The Impact of Infant Sleep Location and Mother Bed-Sharing Intent at 3 Months on Infant Responses to the Still-Face Paradigm at 6 Months

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Abstract

Little research has examined the relationship between infant sleep location and mother-child relationship quality. Further, no studies have considered the contribution of mother bed-sharing intent on this relationship. The current study examines the links between infant sleep location and mother bed-sharing intent at 3 months and mother-child relationship quality at 6 months, as indexed by infant responses to the Still-Face Paradigm (SFP). This study also investigates mother-infant contact and maternal response time during the night as possible mechanisms linking sleep location to relationship quality. Data from the Neonatal and Pediatric Sleep Study (NAPS) were used in this project. Infant sleep location and mother bed-sharing intent as well as mother-infant contact and maternal response time were determined through observational methods. Mother-child relationship quality was measured by responses to the SFP, which included positive affective expression, negative affective expression, negative vocalizations, gaze towards mother, and self-regulatory behaviors. Results indicated that bed-sharing infants displayed more self-regulatory behaviors during the still-face episode of the SFP, while solitary sleeping infants displayed more negative affective expressions and negative vocalizations during the reunion episode of the SFP. Similarly, proactively bed-sharing infants displayed more gazes towards mother during the still-face episode of the SFP. Results suggest that infant SFP responses may vary based on early nighttime experiences, with bed-sharing, particularly proactive bed-sharing, potentially promoting the mother-child relationship. Additionally, it appears as though maternal response time may be one mechanism driving the relationship between infant sleep location and mother-child relationship quality.
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The Impact of Infant Sleep Location and Mother Bed-Sharing Intent at 3 Months on Infant Responses to the Still-Face Paradigm at 6 Months

Parents are increasingly reporting co-sleeping with their infants, for reasons such as circumstantial situations (e.g., space limitations, income) and breastfeeding convenience (Ball, 2002). In fact, one study reported that infant-caregiver bed-sharing increased from 6.5% in 1993 to 13.5% in 2010 (Colson et al., 2013). Co-sleeping is commonly defined as a child sleeping in close proximity to the parent(s), whether that be on the same sleep surface (bed-sharing) or in the same room on a separate sleep surface (room-sharing; McKenna, Ball, & Gettler, 2007). Though previous co-sleeping studies often fail to distinguish between bed-sharing and room-sharing, the current paper focuses specifically on bed-sharing as an experience that may be related to mother-child relationship quality.

Sleep location is important to consider, because where an infant sleeps during the night may influence developmental outcomes. Westernized societies generally believe bed-sharing and room-sharing negatively impact a child’s autonomy and independence, and as a result, many parents in these cultures choose to have their children sleep in a crib in their own room (McKenna & McDade, 2005). However, one study found that children who bed-shared early in infancy were more self-reliant and displayed more social independence at 36 to 68 months of age than children who did not bed-share (Keller & Goldberg, 2004). Similarly, bed-sharing has been shown to predict greater confidence, self-esteem, and intimacy in adulthood (Crawford, 1994). Although evidence is mixed on the relationship between bed-sharing and child autonomy and independence, it is important to also consider the effects of sleep location on less studied factors, such as mother-child relationship quality. The current study is the first of its kind to use observational data to assess the link between infant sleep practices and mother-child relationship
quality. More specifically, this study examines infant sleep location and mother bed-sharing intent when infants are 3 months old to determine how such factors relate to mother-child relationship quality when infants are 6 months old. Attachment, a measure of relationship quality, has been explored using the Strange Situation Procedure; however, this measure cannot be used before infants are 12 months of age (Ainsworth, Blehar, Waters, & Wall, 1978). As a result, the current study will use infant responses to the Still-Face Paradigm (SFP) to assess early mother-child relationship quality, a measure that has been shown to predict later attachment security (Braungart-Rieker, Garwood, Powers, & Wang, 2001).

**Sleep Location, Bed-Sharing Intent, and Relationship Quality**

Only one study to date has investigated the relationship between infant sleep location and mother-child attachment, a well-established measure of relationship quality (Mileva-Seitz et al., 2015). This study utilized parent reports when infants were 2 months of age in order to classify infants into groups of “never bed-sharing” or “any bed-sharing.” Parents and infants then participated in the Strange Situation Procedure when infants were 15 months of age to assess attachment security. Findings revealed that children who never bed-shared were more likely to develop an insecure attachment with their mothers; however, children that had bed-shared were not significantly more likely to develop a secure attachment.

One possible reason for the weak links between infant sleep location and relationship quality may be the lack of distinction between proactive and reactive bed-sharing, because there is reason to believe that the antecedents and correlates of these two types of bed-sharing may differ (Keller & Goldberg, 2004). Proactive bed-sharing occurs when parents intentionally choose for their infant to sleep in the bed with them, while reactive bed-sharing happens when parents sleep in the same bed with their infants in response to infant sleep challenges (e.g., infant
distress). Madansky and Edelbrock (1990) found that engaging in reactive bed-sharing actually exacerbates childhood sleep problems. Conversely, other studies have shown that proactive bed-sharing is not linked with sleep problems (Okami, Weisner, & Olsmtead, 2002).

Although no extant studies have looked at the relationship between proactive and reactive bed-sharing and mother-child relationship quality, one study examined whether bed-sharing intent moderated the relationship between time spent bed-sharing and marital satisfaction (Messmer, Miller, & Yu, 2012). Results indicated that mothers who engaged in reactive bed-sharing had lower marital satisfaction as time spent bed-sharing increased, while mothers who engaged in proactive bed-sharing showed no change in marital satisfaction as time spent bed-sharing increased. Another study found that reactive bed-sharers were more likely to report dissatisfaction with their sleeping arrangements (Ramos, 2003). Similarly, findings reveal that, although proactive and reactive bed-sharing mothers report similar amounts of problematic infant behaviors during the night (e.g., infant difficult to calm during the night, infant requires contact to fall asleep), reactive bed-sharing mothers perceive these behaviors as being significantly more problematic than do proactive bed-sharing mothers (Ramos, Youngclarke, & Anderson, 2007). Overall, these studies indicate that reactive bed-sharing may be associated with more perceived problematic infant behaviors and higher maternal stress, while proactive bed-sharing may promote better maternal outcomes. These differences in maternal outcomes (i.e., maternal perceptions and stress) may affect the way mothers behave towards their infants (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983; Fleming, Ruble, Flett, & Shaul, 1988). Thus, it is reasonable to conclude that proactive and reactive bed-sharing may be differentially associated with later mother-child relationship quality. The distinction between types of bed-sharing may
also account for the mixed findings in regard to the relationship between bed-sharing and child autonomy.

