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Infant Sleeping Arrangements, Social Criticism, and Maternal Distress in the First Year

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Abstract

The present study examined differences in social criticism and maternal distress and in household, maternal, and infant characteristics between families who co-slept with their infants beyond 6 months and those who moved their infants to a separate room by 6 months. Data for infant sleeping arrangements, preferences for their sleeping arrangement choices, criticism, depressive and anxiety symptoms, and worries about infant sleep were collected from 103 European American mothers during the infant's first year. Mothers who co-slept with their infants beyond 6 months (persistent co-sleepers) were more likely than mothers who moved their infants to solitary sleep by 6 months to receive criticism and report depression and worry about infants' sleep behavior, even after controlling for preference for the sleep arrangement they used. Interestingly, criticism was associated with maternal depression and worries only for persistent co-sleeping mothers. Further, these mothers had lower income, reported greater space constraints, were younger, single, or unemployed, less likely to have a Bachelor's degree, and more likely to have infants with greater negative affectivity or problematic night waking, compared to mothers of solitary sleeping infants. Adherence to cultural norms regarding infant sleeping arrangements may be a strong predictor of social criticism and maternal well-being.

Keywords

infant sleeping arrangements; social criticism; maternal distress; American cultural norms

Sleep problems, typically identified as difficulty settling to sleep and frequent night waking, are common in young children, with prevalence estimates of 25% children across the world (Owens, 2004; Kohyama, Mindell, & Sadeh, 2011). Past research indicates that sleeping arrangements are one of the strong predictive factors for young children's sleep problems. For example, co-sleeping was shown to be associated with persistent child night waking and bedtime struggles (Mao, Burnham, Goodlin-Jones, Gaylor, & Anders, 2004; Sadeh, Mindell, Luedtke, & Wiegand, 2009; Volkovich, Ben-Zion, Karny, Meiri, & Tikotzky, 2015) and infants' poor sleep quality (Sadeh et al., 2009; Touchette et al., 2005), as reported by mothers. As a corollary, co-sleeping children's elevated sleep problems may affect parents'

well-being. Shared sleep was found to be associated with heightened maternal distress (Counterline & Teti, 2010; Teti et al., 2015), although the direction of this association is unclear (Mileva-Seitz, Bakermans-Kranenburg, Battaini, & Luijk, 2017).

The associations between sleeping arrangements, child sleep, and parents' distress is complex. Sadeh and Anders (1993) proposed a transactional model of child sleep that emphasizes the dynamic linkages between distal socio-cultural factors, proximal parental factors, and child outcomes in sleep contexts. This model suggests that cultural norms shape parental expectations regarding infant sleep, which in turn influence parenting practices. That is, cultural norms sculpt parental perceptions of what are appropriate parenting practices for infant sleep. This model, however, does not specify whether parental decisions to structure infant sleep that are contrary to cultural norms place parents at risk for distress. Indeed, heightened distress may be the result of frequent feedback from others that what parents are doing is inappropriate for the infant. The associations between sleeping arrangements, children's sleep problems, and maternal depression have been intensively investigated (See comprehensive review by Mileva-Seitz et al., 2017), yet the linkages between cultural norms, social criticism, and maternal distress have been understudied.

Choosing a sleeping arrangement for one's infant is a controversial topic (e.g., AAP Task Force on Sudden Infant Death Syndrome, 2016; McKenna, Ball, & Gettler, 2007). These decisions appear to be culture-bound, ranging from having infants sleep in a separate room from parents (solitary sleep), typical in the U.S. and other Western cultures, to sleeping in the same room or bed as the parents' (co-sleeping), more typical in non-Western cultures (Mileva-Seitz et al., 2017; Mindell, Sadeh, Kohyama, & How, 2010). Although co-sleeping is a widespread parenting practice across the world (Barry & Paxson, 1971; McKenna, 1986), most American parents refrain from co-sleeping practice beyond 6 months of infant age, moving their infants to solitary sleep by 6 months (Hauck, Signore, Fein, & Raju, 2008; McCoy et al., 2004; Morelli, Rogoff, Oppenheim, & Goldsmith, 1992; Teti, Shimizu, Crosby, & Kim, 2016). Although the percentage of U.S. families who engaged in bed-sharing has grown in the past decade (Colson et al., 2013), perhaps in response to increased emphasis on the merits of breastfeeding (Wright & Schanler, 2001) and the popularity of attachment parenting (Sears & Sears, 2001), solitary infant sleep still appears to be the cultural norm in the U.S. (Hauck et al., 2008; Teti et al., 2016). A recent nationwide longitudinal study of 2,000 U.S. families demonstrated that the majority of the American infants co-slept with their parents between 1 (81.1%) and 3 months (63.0%), but infants in solitary sleep outnumbered co-sleeping infants by 6 months (55.0% solitary sleeping) and dramatically increased further between 6 and 12 months (to 71.4%) (Hauck et al., 2008).

