

PARENT-CHILD CONFLICT AND CHILDREN'S SLEEP: ATTACHMENT
SECURITY AS A MODERATOR OR MEDIATOR

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THESIS ABSTRACT
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Findings in recent years have highlighted sleep problems in children as a growing epidemic throughout the world (National Sleep Foundation, 2004; Sadeh, Raviv, & Gruber, 2000). Dahl and El-Sheikh (2007) propose that in order for children to sleep well, they must feel secure enough to reach a state of lowered vigilance and the family is an important place where this security is drawn. Parent-child conflict can be a severely distressing event for children (Lewis, Siegel, & Lewis, 1984) and has been associated with various child adjustment problems (Barber & Delfabbro, 2000). However, the research is scarce concerning parent-child conflict as a factor in children's sleep. Though a few studies have been able to show the role that parent-child interactions play in outcomes such as the amount of sleep in children (Adam, Snell, & Pendry, 2007; Bates et al., 2002), results are inconsistent. Attachment security has also been shown to be

associated with various child adjustment outcomes (add citation). This study will provide a clearer understanding of associations between parent-child conflict, attachment security, and sleep difficulties in children.

The sample consisted of 136 children (76 girls) ages 8 to 12 ($M = 10.69$, $SD = .55$). 70% of families were European American (EA) and 30% were African American (AA). The sample encompassed the full range of socioeconomic levels as determined by the five factor Hollingshead Index. Children reported on their own sleepiness and sleep/wake problems, as well as on levels of parent-child conflict and attachment security. Both parents reported on parent-child conflict and general sleep problems in children. Actigraph devices were worn by children to assess sleep activity.

Results indicated significant direct links between both parent-child conflict and subjective reports of sleep problems, as well as between attachment security and sleep problems. Direct effects were stronger when child-reports of physical conflict were considered, which may indicate an increased risk for children's sleep problems in the context of physical conflict rather than psychological. Further, findings support attachment security as a moderator in the link between physical parent-child conflict (parent report) and subjective sleep problems (parent and child reports). Mediation effects for attachment security were only found in the link between parent-report of psychological parent-child conflict and sleep/wake problems in children. Implications for further research concerning the parent-child relationship are discussed.

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CHAPTER 1

EXTENDED LITERATURE REVIEW

Recent findings have highlighted sleep problems in children as a growing epidemic throughout the world (National Sleep Foundation, 2004; Sadeh, Raviv, & Gruber, 2000; Thome & Skuladottir, 2005). Sleep problems that are most often researched include night awakenings, trouble falling asleep and staying asleep, inadequate quantity and quality of sleep, and daytime sleepiness. Evidence indicates that sleep problems have negative effects on various areas of children's functioning, including academic performance, cognition, and behavior. However, additional research is needed on the factors contributing to the presence of non-clinical sleep problems in normally developing children.

Dahl and El-Sheikh (2007) propose that in order for children to sleep well, they must feel secure enough to allow themselves to function at a state of lowered vigilance. For children, the family is ideally the source of this needed security. Recent research has focused on the role that family relationships play in the occurrence of sleep problems in children. Specifically, links between marital conflict and numerous child adjustment problems, including sleep, have been established (El-Sheikh, Buckhalt, Mize, & Acebo, 2006). However, there is a gap in the literature concerning parent-child conflict and child-parent attachments as factors that may be associated with children's sleep, especially in school-aged children.

In the current study, three different models were examined to clarify relations between children's sleep disruptions, parent-child conflict, and attachment security. An additive model was examined to consider direct links between parent-child conflict and children's sleep, as well as attachment security and children's sleep; additional variance explained by each variable after controlling for the other constituted tests of the additive model. A second model considered mediation effects examining attachment security as the variable that accounts for the link between parent-child conflict and sleep problems. The study also examined a model of moderation in which attachment security affects the strength of the relations between parent-child conflict and children's sleep disruptions. First, a review of the literature concerning the prevalence of non-clinical sleep problems in children and their effects on child functioning will be presented. Next, the scarce literature concerning parent-child conflict and its role in the development of children's sleep problems will be discussed. Lastly, attachment security in children will be discussed as a potential mechanism involved in the link between parent-child conflict and children's sleep problems. In this thesis, sleep problems refer to non-clinical disruptions in the amount or quality of sleep in community samples.

Prevalence of Sleep Problems in Children

Sleep disruptions (i.e., reduced amount of sleep that may be accompanied by increased activity and prolonged night wakings) in American children occur at a rate of 20% to 40% (Mindell, Owens, & Carskadon, 1999; Spruyt et al., 2005). According to the National Sleep Foundation, American children get less than the optimal amount of sleep (10-11 hours) each night, averaging about 9.5 hours. A number of studies demonstrate

the high prevalence of sleep problems in children. For example, with a sample of third, fourth, and fifth graders ($N = 972$), parents reported that 43% of the sample exhibited one or more sleep problems (i.e., quality and quantity) that lasted for at least 6 months (Kahn, et al., 1989). In a study based on a sample of 150 normally developing preschool age children, findings suggest that 47% of parents report the presence of at least one sleep problem (Thome & Skuladottir, 2005). Other recent findings based on parent-report suggest that sleep problems often persist over time. Specifically, children experiencing sleep problems in preschool were more likely to also have difficulty sleeping in infancy based on parental retrospective reports. In a longitudinal study conducted by Gregory and colleagues (2005), parental reports of sleep problems in approximately 1,000 children were obtained at ages 5, 7, 9, and 11. During those years, 12% of the children were reported to have persistent sleep problems throughout childhood (Gregory, Caspi, Eley, Moffitt, O'Connor, & Poulton, 2005). These findings indicate that sleep problems in young children are often persistent over time and may hinder development if not addressed with appropriate treatment.

As children reach pre-adolescence, researchers are more likely to measure sleep problems using child self-report. This method allows for a better assessment of sleep problems in comparison to parental reports, in that parents may not always know about their children's sleep problems or the extent that the problems may influence them throughout the day. In a study conducted by researchers at the University of Amsterdam in Holland, 449 seventh and eighth graders were asked to complete a questionnaire that inquired about sleep latency (i.e., the time between getting in bed and falling asleep),

latency after night-awakenings, and number of night-awakenings (Meijer, Habekothé, & Van Den Wittenboer, 2000). Fifteen percent reported experiencing poor quality sleep during the night, while 43% indicated difficulty waking up in the morning. Another study with adolescents found that approximately 25% reported insomnia symptoms and 4% had a diagnosable insomnia disorder (Ohayon, Roberts, Zulley, Smirne, & Priest, 2000). Taken together, these findings support the prevalence of sleep problems in otherwise normally developing children.

In addition to subjective measures of sleep disruptions, sleep problems have been examined using objective measures (e.g., polysomnography, actigraphy). The most widely used objective measure of sleep involves the use of actigraphy. This method requires children to wear wrist watches that measure movement during the night. For example, sleep was actigraphically measured in 59 healthy kindergarten children for four to five consecutive nights, while parents were asked to complete daily sleep logs (Tikotzky & Sadeh, 2001). Results indicated that 41% of the children were classified as having clinical levels of sleep problems. This classification was based on the presence of at least three periods of wakefulness a night, each lasting five minutes or more, and a sleep percentage (amount of sleep counted as true sleep) of less than 90%. Interestingly, the sleep diaries completed by parents were highly correlated with the actigraph measures of sleep, with the only notable differences being that parents reported earlier sleep onset times and more total hours of sleep each night than the actigraph results. In a comparable study, sleep patterns in second, fourth, and sixth graders were measured through actigraphy for four to five consecutive nights (Sadeh, et al., 2000). Results indicated that

18% of the children had fragmented sleep and were defined as poor sleepers based on the criteria used in the previous study.

It is clear, therefore, that sleep problems are present in otherwise normally developing children regardless of the age of the child or the method of measurement. It is important to note that sleep problems in children have become nationally recognized in many different populations and cultural contexts. American children ages 6 to 10 are reportedly averaging 9.5 hours of sleep each night and a large percentage of families polled (50%) reported children are getting less than 6.8 hours of sleep each night on average (National Sleep Foundation, 2004). This information is startling considering that the National Sleep Foundation recommends 10 to 11 hours of sleep a night for children (ages 5 to 12) to be the optimal amount for healthy functioning and development. Patterns seem to be similar when findings from other countries are examined. Liu and colleagues (2003) found that children in China ages 7 to 13 were sleeping on average 9 hours per night as compared with the 10 to 11 recommended hours. Findings in Israel similarly indicate that sleep amounts are well below the recommended amount (Sadeh, et al., 2000). Taken together, the research clearly shows that sleep problems in children and young adolescents are not only a national concern, but are also prevalent throughout the world.

Effects of Sleep Problems on Child Functioning

The high prevalence of sleep disturbances is an important public health concern, given established links between sleep problems and child functioning. Research indicates that sleep disturbances in children are associated with academic problems (Wolfson &

Carskadon, 2003), cognitive dysfunction (Sadeh, Gruber, & Raviv, 2002), externalizing problems (Fallone, Acebo, Seifer, & Carskadon, 2005; Dahl & Lewin, 2002), and internalizing problems (El-Sheikh, Buckhalt, Cummings, & Keller, 2007). For example, a group of older children completed a self-report questionnaire concerning specific sleep issues such as perceived sleep quality, sleep duration, night awakenings, and amount of time taken to fall asleep (Meijer, et al., 2000). The children completed an assessment concerning their own perception of school performance and motivation (Van der Wolf, 1995) and were also asked to complete the Bourdon-Vos test (Vos, 1992) which measures concentration as a proxy for cognitive performance. Results suggest that the children who reported better quality of sleep also exhibited better school functioning, were better able to consistently concentrate, and had higher self-reported achievement motivation.

In another study, information was gathered concerning sleep quality and quantity using actigraphy and sleep-wake diaries kept by parents (Sadeh, Gruber, & Raviv, 2003). For two nights, all children participating were asked to wear an actigraph to obtain a baseline measure of sleep activity. After this, each of the 77 children in the sample were randomly assigned to a restricted sleep group or an extended sleep group with children in each group adding or taking away one hour from their sleep routine each night. Following three nights of altered sleep schedules, the children's cognitive performance was measured using a series of tests addressing memory, organization, and reaction times. On average, children with extended sleep time either improved or stayed at

baseline, while children with restricted sleep time decreased in cognitive performance (Sadeh, et al., 2003).

In a comparable study, researchers also used parent reports of behavior and belt-worn actigraphs (Aronen, Paavonen, Fjallberg, Soininen, Torronen, 2000). Children who were reported by parents to exhibit more aggressive and delinquent behaviors in the home environment also had greater sleep latency. Furthermore, teachers reported that children receiving shorter, lower quality sleep periods had higher levels of externalizing symptoms such as aggression and inattention in school than children who were receiving more adequate sleep. These findings exemplify that behavior problems can be seen in multiple settings for children who are not receiving adequate, high quality sleep time.

Internalizing behavior problems in children (e.g., depression, worry) have also been found to be linked to sleep problems. Based on a study of over 2,000 students aged 11 to 14, children experiencing less sleep had higher levels of depressive symptoms and lower levels of self-esteem (Fredriksen, Rhodes, Reddy & Way, 2004). Also important to mention is that data were collected from these students at two different waves falling two years apart. When students were reporting that the amount of sleep they were receiving decreased over the two years, they were also reporting heightened depressive symptoms and decreased self-esteem.

Data collected as part of a larger scale longitudinal project indicated that sleep difficulties reported at age four predicted behavioral and emotional problems, aggressive behaviors, and attention difficulties in children at age 15 (Gregory & O'Connor, 2002). These findings are based on parent-report of both sleep problems and

internalizing/externalizing behaviors. In a comparable study of approximately 1,000 participants followed over a 20 to 25-year period, results indicated strong correlations between the presence of significant parent-reported sleep problems throughout childhood and reports of anxiety symptoms in adulthood (Gregory, et al., 2005). The aforementioned studies demonstrate the potential long-reaching effects of childhood sleep problems.

Taken together, results from both the subjectively and objectively derived sleep measures indicate the importance of children's and young adolescents' sleep. Both amount and quality of sleep have been linked to many different aspects of children's functioning on short-term and long-term bases. Most certainly, further research on the many possible effects of sleep problems is needed. Another research direction involves examination of the potential contributors to the development of children's sleep problems. The current study aims to pursue this direction by specifically focusing on parent-child conflict.

Parent-child Conflict and Sleep

Negative interactions in the parent-child relationship have important implications for children's sleep. A broad presentation of parent-child conflict will be addressed here due to the variety of ways in which parent-child conflict is defined and measured. Researchers discuss links between parent-child interactions and sleep problems in the mild forms of discipline styles and parenting practices, as well as more clinical interactions of physical and sexual abuse. Each of these conceptualizations will be

considered, especially in the context of sleep disruptions, though the current study will aim to focus on conflict in the context of discipline.

There have been numerous studies that have examined relations between general parenting behaviors and functioning in childhood, but relatively few that focus on children's sleep. One such study reported significant links between lax discipline and reports of poor sleep quality in a non-clinical population (Owens-Stively, et al., 1997). This finding was based on children (mean age 5.7 years; $SD = 2.7$) and their mothers who had been seen in a primary care clinic for well-child check-ups. Though many mothers acknowledge the appropriateness of firm discipline surrounding bedtime, they have reported difficulty in setting appropriate boundaries with their own children (Sadeh, Flint-Ofir, Tirosh, & Tikotzky, 2007).

It is clear that the parent-child relationship has important implications for child development. Thus, it is important to address more specifically the ways in which negative parent-child interactions can affect children's functioning, including children's sleep. Parent-child conflict is a severely distressing event for children (Lewis, Siegel, & Lewis, 1984) and is associated with various child adjustment problems (Barber & Delfabbro, 2000). The links between negative parent-child interactions and sleep problems in children is a growing focal point for many researchers in child development.

Severe sexual and physical abuse is linked to many severe consequences, including problems surrounding sleep. Moore (1989) states that traumatized children tend to remain hyper-vigilant to potential dangers at all times and because sleeping requires a lowered state of vigilance, it might be seen as threatening for an abused child. One study

addressing abuse used actigraphy to compare sleep functioning in a group of non-abused healthy children with a group of abused children and a group of depressed children all ranging in age from 8 to 10 years (Glod, Teicher, Hartman, & Harakal, 1997). Results indicated that the abused children experienced more difficulty falling asleep and were twice as physically active during the night than the other two groups. Similarly, Sadeh and colleagues (1995) studied a clinical sample of abused children (ages 7 to 14) and found they were more restless during the night than their non-abused counterparts.