**Still-Face Paradigm and Relationship Quality**

Previous studies have found that child responses to the SFP (Mesman, van IJzendoorn, & Bakermans-Kranenburg, 2009) are related to the quality of parental caregiving (Tarabulsy et al., 2003) and later attachment quality (Braungart-Rieker et al., 2001). Specifically, less negativity and more positivity during the still-face and reunion episodes of the SFP have been associated with secure attachment (Braungart-Rieker et al., 2001; Cohn, Campbell, & Ross, 1991). Similarly, more self-regulation during the still-face and reunion episodes of the SFP, as well as better self-regulation in general, has been linked with the formation of a more secure attachment (Braungart-Rieker et al., 2001; Cassidy, 1994). Although there is a lack of literature exploring the relationship between gaze during the SFP and future relationship quality, there is reason to believe that gaze towards mother during the SFP is associated with a stronger relationship quality. Specifically, one study found that insecurely attached infants look away from their parent significantly sooner during the still-face and reunion episodes of the SFP than securely attached infants (Jamieson, 2004). Other studies found that securely attached infants displayed significantly more stable, consistent gaze at mother’s face than avoidant insecurely attached infants (Koulomzin et al., 2002; Koulomzin, Beebe, Jaffe, & Feldstein, 1993). Thus, the current study uses infant responses to the SFP (i.e., less negativity, more positivity, more self-regulation, and more gaze towards mother) as possible early markers of mother-child relationship quality.

**Nighttime Mechanisms**

Although the relationship between bed-sharing and relationship quality has been little studied, there is some evidence that solitary sleeping is associated with risk for an insecure
attachment (Mileva-Seitz et al., 2015). The mechanisms driving this relationship are not well understood. There are many variables, such as mother-infant contact and maternal response time, which may explain the links among infant sleep location, bed-sharing intent, and future mother-child relationship quality.

Contact between the mother and infant is one factor that may be responsible for these associations. Studies have shown that bed-sharing infants experience greater physical proximity and touch from their parents during the night than infants that do not bed-share (Baddock, Galland, Bolton, Williams, & Taylor, 2006; Buckley, Rigda, Mundy, & McMillen, 2002). The physical touch (skin-to-skin contact) and proximity of the mother is believed to provide emotional security and physical comfort to the infant (Germo, Chang, Keller, & Goldberg, 2007; McKenna & Volpe, 2007; Ward, 2015), which may explain why mother-infant physical contact has been shown to relieve infant distress and promote the mother-child relationship (Feldman, Weller, Sirota, & Eidelman, 2003). Indeed, mother-infant skin-to-skin contact is very important for development, as it has also been found to promote child self-regulation and parental sensitivity (Braungart-Rieker et al., 2001; Feldman, 2004; Feldman et al., 2003). Thus, the amount of contact between the mother and infant during nighttime may promote the associations hypothesized in the current study.

Maternal responsiveness to a distressed infant is another factor that may link infant sleep location and bed-sharing intent to mother-child relationship quality. In fact, one study found that bed-sharing infants experience more maternal touch and attention as well as faster maternal responses, suggesting that bed-sharing may be associated with faster and more consistent responses (Baddock et al., 2006). Additionally, a mother’s sensitive responsiveness to infant distress during the first year of life has been shown to play a key role in the formation of a secure
attachment (Ainsworth et al., 1978; Raval et al., 2001). One study investigated the relationship between nighttime maternal responsiveness and infant attachment at one year and found that responding to a distressed infant was key in forming a secure attachment (Higley & Dozier, 2009). Mothers of securely attached infants had nighttime interactions that on average were more consistent, sensitive, and responsive than those of insecurely attached infants. Specifically, in secure dyads, mothers generally picked up and soothed infants when they fussed or cried after an awakening. Similarly, another study found that greater responsiveness to infant distress at 6 months of age predicted increased odds of developing a secure attachment at 15 months of age (McElwain & Booth-LaForce, 2006). However, greater responsiveness to infant distress at 15 months of age was not associated with predictors of attachment security at 15 months. This indicates that mother-child attachment forms very early in infancy and that mother response time to a distressed infant may play a key role in the development of a strong mother-child relationship quality.

Inherently, bed-sharing infants experience more maternal contact and faster maternal responses than non-bed-sharing infants (Baddock et al., 2006; Buckley et al., 2002). These two factors seem to be fostered through bed-sharing and could promote the mother-child relationship. Previous findings suggest that mother-infant contact and maternal response time may be mechanisms responsible for the associations among infant sleep location, mother bed-sharing intent, and mother-child relationship quality. However, these mechanisms have not yet been empirically tested.

**Current Study**

In the current study, I examine the link between infant sleep location (i.e., solitary sleeping [SS]; bed-sharing [BS]) and later mother-child relationship quality, as indicated by child
behavior during the SFP. This study adds to the existing literature in several ways. First, the only existing study to investigate the relationship between infant sleep location and mother-child relationship quality, of which I am aware, was limited by its use of questionnaires for determining infant sleep location (Mileva-Sietz et al., 2015). The current study extends the literature by using naturalistic observational methods to assess the relationship between infant sleep location and relationship quality. Second, I investigate two possible mechanisms by which infant sleep location predicts later relationship quality: mother-infant contact and maternal response time. Each of these are observed naturalistically during the nighttime period, and their relationship to infant sleep location (i.e., SS, BS), bed-sharing intent (i.e., PBS, RBS) and mother-child relationship quality is tested. Third, this study uses the SFP, which allows relationship quality to be measured earlier than most studies that are conducted at the end of the first year using the Strange Situation. Fourth, the current study attempts to disentangle the relationship between bed-sharing intent (i.e., proactive bed-sharing [PBS]; reactive bed-sharing [RBS]) and mother-child relationship quality, a factor that has not been considered previously. Finally, this study consists of exclusively African American mother-infant dyads. African Americans are at greater risk for poor sleep quality (Durrence & Lichstein, 2006) and are more likely to engage in bed-sharing (Colson et al., 2013). Despite this, research on the development of sleep and sleep practices among African American infants is virtually nonexistent. The current study will be the first to examine these relationships within an African American sample as early as the very first months of life. In sum, the following hypotheses were tested:

**Hypothesis 1.** Infant sleep location at 3 months will be related to mother-child relationship quality at 6 months, with bed-sharing dyads having a stronger relationship quality (as indexed by more positivity, less negativity, more gaze towards mother, and more self-regulatory behaviors
during the SFP) than solitary sleeping dyads (i.e., those who room-share or sleep in separate rooms).

**Hypothesis 2.** Mother bed-sharing intent at 3 months will be related to later mother-child relationship quality (as indexed by more positivity, less negativity, more gaze towards mother, and more self-regulatory behaviors during the SFP), with proactive bed-sharing dyads having a stronger relationship quality than reactive bed-sharing dyads.

**Hypothesis 3.** There will be group differences in mother-infant contact and maternal response time based on (a) infant sleep location, with the bed-sharing dyads having more contact and faster maternal response times than solitary sleeping dyads and (b) mother bed-sharing intent, with the proactively bed-sharing dyads having more contact and faster maternal response times than reactively bed-sharing dyads.

**Hypothesis 4.** Mother-infant contact and maternal response times will predict infant responses to the SFP, with greater contact and faster maternal response times predicting less negativity, more positivity, more gazes towards mother, and more self-regulatory behaviors during the SFP.