Worthman (2011) adapted Quinn and Holland's cultural models (1987) and discussed cultural models of sleep, which explain how cultural cognitive frameworks shape parental behaviors and attain "moral force." This model suggests that culture is organized by culturally-specific cognitive scripts, which structure schemas for appropriate parenting, and that sleep settings and parental behaviors are grounded in these parenting schemas. The American cultural model of sleep is characterized as providing a safe environment for sleep along with the development of independence (Worthman, 2011). A protected space and independence learning are believed to be required for physical and psychosocial growth of

infants (Worthman, 2011). Thus, the American cognitive script for protection emphasizes solitary, quiet, and separate spaces for sleep, and minimization of external stimuli that disrupt sleep. This cognitive script shapes the parenting schemas of providing adequate protected sleep in a separate sleep setting by minimizing stimuli and disturbance. Another American cognitive script, fostering independence, shapes the parenting schemas for promoting the development of infant self-soothing skills.

Such cultural scripts and parenting schemas are evident in recommendations by pediatric health professionals. Parents are encouraged to have an infant sleep alone without the presence of adults and to avoid interventions to soothe a baby (Brazelton & Sparrow, 2003; Spock & Needlman, 2011). For example, Spock and Needlman (2011) state in their book:

[...] If your child starts out sleeping in your room, two or three months is a good age to move her to her own, if she's sleeping through the night. By six months, a child who regularly sleeps in her parents' room may feel uneasy sleeping anywhere else. After that, it's harder to move a child to her own room, although never impossible. (p.62).

Moreover, the majority of American pediatric health professionals emphasize that sleeping alone is the best way for children to promote independence (infants' ability to get back to sleep on their own after night waking), with 72% of popular American parenting advice books not endorsing co-sleeping (Ramos & Youngclarke, 2006).

The American cultural model of sleep indicates that cultural scripts and schemas for appropriate parenting are internalized and attain moral force, such that one comes to believe that adhering to culturally supported scripts is the right thing to do (Worthman, 2011). For example, parents in Guatemala and Japan, where co-sleeping is normative, criticize infant solitary sleep arrangements, expressing shock and disapproval (Brazelton, 1990; Morelli et al. 1992) at the parents who practice it. Further, a low degree of correspondence between one's behaviors and cultural norms is associated with high blood pressure and distress (Dressler & Bindon, 2000; Dressler, Balieiro, Ribeiro, & Dos Santos, 2007). Thus, we expected that the majority of American parents would move their infants to a separate room by 6 months of age because such a choice would be consistent with American cultural prescriptions, and that parents who do not follow cultural norms would experience heightened distress, perhaps in reaction to increased social pressure to conform to cultural expectations.

Past research suggests that two subtypes of co-sleeping exist in the U.S.: parents who do not prefer co-sleeping but use this arrangement in reaction to the child's sleep problems (reactive co-sleeping) and those who prefer co-sleeping because of the beliefs that maintaining close infant-parent contact facilitates easier feeds and promotes parent-infant bonding (proactive co-sleeping). Keller and Goldberg (2004) and Ramos and her colleague (2007) found that both proactive co-sleeping and solitary sleeping parents view their child's sleep disruptions as less problematic than reactive co-sleeping parents. This suggests that mothers' preferences for their choice of sleep arrangement may alleviate their distress. Thus, in the present study, the degree to which mothers prefer their sleep arrangement choice was statistically controlled.

The purpose of the present study is to examine the linkages between infant sleeping arrangements, social criticism, and maternal well-being in a European American sample. We hypothesized that (1) consistent with earlier work (e.g., Hauck et al., 2008), the majority of infants would sleep in a separate room by 6 months of age, (2) controlling for preferences for infant sleep arrangement choices, mothers who co-slept with their infants beyond 6 months would be more likely to (2a) report higher amounts of social criticism about their choice of sleep arrangement, and (2b) report higher levels of maternal distress (depression, anxiety, and worries about infant nocturnal needs) than mothers who moved their infants to solitary sleep by 6 months; and (3) social criticism would be associated with maternal distress only for the mothers who used co-sleeping beyond 6 months, but not for the mothers who moved their infants to solitary sleep by 6 months. Lastly, because past work reported that co-sleep is associated with household characteristics (low income, space constraints, larger family size) (Jenni & O'Connor, 2005; Luijck et al., 2013), maternal characteristics (younger maternal age, low maternal education, single parenthood, first-time mothers, employment) (Goyal, Gay, & Lee, 2007; Goldberg & Keller, 2007; Hauck et al., 2008; McCoy et al., 2004), and child characteristics (temperament, mother-reported night waking) (Luijck et al., 2013; Teti et al., 2016), we will examine differences in these three characteristics between the two sleep arrangement groups.

Method

Participants

Data were drawn from a longitudinal study of parenting and infant sleep across the infants' first two years of life (SIESTA: Study of Infants' Emergent Sleep Trajectories) (R01 HD052809). A coordinator recruited the mothers in local hospitals in central Pennsylvania within 2 days after delivery. Mothers were home-visited and asked to complete a variety of questionnaires pertaining to demographic information, infant sleeping arrangements, preferences for infant sleeping arrangements, and levels of social criticism and maternal distress at 1, 3, 6, 9, 12, 18, and 24 months of infant age. We utilized complete data obtained up to 12 months from 121 mothers. The sample consisted of European American (85%), African American (4%), Asian American (3%), Latino (5%), or other ethnicity (3%), but because small numbers of underrepresented ethnic subgroups result in noise that is difficult to control statistically (Bornstein, Jager, & Putnick, 2013), the present study used only European American families' data ($N = 103$). Their sociodemographic information is presented in Table 3.

