

THESIS

EVALUATION OF POSSUMS SLEEP INTERVENTION: A PILOT FEASIBILITY STUDY

Submitted by

Lia Closson

Department of Human Development and Family Studies

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Fall 2018

Master's Committee:

Advisor: Zeynep Biringen

Rachel Lucas-Thompson  
Elizabeth Williams

Copyright by Lia Closson 2018

All Rights Reserved

## ABSTRACT

### EVALUATION OF POSSUMS SLEEP INTERVENTION: A PILOT FEASIBILITY STUDY

The first year after the birth of a child is one of the most challenging times for mothers due to disrupted sleep associated with disorganized infant sleep. Research has shown that persistent fragmented maternal sleep increases a mother's risk of developing depression and negatively influences her overall well-being. Both issues can challenge the mother-infant relationship. In an effort to improve sleep for both mother and infant, healthcare providers often recommend infant behavioral sleep interventions. The primary focus of this pilot study was to assess the feasibility of easily recruiting for, adequately delivering, and sufficiently retaining participants in the Possums Sleep Intervention, a psychoeducational group workshop for women with infants between the ages of 0-6 months. A second goal of the study was to evaluate the Possums' curriculum potential in improving maternal sleep, maternal perceptions and cognitions of infant sleep, reported emotional availability and postnatal depressive symptoms. Participants were assessed at the start of the study and again at the completion of the 4-week workshop. Results showed improvements with respect to the perceived emotional availability in the parent-infant relationship, but there were no positive effects related to sleep for mother or for infant and no positive effects for mother's mood.

## TABLE OF CONTENTS

ABSTRACT.....	ii
INTRODUCTION .....	1
HYPOTHESES .....	10
METHOD .....	11
Participants .....	11
Procedure.....	12
Measures.....	14
Maternal sleep patterns.....	14
Maternal perceptions of infant sleep.....	15
Maternal cognitions about infant sleep problems.....	16
Reported emotional availability.....	17
Postnatal depression.....	17
RESULTS .....	19
Preliminary Analysis .....	19
Feasibility.....	19
Maternal sleep patterns.....	20
Maternal perceptions of infant sleep.....	20
Maternal cognitions about infant’s sleep.....	20
Reported emotional availability.....	21
Postnatal depression.....	21
DISCUSSION.....	22
Limitations.....	25
Lessons Learned and Next Steps.....	26
REFERENCES .....	29

## INTRODUCTION

The first year after the birth of a child is one of the most challenging times for a woman in terms of her sleep. Due to her infant's ever changing sleep and feeding schedules, a mother often experiences fragmented sleep due to frequent disruptions (Hunter, Rychnovsky, & Yount, 2009). Fragmented sleep is associated with impaired cognitive and emotional functioning (Vandekerckhove et al., 2012; Walker, 2009), a decrease in quality of sleep (Meltzer & Mindell, 2007), and an increase in stress (Meltzer & Mindell, 2007). These impairments can challenge a mother's confidence (Willinger, Diendorfer-Radner, Willnauer, Jörgl, & Hager, 2005), her attributions and perceptions of her child and the child's behaviors (Meltzer & Mindell, 2007), and her ability to be emotionally available to the needs of her child, putting the mother-child relationship at risk (Willinger et al., 2005).

Fragmented sleep is also associated with postpartum mood disorders (Goyal, Gay, & Lee, 2009; Hiscock et al., 2014; Meltzer & Mindell, 2007; Wake et al., 2006), which can disrupt a mother's capacity to understand her child's perspective. This lack of perspective taking can negatively affect a mother's ability to respond appropriately to her child's physical and emotional needs (Trapolini, Ungerer, & McMahon, 2008). When infants lack an emotionally available relationship with their primary care provider, they tend to avoid interactions with that provider by withdrawing from daily activities. This disengagement can negatively affect infant language, physical, intellectual and emotional development (Onunaku, 2005).

In an effort to support mothers and infants as they navigate the first year of infant sleep, two theories have emerged on how to manage infant sleep. The first is grounded in operant conditioning theory where behavioral interventions attempt to modify the infant's biological

sleep patterns (Blampied & Bootzin, 2011). The second is founded on evolutionary theory, where disorganized infant sleep is viewed as normative and biologically adaptive. Therefore, it is believed that teaching parents about child development, as it pertains to sleep, will help parents accept sleep disruptions as a part of normative development (Cassels et al., 2013). The two philosophies are discussed below.

### **Behavioral Sleep Interventions**

Researchers Sadeh, Tikotzky, and Scher (2010) view infant sleep through a transactional model believing that there is a bi-directional link between parental night time behaviors and infant sleep. In other words, parental behaviors during nighttime routines can influence how successful the infant will fall asleep and stay asleep. In turn, the child's temperament influences how actively involved parents are in supporting their child as they fall asleep. For example, an infant who has challenging sleep patterns may require more support from their parents.

B.F. Skinner (as cited in Blampied & Bootzin, 2011, p.425), considered sleep a behavior; believing that it can be conditioned through the use of positive and negative reinforcement. Studies have consistently supported these views. Infants with parents who are actively involved (e.g., rocking, feeding, holding) in supporting them as they fall asleep are more likely to experience an increase in both number and duration of night time wakings than infants whose parents consistently practice a more hands off approach (Burnham, Goodlin-Jones, Gaylor, & Anders, 2002; DeLeon & Karraker, 2007; Sadeh, Mindell, Luedtke, & Wiegand, 2009; Tikotzky & Sadeh, 2009). Skinner's principles can be seen in contemporary behavioral infant sleep interventions, which aim to decrease the number and duration of nighttime wakings by reducing or removing parental support as the child falls asleep with the goal of teaching the infant to soothe themselves without parental support. To encourage infants to develop self-soothing skills,

parents are often recommended from birth or after the first 6 to 12 weeks of age to implement one or a combination of the following interventions: delayed parental response to infant cues, initiate feed-play-sleep cycles, and adherence to sleep algorithms (Douglas & Hill, 2013; Mindell, Kuhn, Lewin, Meltzer, & Sadeh, 2006).