**Methods**

**Participants**

The current study includes 50 African American mother-infant dyads who participated in the Neonatal and Pediatric Sleep (NAPS) study when infants were 3 and 6 months of age. Using public birth records and community advertisements, researchers recruited African American mothers in the Triangle area of North Carolina who were 18 years of age or older and gave birth to a single infant. Upon completion of each data collection time point, mothers received compensation via gift cards.
Of the infants included in this study, 27 were male and 23 were female. Although 45 infants were full-term (born after 37 weeks of gestation), 5 infants were premature (born before 37 weeks of gestation); a subgroup of mothers were recruited for an additional prenatal assessment [N = 23] and therefore these infants were not required to meet the full-term inclusion criteria of those recruited postnatally). For premature infants, both the 3 and 6 month visits were scheduled according to infants’ adjusted age. Ninety-six percent of mothers in the sample had received a high school degree and 38% of mothers had received a four-year college degree. Annual household income was measured and examined continuously, and ranged from $13,000 to $215,000. Fifty-eight percent of infants lived in the same household as their biological father. At 3 months of age, 48% of infants were breastfed.

**Procedure**

Data were collected during home visits when the infant was 3 and 6 months of age. After consent procedures, multiple tasks were conducted, including mother-child interactions and infant cognitive assessments. Although both visits followed similar procedures, the SFP was done only at the 6 month visit, which was videotaped for later coding. At the end of each home visit, research assistants set up infrared video recording equipment to record the infant’s sleep for one full night. Research assistants asked the mother to describe the infant’s general sleep location as well as any other areas where the parent and child were likely to spend time together during the observation period. Based on this information, up to 4 infrared cameras were set up in the designated location(s) in order to record mother-child interaction at bedtime and throughout the night, as well as the infant’s sleep. Research assistants retrieved the video equipment the following morning.
Mothers also filled out questionnaires during each of these visits that focused on demographic information, maternal health and well-being, family support, and infant behavior and development, including sleep-related behaviors. Additionally, mothers completed infant sleep diaries (Hall, Liva, Moynihan, & Saunders, 2015) over the phone with a research assistant every day for the course of a week beginning the day after the home visit. These sleep diaries included questions regarding the infant’s sleep behavior during the previous night.

**Measures**

**Infant sleep location.** The current study assessed sleep practices at 3 months of age with parental questionnaires, infant sleep diaries, and naturalistic video observation. Nighttime sleep practices were coded over a 4-hour interval beginning when the mother went to sleep (defined as the moment that she laid down in bed and ceased attending to other stimuli (e.g., television, cell phone; Ball, Ward-Platt, Heslop, Leech, & Brown, 2006)). In cases where mother’s bedtime was impossible to determine due to video camera angles, the bedtime that was reported by mothers on the infant sleep diaries was used instead. If mother did not report her bedtime on the sleep diaries then coding began the last time the mother was visible on camera after putting the infant to bed. This final determination was used because it is the last reliable time that mother is known to be awake before going to sleep.

During the 4-hour nighttime interval, trained research assistants coded several aspects of the infant’s sleep environment. The primary codes of interest for this study referred to the infant’s sleeping location. Researchers coded whether the infant was in his or her own room, a shared bedroom with a sibling, the parent’s room, or another room. In addition, coders indicated where the infant was located within the room, which included an attached crib, bedside crib, standalone crib, parent’s bed, car seat, swing, or parent’s arms. An attached crib was considered
any crib, bassinet, or playpen that was attached to the parent’s bed, while a bedside crib was considered any crib, bassinet, or playpen that was placed directly next to the parent’s bed (i.e., within 3 feet). A standalone crib was any crib, bassinet, or playpen placed in parent’s room away from the parent’s bed (i.e., further than 3 feet) or in a separate room. Bed-sharing was coded when the infant was asleep with an adult in the same bed or something functioning as a bed (e.g., chair, couch). Researchers stopped coding bed-sharing when proximity was broken (i.e., mother got out of bed) or if the infant woke up.

Infant sleep location groups were determined from the observable data in the nighttime videos. If bed-sharing was coded at any point during the 4-hour interval, the infant was considered part of the bed-sharing (BS) group. Similarly, infants were categorized as solitary sleepers (SS) if they were observed sleeping in their own bedroom throughout the 4-hour interval or if they slept in their parents’ room (room-sharing) but were never observed bed-sharing during the 4-hour interval. Thus, if an infant started the night in their own room (SS) but ended up in their parent’s bed later in the night (BS), they would be considered part of the BS group. Among bed-sharing dyads, I was also interested in proactive (PBS) versus reactive bed-sharing (RBS). PBS was defined as a mother intentionally choosing to bed-share with her infant, while RBS was defined as a mother bed-sharing with her infant as a result of child factors (e.g., infant distress). Researchers classified mother-infant dyads as PBS or RBS through observation of the nighttime 4-hour video interval. If the infant began in the parent’s bed and remained there all night they were considered to be PBS. Infants were classified as RBS if they were brought to parent’s bed due to fussy behaviors or only temporarily slept in parent’s bed.

Nighttime parental behavior. Nighttime parental behaviors were coded using a nighttime practices coding scheme described elsewhere (Teti, Kim, Mayer, & Countermine,
2010; Philbrook & Teti, 2016). Based on different sample characteristics and research questions, additional codes were added to the current study. For instance, the original coding scheme included codes for infant state (i.e., awake non-distressed, awake-distressed, asleep) and parent interventions to infant distress. Coders added to the original coding scheme by including codes for infant location (i.e., bedside crib, attached crib, parent’s bed) as well as codes for close and casual contact. The absence and presence of certain parental behaviors were coded in 30-second intervals throughout the 4-hour nighttime interval. In order to achieve reliability, two research assistants held weekly meetings to conference cases and discuss discrepancies. Twelve cases (14.63%) were double coded and inter-rater agreement was high, with Cohen’s kappa values above .80 for all codes.

**Contact.** Close and casual contact between the mother and infant was coded. Close contact was defined as mother holding infant against her body, whether infant was facing towards or away from the mother’s body. This type of contact included holding, cuddling, or breastfeeding. Casual contact was defined as the mother and infant touching, but not closely. Some examples include caressing, diaper changing, and infant sitting on the mother’s lap with little contact between their bodies. These codes were mutually exclusive; if both close and casual contact was present in an interval, close contact was coded. Proportion scores for both close and casual contact were calculated from the 4-hour nighttime interval and used for analyses.

**Mother response time.** Mother response time was defined as the time it took mother to respond to her distressed infant. Infant distress was coded when distressed vocalizations were present, including crying, sobbing, or screaming. The mother’s response, or intervention, could include verbally responding, touching, nursing, bottle feeding, giving a pacifier, or taking care of the infant’s non-nutritive needs (e.g., changing diaper, changing clothes, covering with blankets,
burping, swaddling). Mother’s response time was calculated as the number of intervals between the time that infant became distressed and the maternal intervention. Each of these individual response times to infant distress across the 4-hour interval were averaged to calculate mothers’ average latency to respond. This number was then converted into seconds, with each interval equaling 30 seconds, which was retained as the final analysis variable.