Measures

General maternal distress: depressive and anxiety symptoms—The severity of maternal depressive and anxiety symptoms was assessed using the depression and anxiety subscales of the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1999). The depression subscale contained 13 items (e.g., "Blaming yourself for things"), rated on a 5-point scale (0 "Not At All" to 4 "Extremely"). The total score was computed by summing the score on each item, ranging from 0 to 52 ($\alpha = .89$ to $.90$, across the five time points). The anxiety subscale contained 10 items (e.g., "the feeling that something bad is going to happen to you") with a 5-point scale (0 "Not At All" to 4 "Extremely"). The total score was

computed by summing the score on each item, ranging from 0 to 40 ($\alpha = .77$ to $.91$, across the five time points).

Maternal worries specific to infant sleep—In light of our focus on infant sleep contexts, a separate measure of maternal worries about infant night needs was extracted from the Maternal Cognition about Infant Sleep Questionnaire (MCIS: Morrell, 1999). The MCIS contained 20 items asking about mothers' thoughts and feelings when they faced with an infant experiencing sleep difficulties. Of 20 items, a 9 item subscale was used, which assessed a mother's worries about her infant's physical and emotional needs (e.g., "My child will feel abandoned if I don't respond immediately to his/her cries at night"), rated on a 6-point scale (0 "*strongly agree*" to 6 "*strongly disagree*") (See Teti & Crosby, 2012). The total score was computed by summing the score on each item, ranging from 0 to 45 ($\alpha = .79$ to $.85$, across the five time points).

Sleeping arrangements, social criticism, and maternal preference for infant sleeping arrangement—Individual, stand-alone items from the Sleep Practice Questionnaire (SPQ: Keller & Goldberg, 2004) were adapted for this study. This questionnaire contained 62 items asking about infant sleeping arrangements and feelings on their sleeping arrangement choices. The single SPQ item asking an infant's sleeping location, "*Where does your baby usually sleep at night?*," was utilized to determine the infant sleeping arrangement that participants used at 1, 3, 6, 9, and 12 months of age. Data were aggregated across all five age points to create five sleeping arrangement categories across the first year: Consistent Solitary Sleep (CS: an infant slept in a separate room all night from 1 through 12 months, $n = 29$), Early Transit (ET: switched to solitary sleep arrangement by 3 or 6 months, $n = 50$), Late Transit (LT: switched to solitary sleep arrangement by 9 or 12 months, $n = 11$), Consistent Co-Sleeping (CC: room sharing [an infant and parents slept in the same room, but not in the same bed], bed-sharing [an infant and parents slept in the same bed], part-night room-sharing, or part-night bed-sharing from 1 through 12 months, $n = 13$), and Inconsistent (I: infant sleep arrangement patterns were not consistent from 1 through 12 months, $n = 19$). Because the Inconsistent group does not have clear patterns of infant sleeping arrangements, which may create biased results, this group was dropped from the analyses. This resulted in a final sample of 103 mothers. These sleep arrangement patterns, which were obtained from maternal report, were corroborated by videotaped assessments of infant nighttime sleep behavior. Infants in solitary sleep by 6 months or earlier spent more time at night in their own rooms than infants who co-slept with parents beyond 6 months, $F(1, 100) = 274.93$, $p < .0001$. A comparison between ET and LT groups revealed that infants in the ET group spent more time at night in their own room than infants in the LT group, $F(1, 58) = 88.24$, $p < .0001$. Further, consistent with mothers' reports, time spent in the infants' own room at night for infants in the ET group sharply increased at 6 months and leveled off thereafter, whereas time spent in the infants' own room at night for infants in the LT group linearly increased until 9 months and sharply increased at 12 months, $F(1, 58) = 54.06$, $p < .0001$ (quadratic trend for both groups). The CS and ET groups were combined into a solitary sleeping by 6 months group, and the LT and CC groups were combined into a co-sleeping beyond 6 months group.

One SPQ item was used to tap into the degree to which mothers felt criticized for their choice of sleep arrangement: “*Overall, to what extent do you feel criticized by others about your baby’s sleep location?*” This item obtained information about the amount of criticism received from different individuals in the parent’s social network such as partner, friends, the parent’s mother, mother-in-law, siblings, and partner’s siblings. Each subscale was rated on a 5-point scale (1 “*not at all criticized*” to 5 “*definitely criticized*”). Because the extent to which a mother experiences distress may depend on the source of this criticism, we examined the mean differences in the levels of criticism from a partner and from others excluding a partner between mothers who co-slept with their infants beyond 6 months and those who moved their infants to solitary sleep by 6 months, and compared the effect sizes (Cohen’s *d*). Results revealed that the differences in the effect sizes for criticism from a partner and for criticism from others were small at all time points ($d = 0.00$ to 0.11). Thus, the scores on criticism from a partner and from others excluding a partner were summed to create a total perceived criticism score at 1, 3, 6, 9, and 12 months.

