SEX DIFFERENCES IN THE RELATIONSHIP BETWEEN PARENT-CHILD INTERACTIONS, INTERNALIZING SYMPTOMS, AND SLEEP IN PRESCHOOLERS

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A Thesis

Presented to

The Faculty of the Department

of Psychology

University of Houston

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In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

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By

Jennifer Cowie

May 2015

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ABSTRACT

Although sleep-related parenting behaviors (e.g., involvement in bedtime routines) have been demonstrated to contribute to sleep problems in infants and school-age children, few studies have investigated how daytime parenting behaviors and quality of the maternal-child relationship contribute to preschoolers' sleep problems. Therefore, the aim of the current study is to examine how maternal over-involvement, supportive presence, and affective sharing during the preschool years relate to concurrent child sleep problems separately by child sex. Because internalizing symptoms and sleep problems are closely related and share similar parental influences, internalizing symptoms are hypothesized to explain relationships between parenting behaviors and sleep problems, particularly for girls. **Methods:** Participants (*N*=1181) were enrolled in a large, national, multi-site NICHD study to assess the impact of child care on child functioning between the ages of 0 and 15 years. Mothers' behavior was observed and coded during both play and clean-up tasks when children were 36 months of age, and mothers provided reports of child sleep and internalizing symptoms. Hierarchical regression analyses were conducted to determine the contribution of each of the parenting behaviors on child sleep. Further, internalizing symptoms were examined as a mediator of the relationship between parenting behaviors and sleep problems utilizing a bootstrapped resampling procedure. Because each parenting behavior significantly differed by child sex, analyses were conducted for boys and girls separately. **Results:** Results indicated over-involvement significantly predicted sleep problems for girls only, and internalizing symptoms fully mediated this relationship. However, no significant relationships emerged for boys. **Conclusions:** Maternal daytime over-involvement is an important predictor of preschoolers' sleep problems in this study,

however this relationship was found for girls only and was explained entirely by internalizing symptoms. These findings have clear implications for sleep interventions among typically-developing preschoolers, specifically indicating the benefit of targeting over-involvement in daytime interactions in mother-daughter dyads and anxiety/depressive symptoms in both sexes.

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SEX DIFFERENCES IN THE RELATIONSHIP BETWEEN PARENT-CHILD INTERACTIONS, INTERNALIZING SYMPTOMS, AND SLEEP IN PRESCHOOLERS

Sleep problems are common with around 25-41% of typically-developing children from infancy through preschool-age presenting to a pediatrician with difficulties at bedtime and/or during the night (Lam, Hiscock, & Wake, 2003; Mindell & Owens, 2003). Unfortunately, early sleep problems tend to persist into the preschool and school-age years even when treated in infancy (Lam et al., 2003; Zuckerman, Stevenson, & Bailey, 1987), and are longitudinally associated with several adverse outcomes (Pollock, 1992). Research has generally emphasized the importance of parenting behaviors outside of the sleep routine (i.e., bedtime) and overall family functioning in contributing to and maintaining sleep problems in school-age children. However, little attention has been given to the role of parenting behaviors in sleep problems at the preschool age when broader parent-child interactions have greater impact in shaping children's developing regulatory abilities, an important mechanism contributing to sleep problems. Further, research has yet to specify which child characteristics likely impact the relationship between parenting behaviors and child sleep problems. Therefore, the overall aim of this study is to examine the contribution of three broad parenting behaviors specifically related to the development of child self-regulatory ability (i.e., over-involvement, supportive presence, and affective sharing) in predicting sleep problems in 36-month-old children. Further, child internalizing symptoms will be explored as a mediator of this relationship. Since sex-based differences are commonly observed in parenting behaviors and contribute to divergence in child emotional outcomes, these relationships will be examined for girls and boys separately.

Sleep in Preschoolers

Sleep changes dramatically in the preschool years as parents become less involved in sleep routines, children transition from sleeping in the parent's bed or a crib to sleeping in their own bed, and children must learn to initiate sleep independently. However, some children experience persistent sleep problems across early childhood and into the preschool years, even when treated with evidence-based interventions in infancy (Lam et al., 2003). Unfortunately, difficulties with sleep at the preschool age are associated with a range of negative outcomes across cognitive, behavioral, and affective domains (Hiscock, Canterford, Ukoumunne, & Wake, 2007). From the preschool years and beyond, sleep problems are concurrently linked with greater cognitive and behavioral impairments (Lavigne et al., 1999; Touchette et al., 2007) and poorer academic performance (Bates, Viken, Alexander, Beyers, & Stockton, 2002). Sleep difficulties in toddlers and preschoolers also longitudinally predict greater risk for obesity during the school-age years (Reilly et al., 2005) and for substance use in early adolescence (Wong, Brower, & Zucker, 2009). Sleep problems at age four years predict anxiety and depressive symptoms in addition to attentional problems in adolescence (Gregory & O'Connor, 2002). Even earlier in development, difficulties initiating or maintaining sleep at both two and 24 months of age is predictive of internalizing problems at three years (Jansen et al., 2011). Given the wide range of associated problems, early efforts aimed at reducing disruptions in the sleep-wake cycle have potentially far-reaching effects in promoting healthy child development.

The development of healthy sleep depends primarily on consolidation and self-regulation, two biopsychosocial processes which interact over time to gradually organize sleep patterns (Goodlin-Jones, Burnham, Gaylor, & Anders, 2001). Consolidation refers to

the diurnal pattern of sleeping for long periods throughout the night in conjunction with long periods of wakefulness during the day. Self-regulation is defined as the infant's increasing ability to achieve a calm internal state in order to allow for independent sleep onset at bedtime and re-initiation of sleep following nighttime arousals (Dahl, 1996). Initially, infants rely on dyadic interactions with a caregiver to externally regulate arousal and the sleep-wake cycle (Anders, 1994). However, in order to increase efficiency of sleep re-initiation and promote consolidation, children must increasingly learn to employ independent strategies for regulating arousal (i.e., self-soothing) both at bedtime and throughout the night (Anders, 1994). In fact, the best predictor of successful sleep consolidation is the ability to independently regulate sleep (Goodlin-Jones, Burnham, & Anders, 2000).

As children develop, numerous contextual, psychosocial, and individual factors influence the consolidation and self-regulation of their sleep. These factors include socioeconomic status (Lozoff, Askew, & Wolf, 1996), cultural beliefs (Jenni & O'Connor, 2005), maternal psychopathology (Stoléru, Nottelmann, Belmont, & Ronsaville, 1997), parenting stress (Meltzer & Mindell, 2007), and child temperament (Owens-Stively et al., 1997). Although each of these factors is individually important, the parent-child interaction is one of the most salient factors impacting children's sleep, both directly (e.g., setting bedtimes) and indirectly via behaviors aimed at promoting self-regulation capacities (Mindell, Sadeh, Kohyama, & How, 2010; Sadeh, Tikotzky, & Scher, 2010). Because the literature on self-regulation in young children incorporates many overlapping terms, differentiation among the specific constructs is described below with a focus on the role of self-regulation in the organization and regulation of the developing sleep-wake cycle.

Child Self-Regulation and Sleep

Self-regulation is an adaptive control process which is coordinated across physiological, attentional, behavioral, and cognitive domains, thus occurring at many different levels (Calkins & Fox, 2002). Maturational changes in the prefrontal cortex and limbic system contribute to the progression of a young child's capacity for automatic regulation in the early years to more advanced, intentional regulation of cognitive processes in middle childhood (Ochsner & Gross, 2004). Many interrelated concepts integral to self-regulation during early development have been described including compliance, inhibition, emotion regulation, and effortful control (Graziano, Keane, & Calkins, 2010; Karreman, van Tuijl, van Aken, & Deković, 2006; Kopp, 1989), however emotion regulation has most commonly been proposed as an underlying mechanism contributing to children's sleep problems (Erath & Tu, 2011). Emotion regulation is a dynamic and ongoing process consisting of alternating reactivity and control strategies over time, initially guided by the parent (Calkins & Hill, 2007). During infancy, excessive maternal settling strategies are specifically believed to contribute to child sleep problems by undermining the child's ability to learn to self-soothe (i.e., regulate emotion) at sleep onset (Morrell & Cortina-Borja, 2002; Sadeh, Mindell, Luedtke, & Wiegand, 2009; Sadeh et al., 2010). For example, Morrell and Cortina-Borja (2002) found that parental behaviors promoting self-soothing and autonomy (i.e., leaving the infant to cry) significantly improved sleep consolidation in infants. Most children are able to learn to self-soothe after awakening from sleep by one year of age (Goodlin-Jones et al., 2001), and the ability to self-soothe at this age has been found to decrease risk for sleep-related problems at two years of age (Gaylor, Burnham, Goodlin-Jones, & Anders, 2005).

Parental Contributions to Child Self-Regulation and Sleep

Because self-regulatory ability is related to several domains of child adjustment, it is not surprising that research has emphasized the same or similar parenting behaviors as contributing to both child self-regulation and sleep. Broadly, three main dimensions of parenting behaviors have emerged in the empirical literature: involvement/positive control, maternal sensitivity/support, and appropriate sharing of affect.