### **Feed-play-sleep cycles.**

Similar to delayed response, feed-play-sleep cycles aim to teach the infant to self-soothe as they fall asleep in a solitary sleep environment. The goal of the feed-play-sleep strategy is to separate the infant's connection between sleep and physical contact with parent, including feedings (Whittingham & Douglas, 2014a). Proponents theorize that feeding is an inappropriate learned stimulus cue for sleep, and believe that infants should have other stimuli (e.g., bedtime routines) to associate with sleep, thereby encouraging the infant to self-soothe to sleep. The feed-play-sleep intervention places value on routines and view them as an appropriate stimulus cue for sleep. Therefore, parents are instructed to create a routine in which the infant, upon waking, should be fed, then engaged in stimulating play, and finally, to be put down to sleep without parental support. The theory is that if infants have a routine, they learn to expect that sleep follows play and therefore, will not need parental assistance. Opponents suggest that falling asleep while feeding or soon after a feed is not a learned behavior, but rather a biologically driven phenomenon associated with the activation of the parasympathetic nervous system and elevated levels of oxytocin and plasma cholecystokinin after a feeding (Douglas & Hill, 2013; Whittingham & Douglas, 2014a). It is suggested that separating sleep from feeds can have the unintended outcomes of increasing the infants arousal of the sympathetic nervous system and the hypothalamic-pituitary-adrenal system which can create inconsolable crying for the infant (Whittingham & Douglas, 2014a).

### **Delayed parental response.**

To teach infants to self-soothe at bedtime, parents are encouraged to delay responding to their infant cues (e.g., crying or calling out). The extent to which a parent delays their response range from complete parental extinction to graduated extinction (Hill, 2011). Complete extinction involves parents placing their infant in bed at a designated time each night and not returning until morning regardless of the infant's distress, whereas in the graduated extinction paradigm, parents are encouraged to wait for a specified time before responding to their infant's cries. Child's age, temperament, and parent's ability to tolerate their infant's crying dictate response times. Examples of delayed response include a parent waiting for a specified time, such as five minutes, before responding to their child or gradually increasing response times from 5 to 10 to 15 minutes. As overly attentive parental interactions are thought to reinforce undesired infant behaviors, parental responses usually last between 15 seconds to 1 minute with minimal parent-child interaction (Hill, 2011; Mindell, Kuhn, Meltzer & Sadeh, 2006).

Opponents of the extinction method are concerned that ignoring infants crying cues is at odds with the needs and wants of the child and that ignoring infant cues is inconsistent with sensitive and responsive parenting (Whittingham & Douglas, 2014a). Ignoring infant cues may also create parental confusion and undermine their self-confidence as they attempt to learn which infant cues to respond to and which ones to ignore.

For many parents, compliance is an issue when attempting behavioral interventions (Mindell et al., 2006). In a study focused on parents' perceptions of behavioral intervention, those who did not apply the graduated extinction method or started and then stopped the technique stated that they did not follow through with the intervention because they felt concerned that the method was detrimental to either the child's or to the parent's mental health



(Blunden & Baills, 2013). Reasons cited for discontinuing graduated extinction included: (a) too stressful for the parent, (b) dislike the concept, (c) too stressful for the child, (d) “I can’t bear to hear my child cry alone,” (e) an anxious baby will stay upset, and (f) the child will cry too much.

### **Sleep algorithms.**

Sleep algorithms are statistical averages that dictate recommendations on infant sleep patterns within a 24-hour period (Whittingham & Douglas, 2014a). Based on these numerical averages, health care providers encourage parents to adhere to the recommended sleep algorithms. Depending on the methodologies used, the suggested amount of sleep varies from study to study. One study found that the normal range of infant sleep within a 24-hour period is 9.3-20 hours ( $M=14.6$ ) for a 0-2 month old infant, 9.4-17.8 hours ( $M=13.6$ ) for a 3-month old, and 8.8-17 hours ( $M=12.9$ ) for a 6-month old (Galland, Taylor, Elder, & Herbison, 2012). Another study categorized infant sleep development into three stages: longest sustained sleep period, longest self-regulated sleep period, and sleeping through the night (Henderson, France, & Blampied, 2011). According to the authors, a 6-month old infant can sustain uninterrupted sleep for eight hours and 9-month olds for nine or more hours. Although Galland (2012) examined infant sleep within a 24-hour period and Henderson (2011) examined nighttime sleep, there is a discrepancy between the hours. It is discrepancies such as these that create challenges for providers and parents when trying to understand what normative infant sleep behavior look like. The American Academy of Pediatricians’ (AAP, 2014) recommendation of 16-17 hours of sleep within a 24-hour period fails to disclose the full range of normative sleep (9-20 hours); therefore, a parent of a healthy 2-month old infant who sleeps only 10 hours in a 24-hour period may be unnecessarily concerned. Whittingham and Douglas (Whittingham & Douglas, 2014a) suggest that algorithms put an infant at risk for developing sleep issues because algorithms encourage

parents to ensure that their child gets the AAP recommended sleep of 16-17 hours sleep which may be more than the infant biologically needs, disrupting the development of healthy sleep regulation. The authors also suggest that algorithms teach the infant to rely on external cues dictated by parents rather than internal cues to induce sleep.

Although the behavioral interventions described above have been found to be associated with moderate improvements in infant night time sleep duration (St James-Roberts, Morris, Owen, & Gillham, 2001; Symon, Marley, & Norman, 2005), some studies indicate that the interventions are ineffective in improving maternal and infant sleep (Stremmer et al., 2013) or protecting mothers against postpartum depression (Dørheim, Bondevik, Eberhard-Gran, & Bjorvatn, 2009; Iacovou & Sevilla, 2012; Stremmer et al., 2013). For example, a behavioral-educational intervention implemented prior to discharge from hospital, which taught new mothers about infant sleep structure, sleep promotion strategies, maternal sleep hygiene, and how to support parenting and sleep found no significant difference between intervention and care-as-usual groups in maternal nocturnal sleep, longest stretch of nocturnal infant sleep or in maternal and infant night awakenings when measured at six and twelve weeks (Stremmer et al., 2013). For maternal nocturnal sleep, the estimated mean difference between the two groups was 5.97 minutes (95% confidence interval -7.77 to 19 minutes,  $p=0.39$ ). In other studies, even if infant sleep improved, improved infant sleep was not associated with improvements in maternal depression. For instance, when sleep was assessed for onset, duration, efficacy, number of night awakenings, and subjective quality, Dørheim et al., (2009) found no difference in sleep between depressed and non-depressed mothers. Finally, Iacovou and Sevilla (2012), found no differences in maternal depression levels between mothers who implemented an intervention that

encouraged scheduled infant feeds and mothers who were encouraged to follow their infant's cues and feed when they display hunger signs.