A SPQ item asking, “*Is your baby’s current sleep location the place that you most prefer for him/her to sleep?*” was utilized to determine mothers’ preference for the infant sleep arrangement they are using at each time point. This item was rated on a 3-point scale (1 “*No, not my preference*,” 2 “*Yes, to some extent my preference*,” and 3 “*Yes, definitely my preference*”).

Infant temperament—The Infant Behavior Questionnaire–Revised (IBQ-R; Gartstein & Rothbart, 2003) was utilized to measure infant temperament. Parents rated 191 item on a scale of 0 (“*Do not apply*”) to 7 (“*Always*”) at 3, 6, 9, and 12 months of infant age. Three subfactors of Surgency/Extraversion (SE: approach, vocal reactivity, high intensity pleasure, smiling and laughter, activity level, and perceptual sensitivity), Negative Affectivity (NA: sadness, distress to limitations, fear, and falling reactivity), and Orienting/Regulation (OR: low intensity pleasure, cuddliness, duration of orienting, and soothability) were obtained (see Gartstein & Rothbart, 2003). Inter-item reliability (Cronbach’s alpha) was adequate, $.80 < \alpha_s$ (SE) $< .83$, $.61 < \alpha_s$ (NA) $< .68$, and $.60 < \alpha_s$ (OR) $< .68$. Because cross-time correlational analyses revealed that infant temperament was stable from 3 to 12 months (SE: $.74 < r_s < .77$, NA: $.57 < r_s < .70$, OR: $.59 < r_s < .72$, $p_s < .05$), corresponding subfactor scores at each time point were summed for each infant to create a total infant temperament score for each subfactor (SE, NA, and OR).

Problematic infant night waking—A SPQ item asking, “*How much of a problem for you are your baby’s night wakings?*” was utilized to determine the degree to which mothers perceived their infants’ night waking as problematic (1 “*Not at all*” to 5 “*Definitely*”). Because cross-time correlational analyses revealed that mothers’ perceptions of their infants’ problematic night wakings were stable across time ($.49 < r_s < .67$, $p_s < .05$), these scores were summed across all time points to create a total score for each infant.

Statistical Analysis

To analyze the longitudinal data, a covariance pattern model was performed using PROC MIXED in SAS 9.3. The covariance pattern model, which is an extension of a repeated

measures ANOVA, was selected because, unlike the standard repeated measures ANOVA, it adjusts for missing values in the data and allows researchers to examine possible error structures other than compound symmetry, which may be considered a limitation of the standard repeated measures ANOVA (Hedeker & Gibbons, 2006; Liu, Rovine, & Molenaar, 2012; Singer & Willet, 2003). A detailed information about the covariance pattern model can be found elsewhere (e.g., Hedeker & Gibbons, 2006). Covariance pattern analyses were performed to examine infant age, sleeping arrangement, and sleeping arrangement X infant age differences in the levels of perceived criticism and maternal distress, controlling for the effect of mothers' preferences for the infant sleeping arrangements.

Results

Hypothesis 1: The Majority of Infants Would Sleep in A Separate Room by 6 Months

Figure 1 presents the frequency of sleeping arrangement categories in the first year. Co-sleeping (bed- and room-sharing) and part-time bed- and/or room-sharing (mixed) was dominant (72%) over solitary sleeping at 1 months but decreased thereafter (17% at 12 months). By contrast, solitary sleeping increased at 3 months (54%), outnumbered co-sleeping at 6 months (77%), and became dominant at 9 months (83%) and 12 months (83%). Consistent with past research (Hauck et al., 2008; McCoy et al., 2004; Morelli, Rogoff, Oppenheim, & Goldsmith, 1992; Teti et al., 2016), our data indicate that it is a culturally normative trend, particularly for European Americans, to move their infants into solitary sleep by 6 months of age.

We took advantage of our longitudinal data and examined individual patterns of sleeping arrangements across the first year. Of 103 mothers, 79 (77%) moved their infants to solitary sleep by 6 months (CS = 29 and ET = 50), and 24 (23%) co-slept with their infants beyond 6 months (LT = 11 and CC = 13). Figure 2 presents trajectories of mothers' preferences for their sleeping arrangement choices for mothers who used solitary sleep by 6 months and those who used co-sleeping beyond 6 months. A covariance pattern model, using the best-fitting Unstructured (UN) error structure, revealed a significant main effect of sleeping arrangements, $p < .0001$, and a marginally significant infant age X sleeping arrangements interaction, $p = .057$. Mothers who used solitary sleep by 6 months were more likely than mothers who co-slept beyond 6 months to prefer their sleep arrangement choice. Further, the mean preference score for the former group increased at 6 months and leveled off thereafter, $F(1, 101) = 4.33$, $p < .05$, whereas the mean preference score for the latter group increased at 3, decreased at 6 months, increased again at 9 and slightly decreased at 12 months, $F(1, 477) = 12.92$, $p = .05$. Together, our results indicated that mothers who used solitary sleep by 6 months were more likely to prefer their sleeping arrangement choice across time, but mothers who used co-sleeping beyond 6 months were less likely to prefer their sleeping arrangement choice, particularly at 6 months.