Involvement/positive control. One dimension of parenting is concerned with the mother's level of involvement or control. Negative control, which includes harsh discipline practices (i.e., critical comments and hostility) and intrusiveness (i.e., over-involvement), inhibits self-regulation (Kochanska & Aksan, 1995; Silverman & Ragusa, 1990) theoretically by undermining the child's self-efficacy and autonomy-seeking behaviors. Alternatively, positive control facilitates autonomy support by providing the scaffolding to guide appropriate child behaviors and, consequently, encourages children to independently make choices and solve problems. Mothers high in positive control also actively reward successful task completion, thereby communicating confidence in the child's abilities. Children are then more likely to be successful in developing self-regulatory abilities (Karreman et al., 2006; Putnam, Spritz, & Stifter, 2002) and also demonstrate better sleep (Bordeleau, Bernier, & Carrier, 2012). For example, Bordeleau, Bernier, and Carrier (2012) observed that 15-month-old children whose mothers provided support for autonomy during a daytime problem-solving task had a higher percentage of nighttime sleep during the preschool years.

Maternal sensitivity/support. A second dimension of parenting behavior relates to level of support, a more qualitative aspect of the parent-child interaction which ultimately enhances the overall relationship. Maternal support is defined as the degree to which a

mother responds to the child in a timely way, is positive or warm towards the child (i.e., gives encouragement or reassurance), and displays sensitivity in response to the needs of the child. Across studies, support is frequently labelled as "maternal sensitivity," operationalized as synchrony, mutuality, emotional support, supportive presence, and stimulation (Wolff & Ijzendoorn, 1997). Generally, high maternal support creates a warm, accepting environment that promotes internalization of behaviors (Kochanska & Aksan, 1995; Parpal & Maccoby, 1985) and is correlated with adaptive child self-regulation (Kochanska & Kuczynski, 1991; Shamir-Essakow, Ungerer, Rapee, & Safier, 2004; Smith & Walden, 2001).

Across development, research examining maternal behaviors in relation to children's sleep has focused mostly on behavioral indices of maternal support (e.g., warmth) and maternal sensitivity. Sensitivity observed during maternal-child interactions at 12 months of age has been shown to predict fewer sleep problems in three- and four-year-old preschoolers (Bordeleau et al., 2012). Similarly, among school-age children, Bell and Belsky (2008) found that observed sensitivity (a composite of supportive presence, autonomy support, and hostility reverse scored) predicted fewer child sleep problems. A separate study also found that parental warmth is also associated with greater sleep time in school-age children, even when controlling for several demographic and family variables known to impact sleep patterns such as ethnicity and parental stress (Adam, Snell, & Pendry, 2007). In adolescence, lower perceived maternal support is associated with longer time required to initiate sleep, and lower perceived commendation or praise is associated with shorter total sleep time (Brand, Hatzinger, Beck, & Holsboer-Trachsler, 2009).

Appropriate sharing of affect. A third dimension of parenting relates to appropriate sharing of affect (see Gross, 2009; Halberstadt & Eaton, 2002). High positive emotionality is

associated with better emotional understanding in children, an important facet of learning to regulate emotions (Halberstadt & Eaton, 2002; Stegge & Terwogt, 2007). Mothers who model appropriate emotional responses across a range of situations, in conjunction with effective management strategies of negative emotions in particular, help children to manage their own emotional responses (Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997). Alternatively, parents who minimize or dismiss the emotional expressions of their children invalidate child expression of emotion, which often leads to avoidant emotion regulation strategies in early childhood (Eisenberg, Fabes, Carlo, & Karbon, 1992).

In families characterized by conflict, frequent and/or unexpected negative emotional displays foster less emotional security in children (Cummings & Davies, 1996), which has been shown to disrupt child sleep (Keller & El-Sheikh, 2011). Bell and Belsky (2008) found that children's sleep in third grade was significantly more disrupted three years later when mothers displayed more negative emotionality. These mothers also reported less closeness and more conflict in interactions with their children. In a sample of adolescents, Brand and colleagues (2009) found that adolescents who perceive their parents to have a parenting style low in positivity and high in negativity had significantly poorer sleep quality.

In summary, research findings converge to reveal that maternal behaviors which include an appropriate level of involvement/positive control, maternal sensitivity/support, and sharing of affect promote more self-regulation and better sleep in children (see Grusec & Davidov, 2007). To date however, a vast majority of research examining parental behaviors in relation to children's sleep have focused specifically on the presence/absence of these behaviors *within* the sleep context (e.g., at bedtime). What is less well understood is the extent to which these behaviors, in general, impact child sleep patterns.

Children's Internalizing Symptoms, Sleep, and Parenting

The influence of child behavior must also be considered in the translation of parenting behavior to sleep problems. Several child characteristics directly relate to sleep problems and are therefore likely important. In particular, sleep disruptions are strongly linked with a range of emotional and behavioral difficulties from childhood through adolescence (Gregory & Sadeh, 2012) but are a core feature of affective disorders in particular (Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010). Further, anxiety and depressive disorders are the most common psychiatric disorders in youth (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Egger & Angold, 2006). More than a symptom of these disorders, sleep problems demonstrate a bidirectional relationship with mood and anxiety (see Gregory & Sadeh, 2012). Experimental studies have shown that even small amounts of sleep restriction decrease positive affect and increase anxiety in young children and adolescents (Berger, Miller, Seifer, Cares, & Lebourgeois, 2012; Dagys et al., 2012), and sleep disturbances in early childhood longitudinally predict both depression and anxiety in adulthood (Gregory et al., 2005; Gregory, Eley, O'Connor, & Plomin, 2004; Johnson, Chilcoat, & Breslau, 2000).

Not surprisingly, many of the parenting behaviors that impact children's sleep overlap with those that contribute to the development of internalizing symptoms (McLeod, Wood, & Weisz, 2007; Rothbaum & Weisz, 1994). For example, excessive parental control, defined as over-regulation of child behavior and encouragement of dependency on parents (i.e., lack of autonomy), is proposed to diminish self-efficacy and therefore increase risk for anxiety and depression (Garber, Robinson, & Valentiner, 1997; Wood, 2006). Conversely, positive parenting behaviors, such as warmth and sensitivity in combination with appropriate limit-

setting, are associated with lower levels of behavior problems, due in part to promoting more successful regulation of negative affective states such as anger and anxiety (Denham et al., 2000). Early difficulties regulating both internal emotional states and external expression of emotional responses is hypothesized to be a risk factor in the development of anxiety and mood disorders (Suveg & Zeman, 2004), and, similarly, the frequency and intensity of children's emotional expression has been shown to predict sleep problems (El-Sheikh & Buckhalt, 2005). Therefore, poor development of emotion regulation strategies likely represents a common underlying mechanism explaining how the same parenting behaviors contribute to both sleep problems and internalizing symptoms.

Considering the strong link between sleep and internalizing problems, early internalizing symptoms likely represent one aspect of child functioning that may mediate (i.e., explain) how parenting contributes to sleep problems. In a sample of adolescents, Cousins, Bootzin, Stevens, Ruiz, and Haynes (2007) found that psychological distress (i.e., a composite of anxiety, depressive, suicidal, and somatic symptoms) mediated the relationship between low parental involvement and sleep problems. Even earlier in development, separate studies have shown that: 1) parenting behaviors contribute to sleep difficulties (e.g., Bordeleau et al., 2012); 2) disrupted sleep contributes to anxiety/depressive symptoms (e.g., Jansen et al., 2011); and 3) children's mood and anxiety problems maintain or perpetuate later sleep difficulties (see Gregory & Sadeh, 2012).

Sex-Based Differences and Parenting

Sex-based differences in parenting have been well-established in research. Some studies show caregivers respond to preschool-age boys with higher levels of punishment and control (Bezirganian & Cohen, 1992), greater responsiveness to their actions (see Nolen-

Hoeksema, 1990), and fewer expressions of positivity (Garner, Robertson, & Smith, 1997). Further, mothers are more likely to report using over-control with higher levels of autonomy support when interacting with boys, but with lower levels of autonomy support when interacting with girls (Pomerantz & Ruble, 1998). Earlier in development, several studies have observed that mothers respond to their infant sons with greater positivity (Biringen et al., 1999) and greater synchronicity or coordination of behavior and affect, such as matching facial expressions or following gaze (Robinson, Little, & Biringen, 1993), which may encourage greater emotional self-control (Brody, 2000; Eisenberg, Cumberland, & Spinrad, 1998; Haviland & Malatesta, 1981; Malatesta et al., 1989). Craske (2003) theorizes that lower levels of synchronicity and positivity in mother-daughter dyads early in development may create greater risk for the development of symptoms of internalizing disorders in girls (Barlow, 1991).