Normative parent-child interactions such as parental warmth, discipline practices, and limit-setting can also affect children's sleep. In a recent study, sleep timing and quality in the family context were addressed in a large nationally-representative sample of 5- to 11-year-old children (Adam, Snell, & Pendry, 2007). Daily diaries were completed by the primary caregiver and participant to record sleep-wake times, sleep onset, and sleep duration. The study also obtained primary caregiver reports concerning parental warmth. Findings indicate that longer sleep duration was associated with higher parental warmth (positive interactions) with children (Adam, et al., 2007).

It is important to note however, that the positive relationship between parental warmth and sleep has been an inconsistent finding in the literature. For example, no significant relations between parenting practices (represented by parental warmth, monitoring, and cohesion) and child sleep patterns were found in a low-income community sample (Bates, Viken, Alexander, Beyers, & Stockton, 2002). Information on sleep patterns were kept in daily diaries by parents and the diaries included information about bedtimes, wake times, and estimated total amounts of sleep per night. Parental

warmth was assessed using detailed interviews and in-home observations of parent-child interactions. The contradictory findings in these studies could relate to the alternative methods that were used; self-report of parenting practices (Adam, et al., 2007) versus observations of in-home parent-child interactions (Bates, et al., 2002). Questions therefore remain regarding how parenting practices are related to children's sleep, and it is imperative to examine this relation using both subjective and objective measures.

It is possible that ideal parenting in regards to children's sleep involves a balance between discipline, which sometimes leads to negative parent-child interactions, and warmth, which is characterized by positive interactions. However, research studies specifically addressing children's sleep problems in the context of the parent-child relationship are scarce. Given the importance of security in the context of the family for children to suspend their vigilance and obtain optimal amount and quality of sleep (Dahl, 1996; Dahl & El-Sheikh, 2007), it is of importance to examine specific family functioning domains in relation to children's sleep. In the broader area of child adjustment, parent-child conflict and negative interactions have consistently been found to play an important role in children's adjustment outcomes (El-Sheikh & Elmore-Staton, 2004; El-Sheikh & Flanagan, 2001; Fauber, Forehand, Thomas, & Wierson, 1990). Therefore, given their significance in children's lives, it is necessary for researchers to conduct examinations of the role that interactions in the parent-child relationship such as psychological and physical conflict play in children's sleep. This will help to establish the dimensions of parenting that are most important for optimal amount and quality of children's sleep. A main goal of this study was to examine multiple aspects of the parent-

child relationship, focusing on parent-child conflict and perceived attachment security, in relation to disruptions in children's sleep.

Although the literature is scant regarding the effects of parent-child interactions on children's sleep, results indicate that certain types of interactions (e.g., sexual and physical abuse) can negatively affect the quantity and quality of children's sleep. However, the mechanisms underlying these associations are not as clearly understood. It is important to explore these possible mechanisms that underlie the significant links between parenting and children's sleep, to clarify which parent-child factors are consistently associated with children's sleep. In this study, perceived attachment security was examined as a potential mediator and moderator in relation to parent-child conflict and children's sleep disruptions.

The Role of Attachment

From birth, children begin to form affectional ties to significant people surrounding them, usually primary caregivers, which results in consistent attempts to remain in close proximity to that person (Ainsworth, 1970; Bretherton, 1997). According to attachment theory, the parent or primary caregiver must ideally function not only as protector, but also as a secure base from which the child can explore the environment (Bowlby, 1973). As attachments form, children develop mental representations of how they view their primary relationships. Children then use these images as models to help them relate to other people in their lives. Insecurely attached children have been shown to be at risk for a variety of adjustment problems, which could perhaps be because of their view of relationships as being unreliable or because they are likely to become

emotionally distressed and dysregulated in threatening situations (Bowlby, 2006; Colin, 1996).

In infancy, attachment behavior is typically measured using the Strange Situation paradigm (Ainsworth, 1970). This laboratory procedure is used to observe attachment and exploratory behavior in infants in three different situations – with the primary caregiver present in an unfamiliar place, after the entrance of a stranger, and during brief separations from and reunions with the primary caregiver. The child's reaction to the return of the caregiver classifies the infant as securely or insecurely (ambivalently or avoidantly) attached. Generally, children who are securely attached seek out their caregiver after they return, and are then easily comforted and able to return to exploration. Insecure-avoidant children respond to the returning caregiver with a lack of proximity seeking behavior, and are rejecting of caregivers attempts to comfort. If children are classified as insecure-ambivalent, they are generally distressed by separation and are not easily comforted upon being reunited with their primary caregiver.

The current study used the conceptual framework of child-parent attachment but considered attachment using children's reports of their own perceived attachments. While the Strange Situation is useful in infancy, it is less appropriate for older children (Gullone & Robinson, 2005). School-aged children have had more social interactions outside of the caregiver-child relationship and are not as easily distressed when separated from their caregivers. However, school-age children are able to report on their perceptions of the parent-child relationship, which in secure children are ideally characterized by warm, sensitive, and consistent interactions. In contrast, insecurely attached children often

experience inconsistent parent-child relationships that leave them feeling insecure. Thus, self-reports of attachment security are often preferred for this age group (Gullone & Robinson, 2005).

Secure attachments are especially important in helping children to feel safe in their environments. Dahl (1996) proposes that sleep and vigilance are opponent processes – to reach a state of deep sleep there must be a relative cessation in awareness. For all species, sleep most often occurs in places that promote feelings of safety, due to the lowered state of awareness needed to obtain optimal sleep. The familial context is ideally a secure place for humans where they can feel relaxed enough to get quality sleep. However, if there are repetitive, destructive (high frequency and intensity) conflictual interactions in the family environment, children will become sensitized to that conflict (Cummings & Davies, 1996). Children who are exposed to destructive conflict tend to be sensitized to conflict through repeated exposure and exhibit higher levels of vigilance and distress than those who are less often exposed to conflict (El-Sheikh, et al. 2006; El-Sheikh, et al., 2007). Therefore, it is likely that a safe, secure family environment will contribute to high quality sleep, whereas stressful interactions in the family are likely to increase vigilance and inhibit sleep (Dahl & El-Sheikh, 2007).

As noted by Dahl (1996), when security is low, an individual will have trouble achieving a deep, beneficial sleep state. The findings, however, are inconsistent regarding relations between attachment security and children's sleep quality and quantity. One cross-sectional study utilized actigraphy and the Strange Situation task to examine attachment and sleep quality in 94 mother-infant pairs (Scher, 2001). The results

indicated only marginal associations between the 12-month-old infants' sleep characteristics and their attachment behavior. Furthermore, there were no significant differences in number of night awakenings between groups of securely attached versus ambivalently attached infants. In a similar study, McNamara and colleagues (2003) investigated differences between avoidantly and ambivalently attached infants (15-months old) and found that the ambivalently attached infants experienced more night awakenings and longer duration of wake episodes. Other findings based on actigraphy and child-report of attachment in school-aged children did not yield significant associations between perceived attachment security and sleep problems (El-Sheikh et al., 2007).

Thus, the findings are scarce and inconsistent concerning relations between sleep problems and attachment security. On the other hand, findings have pointed to the importance of attachment in relation to links between family conflict and child outcomes. Specifically, attachment has been found to be both a risk and protective factor in relations between marital conflict and child adjustment outcomes, including externalizing (poor self-control) and internalizing (depression) symptoms (El-Sheikh & Elmore-Staton, 2004). Secure attachment functioned as a protective factor against the negative effects of conflict, while insecure attachment styles in children exacerbated the risk. While some parent-child conflict is normative, these findings add support to the idea that a secure attachment serves to protect children from the possible emergence of sleep difficulties associated with parental conflict.

Although there are speculations concerning the role of attachment security in children's sleep, the research is limited and inconsistent especially concerning older children. The current study addresses this gap by examining relations between children and early adolescent's perceived attachments to parents and subjective (parent- and child-reported) and objective (actigraphy) measures of sleep quality and quantity. From the literature reviewed it is apparent that both positive and negative interactions in the parent-child relationship may have important implications for children's sleep. However, current findings are inconsistent and scarce and the present study aimed to address this gap in the literature by providing a comprehensive look at the links between conflict, attachment and children's sleep problems. The examination of multiple models using multiple reporters and both subjective and objective sleep measures provides a more comprehensive look than is typical in the literature regarding possible links between parent-child conflict and children's sleep.

CHAPTER 2: MANUSCRIPT

INTRODUCTION

Recent findings have highlighted sleep problems in typically developing children, including chronic sleep deprivation, as a growing epidemic throughout the world (National Sleep Foundation, 2004; Sadeh, Raviv, & Gruber, 2000; Thome & Skuladottir, 2005). Although the negative effects of sleep problems on various areas of children's functioning and development are clear (Sadeh, Gruber, & Raviv, 2002; Wolfson & Carskadon, 2003), not as much is known about factors contributing to these sleep disruptions. Further, although family functioning is likely to affect children's sleep, very few studies have investigated this association in elementary school-aged children. Building on the literature, the current study utilized subjective and objective measures of sleep to examine relations between family functioning, particularly in the parent-child relationship, and sleep disturbances in school-aged children. Specifically, we examined direct associations between children's sleep and both parent-child conflict and perceived attachment security to both parents. Attachment was also examined as the explaining variable in the conflict to sleep link. Further, interactions between attachment security and parent-child conflict were examined as statistical predictors of children's sleep.

In a recent poll of American children ages 6 to 10 years of age, 50% of families reported that children were getting less than an average of 6.8 hours of sleep a night as compared to the National Sleep Foundation's recommended amount of 10 to 11 hours a

night (National Sleep Foundation, 2004). Further, in one recent study, 41% of children in a community sample were classified as having significant levels of sleep problems based on the presence of at least three five-minute periods of wakefulness each night, as measured by actigraphy (Tikotzky & Sadeh, 2001). The negative effects of sleep problems are also becoming clear including academic problems (Wolfson & Carskadon, 2003), cognitive dysfunction (Sadeh, Gruber, & Raviv, 2002), externalizing problems (Fallone, Acebo, Seifer, & Carskadon, 2005; Dahl & Lewin, 2002), and internalizing problems (El-Sheikh, Buckhalt, Cummings, & Keller, 2007). However, less is known about potential contributing factors to non-clinical sleep problems in otherwise normally developing children, especially in the context of family functioning.

Dahl and El-Sheikh (2007) propose that in order for children to sleep well, they must feel secure enough to allow themselves to function at a lowered state of vigilance. Consistent with this premise, researchers have begun to examine associations between sleep and family functioning. A few studies have established that parental marital conflict (El-Sheikh, Buckhalt, Mize, & Acebo, 2006), and children's insecurity about that conflict (El-Sheikh, Buckhalt, Keller, Cummings, & Acebo, 2007), can be disruptive of children's sleep. However, the role of normative conflict in the parent-child relationship in affecting children's sleep remains largely unknown.

More severe parent-child conflict in the form of sexual and physical abuse has been linked to adverse sleep outcomes including more difficulty falling asleep and more awakenings during the night (Glod, Teicher, Hartman, & Harakal, 1997). However, parent-child conflict is conceptualized in a variety of ways and when more normative

parenting practices such as parental warmth are considered, the findings are scarce and inconsistent with some results supporting a link between high parental warmth and more sleep in children (Adam, Snell, & Pendry, 2007), while other comparable studies do not support this link (Bates, Viken, Alexander, Beyers, & Stockton, 2002). Parent-child conflict in the context of discipline practices has consistently been found to play an important role in numerous child adjustment outcomes (El-Sheikh & Elmore-Staton, 2004; El-Sheikh & Flanagan, 2001; Fauber, Forehand, Thomas, & Wierson, 1990). Yet, there remains much to be discovered concerning sleep problems in the context of parent-child conflict. In the present study, we investigated associations between parent-child conflict and a wide range of sleep parameters. Further, research on children's responses to conflict has shown that physical parent-child conflict induces more distress and arousal in children than psychological conflict (Harger & El-Sheikh, 2003). Thus the current study separately examined links between psychological and physical conflict and sleep problems in children to determine relations between sleep and a wider range of parent-child disputes. Conflict in the current study is defined as any psychological or mild physical aggressive act initiated by parents towards children in the form of discipline or punishment usually in response to persistent misbehavior (Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). Psychological conflict in the present study includes behaviors such as swearing, cursing, or screaming while physical conflict includes acts such as shaking the child or slapping on the hand, arm, or leg. Further, sleep problems in the current study refer to non-clinical disruptions in the amount or quality of sleep in community samples.

Attachment security, which was also examined in the present investigation, is another aspect of the parent-child relationship that has been associated with various child adjustment domains (Bowlby, 2006; Colin, 1996). From birth, children begin to form affectional ties to significant people, usually primary caregivers, who ideally serve as secure bases from which the child can explore the environment (Ainsworth, 1970; Bowlby, 1973). In infancy, attachment behavior is typically measured using the Strange Situation paradigm (Ainsworth, 1970). The findings based on this method have provided support for the idea that insecurely attached infants experience more frequent and longer night wakings (McNamara, Belsky, & Fearon, 2003). However, similar studies did not find consistent links between insecure attachments and sleep problems beyond infancy (Scher, 2001). As children reach school-age and begin to have more social interactions outside of the caregiver-child relationship, researchers recommend measuring attachment security based on children's own reports of feelings of security about parents (Gullone & Robinson, 2005). Though there is support in the literature for the link between attachment security and older children's adjustment (El-Sheikh & Elmore-Staton, 2004; see Greenberg, Speltz, & DeKlyen, 1993 for a review), findings specifically concerning attachment and sleep difficulties in elementary school-aged children are virtually non-existent. The current study addressed this literature gap through examining direct links between children's perceived attachments to mothers and fathers, and children's sleep.

To further explicate the links between these variables, mediation effects of attachment security in the link between parent-child conflict and sleep problems were examined. Specifically, this model suggests that attachment security serves as the

mechanism explaining the link between parent-child conflict and sleep difficulties in children. Though research examining attachment security as a mediator for the parent-child conflict-sleep link is scarce, recent findings have supported attachment security as a partial mediator in the link between marital conflict and various child adjustment outcomes (El-Sheikh & Elmore-Staton, 2004). Thus the current study will serve as a novel addition by examining attachment security as a mediator in the parent-child conflict-sleep link.

