03$, accounting for 7% (6% adjusted) of the variance in negative

emotionality. Maternal depression was also found to predict negative emotionality, $F(1,$

128) = 13.56, p = .04, explaining 9% (8% adjusted) of the variance in negative

emotionality. Because parenting stress accounted for 18% (17% adjusted) of the variance

in negative emotionality, $F(1, 128) = 28.20$, $p < .001$, parenting stress was tested as a

mediator of the other maternal well-being variables on negative emotionality. The test of

mediation recommended by (Baron & Kenny, 1986) was used, which consists of several

regression analyses and examination of the significance of coefficients. Parenting stress

was found to mediate the association between maternal self-efficacy and negative

emotionality, $F(2, 127) = 16.99$, $p < .001$, $R^2 = .21$ (see Table 14). Likewise, the

relationship between maternal depression and negative emotionality was mediated by

parenting stress, $F(2, 127) = 18.30$, $p < .001$, $R^2 = .22$ (see Table 15). Figure 2 illustrates

parenting stress as a mediator between both maternal self-efficacy and maternal

depression and negative emotionality.

Table 14. Parenting Stress Mediating Maternal Self-Efficacy and Negative Emotionality

	B	$SE\ B$
Parenting stress	.003***	.001
Maternal self-efficacy	-.005	.011
R^2	.21	
F	16.99***	

$*p < .05, **p < .01, ***p < .001$

Table 15. Parenting Stress Mediating Maternal Depression and Negative Emotionality

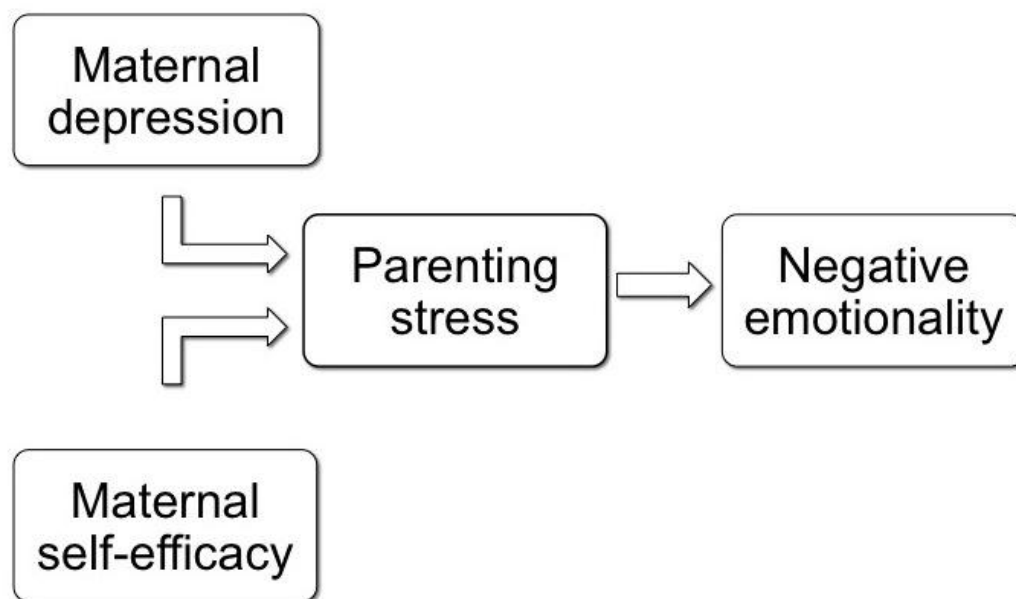|	*B*	*SE B*
Parenting stress	.003**	.001
Maternal depression	.005	.011
R^2	.22	
F	18.30***	

$*p < .05, **p < .01, ***p < .001$

Figure 2. Parenting stress as a mediator of the influence of maternal depression and maternal self-efficacy on child negative emotionality

CHAPTER V

DISCUSSION

This chapter begins with a summary of the findings, discussing maternal well-being variables, infant crying, and dyadic mutuality in relation to child emotion regulation. Interpretations of the findings, both significant and insignificant, are offered. Study limitations are then presented. Finally, the chapter concludes with the research and practical implications of the study.

Summary of Findings

Because challenges regulating emotions in early childhood increases the risk for adverse outcomes later in life (Barkley, 1997; Bowie, 2010; Calkins et al., 1995; Campbell-Sills & Barlow, 2007; Cole et al., 1996; Cole, Zahn-Waxler et al., 1994; Eisenberg et al., 2002; Fabes & Eisenberg, 1992; Gottman et al., 1996; Gross, 2002; Hay, 1997; Mullin & Hinshaw, 2007; Rutter, 1991; Shonkoff & Phillips, 2000), the factors that predict emotion regulation difficulties in early childhood are of interest. The results of this study suggest that certain facets of maternal well-being and maternal perception of the infant are important factors that predict emotion regulation in early childhood. Overall, the findings of this study demonstrated the importance of parenting stress in predicting maladaptive emotion regulation in toddlers. Of the maternal well-being variables examined in this study, parenting stress experienced by the mother in the postpartum period was the strongest predictor of challenges with emotion regulation in

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early childhood.   Maternal perception of infant crying as problematic predicted difficulty with emotion regulation in early childhood, as well. Dyadic mutuality in the parent-child interaction also plays a role in the development of child emotion regulation.

Maternal Well-Being and Dyadic Mutuality Predicting Child Emotion Regulation

As anticipated, the maternal well-being variables were all correlated. Previous studies have found that parenting stress increases with depression, which both have a negative relationship with maternal self-efficacy (e.g., Gelfand, Teti, & Fox, 1992; Holland et al., 2011; Katch, 2012; Leahy-Warren, McCarthy, & Corcoran, 2012; Weaver, Shaw, Dishion, & Wilson, 2008). The present study replicated this finding. Each maternal well-being variable is discussed below.

Parenting stress. The level of parenting stress experienced by the mother at 6 months postpartum consistently predicted child emotion regulation. In the main effects models, parenting stress independently predicted externalizing symptoms, internalizing symptoms, and negative emotionality while controlling for dyadic mutuality. Previous studies also found that parenting stress predicted child behavioral regulation problems (Holden & Ritchie, 1991; Roberts, 1989). Yet unlike Roberts, the present study did not indicate that dyadic mutuality mediates the relationship between parenting stress and child self-regulation, as parenting stress demonstrated a main effect on emotion regulation in this study. Thus, regardless of the dyadic mutuality in the parent-infant interaction, the level of parenting stress experienced by the mother at six months postpartum predicted the child's emotion regulation capacity at 24 months of age.

In previous studies, high levels of parenting stress has been associated with

suboptimal parenting behavior and dysfunctional parent-child interactions (Belsky, 1984; Calkins et al., 2004; Roberts, 1989; Xu et al., 2005). More intrusive (Calkins et al., 2004), less responsive (Belsky & Fearon, 2002; Calkins et al., 2004) behavior in interactions has been found in parents with higher parenting stress levels. In the present study, however, parenting stress was not related to dyadic mutuality or any other aspects of the parent-child interaction. Together parenting stress and dyadic mutuality explained (from 6% to 20% of) the variance in child emotion regulation, yet parenting stress alone significantly contributed to the prediction of the emotion regulation variables. Parenting stress does appear to be the "catalyst" that directly influences parent-child interaction (Farmer & Lee, 2011).

Maternal depression. In combination with dyadic mutuality, maternal depression at 6 months postpartum predicted externalizing symptoms and negative emotionality in the child at 24 months of age. Even when dyadic mutuality was controlled for, maternal depression predicted negative emotionality. This finding is noteworthy, as the dyadic interaction has been found to mediate the association between maternal depression and child negative emotionality (Lunkenheimer et al., 2013). In the present study, however, level of depression was not related to dyadic mutuality or any parenting behavior in the parent-child interaction. This finding is somewhat unexpected, given that a host of prior research has found that maternal responsiveness and engagement with her infant tends to decrease in the presence of maternal depression (Bettes, 1988; Cohn & Tronick, 1983; Field, 2000; Murray & Cooper, 1999; Murray et al., 1996; Tronick & Weinberg, 1997), producing less coordinated interactions (Tronick

& Gianino, 1986b). Belsky (1984) theorized that maternal mental health mediates the relationship between parenting stress and parenting behavior. On the other hand, some studies found no association between maternal depression and maternal behavior in the parent-child interaction (Campbell et al., 1995; Farmer & Lee, 2011; Mäntymaa, Puura, Luoma, Salmelin, & Tamminen, 2006). Furthermore, Carter et al. (2003) also found a direct association between maternal depression and negative emotionality. The findings from the present study suggest that maternal depression may predict child emotion regulation through different means other than maternal behavior in the parent-child interaction, such as a lack of modeling adaptive emotion regulation skills (Feldman, 2007; Field, 1984).

Although maternal depression predicted negative emotionality when dyadic mutuality was accounted for, maternal depression no longer predicted negative emotionality when included in a model with parenting stress. Adding maternal depression to the model did not increase the variance in negative emotionality that was accounted for by parenting stress alone. This finding contradicts the recent finding that depression mediated the relationship between parenting stress and later child outcomes (Huang et al., 2014). This may be due to the measure of child outcome: in the study by Huang et al. overall developmental level was used as the child outcome, while the present study focused on emotion regulation, in particular. The population also differed, as the participants studied by Huang et al. were adolescent mothers of African American and Hispanic descent. Depression and parenting stress may have a different effect on this

population. Regardless, in the present study parenting stress mediated the association between maternal depression and negative emotionality.

Maternal self-efficacy. Maternal self-efficacy at six months postpartum predicted negative emotionality in the child at 24 months. However, this relationship disappeared when parenting stress was included in the model. Parenting stress was found to mediate the relationship between maternal self-efficacy and negative emotionality, as it does with maternal depression and negative emotionality.

Maternal self-efficacy was not associated with dyadic mutuality or any other aspect of maternal behavior in the parent-child interaction. This finding was contrary to that of Teti and Gelfand (1991), who found that maternal self-efficacy was directly related to parenting behavior. Yet Teti and Gelfand (1991) did not measure parenting stress, which may have mediated the association. They also used a clinical sample of mothers, referred to the study by their therapists. It is possible that maternal self-efficacy affects parenting behavior differently in a clinical population.

Infant Crying and Maternal Well-Being

Parenting stress at six months and child negative emotionality at 24 months were both associated with amount of infant crying at six months of age.   Neither maternal depression nor maternal self-efficacy was associated with amount of infant crying. Mothers who perceived their infants' crying to be a problem, however, reported higher parenting stress, lower maternal self-efficacy, higher externalizing behavior for the child at 24 months, and higher negative emotionality in the child at 24 months. Interestingly, the amount of infant crying did not differ between mothers who perceived their infants'

crying to be a problem and those who did not. This finding is especially striking, considering that amount of crying was measured by maternal report.

Mothers with excessively crying infants tend to report higher levels of parenting stress (Asnes & Mones, 1983; Beebe et al., 1993; Humphry & Hock, 1989; Miller et al., 1993; Wake et al., 2006). Findings from the present study support this conclusion. The Parenting Stress Index measures stress experienced in the parenting role, as well as stress around their child's behavior, and both domains of parenting stress increased with infant crying in this study. Thus, the more the infant cries the more stress the mother tends to experience related to her child's behavior and her own functioning as a parent. Parenting stress was also significantly higher for mothers who reported that her infant's crying was a problem. High scores on the parent domain indicate that a parent feels "overwhelmed and inadequate to the task of parenting" (Abidin, 1995, p. 10). It follows that these intense negative feelings would impact the family, increasing the risk for family conflict and tension in the parenting partners' relationship (Papoušek & von Hofacker, 1998; Räihä et al., 1995).

Research on maternal depression and infant crying has been inconsistent. While a body of research has demonstrated increased amounts of infant crying for infants of depressed mothers (e.g., Howell, Mora, & Leventhal, 2006; Miller et al., 1993; Papoušek & von Hofacker, 1998; Vik et al., 2009; Wake et al., 2006), other studies did not find an association between maternal depression and infant negative emotionality (e.g., Boyd, Zayas, & McKee, 2006; Pauli-Pott, Mertesacker, & Beckmann, 2004). Neither amount of crying nor maternal perception of crying as problematic was related with depressive

symptoms in the present study. Although causal relationships were not examined in the present study, some researchers have claimed that maternal depression and infant crying have a causal relationship, and both directions of causality have been proposed. For example, Pauli-Pott, Mertesacker, Bade, Bauer, and Beckmann (2000a) suggested that interacting with a depressed mother may bring about excessive crying in the infant. On the contrary, Murray et al. (1996) concluded that because infant irritability strongly predicted later maternal depression, the infant's excessive crying leads to—or at least contributes to—depressive symptoms in the mother. The theory that mothers experiencing depression cause increased crying in their infants, or that excessively crying infants cause maternal depression, are not supported by the findings of this study.

Previous studies have found that maternal self-efficacy decreases with higher levels of infant crying (Cutrona & Troutman, 1986; Leerkes & Crockenberg, 2002; Troutman et al., 2012). Although the present study did not find an association between maternal self-efficacy and amount of crying, maternal self-efficacy was lower for mothers who perceived their infants' crying to be problematic. Maternal perception of infant behavior as difficult, specifically challenges with soothing an infant, has been found to relate to decreased maternal self-efficacy (Fulton et al., 2012; Teti & Gelfand, 1991). The present study also found an association between maternal self-efficacy and negative mood observed in the child during the parent-child interaction, in that maternal self-efficacy decreased as negative mood in the child increased. Although this contradicts the lack of association found between maternal self-efficacy and amount of crying reported in the cry diaries, the context of high irritability during the parent-child

interaction may have played a role. Perhaps overall crying amount does not relate to maternal self-efficacy, but crying and fussing during parent-child interactions may be associated with decreased maternal self-efficacy.

A curvilinear association may exist between maternal self-efficacy and parenting behavior in the presence of excessive infant crying. Leerkes and Crockenberg (2002) found that high levels of infant crying predicted less responsive maternal behavior when maternal self-efficacy was low or very high, while infant crying was associated with maternal responsiveness when maternal self-efficacy was moderately high. Complex relationships between these variables, beyond linear, should be explored in future research.

Dyadic Mutuality and Child Emotion Regulation

Dyadic mutuality in the parent-child interaction was examined in relation to maternal well-being and infant crying in predicting later child emotion regulation. Including dyadic mutuality in the main effects models allowed for investigating which risk factors would predict child emotion regulation, controlling for dyadic mutuality. Although its role appears more complicated than that of parenting stress, dyadic mutuality does seem to have an impact on child emotion regulation capacity. This finding supports previous research that has demonstrated that dyadic mutuality in infancy was associated with effortful control at age 2 (Feldman & Greenbaum, 1999; Kim & Kochanska, 2012b).

The present study found that together, dyadic mutuality, parenting stress, and problematic infant crying accounted for 18% of the variance in child externalizing

symptoms at 24 months. This finding is unique in that maternal well-being and the effect

of infant behavior on the mother was examined with dyadic mutuality and child emotion

regulation. In the present study, dyadic mutuality was not directly associated with any of

the maternal well-being variables, amount or maternal perception of infant crying, or

child emotion regulation. Nevertheless, low dyadic mutuality in conjunction with high

parenting stress and maternal perception of infant crying as problematic predicted high

externalizing behavior. Previous research has suggested that dyadic mutuality and

responsiveness in parent-child interactions is key to the development of emotion

regulation (Conradt & Ablow, 2010; Haley & Stansbury, 2003; Kogan & Carter, 1996;

Mills-Koonce et al., 2007; Moore et al., 2009; Propper et al., 2008). The findings of the

present study indicate that dyadic mutuality matters, but is not the only important feature

of the parent-child relationship in understanding the development of externalizing

behavior; parenting experiences and perceptions of the infant are important, as well.

Parenting stress alone best predicted internalizing symptoms in the child at 24

months, which accounted for only 6% of the variance in internalizing symptoms. One

possible explanation for the low amount of variance explained for internalizing

symptoms is the ITSEA scores themselves: while the means on the externalizing domain

and the negative emotionality scale for this sample were not significantly different from

the means for a similar non-clinical sample (see Carter, Briggs-Gowan, Jones, & Little,

2003), the mean on the internalizing domain was significantly lower in this study.[7] The

reduced level of internalizing symptoms in the children in the present study may have

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[7] $t(419) = 3.34, p < .001.$

prevented a more robust model to predict this variable. Moreover, the mothers in this sample may have under-reported internalizing symptoms, since "parents sometimes see internalizing as externalizing" (A. Carter, personal communication, January 30, 2014). Anxious children are likely to display externalizing behaviors because they are attempting to avoid anxiety-inducing situations, which may be misread as defiance or aggression by the parent (Child Mind Institute, 2013; Egger & Angold, 2006). If a toddler is displaying both internalizing and externalizing behaviors, parents are more likely to observe the externalizing behaviors, unless the parent also experiences anxiety (A. Carter, personal communication, January 30, 2014). The role of parental anxiety in reporting child internalizing and externalizing symptoms should be explored in future studies.

Another possible explanation for the low level of variability in internalizing symptoms explained by these variables is that the subscales of the internalizing domain (depression/withdrawal, general anxiety, separation distress, and inhibition to novelty) have been found to measure distinct constructs. Psychometrics of the ITSEA support analyzing the externalizing domain globally, but the support for analyzing the internalizing domain globally is weaker (Briggs-Gowan & Carter, 1998). For one- to three-year-olds, examining the scales of the internalizing domain separately may uncover more meaningful findings (Carter et al., 2010). Complex models, perhaps using structural equation modeling, with the maternal well-being variables, perception of infant crying, and dyadic mutuality predicting the internalizing subscales should be explored in future research.

While parenting stress alone predicted internalizing symptoms, parenting stress and maternal perception of infant crying as problematic predicted negative emotionality at 24 months. Contrary to expectations, dyadic mutuality did not improve the fit of either of the models predicting negative emotionality and internalizing symptoms. It is possible that dyadic mutuality did not contribute to internalizing symptoms and negative emotionality due to group differences on the missing data for these variables. The participants with missing data for the parent-child interaction or the ITSEA had lower educational attainment than the participants who had data for these variables. Participants with missing data for the ITSEA were also younger and reported fewer depressive symptoms. The group with missing data for the child emotion regulation variables may have differed in meaningful ways that affected the influence of dyadic mutuality on these outcome variables. Additionally, the research protocol during which the parent-child interactions occurred had constraints and may have affected the observable dyadic mutuality of the mother and infant (see Limitations below).