Research has also found sex differences in the relationship between parenting behaviors and internalizing symptoms, (Cunningham, Kliewer, & Garner, 2009; Garside & Klimes-Dougan, 2002), however evidence is mixed whether the effects are more robust for girls or boys (Denham, Renwick, & Holt, 1991; Van Der Bruggen, Bögels, & van Zeilst, 2010). A meta-analysis by Van Der Bruggen, Stams, and Bögels (2008) found that the effects of over-control or poor autonomy support on anxiety symptoms were more robust for girls, even though a later study indicated greater effects of parental over-control on sleep problems in boys (Van Der Bruggen et al., 2010). In consideration of research suggesting that parental influences may have greater effects within same-sex dyads (Bögels & Phares, 2008; Crockenberg, Jackson, & Langrock, 1996), boys are overall less likely to be affected by

maternal behaviors. Collectively, these findings suggest that certain parenting behaviors like over-involvement in particular are more likely to predict poorer emotional outcomes for girls.

Although parenting behaviors appear to differ by sex, such differences have rarely been considered with regard to sleep patterns and the effects of parenting behaviors on sleep problems. Some studies have suggested that infant boys have less total sleep and more frequent awakenings than infant girls (Bach, Telliez, Leke, & Libert, 2000), although research generally indicates sleep disturbances do not differ for pre-pubertal children (Driver, 2012). Regardless, studies examining sex as a moderator of longitudinal associations between sleep and other outcomes (e.g., cognitive performance and depressive/anxiety symptoms) indicate greater adverse effects of sleep problems for young girls (Bub, Buckhalt, & El-Sheikh, 2011; El-Sheikh, Bub, Kelly, & Buckhalt, 2013). At least one study demonstrated that lower quality maternal attachment predicted subjective sleep problems for school-age boys but not girls (Keller & El-Sheikh, 2011), however this finding needs further replication. Ultimately, available research showing differences in socialization of emotions suggests that girls are most likely to be affected by the parenting behaviors examined in this study.

Summarizing the Research

Achieving mastery over sleep regulation in early childhood is highly influenced by parent-child interactions (Anders, 1994). Many parenting behaviors have been implicated in promoting healthy sleep by way of helping children develop strategies for effectively regulating emotions. Research on emotion regulation has revealed that positive parental control, greater maternal responsiveness, and emotional security as reflected by appropriate expression of emotion within the maternal-child relationship are associated with better child

emotion regulation development (e.g., Denham et al., 1997; Putnam et al., 2002). Relatedly, research examining the adverse impact of specific parenting behaviors on children's sleep has emphasized that maternal over-involvement, lower levels of sensitivity and warmth, and poor support for autonomy is linked with sleep difficulties (e.g., Bordeleau et al., 2012; Sheridan et al., 2013). Many of these parenting behaviors also contribute to children's internalizing symptoms and disorders (see Barber & Harmon, 2002). However, parenting behaviors are likely to vary based on child sex (see Leaper, 2002), and the effects of these parenting behaviors are more likely to relate to internalizing symptoms and sleep problems for girls than boys.

Gaps in Knowledge

To date, most studies have focused on sleep-specific parenting behaviors without attention to broader parenting behaviors and the overall quality of the maternal-child relationship. Even fewer studies have measured parenting behavior via direct observational methods or considered more than one or two parenting behaviors. Since parenting is a complex, multidimensional construct, understanding the contribution of multiple parenting behaviors is important in order to move from theory toward more practical applications and identify specific targets for prevention/early intervention efforts. Also lacking are studies that consider internalizing symptoms in models of how parenting behaviors predicting sleep problems, and how these relationships may be different for girls and boys.

Aims and Hypotheses of the Current Study

The aims of the current study are twofold. The first aim is to examine the contribution of multiple, theoretically-relevant parenting behaviors in predicting child sleep problems at 36 months of age among a large, representative national sample. Maternal over-

involvement (i.e., overly controlling maternal behavior which provides little opportunity for child autonomy), supportive presence (i.e., appropriate guidance and encouragement), and affective sharing (i.e., high intimacy and freedom to express emotions) as rated by observers during a daytime interaction task with children at age 36 months will be examined. It is hypothesized that supportive presence and affective sharing will be negatively related to sleep problems, whereas over-involvement will be positively related to sleep problems. However, because previous research suggests that early parental behaviors may encourage boys to exhibit greater emotional control while providing girls with fewer experiences of controllability (see Brody, 2000), over-involvement in particular is hypothesized to be related to sleep problems for girls only. Further, the relationship between maternal behaviors and sleep problems may be more robust for girls since some studies have suggested greater effects within same-sex dyads (Crockenberg et al., 1996). Therefore, supportive presence and affective sharing are hypothesized to predict sleep problems also for girls only.

The second aim is to explore the role of child internalizing symptoms at 36 months of age as a potential mediator of the relationship between parenting behaviors and concurrent child sleep problems. Considering that internalizing symptoms and sleep problems are highly interrelated and that similar parenting behaviors contribute to both outcomes, internalizing symptoms are hypothesized to partially explain the relationship between parenting and sleep problems. However, because parents tend to be more accepting of girls' displays of shyness and withdrawal and therefore differentially reinforce these behaviors in girls (Brody, 2000), internalizing symptoms are expected to mediate this relationship for girls only.

Method

Participants

Data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (NICHD SECCYD) were used in the current study. Permission had been granted by NICHD for the use of their archival data, and approval was also obtained from the University of Houston IRB. Participants were originally recruited in 1991 from ten different hospitals across the United States. A full description of study design, procedures, and measures can be found at the NICHD Early Child Care Research Network (Allhusen et al., 2001). Women were selected (N = 5,265) if they were over the age of 18 years, English-speaking, and delivered a single birth. Families were excluded if the child was hospitalized for more than seven days after birth or had obvious disabilities, or if the mother admitted to substance-abuse problems. Randomized call lists at each site enrolled two to three families per week throughout the year. When the infant reached 1 month of age, families completed the first visit (N = 1,364). The recruited families did not differ significantly from eligible families on key demographic variables. The demographic characteristics of the sample were comparable to census track records in each area and to national statistics. Because the primary goal of the study was to explore the effects of child care on young children, a range of family, parent, and child variables were collected at various time points (1, 6, 15, 24, and 36 months in Phase I). Participants included in the present analyses were families who participated in assessments when children were 36 months of age.

The initial sample consisted of 51.7% males and 48.3% females. Child race/ethnicity was reported as 80.4% Caucasian, 12.9% African American, 1.6% Asian or Pacific Islander,

0.4% American Indian, and 4.7% other. The ages of the mothers ranged from 18-46 years with a mean age of 28.11 years (*SD*=5.63 years). Mothers had on average 14.23 years of education (*SD*=2.51). Most of the mothers had some college education or an Associate's degree (33.4%), although many had a high school degree or GED (21%), a Bachelor's degree (20.8%), or some graduate work or a Master's degree (11.8%). When children were 36 months of age, 77.1% of mothers were married and living with a spouse, 8.1% were not married but living with a partner, 9% were never married and not living with a partner, and 5.2% were separated and not living with a spouse/partner. The mean household income at 36 months of age was $53,526.51 (*SD*=$43,833.36).

Observational Tasks

At 36 months of age, mothers and their children were brought into the lab and videotaped for a 15 minute semi-structured toy play task followed by a five minute clean-up period. During the toy play observation, a three box procedure was implemented to assess the quality of mother-child interactions (see Vandell, 1979). Mothers were instructed to have children play with the toys in each of three boxes as they would at home, beginning with the first box and ending with the third. The first box contained washable markers, stencils, and paper. The second box contained dress-up clothes and a cash register, and the third contained Duplo blocks with the picture of a model. Mothers were given no further instructions concerning how the child should play with each toy or for how long.

During the clean-up observation, the researcher handed empty containers to the mothers and instructed them to have their children clean-up the toys. Mothers could manage the clean-up however they liked as long as the children were involved, and no further

instructions were given. The task was recorded for five minutes or until all toys were placed back in the containers.

Research assistants collected the data at each of the ten sites. All data collectors attended a common training meeting and passed a certification procedure in order to ensure adequate standardization of the protocol. Coding procedures for the 15 minute play task were adapted from Egeland and Heister (1993). Following the observational task, the videotapes were shipped to a separate location for coding. Teams of approximately five to six coders who were blind to any information about the families scored the tapes. Coders were intensively trained and received supervision throughout scoring. Interrater reliability was obtained by randomly assigning 20% of the tapes to two coders and calculating the intraclass correlation (ICC; Winer, 1971). Coders were blind to which tapes would be assigned to a second coder for reliability scoring.

Parent-Child Relationship Variables

Over-involvement. Over-involvement is rated on a 7-point Likert scale and captures maternal behaviors that are intrusive or overly controlling during the clean-up task. A high score indicates that the mother is giving constant commands or directives and is continually monitoring and directing the child's progress and behavior. For example, she could physically force the child to move a toy, interrupt an appropriate or inappropriate activity, or redirect the child without allowing sufficient time for transitions or allowing the child to express his or her own initiative. A low score indicates that the mother is providing appropriate control or allows adequate autonomy. This scale demonstrated good interrater reliability (ICC = 0.77).