### **Infant Sleep Issues as Normative**

In response to the above inconsistencies and concerns, some researchers have suggested an alternative paradigm to infant sleep; that is to view night awakenings and erratic daytime sleep patterns as normative and biologically adaptive (Ball, 2013; Blunden, Thompson, & Dawson, 2011; Cassels et al., 2013, Whittingham & Douglas, 2014). Proponents explain that frequent arousals are evolutionary based, in that they serve as a survival mechanism. For example, when discussing arousals and infant feeding, advocates explain that at birth, newborns stomach capacity is limited to 5-7 milliliters or a teaspoon of breastmilk or formula, at three days, 22-27 milliliters, and day ten, 60-81 milliliters (Scammon & Doyle, 1920); therefore frequent feedings are necessary (Cassels et al., 2013). For breastfed infants, breastmilk is designed to be digested quickly, which requires more feedings and; therefore more arousals. Proponents also cite that frequent arousals are a protective factor for infants, including Sudden Infant Death Syndrome (SIDS) (Cassels et al., 2013; McKenna & McDade, 2005). Frequent night arousals keep the infant from falling into deep sleeps from which they cannot awaken (McKenna & McDade, 2005).

Normative progression in infant development creates disequilibrium within the infant's system; therefore, development can also affect infant sleep patterns (Cassels et al., 2013). For example, an infant who previously was sleeping through the night may begin waking up again when they are learning how to crawl or when they experience separation anxiety due to cognitive development. Proponents also suggest that the perception that frequent night awakenings and erratic daytime sleep are problematic is a socially constructed concept (Blunden et al., 2011) and

that not all societies view frequent arousals as problematic. Proponents advocate reframing what we tell parents about infant sleep. They propose giving parents realistic information on what normative infant sleep looks like and that sleep development is biologically driven. By doing so, parents may be able to anticipate and accept their infants sleep behaviors (Ball, 2013).

Although the concept of viewing infant sleep issues as normative addresses some of the concerns associated with behavioral sleep interventions, it does not empathize with parents' basic need for restorative sleep or self-care that supports their well-being (Whittingham & Douglas, 2014a). What is missing from contemporary infant sleep paradigms is an interdisciplinary prevention strategy that recognizes and is sensitive to the needs and well-being of both mother and infant while also protecting the mother-infant relationship.

Developers of the Possums Sleep Intervention attempt to address the gap between the two perspectives by taking an interdisciplinary approach to maternal and infant sleep. The intervention incorporates important concepts from developmental psychology, medical science, lactation science, evolutionary science, emotional availability theory, and acceptance and commitment therapy to support healthy sleep and well-being for mothers (Whittingham & Douglas, 2014a). The Possums Sleep Intervention is not an intervention that solely focuses on changing infant sleep patterns but rather emphasizes the development of maternal knowledge and skills to increase mother's acceptance of normative infant sleep patterns while also minimizing nighttime disruptions. Possums also encourage mothers to create enjoyable and meaningful lives despite sleep challenges while also embracing a mindset that promotes positive mother-infant relationships. The original concept of Possums was for practitioners to deliver the educational content during office visits with parents.

To our knowledge, this is the first study to conduct the Possums Sleep Intervention in a group format and also the first with an evaluation component to the implementation. With the developers' permission, the current study was designed to deliver the Possums curriculum in a group setting rather than individually as originally designed. Given that this was a pilot project, we first wanted to assess the feasibility of easily recruiting for, adequately delivering, and sufficiently retaining participants in Possums (group setting format) and secondarily to evaluate it in potentially improving maternal sleep, maternal perceptions and cognitions of infant sleep, reported emotional and postnatal depressive symptoms. Given this was a feasibility study, and some of the challenges to recruitment; we were not able to include a control group in this pilot study.

## HYPOTHESES

It is hypothesized that there will be within subject improvements between pretest and posttest assessments in the following areas:

**Hypotheses 1: Maternal sleep patterns:** specifically, participants will experience:

- a. a decrease in sleep disturbances,
- b. an increase in sleep adequacy,
- c. an increase in sleep quantity.

**Hypotheses 2: Maternal perception of infant sleep:** participants will perceive their child's sleep patterns as less problematic at post-test.

**Hypotheses 3: Maternal cognitions about infant's sleep:** participants' scores will decrease, indicating an improvement in their cognitions regarding their child's sleep.

**Hypotheses 4: Reported emotional availability:** participants will report improvements in the emotional quality of their relationship with their child

**Hypotheses 5: Postnatal depression:** participants will report a decrease in their postnatal depressive symptoms.

## METHOD

### Participants

Fifty-eight women responded to recruitment flyers which were placed at local pediatric clinics, birth and postpartum doula offices, new parent support groups, breastfeeding support groups, clinical breastfeeding clinics, and social media over a 14-month time period. The flyer briefly described the study and included an offer to participate was the primary means of recruitment. Inclusion criteria for the study required that infants be between the ages of 0-6 months at the beginning of the first workshop and mothers be English speaking. Twins and higher order multiples were excluded from the study due to the complexity of their needs. Compensation for participation in study was not offered.

Given that maternal/infant sleep can be challenging during the first year of life (Hunter et al., 2009) we expected easy recruitment. Contrary to our expectations, recruitment proved to be challenging. Of the 58 women who contacted us, 34 (59%) chose not to participate after being given more information regarding the study or in one case, the infant aged out of the 6-month inclusion requirement before the first workshop. However, once participants committed to the study, attrition was in fact low, this was important information for this pilot feasibility study. Of the remaining 24 mother-infant pairs, two (8.3%) completed only a portion of the study; one (4%) completed only a portion of the Time 1 assessment and requested to withdraw from the project; and one (4%) did not complete all workshops or the Time 2 assessment leaving us with 22 participants who completed all portions of the study. Given that we approached the study with “an intention to treat” mindset, we analyzed all data that was available ( $N=24$ ). Of the 24 infants in the study, 67% were male and 74% were first-born. Approximately 92% of the

participants identified as Caucasian with the remaining 8% identifying as either Latina or Indian. At intake, maternal ages ranged from 22-38 years of age ( $M = 30$ ,  $SD = 4.2$ ) and infants' ages ranged from 2-28 weeks ( $M = 12.4$ ,  $SD = 7.0$ ). All participants were either married (92%) or in a relationship and living with their partner (8%). All adult participants attended college with 42% of the women having a bachelor's degree and 38% holding graduate or higher degrees. The annual household incomes ranged from \$40,000 to over \$100,000. In terms of infant sleep arrangements, 33.3% of the infants slept in bed with their parents, 33.3% slept in a crib in the parents' room, 25% slept in a crib in a separate room, .04% cited that the infant began the night in a crib in his/her own room and moved to the parent's bed with the first feeding.