**Still-Face Paradigm.** During the SFP, infants are observed with their mothers during three-episodes, each of which are 2 minutes long (Mesman et al., 2009). The first stage is a normal, or baseline, interaction episode between the mother and the infant. Caregivers are told to interact with their infant as they normally would. The next stage is a ‘still-face’ episode in which the mother is instructed to maintain an expressionless face while also being unresponsive to infant cues. The last episode is a reunion phase in which the mother resumes normal interaction with the infant. Although each episode is 2 minutes long, the still-face episode may be cut short if the infant cries hard for 15 seconds or more. Thus, due to the varied length of each SFP video, coded child behaviors were transformed into proportion scores for each episode.

Researchers coded each of the three episodes in 5-second intervals. For each interval, the presence of infant affective expressions, vocalizations, gaze, and self-regulatory behaviors were coded (see below). To achieve reliability, two research assistants trained with a master coder and met weekly to discuss discrepancies. Agreement was quantified using Cohen’s kappa, with coder reliability values all above .70.

**Affective expression.** For each of the three phases of the SFP, negative and positive affect were coded. Negative affect was coded as present if the infant displayed a negative expression, characterized by sharply lowered brows, tightly closed eyes, or downward turned corners of the mouth. Positive affect was coded as present if the infant displayed a positive expression,
characterized by raised corners of the mouth, raised cheeks, a wide mouth, a surprised expression, or a playful expression. If positive and negative facial expressions were present simultaneously (e.g., brows drawn together, but corners of mouth raised), negative affect was coded. If distinct positive and negative affective expressions were both present in the same interval, then the affect present for the majority of the interval was coded.

**Vocalizations.** Infant vocalizations were only coded if they were of a negative valence. A negative vocalization included fussing, crying, screaming, and other expressions of mild fussiness (e.g., frustrated grunt). Researchers did not code if vocalizations were not present or were not negative (i.e., neutral or positive). If infant non-negative vocalizations were matched with a negative affective expression or crying, then the interval was coded as negative. Researchers also coded negative valence if there was a mix of positive and negative vocalizations.

**Gaze.** Infant gaze was only coded if the infant was looking toward the mother, meaning that the infant was gazing above the mother’s neck. Toward mother was the default code; thus, if the direction of the infant’s gaze was ambiguous then towards caregiver was coded. Researchers also coded gaze toward mother if the infant was looking at the mother with squinted eyes (e.g., when crying) or if the infant gazed towards the mother but closed his or her eyes for some duration of the interval. If the infant was gazing away from the mother, meaning that infant was gazing below the mother’s neck, or if infant’s gaze was obscure, meaning the infant’s eyes or face was hidden, then nothing was coded. The infant was also considered to be gazing away from the mother if his or her eyes were closed for the whole interval, if he or she was not looking at the mother at all, or if he or she was looking down at the mother’s hands or clothing.
**Self-regulation.** Self-regulation was defined as any action an infant took to soothe him or herself or direct his or her attention away from stress or discomfort. As seen in Figure 1, self-regulatory behaviors could include deliberate behavior by the infant, such as sucking on a body part (e.g., thumb), sucking on an object (e.g., chair strap), auto-manipulation (e.g., tonguing, lip-smacking), and manual manipulation (e.g., hand wringing, playing with foot). Self-regulation was coded during the reunion episode if the infant used his or her mother for regulating (e.g., grabbing her hand or bringing her finger to his or her mouth); however, this was not coded during the still face episode because it is considered a breach of the still-face. When any of these behaviors appeared, no matter their length, self-regulation was coded. Behaviors such as banging, stroking, tapping, and patting were not coded unless they were seen at least two times during an interval, indicating a more purposeful response pattern. Finally, self-regulation was not coded if the infant had a toy or pacifier.

**Results**

**Analysis Plan**

In order to explore the differences between BS and SS infants as well as the differences between PBS and RBS infants, I will first compare demographic information (e.g., gender, maternal education, breastfeeding) across groups. Correlations between maternal response time, mother-infant contact, and SFP outcomes will also be run. Independent samples t-tests will be conducted to examine the association between infant sleep location and infant responses to the SFP, as well as the relationship between mother bed-sharing intent and infant responses to the SFP. Additionally, independent samples t-tests will be conducted to test group differences in nighttime mother-infant contact (close and casual) and maternal response time based off both infant sleep location and mother bed-sharing intent. Finally, regression analyses will be used to
determine whether mother-infant contact and maternal response time predict infant responses to the SFP.

All of the dyads had to complete at least one episode of the SFP in order to be included in this study. Although some missing data in SFP response variables is due to poor camera angles and camera malfunctions, the majority of the missing data resulted from the SFP terminating early due to infant distress. As a result, there are different sample sizes for each episode of the SFP (see Table 3).

**Descriptive Statistics**

Analyses were conducted to test group differences between BS infants \((n = 31)\) and SS infants \((n = 19)\). Similarly, group differences were tested between PBS infants \((n = 20)\) and RBS infants \((n = 11)\). Specifically, before testing my hypotheses, I tested for possible demographic differences between the groups (Table 1). There was a marginally significant difference between the BS infants and SS infants, such that BS infants were more likely to be breastfed, \(X^2 (1, N = 49) = 3.76, p = .052\). Although breastfeeding was trending towards significance, no group differences reached true statistical significance. As a result, I did not retain these variables as covariates in subsequent analyses.

Correlations among all study variables are presented in Table 2. There were no significant correlations between contact (either close or casual) and SFP outcomes. Maternal response time, however, was significantly correlated with multiple SFP outcomes, including negative affective expression \((r = .58, p = .004)\), negative vocalizations \((r = .68, p = .001)\), gaze towards mother \((r = -.51, p = .015)\), and self-regulation \((r = -.45, p = .034)\) during the reunion episode of the SFP.

**Hypothesis Testing**
Sleep location and SFP. For the first hypothesis, I examined group differences in SFP responses between SS and BS infants using an independent samples t-test (see Table 3). Results indicated that SS infants ($M = .62, SD = .39$) displayed significantly more negative affective expression during the reunion episode of the SFP than BS infants ($M = .33, SD = .36$); $t(42) = 2.49, p = .017$. Similarly, SS infants ($M = .55, SD = .43$) displayed significantly more negative vocalizations during the reunion episode of the SFP than BS infants ($M = .26, SD = .35$); $t(38) = 2.35, p = .024$. BS infants ($M = .61, SD = .29$), however, displayed significantly more self-regulatory behaviors during the still-face episode of the SFP than SS infants ($M = .44, SD = .26$); $t(48) = -2.06, p = .045$.