Supportive presence. Supportive presence is rated on a 7-point Likert scale during the play interaction and demonstrates positive regard and emotional support of the child. Mothers scoring high on this scale acknowledge the child's accomplishments and verbally encourage the child. She provides increased support and reassurance when the child has difficulty and appropriately redirects behavior for independent success. A mother with a low score is passive or aloof, especially when the child exhibits a need for support. This scale demonstrated good interrater reliability (ICC = 0.81).

Affective sharing. Affective sharing is rated on a 7-point Likert scale during the play interaction and represents the availability and mutuality of emotion between the mother and child, ultimately reflecting how secure the child feels with the parent. High scores indicate open and free communication of emotions, and the child appears to freely express his or her emotions. Many of the dyads high on this scale almost always exhibited a shared, pleasurable emotion. Low scores indicate closed communication and muted affect, or lack of intimacy in the pair. The interaction may be stifled or the emotional experience of the parent may be out of sync with the child's emotional experience. Interrater reliability was good (ICC = 0.82).

Measures

Demographics. A demographic questionnaire assessing child race and sex, household income, parental education level, and marital status was completed at 1 month of age. Demographic information was collected again via questionnaire at 36 months of age.

Sleep problems. The Child Behavior Checklist is a widely used measure assessing emotional and behavioral problems for children ages 2-3 years (CBCL/2-3; Achenbach, 1992). Mothers were asked to rate items that describe their children currently or in the past

two months (0 = "not true," 1 = "somewhat or sometimes true," 2 = "very true or often true"). The measure yields a Total Problems score in addition to broad band Internalizing and Externalizing scales. Narrow band scales on the CBCL/2-3 include Social Withdrawal, Anxious/Depressed, Sleep Problems, Aggressive Behavior, and Destructive Behavior. Consistent with standard convention, participants with less than 25% completion had subscale scores that were entered as "missing."

The CBCL/2-3 Sleep Problems subscale administered to mothers when the child was 36 months was retained for analysis. This subscale consists of seven items pertaining to problematic sleep behaviors and difficulty sleeping such as "doesn't want to sleep alone," "has trouble getting to sleep," "nightmares," and "resists going to bed at night." The sum of these items (range 0-14) were standardized (T-scores; M = 54.7). There were no significant differences in mean scores across the ten sites.

Internalizing symptoms. The Internalizing subscale from the CBCL/2-3 at 36 months of age was used as a measure of internalizing symptoms. This scale is a standardized score (T-score; M = 51.2) representing the sum of the Anxious/Depressed and Withdrawn subscales (and does not include any sleep items). This scale was selected over the Anxious/Depressed subscale since the inclusion of withdrawal behavior is a more appropriate operationalization of internalizing symptoms at this developmental stage. Further, skewness and kurtosis indices were a better reflection of normal distribution.

Analytic Plan

All analyses will be conducted in SPSS, version 21. Data will first be examined for normality, linearity, and homoscedasticity. Missing data will be assessed and decisions regarding imputation will be made accordingly. Bivariate correlations among key

demographic variables and other variables of interest will be examined to determine covariates to include in subsequent analyses. Further, t-tests will be conducted to examine whether each of the parenting behaviors significantly differ by sex. Based on significant sex-based differences in parenting behaviors, all other analyses will be conducted separately by child sex.

The current study will include two overall analytic approaches in line with the primary aims. First, hierarchical linear regression models with stepwise entry will be utilized to determine the extent to which each parent behavior of interest predicts child sleep problems. Covariates will be entered into step 1, over-involvement in step 2, supportive presence in step 3, affective sharing in step 4, and sleep problems will be entered as the dependent variable.

Second, a test of internalizing symptoms as a mediator of the relationship between parent-child relationship predictors and sleep problems will be conducted using an ordinary least squares-based path analytical framework (see *Figure 1*). The Sobel (1982) test has been criticized as a means for testing the significance of indirect effects due to inaccurate assumptions about the sampling distribution (Preacher & Hayes, 2008). Therefore, a bootstrapping resampling procedure will be conducted as recommended by Preacher and Hayes (2008). This procedure will test the significance of indirect effects by drawing 10,000 bootstrapped samples from the data (with replacement) in order to calculate an indirect effect using each of the resampled data. More specifically, Model 4 from the PROCESS Macro (see *Figure 1*) will be selected from the program installed directly into SPSS (Hayes, 2012). The macro yields estimates of both direct and indirect path coefficients and generates bias-corrected 95% confidence intervals.

The direct effect is defined as the effect of the predictor on the outcome variable, controlling for the mediator. The indirect effect is defined as the product of the main effect of the predictor on the mediator (path a_i in *Figure 1*) and the main effect of the mediator on the outcome variable (path b_i in *Figure 1*). The total effect of the predictor on the outcome (path *c*) consists of both the direct effect (path *c'* in *Figure 1*) and the indirect effect (path $a_i b_i$ in *Figure 1*) on the outcome. Significant direct and indirect effects will have confidence intervals that do not contain zero. Because PROCESS allows only one independent variable to be entered at a time, mediation models will be computed separately for each of the three parenting behaviors. Each parenting behavior will be entered as the independent variable, internalizing symptoms will be entered as the mediator, and sleep problems will be entered as the dependent variable. Previously identified covariates will also be entered in each model.

Results

The data were first visually examined for outliers via scatterplots and boxplots. Scatterplots indicated that linearity was acceptable for all variables. Based on examination of plots of residuals versus predicted values, heteroscedasticity of the data was not violated. Although a few of the variables were non-normally distributed, violations of the normality assumption do not have a significant impact on data with large samples and is regarded as the least essential assumption for linear regression (Hayes, 2008). Therefore, data transformations were not conducted. Despite the significant correlations among a few of the predictor variables, multicollinearity diagnostics were within acceptable limits.

Missing Data

Retention was generally good throughout the early phases of the NICHD project, although 183 participants (15.50%) had missing data at 36 months. When comparing participants with complete data with those with missing data (see *Table 1*), children with incomplete data were more likely to identify as Black than completers (χ^2= 18.99, p<0.001). Additionally, at the child's birth, mothers of children with complete data reported higher income (*M*= $38,849.11, *SD*= $33,238.24) than those with missing data (*M*= $30,419.27, *SD*= $37,297.70), were more likely to be married than those with missing data (χ^2= 20.20, p<0.001), and had more years of education (*M*= 14.38, *SD*= 2.48) than those with missing data (*M*= 13.30, *SD*= 2.53; see *Table 1*).

Bivariate Correlations

Pearson's bivariate correlations are presented in *Table 2*. All demographic variables were taken from the measure administered to families at the child's birth except for marital status and total income, which were reassessed when the child was 36 months of age. Race

was dummy coded as White versus all other races, and marital status was dummy coded as married and/or living with a spouse/partner versus single, widowed, or divorced. Race was significantly associated with marital status at birth, maternal education at birth, and maternal age at birth, and total income at 36 months of age. These correlations suggest that White families have higher income, and White mothers tend to be older, married, and have more education. Marital status, total income, maternal education, and maternal age were all significantly correlated with sleep problems and internalizing problems at 36 months of age. Therefore, these variables will be included as covariates both in the regression models and the mediation models.

Parenting Behaviors and Sex-Based Differences

Bivariate correlations between child sex and the variables of interest indicated that sex was significantly correlated with all parenting behaviors (see *Table 2*). Follow-up t-tests (see *Table 3*) indicated that over-involvement was significantly higher for boys whereas both supportive presence and affective sharing were significantly higher for girls. Because sex-based differences in parenting have been shown to differentially relate to several child outcomes (e.g., Pettit, Bates, & Dodge, 1997), remaining analyses were conducted for boys and girls separately.

Regression Analyses

Separate hierarchical linear regression models for boys and girls were conducted to determine whether each parenting behavior significantly predicted child sleep problems at 36 months. In both models, marital status at 36 months, total income at 36 months, maternal education, and maternal age were entered into block 1, each of the three parenting behaviors

were entered separately in blocks 2 through 4, and sleep problems at 36 months was entered as the dependent variable.

For girls, (see *Table 4*) the inclusion of over-involvement in the model (step 2) resulted in an increase in model significance (F_{change}= 5.08, p= .03). However, neither supportive presence nor affective sharing significantly predicted sleep problems. For boys, none of the parenting behaviors emerged as significant predictors of sleep problems (see *Table 5*). Also, similar to findings for girls, none of the covariates entered in block 1 were significant predictors of sleep problems, and the overall regression model was not significant.

Mediation Analyses

Internalizing symptoms at 36 months (M_i) were examined as a mediator of the relationship between each parenting behavior (X) and concurrent sleep problems (Y) (see *Figure 1*). Three mediational models were computed for boys and girls separately (a total of six models). Marital status at 36 months, total income at 36 months, maternal education, and maternal age were entered as covariates in each model.