Hypothesis 2a: Mothers Who Co-Slept with Their Infants Beyond 6 Months Would Be More Likely to Feel Criticized About Their Choice of Sleeping Arrangements Than Mothers Who Moved Their Infants to Solitary Sleep by 6 Months

The summary of least squares means and standard errors of the scores on social criticism at each time point is presented in Table 1. First, infant age, sleeping arrangements, infant age X sleeping arrangements interaction, and a control variable (preferences for infant sleeping arrangements) were included into the model, using the best-fitting unstructured (UN) error structure. Because the interaction term was not significant, it was deleted, and the model was re-examined. The results revealed that only a main effect of sleeping arrangements was significant, controlling for the effect of mothers' preferences for the infant sleeping arrangements (See Table 2). The difference in the levels of social criticism was relatively constant over time, with the mothers who co-slept with their infants beyond 6 months reporting significantly higher levels of criticism from others than the mothers who moved their infants to solitary sleep arrangement by 6 months, $F(1, 101) = 12.62, p < .001$ (See Figure 3).

Hypothesis 2b: Mothers Who Co-Slept with Their Infants Beyond 6 Months Would Be More Likely to Report Higher General Maternal Distress, And Maternal Worries Specific to Infant Sleep, Than Mothers Who Moved Their Infants to Solitary Sleep by 6 Months

The UN error structure was the best-fitting model for depressive symptoms, whereas TOEPH was the best for anxiety symptoms and worries about infant night needs. Thus, the covariance pattern models were performed using the UN for maternal depressive symptoms and the TOEPH for maternal anxiety symptoms and worries about infant night needs. The summary of least squares means and standard errors of the scores on maternal depressive symptoms, anxiety symptoms, and worries about infant night needs at each time point is presented in Table 1. Infant age, sleeping arrangement patterns, the interaction between the two, and a control variable (preference) were first included into the model. Because in all the models, the interaction term was not significant, it was trimmed from the model and analyses were conducted again without this interaction term.

General maternal distress: Maternal depressive symptoms—The model indicated significant main effects of infant age, $F(4, 101) = 3.48, p < .01$, and sleeping arrangements, $F(1, 101) = 5.52, p < .05$, controlling for the effect of mothers' preferences for the infant sleeping arrangements (See Table 2). The mean scores of maternal depressive symptoms linearly decreased over time, $F(1, 101) = 9.15, p < .01$. As can be seen in Figure 4, mothers who co-slept with their infants beyond 6 months reported consistently higher levels of depressive symptoms than mothers who used solitary sleep by 6 months, controlling for the effects of mothers' preferences for the sleeping arrangement choices.

General maternal distress: Maternal anxiety symptoms—Neither the main effects of infant age nor sleeping arrangements were significant, controlling for the effect of mothers' preferences for the infant sleeping arrangements (See Table 2).

Maternal worries specific to infant sleep—The model indicated that the main effects of both infant age and sleeping arrangements were significant, $F(4, 397) = 47.39, p < .0001$,

and $F(1, 101) = 8.90, p < .01$, controlling for the effects of mothers' preferences for the sleeping arrangement choices (See Table 2). As can be seen in Figure 5, the mean score on maternal worries about infant night needs decreased over time, with the mean score decreasing sharply between 3 and 6 months (quadratic trend), $F(1, 397) = 8.66, p < .01$. Further, the mothers who co-slept with their infants beyond 6 months reported consistently higher levels of worries about infant sleep over time than the mothers who moved their infants to solitary sleep by 6 months.

Hypothesis 3: Social Criticism Would Be Associated with Maternal Distress Only for Mothers Who Co-Slept with Infants Beyond 6 Months

We performed a covariance pattern model analyses separately for mothers who co-slept with their infants beyond 6 months and mothers who moved to solitary sleep by 6 months. First, infant age, criticism, infant age X criticism interaction were included into the model, using depressive symptoms or maternal worries about infant sleep as an outcome. When the interaction term was not significant, it was deleted, and the models were re-examined. As expected, the final models for depressive symptoms, both using the best fitting UN error structure, indicated a significant association between criticism and maternal depressive symptoms only for the mothers who used co-sleeping beyond 6 months, $F(1, 23) = 11.03, p < .01$, but not for the mothers who moved their infants into solitary sleep by 6 months, $F(1, 78) = 0.26, p = .61, N.S.$ Similarly, the final models for maternal worries about infant sleep, both using the best fitting TOEPH error structure, also indicated a significant association between criticism and maternal worries about infant sleep only for the mothers who used co-sleeping beyond 6 months, $F(1, 78) = 5.61, p < .05$, but not for the mothers who moved their infants into solitary sleep by 6 months, $F(1, 229) = 0.31, p = .58, N.S.$

Differences in Sample Characteristics by Sleeping Arrangements

We identified sample characteristics that co-sleeping was associated with in prior work (Goval et al., 2007; Luijik et al., 2013) and examined differences/relations between families who co-slept with their infants beyond 6 months and families which moved their infants to solitary sleep by 6 months. Table 3 presents descriptive statistics for household, maternal, and child characteristics, and statistical results. Mothers who co-slept with their infants beyond 6 months had lower income, felt greater space constraints, were younger, single, unemployed at 9 and 12 months, were less likely to have a Bachelor's degree, had infants with greater negative affectivity, or were more likely to perceive their infants' night waking as problematic, compared to mothers who used solitary sleep by 6 months, $ps < .05$ (See Table 3).