Furthermore, attachment security was also examined as a possible moderator in the association between parent-child conflict and sleep problems. Specifically, attachment security was considered as a possible risk or protective factor for children in the context of parent-child conflict. It is important to note that in the current study protective and risk factors are conceptualized along a continuum (Rutter, 1990; Luthar, Cicchetti, & Becker, 2000), rather than as separate types of factors. While a secure attachment can serve as a protective factor for children against possible sleep problems in the context of parent-child conflict, it is also possible for an insecure attachment to function as a vulnerability factor. Associations between parent-child conflict and sleep problems for children may be more likely when attachment security is lower for children. Though recent findings support attachment as a moderator in the marital conflict - sleep link (El-Sheikh, et al., 2007), the current study will address an apparent gap in the literature concerning attachment as a moderator for sleep problems in the context of parent-child conflict. Further, this study provides a thorough look at the role of attachment security in older children's sleep in the context of the parent-child

relationship, as most of the existing research on attachment and sleep has focused on infants (McNamara, et al., 2003).

The present study aims to extend existing work in a number of directions. We examined direct effects between (a) physical and psychological parent-child conflict and (b) attachment security as they each uniquely relate to non-clinical sleep problems in elementary school-aged children. Specifically, examination of this additive model aims to identify the individual relations between parent-child conflict and sleep controlling for attachment security, and between attachment security and sleep in children controlling for parent-child conflict. The present study adds to the literature by examining normative parent-child conflict focusing on psychological aggression and mild physical aggression and their links to sleep problems in otherwise healthy developing children. Also, much of the existing research concerning the parent-child relationship does not employ mother-, father-, and child-report of conflict and thus does not provide comprehensive information about the construct (Davies, Harold, Goeke-Morey, & Cummings, 2002). The inclusion of fathers in the current study is a beneficial addition; fathers have been labeled as the “forgotten contributors of child development” and only recently have researchers made more efforts to include them (Lamb, 1975). The current study employs all three reporters concerning conflict and sleep as well as objective measures of sleep (actigraphy).

It was expected that both parent-child conflict and attachment security would each be directly associated with children’s sleep. Higher levels of conflict were expected to be related to lower sleep duration and quality as defined by daytime sleepiness and sleep and wake problems. Conversely, a higher level of attachment security was expected to be

related to better sleep. In addition to direct effects, additive effects explained by either parent-child conflict or attachment security were examined. Given the paucity of such research, no specific predictions were made regarding additive effects. Further, based on prior findings concerning physical versus psychological conflict (Fantuzzo, et al., 1991; Harger & El-Sheikh, 2003), we examined links between sleep and either psychological or physical parent-child conflict separately. This allowed for a delineation of parent-child conflict characteristics associated with various sleep parameters.

In considering attachment security as a mediator, it was expected that attachment security would at least partially explain the link between conflict and sleep. The current findings will fill the gap in existing research concerning these links and give a thorough presentation of the role attachment security plays in children's sleep. Lastly, attachment security was examined as a moderator of the link between parent-child conflict and sleep problems. It was expected that attachment security would moderate the association between conflict and sleep problems. More specifically, we expected that a higher level of attachment security would function as a protective factor in ameliorating sleep problems generally associated with parent-child conflict. Conversely, children with lower levels of attachment security are expected to be more at risk for the development of sleep problems associated with parent-child conflict. Given the more stressful nature of parent-child physical than psychological conflict, it was anticipated that the moderation effects would be more evident in the context of physical altercations.

METHODS

Participants

The current study is part of a broader, longitudinal investigation and for the purposes of this paper only the applicable measures and procedures are discussed. Third grade children were recruited from a rural Southeastern public school system. To minimize confounds, the following criteria had to be met for children to participate: no chronic or acute physical illness, no mental retardation, no ADHD, and no history of a diagnosed sleep problem. Further, children had to live with two parents for at least two years. Families participated during two waves of data collection, two years apart, and the current study is based on the second wave of data.

The sample consisted of 136 children ages 8 to 12 ($M = 10.69$, $SD = .55$) with 76 girls and 60 boys. Further, 27 children (20 % of sample) were living with a biological mother and a stepfather, and one child was living with a biological father and a stepmother (approximately 1%). The remainder of children (79%) resided with both biological parents. Children's parents had been living together for an average of 12.5 years ($SD = 5.5$).

Based on mother and father reports, 70% of families were European American (EA) and 30% were African American (AA). The sample encompassed the full range of socioeconomic levels as determined by the five factor Hollingshead Index (Hollingshead, 1975) with the following percentages classified in the various SES categories: 23% in level 1 or 2 (e.g., unskilled or semi-skilled labor), 41% in level 3 (e.g., skilled labor), and 36% in level 4 or 5 (e.g., professionals). One hundred and thirty mothers (97.8% of the

sample) completed questionnaires concerning parent-child conflict and children's sleep habits. Comparatively, 105 fathers (77% of the sample) completed questionnaires.

Though less data are available from fathers, these reports are still important and can be considered an advance to an area of the literature that is accustomed to the exclusion of fathers (Phares, Lopez, Fields, Kamboukos, & Duhig, 2005).

Procedure

The study was granted approval by the University Internal Review Board (IRB). Parents and children each read and completed informed consent and/or assent forms. Monetary compensation was provided to all participants for their time and effort. Research assistants delivered the actigraph to families (typically the mother and child) who were then given instructions to attach the actigraph to the child's non-dominant wrist at bedtime for 7 consecutive nights (all data collection occurred during the school year). Most families (63%) came to the laboratory to complete questionnaires after the last night of actigraphy monitoring. Due to scheduling conflicts, 7% of the families completed their lab visit prior to wearing the watch while 20% of families completed lab visits an average of 29 days after wearing the watch for one week. Mothers and fathers each completed questionnaires concerning family and child functioning. Trained research assistants administered questionnaires to children via interview to minimize effects associated with reading abilities.

Measures

Parent-child Conflict. The Parent-Child Conflict Tactics Scale (CTSPC; Straus, et al., 1998) was completed by mothers, fathers, and children. The CTSPC assesses the

frequency of psychological and physical aggression and conflict behaviors. Each participant was asked to report how often he or she had engaged in any of 18 conflict behaviors with their parent or child in the past year. Each parent reported about self and partner initiation of conflict behaviors while children answered about each parent's initiation of conflict behaviors with the following possible answers: 1 = once in the past year, 2 = twice in the past year, 3 = 3 to 5 times in the past year, 4 = 6 to 10 times in the past year, 5 = 11 to 20 times in the past year, 6 = more than 20 times in the past year, or 0 = has never happened before. Higher scores indicated more frequent physical or psychological conflict in the parent-child relationship. In the current study, the two pertinent scales of Physical Aggression (9 items) and Psychological Aggression (5 items) were examined. For children, and consistent with IRB stipulations for this study, the severe physical aggression items were omitted, which resulted in a 4-item Physical Aggression scale: How many times has your mother/father shook you, spanked you on the bottom with his/her bare hand, slapped you on the hand, arm, or leg, or pinched you. The Psychological Aggression scale included items such as how many times has your mother/father yelled or screamed at you, or swore or cursed at you. The parent-child version of the CTSPC has demonstrated adequate reliability and validity in numerous studies (Straus, 1995; Straus et al., 1998; El-Sheikh & Elmore-Staton, 2004).

Composite scores were created for the CTSPC to reduce the number of variables used in analyses and the probability of Type I error. There were four composite scores that were created and used in analyses: parent-report of Physical Conflict, parent-report of Psychological Conflict, child-report of Physical Conflict, and child-report of

Psychological Conflict. All composites were aggregated across mother-child and father-child conflict. The items were composited this way to test the differences between Physical and Psychological Conflict and their links with children's sleep difficulties. This decision was based on prior literature showing that physical parent-child conflict induces more distress and arousal in children than psychological conflict (Harger & El-Sheikh, 2003). Further, children's perceptions of conflict may be differentially associated with child outcomes than parental accounts of such conflict (Davies, Harold, Goeke-Morey, & Cummings, 2002). Thus, child- and parent-reported conflicts were examined separately to provide a thorough assessment of the construct.

Mother and father reports about self and partner parent-child *Physical* Conflict were significantly correlated ($r_s = .41$ to $.82$, $p_s < .001$) and all four scores were averaged to create a composite of parent-reported Physical Conflict ($\alpha = .87$). Similarly, mother and father reports about self and partner parent-child *Psychological* Conflict were significantly correlated ($r_s = .27$ to $.85$, $p_s < .05$) and were thus averaged to create a composite of parent-reported Psychological Conflict ($\alpha = .80$). Children's reports of *Physical* mother- and father-child Conflict were highly correlated ($r = .69$, $p = < .05$) and were composited ($\alpha = .72$), to derive the child-reported variable examining parent-child Physical Conflict. Similarly, children's reports of mother- and father-child *Psychological* Conflict were highly correlated ($r = .89$, $p = < .05$) and averaged for analyses ($\alpha = .87$). Note that for mother and father reports, when data were missing from one reporter, pertinent data from the other reporter were used to create the composite.

Child-parent attachment. The Inventory of Parent and Peer Attachment (IPPA; Armsden, 1986; Armsden & Greenberg, 1987) was used to examine children's perceptions of the quality of their attachments to mothers and fathers. The IPPA measures the extent to which children feel they gain emotional security from each parent. The 25 item scale (25 for mother-child relationship; 25 for father-child relationship) has three subscales concerning children's perceived mutual trust (e.g., When I am angry, my mother/father tries to be understanding), communication quality (e.g., I tell my mother/father about my problems or troubles), and degree of anger and alienation (e.g., My mother/father helps me to talk about my difficulties) toward each parent. Scores on the IPPA range from 1 (Almost never or never true) to 5 (Almost always or always true): higher scores on the total scale represent higher attachment security with each parent. The IPPA has good reliability and validity with children similar in age to child participants in this study (e.g., Armsden, 1986; Armsden & Greenberg, 1987; Armsden, McCauley, Greenberg, Burke, & Mitchell, 1990). The three subscales of attachment security were highly correlated for mothers ($r_s = .65$ to $.79, p < .001$) and fathers ($r_s = .73$ to $.85, p < .001$). Further, attachment security towards mothers and fathers were also highly correlated ($r = .80, p < .01$). Based on recommendations in the literature (Armsden, et al., 1990), as well as to reduce the number of variables used in analyses and the probability of Type I error, the subscales were standardized and averaged to create one composite measure of children's attachment security towards parents ($\alpha = .89$), which was used in analyses.

Parent-reported child sleep. Mothers and fathers completed the Children's Sleep Habits Questionnaire (CSHQ; Owens, Spirito, & McGuinn, 2000). The CSHQ is a 35-item questionnaire that assesses sleep behaviors of school-aged children as reported by parents. Parents were asked to recall their child's sleep behaviors occurring over a typical week by rating the frequency of their occurrence: "Rarely" (0 to 1 time a week), "Sometimes" (2 to 4 times a week), or "Usually" (5 to 7 times a week). Some items were reverse scored and higher scores on the total measure indicate more frequent overall sleep disturbances. The measure contains six subscales: Bedtime Resistance, Sleep Onset Delay, Sleep Duration, Sleep Anxiety, Night Wakings, Parasomnias, Sleep Disordered Breathing, and Daytime Sleepiness. Similar to other studies (e.g., Gregory, Eley, & Rijdsdijk, 2006; Heng & Wirrell, 2006), and to reduce the number of variables used in analyses and the probability of Type I error, the total of the CSHQ subscales was used as an indicator of the presence of general sleep problems. Mother and father reports were significantly associated ($r = .40, p < .001$) and were averaged to create one variable representing parent-reported sleep problems ($\alpha = .78$).

Child-reported sleep. Children were administered the Sleep Habits Survey (SHS; Wolfson & Carskadon, 1998), which has been widely used (Carskadon, Seifer, & Acebo, 1991), including with children in the age range of the present sample (El-Sheikh & Buckhalt, 2005). The current study focused on two subscales: the Sleepiness Scale (9-items), which focuses on children's feelings of struggling to stay awake during the day, and the Sleep/Wake Scale (15-items), which measures how often children have problems such as falling asleep at night, oversleeping, or falling asleep in class; one SHS item that

pertains to feeling sleepy while driving was excluded given the young age of the sample. Possible responses on the Sleepiness Scale are 1 = no, 2 = struggled to stay awake, 3 = fallen asleep, and 4 = both struggled to stay awake and fallen asleep; higher scores indicate more problems with daytime sleepiness. On the Sleep/Wake Scale possible answers are 1 = never, 2 = once, 3 = twice, 4 = several times, and 5 = everyday/night, with higher scores indicating higher frequency of Sleep/Wake Problems. The SHS has been shown to be reliable and valid (Carskadon & Acebo, 1993). In the current study, adequate reliability was found for both the Sleep/Wake Problems ($\alpha = .73$) and Sleepiness ($\alpha = .67$) scales.

Actigraphy. Children's sleep was monitored via actigraphy using the Motionlogger Octoagonal Basic actigraph (Ambulatory Monitoring, Inc., 2002). The Octagonal Motionlogger Interface with ACTme Software and Analysis Software Packages (ActionW2 or AW2) were used to analyze data from actigraphy and create sleep variables. The Sadeh algorithm, which has very good reliability (Sadeh, Sharkey, & Carskadon, 1994; Sadeh, Acebo, Seifer, Aytur, & Carskadon, 1995) and validity (Acebo, Sadeh, Seifer, Tzischinsky, Wolfson, Hafer, & Carskadon, 1999), was used to score the data in one-minute epochs. Actigraphy has been validated against Polysomnography (PSG) with inter-method agreements ranging from 85% to 90% (Sadeh, Lavie, & Scher, 1994; Sadeh, et al., 1995). For the purposes of the current study, three sleep variables were examined based on averages of data for all available nights: Sleep Amount (number of minutes slept during the night); Sleep Efficiency (of total time in bed, percentage of

minutes scored as sleep); and Sleep Activity (percent of epochs with activity > 0, indicating movement during sleep).

Thus, Sleep Amount provides an objective measure of sleep duration whereas Sleep Efficiency and Sleep Activity are two measures of Sleep Quality. These three actigraphy-based sleep variables are frequently used in the literature with typically developing children (Sadeh, et al., 2002; Sadeh, Gruber, & Raviv, 2003). Night-to-night stability α coefficients across all available nights indicated high stability across the week: Sleep Amount = .86; Sleep Efficiency = .93; Sleep Activity = .96. Thus, the suggested stability level of .70 (Acebo et al., 1999) has been exceeded for all variables in the current study.