For girls, the 95% CI for the effect of over-involvement on sleep problems via internalizing symptoms did not contained zero, indicating a significant indirect effect, 0.41 (0.14), 95% CI [.16, .72]. Further, direct paths from over-involvement to internalizing symptoms and from internalizing symptoms to sleep problems were both significant (see *Figure 2*). Specifically, higher levels of over-involvement significantly contributed to greater internalizing symptoms. The direct effect of over-involvement on sleep problems was no longer significant when including internalizing symptoms in the model, β= 0.52, SE= 0.45, t(541)= 1.16, p= 0.25, 95% CI [-.36, 1.41] indicating internalizing symptoms fully mediated this relationship. No significant indirect effects were found in models examining supportive

presence and affective sharing as predictors of sleep problems via internalizing symptoms (see *Figures 3* and *4*). Further, paths from supportive presence and affective sharing to internalizing symptoms were also insignificant. However, internalizing symptoms significantly predicted sleep problems across all three models for girls.

For boys, significant indirect effects were found for two mediational models. The 95% CI for the effect of supportive presence on sleep problems via internalizing symptoms did not contain zero, indicating a significant indirect effect, -0.26 (0.10), 95% CI [-.47, -.08] (see *Figure 6*). Additionally, the 95% CI for the effect of affective sharing on sleep problems via internalizing symptoms did not contain zero, -0.28 (0.09), 95% CI [-.48, -.13] (see *Figure 7*). However, for both models, the paths from these parenting behaviors to sleep problems were not significant, regardless of whether internalizing symptoms were included in the models (i.e., both the total and direct effects). The path from over-involvement to internalizing symptoms was also not significant (see *Figure 5*), however paths from supportive presence and affective sharing to internalizing symptoms were significant (see *Figures 6* and *7*). Specifically, higher levels of supportive presence and affective sharing significantly contributed to lower levels of internalizing symptoms in boys. Similar to results for girls, the paths from internalizing symptoms to sleep problems were significant across all three models.

Post Hoc Analyses

Even in the absence of a significant association between the predictor and the outcome (or a significant total effect), a predictor may still exert an indirect effect on an outcome through a mediator (Hayes, 2013; Shrout & Bolger, 2002). One potential reason for an insignificant total effect in the presence of a significant indirect effect may be due to

suppression. Suppression is indicated when the direct effect (path *c'* in *Figure 1*) and the indirect effect (path $a_i b_i$ in *Figure 1*) have opposite signs (Shrout & Bolger, 2002). Since the total effect represents the sum of both the direct and indirect effects, the direct and indirect effects may be working against each other to produce a total effect closer to zero. However, because the direct and indirect effects are both negative in the models for boys and the direct effect is also insignificant, the significant indirect effects found for boys are not interpreted as evidence of mediation.

Discussion

The aim of this study was to examine how parenting behaviors theoretically related to the development of emotion regulation in pre-school children predict concurrent sleep problems. Although previous studies have focused on sleep-related parenting behaviors specifically, the current study sought to understand relationships between parenting behaviors in general and children's sleep. We examined these relationships for boys and girls separately (based on established sex-based differences in parenting) as well as the mediational role of internalizing symptoms. We found greater levels of maternal over-involvement during a cleanup task significantly predicted more sleep problems among girls. Broadly, parental intrusiveness can decrease opportunity for children to independently regulate emotion and behavior in order to build the skills necessary for increasing autonomy (Kochanska & Aksan, 1995). These skills are also important for decreasing arousal and self-soothing at night to facilitate independent initiation of sleep (Anders, 1994). The current findings suggest that even when not occurring during bedtime routines specifically, parental over-involvement may contribute to girls' sleep problems, theoretically by interrupting emotion regulation skills.

Interestingly however, even though rates of maternal over-involvement were significantly higher for boys than girls, this parenting behavior was not a significant predictor of sleep problems for boys. Because boys typically demonstrate greater behavioral problems than girls (Campbell, 1995; Campbell, Shaw, & Gilliom, 2000), mothers may have intruded more with boys in order to manage their behavior during a task that required child compliance. Thus, over-involvement (as assessed in this study) may have been somewhat more adaptive for boys by providing them with greater structure and direction for completing

the task successfully. Additionally, because previous research has shown that girls are provided with lower levels of autonomy support and fewer early experiences of positivity relative to boys (Biringen et al., 1999; Pomerantz & Ruble, 1998), over-involvement may disrupt the broader nature of the mother-daughter relationship, contributing to greater sleep problems in girls only.

Contrary to hypotheses, neither maternal supportive presence nor affective sharing significantly predicted sleep problems for girls or boys. This finding is inconsistent with previous research demonstrating an association between positive parenting behaviors and children's sleep (Adam et al., 2007; Bell & Belsky, 2008; Spilsbury et al., 2005). Notably however, many studies finding significant associations have utilized a composite of maternal behaviors to represent broader parenting constructs, such as maternal sensitivity (Bell & Belsky, 2008). Although investigations of more specific maternal behaviors such as supportive presence and affective sharing allow for differentiation among potential targets for intervention, these individual behaviors may be less predictive of children's sleep when examined in isolation. Moreover, the presence of positive parenting behaviors may only impact sleep to the extent that they occur contextually (i.e., during the sleep onset period or during the night).

We also examined the role of child internalizing symptoms as a mediator of relationships among parenting behaviors and sleep problems based on research demonstrating sleep and internalizing symptoms are reciprocally related (see Gregory & Sadeh, 2012). However, no studies have examined internalizing symptoms as a possible mediator accounting for the relationship between parenting behaviors and sleep problems in preschoolers. Similar to prior research, results indicated that internalizing symptoms were

significantly associated with sleep problems for both girls and boys. Therefore, in preschoolers presenting with sleep problems, these results emphasize the importance of assessing and targeting internalizing symptoms as part of sleep interventions, regardless of child sex.

Unlike the relationship between internalizing symptoms and sleep problems, several sex-based differences in relationships between maternal behavior and internalizing symptoms were found in mediational models. For boys only, higher levels of supportive presence and affective sharing significantly were protective for internalizing symptoms, but these two maternal behaviors did not consequently predict fewer sleep problems. However, other sleep-related behaviors were not assessed in this study and may be important for future studies to consider. For example, parental presence at sleep onset or co-sleeping can interfere directly with child self-regulation of the sleep-wake cycle by fostering a dependency on the caregiver in order to initiate sleep (Mindell, Kuhn, Lewin, Meltzer, & Sadeh, 2006). Co-sleeping in preschoolers is also associated with poorer overall sleep hygiene (i.e., sleeping in more than one location, inconsistent bed/wake times), which further exacerbates sleep problems (Hayes, Parker, Sallinen, & Davare, 2001).

Alternatively, for girls only, higher levels of over-involvement significantly contributed to greater internalizing symptoms. In turn, internalizing symptoms fully explained the relationship between over-involvement and sleep problems. This finding corresponds with other research suggesting that preschool-age girls may be more vulnerable to the deleterious effects of intrusive or over-controlling parenting practices, which directly contribute to symptoms of anxiety/depression in girls only (Denham et al., 1991). Although results from this study revealed greater levels of maternal over-involvement within mother-

son dyads, this specific parenting behavior appears to function differently in boys and girls. Girls may ultimately have fewer experiences with controllability, contributing to a lower sense of self-efficacy and greater risk for internalizing and sleep problems (Barlow, 2002). Thus, it may be the nature of these interactions rather than their frequency that serves to influence internalizing and sleep-based outcomes. Accordingly, sleep interventions that target specific over-involvement behaviors in mother-daughter dyads may be helpful for addressing both internalizing and sleep problems in preschool-age girls.

Additionally, although mediational models represent current interactions between mothers and their children which limit making any inferences about causality, it is possible that maternal over-involvement may strengthen pre-existing internalizing problems in girls but not boys. For example, girls who tend to be more behaviorally inhibited (i.e., a pattern of responding with withdrawal and fear) may be more likely than boys to elicit a parenting style that is more controlling/over-involved, especially given prevailing maternal beliefs that girls are less emotionally controlled and require greater parental involvement to manage their negative affective states (Kingsbury & Coplan, 2012). Results from this study support this hypothesis by demonstrating over-involvement contributes to internalizing symptoms in girls but not boys. Given the robust link between internalizing problems and sleep, it is not surprising then that over-involvement contributes to problems in both domains. Unfortunately, because direct observations of child inhibition or fearful behavior during interaction tasks were unavailable, bidirectional relationships could not be explored. Regardless, these results add significantly to our understanding of how daytime parental behaviors differentially impact sleep problems for boys and girls.

Limitations and Future Directions

Despite the numerous strengths of the present study, several limitations must be considered. Measuring parenting behaviors via direct observation is more objective than relying on self-reports, however, coding descriptions for behaviors examined in the current study, to some extent, incorporated overlapping or non-specific behaviors. For example, mother-child dyads who scored high on affective sharing may have exchanged high levels of either positive or negative emotion. Although the coding data stated that most dyads shared at least one pleasurable moment, the extent to which the predominant valence of these exchanges was more positive or more negative likely decreases the predictive utility of this construct. Additionally, maternal behaviors lower on this scale incorporated a range of responses from aloofness to outright hostility, which is also likely to have very different effects on the outcomes of interest.