## **Procedure**

Possums is a psychoeducational group workshop delivered over four consecutive weeks in 1.5-2-hour segments to mothers with infants between the ages of 0-6 months. Through discussions on maternal parenting values, responsive caregiving, sleep hygiene, relaxation, and mindfulness, mothers are empowered to create individualized lifestyle plans that promote healthy sleep practices for both mother and infant; thereby, improving maternal and infant well-being (Whittingham & Douglas, 2014a). All workshops were facilitated by the same group leader.

**Session 1: Empowerment.** The focus of Session 1 was to facilitate a relationship between the group leader and participants, which was built on trust, empathy, and empowerment. Each mother had an opportunity to share her perceptions of her infant's sleep. Participants were introduced to the concept that they are the experts when it comes to their own infant. Therefore, it was essential that the facilitator put herself in the position of a "fellow traveler" rather than the expert (Whittingham & Douglas, 2014b) rather than the expert. The facilitator's role was to



teach mothers the latest evidence about sleep so they could create personalized solutions to promote healthy sleep and lifestyle.

Identifying personal parenting values was a key component of Session 1. A discussion on valued living helped mothers understand the difference between expansion of attention and attention narrowing during challenging sleep situations

**Session 2: The facts about sleep.** Session 2 aimed to teach mothers that falling asleep is not under conscious control, but rather, is regulated by sleep-inducing hormones and the circadian pacemaker. Although it is understood that people cannot consciously fall asleep at any given moment, the Possums Sleep Intervention aimed to help mothers create a lifestyle that would promote healthy sleep patterns. Mothers were also taught that sleep is dynamic and variable; therefore, it changes from day-to-day. Possums Sleep Intervention helped mothers to understand the variability in infant sleep and discouraged comparisons between their baby and another mother's baby. Reducing barriers to healthy sleep was also a focus of Session 2. A discussion on the importance of the sympathetic nervous system and its impact on sleep efficiency was incorporated into the curriculum with a focus on down regulating the sympathetic nervous system. An infant sleep curriculum would not be complete without a discussion on SIDS and safe infant sleep; therefore, infant sleeping position, location, and proximity were also covered.

**Session 3: Action.** During Session 3, mothers were taught how simple lifestyle changes can enhance their sleep and therefore, their well-being. Mothers learned the importance of ensuring that their circadian pacemaker was exposed to as many natural environmental clues as possible. A conversation on how cognitive diffusion negatively affects a mother's sleep efficiency was also discussed. Rather than ruminating about how tired they are going to be in the

morning while they are up in the middle of the night with their infant, mothers were encouraged to pull their focus away from these negative thoughts and focus their attention on positive aspects of her life. In doing so, mothers could decrease their anxiety and arousal, increase sleep efficiency and decrease subjective feelings of being tired in the morning. Relaxation was an important concept in Session 3. To help alleviate stress and tension and to create a more relaxing evening, mothers were encouraged to participate in physical activity by themselves or with their infants as well as incorporating enjoyable and sensory rich activities to her daily routine to help her live a meaningful life.

**Session 4: Check-in.** Session 4 was a check-in session to evaluate the effectiveness and feasibility of each mother's personal lifestyle plans.

### **Measures**

Measures were completed using the online survey platform, Qualtrics. All measures were administered prior to attendance of the first of four workshops and again after completion of the fourth session. Participants accessed the survey using their personal computer or smart phone.

#### **Maternal sleep patterns.**

The Sleep Scale from the Medical Outcomes Study (MOS Sleep Study; Hays, Martin, Sesti, & Spritzer, 2005) is a 12-item, self-administered tool that assesses adults perceptions of their sleep initiation, maintenance, respiratory issues, quantity, perceived adequacy and desire for sleep (Hays & Stewart, 1992). Sample questions include "How long did it usually take for you to fall asleep during the past 4 weeks," "How often during the past 4 weeks did you get enough sleep to feel rested upon waking in the morning," and "How often during the past 4 weeks did you feel drowsy or sleepy during the day?" In terms of internal reliabilities, the MOS Sleep

scales were adequate: sleep disturbance (.80), sleep adequacy (.76), daytime somnolence (.63) and sleep problems (.78; Hays et al., 2005). While the MOS Sleep Study questionnaire addresses several aspects of sleep, this project focused on three specific domains: *sleep disturbances* (difficulty in falling asleep, length of time to fall asleep, restless sleep, waking during sleep and having difficulty in falling asleep again), *sleep adequacy* (feeling rested upon waking in the morning, getting the amount of sleep needed), and *quantity of sleep*.

### **Maternal perceptions of infant sleep.**

Maternal perceptions of infant sleep was measured with the Brief Infant Sleep Questionnaire (BISQ; Sadeh, 2004). This is a brief screening tool to assess for sleep problems in infants and young children, meant to be used by practitioners. Care providers answer questions that address their infant's day and nighttime sleep patterns, sleep related behaviors, sleep location, and bedtime routines. The final question, "Do you consider your child's sleep as a problem?" addresses the care provider's perception of whether they perceive the infant's sleep as problematic. Clinical cutoff scores for referrals are based on care provider's written responses. Referrals are recommended if infant (6-30 months of age) wakes up more than three times per night, is awake for more than an hour during the night, or sleeps less than 9-hours in a 24-hour period. Retest reliability for duration of nighttime sleep is  $r = .82$ ; duration of daytime sleep is  $r = .89$ ; number of night awakenings is  $r = .88$ ; length of night awakenings is  $r = .95$ ; onset of nighttime sleep is  $r = .95$ ; and settling time is  $r = .94$ . All correlations were significant at  $p < .0001$  (Sadeh, 2004). The BISQ is correlated with actigraph data in the domains of onset of nighttime sleep ( $r = .54, p < .001$ ) and number of night awakenings ( $r = .42, p < .0001$ ). Given that the focus of the present study was to assess the effectiveness of the Possums Sleep Intervention in supporting positive maternal perceptions related to infants sleep and not whether

the intervention improves infant sleep, the final question, “*Do you consider your child’s sleep as a problem*” was the only BISQ variable analyzed.