Moderation

Although previous studies investigating the influence of the parent-child interaction on child self-regulation did not incorporate number of minutes of infant crying or maternal perception of infant crying as problematic, infant temperament was considered in these studies, and temperament was found to moderate the relationship between dyadic mutuality and child self-regulation: dyadic mutuality was a stronger predictor of child self-regulation for difficult infants (Feldman & Greenbaum, 1999; Kim & Kochanska, 2012b). The second research question and corresponding hypothesis in

the present study followed a similar theory, postulating that for mother-infant pairs for whom maternal well-being or infant self-regulation was at risk (i.e., high parenting stress, high maternal depression, low maternal self-efficacy, high infant crying, or maternal perception of infant crying as problematic), dyadic mutuality would be a stronger predictor of child emotion regulation. This hypothesis that the maternal and infant risk factors would moderate the relationship between dyadic mutuality and child emotion regulation was not supported. None of the interaction terms were significant, indicating that none of the maternal well-being or infant crying variables moderates the relationship between dyadic mutuality and child emotion regulation. Although it was speculated that excessively crying infants or infants of mothers experiencing challenges with their postpartum functioning, for example, may especially benefit from positive parent-child interactions, the maternal and infant risk factors did not strengthen the impact of dyadic mutuality in the parent-child interaction on the child's later emotion regulation. Thus, the main effects models represent the influence of the maternal well-being and infant crying variables and dyadic mutuality on child emotion regulation.

Whereas previous research has focused mainly on maternal behavior (e.g., responsiveness) in the parent-child interaction and fewer studies have considered dyadic mutuality, examining the role of dyadic mutuality was of interest in the present study. Dyadic mutuality acknowledges both halves of the dyad, assessing the reciprocal behavior and affect that comprises the interaction. Infants bring their own biological predispositions, including temperament, and learned behaviors, as biology always interacts with environment (Shonkoff & Phillips, 2000). Infants participate in

interactions, and the bidirectionality of interactions should be reflected in the measures used to study them, yet research on parent-child interactions has mostly implemented a unidirectional view focused on mothers' behavior toward their children. When observing the parent-child interaction through a lens of bidirectionality, such as when measuring dyadic mutuality, both the parent and the child are deemed active participants, engaging in behaviors and responding to each other (Kochanska & Aksan, 2004).

Limitations

Sample

This study was part of a larger research project that consisted of additional data collection measures. Due to the research aims and design of the larger study, participant recruitment included intentional over-sampling of infants who cried excessively. Therefore, the amount of infant crying and the proportion of families with excessively crying infants were greater in this sample than in the general population.

The participant eligibility criteria also limited the sample. Adult participants were required to be mothers, excluding fathers and other caregivers.[8] Participant mothers were also required to be English speaking, which excluded mothers who are not fluent in English. The sample reflected demographics similar to that of the Chicago area, with the exception of a smaller proportion of Hispanic/Latino participants in this study than in Chicago (United States Census Bureau, 2010), likely due to the English fluency requirement to participate. Nevertheless, the racial and ethnic makeup of the sample in this study was diverse and similar to the sample on which the ITSEA was originally

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[8] The organization that funded the study required participant parents to be mothers for sample consistency.

normed (see Briggs-Gowan & Carter, 1998).

Infants included in the study were required to be healthy, full term, and born without significant birth complications. Participants were excluded if they had a neurological disorder (e.g., cerebral palsy, hydrocephaly, seizures, blindness) or a genetic disorder (e.g., Down syndrome, Fragile-X-syndrome). Although these exclusions were intended to control for the influence of significant health issues on outcomes, these constraints may limit the generalizability of the study.

Data Collection

A major limitation of this study was missing data due to the addition of two maternal well-being measures (MEQ and EPDS at 6 months) after over half of sample had completed this phase of the study. Additionally, due to the length of the study (24 months), a significant number of respondents missed at least one data collection time. As a result, 75% of the cases were incomplete. Multiple imputation was used to impute the missing data. Although means and standard deviations for the imputed variables were comparable to the original data, ideally the dataset would have been comprised of a sufficient number of complete cases of original data so as not require data imputation.

The constraints of the parent-child interaction protocol were limiting in several ways. The interaction occurred in the laboratory, which may reduce the construct validity of the observation, as the behavior of the dyad may be more representative of typical interactions in a more natural setting (i.e., the family's home). A review of whether observational findings are influenced by the presence of the observer and the location of the observation (e.g., laboratory or home) found that the presence of an

observer does not necessarily influence the interaction, but the location may: interactions in laboratories are not necessarily representative of typical interactions that occur in the home (Gardner, 2000). Examining the parent-infant interaction in the home may be more representative of typical interactions. Regardless, feasibility often requires parent-child interaction observations to occur in the laboratory, and the parent-child interaction coding schema used in this study was developed for laboratory observations.

Mothers were instructed to place the infant in the high chair in the observation room and interact/play with her child as she normally would for 10 minutes. However, because physiological data were also collected during this interaction, the mother was asked not to pick up her child. If the child were to become upset (and the mother did not pick up her child), the researcher told the mother that she could pick up the child and the researcher stopped the session until the child was calm and could sit in the high chair relatively content. Considering the sample contained many infants who cried excessively, this task presented a challenge for some infants. In addition, the infants were fed (via bottle or breast) just prior to this parent-child interaction period. Some infants would become sleepy during the feeding, with some falling asleep completely. And because the infants were six months old, some infants were accustomed to only sitting in a high chair when they were about to be fed. Thus, some infants became fussy as soon as they were placed in the high chair. If the infant continued to fuss or cry, this segment of the protocol was skipped. For the missing parent-child interaction videos, it was unknown whether the interaction session did not occur because the infant was upset or if it was missing due to a technical or other problem. It would have been useful to

have documentation of the reason for the missing interaction data.

The measures of maternal well-being, infant crying, and child emotion regulation are all maternal report. Maternal report measures can be biased and influenced by social desirability. The fact that mothers who completed the questionnaires also participated in laboratory sessions, meeting research staff in person, may have influenced their responses about their own well-being. In addition, mothers' own traits have been found to influence the extent to which they successfully report on related child behaviors (Hayden, Durbin, Klein, & Olino, 2010). While the parent-child interactions were observer-rated, and the coder was trained to reliability with a master coder, it is important to note that the ratings still contain an element of subjectivity. Furthermore, without knowledge of each family's background and cultural practices, the meaning of maternal behavior could vary between different families. Previous research has indicated that similar parenting behaviors may impact children in different ways, depending on the culture (e.g., Chan, Penner, Mah, & Johnston, 2010). Additionally, the impact of emotion regulation strategies on later child behavior has been found to be moderated by the child's race (Supplee, Skuban, Shaw, & Prout, 2009). Rather than testing race and ethnicity and income as covariates, it would be preferable to test for model equivalence across socioeconomic and racial and ethnic groups (Raver, 2004). Another method of further considering cultural context would be to use an in-home observational coding schema, such as Parent-Child Observation Guide (Bernstein, Percansky, & Hans, 1987), which was developed to be sensitive to culture.

Finally, the variables included in this study are only a few of the factors that may impact the development of emotion regulation in children. The maternal risk factors of

parenting stress, maternal depression, and maternal self-efficacy examined in this study are some facets that affect maternal well-being, yet other maternal risk factors are not included in this study that could potentially impact maternal behavior and the development of the child's emotion regulation, such as mental illness, substance use, history of trauma, marital/partner problems, lack of social support, and other psychosocial and relationship issues. Social support and maternal anxiety, in particular, would have been informative to include in the present study. Furthermore, many other factors impact child development. As detailed in Bronfenbrenner's (1975) ecological systems theory, children develop within different systems. Examining maternal well-being and features of the parent-child interaction may provide an insight into the "microsystem" of the mother-child dyad, and some demographic variables included in this study reflect aspects of the "macrosystem" (e.g., level of education, household income, race/ethnicity), yet many other contextual factors within the ecological systems could potentially influence the child's development of emotion regulation, which is beyond the scope of this study.

Implications

Parenting stress was found to predict internalizing symptoms, externalizing symptoms, and negative emotionality. The impact of parenting stress on challenges with emotion regulation in early childhood highlights the significance of reducing levels of parenting stress in mothers during the postpartum period. Some factors that are associated with parenting stress could be assessed in the early postpartum period to identify mothers and infants who may be at risk for experiencing elevated levels of

parenting stress. New mothers' parenting concerns just after childbirth have also been found to predict parenting stress in infancy (Combs-Orme, Cain, & Wilson, 2004). If new mothers were provided opportunities to discuss their parenting concerns, support services could be offered to the parents who express concerns that are associated with elevated levels of parenting stress.

Mothers who perceive their infants' crying as problematic are at increased risk of experiencing higher levels of parenting stress and their children are at increased risk for difficulty with emotion regulation. The findings from the present study support previous research that concluded that perception of infant crying was more instrumental in predicting family well-being than actual amount of crying. Parental perception of crying is associated with parenting stress, anxiety, child behavior problems, and child abuse (MacKenzie & McDonough, 2009; Pauli-Pott, Becker et al., 2000; Reijneveld, Van der Wal, Brugman, Sing, & Verloove-Vanhorick, 2004). Health professionals who work with mothers and infants should inquire about maternal perceptions of infant crying, in addition to amount of crying (Papoušek & von Hofacker, 1998). Just as depression screening has been added to postpartum primary care visits for many mothers of infants, a simple screen of infant crying and parental perceptions of the crying could be included, as well. Appropriate resources could then be provided to parents who are struggling with their infants' crying, such as a home visiting program or parent support group for parents with "difficult" infants.

For families experiencing additional stressors or risk factors, certain interventions have been found to be helpful. One intervention for families in poverty that combined an

interactive feedback session, a series of workshops, and a resource packet significantly increased both maternal self-efficacy and parenting skills and decreased parental stress (Rooney, 2013). For mothers experiencing mental health problems, treatments aimed at improving the mother-infant relationship, such as infant-parent psychotherapy, demonstrate the most promising outcomes for the child (Nylen et al., 2006). Infant – parent psychotherapy is a therapeutic process that aims at "protecting infant mental health by aligning the parents' perceptions and resulting caregiver behaviors more closely with the baby's developmental and individual needs within the cultural, socioeconomic, and interpersonal context of the family" (Lieberman, Silverman, & Pawl, 2005, p. 472). Mothers who hold negative perceptions of their infants due to their own past experiences of trauma may especially benefit from infant-parent psychotherapy.

Although dyadic mutuality in the parent-child interaction did not have as strong of an impact on child emotion regulation in this study as predicted, the findings indicated that dyadic mutuality does influence externalizing behavior in early childhood. Mothers whose interactions with their infants lack the responsive, synchronous behaviors that comprise dyadic mutuality who are also experiencing high parenting stress have children who are at increased risk for externalizing behavior problems. Dyadic mutuality also becomes the basis for the child's future capacity for intimacy, empathy, perspective taking, and internalization of parental values and rules (Feldman, 2007; Kochanska, 1997); therefore, dyadic mutuality should be facilitated in parent-child interactions as early as possible.

Home visiting programs that offer support and education in the postpartum period

can help reduce parental stress and improve parent-child interactions. A major goal in many home visiting programs is to promote positive parent-child relationships through responsive interactions (U.S. Department of Health and Human Services, Administration for Children and Families, 2012). Programs that incorporate the construct of dyadic mutuality into their model may be especially advantageous. Likewise, reducing and preventing parenting stress should be an outcome of home visiting programs. Indeed, a significant decline in parenting stress has been demonstrated in participants of home visiting programs in which this is an objective (Gilkerson, Burkhardt, & Hans, 2011; Prevent Child Abuse America, 2002).

In this study, parenting stress and perception of infant crying as problematic predicted negative emotionality and externalizing symptoms at 24 months of age. Parental perception of infant behavior as difficult or problematic has been linked with heightened levels of parenting stress (MacKenzie & McDonough, 2009). One aspect of parenting stress is parental perception of child behavior and its impact on the parent-child relationship (Abidin, 1995). It follows that mothers who perceive their infants' crying to be a problem would also have elevated parenting stress. Sheinkopf et al. (2006) has asserted that the two central parenting factors that increase risk for vulnerable families are stress in the parental role and perception of infant behavior as difficult. Focusing on the reduction of parenting stress may improve parental perceptions of infant behavior and later child emotion regulation. Moreover, treatments based on an infant mental health approach that aim to shift the parent's perception to a more balanced one and improve the parent-infant relationship may be effective at promoting later child emotion regulation

skills.

       Lack of social support and dissatisfaction with one's social support network have consistently been found to contribute to parenting stress (Jackson, 2009; Secco & Moffatt, 2003). Participating in a support group for parents of infants or utilizing support services like home visiting programs could help reduce the amount of parenting stress experienced by mothers of infants. Even mothers who have friends and family nearby may benefit from home visiting services, as home visitors are trained to support parents through the various challenges of parenthood. If they cannot be offered to all families, home visiting services should at least be available to families who are experiencing high parenting stress and other risk factors that present obstacles to optimal child development and family well-being.

APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE

Subject # _____

Date _____

Demographic Information Form
"Fussy Baby Research" / "Infant Development Study"

1. Child's gender   ____☐Female ____☐Male

2. Child's date of birth _____

3. Relation of primary caregiver to child _____

4. Relation of secondary caregiver to child _____
        ____☐☐No secondary caregiver to child

5. Please list all individuals living at child's primary residence (including you):

Relation to child	Age	Gender

6. Occupation of primary and secondary caregiver of child

Primary: _____

Secondary: _____

7. Highest education of primary and secondary caregiver of child
Primary   Secondary
☐_____   _____ ☐☐☐☐Professional (MA, MS, ME, MD, PhD, LLD and the like)
☐_____   _____ ☐☐☐☐Four-year college graduate (BA, BS, BM)
☐_____   _____ ☐☐☐☐One to three years college (also business schools)
☐_____   _____ ☐☐☐☐High school graduate
☐_____   _____ ☐☐☐☐Ten to 11 years of school (part high school)
☐_____   _____ ☐☐☐☐Seven to nine years of school
☐_____   _____ ☐☐☐ Less than seven years of school

8. UIC/Erikson affiliation of primary and secondary caregiver of child

Primary   Secondary

☐_____   _____   ☐ ☐ ☐ ☐Is a current UIC student
☐_____   _____   ☐ ☐ ☐ ☐Is a current UIC employee
☐_____   _____   ☐ ☐ ☐ ☐Is a current Erikson student
☐_____   _____   ☐ ☐ ☐ ☐Is a current Erikson employee

9. Racial group of **mother** and **child** (check all that apply)

Mother   Child

☐_____   _____   ☐ ☐ ☐ ☐American Indian or Alaskan Native
☐_____   _____   ☐ ☐ ☐ ☐Asian
☐_____   _____   ☐ ☐ ☐ ☐Native Hawaiian or Other Pacific Islander
☐_____   _____   ☐ ☐ ☐ ☐Black or African American
☐_____   _____   ☐ ☐ ☐ ☐White

10. Ethnic group of **mother** and **child**

Mother   Child

☐_____   _____   ☐ ☐ ☐ ☐Hispanic or Latino
☐_____   _____   ☐ ☐ ☐ ☐Not Hispanic nor Latino

11. Total annual household income:

☐   over $50,000
☐   under $50,000
       ☐   I receive public assistance

APPENDIX B

BABY CRY DIARY

Baby Cry Diary

Please record your baby's activity during the following times for today, _____ (date)

Please note the main activity of your baby during each 15-minute period. The activities are the following:
F=Fussing, **C**=Crying, **U**=Unsoothable Crying, **S**=Sleeping, **E**=Eating, **A**=Awake & Content, **X**=Cannot remember

6am	7am	8am	9am	10am	11am

12noon	1pm	2pm	3pm	4pm	5pm

6pm	7pm	8pm	9pm	10pm	11pm

12midnight	1am	2am	3am	4am	5am

Circle One Number
How frustrating to you was your baby's crying today?
0   1   2   3   4   5
Not at all   Hardly   A little   Somewhat   Very   Extremely

Was this a typical day? (*Circle One*) **YES**   **NO**
If no, please explain _____
_____
_____

Adapted from Barr Baby Day Diary (Barr et al., 1988) and Baby's Day Diary from the Women & Infants' Hospital Cry and Sleep Center

APPENDIX C

CRYING PATTERNS QUESTIONNAIRE

Thank you for agreeing to take part in this study. Please fill in the details below and then answer the questions on the following pages.

1. Your baby's name _____

    date of birth _____

    current age _____ months _____ weeks

    Sex   Boy [ ]   Girl [ ]

2. Is this baby your first child?

| 1st [ ] | 2nd [ ] | 3rd [ ] | 4th or more [ ] |

3.

Is baby currently being breastfed, fed on formula, on cow's milk, on baby solid foods, or on the same foods as the family?

breast feed	formula	Cow's milk	Baby solid foods	Family foods

(Please check more than one if a mixture is being used).

Please write the brand names of any formula currently being used. Write more than one if you are using a mixture.

4. If you would like to receive a copy of the study findings, please fill in your name and address.

Name   _____

Address   _____

             _____

All babies fuss and cry sometimes. The aim of the questions below is to get some idea of what your baby's crying patterns have been like <u>during the last week</u>.

	Morning (6 am – noon)	Afternoon (noon - 6 pm)	Evening (6 pm – midnight)	Night (midnight – 6 am)
1. Firstly, can you give me some idea of how much time your baby has usually spent fussing and crying in the morning? How about in the afternoon? in the evening? at night?	_____hrs ___ mins	_____ hrs ___mins	____hrs ___ mins	____ hrs ___mins

NB If there is no "usual" pattern – if crying has varied a lot from day to day – please fill in <u>yesterday's</u> crying times and check this box

☐

2. Are there any situations where your baby is especially likely to cry?	No	Yes bed/nap times	
		mealtimes	
		bathtimes	
		trips, shopping, etc.	
		visitors to your home	
		other (please describe)	

	No. of mornings	No. of afternoons	No. of evenings	No. of nights
3. What about periods of persistent fussing and crying – periods of half an hour or more when your baby just won't settle down. How many <u>mornings</u> this week have included such a period? What about <u>afternoons</u>? <u>evenings</u>? <u>night-times</u>?				

(Please record no. in each case)

4. Have you tried leaving your baby to "cry it out"?	No	Yes once	Yes a few times	Yes frequently

If yes how long for? _____
(Please indicate mins. or hours.)

5. During the last week which methods have you used in settling and looking after your baby? Please go through the list and check any methods used to show how often you have used them.

	Used occasionally	Used about once a day	Used repeatedly each day	Is this effective?	
				Yes	No
cuddling & rocking					
swaddling in blanket					
carrying in arms					
carrying in baby sling					
pacifier					
rocking in baby carrier or swing					
car rides					
singing or soothing music					
extra feedings					
bringing baby into your bed					
herbal remedy					
non-prescribed medications					
prescribed medications					
other – please describe					

6. Are you finding your baby's crying to be a problem or upsetting? (If yes, please say how often in the last week.)

No	Yes: how many times?