Bed-sharing intent and SFP. For my second hypothesis, I used an independent samples t-test to assess group differences in SFP responses between PBS and RBS infants (see Table 3). Results indicated that PBS infants ($M = .45, SD = .28$) displayed significantly more gaze towards mother during the still-face episode of the SFP than RBS infants ($M = .20, SD = .13$); $t(29) = -2.74, p = .002$.

Contact and maternal response time. Additional independent samples t-tests were conducted to examine the associations between mother-infant close contact and maternal response time and infant sleep location (see Table 4). First, I examined how close contact, casual contact, and maternal response time differed between BS infants and SS infants. An independent samples t-test indicated that BS infants ($M = .26, SD = .31$) were significantly more likely to have close contact with their mothers during the nighttime interval than SS infants ($M = .02, SD = .04$); $t(48) = -3.45, p = .000$. Similarly, BS infants ($M = .14, SD = .20$) were significantly more likely to have casual contact with their mothers during the nighttime interval than SS infants ($M = .01, SD = .01$); $t(48) = -2.84, p = .001$. Moreover, mothers of BS infants ($M = 30.0, SD = \ldots$)
36.06) responded to infant distress significantly faster during the nighttime interval, as compared to SS infants ($M = 92.87, SD = 65.25$); $t(7.4) = 2.42, p = .044$.

Similarly, I used an independent samples t-test to examine how close contact, casual contact, and maternal response time differed between PBS infants and RBS infants (see Table 4). Only casual contact yielded significant results, such that PBS infants ($M = .19, SD = .22$) were significantly more likely to have casual contact with their mothers during the nighttime interval than were RBS infants ($M = .05, SD = .09$); $t(29) = -2.0, p = .022$.

In a final set of tests, I investigated whether mother-infant close and casual contact as well as maternal response time predicted later mother-child relationship quality. As seen in Table 5, significant associations were found between multiple variables. A linear regression indicated that maternal response time significantly predicted negative affective expression during the reunion episode of the SFP ($\beta = 0.58, p = .004$). Another linear regression indicated that maternal response time significantly predicted negative vocalizations during the reunion episode of the SFP ($\beta = 0.85, p < .001$).

**Discussion**

This study examined the associations among infant sleep location and mother bed-sharing intent at 3 months and mother-child relationship quality at 6 months, as indexed by infant responses to the SFP. Previous studies indicate that during the SFP, less negativity, more positivity, more gaze towards mother, and more self-regulatory behaviors predict a more secure attachment (Braungart-Rieker et al., 2001; Cassidy, 1994; Cohn et al., 1991). Current analyses revealed that BS infants displayed significantly fewer negative affective expressions and negative vocalizations during the reunion episode of the SFP and more self-regulatory behaviors during the still-face episode of the SFP than SS infants. Additionally, PBS infants displayed
significantly more gaze towards mother during the still face episode of the SFP than RBS infants. Exploratory analyses indicated group differences in maternal response times based on infant sleep location and also indicated that maternal response times predict infant negative affective expression and negative vocalizations during the reunion episode of the SFP. Finally, exploratory analyses revealed group differences in close and casual contact based on infant sleep location; however, the analyses only indicated differences in casual contact based on mother bed-sharing intent. Interestingly, neither close contact nor casual contact predicted infant responses to the SFP.

**Infant Sleep Location and SFP Responses**

The current study hypothesized that infant sleep location would be associated with mother-child relationship quality, as indexed by infant responses during the SFP, with BS infants having a stronger relationship quality than SS infants. As expected, BS infants displayed less negativity and more self-regulation during the SFP than SS infants. The significant links between SS infants, negative affective expression, and negative vocalizations during the reunion episode of the SFP indicates that SS infants may not be as comforted by their mothers presence during the reunion episode, compared to BS infants. For instance, it is possible that BS infants are comforted by their mothers because they spend more time in close contact and receive faster maternal responses during the night (Baddock et al., 2006; Buckley et al., 2002; Feldman et al., 2003); thus, having the mother back after the still-face episode is soothing and may help calm the BS infants down. Similarly, it is possible that more negative infants are difficult to sleep near and, as a result, mothers choose to have these infants sleep in their own rooms because they are too noisy. Subsequently, SS infants may not receive as much comfort from the mother during the night.
Additionally, the association between sleep location and self-regulatory behaviors during the still-face episode indicates that children who share a bed with their mothers during the night are better at regulating their emotions during distressing situations. These infants are better able to help themselves when needed, which may be due to the greater amounts of contact and maternal responsiveness that these infants receive (Braungart-Rieker et al., 2001; Feldman, 2004). As less negativity and more self-regulation during the SFP has previously been shown to be associated with a stronger relationship quality (Braungart-Rieker et al., 2001; Cassidy, 1994; Cohn et al., 1991), these findings suggest that bed-sharing may promote the mother-child relationship.

The only other study to look at the relationship between infant sleep location and mother-child attachment found a relationship between solitary sleeping dyads and an insecure attachment; however, the study did not find any association between bed-sharing dyads and a secure attachment (Mileva-Seitz et al., 2015). Consistent with previous findings, the current study found that solitary sleeping was related to negative outcomes (e.g., more negativity); however, contrary to previous findings, bed-sharing was found to be related to positive outcomes (e.g., better self-regulation). The use of self-reported data in the previous study may have been a limitation because mothers can be biased or inaccurate at recalling what actually occurs during the night. Thus, categorizing infants as BS or SS based on observable data ensures that infants are placed in the correct group. Moreover, the current study assessed relationship quality at 6 months using the SFP, while the study done by Mileva-Seitz et al. (2015) assessed attachment at 15 months using the Strange Situation. These two variables have different definitions, and although relationship quality is a precursor to attachment, they are not necessarily the same.
thing. Thus, the discrepancies in study methods and outcome variables may account for the differing findings between the current study and previous literature.

**Mother Bed-Sharing Intent and SFP Responses**

The current study also hypothesized that mother bed-sharing intent would be associated with mother-child relationship quality, as indexed by infant responses during the SFP, with PBS infants having a stronger relationship quality than RBS infants. As expected, PBS infants displayed significantly more gaze towards mother during the SFP, which has been linked with a stronger relationship quality (Jamieson, 2004; Koulomzin et al., 2002; Koulomzin et al., 1993). Previous studies indicate that RBS mothers are unhappy with their sleeping arrangements and also perceive their infant’s behaviors to be significantly more problematic than PBS mothers (Ramos, 2003; Ramos et al., 2007). Thus, RBS mothers may be more likely to treat their infants in more negative and less sensitive ways in comparison to PBS mothers, which could affect infant responses to the SFP as well as mother-child relationship quality. In fact, previous studies indicate that parent’s sensitivity is associated with infants’ SFP responses, with infants exhibiting more gaze towards more sensitive mothers (Braungart-Rieker et al., 2001; Carter, Mayes, & Pajer, 1990; Koulomzin et al., 2002). Although this is one possible explanation for the link between bed-sharing intent and mother-child relationship quality, future research should explore parent sensitivity and responsiveness as a potential mediator driving this relationship. It is also important to note that there may be other explanations for this link. For example, it is possible that RBS mothers may engage in bed-sharing in response to a very negative infant who cries for her constantly. Infant negativity, or the effect that it has on the dyadic relationship, may be responsible for the differences in gaze that we saw in the SFP.