### **Maternal cognitions about infant sleep problems.**

Maternal cognitions about infant sleep problems was assessed with the Maternal Cognitions about Infant Sleep Questionnaire (MCISQ; (Morrell, 1999)). This is a 20-item scale that attempts to identify maternal cognitions associated with infant sleep problems. Subscales of the MCISQ measure maternal limit setting (ability to resist infant’s demands and level of threshold for responding to demands), anger (level of anger, regret, and helplessness in response to infant demands), doubt (parental self-efficacy), feeding (beliefs regarding the importance of feeding to soothe the infant and concerns about nighttime hunger), and safety (level of concern about Sudden Infant Death Syndrome). Items are scored on a 6-point Likert-scale with “5” indicating that a mother “Strongly Agrees” and 0 indicating “Strongly disagrees.” High scores on subscales indicate problematic maternal cognitions. Sample questions include “When my child cries at night, I think something awful might have happened to him/her,” “When my child cries at night and needs me, I wish she wasn’t so demanding,” and “If I say no to my child’s demands at night, then that means I’m a bad parent.” In terms of reliability, the MCISQ is satisfactory with an alpha of .82 (Morrell, 1999) and a test-retest reliability of .81. With regard to construct validity, the measure demonstrates statistically significant correlations with sleep diaries. Given that maternal cognitions regarding *setting limits, anger, doubt, feeding, and safety* can influence maternal behaviors (Morrell, 1999), thereby affecting her and the relationship with her child, all MCISQ subscales were analyzed.

### **Reported emotional availability.**

Emotional availability was assessed using the Emotional Availability-Self Report (EA-SR; Biringen, Vliegen, Bijttebier, & Cluckers, 2002). This assesses parent's perception of the emotional quality in their relationship with their child and is not the observational assessment of emotional availability. The EA-SR is a 36-item self-report scale that measures *mutual attunement, child involvement with parent, affect quality, intrusiveness, and hostility*. Sample items include "I like to have eye-contact with my child," "By using his/her body language, my child is able to show me he/she wants to play, talk, or interact," and "I wonder whether my child enjoys my presence." Items are scored on a 5-point Likert scale ranging from "*not agree at all*" to "*totally agree*." For all subscales except affect quality, internal reliabilities range from .71 to .84; affect quality is .49 (Vliegen, Luyten, & Biringen, 2009). All subscales of the EA-SR (mutual attunement, child involvement with parent, affect quality, intrusiveness, and hostility) were used in analyses.

### **Postnatal depression.**

To screen for perinatal mood disorders, the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) was administered. The EPDS is a 10-item self-report scale where mothers are asked to rate their symptoms over the past 7-days. Sample items include "I have been able to laugh and see the funny side of things," "I have been anxious or worried for no good reason," and "The thought of harming myself has occurred to me." Items are scored on a 0-3 scale with final scores ranging from 0-30. Higher scores indicate higher levels of depressive symptoms. Scores < 10 indicate low depressive symptoms, scores 10-12 indicate minor depressive symptoms, scores  $\geq 13$  signify major depressive symptoms. The EPDS has adequate

reliability with split-half reliability of .88 and alpha coefficient of .87 (Cox et al., 1987). Within subject changes in participants' total scores on the EPDS were used in analyses.

## RESULTS

This study was designed as a pilot feasibility project, using a single-group pre/post design without a control group. We conducted multivariate analyses of covariance (controlling for infant age) given the possible important contribution of the age of the infant to sleep-related issues. Where main effects for time were significant, we then used the univariate t-tests within each domain area to understand if there were changes in sleep-related issues, relationships-related areas, and maternal depression between Time 1 and Time.

### **Preliminary Analysis**

#### **Feasibility.**

In terms of recruitment, we found it more challenging than we had originally anticipated. Given that fragmented sleep is common among women during the postpartum year, we expected the recruitment of 25 mothers for Possums, a workshop that addresses common sleep issues and promotes maternal well-being during the first 6-months of their infant's life, would be straightforward. Contrary to our initial optimism, it took 14 months to recruit 24 women. The primary explanation given for not participating in the study was pre-existing family or work commitments that conflicted with the weekend workshops.

Although recruitment proved to be challenging, issues with attrition (8.3%) were not. Once women committed to the study, they were likely to continue for the duration. One participant with a 3-week old infant withdrew from the study while she was in the process of completing the initial assessment. She explained that on further reflection, she and her husband felt that she was unable to commit the time necessary to participate in the study while they also established a nursing and sleep routine with their infant.

The study design did not include an objective measure to assess ratings of participant engagement. However, participation in the sessions was extensive and attendance and time log indicated impeccable and prompt attendance. The women actively participated in group discussions, they rarely missed a class and when one was missed, they were willing to schedule a make-up session prior to the next class.

#### **Maternal sleep patterns.**

Measured with the MOS, multivariate analyses of covariance (with age controlled) did not reveal any between subjects effects of infant age ( $F = .84, p = .49$ ), main effect for time ( $F = 1.00, p = .42$ ); thus, no univariate tests were performed. The first hypothesis that mothers' own sleep improves was not supported.

#### **Maternal perceptions of infant sleep.**

Measured using the BISQ, the multivariate analysis of covariance did not reveal a main effect for time ( $F = .49, p = .49$ ), but a between subjects effect for infant age ( $F = 4.64, p = .04$ ), suggesting that infant sleep is perceived by mothers as worse for older infants. No univariate tests were performed, given no main effect of time. Thus, hypothesis 2 that infant sleep improves was not supported.

#### **Maternal cognitions about infant's sleep.**

Measured using the MCISQ, multivariate analyses of variance revealed no between subjects effects of age ( $F = 1.33, p = .30$ ) or time ( $F = .07, p = 1.00$ ); no univariate tests were performed, given no main effects of time. The third hypothesis about maternal cognitions was thus not supported.



**Reported emotional availability.**

Measured using the EA-SR, there was no between subjects effect for infant age ( $F = .15$ ;  $p = .98$ ), indicating that relationship quality was not related to infant age. However, there was a main effect of time, suggesting that relationship quality improved over time ( $F = 3.45$ ,  $p = .03$ ), and potentially as related to the intervention. EA mutual attunement ( $F = 5.39$ ,  $p = .03$ ) and EA hostility ( $F = 7.82$ ,  $p = .01$ ) both showed improvements, supporting the last hypothesis.

**Postnatal depression.**

The level of postnatal depression was assessed with the EPDS. Multivariate analyses of variance did not reveal a between subjects effect of infant age ( $F = .08$ ,  $p = .78$ ) or time ( $F = .46$ ,  $p = .51$ ), which did not support the fifth hypotheses that mother's mood may improve over time.