Actigraphy data for seven nights were available for 47% of the sample. Due to actigraph malfunction, forgetting to wear the device, wearing the device in an inappropriate setting (such as in a car), or exclusion because of use of allergy medication, 27% of children had data for six nights, 14% had data for five nights, 5% had data for four nights, and 7% had data for 3 or fewer nights. Based on current literature on reliable use of actigraphy, 3 or more nights of actigraphy data has been found to be sufficient for reliable results (Littner, et al., 2002); 95% of the current participants have data for 3 or more nights which is considered sufficient for reliable results.

RESULTS

Preliminary Analyses

Descriptive statistics. Means, standard deviations, medians, ranges, and sample sizes for all variables are provided in Table 1. As shown in Table 1, parents reported an average score of 4 ($SD = 4.5$) on the physical parent-child conflict scale, which corresponds to an average of 6 to 10 acts of physical conflict towards the child in the past year. Children reported a mean score of 1 ($SD = 2.44$), which corresponds to an average of one physical conflict episode in the last year. Standard deviations corresponding with these means indicate a relatively wide range of physical conflict in this sample. Further, the following percentages of participants reported the occurrence of any amount of parent-child physical conflict within the past year: 72% of mothers, 58% of fathers, and 44% of children. Comparatively, in a study utilizing a community sample consisting of 1,000 families, 62% of parents (randomly selected mother or father) reported the presence of parent-child Physical Conflict within the past year (Straus, et al., 1998). In the current study, 13 mothers reported a frequency of parent-child Physical Conflict above the mean of 13.4 acts of aggression reported in the previously mentioned study. Seven fathers and only one child reported a frequency of Physical Conflict above this same reported mean.

As seen in Table 1, average reports of Psychological Conflict are somewhat higher than Physical Conflict; parents reported a mean score of 7 ($SD = 4.63$), which corresponds to an average of more than 20 incidents of Psychological Conflict in the past year. Comparatively, the child-reported mean score for Psychological Conflict was 3 (SD

= 4.43), which corresponds to an average of 3 to 5 occurrences of parent-child Psychological Conflict in the past year. In the current sample, the presence of parent-child Psychological Conflict was reported by 86% of mothers, 84% of fathers, and 63% of children. Comparatively, 86% of families in the study by Straus and colleagues (1998) reported the presence of any amount of Psychological Conflict. Furthermore, in the present study, three mothers reported a frequency of parent-child Psychological Conflict above the mean of 21.7 in the study by Straus and colleagues (1998). None of the fathers and two of the children reported Psychological Conflict above that same mean.

In the current sample, parents reported a mean of 44.39 ($SD = 5.98$) on the total CSHQ scale. As indicated by the standard deviation, there is a relatively wide range of sleep problems in the current sample. The CSHQ has no established norms for the total score therefore, the instrument has been found most useful when comparing scores between samples. In a comparable sample of 495 elementary school children, parents reported a mean of 56.2 ($SD = 8.9$) on the CSHQ (Owens, Spirito, & McGuinn, 2000). Owens and colleagues assigned 41 as a clinical cut-off score in their community sample; 23.2% of their sample corresponded to a CSHQ score above 41 while around 63% of the current sample scored above 41. Important to note is that the CSHQ is a screening tool to detect potential sleep problems in community samples and to determine which children may need further attention.

Children reported a mean of 12.63 ($SD = 3.53$) on the Sleepiness Scale. Comparatively, in a study by El-Sheikh and Buckhalt (2005), a sample of 6- to 12-year-old children reported a mean of 17.59 ($SD = 9.87$). Of note is that sleepiness increases as

children transition from childhood to adolescence (Carskadon, Acebo, & Oskar, 2004; Sadeh et al., 2000; Wolfson & Carskadon, 1998). The Sleepiness Scale and the Sleep/Wake Problems Scale have been used mostly with children older than child participants in this study, making comparisons of these measures among samples difficult. Children in the current study reported a mean score of 15.93 ($SD = 4.67$) on the Sleep/Wake Problems Scale, which is close to the mean of 14.77 ($SD = 7.49$) in the sample utilized by El-Sheikh and Buckhalt (2005).

On average, children in the current sample fell asleep at 9:44 P.M. and woke up at 6:12 A. M. (recall that all data collection occurred during the school year). Further, in relation to objectively-derived sleep measures, children were asleep for an average of 7 hours and 42 minutes, which is a considerable amount less than that indicated by the sleep onset and wake times (i.e., children were in bed longer than they were asleep). Children's Activity Mean indicates that they were scored as awake for an average of 39 minutes during the time between Sleep Onset and Wake Time. The mean Sleep Efficiency for the sample indicates that children were awake for around 10% of their time in bed between Sleep Onset and Wake Time.

Variable transformations. Descriptive statistics suggested possible skew in several variables. The primary study variables were tested for skewness and results indicated that the following variables were skewed (skewness statistic / standard error in parentheses): parent-report of parent-child Physical Conflict (7.37), parent-report of parent-child Psychological Conflict (2.08), child-report of parent-child Physical Conflict

(11.97), child-report of parent-child Psychological Conflict (10.50), and children's attachment security (-6.72). These five variables were log transformed for analyses.

Associations among variables. Correlation analyses (see Table 2) show that Physical Conflict (parent- and child-report) was positively associated with Psychological Conflict (parent- and child-report). Further, higher levels of parent-reported Physical Conflict were significantly associated with increased child sleep problems indicated by general sleep problems (parent-report), Sleep/Wake Problems (child report), and reduced total Sleep Amount (actigraphy-based). In addition, higher levels of child-reported Physical Conflict were associated with less secure attachments, higher levels of parent-reported sleep difficulties, and higher levels of child-reported Sleepiness and Sleep/Wake Problems. When considering Psychological Conflict based on either parent or child reports, higher levels were associated with less secure attachments, more Sleepiness in children, and more Sleep/Wake Problems in children. In addition, higher parent-reported Psychological Conflict was associated with more general sleep difficulties in children as reported by parents on the CSHQ.

In relation to attachment security, children's report of a more secure attachment to mothers and fathers was associated with less Sleepiness and Sleep/Wake Problems. Among the sleep variables, parent-reports of child sleep problems, and child-reported Sleepiness were both significantly correlated with increased levels of Sleep/Wake Problems. In considering the objective sleep measures, Sleep Amount was positively associated with Sleep Efficiency, and negatively related to Sleep Activity.

Direct and Additive Effects

Analysis plan. To examine direct effects accounted for by both conflict and attachment security, several sets of regression models were fit. First, we examined whether (a) parent-child conflict predicted children's sleep problems, and (b) children's attachment security towards both parents predicted additional unique variance in children's sleep problems after controlling for parent-child conflict. In the first step of each regression equation, age, race, SES, and gender were entered. In the second and third steps parent-child conflict and children's attachment were entered in the models, respectively.

Next, to examine whether parent-child conflict explained *additional unique variance* in children's sleep after controlling for attachment securities, similar regression models were fit. The only exception is that the variable of children's attachment securities was entered in the second step followed by parent-child conflict in the third step. In the absence of guiding theory and empirical evidence regarding the prominence of associations between sleep and either attachment security or parent-child conflict, these two sets of regression analyses allowed for an elucidation of the amount of variance accounted for by each child-parent variable (i.e., conflict, attachment), and an estimation of the unique variance accounted for by each variable while taking the other variable into account. Regression analyses are reported below in separate sections as they pertain to (a) parent-reported Physical Conflict, (b) parent-reported Psychological Conflict, (c) child-reported Physical Conflict, and (d) child-reported Psychological Conflict. Only significant findings will be presented in all sections of this thesis.

Parent-reported Physical Conflict as a predictor of children's sleep. Physical Conflict was examined as a predictor of children's sleep before and after controlling for attachment security. One outlier was found and removed from the data for models predicting general sleep problems. Before controlling for attachment security, Physical Conflict was a significant statistical predictor of general sleep problems, accounting for 5% of the unique variance; greater conflict was related to greater general sleep problems ($\beta = .24, p < .05$). Furthermore, even after controlling for attachment security, Physical Conflict accounted for 4% of unique variance in children's general sleep problems ($\beta = .22, p < .05$). These additive effects are presented in Table 3.

One outlier was removed from the model predicting Sleep/Wake Problems. After removing the outlier, conflict was not associated with Sleep/Wake Problems. Before removing the outlier, significant direct effects were present between parent-reported Physical Conflict and Sleep/Wake Problems as reported by children. Conflict accounted for 5% of the variance in Sleep/Wake Problems after controlling for demographic variables ($B = .21, p < .05$), and conflict accounted for 3% of the variance in Sleep/Wake Problems after controlling for demographic variables and attachment security ($\beta = .19, p < .05$). Parent-reported Physical Conflict was not significantly related to any of the other sleep outcome variables.

Next, attachment security was examined as a predictor of children's sleep parameters before and after controlling for physical parent-child conflict as reported by parents. Attachment was significantly related to Sleepiness in children before controlling for physical conflict as well as after controlling for physical conflict. This additive effect

is shown in Table 3. Before controlling for conflict, attachment security explained 4% of unique variance in children's Sleepiness after controlling for demographic variables ($\beta = -.20, p < .05$). After adding Physical Conflict as a control variable, attachment security predicted 4% of unique variance ($\beta = -.20, p < .05$). Similarly, attachment security was significantly related to Sleep/Wake Problems reported by children both before and after controlling for parent-reported Physical Conflict. Specifically, less secure attachment security was related to higher levels of Sleep/Wake Problems in children (See Table 3.). Before controlling for conflict, attachment security explained 4% of unique variance ($\beta = -.21, p < .05$). Furthermore, after controlling for both demographics and Physical Conflict, attachment security explained 4% of unique variance in the model ($\beta = -.21, p < .05$).

Parent-reported Psychological Conflict as a predictor of children's sleep.

Psychological Conflict was examined as a predictor of children's sleep before and after controlling for attachment security (regression analyses are reported in Table 4). When parent-report of parent-child Psychological Conflict was entered into the model, it accounted for 4% of unique variance in general sleep problems (CSHQ) after controlling for child characteristics and demographic variables; greater Psychological Conflict was associated with greater general sleep problems ($\beta = .20, p < .05$). However, after controlling for attachment security, this association was no longer significant, so no additive effects were present. Furthermore, parent-reported Psychological Conflict accounted for 6% of the variance in Sleep/Wake Problems in children; higher levels of Psychological Conflict were associated with higher levels of Sleep/Wake Problems in

children ($\beta = .26, p < .01$). Conflict also accounted for 4% of the variance in Sleep/Wake Problems after controlling for demographic variables and attachment ($\beta = .23, p < .05$), which indicates significant additive effects (See Table 4).

Attachment security was examined as a predictor of children's sleep before and after controlling for parent-report of Psychological Conflict. After controlling for parent-report of Psychological Conflict, no additive effects were present between attachment security and any of the outcomes. Before controlling for Psychological Conflict, attachment security was significantly associated with Sleep/Wake Problems in children, accounting for 4% of the variance in the outcome ($\beta = -.20, p < .05$) (see Table 4). One outlier was removed from the model with Sleep/Wake Problems as the outcome. Before removing this outlier, there were significant additive effects; attachment was significantly related to Sleep/Wake Problems after controlling for demographic variables with Conflict accounting for 5% of the variance; greater Conflict was associated with more Sleep/Wake Problems ($\beta = -.23, p < .05$). After attachment security was added into the model, Conflict accounted for 3% of the variance in Sleep/Wake Problems; greater Psychological Conflict was associated with more Sleep/Wake Problems ($\beta = -.18, p < .05$).

Child -reported Physical Conflict as a predictor of children's sleep. Physical Conflict was examined as a predictor of children's sleep before and after controlling for attachment security. Child-report of parent-child Physical Conflict accounted for 4% of the variance in Sleepiness before controlling for attachment security; higher levels of Physical Conflict were associated with more Sleepiness ($\beta = .20, p < .05$); see Table 5.

However, after controlling for attachment, child-reported Physical Conflict was no longer significantly associated with children's Sleepiness, so no additive effect is present. Furthermore, child-report of Physical Conflict accounted for 11% of the variance in Sleep/Wake Problems before controlling for attachment security as well as 8% of the variance in Sleep/Wake Problems in children after controlling for attachment security; higher levels of Conflict were associated with more Sleep/Wake Problems in children both before ($\beta = .34, p < .01$) and after ($\beta = .30, p < .01$) controlling for attachment security. This additive effect can be seen in Table 5.

Attachment security was a significant predictor of children's sleep before and after controlling for child-reported parent-child Physical Conflict; lower levels of attachment security were associated with more Sleepiness in children. Specifically, after controlling for demographics, attachment security predicted 6% of the variance in children's Sleepiness ($\beta = -.25, p < .01$). After controlling for child-reported Physical Conflict, attachment security accounted for 5% of the variance in Sleepiness ($\beta = -.22, p < .05$) (see additive effects in Table 5).

Furthermore, and in relation to Sleep/Wake Problems, attachment security explained 6% of unique variance in this variable before controlling for Physical Conflict, with less attachment security associated with increased Sleep/Wake Problems ($\beta = -.26, p < .05$). After controlling for Psychological Conflict, attachment security accounted for 3% of the variance in children's Sleep/Wake Problems; less attachment security was associated with more Sleep/Wake Problems ($\beta = -.18, p < .05$). These additive effects can be seen in Table 5.

Child-reported psychological conflict as a predictor of children's sleep.

Psychological Conflict was examined as a predictor of children's sleep before and after controlling for attachment security. Significant associations were found between child-report of parent-child Psychological Conflict and Sleepiness in children before controlling for attachment security; higher levels of Conflict were associated with more Sleepiness reported by children ($\beta = .22, p < .05$). Conflict accounted for 4% of the unique variance in Sleepiness. However, after attachment security was added to the model, there was no longer a significant association between conflict and Sleepiness in children, so no additive effects were present (See Table 6).

Furthermore, child-report of Psychological Conflict accounted for 5% of the variance in Sleep/Wake Problems before controlling for attachment security; higher levels of Psychological Conflict were associated with more Sleep/Wake Problems in children ($\beta = .22, p < .05$); see Table 6. After controlling for attachment, this direct effect was no longer significant, so no additive effects were present (See Table 6).