7. Have you approached your health care professional because of concern about your baby's crying?

No	Yes in the last month	Yes in the past

8. Have you approached anyone else because of concern about your baby's crying?

If yes, who did you approach? (e.g. friend, family, Fussy Baby Network)

No	Yes in the past month	Yes in the past

Thank you for completing this questionnaire. Please record any other information or comments overpage. Please return the questionnaire to us in the stamped addressed envelope provided.

NB ALL INFORMATION WILL BE KEPT COMPLETELY CONFIDENTIAL

APPENDIX D

PARENTING STRESS INDEX

Parenting Stress Index (PSI) (Psychological Assessment Resources, Inc.) Short Form

Below is a list of feelings and thoughts you may have had. Please answer how much you agree or disagree with these feelings. You can answer strongly agree, agree, not sure, disagree, or strongly disagree.

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1.	I often have the feeling that I cannot handle things very well.	1	2	3	4	5
2.	I find myself giving up more of my life to meet my children's needs than I ever expected.	1	2	3	4	5
3.	I feel trapped by my responsibilities as a parent.	1	2	3	4	5
4.	Since having this child, I have been unable to do new and different things.	1	2	3	4	5
5.	Since having a child, I feel that I am almost never able to do things that I like to do.	1	2	3	4	5
6.	I am unhappy with the last purchase of clothing I made for myself.	1	2	3	4	5
7.	There are quite a few things that bother me about my life.	1	2	3	4	5
8.	Having a child has caused more problems than I expected in my relationship with my child's father.	1	2	3	4	5
9.	I feel alone and without friends.	1	2	3	4	5
10.	When I go to a party, I usually expect not to enjoy myself	1	2	3	4	5
11.	I am not as interested in people as I used to be.	1	2	3	4	5
12.	I don't enjoy things as I used to.	1	2	3	4	5
13.	My child rarely does things that make me feel good	1	2	3	4	5
14.	Sometimes I feel my child doesn't like me and doesn't want to be close to me.	1	2	3	4	5
15.	My child smiles at me much less than I expected	1	2	3	4	5
16.	When I do things for my child, I get the feeling that my efforts are not appreciated very much.	1	2	3	4	5

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
17.	When playing, my child doesn't often giggle or laugh.	1	2	3	4	5
18.	My child doesn't seem to learn as quickly as most children.	1	2	3	4	5
19.	My child doesn't seem to smile as much as most children.	1	2	3	4	5
20.	My child is not able to do as much as I expected.	1	2	3	4	5
21.	It takes a long time and it is very hard for my child to get used to new things.	1	2	3	4	5

For the next statement, choose your response from the choices "1" to "5" below.

22.	I feel that I am:
	  1. not very good at being a parent.
	  2. a person who has some trouble being a parent.
	  3. an average parent
	  4. a better than average parent.
	  5. a very good parent.
		1	2	3	4	5

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
23.	I expected to have closer and warmer feelings to my child than I do and this bothers me.	1	2	3	4	5
24.	Sometimes my child does things that bother me just to be mean	1	2	3	4	5
25.	My child seems to cry or fuss more often than most children	1	2	3	4	5
26.	My child generally wakes up in a bad mood.	1	2	3	4	5
27.	I feel that my child is very moody and easily upset.	1	2	3	4	5
28.	My child does a few things which bother me a great deal.	1	2	3	4	5
29.	My child reacts very strongly when something happens that my child doesn't like.	1	2	3	4	5
30.	My child gets upset easily over the smallest thing.	1	2	3	4	5
31.	My child's sleeping or eating schedule was much harder to establish than I expected.	1	2	3	4	5

For the next statement, choose your response from the choices "1" to "5" below.

32.	I have found that getting my child to do something or stop doing something is:
	  1. much harder than I expected.
	  2. somewhat harder than I expected.
		1	2	3	4	5

		3. about as hard as I expected 4. somewhat easier than I expected. 5. much easier than I expected.					

For the next statement, choose your response from the choices "10+" to "1-3."							
			1	2	3	4	5
33.	Think carefully and count the number of things which your child does that bother you. For example: cries, whines, etc.		10+	8-9	6-7	4-5	1-3

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
34.	There are some things my child does that really bother me a lot	1	2	3	4	5
35.	My child turned out to be more of a problem than I had expected.	1	2	3	4	5
36.	My child makes more demands on me than most children.	1	2	3	4	5

APPENDIX E

EDINBURGH POSTNATAL DEPRESSION SCALE

Mood

As you have recently had a baby, we would like to know how you are feeling. Please respond with the answer that comes closest to how you have felt in the past 7 days, not just how you feel today. (Interviewer: circle **one** response on each line)

In the past 7 days:

E1. I have been able to laugh and see the funny side of things.	As much as I always could (0)	Not quite so much now (1)	Definitely not so much now (2)	Not at all (3)
E2. I have looked forward with enjoyment to things.	As much as I ever did (0)	Rather less than I used to (1)	Definitely less than I used to (2)	Hardly at all (3)
E3. I have blamed myself unnecessarily when things went wrong.	Yes, most of the time (3)	Yes, some of the time (2)	Not very often (1)	No, never (0)
E4. I have been anxious or worried for no good reason.	No, not at all (0)	Hardly ever (1)	Yes, sometimes (2)	Yes, very often (3)
E5. I have felt scared or panicky for no very good reason.	Yes, quite a lot (3)	Yes, sometimes (2)	No, not much (1)	No, not at all (0)
E6. I have been feeling overwhelmed.	Yes, most of the time I haven't been able to cope at all (3)	Yes, sometimes I haven't been coping as well as usual (2)	No, most of the time I have coped quite well (1)	No, I have been coping as well as ever (0)
E7. I have been so unhappy that I have had difficulty sleeping.	Yes, most of the time (3)	Yes, quite often (2)	Not very often (1)	No, not at all (0)
E8. I have felt sad or miserable.	Yes, most of the time (3)	Yes, quite often (2)	Not very often (1)	No, not at all (0)
E9. I have been so unhappy that I have been crying.	Yes, most of the time (3)	Yes, quite often (2)	Only occasionally (1)	No, Never (0)
E10. The thought of harming myself has occurred to me.	Yes, quite often (3)	Sometimes (2)	Hardly ever (1)	Never (0)

Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry, 150*:782-786

APPENDIX F

MATERNAL SELF-EFFICACY QUESTIONNAIRE

You and Your Baby

	NOT GOOD AT ALL	NOT GOOD ENOUGH	GOOD ENOUGH	VERY GOOD
1. When your baby is upset, fussy or crying, how good do you feel you are at soothing your baby?	1	2	3	4
2. How good do you feel you are at understanding what your baby wants or needs; for example, when your baby needs to be changed or fed?	1	2	3	4
3. How good do you feel you are at feeding your baby?	1	2	3	4
4. How good do you feel you are at getting your baby to pay attention to you; for example, getting your baby to smile or laugh with you?	1	2	3	4
5. How good do you feel you are at bathing your baby?	1	2	3	4
6. How good do you feel you are at knowing what your baby will enjoy; for example, what toys and games your baby will like?	1	2	3	4
7. How good do you feel you are at keeping your baby content when you need to do something else?	1	2	3	4
8. How good do you feel you are at getting your baby to sleep?	1	2	3	4
9. How good do you feel you are at getting your baby to smile or laugh at objects, animals, or other people?	1	2	3	4
10. In general, how good a mother do you feel you are?	1	2	3	4

APPENDIX G

PARENT-CHILD INTERACTION CODING

Qualitative Ratings for Parent-Child Interaction at 3-15 months of age

PARENT CODES

SENSITIVITY/RESPONSIVENESS (Adapted from Ainsworth)
This scale focuses on how the parent observes and responds to the child's social gestures, expressions, and signals as well as responds to cries, frets, or other expressions of negative affect. The key defining characteristic of a sensitive interaction is that it is child-centered. The sensitive parent is tuned to the child manifests awareness of the child's needs, moods, interests, and capabilities, and allows this awareness to guide his/her interaction.

If the child initiates social gestures and expressions (looking at the parent, reaching toward the parent, waving, clapping hands, handing objects, vocalizing), or makes demands, desires, or requests known (stretching arms to be picked up, reaching for toys the parent is holding), the sensitive parent responds appropriately.

If the child loses interest, the sensitive parent takes time to re-engage the child in a manner that demonstrates sensitivity to the child's mood. When the child is bored or frustrated, the parent offers toys or other distractions. When the child is interested and involved with toys, the sensitive parent allows him/her to independently explore them. During play, the sensitive parent provides one toy or game at a time and bases continuation on the child's response. How and what they play is geared to whether or not the child seems to be enjoying the activity. The parent does not persist with an activity or toy that the child is obviously not enjoying.

A sensitive parent provides stimulation that is appropriate to the situation. He/she provides the child with contingent vocal stimulation and acknowledges the child's interest, efforts, affect, and accomplishments.

Sensitive parents can spend some time watching the child, but the difference between them and the detached parent is that the sensitive parent seems to be actively taking an interest in the child's activities, as evidenced by comments and embellishments when the child loses interest. It is at these times--when the child loses interest or is distracted--that the difference between the sensitive parent and the detached, under stimulating parent is most easily seen; the detached parent does not respond, responds in a listless manner, or responds with developmentally inappropriate comments and behavior. The insensitive parent could also be overstimulating/intrusive and might continue in his/her attempts to engage the child even when the child is providing clues that he/she is seeking to end the interaction.

A sensitive interaction is well timed and paced to the child's responses, a function of its child-centered nature. Such an interaction appears to be "in sync". The parent paces games or toy presentation to keep the child engaged and interested, but also allows him/her to disengage in order to calm down and reorganize his/her behavior. Sensitivity involves judging what is a pleasurable level of arousal for the child and helping the child to regulate arousal and affect. When the child loses interest, the sensitive parent switches to a new tactic or toy and observes the child's reaction, or stops interacting entirely. In this way the sensitive parent can be distinguished from both an intrusive and a detached parent.

Markers of sensitivity include:
(a) acknowledging the child's affect;
(b) contingent vocalizations by the parent;
(c) facilitating the manipulation of an object or child movement;
(d) appropriate attention focusing;
(e) evidence of good timing paced to the child's interest and arousal level;
(f) slowing the pace when the child appears over stimulated or tired (e.g., demonstrates gaze aversion, fussiness);
(g) picking up on the child's interest in toys or games;
(h) shared positive affect;
(i) encouragement of the child's efforts;
(j) providing an appropriate level of stimulation when needed; and
(k) sitting on floor or low seat, at the child's level, to interact.

Thus, the sensitive parent demonstrates the ability to adapt interactions to the child's mood and level of development. The parent neither over-nor underestimates. The parent knows when it is time to increase or reduce the amount of stimulation the child is experiencing. For example, the parent discontinues an activity that is beyond the child's capacity for response or introduces a new activity when the child appears bored. Sensitive parents attend to and follow the child's lead. Ratings on this scale should be based on both quality and quantity of parent behavior.

This scale also focuses on how the parent responds to the child's cries, frets, or other expression of negative affect. It is judged in the following three ways:
1) Proportion of distress signals responded to. The parent consistently responds to all distress signals.
2) Latency of response. The parent responds promptly. Mild fussiness does not require the parent to respond as quickly as does the child's acute distress.
3) Appropriateness of response. Appropriateness of the adult's behavior can generally be inferred by its effectiveness in soothing the child. However, the completeness of the response should also be taken into account. For example, a parent who responds distally (e.g., voice from the other side of the room) should not be judged as sensitive as a parent who approaches and/or picks up the child. Parents who do not acknowledge distress, even if the infant self-soothes quickly, should be judged as less sensitive than those who do acknowledge the distress, however short lived. Parental responses to infant distress generally involve speaking to the child, approaching the child, changing position, offering toys, patting, picking up, holding closely (especially in a ventral/ventral position), and rocking. Any of these or other behaviors can be considered appropriate if they appear to have the effect of soothing the child. If the parent's first response to the distressed infant does not soothe the child, the episode should be judged as insensitive/unresponsive (even if their response was immediate) unless the parent proceeds to offer a "fuller" response (i.e., more proximal soothing behaviors).

Sensitivity/Responsiveness

1 = Not at all characteristic. There are almost no signs of parent sensitivity. Thus, the parent is either predominantly intrusive or detached. The parent rarely responds appropriately to the child's cues, and does not manifest an awareness of the child's needs. Interactions are characteristically ill timed or appropriate. When the child cries or frets, the parent responds not at

all, very slowly, negatively or inappropriately. If there is a response, it is only after the child becomes very demanding, and the response is so delayed that it cannot be construed to be contingent upon the child's behavior. A parent who typically appears oblivious or punitive to the child's distress would receive this score.

    2 = Minimally characteristic. This rating should be given to parents who display infrequent or weak sensitivity/responsiveness. While the parent is sometimes sensitive, the balance is clearly in the direction of insensitivity. The parent may give some delayed perfunctory responses to cues. The parent responds rarely or slowly to the child's signals (e.g. vocalizations, affect, distress), and appears more unresponsive than responsive. The responses tend to be minimal or perfunctory. For example, if the child shows distress, the parent may talk to or briefly pat a crying child and he/she may not pick up the child. The parent may not typically bring the child to a ventral/ventral position.

    3 = Somewhat characteristic. This rating should be given to parents who display some clear instances of sensitive responding. The parent can be characterized as sensitive to the child; however, the parents' behaviors may be mechanical in quality and ill paced. There are fleeting instances of genuine comforting of child (e.g. picking up the child, bringing him/her to a ventral/ventral position), but these instances may be delayed or perfunctory. The interaction can be characterized by a mix of well-timed and faster paced episodes, or by a parent who is trying to be sensitive, but the interaction has signs of insensitivity. This rating can also be given when the parent is making an effort to comfort his/her child, but he/she may appear to not know what he/she should do. The parent is inconsistently sensitive and hard to categorize.

    4= Moderately characteristic. This rating should be given to parents who are predominantly sensitive/responsive. The parent demonstrated sensitivity in most interactions but may neglect to give a fuller response or a well-timed or appropriate response. If the child cries or frets, the parent typically responds promptly to the child's distress, demands, and signals, but there is some time in which clear child signals do not receive a response or in which the response is somewhat delayed. Some of the parent's responses are mixed, i.e. some are half-hearted or perfunctory, but the majority are full responses.

    5 = Highly characteristic. This rating should be given to parents who are exceptionally sensitive and responsive. Instances of insensitivity are rare and never striking. Interactions are characteristically well timed and appropriate. If the child shows distress, this rating should be given to parents who are exceptionally sensitive and responsive to distress. The parent responds quickly and appropriately to the child's distress. If the child is upset, the parent takes the time to soothe and calm the child. Overall most responses are prompt, appropriate, and effective.

INTRUSIVENESS

    An intrusive, insensitive interaction is adult centered rather than child centered. Prototypically, intrusive parents impose their agenda on the child despite signals that a different activity, level, or pace of interaction is needed. High arousal, vigorous physical interaction, or a rapid pace, are not, by themselves, indicative of intrusive overstimulation--if the child responds positively with sustained interest and is not engaging in defensive behaviors. It is when the child averts his/her gaze, turns away, or expresses negative affect and the parent continues or escalates his/her activity that intrusive behavior is most evident. Particularly at 12-15 months of age, a child may respond to intrusive behaviors by displaying active avoidance of

the parent. Intrusiveness is also apparent when the parent does not allow the child a "turn" or an opportunity to respond at his/her pace. Some intrusive parents persist in demonstrating toys to the child long after his/her interest has been gained and he/she obviously wants to manipulate the toy him/herself. These parents appear unable to facilitate the child's exploration or regulation of the activity. Another controlling intrusive behavior is displayed by parents who overwhelm the child with a rapid succession of toys or approaches, not allowing him/her time to react to one before another occurs.

Extreme intrusiveness can be seen as overcontrol to a point where the child's autonomy is at stake. It should be kept in mind that a parent can become involved in play with the child without being highly intrusive.

Specific behaviors characterizing intrusive interactions include:
(a) failing to modulate behavior that the child turns from, defends against, or expresses negative affect to;
(b) offering a continuous barrage of stimulation (physical and/or verbal), food, or toys;
(c) not allowing the child to influence the pace or focus of play, interaction, or feeding;
(d) taking away objects or food while the child still appears interested;
(e) not allowing the child to handle toys he/she reaches for;
(f) insisting that the child do something (play, eat, interact) in which he/she is not interested;
(g) not allowing the child to make choices; and
(h) manipulating the child's body in an intrusive manner (e.g. making the child dance or bounce for the parent)
(i) physically impairing the child's movement

Parent's actions, which are clearly in the child's best interests, such as removing a child from danger, administering medicine, or putting an obviously tired child to bed, are not included in the considerations of intrusiveness. Similarly, bringing the child back to the mat for play when instructions to the mother are to do so, will not be judged intrusive unless the child is handled in an unduly perfunctory or rough manner.

Intrusiveness must be evaluated from the perspective of the child. If fast-paced stimulation is enjoyed by the baby, as shown by smiles and laughter, or seems a part of a game or ritual that is clearly enjoyed, parental behavior that might otherwise be judged intrusive will not be counted as such. An important element in judging the behavior as intrusive or not is the degree to which the parent modulates his/her behavior in response to the child's interest and enjoyment in the stimulation.

Intrusiveness

1 = Not at all characteristic. This rating should be given to parents who display almost no signs of intrusive behavior. The interactions are well-timed and tuned to the baby's signals. The interaction is clearly "child centered".
2 = Minimally characteristic. This rating should be given to parents who display minimal intrusiveness. There is some evidence of intrusiveness, but it is not typical. The parent may initiate interactions with and offer suggestions to the child, which occasionally are not welcomed. The parent may sometimes continue his/her activity in instances when the child engages in defensive behavior, but even when this happens; the parent does not escalate the

activity.

3 = Somewhat characteristic. This rating should be given to parents who display frequent, but weak signs of intrusiveness or display a few clear instances of unwelcomed behavior. The parents engage in activities that are characterized by the parent's agenda, and may repeat or escalate these activities, even if the child does not respond negatively to them. The parents are not predominately intrusive, however, intrusive behaviors appear to be more typical than a minimally characteristic (rating of 2) interaction. There may be inconsistent intrusive behavior and the parents may be hard to categorize.

4 = Moderately characteristic. This rating should be given to parents who are regularly intrusive. Parental intrusiveness occurs with moderate frequency. The pace is frequently controlled by the parent and ill timed to the baby's signals. Parents persist with intrusive behaviors even when the child engages in defensive and/or avoidant behavior.

5= Highly characteristic. This rating should be given to parents who are highly intrusive. The parent is consistently and typically intrusive. Most of the observation period is marked by the parent completely controlling the interaction, allowing the child little self-direction in his/her activities. The parent allows the child little autonomy, and essentially negates the child's experience.