## DISCUSSION

The purpose of the current study was first to assess the feasibility of easily recruiting for, adequately delivering, and sufficiently retaining participants for the Possums curriculum implementation in a group setting and secondarily to evaluate the intervention in improving participants' sleep patterns, maternal perceptions and cognitions regarding infant sleep, reported emotional availability, postpartum depressive symptoms.

Recruitment proved far more challenging than we had anticipated. Conflict with prior work and family commitments was a reoccurring theme for potential participants choosing not to participate. To address this issue, we added two weekday workshops. In hindsight, offering workshops on various days and times (e.g., weekdays, weeknights, weekends) may have improved our recruitment rates. The lack of success in recruiting from a large pediatric office was also surprising. Despite the study being advertised through flyers and on the clinic's website, only two of the 24 participants were recruited from the clinic. Knowing that infant sleep is the most common complaint reported to pediatricians by parents (Ferber, 1986), we thought that the pediatric office would be the ideal venue for recruitment. On further reflection, one wonders whether potential participants who may not have subscribed to behavioral sleep interventions or the AAP's (2016) recommendation against bedsharing may have interpreted the study as one that promotes these methods; therefore, chose not to participate. Individuals comfort with group workshops is another area to investigate further in terms of recruitment difficulties. Although the content of the Possums curriculum may have been interesting to new mothers, some women may not be comfortable in group settings due to various reasons. For example, a woman who is experiencing postpartum depression may not feel well enough to

motivate herself to leave her house and engage in group discussions. To address this barrier, it is worth contemplating creating workshops that are delivered via video conferencing platforms such as Skype or Zoom. To supplement the video conferencing options, further workshops might include a Facebook page or discussion board where participants engage when it is convenient for them. This has the potential of also benefiting women whose busy schedules are in conflict with in-person groups.

Our most successful recruitment locations were a local new mother's group and the Facebook page associated with the group. The success of these two sites may be contributed to the fact that same the facilitator of the mother's group conducted the Possums workshops. Prior personal knowledge of the facilitator may have positively influenced recruitment.

Culture and demographics may have had important implications in terms of recruitment. Where and how an infant falls asleep is a controversial issue (McKenna & McDade, 2005; Mileva-Seitz, Bakermans-Kranenburg, Battaini, & Luijk, 2017). This very controversy may have played an important role in our challenges with recruitment. From the perspective of the investigator, the recruitment material did not align with any specific infant sleep paradigms; however, it is worth delving deeper and understanding if the language or perhaps even the placement of flyers may have inadvertently alienated potential participants. For example, a parent who chooses to sleep with their infant in the parental bed, against the advice of AAP and their pediatrician's recommendation may view a study posted on the clinic's website as a study that promotes the infant sleeping on his/her own sleeping surface; therefore, does not want to participate. The phrase "safe sleeping options" on the recruitment flyer may solidify their concerns. On the other hand, the phrase "emotionally available care giving" may have alienated those parents who practice various forms of delayed response to infant distress.

Although our attrition rate was low, one has to question the motive of why the single participant chose to withdraw from the study withdrew during the administration of the first assessment. Her primary concern was that the time commitment required for participation in the study was too much given that she was also attempting to establish a nursing and sleep routine for her 3-week old infant. Interestingly, her reasons for withdrawing from the study are the precise issues addressed in the Possums' curriculum. One wonders whether the amount of questions on the assessment was overwhelming, especially with a 3-week old infant to care for. If this was the scenario, then this speaks loudly to participant burden of completing a lengthy questionnaire, especially for new mothers. Future studies would do well to keep questionnaires for new mothers brief. The second participant who did not complete the final workshop session or the last assessment cited work/travel conflicts as her reason for not continuing. Every effort was made (make-up sessions) to accommodate her schedule.

Participant engagement was high. Without specific measures to assess engagement, it is impossible to know exactly what contributed to the program's success in terms of participant commitment; however, an essential goal of Session 1 was to establish a relationship between facilitator and group members, a relationship built on trust, empathy, and empowerment. It is our perception that in building these relationships the women felt safe to share their frustrations and their triumphs regarding their infant's sleep and wanted to actively engage in such discussions.

An unexpected and delightful strength of the Possums program is its potential to build and strengthen relationships, relationships among the women and relationships between the women and their children. Although the study design did not incorporate a measure that assessed participant connectedness with one another, anecdotally, the women in the study tended

to build supportive friendships. In the case of one cohort, a year after the completion the study these seven women still arrange regular playdates with one another. In terms of the relationship between mother and child, the Possums Intervention may actually strengthen their emotional relationship, based on maternal reported emotional availability.

Findings regarding the effectiveness of the Possums curriculum were mixed. While results did not show that infant sleep, mother sleep, or maternal mood improved over time, the Possums Intervention did improve parent-child relationship quality, as perceived by the mother.

### **Limitations**

With regard to the evaluation of the Possums curriculum, it is important to recognize the limitations with the study. Foremost is absence of a control group, which threatens the internal validity of the evaluation. Without a control group to compare to, it is impossible to assess whether significant changes or lack thereof, in maternal sleep patterns, perceptions and cognitions about infant sleep, reported emotional availability and postnatal depressive symptoms are due to the intervention, the progression of time, or developmental changes within the infant. As previously discussed, infant sleep is a complex developmental process that both progresses and regresses over the first year depending on where the child is developmentally. Positive or negative changes in the amount of sleep a mother receives each night may be due to her infant's newfound ability to sleep in more concentrated segments throughout the night allowing the mother to achieve longer periods of sleep. In the same vein, a mother's sleep may be compromised as her infant learns to stand in the crib but does not have the skill to sit back down on their own causing them to cry out for help. The progression of time must also be considered. For example, a mother's self-efficacy may increase due to more time in her role as a mother rather than any effects of the intervention.

The use of self-report measures to assess mother's sleep patterns, emotional availability, and depression symptoms is another limitation of the evaluation. Personal inventories rely on a mother's ability to answer questionnaire items honestly; therefore, it is important to recognize that findings may be biased. To address this issue, future research should consider using a questionnaire such as the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960) to assess whether a participant is "faking good" or "faking bad." Observational data collection may also reduce measurement biases.

The small sample size is a substantial limitation to study. A sample size of 24 decreases the statistical power of the findings which limited the investigator's ability to detect findings that may be practically or clinically important. Increased efforts during the recruitment stage would be beneficial in increasing the sample size.