Several other aspects of the parent-child interactions present additional challenges. The two tasks selected (i.e., a play interaction and a clean-up task) were advantageous for ensuring that the maternal behaviors of interest would be elicited, and lab-based observation also facilitates adequate control of other potential environmental confounds. However, observing mothers in the lab introduces the possibility of bias in maternal behavior. Future studies would strengthen ecological validity by observing dyads more naturalistically in the home setting. Importantly, parent-child interactions in this study focused on mothers; however fathers and/or other caregivers in the home have a significant impact on both maternal parenting behaviors and child functioning and might have served to dilute some of the relationships examined. Paternal influences are also especially important when considering their impact on sex differences in emotion socialization strategies (Garner et al., 1997). Therefore, future studies should incorporate the behavior of other primary caregivers

in the interactive context. Also, examining bidirectional effects of specific child behaviors on parenting behaviors would provide more insight into the nature of these relationships.

It is also notable that models ultimately accounted for a small proportion (about 2%) of the variance in child sleep outcomes. However, these findings are consistent with the small effect sizes found in many studies examining parental influences on child adjustment (Rothbaum & Weisz, 1994). For example, a study by Bordeleau and colleagues (2012) found that an overall composite of several broad maternal behaviors (e.g., maternal sensitivity, autonomy support, and mind-mindedness) predicted around 11% of the variance in preschooler's sleep, however each of the constructs failed to significantly predict sleep problems individually. Because the behaviors examined in the present study represented even narrower and more specific aspects of maternal behavior, the small effect sizes are not surprising. Regardless, daytime interactions may be less relevant to child sleep or may differ considerably from nighttime parenting practices in the prediction of sleep problems when compared with other sleep-related parenting behaviors. For example, establishing nightly bedtime routines and consistent bedtimes have been shown to improve sleep problems in young children (Mindell et al., 2006). Further, the maternal behaviors selected in this study may exert greater and more enduring effects at other more critical developmental periods, like when children are initially learning to self-soothe during infancy and early toddlerhood. Therefore, future research should aim to determine which parental behaviors are the most predictive of sleep problems in this age group by examining predictors both concurrently and longitudinally across early childhood.

Although the significant relationship found between sleep problems and anxiety/depressive symptoms is strongly supported in previous research (Gregory & Sadeh,

2012), both internalizing symptoms and sleep problems in this study were captured via maternal report from the same measure. Therefore, shared measurement variance needs to be considered. These results would be strengthened by examining information from multiple informants and by utilizing various subjective and objective measures of child sleep. Parental report of subjective sleep problems from the CBCL is often cited as a reliable indicator of child sleep (Gregory et al., 2011), however the inclusion of objective sleep data would provide greater support for these findings.

Implications and Conclusions

These findings have several important clinical implications. Interventions focusing on child sleep problems typically target sleep-related parenting behaviors specifically. However, findings from the present study suggest that maternal over-involvement more broadly (e.g., in daytime interactions) significantly contributes to sleep problems in girls. Since clinicians are not present at night to observe sleep-related parenting behaviors directly, these findings highlight the potential benefit of targeting specific parental behaviors during daytime interactions, which can be more readily observed and modified during appointments with a clinician. Alternatively, although not directly assessed in this study, boys' sleep problems may be better addressed by helping parents to improve limit-setting strategies more generally. Additionally, because internalizing symptoms were highly related to sleep problems in both sexes and explained the relationship between over-involvement and sleep in girls, preschoolers with sleep problems will likely benefit from evaluation and intervention for these symptoms. In conclusion, results from this study contribute to our understanding of how broader parenting behaviors relate to sleep problems differently in a non-clinical

population of preschool-age girls and boys, which may serve to increase effectiveness of sleep intervention efforts in young children.

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Table 1. Comparison of Demographic Information between Completers and Non-Completers

	Completers (*N*=1181)	Non-completers (*N*=183)	$\chi 2/t$ Statistic	*p* value
Female (*n*/%)	575 (48.7%)	84 (45.9%)	0.49	0.48
Child race/ethnicity			27.60	0.00***
White (*n*/%)	975 (82.6%)	122 (66.7%)		
Black (*n*/%)	134 (11.3%)	42 (23.0%)		
Asian/Pacific Islander (*n*/%)	18 (1.5%)	4 (2.2%)		
Other (*n*/%)	3 (0.3%)	2 (1.1%)		
Income at 1 month			2.96	0.00**
<$20 K (*n*/%)	294 (26.5%)	78 (48.4%)		
$20-$40 K (*n*/%)	407 (36.7%)	48 (29.8%)		
$40-$60 K (*n*/%)	224 (20.2%)	15 (9.3%)		
$60-$80 K (*n*/%)	85 (7.7%)	9 (5.6%)		
$80-$100 K (*n*/%)	43 (3.9%)	5 (3.1%)		
>$100 K (*n*/%)	57 (5.1%)	6 (3.7%)		
Marital status at 1 month			41.65	0.00***
Married (*n*/%)	936 (79.3%)	108 (59.3%)		
Partnered/living together (*n*/%)	94 (7.9%)	28 (15.4%)		
Single (*n*/%)	131 (11.1%)	41 (22.5%)		
Separated/divorced/widowed (*n*/%)	11 (0.9%)	4 (2.2%)		
Maternal education at 1 month			5.46	0.00***
High school degree/GED (*n*/%)	242 (20.5%)	45 (24.7%)		
Associate's degree/some college (*n*/%)	388 (32.9%)	67 (36.8%)		
Bachelor's degree (*n*/%)	266 (22.5%)	18 (9.9%)		
Master's or doctoral degree (*n*/%)	182 (15.4%)	16 (8.8%)		
Maternal age in years (*M*/*SD*)	28.42 (5.56)	26.10 (5.67)	5.23	0.00***

Note. ** p<0.01, *** p<0.001

Table 2. Descriptive Statistics and Pearson's Bivariate Correlations among Key Demographic Variables and Variables of Interest

	1	2	3	4	5	6	7	8	9	10	11
1. Child Sex (Female)	-										
2. Race: White	-.02	-									
3. Married and/or living with spouse/partner	.00	.27**	-								
4. Total Income	.06	.18**	.34**	-							
5. Maternal education	.04	.20**	.28**	.49**	-						
6. Maternal age	.03	.26**	.31**	.45**	.55**	-					
7. Supportive presence	.07*	.28**	.24**	.33**	.39**	.35**	-				
8. Affective sharing	.10**	.22**	.21**	.28**	.35**	.29**	.08**	-			
9. Over-involvement	-.10**	-.18**	-.10**	-.09**	-.16**	-.13**	-.21**	-.18**	-		
10. Sleep problems	.00	-.03	-.07*	-.06*	-.10**	-.06*	-.08**	-.07*	.09**	-	
11. Internalizing symptoms	.04	-.12**	-.14**	-.18**	-.26**	-.21**	-.19**	-.18**	.12**	.35**	-
Mean							5.28	5.25	1.38	54.70	51.28
Standard deviation							1.32	1.34	0.75	6.23	9.50

Note. *p<0.05, ** p<0.01

Table 3. T-Tests Comparing Parenting Behaviors by Sex at 36 Months

	Males (*N*=605)		Females (*N*=570)		
Parenting Behavior	*M*	*SD*	*M*	*SD*	*t*
Over-involvement	1.44	0.82	1.30	0.65	3.27***
Supportive presence	5.19	1.33	5.37	1.29	-2.39*
Affective sharing	5.13	1.39	5.39	1.29	-3.28***

Note. *p<.05, ***p=.001.

Table 4. Hierarchical Regression Models Predicting Sleep Problems at 36 Months For Females Only

	Step 1				Step 2			
Variable	*B*	*SE (B)*	*β*	*p*	*B*	*SE (B)*	*β*	*p*
Marital status	-0.80	0.82	-0.05	.327	-0.63	0.82	-0.04	.445
Total income	0.00	0.00	-0.02	.693	0.00	0.00	-0.02	.637
Maternal education	-0.22	0.14	-0.09	.104	-0.18	0.14	-0.07	.188
Maternal age	0.01	0.06	0.01	.869	0.02	0.06	0.01	.797
Over-involvement					0.96	0.42	0.10	.025
R^2	0.014				0.023			
F	1.85				2.51*			
	Step 3				Step 4			
Variable	*B*	*SE (B)*	*β*	*p*	*B*	*SE (B)*	*β*	*p*
Marital status	-0.63	0.83	-0.04	.447	-0.64	0.84	-0.04	.447
Total income	0.00	0.00	-0.02	.635	0.00	0.00	-0.02	.638
Maternal education	-0.18	0.14	-0.07	.190	-0.18	0.14	-0.07	.191
Maternal age	0.02	0.06	0.01	.805	0.02	0.06	0.01	.805
Over-involvement	0.96	0.43	0.10	.026	0.96	0.43	0.10	.027
Supportive presence	0.01	0.24	0.00	.960	0.00	0.36	0.00	.994
Affective sharing					0.12	0.35	0.00	.972
R^2	0.023				0.023			
F	2.09*				1.78[a]			

Note. *p<.05, [a]p=.088.

