Families, Systems, & Health
2015, Vol. 33, No. 2, 146–154

1091-7527/15/$12.00 http://dx.doi.org/10.1037/fsh0000119

Parent Psychopathology as a Mediator of the Relationship Between Anxiety and Sleep Problems in Children

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Introduction: Sleep problems exert a negative impact on youths and their families. Parent and child mental health represent 2 posited, yet understudied, risk factors for sleep problems in youths. As such, this study sought to examine the role that parental psychopathology may play in mediating the relationship between child anxiety and sleep problems utilizing Internet sampling procedures. ***Method:*** Parents (n = 83; 90.4% female) answered questions about their own mental health, and about their child's (n = 83; 77.1% female) anxiety and sleep. ***Results:*** Analyses found that parent anxiety and stress mediated the relationship between child anxiety and sleep problems. ***Discussion:*** This is the first study to examine the joint roles of parent psychopathology and child anxiety in explaining sleep problems in youths. Limitations notwithstanding, these results suggest that both parent- and child-level variables are important for developing a more comprehensive understanding of child sleep problems. Future areas of research are discussed.

Keywords: parental anxiety, parental stress, child sleep problems, child anxiety

Adequate sleep is necessary for healthy social, academic, and family functioning in children and adolescents (Alfano, Ginsburg, & Kingery, 2007). However, sleep disturbances are surprisingly common, with epidemiological studies estimating that sleep problems affect more than 25% of children in the United States (Blunden et al., 2004; Meltzer & Mindell, 2007; Owens, 2005). Insufficient sleep is associated with a myriad of negative outcomes, including behavioral problems, learning and attention deficits (Wolfson & Carskadon, 1998), and poorer health-related quality of life (Hiscock, Canterford, Ukoumunne, & Wake, 2007). Children who experience sleep problems demonstrate greater difficulty in social and academic situations, are more likely to have decreased health and immune system functioning, and experience a decrease in overall quality of life (Chorney, Detweiler, Morris, & Kuhn, 2008).

Risk Factors for Sleep Problems in Children

A number of factors have been shown to contribute to sleep disturbances in children and adolescents, including respiratory problems, low socioeconomic status (SES), stressful life events, gender, and age (Camhi, Morgan, Pernisco, & Quan, 2000; El-Sheikh, Buckhalt, Mize, & Acebo, 2006; Meltzer & Mindell, 2007; Redline et al., 1999). Additional risk factors such as comorbid child and parental psychopathology (e.g., anxiety, depression, and stress) have received less attention (Alfano et al., 2007; Coulombe, Reid, Boyle, & Racine, 2010; Moore, Gordon, & McLean, 2012). Yet these risk factors represent important potential contributors to sleep problems. Collectively, these findings highlight the importance of gaining a more comprehensive understanding of those factors germane to the onset and maintenance of sleep problems in youths. The primary aim of this study is to examine the relationship between two potential risk factors—child anxiety and parent psychopathology—and sleep

This article was published Online First April 27, 2015.

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disturbances in children. We endeavor to investigate this triadic relationship within a socioecological model of child health (Bronfenbrenner, 1994).

Bronfenbrenner's Socioecological Model, Parent Psychopathology, and Child Sleep Problems

The examination of parent psychopathology as an influence on child sleep problems is a logical extension of the socioecological model of child health (Bronfenbrenner, 1994). According to this model, children impact and are impacted by several layers of social influence (Bronfenbrenner, 1994). The primary interaction occurs between children and their immediate environment, which consists of parents, siblings, and peers. Consistent with the notion that parents influence and guide child development, parental psychopathology may significantly contribute to sleep problems in anxious children. For example, Shang, Gau, and Soong (2006) demonstrated that sleep disturbances such as insomnia, oversleeping, sleep talking, and nightmares are more prevalent in children with parents who scored higher on a self-report questionnaire of minor psychiatric disorders (i.e., anxiety/depression, sleep disturbance, somatic concerns, and interpersonal difficulties). In studies of parents with young children, decreased daily functioning and maternal depression were significantly associated with parent reports of child sleep problems (Martin, Hiscock, Hardy, Davey, & Wake, 2007). Conversely, low parental stress has also been identified as a protective factor against the negative consequences of childhood sleep problems (Carr, 2009). Extant literature has linked sleep problems in children as a risk factor for increased parental stress and psychopathology (Doo & Wing, 2006; Gelman & King, 2001; Sadeh, Raviv, & Gruber, 2000), yet few studies have sought to examine this relationship in the opposing direction—parental psychopathology as a risk factor for sleep problems in children. The current study extends this literature by examining the relationship between anxiety and sleep problems in children with the potential mediating role of parental psychopathology.

Current Study Aims

The aim of the present study is to explore the possibility of the triadic relationship between parental psychopathology, child anxiety, and sleep problems in children. We hypothesize that greater child anxiety will predict greater sleep problems in children. In addition, we hypothesize that parental psychopathology will serve as one potential mechanism (i.e., mediator) by which child anxiety is linked to child sleep problems.

Method

Participants

The present study utilized data from a larger, Internet-based study ($N = 172$). Participants were recruited through web-based advertisements. In total, the survey was posted to 15 sites, listservs, and forums pertaining to mental health (e.g., International OCD Foundation), parenting (e.g., Mothering Forum), self-help (e.g., Uncommon Knowledge), and general health (e.g., Daily Strength, eHealth Forum) both in the United States and internationally. In an effort to better control for heritability between child and parent psychopathology, only biological parents who live in the same home as their child and who completed all study-related measures were eligible to participate. This inclusion criteria resulted in the exclusion of 89 parents from the larger study for various reasons including not being the child's biological parent ($n = 15$), the child's age was out of range ($n = 25$), or the parent did not complete all the study measures ($n = 49$). This resulted in a final sample size of 83 parents (90.4% female; mean age = 42.64, $SD = 6.02$) with at least one child between the ages of 8 and 17. Parent and child demographic data are provided in Table 1.