Discussion

The present study drew upon the transactional model (Sadeh & Anders, 1993) and the American cultural model of sleep (Worthman, 2011) to examine the differences in social criticism and distress in the first year between European American mothers who co-slept with their infants beyond 6 months and those who moved their infants to solitary sleep by 6 months. As expected, solitary sleeping arrangements outnumbered co-sleeping at 6 months of infant age. Moreover, mothers who moved their infants to solitary sleep by 6 months

reported higher preference for their sleeping arrangements than mothers who co-slept with their infants beyond 6 months. We note that preference for the sleeping arrangement increased from 1 to 6 months and levelled off thereafter in the former group, whereas preference of the latter group significantly decreased at 6 and 12 months. This suggests that solitary sleep by 6 months is a cultural preference for European American families. Together with the past reports that most American parents move their infants to a separate by 6 months (Hauck et al., 2008; McCoy et al., 2004; Morelli et al., 1992; Teti et al., 2016), it appears that it is the American cultural norm to refrain from co-sleeping beyond 6 months.

Our data also indicated that mothers who used co-sleeping beyond 6 months were more likely than mothers who used solitary sleep by 6 months to report being criticized about their sleeping arrangements, controlling for the effect of preferences for their sleeping arrangement choices. This finding is consistent with previous reports that parents whose parenting deviated from the cultural norms tended to be criticized (Counterline & Teti, 2010; Morelli et al., 1992). We also found that mothers who co-slept with their infants were at risk for heightened distress. Mothers who co-slept with their infants beyond 6 months reported consistently higher levels of depressive symptoms as well as worries about infant sleep across time than mothers who used solitary sleep by 6 months. Moreover, social criticism was associated with both depressive symptoms and worries specific to infant sleep only for the mothers who co-slept with infants beyond 6 months. Together, our findings support the cultural model of sleep (Worthman, 2011), which postulates that culturally-specific scripts structure the schemas for what is appropriate parenting. The present findings indicate that, when parents do not follow cultural schemas about how to structure infant sleep, they are more likely to be criticized and experience heightened depression and worries about their infants' sleep. This also supports the effect of cultural sanctions on one's well-being, which the cultural model of sleep postulates. It is unclear, however, what was driving this association. Mother's depression and worries about infant's night waking may have increased the use of co-sleeping, in turn leading to social criticism. Alternatively, the criticism co-sleeping mothers faced may have led to heightened depression and worries, and increased vigilance about their infants' sleep-wake behavior, as a consequence of being repeatedly told that what they were doing was not appropriate. Both interpretations are viable and represent an important focus for future research.

We also found that mothers who co-slept with their infants beyond 6 months were characterized as lower income, greater space constraints in the household, younger, single, unemployed during the last quarter of the first year, not having a Bachelor's degree, or having infants with greater negative affectivity or problematic night waking, compared to mothers who used solitary sleep by 6 months. This is consistent with findings by McCoy et al. (2004) and Colson et al. (2013) that the prevalence of co-sleeping was higher among mothers who reported lower income and household crowding, were younger and single, or had less than a high school education. However, their samples included non-European American families (about 20% of the sample in both McCoy et al.'s study and Colson et al.'s study), which may have created potential confounds in their data whose effects are difficult to detect (Bornstein et al., 2013). Given the previous report that non-Caucasian families tend to co-sleep regardless of their SES, household crowding, maternal age, and marital status (Lozoff, Askew, & Wolf, 1993; Luijk et al., 2013; Salm Ward & Ngui, 2015),

and that having more than a Bachelor's degree are associated with greater odds of co-sleeping among ethnic minority mothers in the U.S. (Salm Ward & Ngui, 2015), co-sleepers' household and maternal characteristics found by McCoy et al. and Colson et al. may be most applicable to European American families as our results suggested.