**Maternal Contact and Response Time**
Further, in order to investigate two possible mechanisms that could be driving the relationships found in this study, the current study hypothesized that there would be group differences in contact (close and casual) and maternal response time based on infant sleep location and mother bed-sharing intent. Specifically, I hypothesized that BS infants, particularly PBS infants, would have greater amounts of contact (close and casual) and faster maternal response times during the night. The first potential mechanism that this study investigated was mother-child contact during the night. Bed-sharing infants have been shown to spend a larger amount of time during the night in close physical contact than non-bed-sharing infants (Buckley et al., 2002). Similarly, bed-sharing infants experience more touch from their parents during the night than non-bed-sharing infants (Baddock et al., 2006). As expected, findings support previous research, such that BS infants had significantly more close and casual contact with their mothers during the night than SS infants, indicating that both close and casual contact may be fostered through bed-sharing.

Similarly, as hypothesized, PBS infants had significantly more casual contact with their mothers during the night than RBS infants, which reveals that casual contact may be promoted by engaging in proactive bed-sharing. Although there is a lack of literature examining the relationship between bed-sharing intent and contact, it is possible that PBS dyads have more casual contact, but not close contact, in comparison to RBS dyads because mothers that proactively bed-share maintain casual contact throughout the night. That being said, many PBS mothers may choose to set up a space on the bed for the infant to sleep that is near them, but also provides them with some space (i.e., casual contact). When infants become distressed during the night the PBS mothers may then engage in close contact in order to soothe and comfort the infant (Scher, 2001). RBS mothers, however, may generally only bring infants to bed with them when
the infants are distressed (Ramos, 2003). In order to calm these infants, the RBS mothers are less likely to engage in casual contact and more likely to engage in close contact. Thus, it is possible that PBS and RBS mothers engage in fairly equal amounts of close contact, which generally occurs when the infant is distressed (Scher, 2001). PBS mothers, however, likely engage in more casual contact than RBS mothers because they maintain this contact when the infants are non-distressed.

Furthermore, maternal response time is another mechanism that the current study explored. Researchers expected there to be group differences in maternal response time based on infant sleep location and mother-bed-sharing intent. Previous literature found that BS infants experience faster maternal responses and more maternal touch and attention, suggesting that bed-sharing may be associated with faster and more consistent responses (Baddock et al., 2006). Indeed, results indicated that BS infants had mothers with significantly faster response times than mothers of SS infants. This finding indicates that bed-sharing may promote faster mother response times. However, no group differences in maternal response time were found based on mother bed-sharing intent. Inherently, PBS mothers should respond quickly because the infant is always sleeping in the same bed with them. In regard to RBS mothers, it is likely that these mothers expect infants to become distressed, and as a result, they are ready to quickly attend to their infant’s needs. Similarly, an RBS mother may choose to keep her infant in her room on an easily accessible but separate sleep surface (e.g., attached crib, bedside crib) so that she is able to quickly attend to her infant when he or she becomes distressed. This could explain the lack of group differences in maternal response time based on mother bed-sharing intent.

Finally, the current study hypothesized that contact and maternal response time would predict infant responses to the SFP, with greater contact and faster maternal response times
predicting less negativity, more positivity, more gazes towards mother, and more self-regulatory behaviors during the SFP. Engaging in a large degree of contact during the night at this young age is believed to provide emotional and physical comfort to the infant (Germo et al., 2007; McKenna & Volpe, 2007), which appears to then foster the development of a strong relationship quality (Feldman, 2004; Feldman et al., 2003). Contrary to previous findings, the amount of contact (both close and casual) during the night was not predictive of infant SFP responses; thus, it does not seem as though contact during the night promotes a stronger relationship quality.

Additionally, responding quickly to infant distress provides the infant with consistent comfort and allows the infant to trust the mother, which ultimately fosters the development of a secure attachment (Ainsworth et al., 1978; Higley & Dozier, 2009; McElwain & Booth-LaForce, 2006; Raval et al., 2001). As expected, results indicated that mother response time predicted infant’s responses to the SFP, such that slower response times were associated with more displays of negative affective expressions and negative vocalizations during the reunion episode of the SFP. These findings suggest that mother response time may be one factor that promotes a stronger relationship quality between mother and child.

Overall, although there were group differences in close and casual contact based on infant sleep location and group differences in casual contact based on mother bed-sharing intent, neither close nor casual contact predicted infants’ responses to the SFP. These findings indicate that close contact and casual contact do not seem to be driving the relationship between infant sleep location and mother-child relationship quality or the association between mother bed-sharing intent and mother-child relationship quality. Similarly, there were no group differences in maternal response time based on mother bed-sharing intent; thus, although maternal response time predicted infant responses to the SFP, it does not appear to be a mechanism driving the
relationship between mother bed-sharing intent and mother-child relationship quality. However, maternal response time may be a factor that influences the relationship between infant sleep location and mother-child relationship quality. Not only were there group differences in maternal response time based on infant sleep location, but maternal response time also predicted infant responses to the SFP. Specifically, maternal response time predicted infant negative affective expressions and negative vocalizations during the reunion episode of the SFP, which are two of the same outcome variables that are significantly related to infant sleep location. Thus, it appears as though bed-sharing leads to different patterns in maternal response times, which then leads to changes in relationship quality. Unfortunately, the current sample size is too small to conduct a full mediation analysis, but these preliminary findings seem to indicate that mother response time may be a factor driving the relationship between infant sleep location and mother-child relationship quality. Future studies should utilize a larger sample size to further investigate both mother-infant contact and maternal response time in order to determine their functions within these relationships.

Limitations and Future Directions

Although the current study included 50 mother-infant dyads, the power to detect significant results was still limited by the small sample size. Also, all participants were African American and from the Triangle area of North Carolina, which limits generalizability. However, studies have found that bed-sharing is much more common among the African American population than any other race (Colson et al., 2013). Thus, using an African American sample in this study may have also had some benefits because it allowed for the examination of outcomes related to bed-sharing and provided more information on African American sleep practices. Further, the current study used the SFP as an indicator of relationship quality; however, the SFP
does not directly measure relationship quality or indicate a specific attachment security.

Similarly, protocol required that research assistants stopped filming the SFP if the infant cried hard for more than 15 seconds. As a result, the current study had some missing data, especially during the reunion episode of the SFP. Finally, although I have measurements at 3 and 6 months of age, this study only focuses on associations across time and does not determine causality; thus, it is unclear whether mothers and infants with a stronger relationship quality choose to bed-share or if bed-sharing actually promotes relationship quality.