Attachment security was examined as a predictor of children's sleep before and after controlling for Psychological Conflict. Direct effects between attachment security and Sleepiness were significant before and after controlling for Psychological Conflict. Specifically, attachment security accounted for 6% of the variance in Sleepiness before controlling for Conflict ($\beta = -.25, p < .01$) and 5% of the variance in Sleepiness after controlling for Conflict ($\beta = -.22, p < .05$). Furthermore, attachment security was significantly associated with Sleep/Wake Problems before and after controlling for conflict. Attachment security accounted for 6% of the variance in Sleep/Wake Problems

before controlling for Conflict ($\beta = -.24, p < .01$) and 4% after controlling for Conflict ($\beta = -.21, p < .05$; See Table 6 for these additive effects).

Mediation Effects.

To examine whether attachment security mediated associations between parent-child Physical and Psychological Conflict and sleep parameters in children, a series of hierarchical multiple regression analyses were conducted according to procedures recommended by Baron & Kenny (1986). In order for mediation to occur, (a) parent-child conflict must be associated with attachment security (potential mediator) and sleep problems in children (outcome); (b) attachment security must be associated with sleep problems in children; and (c) perceived attachment must cause a significant reduction in the association between parent-child conflict and children's sleep problems after it is added into the model. This last step was tested using the Sobel test for mediation (1982). Only significant mediation effects are explicated in this thesis. Mediation results are reported respectively as they pertain to (a) parent-reported Physical Conflict, (b) parent-reported Psychological Conflict, (c) child-reported Physical Conflict, and (d) child-reported Psychological Conflict.

Parent-reports of parent-child Physical Conflict were not significantly associated with attachment security; therefore, mediation was not possible when considering this predictor. Psychological Conflict reported by parents was significantly associated with attachment security ($\beta = .20, p < .05$), which satisfies the first step of mediation. Furthermore, attachment security was significantly associated with children's Sleepiness ($\beta = -.20, p < .05$) and Sleep/Wake Problems ($\beta = -.21, p < .05$). Given that parent-

reported Psychological Conflict was only significantly associated with Sleep/Wake Problems, this mediation effect was tested and was found to be non-significant ($Z = 1.56$, $p = .12$). One outlier was removed from this model. Before the outlier was removed, partial mediation was present ($Z = 2.12$, $p < .05$). Specifically, after controlling for attachment security, Psychological Conflict was still significantly associated with Sleep/Wake Problems. Because there was still a significant direct effect between Psychological Conflict and Sleep/Wake Problems after considering attachment security as a mediator, this effect is considered partial mediation. This mediation effect can be seen in Figure 1.

Child-report of Physical Conflict was associated with Sleepiness through attachment security ($Z = 1.94$, $p < .10$) though the indirect effect was only marginally significant (Figure 2). A marginally significant indirect effect was also found between child-reported Physical Conflict and Sleep/Wake Problems. Specifically, Physical Conflict was associated with Sleep/Wake Problems in children through attachment security ($Z = 1.89$, $p < .10$). One outlier was removed from the model with Sleep/Wake Problems. Before this removal, a significant indirect effect was found ($Z = 2.15$, $p < .05$). This mediation can be seen in Figure 3.

There was also a marginally significant indirect effect between child-reported Psychological Conflict and Sleepiness through attachment security ($Z = 1.88$, $p < .10$). Furthermore, direct effects between child-reported Psychological Conflict and Sleepiness were not significant after controlling for attachment security, further supporting the indirect effect (see Figure 4). When Sleep/Wake Problems were considered,

Psychological Conflict was significantly associated with Sleep/Wake Problems through attachment security ($Z = 2.04, p < .05$). After controlling for attachment security, parent-child Psychological Conflict was no longer significantly associated with Sleep/Wake Problems (see Figure 5). Thus, a full mediation model was supported for the indirect effects between child-reported Psychological Conflict and Sleep/Wake Problems through attachment security.

Moderation Effects.

Hierarchical regression analyses were used as recommended by Aiken and West (1991) to assess moderation effects. All of the parent-child conflict variables and attachment security were centered. In the first step of the regression model, age, ethnicity, SES, and gender were entered, followed by parent-child conflict and attachment security in the second and third steps, respectively. In the fourth step, an Attachment Security \times Parent-child Conflict interaction term was entered into the model. If the β was found to be significant ($p < .05$), the interaction was graphed at 1 *SD* above and below the mean. Slope analyses were then conducted to determine if the slopes were significantly different from zero.

One outlier was removed from the models predicting general sleep problems. After removing the outlier, no moderation effects were observed. Before removing the outlier, the interaction between attachment security and parent-reported Physical Conflict significantly predicted general sleep problems. Thus, the association between conflict and sleep problems was different for children with lower versus higher levels of attachment security (See Table 7). When this significant interaction was graphed, the slope was not

significantly different from zero for children with higher levels of attachment security. Comparatively, for children with lower levels of attachment security, the line was significantly different from zero indicating that the link between parent-reported Physical Conflict and general sleep problems was stronger for children with lower attachment security (See Figure 1). Thus, in the context of parent-reported Physical Conflict, a lower level of attachment security can be considered a vulnerability factor for general sleep problems in children while, higher attachment security can be considered a protective/stabilizing factor (Luthar, Cicchetti, & Becker, 2000) against general sleep problems associated with Conflict. Protective/stabilizing factors in this study are seen as variables that confer stability in sleep despite increased risk for sleep problems related to parent-child Conflict (Luthar, et al., 2000).

The interaction between parent-reported Physical Conflict and attachment security significantly predicted Sleepiness, indicating that the conflict-Sleepiness link is different for children with lower and higher levels of attachment security (See Table 7). This interaction effect was graphed (Figure 2) and indicated that the slope representing the association between Physical Conflict and Sleepiness was significantly different from zero only for children with less secure attachments. Thus, a lower level of attachment security can be considered a vulnerability factor for child Sleepiness associated with higher levels of Physical Conflict while higher attachment security served as a protective/stabilizing factor.

One outlier was removed from models predicting child-reported Sleep/Wake Problems. After removing the outlier, no significant interactions were observed. Before

removing the outlier, the interaction between parent-reported Physical Conflict and attachment security was a significant predictor of Sleep/Wake Problems (See Table 7). When this interaction was graphed, it illustrated that the slope representing the association between Physical Conflict and Sleep/Wake Problems was significantly different from zero only for children with less secure attachments (Figure 3). Further, the graph indicates that, in the context of higher levels of parent-child Physical Conflict, a lower level of attachment security can be considered a vulnerability factor whereas a higher level of security can be considered a protective/stabilizing factor.

Lastly, the interaction between parent-reported Psychological Conflict and attachment security was significantly associated with Sleep Activity (See Table 8). This effect indicates that the association between Conflict and Sleep Activity is different for children with lower or higher attachment securities. This interaction is depicted in Figure 4, and neither of the slopes was significantly different from zero. Note that ethnicity was significantly associated with Sleep Activity indicating that African-American children may have less Sleep Activity than European American children.

DISCUSSION

We examined associations between child sleep problems and both parent-child conflict and children's perceived attachments to parents. We also assessed the intervening role of attachment security in the conflict-sleep association. Augmenting the scant literature, results support a pattern of direct links between sleep disturbances and Physical Conflict, Psychological Conflict, and attachment insecurity. Further, after controlling for conflict, attachment insecurity explained additional unique variance in some parameters of sleep. Likewise, parent-child Physical and Psychological Conflict accounted for unique variance in some sleep variables after controlling for attachment insecurity. Furthermore, findings are supportive of attachment security as a mediator of effects in the link between Psychological Conflict and Sleep/Wake Problems. Attachment security also served as a moderator (protective factor) in the link between exposure to parent-child Physical Conflict and children's sleep disruptions. These findings highlight the importance of examining children's sleep functioning in the context of family relationships. Further, these results suggest the importance of testing various models (additive, mediation, moderation) when examining associations between sleep and family functioning, especially in an elementary school-aged sample, which until recently is a population that has not received much attention in the attachment and sleep literature.

Both Physical and Psychological parent-child Conflict were related to increased daytime Sleepiness characterized by struggles to stay awake or even falling asleep during daytime activities. Specifically, findings show that children who experienced more frequent conflict with their parents consistently exhibited more parent-reported sleep

disturbances (CSHQ) and child-reported Sleepiness during daytime activities; these links were frequently significant even when attachment security was included in the model. Although findings are cross-sectional, and no causal inferences can be made, results are suggestive of the potential role of higher levels of parent-child conflict in affecting children's sleep due to the consistent positive relations found between conflict and children's Sleepiness. These results could also be suggestive of the effects sleep can have on parent-child relations; specifying the direction of these links is a promising area for future research.

Although parent-child Physical Conflict investigated in this study was not classified as abuse but rather physical aggression in the form of discipline practices, results are consistent with those derived from the previous few studies documenting an association between child abuse and increased sleep problems (Glod, Teicher, Hartman, & Harakal, 1997; Sadeh et al., 1995). Current findings are novel due to our focus on non-abusive conflict and they serve to extend established associations between sleep disruptions and family functioning to the context of more normative child-parent interactions. These findings concerning non-abusive conflict serve to clarify that even milder forms of conflict, when occurring frequently, are related to children's feelings of Sleepiness and problems with sleep onset and awakening (Sleep/Wake Problems). Further, links between Conflict and Sleepiness were more significant when child-report of Physical Conflict was examined, consistent with previous findings showing stronger effects of Physical Conflict on children's adjustment (Cummings & Davies, 1994; Cummings, 1998; Harger & El-Sheikh, 2003).

Important implications can be drawn from the links between conflict and child-reported Sleepiness and Sleep/Wake Problems. Interestingly, though links between Physical Conflict and sleep were more significant in some cases (e.g., child-reported conflict to Sleep/Wake problems), robust links were consistently present for both Physical and Psychological Conflict and sleep. This provides evidence that not only Physical Conflict has important implications for child functioning but also Psychological Conflict can be connected to adverse sleep outcomes. Specifically, these findings can be interpreted in the context of the proposition that sleep and vigilance are opponent processes (Dahl, 1996). It is possible that negative interactions in the form of Physical or Psychological Conflict can be perceived by children as threatening. Children's perceptions of threat may lead to heightened levels of arousal and difficulty in reaching the state of lowered awareness that is needed to achieve sleep (El-Sheikh, et al. 2006; El-Sheikh, et al., 2007), hence the Sleep/Wake Problems and Sleepiness during the day.

It was also expected that increased attachment security would be significantly related to decreased levels of sleep problems. Findings supported this hypothesis in that children who reported higher levels of attachment security had fewer subjective Sleep/Wake Problems and less Sleepiness during the day. Further, these associations were significant even after the effects of Physical and Psychological Conflict were considered, supporting the unique role that attachment plays in children's sleep. Interestingly, attachment insecurity explained unique variance in children's sleep after controlling for conflict more often than Physical or Psychological Conflict after controlling for attachment, which also explicates the important role that attachment

security plays in children's sleep. Findings support associations between attachment security and sleep and extend the established literature linking attachment to child outcomes in elementary school aged children (See Greenberg, Speltz, & DeKlyen, 1993) to the sleep domain. An important piece of the current findings involves the link between more secure attachment and less subjectively reported sleep and wake problems in children. Again, although present findings are cross-sectional, it is plausible that when children feel secure, it is easier for them to obtain better sleep. Though there are numerous studies examining attachment and children's sleep outcomes in infancy (Scher, 2001; McNamara, Belsky, & Fearon, 2003), studies considering attachment and sleep in school-aged children are scarce. The current findings are consistent with recent studies that found attachment to be related to externalizing and internalizing symptoms in children (Troy & Stroufe, 1987; Warren, Huston, Egeland, & Stroufe, 1997) but are unique in their inclusion of sleep in elementary school-aged children. Based on reviewed literature, links between attachment security and sleep are a novel addition to the research in family functioning and children's sleep. Importantly, associations between attachment and sleep are found only in the context of child-reported sleep; shared informant bias may have also affected the noted associations thus results should be interpreted with caution.

Important to mention is that in considering children's reports of physical and psychological parent-child conflict and attachment there is a mono-informant issue at hand. More specifically, significant findings for these predictors were only found to be present when children's reports of sleep problems were considered (See Tables 5 and 6).

These results should be interpreted with caution since child-report was utilized for conflict, attachment, and sleep.

Mediation effects were also examined with the expectation that attachment security would at least partially explain the link between parent-child conflict and sleep problems. Child-report of Psychological Conflict was associated with more Sleep/Wake Problems indirectly through lower attachment security. Thus, attachment security mediated the association between Psychological Conflict and sleep problems. No direct link between Psychological Conflict and Sleep/Wake Problems was present after controlling for attachment security, indicating full mediation. This was the only full mediation link found in the current study, although a number of marginally significant partial mediation effects were found. Important to mention is that outliers were removed from mediation models predicting Sleep/Wake Problems and after removing these outliers, indirect effects were less significant, though still marginal; results should be interpreted with caution. Attachment security has never been considered as a mediator in the link between parent-child Conflict and sleep problems in the age range used in the current study. These findings provide a solid groundwork for future research to explore the nature of the role of attachment security as a mediator in the link between conflict and children's sleep functioning.

In addition, attachment functioned as a moderator of risk in the link between exposure to higher levels of child-parent conflict and children's sleep disruptions. Specifically, attachment security moderated the association between parent-reported Physical Conflict and parent-reported general sleep problems, child-reported Sleep/Wake

Problems, and daytime Sleepiness. The pattern of moderation effects illustrated that the association between Physical Conflict and sleep disruptions as reported by either parents or children was only significant for children with less secure attachments. Conversely, children with higher attachment security did not evidence sleep problems regardless of the level of parent-child conflict. This suggests that a less secure attachment is a vulnerability factor for increased sleep disruptions in the context of higher levels of parent-child Physical Conflict. On the other hand, a more secure attachment functioned as a protective-stabilizing factor (Luthar, et al., 2000) against sleep problems in the context of risk. Consistency in moderation effects based on either parents' or children's reports of sleep problems using different sleep scales increases confidence in the moderating role of attachment security in the context of sleep disturbances. Of note is that protective and vulnerability factors are conceptualized in various ways in the literature, and in the current study they are considered on a continuum rather than as different types of factors (Rutter, 1990). Therefore, and given the graphs of the interaction effects, a higher level of secure attachment can be considered a protective factor whereas a lower level can be considered a vulnerability factor for sleep problems. Important to mention is that outliers were removed from two of the moderation models discussed (those predicting Sleep/Wake Problems and general sleep problems) and after removing these outliers, no significant moderation effects were observed; therefore results should be interpreted with caution.