In addition to practicalities (household income and space availability in the household), U.S. parents' choices for the infant sleeping arrangements are also determined by parenting beliefs. As noted earlier, proactive co-sleepers voluntarily co-sleep with their children because of their beliefs that co-sleeping promotes breastfeeding and parent-infant bonding, whereas reactive co-sleepers bring the infant into their room and or bed to reduce the frequency and duration of infant night waking and their own interrupted sleep (Goldberg & Keller, 2007). Given the definitions of co-sleeping subtypes, the European American families who co-slept with their infants beyond 6 months in the present study may be reactive co-sleepers: they were less likely to prefer their sleeping arrangement choices and more likely to perceive their infants' night waking as problematic. It is unclear, however, how infant temperament plays a role in parents' decision to co-sleep. Because the Orienting/Regulation (OR) subfactor assesses the child's regulatory functioning (regularity and soothability) (Gartstein & Rothbart, 2003), it can be expected that proportion of parents who have infants with poor OR would be higher among persistent co-sleeping families. Our result indicated, however, that co-sleeping was associated not with infants' OR but with their negative affectivity (NA), which refers to sadness, distress, and slow rate of recovery from distress. Qualitative observations in an earlier study (Teti & Crosby, 2012) indicate that mothers with elevated depressive symptoms and worries about infant sleep tended to be hyper-responsive to non-distressed infant vocalizations at night, such as babbling or cooing that did not require parental assistance. That is, it may be not infants' regulatory functioning or soothability but the extent to which distressed mothers viewed their infant's behavior as "sad" or "distressed" that may have further increased their vigilance and led to bring their infant to their bedroom. The association between co-sleeping and infants' negative affectivity also supports our assumption that persistent co-sleeping mothers in our sample may be reactive co-sleepers.

This study has several limitations that need to be addressed. First, it was unfortunate that only 13 percent of our sample was non-European American, and thus they were eliminated from analyses. This limited our ability to generalize the present findings beyond European American families to non-European American families. Second, data were collected entirely using maternal self-reports, and thus shared method variance may have inflated associations between sleeping arrangements, social criticism, and maternal distress. Third, due to relatively small subgroup samples, the present study was unable to examine differences in criticism and maternal distress between late transit and consistently co-sleeping. In addition, it was impossible to separate bed- and room-sharing subcategories when constituting first-year sleeping arrangement patterns, because both tended to occur together. We anticipate that there would be greater criticism for mothers who consistently shared a bed with their infants than for mothers who shared a room with their infants. Fourth, because each of mothers' preference for the sleeping arrangement they used and social criticism mothers perceived was measured using a single item, these measurements may not have sufficient content validity and measurement reliability. Lastly, the present study recruited only in

central Pennsylvania, and thus, unlike population-based sampling, our sampling may produce estimates that lack generalizability.

Our findings suggest that parental choices about infant sleeping arrangements have ramifications not just for the infant but for the parent and the larger family system. These choices can be informed by cultural norms, but may also be based on parental beliefs about the personal well-being of the infant, which may be at odds with cultural norms. To the extent that cultural norms carry moral force, parents who decide not to follow cultural norms may find themselves vulnerable to criticism from those within and outside their own families who believe that following cultural norms is best for the infant. Such parents are, in turn, at risk for depression and worries about their infants' sleep behavior. We do not advocate one type of sleeping arrangement over another. We do advocate, however, that parents who co-sleep with their infants beyond 6 months be mindful of this vulnerability and support each other in the face of external criticism. A strong co-parenting alliance may prove to be a buffer against the detrimental effects of criticism on one's well-being.

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Figure 1.
Frequency of sleeping arrangement categories in the first year.

Figure 2.

Trajectories of mothers' preferences for their sleeping arrangement choices. Mothers' preference for the infant sleeping arrangement they were using were rated on a 3-point scale (1 "No, not my preference" to 3 "Yes, definitely my preference") at each time point.

Figure 3.

Least squares means of social criticism across age by infant sleeping arrangements. Scores on preference for the infant sleeping arrangements were statistically controlled. Scores on criticism received from different individuals in the parent's social network (partner, friends, the parent's mother, mother-in-law, siblings, and partner's siblings) were aggregated. The amount of criticism perceived by mothers from each individual was rated on a 5-point scale (1 "Not at all criticized" to 5 "Definitely criticized") at each time point.

Figure 4.

Least squares means of depressive symptoms across age by infant sleeping arrangements. Scores on preference for the infant sleeping arrangements were statistically controlled. Each of the 13 items of the depression subscale was rated on a 5-point scale (0 “*Not At All*” to 4 “*Extremely*”) at each time point.

Figure 5.

Least squares means of maternal worries about infant night needs across age by infant sleeping arrangements. Scores on preference for the infant sleeping arrangements were statistically controlled. Each of the 9 items, which assessed mothers' worries about her infant's physical and emotional needs at night, was rated on a 6-point scale (0 "*Strongly agree*" to 6 "*Strongly disagree*") at each time point.