DETACHMENT/DISENGAGEMENT

The detached parent appears emotionally uninvolved or disengaged and unaware of the child's needs for appropriate interaction to facilitate involvement with objects or people. This parent does not react contingently to the child's vocalizations or actions, and does not provide the "scaffolding" needed for the child to explore objects. Detached parents "miss" the child's looks to them or reach for a toy, and their timing is out of synchrony with the child's affect and responses (although not the overwhelming barrage of stimulation that intrusive parents present. Simply allowing the child to play by him/herself is not necessarily a sure sign of detachment; this can be appropriate at times, such as when the child is playing happily or contentedly and the parent checks in with the child visually. The detached parent will remain disengaged even when the child makes a bid for interaction with the parent. The detached parent is passive and lacks the emotional involvement and alertness that characterizes a sensitive parent. He/she appears uninterested in the child. There may be a "babysitter-like" quality to the interaction in that the parent appears to be somewhat attentive to the child, but behaves in an impersonal manner that fails to convey an emotional connection between the parent and the child. Other parents may demonstrate a performance-orientation in that the interaction is tailored towards performing for the camera rather than reacting to and facilitating child-centered behavior.

A parent receiving a high rating for detachment is considered to be insensitive. A low rating for detachment can signal either sensitivity or intrusiveness.

Detachment can be marked by:

(a) putting the child so he/she faces away from the parent without attempts to visually "check in"
(b) presenting toys without first engaging the child or showing him/her how to manipulate them;
(c) rarely making eye contact or rarely talking to the child

(d) not responding to the child's vocalizations, smiles, or reaches for toys
(e) an unawareness of the child's capabilities and appropriate activities
(f) positioning the child so that he/she cannot reach or manipulate a toy
(g) ignoring the interesting things the child does
(h) letting the child play unsupervised without checking in
(i) continually calling the child "baby" instead of using his/her name
(j) directing comments or stares towards the camera
(k) behaving in a mechanical or performance-oriented manner
(l) behaving in an emotionally uninvolved manner or appearing to be a baby-sitter rather than a parent when interacting with the child

While an intrusive parent might persist in presenting a toy to the child even if the child turns away, the detached parent does not respond to the child's bids to play with the toy (e.g., the child reaches for the toy, hands the toy to the parent or looks to the parent for a reaction to actions with the toy, and the parent neglects to respond to the child and to facilitate play). Detached parents tend to pay greater attention to the toys than to their child's response to the toys, or they tend to pay greater attention to other objects or people outside of the play interaction, or they appear distracted, for whatever reason, from attending to the child's interest. When interactions do occur, they may have an artificial or performance-oriented quality.

This scale contains both qualitative and quantitative components. A parent who interacts consistently with the child but does so in a perfunctory or indifferent manner with little or no emotional involvement would be rated high on detachment.

Detachment

1 = Not at all characteristic. This rating should be given to parents who display almost no signs of detachment or under involvement. When interacting with the child, the parent is clearly emotionally involved. These parents can be sensitive or intrusive.

2 = Minimally characteristic. This rating should be given to parents who display minimal signs of detachment. While they are clearly emotionally involved with the child during most of the interaction, there may be brief periods of detachment.

3 = Somewhat characteristic. This rating should be given to parents who remain involved and interested in the child while at the same time demonstrating the tendency to act in an uninterested, detached or perfunctory manner. Parents alternate between periods of engagement and disengagement. The periods of disengagement may be marked by unemotional or impersonal behavior. There may be a low-level of impersonal/unemotional behavior running throughout the interaction.

4 = Moderately characteristic. This rating should be given to parents who are predominantly detached. While there may be periods of engagement, the interaction is characterized chiefly by disengagement. The parent may be passive and fail to initiate interactions with the child. When interactions do occur, they may be marked by an impersonal, perfunctory style. Parent may show a lack of emotional engagement throughout the interaction

5 = Highly characteristic. This rating should be given to parents who are extremely detached. The child lies or sits without parent attention almost all of the time, even when the parent is within a suitable distance for interacting. In the minimal instances of involvement, the parent's behaviors are simple, mechanical, stereotyped, bland, repetitive, and perfunctory. The parent is clearly not emotionally involved with the child, and appears to be "just going through the motions".

POSITIVE REGARD FOR THE CHILD/POSITIVE AFFECT

This scale rates the parent's positive feelings toward the child, expressed during interaction with him/her.

Positive feelings are shown by
(a) speaking in a warm tone of voice
(b) hugging or other expressions of physical affection
(c) an expressive face
(d) smiling
(e) laughing with the child
(f) enthusiasm about the child
(g) praising the child
(h) general enjoyment of the child

Positive regard is evident when the parent listens, watches attentively, looks into the child's face when talking to him/her, has affectionate physical contact, and is playful. Ratings on this scale are based on both quality and quantity of positive regard. Keep in mind the uniformity of positive affect, and also be aware of the "brightness" in vocal quality. Positive regard that lacks "genuineness" should not receive a rating of 5.

1 = Not at all characteristic. This rating should be given to parents who display little positive regard. This rating can also be used for positive expressions (laughing, smiling) that appear to be inappropriate to the situation or an inaccurate reflection of the parent's feelings. The parent may be expressionless or flat, or negative.

2 = Minimally characteristic. This rating should be given to parents who display infrequent or weak signals of positive regard. The intensity and frequency of behavioral indicators of positive regard are both low.

3 = Somewhat characteristic. This rating should be given to parents who inconsistently express positive affect towards their child. Parents can receive a rating of 3 when they are hard to categorize (a mix between positive and negative or flat affect).

4 = Moderately characteristic. This rating should be given to parents who predominantly display positive regard. Parents must show some enthusiasm for the infant, but "true delight" is not evident as in a rating of 5. Parental enthusiasm for the infant must be evident in more than just the parent's voice. More frequent and intense positive affect is shown than in a rating of 3, but the parent is not as consistently positive as those scored as a 5.

5 = Very characteristic. This rating should be given to parents who are exceptionally positive, in terms of facial and vocal expressiveness and behavior. Affect is positive and spontaneous. The

parent shows a range of expressions and behaviors that are all clearly positive. He/she clearly "delights" in the child.

NEGATIVE REGARD FOR THE CHILD/NEGATIVE AFFECT

This scale rates the parent's negative regard for the child. Both frequency and intensity of negative affect toward the child are considered.
Some markers of negative regard include:
(a) disapproval
(b) tense body
(c) negative voice when correcting
(d) abruptness
(e) tense facial muscles and strained expression
(f) harshness
(g) threatening the child or punishing without explanation
(h) roughness in wiping the child's face, changing his/her diapers, or burping
(i) calling the child unflattering names
(j) teasing in a non-playful manner

Coders should be sensitive to non-verbal as well as verbal indicators. Ratings on this scale are composed of both qualitative and quantitative evaluations. The amount and intensity of negative affect exhibited is evaluated in relation to the duration of the observation period.

1 = Not at all characteristic. This rating should be given to parents who do not display negative regard for the child either in words or in expressions. No evidence of anger, distrust, frustration, impatience, disgust, general dislike, or other indicators of negative regard is observed in the parent's face or voice. The parent may be expressionless or flat or positive.

2 = Minimally characteristic. This rating should be given to parents who display minimal negative regard. There are one or two instances of negative affect with moderate or low intensity of negative expression.

3 = Somewhat characteristic. This rating should be given to parents who display a few weak instances of negative affect or regard (about 3 or 4) or one particularly intense expression of negative regard. The parent's may show a mix of negative affect and positive or flat affect. The difference from a rating of 2 is frequency and intensity in expression.

4 = Moderately characteristic. This rating should be given to parents who predominantly display negative regard. Persistent evidence of low-intensity negative regard or some evidence of more intense negative regard is observed. Parents are more negative than positive throughout the interaction. Parents who engage in mean spirited teasing should receive at least a rating of 4.

5 = Highly characteristic. Feelings of negative regard are expressed strongly, or persistent moderate levels of negative regard are expressed. The overriding affect influencing the parent-child interaction is negative.

STIMULATION OF DEVELOPMENT

This scale measures the degree to which the parent tries to foster the child's development. A stimulating parent may take advantage of even simple activities (like feeding and diapering) to stimulate development, and will consistently engage in a variety of activities that can facilitate learning. The parent will make deliberate attempts to encourage the child's development, achievement and learning.

Behaviors characterizing stimulation include:
(a) attempting to focus the child on an object or task
(b) focusing the child's attention on perceptual qualities (sounds, colors, movement, etc.) of objects
(c) verbally responding to or expanding the child's verbalizations or vocalizations
(d) encouraging the child to actively participate in activities
(e) assisting in motor movement or coordination

However, parents who simply focus or encourage a child should not be given the highest scores. Higher scores should be reserved for parents who engage in some of the following:
(a) describe or label toys or objects or demonstrate how they work
(b) stimulate the child's verbalizations or vocalizations and expand on them
(c) read or recite to the child;
(d) encourage or reinforce the child's attempts at mastery, or challenge the child to try something new
(e) present activities in an organized sequence of steps
(f) teach the child or give him/her an opportunity to experiment with materials that illustrate or teach concepts
(g) ask questions that require problem solving
(h) label and interpret the child's experiences (e.g., "You think that's funny")
(i) assist the child in motor coordination or mastery of a developmental milestone, and so on

Activities involving strictly physical stimulation such as rough and tumble play, bouncing, and tickling are not considered as stimulating development per se, but it is possible for a caregiver to provide stimulation in these contexts if the caregiver expands on these experiences with verbal labels. For example, active play with a child that expands on the child's abilities or assists in the coordination of the child's movements would be considered stimulation of development because it encourages and elaborates on the child's current ability and mastery. This scale does not measure those activities that are only social (smiling) or caretaking (soothing), but stimulation can occur in these contexts as well.

The focus of this scale is on the amount and quality of activities that may ultimately enhance perceptual, cognitive, linguistic, and physical development. The parent's attempts may be less than perfect from a developmental psychologist's point of view, but they reflect the parent's belief that he/she is teaching the child. Simply placing objects in front of the child or handing him/her toys is not to be considered stimulating. Stimulation must involve effortful interaction with the child in the contexts described above.

All qualitative judgments must be considered in relation to the quantity of stimulation provided by the parent: How many of the available opportunities for stimulation were taken

advantage of? A parent who simply repeats a word or phrase that a child says (e.g., "shoe") would be lower level stimulation than putting the word in a sentence or elaborating on it (e.g., "The shoe is red"). A rating of 1 should be given to those parents who provide almost no stimulation of development. If a parent spends a very brief portion of the time in high-quality interactions with the child and provides that child with no stimulation for the remainder of the time, he/she would receive a rating of 2. A parent might also receive a 2 if stimulation is continuous but minimally advantageous. A rating of 3 is generally given when the parent doesn't strive to offer cognitive or physical stimulation for some small portion of the time or when he/she neglects some aspects of stimulation (e.g., manipulative skills), but otherwise engages in stimulating activities. A rating of 4 should be given to parents who clearly have a stimulation agenda, but may fail to take full advantage of opportunities or whose efforts are not "rich" in stimulation. A rating of 5 should be given to those parents who work at providing exceptionally advantageous stimulation. Higher scores for stimulation of development indicate that the parent's stimulation attempts are at the appropriate developmental level for the child and are in tune with the child's interests and activities so that the child may potentially benefit from the parent's behavior.

Note that at 3 months, stimulation of development may take the form of physical and sensory-motor stimulation, whereas at 6 and 12 months, stimulation of development may tend to focus on cognitive stimulation.

1 = Not at all characteristic. This rating should be given to parents who provide little or no stimulation. The parent makes almost no attempts to teach the child anything or provide any stimulation. He/she may provide routine care but does not use it as an opportunity for learning. The parent may ignore the child's activities or interact perfunctorily, providing no stimulation. The parent never does more than offer toys in a perfunctory, mechanical manner, without demonstration or labeling or bouncing the child around. The parent is typically silent. Any efforts made are developmentally inappropriate.

2 = Minimally characteristic. This rating should be given to parents who provide infrequent or weak stimulation. The parent's conscious and purposeful attempts to engage the child in development-fostering experiences are limited. He/she may label or demonstrate materials or demonstrate physical activities, but does so perfunctorily and with minimal elaboration.

3 = Somewhat characteristic. The parent makes some effort to stimulate development, but it may not be her/his main agenda or the parent's agenda is inconsistent. Efforts to engage the child are limited in number and are often unsuccessful. The parent does not consistently take advantage of opportunities to provide stimulation. The parent provides few opportunities for rich, varied stimulation and most attempts are repetitive.

4 = Moderately characteristic. This rating should be given to parents who have a clear agenda of expanding their child's physical and/or cognitive mastery. Parents who receive this rating provide adequate stimulation but could reasonably be expected to provide more and higher-quality stimulation. The parent may find some new ways to engage the child with toys or activity, for example, but these ways are limited in number. Parents who provide a rich linguistic or physical environment, but do not demonstrate the potential of toys or movements, would receive this rating as well as parents who demonstrate toys or movements in a stimulating but

non-vocal manner.

5 = Highly characteristic. This rating should be given to the parent who is consistently stimulating and takes advantage of many activities as opportunities for stimulation. The parent provides frequent stimulation through "lessons," explanations, activities, physical games, or toys. Teaching and fostering development is a primary intent of the parent's frequent interactions with the child, and as such the stimulation episodes should be more frequent and prolonged. The parent thoughtfully varies and elaborates on these activities, providing numerous opportunities, which are exceptionally advantageous to the child. He/she provides rich stimulation in terms of language and movement as well as embellishment of the potential of the physical world.

CHILD SCALES

POSITIVE MOOD

This scale assesses the extent to which the child is satisfied, content, and pleased with the situation overall. Measures of child positive affect include smiles, laughter, and positive tone of voice, as well as enthusiasm expressed with arms, legs, and body tone. Lack of positive affect may be manifested by a neutral or negative mood. Note that positive and negative mood are two independent codes and scores should be assigned based on the behaviors evident in the interaction. For example, a 3 on positive mood does not necessarily mean that the child receives a score of 3 on negative mood.

Ratings on this scale should be based on the quality and quantity of behavior. Attempt to balance both the intensity of the child's positive affect and the relative amount of time positive behavior is shown. A rating of 1 should be given to those children who exhibit almost no positive affect. A child would receive a 3 for an entire observation period of weak positive affect (e.g., contentment) with 1 or 2 strong instances of positive mood. A rating of 5 should be given to those children who regularly display high-intensity positive affect, who "sparkle".

1 = Not at all characteristic. This rating should be given to children who display almost no signs of positive mood. The child may be fussy, or largely neutral or flat throughout the interaction. Children who show fleeting interest in the interaction (e.g. brief periods of observing toys, etc.) and no clear signs of positive affect may receive a 1.

2 = Minimally characteristic. This rating should be given to children who predominately display infrequent or weak positive affect (e.g. ambiguous vocalizations, small smiles, smirks). The child may show several fleeting instances of positive affect that may be paired with few, low intensity expressions of negative affect, or the child may be characteristically pleasant, content, or satisfied throughout the observation period. At 12 months, the child may exhibit only 1 display of stronger positive affect (e.g., full smile). Contentment may be characterized by the child's sustained interest in the interaction (e.g. observing the toys, parent, etc. throughout most of the interaction) without showing any clear signs of positive affect.

3 = Somewhat characteristic. This rating should be given to children who are characteristically content, but show at least 1 or more instances of clear positive affect (e.g. full smiles, laughter). The child may also show some instances of negative mood or neutral

expression.

      4 = Moderately characteristic. This rating should be given to children who predominately display positive affect. The child exhibits several instances of strong positive affect (expresses enthusiasm, playfulness, smiling, and laughter) and are frequently pleasant.

      5 = Highly characteristic. This rating should be given to children who are exceptionally positive in terms of physical and vocal expressiveness. This child displays multiple instances of strong positive affect and is characteristically "happy" during the observation period. The child should truly "radiate" or "sparkle". For this rating, a child can have no prolonged episodes of flatness or strong distress.

NEGATIVE MOOD

      This scale assesses the extent to which the child cries, fusses, frowns, tenses the body while crying, throws "temper tantrums," or otherwise expresses his/her discontentment.   Note that positive and negative mood are two independent codes and scores should be assigned based on the behaviors evident in the interaction. For example, a 3 on positive mood does not necessarily mean that the child receives a score of 3 on negative mood.

      Ratings on this scale should be based on both qualitative (intensity) and quantitative (frequency) assessments.

If there is a false start (interaction is restarted after taping has begun) and the child displays signs of negative mood, <u>DO NOT</u> code the behavior if it is apparent that the child was negative because he/she was hungry, tired or needed to be changed. If this is not the case and the child continues to be negative when taping commences, then you should take into account the behaviors elicited during the false start

      1 = Not at all characteristic. This rating should be given to children who display no negative affect. There are no signs of strong (intense crying, body stiffening) or weak (fussing) negative affect from the child during the observation period.

      2 = Minimally characteristic. This rating should be given to children who display infrequent or weak signs of negative affect.   The child may display fleeting instances of mild negative affect.

      3 = Somewhat characteristic. This rating should be given to children who display one or two strong instances of negative affect or instances of negative affect are inconsistent. The child may display a mix of negative and positive and/or flat affect throughout the interaction. Child may inconsistently respond to parental attempts to soothe and longer or stronger attempts to soothe may be required.

      4 = Moderately characteristic. This rating should be given to children who display stronger negative affect. The child displays two or more instances of strong negative affect or are moderately discontented ("fussy") throughout most of the observation period. Fairly consistent parental soothing is needed to calm, though the child does show some periods of calmness.

5 = Highly characteristic.   This rating should be given to children who are crying and angry for most of the observation. Expressions of negative affect are much stronger and more explicit, which could include, but is not limited to more screaming, hostile verbalizations, or intense body language. The child is resistant to parental attempts to soothe and is rarely or never content or positively affective.

SUSTAINED ATTENTION (for use at 6 and 12 months only)

This scale assesses the child's sustained attention to/involvement with the physical world (i.e., objects and people). The involved child initiates contact with objects or responds with strong attention to objects or persons engaging them. In either case, the attention must be sustained. There are a variety of ways that attention can be displayed. For example, when objects are within reach, a child may seek toys out, look at them, touch them, explore them; and may comment on them. Alternatively, a child may watch intently or reach as a parent demonstrates an object or plays a game. The child seems interested in objects/people and what can be done with them. The length of possible sustained attention will increase with age. The uninvolved child may appear apathetic, bored, distracted, or distressed (e.g., frequently looking away or squirming/flailing).