Finally, in an ideal situation, the role of evaluator would be separate from program developer, implementer, and group facilitator. In the present study, the investigator filled all roles, an obvious blurring of roles. As the developer of the intervention, the investigator had a vested interest for the program to be effective which is a significant conflict of interest. Another concern with the investigator playing all roles, implementation fidelity was not assessed to whether the delivery of the curriculum was consistent among all cohorts which, puts the outcomes at further risk for scrutiny.

### **Lessons Learned and Next Steps**

The current study offered many lessons for the investigator. The primary lesson learned was not to underestimate the challenges of the recruitment stage of a project. Regardless of the investigator's passion for a project and her certainty that the public will be equally passionate, recruitment takes a considerable amount of time and effort and impacts a study's findings

considerably; therefore, it is wise not to be over confident during this important stage of the project. Further recruitment efforts should begin with a review of the recruitment materials (e.g., flyers, websites, social media platforms, discussion boards) by a multidisciplinary team to ensure that the language on all resources are viewed as health promotive rather than “something is wrong, culturally sensitive and inclusive, and does not unintentionally alienate potential participants. Recruitment efforts should also include extensive outreach to multiple clinics. For example, rather than relying on one pediatric office for recruitment, it would be beneficial to connect with multiple pediatric or family practice clinics. On-line recruitment is another area worth investigating further given that the majority of the participants were recruited from on-line sources.

Although, it is tempting to add additional measures to address gaps (e.g., participant engagement, participant satisfaction) in the study, it is wise to anticipate participant burden when completing assessments. Given that one consented participant chose to withdraw from the study while attempting to complete the assessment is enough of a compelling reason to reduce the amount of measures, especially for women who have young children and may already be feeling overwhelmed.

In summary, the current study is the first to evaluate the feasibility of recruiting for, implementing, and retaining participants in Possums group workshop. The findings indicate that once participants are recruited, Possums can be successfully implemented in a group setting with high participant engagement and low attrition rates. Further studies that include both an intervention and control are needed to evaluate whether changes in maternal sleep patterns, maternal perceptions and cognitions, emotional availability, and postnatal depressive symptoms are due to the intervention or external factors. It is fascinating that while the intervention did not

improve the intended outcomes, it appears to have had a positive effect on the quality of emotional availability in the relationship, at least as perceived by mothers.



## REFERENCES

- Ball, H. L. (2013). Supporting parents who are worried about their newborn's sleep. *BMJ (Clinical Research Ed.)*, *346*(April), f2344. doi:10.1136/bmj.f2344
- Biringen, Z., Vliegen, N., Bijttebier, P., & Cluckers, G. (2002). The Emotional Availability Self-Report. Requested from [www.emotionavailability.com](http://www.emotionavailability.com).
- Blampied, N. M., & Bootzin, R. R. (2011). Sleep - a behavioral account. In G. Madden (Ed.), *The Handbook of Behavior Analysis*. Washington, D.C.: American Psychology Association.
- Blunden, S., & Bails, A. (2013). Treatment of behavioural sleep problems: Asking the parents. *Journal of Sleep Disorders: Treatment and Care*, *2*, 1–7. doi:10.4172/2325-9639.1000110
- Blunden, S. L., Thompson, K. R., & Dawson, D. (2011). Behavioural sleep treatments and night time crying in infants: challenging the status quo. *Sleep Medicine Reviews*, *15*(5), 327–34. doi:10.1016/j.smr.2010.11.002
- Burnham, M. M., Goodlin-Jones, B. L., Gaylor, E. E., & Anders, T. F. (2002). Nighttime sleep-wake patterns and self-soothing from birth to one year of age: a longitudinal intervention study. *Journal of Child Psychology and Psychiatry*, *43*(6), 713–725. doi:10.1111/1469-7610.00076
- Cassels, T., Ockwell-Smith, S., Middlemiss, W., Kendall-Tackett, K., Stevens, H., & Narvaez, D. (2013). Is your baby's sleep a problem? Or is it just normal? Mother-baby sleep experts weigh in on normal infant sleep (White Paper). Retrieved February 1, 2015, from

<http://praeclaruspress.com/wp-content/uploads/2013/08/praeclarus-press-normal-infant-sleep-2.pdf>

- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry, 150*, 782–786.
- Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*(4), 349–354.  
doi:10.1037/h0047358
- DeLeon, C. W., & Karraker, K. H. (2007). Intrinsic and extrinsic factors associated with night waking in 9-month-old infants. *Infant Behavior and Development, 30*(4), 596–605.  
doi:10.1016/j.infbeh.2007.03.009
- Dørheim, S. K., Bondevik, G. T., Eberhard-Gran, M., & Bjorvatn, B. (2009). Sleep and depression in postpartum women: a population-based study. *Sleep, 32*(7), 847–55.
- Douglas, P. S., & Hill, P. S. (2013). Behavioral sleep interventions in the first six months of life do not improve outcomes for mothers or infants: A systematic review. *Journal of Developmental and Behavioral Pediatrics, 34*, 497–507.
- Ferber, R. (1986). Sleepless child. In C. Guilleminault (Ed.), *Sleep and its disorders in children* (pp. 141–163). New York: Raven Press.
- Galland, B. C., Taylor, B. J., Elder, D. E., & Herbison, P. (2012). Normal sleep patterns in infants and children: a systematic review of observational studies. *Sleep Medicine Reviews, 16*(3), 213–22. doi:10.1016/j.smrv.2011.06.001

- Goyal, D., Gay, C., & Lee, K. (2009). Fragmented maternal sleep is more strongly correlated with depressive symptoms than infant temperament at three months postpartum. *Archives of Women's Mental Health, 12*(4), 229–37. doi:10.1007/s00737-009-0070-9
- Hays, R. D., Martin, S. A., Sesti, A. M., & Spritzer, K. L. (2005). Psychometric properties of the Medical Outcomes Study Sleep measure. *Sleep Medicine, 6*(1), 41–4. doi:10.1016/j.sleep.2004.07.006
- Hays, R. D., & Stewart, A. L. (1992). Sleep measures. In A. L. Stewart & J. E. Ware (Eds.), *Measuring functioning and well-being: The Medical Outcomes Study approach* (pp. 235–259). Durham, NC: Duke University Press.
- Henderson, J. M. T., France, K. G., & Blampied, N. M. (2011). The consolidation of infants' nocturnal sleep across the first year of life. *Sleep Medicine Reviews, 15*(4), 211–20. doi:10.1016/j.smr.2010.08.003
- Hill, C. (2011). Practitioner review: effective treatment of behavioural insomnia in children. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 52*(7), 731–40. doi:10.1111/j.1469-7610.2011.02396.x
- Hiscock, H., Cook, F., Bayer, J., Le, H. N. D., Mensah, F., Cann, W., Symon, B., & St James-Roberts, I. (2014). Preventing early infant sleep and crying problems and postnatal depression: a randomized trial. *Pediatrics, 133*(2), e346-54. doi:10.1542/peds.2013-1886
- Hunter, L. P., Rychnovsky, J. D., & Yount, S. M. (2009). A selective review of maternal sleep characteristics in the postpartum period. *JOGNN - Journal of Obstetric, Gynecologic, and Neonatal Nursing, 38*(1), 60–68. doi:10.1111/j.1552-6909.2008.00309.x