Table 1

Descriptive Statistics for Co-Sleeping beyond 6 Months and Solitary Sleeping by 6 Months in the First Year

Variable	Co-Sleeping beyond 6 Months						Solitary Sleeping by 6 Months					
	<i>n</i> = 24						<i>n</i> = 79					
	Infant Age						Infant Age					
	1	3	6	9	12		1	3	6	9	12	
Criticism												
<i>LS-M</i>	7.76	8.22	7.23	7.24	7.04		6.53	6.41	6.23	6.09	6.10	
<i>SE</i>	0.49	0.43	0.35	0.36	0.26		0.26	0.23	0.19	0.20	0.15	
Depression												
<i>LS-M</i>	9.88	8.29	9.85	8.66	8.58		6.86	6.47	5.60	5.11	4.89	
<i>SE</i>	1.40	1.40	1.38	1.26	1.28		0.77	0.76	0.76	0.69	0.72	
Anxiety												
<i>LS-M</i>	2.82	3.49	4.25	4.40	3.65		1.90	1.97	2.04	2.30	2.55	
<i>SE</i>	0.67	0.64	0.86	0.99	1.06		0.36	0.35	0.48	0.55	0.59	
Worries												
<i>LS-M</i>	29.59	27.12	21.99	19.64	17.57		23.74	21.27	17.21	14.79	13.02	
<i>SE</i>	1.79	1.90	1.79	1.79	1.69		0.98	1.03	0.98	0.99	0.95	

Note. *N* = 103. *LS-M* = least squares means. *SE* = standard errors. Scores on preference for the infant sleeping arrangements were statistically controlled.

Table 2

Comparison of F-Tests for the Final Model of Social Criticism, General Maternal Distress, and Maternal Worries Specific to Infant Sleep

Variable	<i>df</i>	<i>F</i> -value	<i>p</i> -value	Partial η^2
Criticism				
Infant Age	4/101	2.03	.10	
Sleep Arrangements	1/101	12.62	.00***	.06
Preference	1/101	1.79	.18	
Depression				
Infant Age	4/101	3.48	.01**	.01
Sleep Arrangements	1/101	5.52	.02*	.03
Preference	1/101	14.42	.00***	.04
Anxiety				
Infant Age	4/405	1.07	.37	
Sleep Arrangements	1/101	3.42	.07	
Preference	1/405	7.07	.01**	.02
Worries				
Infant Age	4/397	47.39	.00***	.16
Sleep Arrangements	1/101	8.90	.00**	.04
Preference	1/397	0.32	.57	

* *Note.* $p < .05$.

** $p < .01$.

*** $p < .001$.

$N = 103$. Partial η^2 = Effect sizes for the results of the covariance pattern models.

Table 3

Sample Characteristics and Differences/Relation between Co-Sleeping beyond 6 Months and Solitary Sleeping by 6 Months

Variable	Whole Sample N = 103			Co-Sleep Beyond 6 Months n = 24			Solitary Sleep By 6 Months n = 79			Statistics		
	M	SD	Freq.	M	SD	Freq.	M	SD	Freq.	t	d	χ^2 ϕ
Household Characteristics												
Income (\$)	71.675	44.441		55.527	32.098		76.475	46.603		-1.97*	.52	C < S
Space Constraints	1.77	1.42		2.79	1.77		1.46	1.14		4.37***	1.38	C > S
Family Size	4.05	0.94		4.21	1.02		4.00	0.91		0.95		
Maternal Characteristics												
Age	29.58	4.92		27.29	5.72		30.28	4.45		-2.68**	.58	C < S
Education												
No Bachelor (NB)			39			16			23			11.03*** .33 C ↔ NB
Bachelor (B)			64			8			56			S ↔ B
Marital Status												
Not Single (NS)			91			16			75			14.29*** .37 C ↔ S
Single (S)			12			8			4			S ↔ NS
First-Time Mother												
No			70			15			55			0.42
Yes			33			9			24			
Employment												
6 months												
No			34			11			23			2.33
Yes			69			13			56			
9 months												
No			36			13			23			5.08* .22 C ↔ No
Yes			67			11			56			S ↔ Yes
12 months												
No			36			13			22			5.68* .23
Yes			67			11			57			C ↔ No

Variable	Whole Sample <i>N</i> = 103			Co-Sleep Beyond 6 Months <i>n</i> = 24			Solitary Sleep By 6 Months <i>n</i> = 79			Statistics		
	<i>M</i>	<i>SD</i>	Freq.	<i>M</i>	<i>SD</i>	Freq.	<i>M</i>	<i>SD</i>	Freq.	<i>t</i>	<i>d</i>	χ^2 ϕ
Child Characteristics												
Temperament												
SE	19.27	2.57		19.44	2.93		19.09	2.21		0.62		
NA	11.97	1.70		12.39	1.67		11.55	1.72		2.06*	.73	C > S
OR	19.90	1.97		19.74	2.26		20.06	1.68		-0.72		
Problematic night waking	9.96	4.03		10.76	4.25		9.16	3.81		2.02*	.40	C > S

* *Note.* $p < .05$.

**
 $p < .01$.

 $p < .001$.

Freq. = frequency. Maternal and household characteristics were measured at 1 month of infant age. C = Mothers who co-slept with their infants beyond 6 months. S = Mothers whose infants slept in a separate room by 6 months. Maternal employment status were reported at 6, 9, and 12 months. Space constraints were reported on a 5-point scale (1 "Not at all" to 5 "Definitely"), using SPQ (Keller & Goldberg, 2004). SE: Surgency/Extraversion; NA: Negative Affectivity; OR: Orienting/Regulation. *d* = Effect sizes for the results of the *t*-tests. ϕ = Effect sizes for the results of the chi-square tests.