Coding sustained attention in infants requires attending to gazes, facial expressions and behaviors construed as attempts to initiate contact with object or the parent. Sustained attention in infants may be demonstrated by visual tracking of objects held or moved by parents. Intensity of the sustained periods of attention should also be taken into consideration when assigning scores. Infants who focus with great intensity on an object (e.g. appears that their focus cannot be broken or is hard to break) should receive higher scores. Infants may display interest in objects by placing them in their mouths. However, the infant needs to display exploration of the object (not simple mouthing) in order for the behavior to be coded as high sustained attention. Higher forms of exploration or "complete" exploration of objects involve multiple object directed behaviors (i.e. looking, licking, twisting in hands, etc.). Higher forms of focus are marked by eye gaze matching activity (i.e. looking at the object while banging it). Be aware that these ratings are both context-sensitive and age-dependent. Monitor the parents' activities, but do not use them to determine a score. Even if the parent is intrusive in presenting toys to the child or presents the toys at a rapid rate, infants with higher levels of sustained attention will try to attend to objects and remain involved and interested. Also, keep in mind that enjoyment and interest are separate, but related constructs to higher levels of sustained attention. Enjoyment and interest in combination with sustained attention can be used for discriminating judgments regarding score assignments.

*NOTE: Do not code sustained attention to things off camera. Only code the infant's attention to the objects, people, and/or activities in the interaction.

Sustained Attention

1 = Not characteristic—The child displays limited sustained attention. Attention is not sustained and the child typically moves rapidly from activity to activity. The child's focus is limited and displays very few attempts to initiate contact with objects.

2 = Minimally characteristic—The child exhibits some periods of attention to objects or activities, however, the instances are very brief and the intensity of the attention is weak. Periods

of distraction exceed those of interest. While child may initiate contact with an object more so than a rating of "1", attention for the most part lacks initiation. A child may watch when an object is demonstrated, but mostly fails to reach or initiate contact.

3 = Somewhat characteristic---The child maintains involvement for relatively longer periods of time. However, the child demonstrates a loss of attention or exhibits less complete exploration when involved with an object or activity. Child may alternate between periods of attention and lack of focus.

4 = Moderately characteristic—For the most part child initiates or responds to objects/activity and the child sustains contact/involvement with the objects or activity. While the child may display brief instances of lack of attention, the child is clearly more involved than not. The child's attention is typically less focused or intense than a rating of 5.

5 = Highly characteristic—The child is clearly involved, interested, and focused for a substantial majority of the time. When the child is playing with objects, he/she is interested in playing with objects and the activity is sustained due to the child's intense attention. The child exhibits a thorough, sustained examination/exploration of the object or activity. There may be moments when the child glances away from the object, but they do not disrupt the flow of the interaction.

DYADIC CODES

DYADIC MUTUALITY

This scale assesses the synchrony of the interaction and the degree of shared experience between parent and child. Essentially we are interested in the behaviors that reflect intimacy and coordination in the dyad. Dyadic mutuality may be reflected by reciprocal play, reciprocal communication and shared enjoyment. At the low end, lack of mutuality will be reflected by an interaction that is stifled, conflictual, or non-reciprocal. There may also be a veneer of intimacy evinced by a perfunctory or mechanical quality to the interaction. There may be a stifling of emotion or behaviors, which negate or reject partner behavior. Dyads who are low on this scale rarely exchange glances or shared experience during the interaction. They may negate or reject the experience or behaviors of the partner, or they may be largely disengaged from one another (e.g., playing independently, ignoring the partner's behavior or bids for attention). Dyads high on this scale almost always have a moment of shared emotion that is pleasurable. They are often engaged in the same activity and share experiences with the toys or activities (e.g., infant shows parent toy, parent comments and/or expands on the child's activity). They often show interest in and accept the bids for interaction from the partner. At the high end, there is also a clear synchronous back and forth between the partners, such that both partners are open to the behaviors and emotions of each other. The partners are in tune to each other's signals and respond appropriately.

1 = Not at all characteristic. This rating should be given to dyads whose interaction is largely devoid of any shared experience. The interactions may be characterized by one of the following three descriptions: 1) the dyad appears disengaged (e.g., play independently; sit passively, not participating; rare eye contact); 2) there is underlying conflict or ambivalence within the dyad (e.g., either partner may reject or ignore the other partner by pushing away;

looking away; failing to look at the other partner when attention is sought; disapproval of the other's behavior); or 3) parent and child have very little coordinated play or emotion and appear disconnected from each other. When the interaction is "off," attempts to recover synchrony are rare and when they do occur, they are often unsuccessful.

2 = Minimally characteristic. This rating should be given to dyads that exhibit low levels of synchrony, but are not as severe in their rejection or level of ignoring the partner as evinced in a score of 1. The parent or child makes some attempts at recovery of synchrony. There is some clear evidence, although brief, of shared experience (e.g., positive affect; eye contact; acceptance of toys/activities). There are often signs of disengagement, rejecting, or ignoring behavior by the parent or child. Or, the dyad may just be "off" in terms of timing, without exhibiting rejecting or ignoring behavior.

3 = Somewhat characteristic. This rating should be given to dyads that show a mixture of synchronous and non-synchronous behaviors. Parent and child are clearly synchronous/engaged for a period of time, but there are some instances during which synchrony is lost and not recovered. Attempts at synchrony are sometimes unsuccessful or delayed. There may be moments of tension, disengagement, or passivity by either partner making synchrony difficult. Dyads may appear to be struggling to get or keep in sync.

4 = Moderately characteristic. This rating should be given to dyads that show some break in their level of synchrony, but still are largely engaged and accepting of each other. There is an underlying warmth and appreciation between the two partners that is expressed, even without clear overt signs. Brief periods of independent play, disengagement, passivity, or rejection may be noted, but they rarely break the flow of the interaction, and the interaction is otherwise relaxed. The dyad may have one or two interchanges during which the interaction is out of sync, but there is an attempt to reconcile the synchrony of the interaction, although there may be some delay to the recovery of the interaction.

5 = Highly characteristic. This rating should be given to dyads that exhibit a clear, synchronous interaction with clear evidence of shared positive affect. Both parent and child exhibit clear interest and acceptance in one another and the shared activities. There are clear instances of mirroring and a give and take between partners. The interaction is largely enjoyable for both partners. Moments of non-synchrony are rare and when they do occur, they are very brief and the recovery is swift. There are almost no negating or rejecting behaviors by either partner, so that the interaction flows freely and maintains synchrony

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August 2003

Adapted from Owen, M.T. (1992). *The NICHD Study of Early Child Care Mother-Infant Interaction Scales*. Timberlawn Psychiatric Research Foundation, Dallas, TX

APPENDIX H

INFANT-TODDLER SOCIAL AND EMOTIONAL ASSESSMENT

Infant–Toddler Social and Emotional Assessment (ITSEA)©

For each item, please choose the one response that best describes your child's behavior in the LAST MONTH:
0 - Not True/Rarely
1 - Somewhat True/Sometimes
2- Very True/Often

EXTERNALIZING DOMAIN

Activity
Is restless and can't sit still.
Gets very "wound up" or silly when playing.
Is constantly moving.
Seems to be driven by a motor.
Is very loud. Shouts or screams a lot.
Goes from toy to toy faster than other children his/her age.
Gets hurt more than other children.
Gets hurt so often that you can hardly take your eyes off him/her.

Aggression/Defiance
Acts aggressive when frustrated.
Acts bossy.
Misbehaves to get attention from adults.
Is disobedient or defiant.
Is sneaky. Hides misbehavior.
Is "hard to handle."
Is stubborn.
Has a short fuse. Gets mad easily.
Hits, shoves, kicks, or bites children or adults.
Is aggressive with you (or other parent).
Has temper tantrums.
Throws or pushes away things s/he does not want.

Peer Aggression
Fights with other children.
Is mean to other children on purpose.
"Tests" other children to see if they will get angry.
Hurts other children on purpose. Picks on or bullies other children.
Takes toys away from other children.
Tries to get other children mad or upset.
Teases other children.

INTERNALIZING DOMAIN

Inhibition/Separation Problems
Takes a while to feel comfortable in new places (10 minutes or more)

Hangs on you or want to be in your lap when with other people.
Is very clingy.
Is shy with new people.
Is shy with new children.
Gets upset when left with a new baby-sitter.
Gets upset when left with a familiar babysitter or relative.
Cries or hangs onto you when you try to leave.

Depression/Social Withdrawal
"Spaces out." Is totally unaware of what's happening around him/her.
Does not make eye contact.
Avoids physical contact.
Keeps feelings to self.
Laughs and smiles less than other children.
Has less fun than other children.
Look unhappy or sad without any reason.
Seems withdrawn.
Seems very unhappy, sad, or depressed.

DYSREGULATION DOMAIN

Sleep
Usually sleeps through the night. (Reversed)
Avoids going to bed at night.
Has trouble falling asleep or staying asleep.
Strongly resists going down for a nap (N: no longer needs naps).
Wakes up screaming and does not respond to
you for a few minutes (night terrors).
Wakes up from scary dreams or nightmares.

Eating
 Is a good eater (Reversed).
Refuses to eat.
Is a picky eater.
Accepts new foods right away (Reversed).

Emotional Negativity
 Often gets very upset.
Is impatient or easily frustrated.
Cries a lot.
Is irritable or grouchy.
Gets angry or pouts.

COMPETENCE DOMAIN

Attention Skills
Looks at things for a minute or longer.
Plays with toys for 5 minutes or more.
Plays by him/herself for 10 minutes or more.
Can sit for 5 minutes while you read a story.
Can pay attention for a long time. (Not including TV.)

Compliance
Follows rules.
Tries to do as you ask.
Is well-behaved.
Is easy to take care of.
Stays still while being changed, dressed or bathed.

Prosocial Peer Interactions
Takes turns when playing with others.
Is liked by other children.
Plays well with other children.
Usually plays what other children want to play.
Really wants to please other children.
Shares toys and other things.
Has at least one favorite friend (a child).

Emotional Positivity
Laughs easily or a lot.
Is affectionate with loved ones.
Smiles a lot.

Empathy
Is worried or upset when children cry.
Tries to make you feel better when you are upset.
Is worried or upset when someone is hurt.
Tries to help when someone is hurt. For example, gives a toy.
Gives you things to make you happy.

Emotional Awareness (2-year-olds only)
 Talks about own feelings. For example, says "I'm mad."
Talks about other people's feelings (like "Mommy mad.").
Is aware of other people's feelings.

Mastery Motivation (2-year-olds only)
Wants to do things for self.
Is curious about new things.

Likes figuring things out, like stacking blocks.
Enjoys challenging activities.

MALADAPTIVE SCALES

Has very strange habits.
Is very worried about getting dirty.
Worries about own body.
Repeats the same action over & over again.
Needs things to be clean or neat.
Puts things in a special order over and over again.
"Spaces out." Is totally unaware of what's happening around him/her.
Swears.
Talks about things that are strange, scary or disgusting.
Is destructive. Breaks or ruins things on purpose.
Repeats a particular movement over and over (e.g., rocking, spinning).
Does not make eye contact.
Gets confused about what is real and what is make believe.

APPENDIX I

SUMMARY OF ANALYTIC PLAN

Model	Independent Variables	Dependent Variables	Covariates	Method
1	Parenting stress, Dyadic Mutuality	Internalizing symptoms	None	Multiple linear regression
2	Parenting stress, Dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
3	Parenting stress, Dyadic mutuality	Negative emotionality	None	Multiple linear regression
4	Depression, Dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
5	Depression, Dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
6	Depression, Dyadic mutuality	Negative emotionality	None	Multiple linear regression
7	Maternal self-efficacy, Dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
8	Maternal self-efficacy, Dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
9	Maternal self-efficacy, Dyadic mutuality	Negative emotionality	None	Multiple linear regression
10	Amount of infant crying, Dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
11	Amount of infant crying, Dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
12	Amount of infant crying, Dyadic mutuality	Negative emotionality	None	Multiple linear regression
13	Perception of crying as problematic, Dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
14	Perception of crying as problematic, Dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
15	Perception of crying as problematic, Dyadic mutuality	Negative emotionality	None	Multiple linear regression
16	Parenting stress, Dyadic Mutuality, Parenting stress x dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
17	Parenting stress, Dyadic Mutuality, Parenting stress x dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression

18	Parenting stress, Dyadic Mutuality, Parenting stress x dyadic mutuality	Negative emotionality	None	Multiple linear regression
19	Depression, Dyadic mutuality, Depression x dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
20	Depression, Dyadic mutuality, Depression x dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
21	Depression, Dyadic mutuality, Depression x dyadic mutuality	Negative emotionality	None	Multiple linear regression
22	Maternal self-efficacy, Dyadic mutuality, Maternal self-efficacy x dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
23	Maternal self-efficacy, Dyadic mutuality, Maternal self-efficacy x dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
24	Maternal self-efficacy, Dyadic mutuality, Maternal self-efficacy x dyadic mutuality	Negative emotionality	None	Multiple linear regression
25	Amount of infant crying, Dyadic mutuality, Amount of crying x dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
26	Amount of infant crying, Dyadic mutuality, Amount of crying x dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
27	Amount of infant crying, Dyadic mutuality, Amount of crying x dyadic mutuality	Negative emotionality	None	Multiple linear regression
28	Perception of crying as problematic, Dyadic mutuality, Problematic crying x dyadic mutuality	Internalizing symptoms	None	Multiple linear regression
29	Perception of crying as problematic, Dyadic mutuality, Problematic crying x dyadic mutuality	Externalizing symptoms	Income	Multiple linear regression; Hierarchical multiple regression
30	Perception of crying as problematic,	Negative emotionality	None	Multiple linear regression

	Dyadic mutuality, Problematic crying x dyadic mutuality			
31	[Significant predictors from above models]	Internalizing symptoms	None	Forward selection multiple regression
32	[Significant predictors from above models]	Externalizing symptoms	None	Forward selection multiple regression
33	[Significant predictors from above models]	Negative emotionality	None	Forward selection multiple regression

REFERENCES

Abidin, R. R. (1983). Parenting Stress Index: Manual, Administration Booklet, [and] Research Update.

Abidin, R. R. (1990). *Parenting Stress Index - Short Form*. Lutz, FL: Psychological Assessment Resources, Inc.

Abidin, R. R. (1995). *Parenting Stress Index (PSI) manual (3rd ed.)*. Charlottesville, VA: Pediatric Psychology Press.

Adamson, L., Als, H., Brazelton, B., Tronick, E., & Wise, S. (1978). The infant's response to entrapment between contradictory messages in face-to-face interaction. *American Academy of Child Psychiatry. Journal*, *17*, 1–13.

Aiken, L. S., & West, S. G. (1991). *Multiple Regression: Testing and Interpreting Interactions*. SAGE Publications.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. F. (1974). Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), *The integration of a child into a social world.* (pp. 99–135). New York, NY US: Cambridge University Press.

Allison, P. D. (2001). *Missing Data*. Quantitative Applications in the Social Sciences. SAGE Publications.

Anderson, C. (2010). Using the Edinburgh Postnatal Depression Scale to Screen for Symptoms of Depression among Latina, African American and Caucasian Adolescents. *Southern Online Journal of Nursing Research*, *10*(1). Retrieved from http://www.resourcenter.net/images/snrs/files/sojnr_articles2/vol10num01art03.html

Asnes, R. S., & Mones, R. L. (1983). Infantile colic: A review. *Journal of Developmental & Behavioral Pediatrics*, *4*(1), 57–62.

Austin, M.-P., Hadzi-Pavlovic, D., Leader, L., Saint, K., & Parker, G. (2005). Maternal trait anxiety, depression and life event stress in pregnancy: relationships with infant temperament. *Early Human Development*, *81*(2), 183–190.

Ayissi, L., & Hubin-Gayte, M. (2006). Newborn neonatal irritability and maternal post-partum depression. *Neuropsychiatrie de l'enfance & de l'Adolescence*, *54*(2), 125–132.

Bandura, A. (1977). *Social Learning Theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Self-efficacy: The exercise of control. New York, NY US: W H Freeman/Times Books/ Henry Holt & Co.

Barkley, R. A. (1997). Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. *Psychological Bulletin*, *121*(1), 65–94.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173–1182.

Barr, R. G. (1998). Crying in the first year of life: good news in the midst of distress.. *Child: Care, Health & Development*, *24*(5), 425–439.

Barr, R. G., Hopkins, B., Green, J. A., & Wolke, D. (2000). *Crying as a Sign, a Symptom, and a Signal: Clinical, Emotional and Developmental Aspects of Infant and Toddler Crying*. New York: Cambridge University Press.

Barr, R. G., Konner, M., Bakeman, R., & Adamson, L. (1991). Crying in !Kung San infants: A test of the cultural specificity hypothesis. *Developmental Medicine & Child Neurology*, *33*(7), 601–610.

Barr, R. G., Kramer, K., M., Boisjoly, C., McVey-White, L., & Pless, I. B. (1988). Parental diary of infant cry and fuss behavior. *Arichves of Disease in Childhood*, *63*, 380–7.

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. Losing control: How and why people fail at self-regulation. San Diego, CA US: Academic Press.

Beebe, B. (1982). Development and Psychopathology. *PsycCRITIQUES*, *27*(9), 701–702.

Beebe, B., Jaffe, J., Buck, K., Chen, H., Cohen, P., Feldstein, S., & Andrews, H. (2008). Six-week postpartum maternal depressive symptoms and 4-month mother–infant self- and interactive contingency. *Infant Mental Health Journal*, *29*(5), 442–471.

Beebe, S. A., Casey, R., & Pinto-Martin, J. (1993). Association of reported infant crying and maternal parenting stress. *Clinical Pediatrics*, *32*(1), 15–19.

Beer, J. S., & Lombardo, M. V. (2007). Insights into Emotion Regulation from Neuropsychology. In J. J. Gross (Ed.), *Handbook of emotion regulation.* (pp. 69–86). New York, NY US: Guilford Press.

Belsky, J. (1984). The Determinants of Parenting: A Process Model. *Child Development*, *55*(1), 83–96.

Belsky, J., & Fearon, R. M. P. (2002). Early attachment security, subsequent maternal sensitivity, and later child development: Does continuity in development depend upon continuity of caregiving? *Attachment & Human Development*, *4*(3), 361–387.

Bernstein, V., Percansky, C., & Hans, S. L. (1987). Screening for socialemotional impairment in infants born to teenage mothers. Presented at the Society for Research in Child Development, Baltimore.

Bettes, B. A. (1988). Maternal Depression and Motherese: Temporal and Intonational Features. *Child Development*, *59*(4), 1089.

Bowie, B. H. (2010). Emotion Regulation Related to Children's Future Externalizing and Internalizing Behaviors. *Journal of Child & Adolescent Psychiatric Nursing*, *23*(2), 74–83.