Future studies should extend upon the current findings by using larger sample sizes with greater diversity, especially in race, to test the generalizability of these findings. Additionally, no studies to date have examined bed-sharing as a continuous variable rather than a dichotomous one to see if the frequency of bed-sharing is associated with later mother-child relationship quality. Thus, it would be informative to look at the proportion of time spent bed-sharing during a typical night. Additionally, although relationship quality is a precursor, and possibly even a proxy to attachment, they are different concepts. Future studies should use the Strange Situation to directly measure mother-child attachment at 12 months, as this is the earliest age at which the Strange Situation can be used to assess attachment security. Finally, the use of larger sample sizes will allow researchers to use a full mediation model to test whether close contact, casual contact, and mother response time may fully or partially mediate the relationship between infant sleep location and mother-child relationship quality, as well as the relationship between bed-sharing intent and mother-child relationship quality.

In summary, this study provides valuable knowledge that may help mothers make informed decisions about infant sleep locations and the way in which this may contribute to their developing relationship.
References


### Table 1

*Descriptive statistics by sleep location and bed-sharing intent*

<table>
<thead>
<tr>
<th>Infants Demographic Variables</th>
<th>Total Sample (N = 50)</th>
<th>BS (N = 31)</th>
<th>SS (N = 19)</th>
<th>PBS (N = 20)</th>
<th>RBS (N = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.54 ± 0.50</td>
<td>0.55 ± 0.51</td>
<td>0.53 ± 0.51</td>
<td>0.55 ± 0.51</td>
<td>0.55 ± 0.52</td>
</tr>
<tr>
<td>Full-term</td>
<td>0.9 ± 0.30</td>
<td>0.9 ± 0.3</td>
<td>0.89 ± 0.32</td>
<td>0.85 ± 0.37</td>
<td>1 ± 0</td>
</tr>
<tr>
<td>Breastfed</td>
<td>0.49 ± 0.51</td>
<td>0.6* ± 0.5</td>
<td>0.32 ± 0.48</td>
<td>0.53 ± 0.51</td>
<td>0.73 ± 0.47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parent Demographic Variables</th>
<th>Age</th>
<th>Income</th>
<th>Married</th>
<th>Biological Father in Home</th>
<th>Employed</th>
<th>High School Degree</th>
<th>4 Year College Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>30.14 ± 6.36</td>
<td>479 ± 470</td>
<td>0.48 ± 0.51</td>
<td>0.63 ± 0.49</td>
<td>0.71 ± 0.46</td>
<td>0.98 ± 0.14</td>
<td>0.39 ± 0.49</td>
</tr>
<tr>
<td>Income</td>
<td>54,947 ± 4,750</td>
<td>46,413 ± 33,495</td>
<td>0.47 ± 0.51</td>
<td>0.58 ± 0.5</td>
<td>0.76 ± 0.44</td>
<td>0.97 ± 0.18</td>
<td>0.35 ± 0.49</td>
</tr>
<tr>
<td>Married</td>
<td>0.5 ± 0.52</td>
<td>0.73 ± 0.46</td>
<td>0.6 ± 0.5</td>
<td>0.63 ± 0.5</td>
<td>0.63 ± 0.5</td>
<td>1 ± 0</td>
<td>0.44 ± 0.51</td>
</tr>
<tr>
<td>Biological father in home</td>
<td>0.47 ± 0.5</td>
<td>0.5 ± 0.5</td>
<td>0.55 ± 0.52</td>
<td>0.72 ± 0.46</td>
<td>0.95 ± 0.22</td>
<td>1 ± 0</td>
<td>0.3 ± 0.47</td>
</tr>
<tr>
<td>Employed</td>
<td>0.46 ± 0.5</td>
<td>0.5 ± 0.5</td>
<td>0.55 ± 0.52</td>
<td>0.82 ± 0.4</td>
<td>0.95 ± 0.22</td>
<td>1 ± 0</td>
<td>0.45 ± 0.52</td>
</tr>
<tr>
<td>High school degree</td>
<td>0.14 ± 0.14</td>
<td>0.18 ± 0.18</td>
<td>1 ± 0</td>
<td>0.3 ± 0.47</td>
<td>0.95 ± 0.22</td>
<td>1 ± 0</td>
<td>0.45 ± 0.52</td>
</tr>
<tr>
<td>4 Year college degree</td>
<td>0.49 ± 0.49</td>
<td>0.49 ± 0.49</td>
<td>0.51 ± 0.51</td>
<td>0.47 ± 0.47</td>
<td>0.95 ± 0.22</td>
<td>1 ± 0</td>
<td>0.45 ± 0.52</td>
</tr>
</tbody>
</table>

*Note. All means and standard deviations are given in percentages except for age and income.*

*p<.10, **p<0.05, ***p<0.01, ****p<0.001*
### Table 2

**Correlations Between Sleep Variables, Maternal Response Time, Mother-Infant Contact, and SFP Outcomes**

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infant sleep location (BS = 1)</td>
<td>-</td>
<td>-</td>
<td>-0.53**</td>
<td>0.45**</td>
<td>0.38**</td>
<td>-0.22</td>
<td>-0.1</td>
<td>-0.02</td>
<td>-0.19</td>
<td>0.29*</td>
<td>-0.36*</td>
<td>0.1</td>
<td>0.15</td>
<td>-0.36*</td>
<td>0.1</td>
</tr>
<tr>
<td>2. Mother bed-sharing intent (PBS = 1)</td>
<td>-</td>
<td>-</td>
<td>-0.24</td>
<td>-0.07</td>
<td>0.34</td>
<td>0.25</td>
<td>0.09</td>
<td>0.45*</td>
<td>0.22</td>
<td>0.02</td>
<td>0.15</td>
<td>0.08</td>
<td>-0.1</td>
<td>0.17</td>
<td>-0.19</td>
</tr>
<tr>
<td>3. Maternal response time</td>
<td>-</td>
<td>-</td>
<td>-0.32</td>
<td>-0.32</td>
<td>0.17</td>
<td>-0.28</td>
<td>0.1</td>
<td>0.29</td>
<td>-0.2</td>
<td>.58**</td>
<td>-0.39</td>
<td>-0.51*</td>
<td>.68**</td>
<td>-0.45*</td>
<td></td>
</tr>
<tr>
<td>4. Close contact</td>
<td>-</td>
<td>-</td>
<td>-0.002</td>
<td>-0.11</td>
<td>0.08</td>
<td>-0.04</td>
<td>-0.07</td>
<td>0.19</td>
<td>-0.15</td>
<td>0.1</td>
<td>-0.11</td>
<td>-0.18</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Casual contact</td>
<td>-</td>
<td>-</td>
<td>0.21</td>
<td>-0.004</td>
<td>-0.02</td>
<td>0.14</td>
<td>0.07</td>
<td>0.08</td>
<td>-0.07</td>
<td>0.07</td>
<td>0.004</td>
<td>-0.06</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. Negative affect (SF)</td>
<td>-</td>
<td>-</td>
<td>-0.35*</td>
<td>-0.04</td>
<td>.87**</td>
<td>-0.34*</td>
<td>.65**</td>
<td>-0.36*</td>
<td>0.05</td>
<td>.53**</td>
<td>-0.32*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Positive affect (SF)</td>
<td>-</td>
<td>-</td>
<td>0.19</td>
<td>-0.3*</td>
<td>-0.08</td>
<td>-0.51**</td>
<td>.49**</td>
<td>0.13</td>
<td>-0.43**</td>
<td>0.1</td>
<td></td>
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<tr>
<td>8 Gaze towards mother (SF)</td>
<td>-</td>
<td>-</td>
<td>0.03</td>
<td>0.02</td>
<td>-0.17</td>
<td>0.12</td>
<td>0.25</td>
<td>-0.09</td>
<td>0.22</td>
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<td>9. Negative vocalizations (SF)</td>
<td>-</td>
<td>-</td>
<td>-0.48**</td>
<td>0.7**</td>
<td>-0.43**</td>
<td>-0.03</td>
<td>.66**</td>
<td>-0.45**</td>
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<td>10. Self-regulation (SF)</td>
<td>-</td>
<td>-</td>
<td>-0.24</td>
<td>-0.06</td>
<td>-0.03</td>
<td>-0.25</td>
<td>0.42**</td>
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<tr>
<td>11. Negative affect (R)</td>
<td>-</td>
<td>-</td>
<td>-0.61**</td>
<td>-0.38*</td>
<td>0.93**</td>
<td>-0.31*</td>
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<tr>
<td>12. Positive affect (R)</td>
<td>-</td>
<td>-</td>
<td>0.21</td>
<td>-0.52**</td>
<td>0.2</td>
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</tr>
<tr>
<td>13. Gaze towards mother (R)</td>
<td>-</td>
<td>-</td>
<td>-0.53**</td>
<td>0.31</td>
<td></td>
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<tr>
<td>14. Negative vocalizations (R)</td>
<td>-</td>
<td>-</td>
<td>-0.3*</td>
<td></td>
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</tr>
<tr>
<td>15. Self-regulation (R)</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>