Findings concerning attachment as a moderator in the parent-child conflict to sleep link are consistent with other studies that have found attachment as a moderator in

the marital conflict to sleep link (El-Sheikh, et al., 2007). However, the current study is a valuable addition in its examination of parent-child interactions in relation to attachment security and sleep. Though the literature has focused on each of these variables to some extent in the literature, interactions between parent-child conflict and attachment have not been considered together in relation to sleep problems, especially in elementary school children. Examinations of multiple models involving these three variables are novel additions to the literature and will help to delineate the role these two aspects of the parent-child relationship play in older children's sleep. It is possible that children who do not feel as secure in their parent-child relationship may feel more threatened by conflict when it does occur, especially if it occurs frequently. When children feel threatened, they respond with a heightened sense of awareness; as children are continuously exposed to conflict, they develop a frequent arousal pattern because they are always preparing themselves for potential conflict (El-Sheikh, et al., 2007). This coincides with Dahl's idea (1996) that sleep and vigilance are opponent processes and one cannot reach a state of deep sleep unless their surroundings are supportive of them lowering their level of awareness. If children do not feel secure in the parent-child relationship, which is ideally a primary relationship throughout childhood, then they are probably more likely to feel the adverse effects of negative interactions in the form of sleep disruptions. These results provide preliminary evidence and supportive groundwork for future endeavors focused on the parent-child relationship and the role of attachment in children's sleep regulation.

Interestingly, moderation effects were only present when parent-report of Physical Conflict was considered in relation to parent- and child-reported sleep. This implies that a

secure attachment may be more of a protective factor for children against Physical than Psychological Conflict. To the best of our knowledge, there have been no previous investigations of attachment security as a moderator of sleep disruptions in the context of Physical versus Psychological parent-child Conflict. Thus, it is difficult to comment on why moderation effects were only observed in the context of Physical Conflict. It is important to note that the observed moderation effects were found in relation to both child- and parent-reported sleep disruptions. Therefore, findings are not merely a function of shared informant bias. Ethnicity was also significantly linked to Sleep Activity indicating increased Activity for European versus African American children. While decreased activity during sleep usually indexes less disrupted sleep, children who are chronically sleep deprived may have a strong sleep drive resulting in reduced movement. Thus, the meaning of the association between Sleep Activity and ethnicity is not straight forward. This was the only significant association between a demographic variable and an actigraphy variable and is important when considering potential future directions for research.

The current study draws strength from its objective and subjective measures of sleep, although the most significant findings were found for children's reports of sleep problems. Interestingly, parent-reported Physical Conflict was significantly correlated with lower sleep amount as measured by actigraphy. Though this association did not hold after controlling for demographic variables, it is an interesting correlation and a potential area for future exploration. The use of both actigraphy and self-report provide a thorough assessment of sleep activity during the night as well as children and parents perceptions

of the child's sleep. Consistent with similar studies, actigraphy measures were not highly correlated with subjective measures of sleep (El-Sheikh, et al., 2007). Upon further examination of the constructs, the discrepancy may be due to the fact that perception is often somewhat different from reality. Children's own perception of their quality of sleep is important, because though various children may be obtaining the same amount of objectively measured sleep, they may experience different levels of subjective sleep problems because different people need different amounts of sleep. Further, average scores on actigraphy variables (Sadeh, et al., 2000; Tikotzky & Sadeh, 2001; El-Sheikh & Buckhalt, 2005) as well as subjective reports on either the CSHQ (Owens, Spirito, & McGuinn, 2000) or the School Sleep Habits Survey (El-Sheikh & Buckhalt, 2005) are similar to those observed in comparable studies. Such correspondence indicates that sleep parameters in this sample are similar to those obtained from other community samples.

Some limitations of the current study warrant attention. The study was cross-sectional, which prevents conclusions regarding directionality or causality of effects between variables. Future research is needed to delineate the direction of influence between aspects of the parent-child relationship and children's sleep, including longitudinal research. Further, the current sample is composed of children and families exhibiting normative, non-clinical levels of parent-child conflict and children's sleep disruptions. Although this non-clinical sample makes findings applicable to the majority of families in the general community, results may not be as applicable to children with clinical sleep problems or considerably higher levels of conflict in the home. Findings should also be interpreted in relation to the small amount of variance accounted for by

either parent-child conflict or attachment security. Although such amounts are typical in developmental research, they do suggest that there are potentially many other variables than those examined that can influence children's sleep. Furthermore, the restricted age of children in the present sample should also qualify the context in which results should be interpreted. For example, associations among variables may be different for preschoolers or adolescents. An avenue for future research is the elucidation of various contexts and sample characteristics that can influence the association between parent-child interactions and children's sleep.

Collectively, findings from the present investigation address an understudied yet important question in the literature pertaining to relations between family functioning, specifically in the parent-child relationship, and sleep. Results are supportive of the proposition that negative interactions in the parent-child relationship, specifically, higher levels of psychological and physical conflict, are associated with increased sleep problems cross-sectionally. Further, a secure attachment to parents is not only associated with better sleep in typically developing children, but is also a protective factor against sleep disruptions in the context of higher levels of physical parent-child conflict, and accounted for some of the association between parent-child conflict and children's sleep. Clinical implications include a potential need to focus on the quality of the parent-child relationship when children are presenting with sleep problems such as daytime sleepiness. Though the current study cannot comment longitudinally, it is able to present initial support for the direct and indirect effects presented here, which paves the way for future directions of research. These findings are unique in their combined focus on the

parent-child relationship and sleep problems. It seems that attachment security and parent-child conflict both connect strongly to the presence of sleep problems and future work is warranted to continue to explore relations between these variables.

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Table 1.
Means, Standard Deviations, Medians, Ranges, and Sample Sizes of the Primary Variables

	<i>M</i>	<i>SD</i>	<i>Mdn</i>	Range	<i>N</i>
Physical parent-child conflict					
CTS, PR	4.51	4.56	3	0-23	136
CTS, CR	1.57	2.44	.5	0-15	135
Psychological parent-child conflict					
CTS, PR	7.09	4.63	7	0-24	135
CTS, CR	3.49	4.43	2	0-24	135
Attachment security, IPPA	174.36	25.39	181	68-200	135
Subjective Sleep					
CSHQ, PR	43.50	5.75	43.50	28-62	137
Sleepiness, CR	12.63	3.53	12.00	9-24	132
Sleep/Wake Problems, CR	15.93	4.67	15.00	9-27	134
Objective sleep (Actigraphy)					
Sleep Onset Time	9:44 P.M.	114	9:53	8:25 P.M.-1:15A.M	136
Morning Wake Time	6:12 A.M.	33	6:08	5:09 A.M.-7:32A.M	136
Sleep Amount	7:42	:47	7:54	5:22-8:94	136
Sleep Efficiency	89.12	9.34	91.10	63-99	136
Sleep Activity	39.23	12.24	38.04	15.48-71.94	136

Note: CTS = PR = Parent report, CR = Child report
Conflict Tactics Scale; IPPA = Inventory of Parent and Peer Attachment; CSHQ = Children's Sleep Habits Questionnaire; Actigraphy-derived sleep variables are based on sleep averages during the week of actigraphic assessments.

Table 2. Correlations among Demographic and Primary Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	---													
2. Ethnicity	-.09	---												
3. Gender	-.04	-.10	---											
4. SES	.15	-.22*	.04	---										
5. Physical conflict, PR	-.10	.06	.23**	.06	---									
6. Physical conflict, CR	-.01	-.10	.30**	-.03	.30**	---								
7. Psychological conflict, PR	-.03	-.23**	.23**	.15	.58**	.27**	---							
8. Psychological conflict, CR	.06	-.10	.23**	.11	.20*	.52*	.24**	---						
9. Attachment Security	.02	.01	-.13	-.02	-.09	-.24	-.22	-.23**	---					
10. Sleep Problems, PR	-.09	-.11	.15	-.04	.30**	.21*	.27**	.05	-.15	---				
11. Sleepiness, CR	-.00	.20*	.16	-.01	.16	.27**	.19*	.28**	-.27**	.14	---			
12. Sleep/Wake Problems, CR	.01	-.06	.10	-.16	.19*	.37**	.26**	.29**	-.26**	.22**	.47**	---		
13. Sleep Amount	-.03	-.18*	-.08	.23*	-.03	-.03	.04	-.07	-.01	-.12	.02	-.11	---	
14. Sleep Efficiency	.13	-.05	-.04	.18*	.06	-.03	.02	.01	-.09	-.07	.06	-.01	.46**	---
15. Sleep Activity	-.17	-.27**	.20*	-.05	-.01	.02	.08	.05	.05	.12	-.07	.05	-.52**	-.49**

Note: PR = Parent report, CR = Child report,
 *p ≤ .05; **p < .01; ***p < .001.

Table 3.

Additive and Direct Effects of Physical Parent-child Conflict, Parent-report and Attachment Security on CSHQ, Sleepiness, and Sleep/Wake Problems

Step and Variables	β	R^2	ΔR^2	ΔF (df)
Sleep Problems, CSHQ				
1. Demographic Variables		.04	.04	1.16 _(4, 114)
Age	-.11			
Ethnicity	-.10			
Gender	.12			
SES	-.06			
2. Physical Conflict, PR	.24*	.09	.05*	6.06 _(1, 113) *
3. Attachment Security	-.15	.11	.02	2.73 _(1, 112)
2. Attachment Security	-.17	.07	.03	3.25 _(1, 113)
3. Physical Conflict, PR	.22*	.11	.04*	5.50 _(1, 112) *
Sleepiness				
1. Demographic Variables		.05	.05	1.38 _(4, 114)
Age	-.03			
Ethnicity	.10			
Gender	.19*			
SES	.00			
2. Physical Conflict, PR	.04	.05	.00	.20 _(1, 113)
3. Attachment Security	-.20*	.09	.04*	4.56 _(1, 112) *
2. Attachment Security	-.20*	.09	.04*	4.72 _(1, 113) *
3. Physical Conflict, PR	.03	.09	.00	.08 _(1, 112)
Sleep/Wake				
1. Demographic Variables		.05	.05	1.59 _(4, 114)
Age	-.03			
Ethnicity	-.08			
Gender	.14			
SES	-.18			
2. Physical Conflict, PR	.12	.07	.01	1.62 _(1, 113)
3. Attachment Security	-.21*	.11	.04*	5.11 _(1, 112) *
2. Attachment Security	-.21*	.10	.04*	5.53 _(1, 113) *
3. Physical Conflict, PR	.11	.11	.01	1.25 _(1, 112)

Note: PR = Parent report, CR = Child report

* $p \leq .05$; ** $p < .01$; *** $p < .001$.

Table 4.

Additive and Direct Effects of Psychological Parent-child Conflict, Parent-Report and Attachment Security on CSHQ and Sleep/Wake Problems

Step and Variables	β	R^2	ΔR^2	$\Delta F (df)$
CSHQ				
1. Demographic Variables		.03	.03	.77 _(4,113)
Age	-.08			
Ethnicity	-.09			
Gender	.11			
SES	-.05			
2. Psychological Conflict PR	.20*	.06	.04*	4.19 _(1,112) *
3. Attachment Security	-.15	.08	.02	2.50 _(1,111)
2. Attachment Security	-.17	.06	.03	3.61 _(1,112)
3. Psychological Conflict PR	.17	.08	.03	3.07 _(1,111)
Sleep/Wake Problems				
1: Demographic Variables		.07	.07	1.97 _(4, 113)
Age	-.07			
Ethnicity	-.09			
Gender	.15			
SES	-.19			
2. Psychological Conflict PR	.26**	.12	.06**	7.47 _(1,112) **
3. Attachment Security	-.18	.15	.03	3.29 _(1, 111)
2. Attachment Security	-.20*	.11	.04*	4.93 _(1, 112) *
3. Psychological Conflict PR	.23*	.15	.04*	5.77 _(1, 111) *

Note: PR = Parent report, CR = Child report

* $p \leq .05$; ** $p < .01$; *** $p < .001$.

Table 5.

Additive and Direct Effects of Physical Parent-child Conflict, Child-report and Attachment Security on Sleepiness and Sleep/Wake Problems

Step and Variables	β	R^2	ΔR^2	$\Delta F (df)$
Sleepiness				
1: Demographic Variables		.04	.04	1.29 _(4, 115)
Age	-.01			
Ethnicity	.14			
Gender	.16			
SES	-.00			
2. Physical Conflict CR	.20*	.08	.04*	4.69 _(1,114) *
3. Attachment Security	-.22*	.13	.05*	5.88 _(1,113) *
2. Attachment Security	-.25**	.11	.06**	8.08 _(1,114) *
3. Physical Conflict CR	.15	.13	.02	2.56 _(1, 113)
Sleep/Wake Problems				
1: Demographic Variables		.05	.05	1.42 _(4, 115)
Age	-.02			
Ethnicity	-.05			
Gender	.13			
SES	-.18			
2. Physical Conflict CR	.34***	.15	.11***	14.27 _(1,114) ***
3. Attachment Security	-.18*	.18	.03*	3.97 _(1,113) *
2. Attachment Security	-.26*	.10	.06**	7.29 _(1, 114) **
3. Physical Conflict CR	.30**	.18	.08**	10.70 _(1,113) **

Note: PR = CR = Child report

* $p \leq .05$; ** $p < .01$; *** $p < .001$.

Table 6.

Additive and Direct Effects of Psychological Parent-child Conflict, Child-report and Attachment Security on Sleepiness and Sleep/Wake Problems

Step and Variables	β	R^2	ΔR^2	$\Delta F (df)$
Sleepiness				
1: Demographic Variables		.04	.04	1.29 _(4, 115)
Age	-.01			
Ethnicity	.14			
Gender	.16			
SES	-.01			
2. Psychological Conflict CR	.22*	.09	.04*	5.28 _(1, 114) *
3. Attachment Security	-.22*	.13	.05*	6.04 _(1, 113) *
2. Attachment Security	-.25**	.11	.06**	8.10 _(1, 114) *
3. Psychological Conflict CR	.17	.13	.03	3.29 _(1, 113)
Sleep/Wake Problems				
1: Demographic Variables		.05	.05	1.42 _(4, 115)
Age	-.02			
Ethnicity	-.05			
Gender	.13			
SES	-.18			
2. Psychological Conflict PR	.22*	.09	.05*	5.80 _(1, 114) *
3. Attachment Security	-.21*	.16	.04*	5.25 _(1, 113) *
2. Attachment Security	-.24**	.10	.06**	7.29 _(1, 114) **
3. Psychological Conflict PR	.18	.13	.03	3.81 _(1, 113)

Note: CR = Child report

* $p \leq .05$; ** $p < .01$; *** $p < .001$.