Boyd, R., Zayas, L., & McKee, M. (2006). Mother-Infant Interaction, Life Events and Prenatal and Postpartum Depressive Symptoms Among Urban Minority Women in Primary Care. *Maternal & Child Health Journal*, *10*(2), 139–148.

Brazelton, T. B. (1962). Crying in Infancy. *Pediatrics*, *29*(4), 579–588.

Brazelton, T. B. (1990). Crying and Colic. *Infant Mental Health Journal*, *11*(4), 349–356.

Brazelton, T. B., Koslowski, B., & Main, M. (1974). The origins of reciprocity: The early mother-infant interaction. *The effect of the infant on its caregiver.* (pp. 49–76). Oxford England: Wiley-Interscience.

Brazelton, T. B., Yogman, M. W., Als, H., & Tronick, E. Z. (1979). The infant as a focus for family reciprocity. In M. Lewis & L. A. Rosenblum (Eds.), *The child and its family*. New York: Plenum Press.

Bridges, L. J., & Grolnick, W. S. (1995). The development of emotional self-regulation in infancy and early childhood. *Social development*, Review of personality and social psychology, 15. (pp. 185–211). Thousand Oaks, CA, US: Sage Publications, Inc.

Briggs-Gowan, M. J., & Carter, A. S. (1998). Preliminary acceptability and psychometrics of the Infant-Toddler Social and Emotional Assessment (ITSEA): A new adult-report questionnaire. *Infant Mental Health Journal*, *19*(4), 422–445.

Caldwell, J. G., Shaver, P. R., Li, C.-S., & Minzenberg, M. J. (2011). Childhood Maltreatment, Adult Attachment, and Depression as Predictors of Parental Self-Efficacy in At-Risk Mothers. *Journal of Aggression, Maltreatment & Trauma*, *20*(6), 595–616.

Calkins, S. D., Coplan, R. J., Fox, N. A., & Rubin, K. H. (1995). Emotionality, emotion regulation, and preschoolers' social adaptation. *Development & Psychopathology*, *7*(1), 49–62.

Calkins, S. D., & Hill, A. (2007). Caregiver Influences on Emerging Emotion Regulation: Biological and Environmental Transactions in Early Development. In J. J. Gross (Ed.), *Handbook of emotion regulation.* (pp. 229–248). New York, NY US: Guilford Press.

Calkins, S. D., Hungerford, A., & Dedmon, S. E. (2004). Mothers' interactions with temperamentally frustrated infants. *Infant Mental Health Journal*, *25*(3), 219–239.

Calkins, S. D., & Johnson, M. C. (1998). Toddler regulation of distress to frustrating events: Temperamental and maternal correlates. *Infant Behavior & Development*, *21*(3), 379–395.

Camaioni, L., Aureli, T., Bellagamba, F., & Fogel, A. (2003). A longitudinal examination of the transition to symbolic communication in the second year of life. *Infant & Child Development*, *12*(1), 1–26.

Campbell, S. B., & Cohn, J. F. (1997). The timing and chronicity of postpartum depression: Implications for infant development. In L. Murray & P. J. Cooper (Eds.), *Postpartum depression and child development.* (pp. 165–197). New York, NY US: Guilford Press.

Campbell, S. B., Cohn, J. F., & Meyers, T. (1995). Depression in first-time mothers: Mother-infant interaction and depression chronicity. *Developmental Psychology*, *31*(3), 349–357.

Campbell-Sills, L., & Barlow, D. H. (2007). Incorporating Emotion Regulation into Conceptualizations and Treatments of Anxiety and Mood Disorders. In J. J. Gross (Ed.), *Handbook of emotion regulation.* (pp. 542–559). New York, NY US: Guilford Press.

Campos, J. J., Frankel, C. B., & Camras, L. (2004). On the Nature of Emotion Regulation. *Child Development*, *75*(2), 377–394.

Carpenter, M., Nagell, K., Tomasello, M., Butterworth, G., & Moore, C. (1998). Social cognition, joint attention, and communicative competence from 9 to 15 months of age. *Monographs of the Society for Research in Child Development, 64*(4), 1-174.

Carter, A. S., & Briggs-Gowan, M. J. (2006). *Manual for the Infant-Toddler Social & Emotional Assessment (ITSEA) – Version 2*. San Antonio, TX: Psychological Corporation, Harcourt Press.

Carter, A. S., Briggs-Gowan, M. J., Jones, S. M., & Little, T. D. (2003). The Infant-Toddler Social and Emotional Assessment (ITSEA): Factor Structure, Reliability, and Validity. *Journal of Abnormal Child Psychology*, *31*(5), 495–514.

Carter, A. S., Godoy, L., Wagmiller, R. L., Veliz, P., Marakovitz, S., & Briggs-Gowan, M. J. (2010). Internalizing Trajectories in Young Boys and Girls: The Whole is Not a Simple Sum of its Parts. *Journal of Abnormal Child Psychology*, *38*(1), 19–31.

Chan, K., Penner, K., Mah, J. W. T., & Johnston, C. (2010). Assessing Parenting Behaviors in Euro-Canadian and East Asian Immigrant Mothers: Limitations to Observations of Responsiveness. *Child & Family Behavior Therapy*, *32*(2), 85–102.

Child Mind Institute. (2013, March 26). How Anxiety Leads to Disruptive Behavior. *Child Mind Institute*. Retrieved February 8, 2014, from http://www.childmind.org/en/posts/articles/2013-3-26-anxiety-and-disruptive-behavior

Choi, S. Y., Kim, E. J., Ryu, E., Chang, K. O., & Park, M. N. (2012). Postpartum Depression and Parental Self-Efficacy: A Comparison of Native Korean and Vietnamese Immigrant Mothers in Korea. *Journal of Transcultural Nursing*, *23*(2), 181–187.

Cicchetti, D. V. (1994). Guidelines, Criteria, and Rules of Thumb for Evaluating Normed and Standardized Assessment Instruments in Psychology. *Psychological Assessment*, *6*(4), 284–90.

Cisler, J. M., Olatunji, B. O., Feldner, M. T., & Forsyth, J. P. (2010). Emotion Regulation and the Anxiety Disorders: An Integrative Review. *Journal of psychopathology and behavioral assessment*, *32*(1), 68–82.

Cohn, J. F., Matias, R., Tronick, E. Z., & Connell, D. (1986). Face-to-face interactions of depressed mothers and their infants. In E. Z. Tronick & T. Field (Eds.), *Maternal depression and infant disturbance.* (pp. 31–45). San Francisco: Jossey-Bass.

Cohn, J. F., & Tronick, E. (1989). Specificity of infants' response to mothers' affective behavior. *American Academy of Child & Adolescent Psychiatry. Journal*, *28*(2), 242–248.

Cohn, J. F., & Tronick, E. Z. (1983). Three-Month-Old Infants' Reaction to Simulated Maternal Depression. *Child Development*, *54*(1), 185.

Cole, P. M., & Hall, S. E. (2008). Emotion dysregulation as a risk factor for psychopathology. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *Child and adolescent psychopathology.* (pp. 265–298). Hoboken, NJ US: John Wiley & Sons Inc.

Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion Regulation as a Scientific Construct: Methodological Challenges and Directions for Child Development Research. *Child Development*, *75*(2), 317–333.

Cole, P. M., Michel, M. K., & Teti, L. O. (1994). The development of emotion regulation and dysregulation: A clinical perspective. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations* (Vol. 59, pp. 73– 100). Chicago: Monographs of the Society for Research in Child Development.

Cole, P. M., Zahn-Waxler, C., Fox, N. A., Usher, B. A., & Welsh, J. D. (1996). Individual differences in emotion regulation and behavior problems in preschool children. *Journal of Abnormal Psychology*, *105*(4), 518–529.

Cole, P. M., Zahn-Waxler, C., & Smith, K. D. (1994). Expressive control during a disappointment: Variations related to preschoolers' behavior problems. *Developmental Psychology*, *30*(6), 835–846.

Combs-Orme, T., Cain, D. S., & Wilson, E. E. (2004). Do Maternal Concerns at Delivery Predict Parenting Stress during Infancy? *Child Abuse & Neglect: The International Journal*, *28*(4), 377–392.

Conradt, E., & Ablow, J. (2010). Infant physiological response to the still-face paradigm: Contributions of maternal sensitivity and infants' early regulatory behavior. *Infant Behavior & Development*, *33*(3), 251–265.

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, EPDS, *150*, 782–786.

Coyl, D. D., Roggman, L. A., & Newland, L. A. (2002). Stress, maternal depression, and negative mother–infant interactions in relation to infant attachment. *Infant Mental Health Journal*, *23*(1- 2), 145–163.

Cutrona, C. E., & Troutman, B. R. (1986). Social Support, Infant Temperament, and Parenting Self-Efficacy: A Mediational Model of Postpartum Depression. *Child Development*, *57*(6), 1507–1518.

Dale, L. P., O'Hara, E. A., Schein, R., Inserra, L., Keen, J., Flores, M., & Porges, S. W. (2011). Measures of infant behavioral and physiological state regulation predict 54-month behavior problems. *Infant Mental Health Journal*, *32*(4), 473–486.

Deater-Deckard, K., & Petrill, S. A. (2004). Parent-child dyadic mutuality and child behavior problems: an investigation of gene-environment processes. *Journal of Child Psychology and Psychiatry*, *45*(6), 1171–1179.

DeGangi, G. A. (2000). *Pediatric disorders of regulation in affect and behavior: a therapist's guide to assessment and treatment*. Waltham, MA: Academic Press.

DeGangi, G. A., Breinbauer, C., Roosevelt, J. D., Porges, S., & Greenspan, S. (2000). Prediction of childhood problems at three years in children experiencing disorders of regulation during infancy. *Infant Mental Health Journal*, *21*(3), 156–175.

Derryberry, D., & Rothbart, M. K. (1985). Emotion, attention, and temperament. In C. E. Izard, J. Kagan, & R. B. Zajonc (Eds.), *Emotions, cognition, and behavior.* (pp. 132–166). New York, NY US: Cambridge University Press.

Dollberg, D., Feldman, R., & Keren, M. (2010). Maternal representations, infant psychiatric status, and mother–child relationship in clinic-referred and non-referred infants. *European Child & Adolescent Psychiatry*, *19*(1), 25–36.

Donovan, W., Leavitt, L., Taylor, N., & Broder, J. (2007). Maternal sensory sensitivity, mother–infant 9-month interaction, infant attachment status: Predictors of mother–toddler interaction at 24 months. *Infant Behavior & Development*, *30*(2), 336–352.

Edhborg, M., Seimyr, L., Lundh, W., & Widstrom, A.-M. (2000). Fussy child--difficult parenthood? Comparisons between families with a "depressed" mother and non-depressed mother 2 months postpartum. *Journal of Reproductive & Infant Psychology*, *18*(3), 225.

Egger, H., & Angold, A. (2006). Anxiety Disorders. In J. Luby (Ed.), *Handbook of Preschool Mental Health: Development, Disorders, and Treatment* (pp. 137–164). New York: Guilford Press.

Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental Socialization of Emotion. *Psychological Inquiry*, *9*(4), 241.

Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2002). The role of emotionality and regulation in children's social competence and adjustment. In L. Pulkkinen & A. Caspi (Eds.), *Paths to successful development: Personality in the life course.* (pp. 46–70). New York, NY US: Cambridge University Press.

Ekman, P. (1993). Facial expression and emotion. *American Psychologist*, *48*(4), 376–379.

Elder, G. H., Jr., Eccles, J., Ardelt, M., & Lord, S. (1995). Inner-City Parents Under Economic Pressure: Perspectives on the Strategies of Parenting. *Journal of Marriage and the Family*, *57*(3), 771–84.

Emde, R. N., Harmon, R. J., & Gaensbauer, T. J. (1976). *Emotional Expression in Infancy: A Biobehavioral Study*. Madison, CT: International Universities Press.

Fabes, R. A., & Eisenberg, N. (1992). Young Children's Coping with Interpersonal Anger. *Child Development*, *63*(1), 116–128.

Fabes, R. A., Leonard, S. A., Kupanoff, K., & Martin, C. L. (2001). Parental Coping with Children's Negative Emotions: Relations with Children's Emotional and Social Responding. *Child Development*, *72*(3), 907.

Farmer, A. Y., & Lee, S. K. (2011). The Effects of Parenting Stress, Perceived Mastery, and Maternal Depression on Parent–Child Interaction. *Journal of Social Service Research*, *37*(5), 516–525.

Feldman, R. (2007). Parent–infant synchrony and the construction of shared timing; physiological precursors, developmental outcomes, and risk conditions. *Journal of Child Psychology & Psychiatry*, *48*(3/4), 329–354.

Feldman, R., & Greenbaum, C. W. (1999). Mother-infant affect synchrony as an antecedent of the emergence of self-control. *Developmental Psychology*, *35*(1), 223.

Field, T. (1994). The effects of mother's physical and emotional unavailability on emotion regulation. *Monographs of the Society for Research in Child Development*, *59*(2-3), 208–227, 250–283.

Field, T., Healy, B., Goldstein, S., Perry, S., Bendell, D., Schanberg, S., Zimmerman, E. A., et al. (1988). Infants of Depressed Mothers Show "Depressed" Behavior Even with Nondepressed Adults. *Child Development*, *59*(6), 1569–79.

Field, T., Healy, B. T., Goldstein, S., & Guthertz, M. (1990). Behavior-state matching and synchrony in mother-infant interactions of nondepressed versus depressed dyads. *Developmental Psychology*, *26*(1), 7–14.

Field, T. M. (1977). Effects of Early Separation, Interactive Deficits, and Experimental Manipulation on Infant-Mother Face-to-Face Interaction. *Child Development*, *48*(3), 763–771.

Field, T. M. (1981). Infant gaze aversion and heart rate during face-to-face interactions. *Infant Behavior & Development*, *4*, 307–315.

Field, T. M. (1984). Early interactions between infants and their postpartum depressed mothers. *Infant Behavior & Development*, *7*(4), 517–522.

Field, T. M. (2000). Infants of depressed mothers. In S. L. Johnson, A. M. Hayes, T. M. Field, N. Schneiderman, & P. M. McCabe (Eds.), *Stress, coping, and depression.* (pp. 3–22). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Fisher, R. A. (1925). *Statistical Methods for Research Workers*. Edinburgh: Oliver and Boyd.

Fogel, A. (1993). *Developing through relationships: Origins of communication, self, and culture*. Chicago, IL: University of Chicago Press.

Fonagy, P., & Target, M. (2005). Commentary: Bridging the transmission gap: An end to an important mystery of attachment research? *Attachment & Human Development*, *7*(3), 333–343.

Forsyth, B. W. C., & Canny, P. F. (1991). Perceptions of Vulnerability 3 1/2 Years After Problems of Feeding and Crying Behavior in Early Infancy.. *Pediatrics*, *88*(4), 757.

Forsyth, B. W. C., Leventhal, J. M., & McCarthy, P. L. (1985). Mothers' perceptions of problems of feeding and crying behaviors. A prospective study. *American Journal of Diseases of Children (1960)*, *139*(3), 269–272.

Frijda, N. H. (1986). *The emotions*. The emotions. New York, NY: Cambridge University Press.

Fulton, J. M., Mastergeorge, A. M., Steele, J. S., & Hansen, R. L. (2012). Maternal perceptions of the infant: Relationship to maternal self-efficacy during the first six weeks' postpartum. *Infant Mental Health Journal*, *33*(4), 329–338.

Gardner, F. (2000). Methodological issues in the direct observation of parent-child interaction: do observational findings reflect the natural behavior of participants? *Clinical child and family psychology review*, *3*(3), 185–198.

Gartstein, M. A., Crawford, J., & Robertson, C. D. (2008). Early Markers of Language and Attention: Mutual Contributions and the Impact of Parent–Infant Interactions. *Child Psychiatry & Human Development*, *39*(1), 9–26.

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (Nov2005 Part 1). Perinatal Depression. *Obstetrics & Gynecology*, *106*(5), 1071–1083.

Gavin, N. I., Gaynes, B. N., Lohr, K. N., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal Depression. *Obstetrics & Gynecology*, *106*(5), 1071–1083.

Gelfand, D. M., Teti, D. M., & Fox, C. R. (1992). Sources of parenting stress for depressed and nondepressed mothers of infants. *Journal of Clinical Child Psychology*, *21*(3), 262–272.

George, M. R. W., Cummings, E. M., & Davies, P. T. (2010). Positive aspects of fathering and mothering, and children's attachment in kindergarten. *Early Child Development & Care*, *180*(1/2), 107–119.

Gershoff, E. T., Raver, C. C., Aber, J. L., & Lennon, M. C. (2007). Income Is Not Enough: Incorporating Material Hardship Into Models of Income Associations With Parenting and Child Development. *Child Development*, *78*(1), 70–95.

Gianino, A., & Tronick, E. Z. (1988). The mutual regulation model: The infant's self and interactive regulation and coping and defensive capacities. In T. M. Field, P. M. McCabe, & N. Schneiderman (Eds.), *Stress and coping across development.* (pp. 47–68). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

Gilkerson, L., Burkhardt, T., & Hans, S. L. (2011). *Closing the Gap: An Evaluation of the Impact of the Fussy Baby Network®*. Unpublished manuscript, Erikson Institute.

Goldsmith, H. H., & Davidson, R. J. (2004). Disambiguating the Components of Emotion Regulation. *Child Development*, *75*(2), 361–365.

Gonya, J. (2003). *Factors influencing maternal self-efficacy: A comparison of hearing mothers with deaf children and hearing mothers with hearing children* (Dissertation). Ohio State University.

Goodman, S. H., Broth, M. R., Hall, C. M., & Stowe, Z. N. (2008). Treatment of postpartum depression in mothers: Secondary benefits to the infants. *Infant Mental Health Journal*, *29*(5), 492–513.

Gordon, I., & Feldman, R. (2008). Synchrony in the triad: A microlevel process model of coparenting and parent-child interactions. *Family Process*, *47*(4), 465–479.

Gottman, J. M., Katz, L. F., & Hooven, C. (1996). Parental Meta-Emotion Philosophy and the Emotional Life of Families: Theoretical Models and Preliminary Data. *Journal of Family Psychology*, *10*(3), 243–268.

Graham, J. W., Olchowski, A. E., & Gilreath, T. D. (2007). How many imputations are really needed? Some practical clarifications of multiple imputation theory. *Prevention science: the official journal of the Society for Prevention Research*, *8*(3), 206–213.

Graziano, P. A., Calkins, S. D., & Keane, S. P. (2011). Sustained attention development during the toddlerhood to preschool period: associations with toddlers' emotion regulation strategies and maternal behaviour. *Infant & Child Development*, *20*(6), 389–408.

Gross, J. J. (1998). The Emerging Field of Emotion Regulation: An Integrative Review. *Review of General Psychology*, *2*(3), 271–299.

Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, *39*(3), 281–291.

Gunnar, M. R., Fisch, R. O., & Malone, S. (1984). The effects of a pacifying stimulus on behavioral and adrenocortical responses to circumcision in the newborn. *Journal of the American Academy of Child Psychiatry*, *23*(1), 34–38.

Haley, D. W., & Stansbury, K. (2003). Infant Stress and Parent Responsiveness: Regulation of Physiology and Behavior During Still-Face and Reunion. *Child Development*, *74*(5), 1534–1546.

Hallgren, K. A. (2012). Computing Inter-Rater Reliability for Observational Data: An Overview and Tutorial. *Tutorials in quantitative methods for psychology*, *8*(1), 23–34.

Halligan, S. L., Cooper, P. J., Fearon, P., Wheeler, S. L., Crosby, M., & Murray, L. (2013). The longitudinal development of emotion regulation capacities in children at risk for externalizing disorders. *Development and Psychopathology*, *25*(02), 391–406.

Hariri, A. R., & Forbes, E. E. (2007). Genetics of Emotion Regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation.* (pp. 110–132). New York, NY US: Guilford Press.

Haslam, D. M., Pakenham, K. I., & Smith, A. (2006). Social support and postpartum depressive symptomatology: The mediating role of maternal self-efficacy. *Infant Mental Health Journal*, *27*(3), 276–291.

Hay, D. F. (1997). Postpartum depression and cognitive development. In L. Murray & P. J. Cooper (Eds.), *Postpartum depression and child development.* (pp. 85–110). New York, NY US: Guilford Press.

Hayden, E. P., Durbin, C. E., Klein, D. N., & Olino, T. M. (2010). Maternal Personality Influences the Relationship Between Maternal Reports and Laboratory Measures of Child Temperament. *Journal of Personality Assessment*, *92*(6), 586–593.

Healey, D. M., Gopin, C. B., Grossman, B. R., Campbell, S. B., & Halperin, J. M. (2010). Mother–child dyadic synchrony is associated with better functioning in hyperactive/inattentive preschool children. *Journal of Child Psychology & Psychiatry*, *51*(9), 1058–1066.

Hedenbro, M., Shapiro, A. F., & Gottman, J. M. (2006). Play With Me at My Speed: Describing Differences in the Tempo of Parent-Infant Interactions in the Lausanne Triadic Play Paradigm in Two Cultures. *Family Process*, *45*(4), 485–498.

Hembree, E. A., Huebner, R. R., & Izard, C. E. (1987). Infant's emotion expressions to acute pain: developmental change and stability in individual differences. *Developmental Psychology*, *23*(1), 105–113.

Hemmi, M. H., Wolke, D., & Schneider, S. (2011). Associations between problems with crying, sleeping and/or feeding in infancy and long-term behavioural outcomes in childhood: a meta-analysis. *Archives of Disease in Childhood*, *96*(7), 622–629.

Hofer, M. A. (2002). Unexplained infant crying: an evolutionary perspective. *Acta Paediatrica*, *91*(5), 491.

Holden, G. W., & Ritchie, K. L. (1991). Linking extreme marital discord, child rearing, and child behavior problems: Evidence from battered women. *Child Development*, *62*(2), 311–327.

Holland, M., Yoo, B.-K., Kitzman, H., Chaudron, L., Szilagyi, P., & Temkin-Greener, H. (2011). Self-Efficacy as a Mediator Between Maternal Depression and Child Hospitalizations in Low-Income Urban Families. *Maternal & Child Health Journal*, *15*(7), 1011–1019.

Howell, E., Mora, P., & Leventhal, H. (2006). Correlates of Early Postpartum Depressive Symptoms. *Maternal & Child Health Journal*, *10*(2), 149–157.

Huang, C., Costeines, J., Kaufman, J., & Ayala, C. (2014). Parenting Stress, Social Support, and Depression for Ethnic Minority Adolescent Mothers: Impact on Child Development. *Journal of Child & Family Studies*, *23*(2), 255–262.

Huffman, L. C., Bryan, Y. E., del Carmen, R., Pedersen, F. A., Doussard-Roosevelt, J. A., & Porges, S. W. (1998). Infant temperament and cardiac vagal tone: Assessments at twelve weeks of age. *Child Development*, *69*(3), 624–635.

Humphry, R. A., & Hock, E. (1989). Infants with Colic: A Study of Maternal Stress and Anxiety. *Infant Mental Health Journal*, *10*(4), 263–272.

Hunziker, U. A., & Barr, R. G. (1986). Increased Carrying Reduces Infant Crying: A Randomized Controlled Trial.. *Pediatrics*, *77*(5), 641.

Huttenlocher, P. R., & Dabholkar, A. S. (1997). Regional differences in synaptogenesis in human cerebral cortex. *The Journal of comparative neurology*, *387*(2), 167–178.

Huynh-Nhu Le, & Lambert, S. F. (2008). Culture, Context, and Maternal Self-Efficacy in Latina Mothers. *Applied Developmental Science*, *12*(4), 198–201.

Ispa, J. M., Fine, M. A., Halgunseth, L. C., Harper, S., Robinson, J., Boyce, L., Brooks-Gunn, J., et al. (2004). Maternal Intrusiveness, Maternal Warmth, and Mother–Toddler Relationship Outcomes: Variations Across Low-Income Ethnic and Acculturation Groups. *Child Development*, *75*(6), 1613–1631.

Jackson, J. F. (1993). Multiple caregiving among African Americans and infant attachment: The need for an emic approach. *Human Development*, *36*(2), 87–102.

Jackson, T. L. (2009). *The study of parenting stress and social support among African American mothers*. ProQuest Information & Learning, US.

Kagan, J. (1998). Is there a self in infancy? In M. D. Ferrari & R. J. Sternberg (Eds.), *Self-awareness: Its nature and development.* (pp. 137–147). New York, NY US: Guilford Press.

Kagan, J., Snidman, N., Arcus, D., & Reznick, J. S. (1994). *Galen's prophecy: Temperament in human nature*. New York, NY US: Basic Books.

Karger, R. H. (1979). Synchrony in Mother-Infant Interactions. *Child Development*, *50*(3), 882.

Katch, L. (2012). *The Relationship Between Infant Crying and Father Well-Being* (Dissertations, Paper 306). Loyola University Chicago.

Keller, H., Lohaus, A., Kuensemueller, P., Abels, M., Yovsi, R., Voelker, S., Jensen, H., et al. (2004). The Bio-Culture of Parenting: Evidence From Five Cultural Communities. *Parenting: Science and Practice*, *4*(1), 25–50.

Kim, S., & Kochanska, G. (2012a). Child Temperament Moderates Effects of Parent-Child Mutuality on Self-Regulation: A Relationship-Based Path for Emotionally Negative Infants. *Child Development*, *83*(4), 1275–1289.

Kim, S., & Kochanska, G. (2012b). Child Temperament Moderates Effects of Parent-Child Mutuality on Self-Regulation: A Relationship-Based Path for Emotionally Negative Infants. *Child Development*, *83*(4), 1275–1289.

Kochanska, G. (1994). Beyond Cognition: Expanding the Search for the Early Roots of Internalization and Conscience. *Developmental Psychology*, *30*(1), 20–22.

Kochanska, G. (1997). Mutually responsive orientation between mothers and their young children: Implications for early socialization. *Child Development*, *68*(1), 94.

Kochanska, G. (2002). Mutually responsive orientation between mothers and their young children: A context for the early development of conscience. *Current Directions in Psychological Science*, *11*(6), 191–195.

Kochanska, G., & Aksan, N. (2004). Development of Mutual Responsiveness Between Parents and Their Young Children. *Child Development*, *75*(6), 1657–1676.

Kochanska, G., Aksan, N., Prisco, T. R., & Adams, E. E. (2008). Mother-child and father-child mutually responsive orientation in the first 2 years and children's outcomes at preschool age: mechanisms of influence. *Child development*, *79*(1), 30–44.

Kochanska, G., & Coy, K. C. (2002). Child Emotionality and Maternal Responsiveness as Predictors of Reunion Behaviors in the Strange Situation: Links Mediated and Unmediated by Separation Distress. *Child Development*, *73*(1), 228.

Kogan, N., & Carter, A. S. (1996). Mother-infant reengagement following the still-face: The role of maternal emotional availability in infant affect regulation. *Infant Behavior & Development*, *19*(3), 359–370.

Kopp, C. B. (1982). Antecedents of self-regulation: a developmental perspective. *Developmental Psychology*, *18*(2), 199–214.

Kopp, C. B. (1989). Regulation of Distress and Negative Emotions: A Developmental View. *Developmental Psychology*, *25*(3), 343–54.

Korja, R., Huhtala, M., Maunu, J., Rautava, P., Haataja, L., Lapinleimu, H., & Lehtonen, L. (2014). Preterm Infant's Early Crying Associated With Child's Behavioral Problems and Parents' Stress. *Pediatrics*, *133*(2), X22.

Kühn, S., Haggard, P., & Brass, M. (2013). Differences between endogenous and exogenous emotion inhibition in the human brain. *Brain Structure & Function*.

Laakso, M.-L., Poikkeus, A.-M., Katajamäki, J., & Lyytinen, P. (1999). Early intentional communication as a predictor of language development in young toddlers. *First Language*, *19*(56, Pt 2), 207–231.

Leahy-Warren, P., McCarthy, G., & Corcoran, P. (2012). First-time mothers: social support, maternal parental self-efficacy and postnatal depression. *Journal of Clinical Nursing*, *21*(3/4), 388–397.

Leavitt, L. (2001). Infant crying: Expectations and parental response. *New evidence on unexplained early infant crying: Its origins, nature and management* (pp. 43–49). Johnson & Johnson Pediatric Institute.

Leerkes, E. M., & Crockenberg, S. C. (2002). The Development of Maternal Self-Efficacy and Its Impact on Maternal Behavior. *Infancy*, *3*(2), 227.

Legerstee, M., & Varghese, J. (2001). The Role of Maternal Affect Mirroring on Social Expectancies in Three-Month-Old Infants. *Child Development*, *72*(5), 1301.

Lehtonen, L. (2001). From colic to toddlerhood. In M. R. G. Barr, P. I. S. James-Roberts, & R., PhD Maureen R. Keefe (Eds.), *New Evidence on Unexplained Early Infant Crying: Its Origins, Nature, and Management*. Johnson & Johnson Pediatric Institute.

Lieberman, A. F. (1993). *The emotional life of the toddler*. New York: Free Press.

Lieberman, A. F., Silverman, R., & Pawl, J. H. (2005). Infant-Parent Psychotherapy: Core Concepts and Current Approaches. In C. H. Zeanah (Ed.), *Handbook of Infant Mental Health* (Second.). New York: Guilford.

Van Lieshout, C. F. (1975). Young children's reactions to barriers placed by their mothers. *Child Development*, *46*(4), 879–886.

Little, R. J. A., & Rubin, D. B. (1987). *Statistical Analysis With Missing Data*. Wiley.

Lovejoy, M. C., Graczyk, P. A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review*, *20*(5), 561–592.

Lunkenheimer, E. S., Albrecht, E. C., & Kemp, C. J. (2013). Dyadic Flexibility in Early Parent-Child Interactions: Relations with Maternal Depressive Symptoms and Child Negativity and Behaviour Problems. *Infant & Child Development*, *22*(3), 250–269.

MacKenzie, M. J., & McDonough, S. C. (2009). Transactions between perception and reality: Maternal beliefs and infant regulatory behavior. In A. Sameroff (Ed.), *The transactional model of development: How children and contexts shape each other.* (pp. 35–54). Washington: American Psychological Association.

Maldonado-Durán, J. M., & Sauceda-Garcia, J. M. (2002). Excessive and persistent crying: Characteristics, differential diagnosis, and management. In J. M.

Maldonado-Durán (Ed.). *Infant and toddler mental health: Models of clinical intervention with infants and their families.* (pp. 239–267). Arlington, VA: American Psychiatric Publishing.

Mangelsdorf, S. C., Shapiro, J., & Marzolf, D. (1995). Developmental and Temperamental Differences in Emotion Regulation in Infancy. *Child Development*, *66*(6), 1817–28.

Manian, N., & Bornstein, M. H. (2009). Dynamics of emotion regulation in infants of clinically depressed and nondepressed mothers. *Journal of Child Psychology & Psychiatry*, *50*(11), 1410–1418.

Mäntymaa, M., Puura, K., Luoma, I., Latva, R., Salmelin, R., & Tamminen, T. (2012). Predicting Internalizing and Externalizing Problems at Five Years by Child and Parental Factors in Infancy and Toddlerhood. *Child Psychiatry & Human Development*, *43*(2), 153–170.

Mäntymaa, M., Puura, K., Luoma, I., Salmelin, R. K., & Tamminen, T. (2006). Mother's early perception of her infant's difficult temperament, parenting stress and early mother–infant interaction. *Nordic Journal of Psychiatry*, *60*(5), 379–386.

Martins, C., & Gaffan, E. A. (2000). Effects of early maternal depression on patterns of infant–mother attachment: A meta-analytic investigation. *Journal of Child Psychology and Psychiatry*, *41*(6), 737–746.

Mason, Z. s., Briggs, R. d., & Silver, E. j. (2011). Maternal attachment feelings mediate between maternal reports of depression, infant social–emotional development, and parenting stress. *Journal of Reproductive & Infant Psychology*, *29*(4), 382–394.

Maxted, A. E., Dickstein, S., Miller-Loncar, C., High, P., Spritz, B., Liu, J., & Lester, B. M. (2005). Infant colic and maternal depression. *Infant Mental Health Journal*, *26*(1), 56–68.

McDonald, J. H. (2009). Multiple Regression. *Handbook of Biological Statistics* (2nd ed., pp. 239–246). Baltimore: Sparky House Publishing.

McGlaughlin, A., & Grayson, A. (2001). Crying in the first year of infancy: patterns and prevalence. *Journal of Reproductive & Infant Psychology*, *19*(1), 47–59.

McGrath, J. M., Records, K., & Rice, M. (2008). Maternal Depression and Infant Temperament Characteristics. *Infant behavior & development*, *31*(1), 71–80.

McMahon, C., Barnett, B., Kowalenko, N., Tennant, C., & Don, N. (2001). Postnatal depression, anxiety and unsettled infant behaviour. *Australian & New Zealand Journal of Psychiatry*, *35*(5), 581–588.

Milgrom, J., Ericksen, J., McCarthy, R., & Gemmill, A. W. (2006). Stressful impact of depression on early mother–infant relations. *Stress & Health: Journal of the International Society for the Investigation of Stress*, *22*(4), 229–238.

Miller, A. R., Barr, R. G., & Eaton, W. O. (1993). Crying and Motor Behavior of Six-Week-Old Infants and Postpartum Maternal Mood. *Pediatrics*, *92*(4), 551–558.

Mills-Koonce, W. R., Gariépy, J.-L., Propper, C., Sutton, K., Calkins, S., Moore, G., & Cox, M. (2007). Infant and parent factors associated with early maternal sensitivity: A caregiver-attachment systems approach. *Infant Behavior & Development*, *30*(1), 114–126.

Mirabile, S., Scaramella, L., Sohr-Preston, S., & Robison, S. (2009). Mothers' Socialization of Emotion Regulation: The Moderating Role of Children's Negative Emotional Reactivity. *Child & Youth Care Forum*, *38*(1), 19–37.

Mischel, W., Rodriguez, M. L., & Shoda, Y. (1989). Delay of gratification in children. *Science*, *244*, 933–938.

Mistry, R. S., Biesanz, J. C., Taylor, L. C., Burchinal, M., & Cox, M. J. (2004). Family Income and Its Relation to Preschool Children's Adjustment for Families in the NICHD Study of Early Child Care. *Developmental Psychology*, *40*(5), 727–745.

Moore, G. A., Hill-Soderlund, A. L., Propper, C. B., Calkins, S. D., Mills-Koonce, W. R., & Cox, M. J. (2009). Mother–Infant Vagal Regulation in the Face-To-Face Still-Face Paradigm Is Moderated by Maternal Sensitivity. *Child Development*, *80*(1), 209–223.

Mullin, B. C., & Hinshaw, S. P. (2007). Emotion Regulation and Externalizing Disorders in Children and Adolescents. In J. J. Gross (Ed.), *Handbook of emotion regulation.* (pp. 523–541). New York: Guilford Press.

Murray, L., & Cooper, P. J. (Eds.). (1999). *Postpartum Depression and Child Development*. New York: Guilford Press.

Murray, L., Stanley, C., Hooper, R., King, F., & Fiori-Cowley, A. (1996). The role of infant factors in postnatal depression and mother-infant interactions. *Developmental Medicine and Child Neurology*, *38*(2), 109–119.

Nelson, K. E., Carskaddon, G., & Bonvillian, J. D. (1973). Syntax Acquisition: Impact of Experimental Variation in Adult Verbal Interaction with the Child. *Child Development*, *44*(3), 497–504.

Neu, M., & Keefe, M. R. (2002). Characteristics of School-Age Children Who Had Colic as Infants: Mothers' Views. *Journal for Specialists in Pediatric Nursing*, *7*(1), 24.

NICHD Early Child Care Research Network. (1997). The Effects of Infant Child Care on Infant-Mother Attachment Security: Results of the NICHD [National Institute of Child Health and Human Development] Study of Early Child Care. *Child Development*, *68*(5), 860–79.

NICHD Early Child Care Research Network. (1998). Early child care and self-control, compliance, and problem behavior at twenty-four and thirty-six months. *Child Development*, *69*(4), 1145–1170.

Noble, E. P., Ozkaragoz, T. Z., Ritchie, T. L., Zhang, X., Belin, T. R., & Sparkes, R. S. (1998). D2 and D4 dopamine receptor polymorphisms and personality. *American journal of medical genetics*, *81*(3), 257–267.

Nylen, K. J., Moran, T. E., Franklin, C. L., & O'Hara, M. W. (2006). Maternal depression: A review of relevant treatment approaches for mothers and infants. *Infant Mental Health Journal*, *27*(4), 327–343.

O'Hara, M. W., Stuart, S., Watson, D., Dietz, P. M., Farr, S. L., & D'angelo, D. (2012). Brief Scales to Detect Postpartum Depression and Anxiety Symptoms. *Journal of Women's Health (15409996)*, *21*(12), 1237–1243.

O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression--a meta-analysis. *International Review of Psychiatry*, *8*(1), 37.

Oburu, P. O., & Palmérus, K. (2003). Parenting stress and self-reported discipline strategies of Kenyan caregiving grandmothers. *International Journal of Behavioral Development*, *27*(6), 505.

Owen, M. T. (1992). *The NICHD Study of Early Child Care Mother-Infant Interaction Scales*. Dallas, TX: Timberlawn Psychiatric Research Foundation.