*Note.* All values are continuous except for infant sleep location and mother bed-sharing intent, which were transformed into zeros and ones.

BS = bed-sharing, PBS = proactive bed-sharing, SF = still-face episode, R = reunion episode.

**Correlation is significant at the 0.01 level. *Correlation is significant at the 0.05 level.
Table 3
Means and standard deviations of SFP responses by sleep location and bed-sharing intent

<table>
<thead>
<tr>
<th></th>
<th>Total sample (N = 50)</th>
<th>BS (N = 31)</th>
<th>SS (N = 19)</th>
<th>PBS (N = 20)</th>
<th>RBS (N = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Still face episode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative affect</td>
<td>0.5</td>
<td>0.4</td>
<td>0.43</td>
<td>0.41</td>
<td>0.61</td>
</tr>
<tr>
<td>Positive affect</td>
<td>0.05</td>
<td>0.09</td>
<td>0.05</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Gaze towards mother</td>
<td>0.37</td>
<td>0.28</td>
<td>0.36</td>
<td>0.27</td>
<td>0.37</td>
</tr>
<tr>
<td>Negative vocalization</td>
<td>0.42</td>
<td>0.41</td>
<td>0.36</td>
<td>0.41</td>
<td>0.51</td>
</tr>
<tr>
<td>Self-regulation</td>
<td>0.55</td>
<td>0.29</td>
<td>0.61*</td>
<td>0.29</td>
<td>0.44</td>
</tr>
<tr>
<td>Reunion episode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative affect</td>
<td>0.44</td>
<td>0.39</td>
<td>0.33</td>
<td>0.36</td>
<td>0.62*</td>
</tr>
<tr>
<td>Positive affect</td>
<td>0.16</td>
<td>0.26</td>
<td>0.18</td>
<td>0.29</td>
<td>0.13</td>
</tr>
<tr>
<td>Gaze towards mother</td>
<td>0.55</td>
<td>0.28</td>
<td>0.58</td>
<td>0.24</td>
<td>0.5</td>
</tr>
<tr>
<td>Negative vocalization</td>
<td>0.37</td>
<td>0.4</td>
<td>0.26</td>
<td>0.35</td>
<td>0.55*</td>
</tr>
<tr>
<td>Self-regulation</td>
<td>0.31</td>
<td>0.32</td>
<td>0.34</td>
<td>0.32</td>
<td>0.26</td>
</tr>
</tbody>
</table>

*Note. All means and standard deviations are given in percentages. Numbers in parentheses indicate the N for each episode. *p<0.05, **p<0.01, ***p<0.001
### Table 4
**Means and standard deviations of mother-infant contact and mother response times by sleep location and bed-sharing intent**

<table>
<thead>
<tr>
<th></th>
<th>Total sample (N = 50)</th>
<th>BS (N = 31)</th>
<th>SS (N = 19)</th>
<th>PBS (N= 20)</th>
<th>RBS (N = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Mother-infant close contact</td>
<td>0.17</td>
<td>0.27</td>
<td>0.26***</td>
<td>0.31</td>
<td>0.02</td>
</tr>
<tr>
<td>Mother-infant casual contact</td>
<td>0.09</td>
<td>0.17</td>
<td>0.14**</td>
<td>0.2</td>
<td>0.01</td>
</tr>
<tr>
<td>Mother response time</td>
<td>46.93</td>
<td>52.6</td>
<td>30.0*</td>
<td>30.06</td>
<td>92.87</td>
</tr>
</tbody>
</table>

*Note. All means and standard deviations are given in percentages. Mother response time is given in seconds.*

*p<0.05, **p<0.01, ***p<0.001*
Table 5

Linear Regression Analyses for Mother-Infant Contact and Maternal Response Time Predicting Infant SFP Responses

<table>
<thead>
<tr>
<th></th>
<th>Negative Affective Expression (R)</th>
<th></th>
<th>Negative Vocalization (R)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>R²</td>
<td>β</td>
<td></td>
</tr>
<tr>
<td>Close contact</td>
<td>0.93</td>
<td>0.02</td>
<td>-0.15</td>
<td></td>
</tr>
<tr>
<td>Casual contact</td>
<td>0.26</td>
<td>0.01</td>
<td>0.08</td>
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<tr>
<td>Response time</td>
<td>10.68</td>
<td>0.34</td>
<td>0.58***</td>
<td></td>
</tr>
</tbody>
</table>

Note. R = reunion episode.
*p<0.05, **p<0.01, ***p<0.001
This section should summarize and interpret the main findings, connect the findings to

**Examples of Regulatory Strategies**

**Child Movements**

- Sucking thumb
- Stroking self
- Rhythmic rocking body (not struggling)
- Self-clasp (holding hands together tightly)
- Controlled rhythmic movements of arms (i.e., tapping arm rests, tapping their own body)
- Rhythmic moving of head
- Hair twirling or touching
- Holding feet
- Fidgeting or touching an article of clothing (button, zipper, etc.)
- Car seat engagement: touching, stroking, patting, sucking, chewing the seat, arm rest, or buckle.