- Iacovou, M., & Sevilla, A. (2012). Infant feeding: the effects of scheduled vs. on-demand feeding on mothers' wellbeing and children's cognitive development. *The European Journal of Public Health*, 23(1), 13–19. doi: 10.1093/eurpub/cks012
- McKenna, J. J., & McDade, T. (2005). Why babies should never sleep alone: a review of the co-sleeping controversy in relation to SIDS, bedsharing and breast feeding. *Paediatric Respiratory Reviews*, 6(2), 134–52. doi:10.1016/j.prrv.2005.03.006
- Meltzer, L. J., & Mindell, J. A. (2007). Relationship between child sleep disturbances and maternal sleep, mood, and parenting stress: A pilot study. *Journal of Family Psychology*, 21(1), 67–73. doi:10.1037/0893-3200.21.1.67
- Mileva-Seitz, V. R., Bakermans-Kranenburg, M. J., Battaini, C., & Luijk, M. P. C. M. (2017). Parent-child bed-sharing: The good, the bad, and the burden of evidence. *Sleep Medicine Reviews*, 32, 4–27. doi:10.1016/j.smrv.2016.03.003
- Mindell, J. A., Kuhn, B., Lewin, D., Meltzer, L. J., & Sadeh, A. (2006). Behavioral treatment of bedtime problems and night wakings in infants and young children. *Sleep*, 29(10), 1263–1279.
- Moon, R. Y. (2016). SIDS and Other Sleep-Related Infant Deaths: Evidence Base for 2016 Updated Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*, 138(5), e20162940–e20162940. doi:10.1542/peds.2016-2940
- Morrell, J. . M. (1999). The role of maternal cognitions in infant sleep problems as assessed by a new instrument, the maternal cognitions about infant sleep questionnaire. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 40(2), 247–258. doi:10.1111/1469-7610.00438

- Onunaku, N. (2005). *Improving Maternal and Infant Mental Health: Focus on Maternal Depression*. Los Angeles, CA: National Center for Infant and Early Childhood Health Policy at UCLA.
- Sadeh, A. (2004). A Brief Screening Questionnaire for Infant Sleep Problems: Validation and Findings for an Internet Sample. *Pediatrics*, *113*(6), e570–e577.  
doi:10.1542/peds.113.6.e570
- Sadeh, A., Mindell, J. A., Luedtke, K., & Wiegand, B. (2009). Sleep and sleep ecology in the first 3 years: a web-based study. *Journal of Sleep Research*, *18*(1), 60–73.  
doi:10.1111/j.1365-2869.2008.00699.x
- Sadeh, A., Tikotzky, L., & Scher, A. (2010). Parenting and infant sleep. *Sleep Medicine Reviews*, *14*(2), 89–96. doi:10.1016/j.smrv.2009.05.003
- Scammon, R., & Doyle, L. (1920). Observations on the capacity of the stomach in the first ten days of postnatal life. *American Journal of Diseases of Children*, *20*(516–538).
- Skinner, B. F. (1953). *Science and human behavior*. New York, NY: Macmillan.
- St James-Roberts, I., Morris, S., Owen, C., & Gillham, P. (2001). Use of a behavioural programme in the first 3 months to prevent infant crying and sleeping problems. *Journal of Paediatrics and Child Health*, *37*(3), 289–297. doi:10.1046/j.1440-1754.2001.00699.x
- Stremmler, R., Hodnett, E., Kenton, L., Lee, K., Weiss, S., Weston, J., & Willan, A. (2013). Effect of behavioural-educational intervention on sleep for primiparous women and their infants in early postpartum: multisite randomised controlled trial. *BMJ (Clinical Research Ed.)*, *346*, f1164. doi:10.1136/bmj.f1164

- Symon, B. G., Marley, J. E., & Norman, E. R. (2005). Effect of a consultation teaching behaviour modification on sleep performance in infants: A randomized controlled trial. *Medical Journal of Australia*, *182*(5), 215–218.
- Tikotzky, L., & Sadeh, A. (2009). Maternal sleep-related cognitions and infant sleep: A longitudinal study from pregnancy through the 1st year. *Child Development*, *80*(3), 860–874.
- Trapolini, T., Ungerer, J. A., & McMahon, C. A. (2008). Maternal depression: relations with maternal caregiving representations and emotional availability during the preschool years. *Attachment & Human Development*, *10*(1), 73–90.  
doi:10.1080/14616730801900712
- Vandekerckhove, M., Kestemont, J., Weiss, R., Schotte, C., Exadaktylos, V., Haex, B., Verbraecken, J., & Gross, J. J. (2012). Experiential versus analytical emotion regulation and sleep: Breaking the link between negative events and sleep disturbance. *Emotion*, *12*(6), 1415–1421. doi:10.1037/a0028501
- Vliegen, N., Luyten, P., & Biringen, Z. (2009). A multimethod perspective on emotional availability in the postpartum period. *Parenting*, *9*(3–4), 228–243.  
doi:10.1080/15295190902844514
- 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), 836–42.  
doi:10.1542/peds.2005-0775
- Walker, M. P. (2009). The role of sleep in cognition and emotion. *Annals of the New York Academy of Sciences*, *1156*, 168–197. doi:10.1111/j.1749-6632.2009.04416.x

- Whittingham, K., & Douglas, P. (2014a). Optimizing parent-infant sleep fro birth to 6 months: A new Paradigm. *Infant Mental Health Journal*, 1–9. doi:10.1002/imhj.21455
- Whittingham, K., & Douglas, P. (2014b). The possums sleep intervention: First six months.
- Willinger, U., Diendorfer-Radner, G., Willnauer, R., Jörgl, G., & Hager, V. (2005). Parenting stress and parental bonding. *Behavioral Medicine (Washington, D.C.)*, 31(2), 63–9. doi:10.3200/BMED.31.2.63-72