Panfile, T. M., & Laible, D. J. (2012). Attachment Security and Child's Empathy: The Mediating Role of Emotion Regulation. *Merrill-Palmer Quarterly*, *58*(1), 1–21.

Papoušek, H., & Papoušek, M. (1997). Fragile Aspects of Early Social Integration. In L. Murray & P. J. Cooper (Eds.), *Postpartum Depression and Child Development* (pp. 35–53). New York: Guilford Press.

Papoušek, M., & von Hofacker, N. (1998). Persistent crying in early infancy: anon-trivial condition of risk for the developing mother-infant relationship. *Child: Care, Health & Development*, *24*(5), 395–424.

Paris, R., Bolton, R. E., & Spielman, E. (2011). Evaluating a home-based dyadic intervention: Changes in postpartum depression, maternal perceptions, and mother-infant interactions. *Infant Mental Health Journal*, *32*(3), 319–338.

Paris, R., Bolton, R. E., & Weinberg, M. K. (2009). Postpartum depression, suicidality, and mother-infant interactions. *Archives of Women's Mental Health*, *12*(5), 309–321.

Parritz, R. H. (1996). A descriptive analysis of toddler coping challenging circumstances. *Infant Behavior & Development*, *19*, 171–180.

Pauli-Pott, U., Becker, K., Mertesacker, B., & Beckmann, D. (2000). Infants with "colic"—Mothers' perspectives on the crying problem. *Journal of Psychosomatic Research*, *48*, 125–132.

Pauli-Pott, U., Mertesacker, B., Bade, U., Bauer, C., & Beckmann, D. (2000). Contexts of relations of infant negative emotionality to caregiver's reactivity/sensitivity. *Infant Behavior & Development*, *23*(1), 23–29.

Pauli-Pott, U., Mertesacker, B., & Beckmann, D. (2004). Predicting the development of infant emotionality from maternal characteristics. *Development and Psychopathology*, *16*(1), 19–42.

Piaget, J. (1954). *The Construction of Reality in the Child*. New York: Basic Books.

Piaget, J. (1981). *Intelligence and Affectivity: Their Relationship During Child Development.* Palo Alto, CA: Annual Reviews.

Pinyerd, B. J. (1992). Infant colic and maternal mental health: Nursing research and practice concerns. *Issues in Comprehensive Pediatric Nursing*, *15*(3), 155–167.

Porges, S. W. (1996). Physiological regulation in high-risk infants: A model for assessment and potential intervention. *Development & Psychopathology*, *8*(1), 43–58.

Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology*, *74*(2), 116–143.

Porges, S. W., Doussard-Roosevelt, J. A., Portales, A. L., & Greenspan, S. I. (1996). Infant regulation of the vagal "brake" predicts child behavior problems: A psychobiological model of social behavior. *Developmental Psychobiology*, *29*(8), 697–712.

Prevent Child Abuse America. (2002). *Healthy Families America Promotes Positive Parenting*. Retrieved from http://www.healthyfamiliesamerica.org/downloads/hfa_fact_e.pdf

Prevent Child Abuse America. (n.d.). Healthy Families America: Critical Elements. *Healthy Families America*. Retrieved June 27, 2013, from http://www.healthyfamiliesamerica.org/about_us/critical_elements.shtml

Propper, C., Moore, G. A., Mills-Koonce, W. R., Halpern, C. T., Hill-Soderlund, A. L., Calkins, S. D., Carbone, M. A., et al. (2008). Gene–Environment Contributions to the Development of Infant Vagal Reactivity: The Interaction of Dopamine and Maternal Sensitivity. *Child Development*, *79*(5), 1377–1394.

Räihä, H., Lehtonen, L., Korhonen, T., & Korvenranta, H. (1997). Family functioning 3 years after infantile colic. *Journal of Developmental and Behavioral Pediatrics*, *18*(5), 290–294.

Räihä, H., Lehtonen, L., & Korvenranta, H. (1995). Family Context of Infantile Colic. *Infant Mental Health Journal*, *16*(3), 206–217.

Rautava, P., Lehtonen, L., Helenius, H., & Sillanpaa, M. (1995). Infantile colic: Child and family three years later. *Pediatrics*, *96*(1), 43.

Raver, C. C. (2004). Placing Emotional Self-Regulation in Sociocultural and Socioeconomic Contexts. *Child Development*, *75*(2), 346–353.

Raver, C. C., & Leadbeater, B. J. (1995). Factors influencing joint attention between socioeconomically disadvantaged adolescent mothers and their infants. In C. Moore & P. J. Dunham (Eds.), *Joint attention: Its origins and role in development.* (pp. 251–271). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

Reijneveld, S. A., Brugman, E., & Hirasing, R. A. (2001). Excessive Infant Crying: The Impact of Varying Definitions. *Pediatrics*, *108*(4), 893.

Reijneveld, S. A., Van der Wal, M. F., Brugman, E., Sing, R. A. H., & Verloove-Vanhorick, S. P. (2004). Infant crying and abuse. *Lancet*, *364*(9442), 1340–1342.

Richards, J. E., & Cameron, D. (1989). Infant heart-rate variability and behavioral developmental status. *Infant Behavior & Development*, *12*(1), 45–58.

Roberts, W. L. (1989). Parents' stressful life events and social networks: Relations with parenting and children's competence. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, *21*(2), 132–146.

Rooney, M. (2013). *A comparison of the effects of three intervention approaches on parental self-efficacy, parenting skills, and parental stress levels of impoverished parents*. ProQuest Information & Learning, US.

Rosenblum, K. L., McDonough, S., Muzik, M., Miller, A., & Sameroff, A. (2002). Maternal representations of the infant: Associations with infant response to the Still Face. *Child Development*, *73*(4), 999–1015.

Rothbart, M. K., Ziaie, H., & O'Boyle, C. (1992). Self-regulation and emotion in infancy. In N. Eisenberg & R. A. Fabes (Eds.), *Emotion and its regulation in early development: New directions for child development*, The Jossey-Bass education series. San Francisco: Jossey-Bass.

Rubin, D. B. (1987). *Multiple Imputation for Nonresponse in Surveys*. New York: John Wiley & Sons, Inc.

Rutter, M. (1991). Age changes in depressive disorders: Some developmental considerations. In J. Garber & K. A. Dodge (Eds.), *The development of emotion regulation and dysregulation.*, Cambridge studies in social and emotional development (pp. 273–300). New York: Cambridge University Press.

Sander, L. W. (1976). Issues in early mother-child interaction. In E. N. Rexford, L. W. Sander, & T. Shapiro (Eds.), *Infant Psychiatry: A new synthesis* (pp. 127–147). New Haven, CT: Yale University Press.

Schaefer, S. M., Jackson, D. C., Davidson, R. J., Aguirre, G. K., Kimberg, D. Y., & Thompson-Schill, S. L. (2002). Modulation of Amygdalar Activity by the Conscious Regulation of Negative Emotion. *Journal of Cognitive Neuroscience*, *14*(6), 913–921.

Secco, M. L., & Moffatt, M. E. K. (2003). Situational, Maternal, and Infant Influences on Parenting Stress Among Adolescent Mothers. *Issues in Comprehensive Pediatric Nursing*, *26*(2), 103.

Sharkey, P. T., Tirado-Strayer, N., Papachristos, A. V., & Raver, C. C. (2012). The Effect of Local Violence on Children's Attention and Impulse Control. *American Journal of Public Health*, *102*(12), 2287–2293.

Sheinkopf, S. J., Lester, B. M., LaGasse, L. L., Seifer, R., Bauer, C. R., Shankaran, S., Bada, H. S., et al. (2006). Interactions Between Maternal Characteristics and Neonatal Behavior in the Prediction of Parenting Stress and Perception of Infant Temperament. *Journal of Pediatric Psychology*, *31*(1), 27–40.

Shonkoff, J. P., & Marshall, P. C. (2000). The biology of developmental vulnerability. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention (2nd ed.).* (pp. 31–53). New York: Cambridge University Press.

Shonkoff, J. P., & Phillips, D. A. (2000). *From Neurons to Neighborhoods: The Science of Early Childhood Development.* National Academy Press.

Sokolowski, M. S., Hans, S. L., Bernstein, V. J., & Cox, S. M. (2007). Mothers' representations of their infants and parenting behavior: Associations with personal

and social-contextual variables in a high-risk sample. *Infant Mental Health Journal*, *28*(3), 344–365.

Spinrad, T. L., Stifter, C. A., Donelan-McCall, N., & Turner, L. (2004). Mothers' Regulation Strategies in Response to Toddlers' Affect: Links to Later Emotion Self-Regulation. *Social Development*, *13*(1), 40–55.

St. James-Roberts, I., Bowyer, J., Varghese, S., & Sawdon, J. (1994). Infant crying patterns in Manali and London. *Child: Care, Health & Development*, *20*, 323–337.

St. James-Roberts, I., & Halil, T. (1991). Infant Crying Patterns in the First Year: Normal Community and Clinical Findings. *Journal of Child Psychology & Psychiatry & Allied Disciplines*, *32*(6), 951–968.

St. James-Roberts, I., Hurry, J., Bowyer, J., & Barr, R. G. (1995). Supplementary Carrying Compared With Advice to Increase Responsive Parenting as Interventions to Prevent Persistent Infant Crying. *Pediatrics*, *95*(3), 381–388.

St. James-Roberts, I., & Wolke, D. (1988). Convergences and discrepancies, among mothers' and professionals' assessments of difficult neonatal behavior. *Journal of Child Psychology & Psychiatry & Allied Disciplines*, *29*(1), 21–42.

St. James- Roberts, I., Conroy, S., & Wilsher, K. (1998). Links between maternal care and persistent infant crying in the early months. *Child: Care, Health & Development*, *24*(5), 353–376.

Stansbury, K., & Sigman, M. (2000). Responses of Preschoolers in Two Frustrating Episodes: Emergence of Complex Strategies for Emotion Regulation. *Journal of Genetic Psychology*, *161*(2), 182.

Stein, A., Gath, D. H., Bucher, J., Bond, A., Day, A., & Cooper, P. J. (1991). The Relationship between Post-natal Depression and Mother-Child Interaction. *British Journal of Psychiatry*, *158*, 46–52.

Stern, D. N. (1974). The goal and structure of mother-infant play. *American Academy of Child Psychiatry. Journal*, *13*, 402–421.

Stern, D. N. (1977). *The First Relationship: Infant and Mother*. Harvard University Press.

Stern, D. N. (1985). *The Interpersonal World Of The Infant A View From Psychoanalysis And Developmental Psychology*. Basic Books.

Stifter, C. A. (2001). "Life" after unexplained crying: Child and parent outcomes. In R. G. Barr, I. St. James-Roberts, & M. Keefe (Eds.), *New evidence on unexplained*

early infant crying: Its origins, nature and management (pp. 273–288). Johnson & Johnson Pediatric Institute.

Stifter, C. A., & Bono, M. A. (1998). The effect of infant colic on maternal self-perceptions and mother–infant attachment. *Child: Care, Health and Development*, *24*(5), 339–351.

Stifter, C. A., & Braungart, J. M. (1995). The regulation of negative reactivity in infancy: Function and development. *Developmental Psychology*, *31*(3), 448.

Stifter, C. A., Fox, N. A., & Porges, S. W. (1989). Facial expressivity and vagal tone in 5- and 10-month-old infants. *Infant Behavior and Development*, *12*(2), 127–137.

Stifter, C. A., & Spinrad, T. L. (2002). The Effect of Excessive Crying on the Development of Emotion Regulation. *Infancy*, *3*(2), 133–152.

Supplee, L. H., Skuban, E. M., Shaw, D. S., & Prout, J. (2009). Emotion regulation strategies and later externalizing behavior among European American and African American children. *Development and psychopathology*, *21*(2), 393–415.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics*. Boston, MA: Allyn & Bacon.

Tamis-LeMonda, C. S., Bornstein, M. H., Baumwell, L., & Damast, A. M. (1996). Responsive Parenting in the Second Year: Specific Influences on Children's Language and Play. *Early Development & Parenting*, *5*(4), 173–183.

Tarabulsy, G. M., Tessier, R., & Kappas, A. (1996). Contingency detection and the contingent organization of behavior in interactions: Implications for socioemotional development in infancy. *Psychological Bulletin*, *120*(1), 25–41.

Teti, D. M., & Gelfand, D. M. (1991). Behavioral competence among mothers of infants in the first year: the mediational role of maternal self-efficacy. *Child development*, *62*(5), 918–929.

Thompson, R. A. (1994). Emotion Regulation: A theme in search of definiton. *The development of emotion regulation: Biological and behavioral considerations* (Vol. 59, pp. 25–52). Chicago: Monographs of the Society for Research in Child Development.

Thompson, R. A. (1998). Early sociopersonality development. In N. Eisenberg (Ed.), *Handbook of child psychology, 5th ed.: Vol 3. Social, emotional, and personality development.* (pp. 25–104). Hoboken, NJ: John Wiley & Sons Inc.

Thompson, R. A. (2007). Emotion Regulation: Conceptual Foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation*. New York: Guilford Press.

Toda, S., & Fogel, A. (1993). Infant response to the still-face situation at 3 and 6 months. *Developmental Psychology*, *29*(3), 532.

Tonyan, H. A. (2002, November). *Emerging emotion regulation: Describing behavioral strategies children and their caregivers use during emotionally challenging situations*. Dissertation Abstracts International, US.

Tronick, E., & Reck, C. (2009). Infants of Depressed Mothers. *Harvard Review of Psychiatry*, *17*(2), 147–156.

Tronick, E. Z. (1989). Emotions and emotional communication in infants. *American Psychologist*, *44*, 112–119.

Tronick, E. Z., & Gianino, A. (1986a). Interactive mismatch and repair: Challenges to the coping infant. *Zero to Three*, *6*(3), 1–6.

Tronick, E. Z., & Gianino, A. F. (1986b). The Transmission of Maternal Disturbance to the Infant. *New Directions for Child Development*, (34), 5–11.

Tronick, E. Z., & Weinberg, M. K. (1997). Depressed mothers and infants: Failure to form dyadic states of consciousness. In L. Murray & P. J. Cooper (Eds.), *Postpartum Depression and Child Development* (pp. 54–81). New York: Guilford Press.

Troutman, B., Moran, T. E., Arndt, S., Johnson, R. F., & Chmielewski, M. (2012). Development of parenting self-efficacy in mothers of infants with high negative emotionality. *Infant Mental Health Journal*, *33*(1), 45–54.

U.S. Department of Health and Human Services, Administration for Children and Families. (2012). Outcomes - Home Visiting Evidence of Effectiveness. *Home Visiting Evidence of Effectiveness*. Retrieved June 27, 2013, from http://homvee.acf.hhs.gov/outcomes.aspx

United States Census Bureau. (2010). Chicago QuickFacts from the US Census Bureau. Retrieved January 25, 2014, from http://quickfacts.census.gov/qfd/states/17/1714000.html

Verhage, M. L., Oosterman, M., & Schuengel, C. (2013). Parenting Self-Efficacy is Associated with Cry Perception, Not Autonomic Responses, during a Cry Response Task. *Parenting*, *13*(4), 253–265.

Vik, T., Grote, V., Escribano, J., Socha, J., Verduci, E., Fritsch, M., Carlier, C., et al. (2009). Infantile colic, prolonged crying and maternal postnatal depression. *Acta Paediatrica*, *98*(8), 1344–1348.

Wake, M., Morton-Allen, E., Poulakis, Z., Hiscock, H., Gallagher, S., & Oberklaid, F. (2006). Prevalence, Stability, and Outcomes of Cry-Fuss and Sleep Problems in the First 2 Years of Life: Prospective Community-Based Study. *Pediatrics*, *117*(3), 836–842.

Weaver, C. M., Shaw, D. S., Dishion, T. J., & Wilson, M. N. (2008). Parenting self-efficacy and problem behavior in children at high risk for early conduct problems: The mediating role of maternal depression. *Infant Behavior & Development*, *31*(4), 594–605.

Webb, T. U., Miles, E., & Sheeran, P. (2012). Dealing With Feeling: A Meta-Analysis of the Effectiveness of Strategies Derived From the Process Model of Emotion Regulation. *Psychological Bulletin*, *138*(4), 775–808.

Weissbluth, M. (1984). *Crybabies*. New York: Arbor House.

Wellman, H. M., & Estes, D. (1986). Early Understanding of Mental Entities: A Reexamination of Childhood Realism. *Child Development*, *57*(4), 910–23.

Wessel, M. A., Cobb, J. C., Jackson, E. B., Harris, G. S., & Detwiler, A. C. (1954). Paroxysmal Fussing in Infancy, Sometimes Called "Colic." *Pediatrics*, *14*(5), 421–435.

West, A. E., & Newman, D. L. (2003). Worried and blue: Mild parental anxiety and depression in relation to the development of young children's temperament and behavior problems. *Parenting: Science and Practice*, *3*(2), 133–154.

Wilkinson, L., & Dallal, G. E. (1981). Tests of Significance in Forward Selection Regression with an F-to-enter Stopping Rule. *Technometrics*, *23*, 377–380.

Wood, B. L., Hargreaves, E., & Marks, M. N. (2004). Using the Working Model of the Child Interview to assess postnatally depressed mothers' internal representations of their infants: A brief report. *Journal of Reproductive and Infant Psychology*, *22*(1), 41–44.

Wurmser, H., Laubereau, B., Hermann, M., Papoušek, M., & von Kries, R. (2001). Excessive infant crying: Often not confined to the first 3 months of age. *Early Human Development*, *64*(1), 1–6.

Xin, F., Shaw, D. S., Kovacs, M., Lane, T., O'Rourke, F. E., & Alarcon, J. H. (2008). Emotion regulation in preschoolers: the roles of behavioral inhibition, maternal affective behavior, and maternal depression. *Journal of Child Psychology & Psychiatry*, *49*(2), 132–141.

Xu, Y., Farver, J. A. M., Zhang, Z., Zeng, Q., Yu, L., & Cai, B. (2005). Mainland Chinese Parenting Styles and Parent-Child Interaction. *International Journal of Behavioral Development*, *29*(6), 524–531.

Yang, Y., & Raine, A. (2009). Prefrontal Structural and Functional Brain Imaging findings in Antisocial, Violent, and Psychopathic Individuals: A Meta-Analysis. *Psychiatry research*, *174*(2), 81–88.

Zeanah, C. H., & Benoit, D. (1995). Clinical applications of a parent perception interview in infant mental health. *Child and Adolescent Psychiatric Clinics of North America*, *4*(3), 539–554.

Zeskind, P. S., & Shingler, E. A. (1991). Child abusers' perceptual responses to newborn infant cries varying in pitch. *Infant Behavior & Development*, *14*(3), 335–347.

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