Table 5. Hierarchical Regression Models Predicting Sleep Problems at 36 Months For Males Only

	Step 1				Step 2			
Variable	*B*	*SE (B)*	*β*	*p*	*B*	*SE (B)*	*β*	*p*
Marital status	-1.18	0.83	-0.06	.154	-1.16	0.82	-0.06	.160
Total income	0.00	0.00	0.03	.568	0.00	0.00	0.03	.578
Maternal education	-0.24	0.13	-0.10	.065	-0.23	0.13	-0.09	.082
Maternal age	-0.01	0.06	-0.01	.870	-0.01	0.06	-0.00	.931
Over-involvement					0.48	0.33	0.06	.149
R^2	0.014				0.018			
F	2.06[a]				2.07[b]			
	Step 3				Step 4			
Variable	*B*	*SE (B)*	*β*	*p*	*B*	*SE (B)*	*β*	*p*
Marital status	-1.11	0.82	-0.06	.178	-1.12	0.82	-0.06	.176
Total income	0.00	0.00	0.04	.442	0.00	0.00	0.04	.410
Maternal education	-0.18	0.14	-0.08	.181	-0.17	0.14	-0.07	.204
Maternal age	0.00	0.06	0.00	.945	0.00	0.06	0.00	.977
Over-involvement	0.40	0.33	0.05	.224	0.39	0.33	0.05	.236
Supportive presence	-0.36	0.23	-0.07	.115	-0.16	0.34	-0.03	.648
Affective sharing					-0.25	0.32	-0.05	.436
R^2	0.022				0.023			
F	2.14*				1.92[c]			

Note. *p<.05, [a]p=.085, [b]p=.068, [c]p=.064.

Figure 1. Model 4: Conceptual and Statistical Diagram of PROCESS Mediational Model

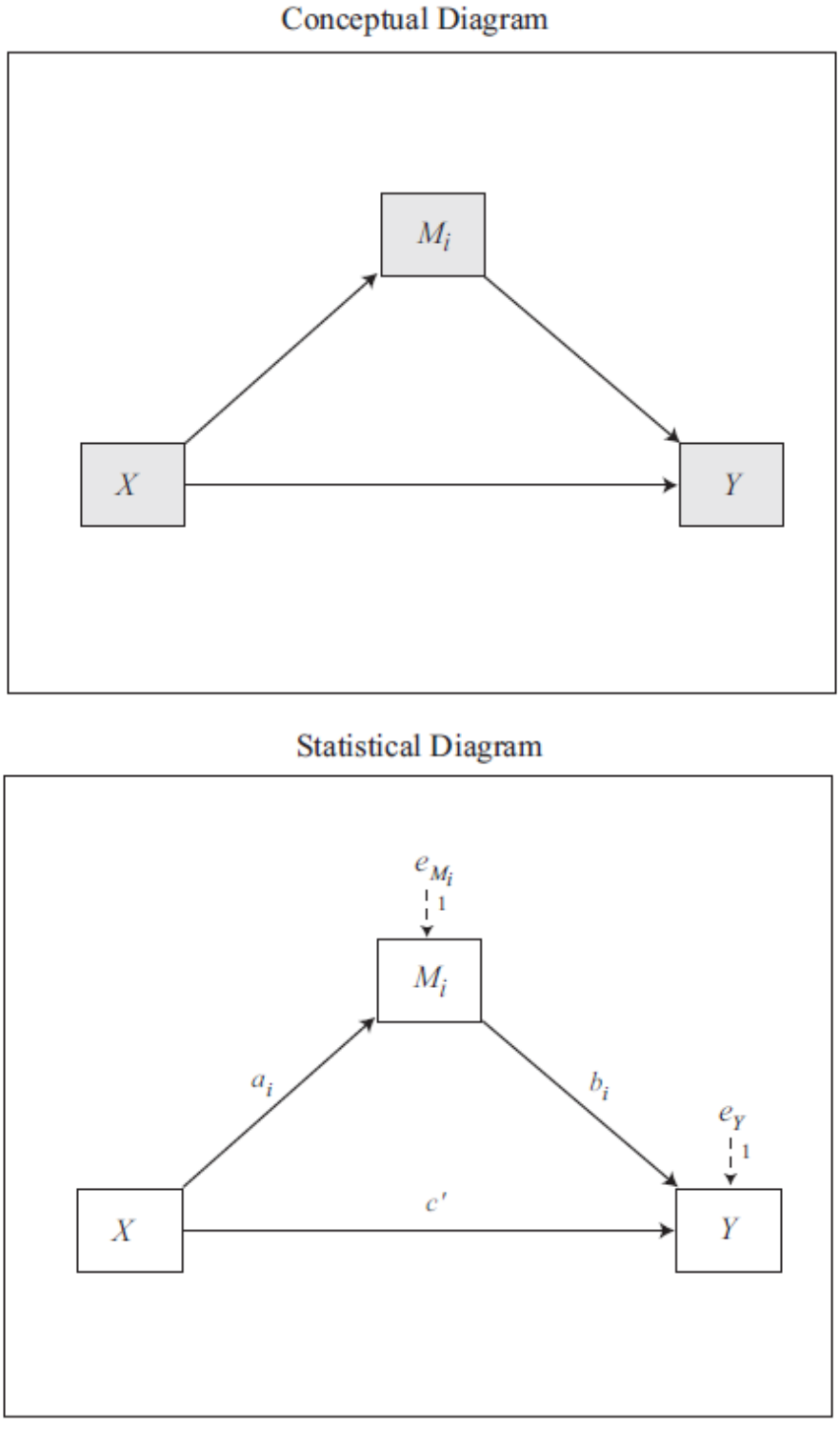
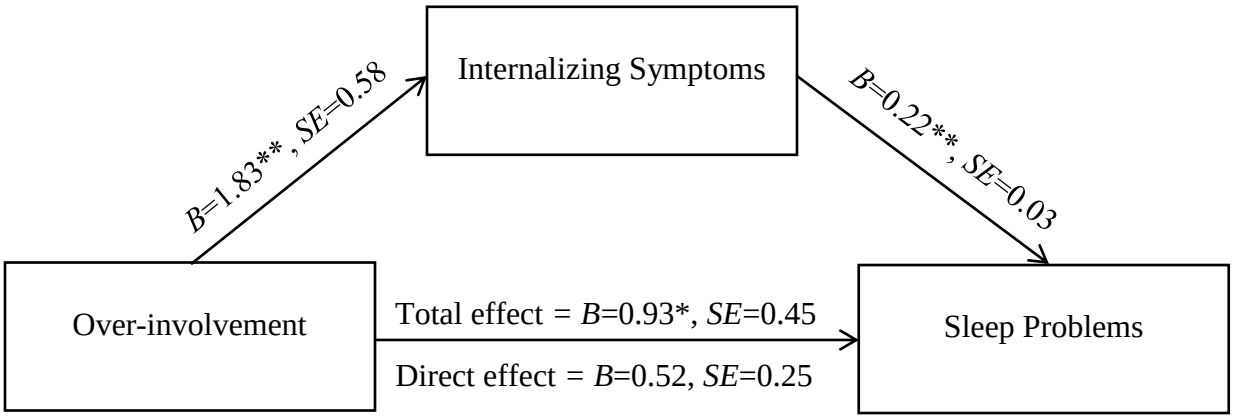
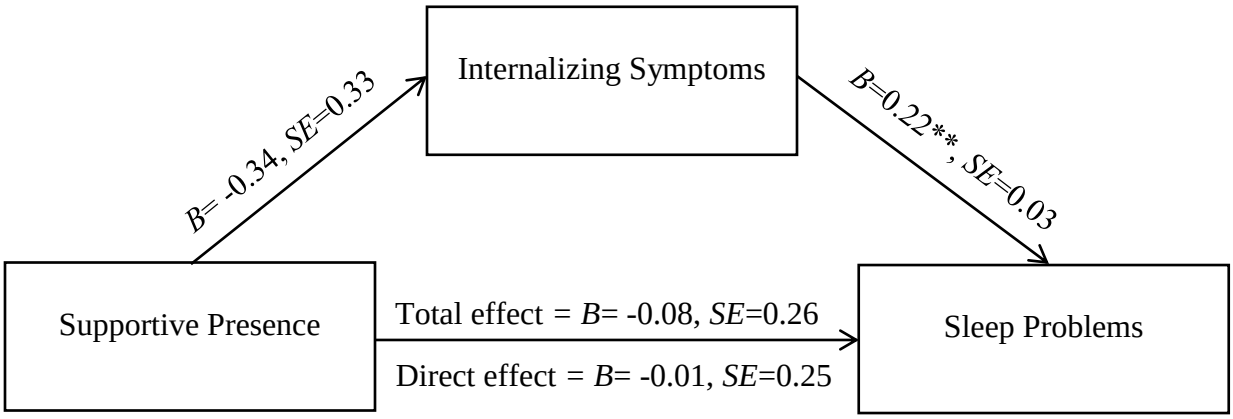