Table 7.

Attachment Security as a Moderator in the Parent-reported Physical Parent-child Conflict-Sleep Link

Step and Variables	β	R^2	ΔR^2	$\Delta F (df)$
Sleep Problems PR, CSHQ				
1: Demographic Variables		.04	.04	1.29 _(4, 115)
Age	-.09			
Ethnicity	-.12			
Gender	.06			
SES	-.05			
2. Physical Conflict, PR	.30**	.11	.08**	5.28 _(1, 114) **
3. Attachment Security	-.14	.13	.02	6.04 _(1, 113)
4. Physical Conflict, PR × Attachment Security	-.18*	.16	.03*	4.14 _(1, 115) *
Sleepiness				
1. Demographic Variables		.07	.07	2.08 _(4, 118)
Age	-.01			
Ethnicity	.19*			
Gender	.19*			
SES	.00			
2. Physical Conflict, PR	.10	.08	.01	1.13 _(1, 117)
3. Attachment Security	-.21*	.12	.04*	5.73 _(1, 116)
4. Physical Conflict × Attachment Security	-.18*	.15	.03*	4.03 _(1, 115) *
Sleep/Wake				
1. Demographic Variables		.03	.03	.78 _(4, 118)
Age	.00			
Ethnicity	.00			
Gender	.08			
SES	-.14			
2. Physical Conflict, PR	.21*	.07	.04*	5.16 _(1, 117) *
3. Attachment Security	-.22**	.12	.05*	6.31 _(1, 116) *
4. Physical Conflict × Attachment Security	-.18*	.15	.03*	4.12 _(1, 115) *

Note: CR = Child report

* $p \leq .05$; ** $p < .01$; *** $p < .001$.

Table 8.

Attachment Security as a Moderator in the Parent-reported Psychological Parent-child Conflict and Sleep Activity Link

Step and Variables	β	R^2	ΔR^2	$\Delta F (df)$
Sleep Activity				
1: Demographic Variables		.10	.10*	3.27 _(4, 117) *
Age	-.09			
Ethnicity	-.27*			
Gender	.16			
SES	-.10			
2. Psychological Conflict PR	-.06	.10	.00	.43 _(1, 116)
3. Attachment Security	.09	.11	.01	.97 _(1, 115)
4. Psychological Conflict, PR × Attachment Security	-.20*	.14	.03*	4.13 _(1, 114) *

Note: CR = Child report

* $p \leq .05$; ** $p < .01$; *** $p < .001$.

Figure Captions

Figure 1. Partial mediation between parent-reported psychological conflict and sleep/wake problems through attachment with direct effects before and after controlling for attachment (Before controlling for attachment/After controlling for attachment)

Figure 2. Marginally significant mediation between child-reported physical conflict and Sleepiness through attachment with direct effects before and after controlling for attachment (Before controlling for attachment/After controlling for attachment)

Figure 3. Partial mediation between child-reported physical conflict and Sleep/Wake Problems through attachment with direct effects before and after controlling for attachment (Before controlling for attachment/After controlling for attachment)

Figure 4. Marginally significant mediation between child-reported psychological conflict and Sleepiness through attachment with direct effects before and after controlling for attachment (Before controlling for attachment/After controlling for attachment)

Figure 5. Full mediation between child-reported Psychological Conflict and Sleep/Wake Problems through attachment with direct effects before and after controlling for attachment (Before controlling for attachment/After controlling for attachment)

Figure 6. Attachment security as a moderator in the link between parent-reported physical parent-child conflict and general sleep problems reported by parents.

Figure 7. Attachment security as a moderator in the link between parent-reported physical parent-child conflict and children's Sleepiness

Figure 8. Attachment security as a moderator in the link between parent-reported physical parent-child conflict and children's Sleep/Wake Problems

Figure 9. Attachment security as a moderator in the link between parent-reported psychological parent-child conflict and Sleep Activity