Figure 2. Direct and Indirect Effects of Over-involvement Predicting Sleep Problems through Internalizing Symptoms for Females Only



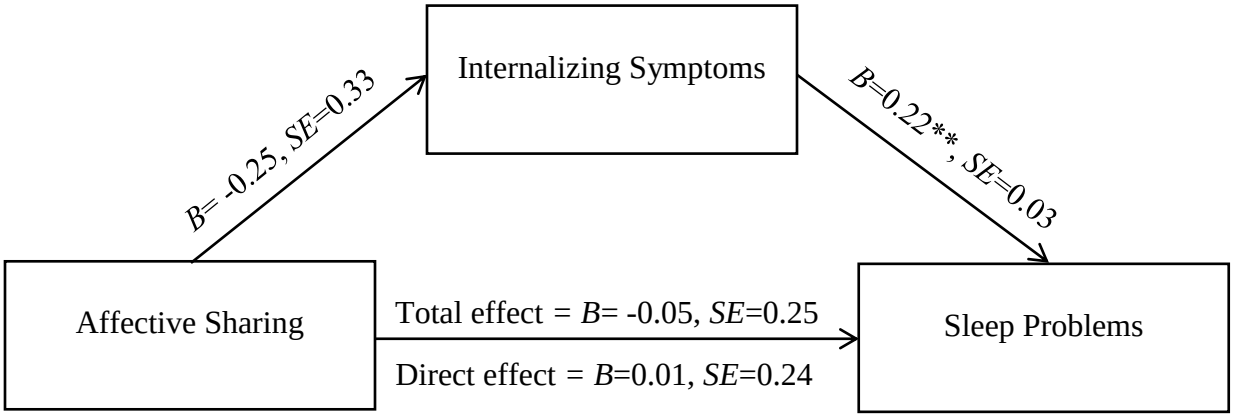
Note. Figure represents unstandardized path coefficients of direct and indirect effects. Covariates included marital status at 36 months, total income at 36 months, maternal education, and maternal age. *$p < 0.05$, **$p < 0.01$. Total effect = path c, Direct effect = path c'.

Figure 3. Direct and Indirect Effects of Supportive Presence Predicting Sleep Problems through Internalizing Symptoms for Females Only



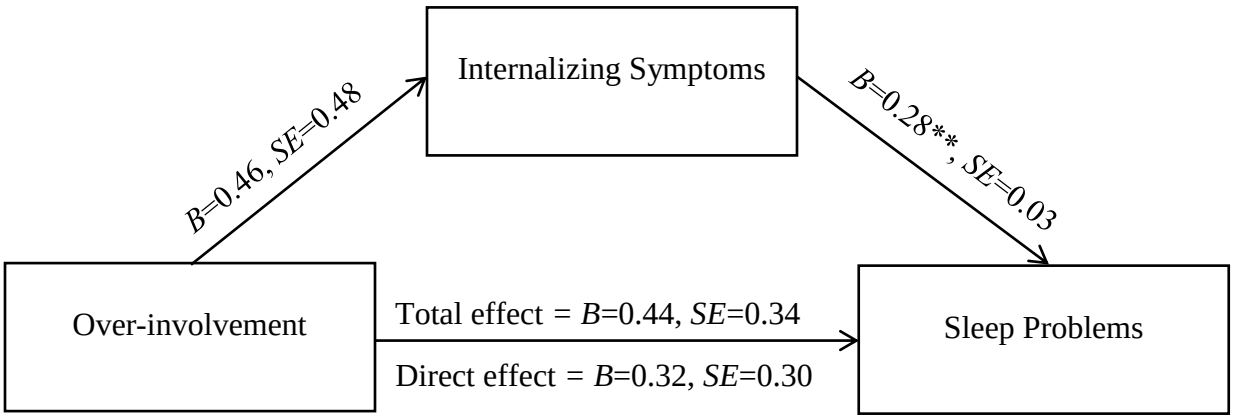
Note. Figure represents unstandardized path coefficients of direct and indirect effects. Covariates included marital status at 36 months, total income at 36 months, maternal education, and maternal age. *$p < 0.05$, **$p < 0.01$. Total effect = path c, Direct effect = path c'.

Figure 4. Direct and Indirect Effects of Affective Sharing Predicting Sleep Problems through Internalizing Symptoms for Females Only



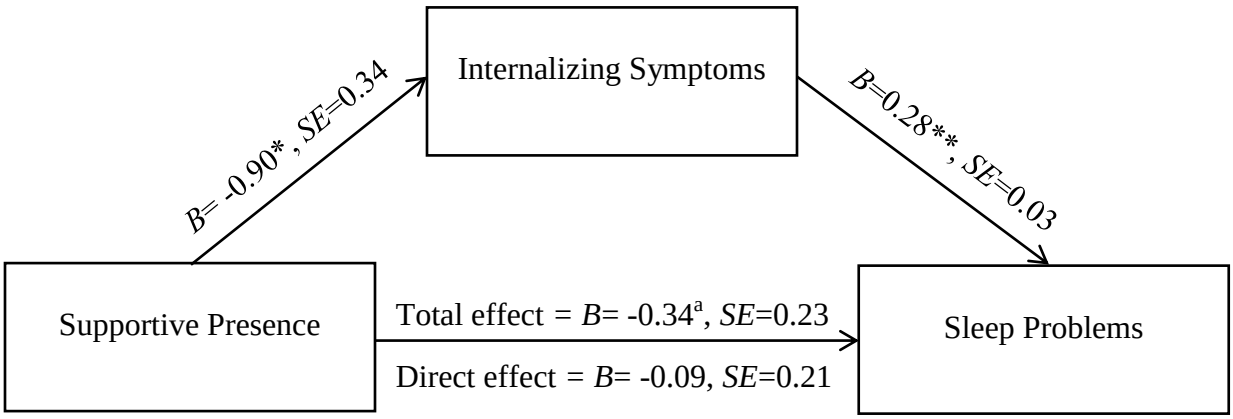
Note. Figure represents unstandardized path coefficients of direct and indirect effects. Covariates included marital status at 36 months, total income at 36 months, maternal education, and maternal age. *$p < 0.05$, **$p < 0.01$. Total effect = path c, Direct effect = path c'.

Figure 5. Direct and Indirect Effects of Over-involvement Predicting Sleep Problems through Internalizing Symptoms for Males Only



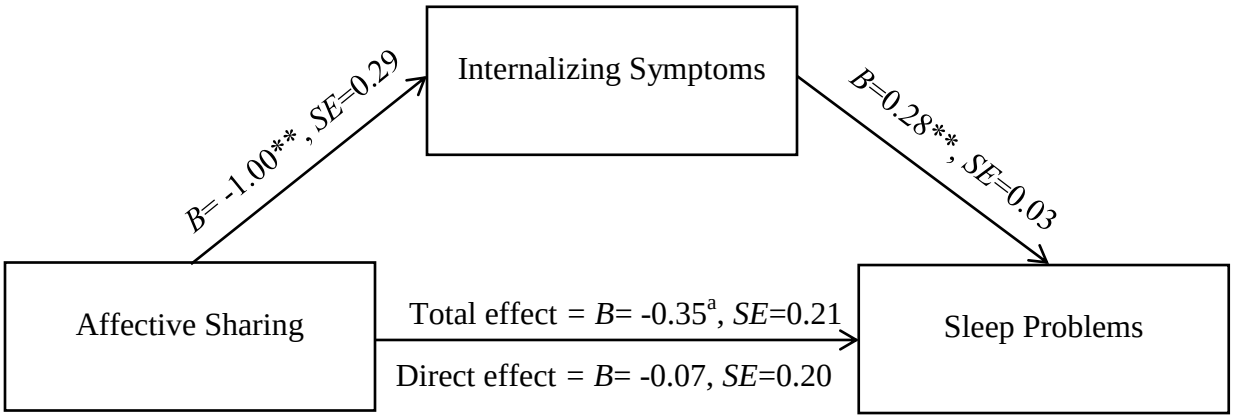
Note. Figure represents unstandardized path coefficients of direct and indirect effects. Covariates included marital status at 36 months, total income at 36 months, maternal education, and maternal age. *$p < 0.05$, **$p < 0.01$. Total effect = path c, Direct effect = path c'.

Figure 6. Direct and Indirect Effects of Supportive Presence Predicting Sleep Problems through Internalizing Symptoms for Males Only



Note. Figure represents unstandardized path coefficients of direct and indirect effects. Covariates included marital status at 36 months, total income at 36 months, maternal education, and maternal age. [a]$p = 0.14$, *$p < 0.05$, **$p < 0.01$. Total effect = path c, Direct effect = path c'.

Figure 7. Direct and Indirect Effects of Affective Sharing Predicting Sleep Problems through Internalizing Symptoms for Males Only



Note. Figure represents unstandardized path coefficients of direct and indirect effects. Covariates included marital status at 36 months, total income at 36 months, maternal education, and maternal age. [a]$p = 0.10$, *$p < 0.05$, **$p < 0.01$. Total effect = path c, Direct effect = path c'.