Figure 1

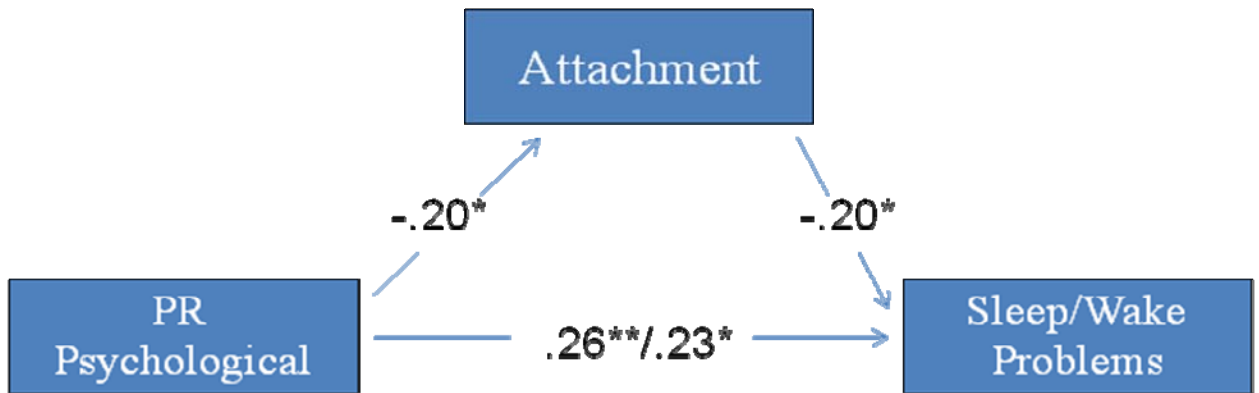


Figure 2

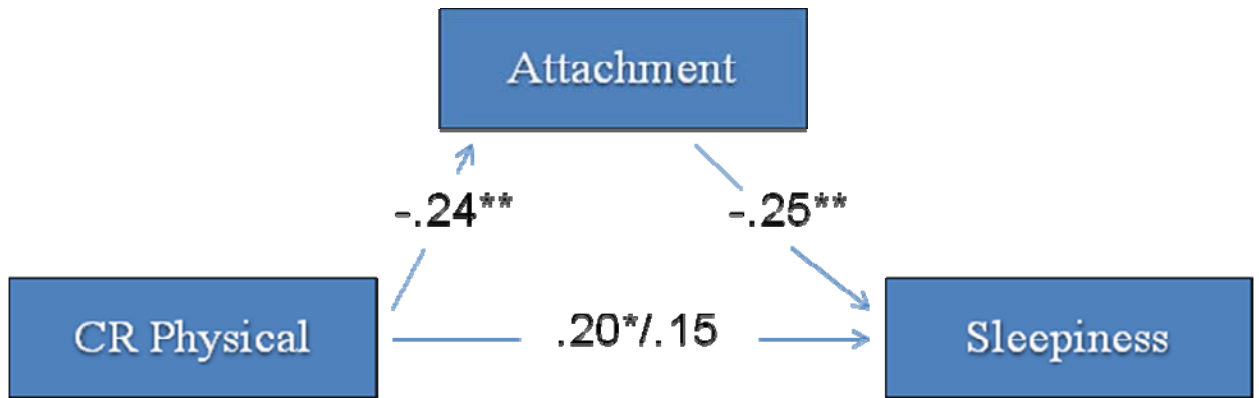


Figure 3

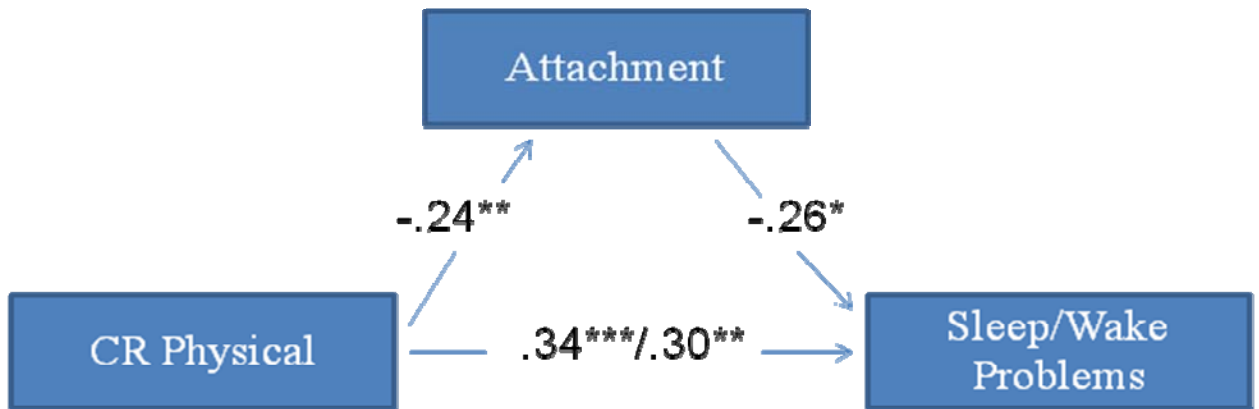


Figure 4

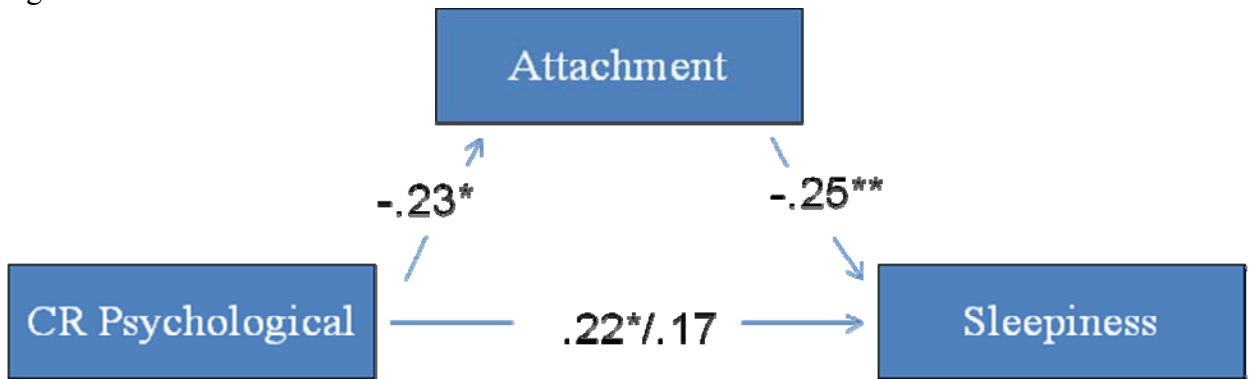


Figure 5

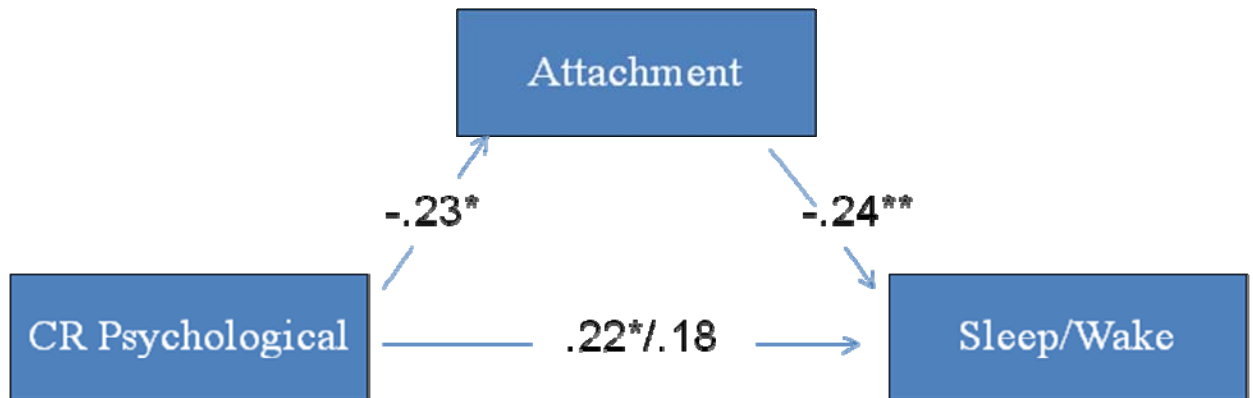


Figure 6

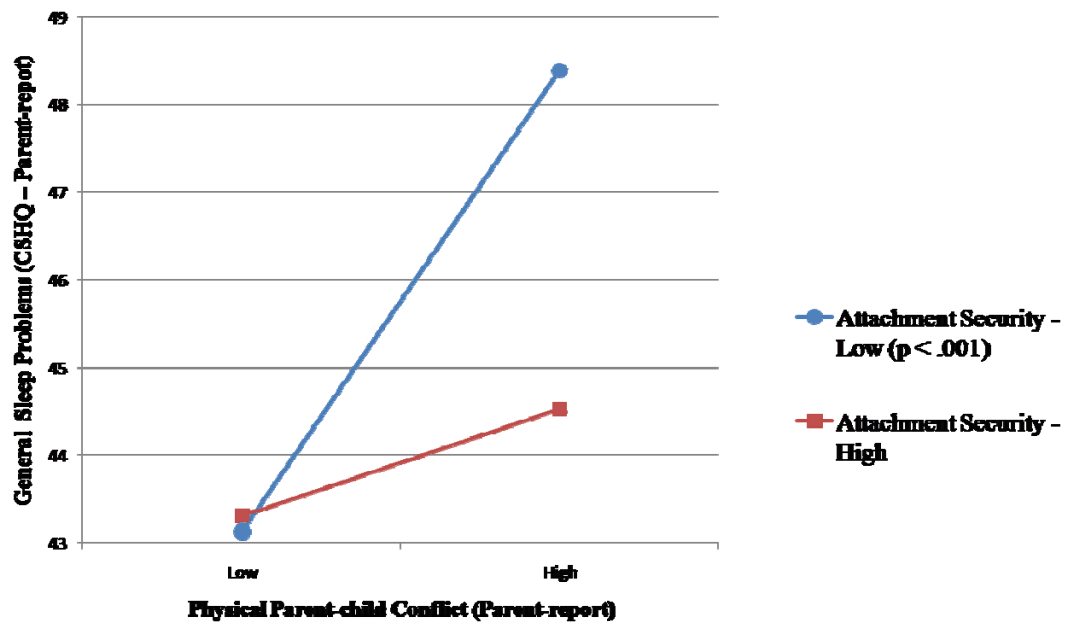


Figure 7

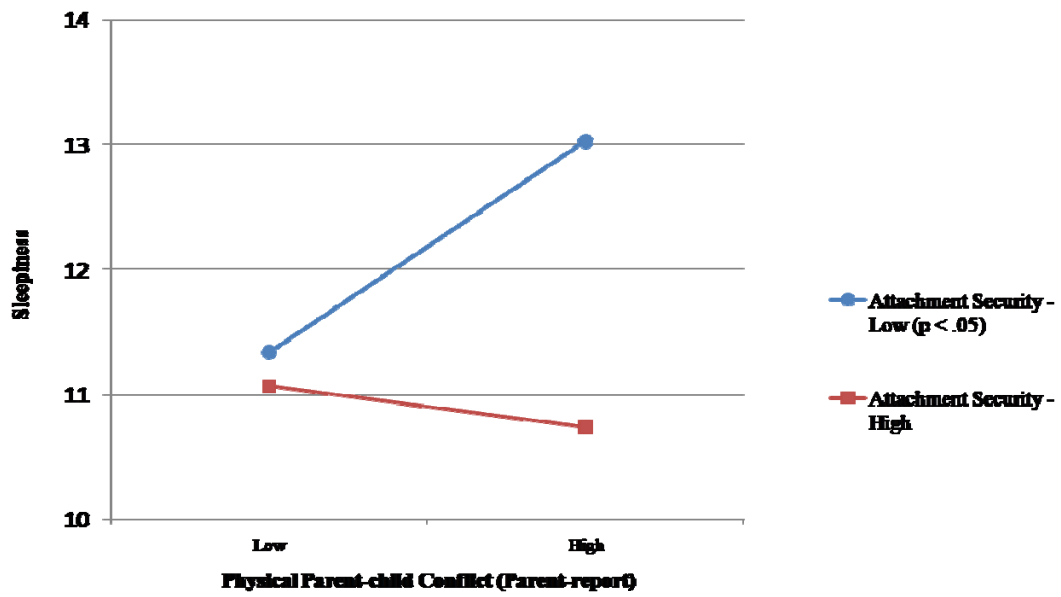


Figure 8

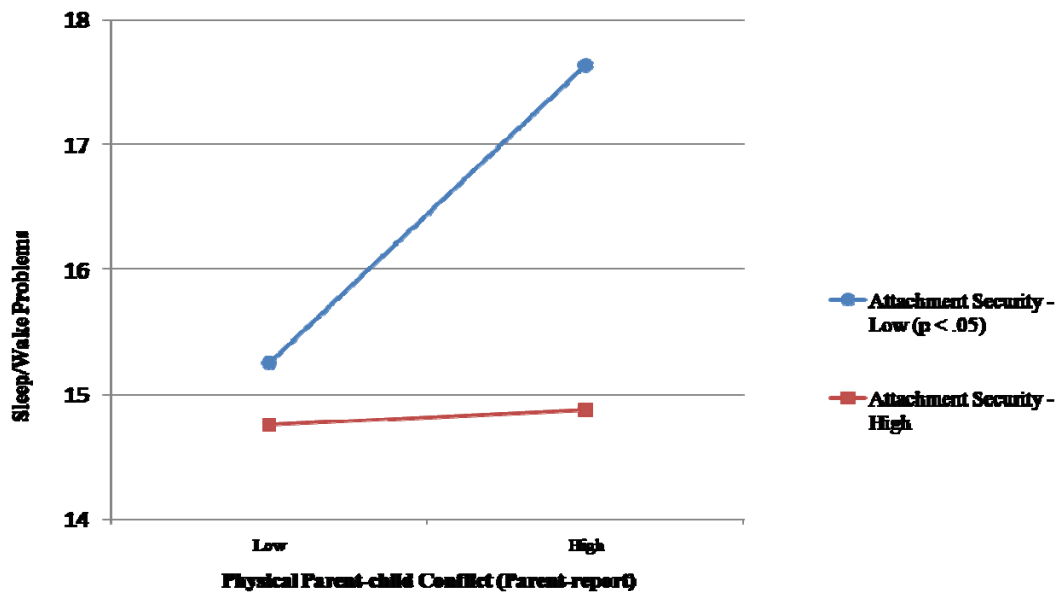
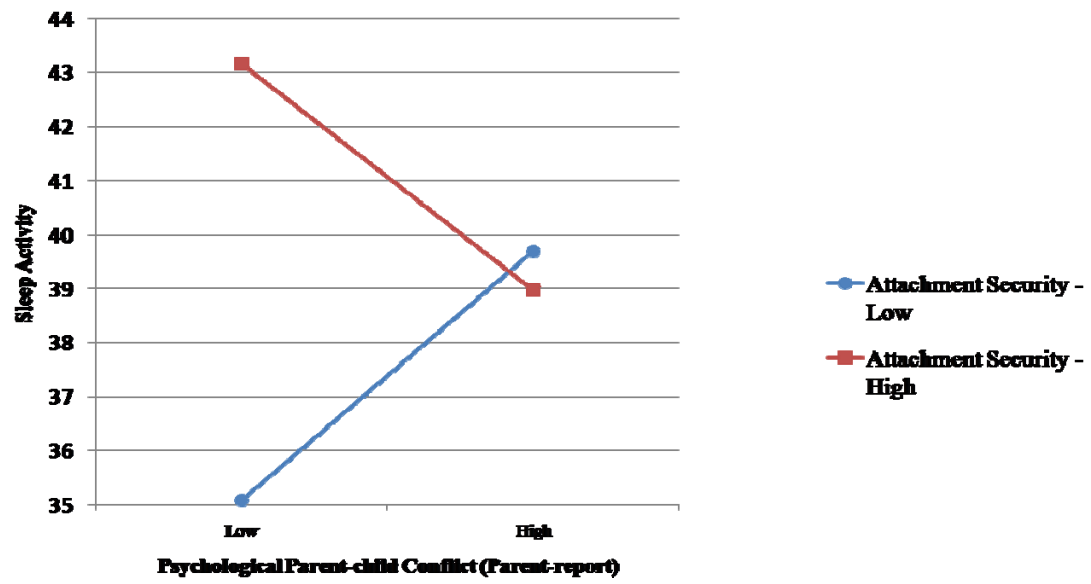


Figure 9



Appendix A

1. CTS-PC: Parent-Child Conflict Tactics Scale, Parent Version (Straus, 1995)
2. CTS-PC: Parent-Child Conflict Tactics Scale, Child Version (Straus, et al., 1998)
3. IPPA: Inventory of Parent and Peer Attachment (Armsden, 1986)
4. School Sleep Habits Survey (Carskadon, Seifer, & Acebo, 1991)
 - a. Sleepiness Scale
 - b. Sleep/Wake Problems Scale
5. CSHQ: The Children's Sleep Habits Questionnaire (Owens, Spirito, & McGuinn, 2000)

PARENT-CHILD BEHAVIORS CTS-I/CTSPC

Parent Version

Children often do things that are wrong, disobey, or make their parents angry. We would like to know what you have done when your child did something wrong or made you upset or angry.

This is a list of things that YOU or our SPOUSE might have done in the past year and I would like you to answer whether either of you have: done it once in the past year, done it twice in the past year, 3-5 times, 6 to 10 times, 11 to 20 times, or more than 20 times in the past year. If either of you haven't done it in the past year but it has happened before that, I would like to know this, too.

1 = Once in the past year

4 = 6-10 times in the past year

2 = Twice in the past year

5 = 11-20 times in the past year

3 = 3-5 times in the past year

6 = More than 20 times in the past year

7 = Not in the past year, but it happened before

0 = This has never happened before

1. Explained why something was wrong
2. Put him/her in time out
3. Shook him/her
4. Hit him/her on the bottom with something like a belt, hairbrush, a stick or some other hard object
5. Gave him/her something else to do instead of what he/she was doing
6. Shouted, yelled, or screamed at him/her

7. Hit him/her with a fist or kicked him/her hard
8. Spanked him/her on the bottom with my bare hand
9. Swore or cursed at him/her
10. Said you would send him/her away or kick him/her out of the house
11. Threatened to spank or him him/her but did not actually do it
12. Him him/her on some other part of the body besides the bottom with something like a belt, hairbrush, a stick or some other hard object
13. Slapped him/her on the hand, arm, or leg
14. Took away privileges or grounded him/her
15. Pinched him/her
16. Threw or knocked him/her down
17. Called him/her dumb or lazy or some other name like that
18. Slapped him/her on the face head or ears

PARENT-CHILD BEHAVIORS CTS-L/CTSPC

Child Version

Children often do things that are wrong, disobey, and make their parents angry.

We would like to know what your parents have done when you did something wrong or made them angry or upset.

This is a list of things you might have done in the past year and I would like you to answer whether your parents have: done it once in the past year, done it twice in the past year, 3-5 times, 6 to 10 times, 11 to 20 times, or more than 20 times in the past year. If they haven't done it in the past year but it has happened before that, I would like to know this, too.

1 = Once in the past year

4 = 6-10 times in the past year

2 = Twice in the past year

5 = 11-20 times in the past year

3 = 3-5 times in the past year

6 = More than 20 times in the past year

7 = Not in the past year, but it happened before

0 = This has never happened before

1. Explained why something was wrong
2. Put you in time out
3. Shook you
4. Hit you on the bottom with something like a belt, hairbrush, a stick or some other hard object
5. Gave you something else to do instead of what he/she was doing
6. Shouted, yelled, or screamed at you

7. Hit you with a fist or kicked you hard
8. Spanked you on the bottom with his/her bare hand
9. Swore or cursed at you
10. Said he/she would send you away or kick you out of the house
11. Threatened to spank or hit you but did not actually do it
12. Hit you on some other part of the body besides the bottom with something
like a belt, hairbrush, a stick or some other hard object
13. Slapped you on the hand, arm, or leg
14. Took away privileges or grounded you
15. Pinched you
16. Threw or knocked you down
17. Called you dumb or lazy or some other name like that
18. Slapped you on the face head or ears

IPPA

This questionnaire asks about your relationships with important people in your life –your mother, your father, and your close friends. Please read the directions to each part carefully.

Part I

Each of the following statements asks about your feeling about your *mother*, or the woman who has acted as your mother. If you have more than one person acting as your mother (e.g. natural mother and a stepmother) answer the questions for the one you feel has most influenced you.

Part II

This part asks about your feeling about your *father*, or the man who has acted as your father. If you have more than one person acting as your father (e.g. natural and stepfathers) answer the questions for the one you feel has most influenced you.

Please read each statement and circle the *ONE* number that tells how true the statement is for you now.

Possible Answers:

1 = Almost never or never true

2 = Not very often true

3 = Sometimes true

4 = Often true

5 = Almost always or always true

1. My mother/father respects my feelings
2. I feel my mother/father does a good job as my mother/fater
3. I wish I had a different mother/father
4. My mother/father accepts me as I am
5. I like to get my mother's/father's point of view on things that I am concerned about
6. I feel it's no use letting my feelings show around my mother/father
7. My mother/father can tell when I'm upset about something
8. Talking over my problems with my mother/father makes me feel ashamed or foolish
9. My mother/father expects too much from me
10. I get upset easily around my mother/father
11. I get upset a lot more than my mother/father knows about
12. When we discuss things, my mother cares about my point of view
13. My mother/father trusts my judgement
14. My mother/father has her own problems, I don't bother her/him with mine
15. My mother/father helps me to understand myself better
16. I tell my mother/father about my problems and troubles
17. I feel angry with my mother/father
18. I don't get much attention from my mother/father
19. My mother/father helps me to talk about my difficulties
20. My mother/father understands me
21. When I am angry about something, my mother/father tries to be understanding

22. I trust my mother/father
23. My mother/father doesn't understand what I'm going through these days
24. I can count on my mother/father when I need to get something off my chest
25. If my mother/father knows something is bothering me, she asks me about it

SCHOOL SLEEP HABITS SURVEY

1 (#43). During the last two weeks have you struggled to stay awake (fought sleep) or fallen asleep in the following situations:

No struggled to stay awake fallen asleep both

- A. In a face-to-face conversation with another person
- B. Traveling in a bus, plane, train, or car
- C. Attending a performance (e.g., movie, concert, or play)
- D. Watching T.V. or listening to music
- E. Reading, studying, or doing homework
- F. During a test
- G. In a class at school
- H. While working on a computer
- I. Playing video games

2 (#45). In the last 2 weeks how often have you...

Everyday several times twice once never

- A. Felt satisfied with your sleep
- B. Arrived late to class because you overslept
- C. Fallen asleep in a morning class

- D. Fallen asleep in an afternoon class
- E. Awaken too early in the morning and couldn't get back to sleep
- F. Stayed up until at least 3 a.m.
- G. Stayed up all night
- H. Slept in past noon
- I. Felt tired, dragged out, or sleepy during the day
- J. Needed more than 1 reminder to get up in the morning
- K. Had an extremely hard time falling asleep
- L. Had nightmares or bad dreams during the night
- M. Gone to bed because you could not stay awake any longer
- N. Done dangerous things without thinking
- O. Had a good night sleep

THE CHILDREN'S SLEEP HABITS QUESTIONNAIRE

(CSHQ)

Please recall your **child's** sleep behaviors occurring over a **typical week**. Select “**usually**” if the sleep behavior occurred five to seven times per week; “**sometimes**” for two to four times per week; and “**rarely**” for zero to one time per week.

5 – 7 times/week = **Usually**

2 – 4 times/week = **Sometimes**

0 – 1 times/week = **Rarely**

1. Bedtime Resistance:

Goes to bed at same time

Falls asleep in own bed

Falls asleep in others bed

Needs parent in room to sleep

Struggles at bedtime

Afraid of sleeping alone

2. Sleep Onset Delay:

Falls asleep in 20 minutes

3. Sleep duration:

Sleeps too little

Sleeps the right amount

Sleeps same amount each day

4. Sleep anxiety

Needs parent in room to sleep

Afraid of sleeping in the dark

Afraid of sleeping alone

Trouble sleeping away

5. Night waking

Moves to other's bed at night

Awakes once during night

Awakes more than once

6. Parasomnias

Wets the bed at night

Talks during sleep

Restless and moves a lot

Sleepwalks

Grinds teeth during sleep

Awakens screaming, sweating

Alarmed by scary dream

7. Sleep Disordered Breathing

Snores loudly

Stops breathing

Snorts or gasps

8. Daytime Sleepiness

Wakes by himself

Wakes up in negative mood

Others wake child

Hard time getting out of bed

Takes long time to be alert

Seems tired

Sleepy when watching T.V.

Sleepy when riding in car