Measures

Child anxiety and health survey. This survey was created by the last author (C. A. Flessner) and consists of a demographic questionnaire, questions assessing the phenomenology of child anxiety and related problems, and three additional measures designed to assess parent and child report of child anxiety (i.e., Screen for Childhood Anxiety Related Emotional Disorders—Parent Report [SCARED-P]), parental psychopathology

Table 1
Sample Characteristics (N = 83)

Characteristic	*n*	%
Parent		
Gender		
Male	6	7.2
Female	75	90.4
Missing	2	2.4
Ethnicity		
White/Caucasian	78	94.0
African American	1	1.2
Hispanic-Latino	3	3.6
Multiracial	1	1.2
Missing	1	1.2
Age (years)	*M* = 42.64	*SD* = 6.02
Education		
High school/GED	16	19.3
Technical college/Associate's degree	17	20.5
Bachelor's degree	29	34.9
Master's degree	17	20.5
Doctoral degree	4	4.8
Marital status		
Single/never married	6	7.2
Currently married	62	74.7
Separated/divorced	13	15.7
Widowed	1	1.2
Missing	1	1.2
Household income		
<$9,999	2	2.4
$10,000–$19,999	4	4.8
$20,000–$29,999	3	3.6
$30,000–$49,999	12	14.5
$50,000–$74,999	17	20.5
$75,000+	45	54.2
Child		
Gender		
Male	18	21.7
Female	64	77.1
Missing	1	1.2
Ethnicity		
White/Caucasian	73	88.0
African American	2	2.4
Hispanic-Latino	4	4.8
Multiracial	2	2.4
Missing	2	2.4
Age (years)	*M* = 13.20	*SD* = 2.68
Education (grade)		
Grade school (2nd–5th)	18	21.6
Middle school (6th–8th)	25	30.1
High school (9th–12th)	40	48.2

Note. Total percentages are not 100 for every characteristic because of rounding.

(i.e., Depression Anxiety Stress Scales [DASS-21]), and child sleep problems (i.e., Sleep Disturbances Scale for Children [SDSC]).

DASS-21 (Lovibond and Lovibond, 1995). This 21-item questionnaire assesses various negative emotional states that may indicate clinically significant symptoms of depression, anxiety, or stress. Individuals answer each item using a 4-point Likert scale regarding negative emotional states that may apply to them in the past week (e.g., "I found it hard to wind down"). The DASS-21 has demonstrated good psychometric properties (Antony, Bieling, Cox, Enns, & Swinson, 1998), and has been utilized in prior research utilizing Internet-sampling methodology (Flessner et al., 2008). In this study, each scale yielded good to excellent internal consistency (α = .79 to 0.91) among the current sample.

SCARED-P (Birmaher et al., 1999). The parent version of the SCARED is a 41-item questionnaire measuring the parent's perceptions of their child's anxiety. Typically used as a screener for child anxiety disorders, parents report on various items using a 3-point Likert scale regarding anxiety symptoms present in their child (e.g., "When my child feels frightened, it is hard for him/her to breathe"; Birmaher et al., 1999). The SCARED demonstrates good psychometric properties (Birmaher et al., 1999; Essau, Muris, & Ederer, 2002; Monga et al., 2000), and yielded excellent (α = .93) internal consistency in the present sample.

SDSC (Bruni et al., 1996). This 26-item scale measures a parent's report of their child's sleep disturbances. Along with items assessing the amount of time their child sleeps most nights, parents use a 5-point Likert scale to respond to items related to child sleep disturbances (e.g., "The child goes to bed reluctantly"). Good psychometric properties for the SDSC are shown in clinical and nonclinical child populations (Bruni et al., 1996; Ferreira et al., 2009). Findings from the current study suggest good (α = .86) internal consistency as well.

Procedures

This study was approved by the institutional review board at Kent State University. Biological parents of children between the

ages of 8 and 17 years and their children completed the online survey. Parents were instructed to base their responses on only one child. First, the parent completed their portion of the Child Health and Anxiety Survey, followed by, when applicable, the child completing their portion of the survey. Completion of the Child Health and Anxiety Survey took approximate 45 min. Upon completing the survey, participants clicked "submit" and data were stored on the Qualtrics server. Combinations of key demographic variables for all respondents were checked providing increased assurance that duplicate participants were not inadvertently included in subsequent data analyses. The online survey website (Qualtrics) ensured security and confidentiality of the data collected. This server required Dr. Flessner's login and password to access and download into a suitable format (i.e., Statistical Software Package for the Social Sciences; 20th ed.; SPSS) for conducting statistical analyses.

Data Analytic Plan

A standard regression was first conducted to examine the direct path of child anxiety independently predicting child sleep problems. Consistent with past literature, we predicted a significant relationship between child anxiety and greater child sleep problems (Kendall & Pimentel, 2003; Masi et al., 2004; Pina, Silverman, Alfano, & Saavedra, 2002).

The present study analyzed three mediation models in SPSS to examine the mediating role of parent psychopathology (DASS—Depression, Anxiety, and Stress subscale scores) in explaining the relationship between parent-reported child anxiety (i.e., SCARED-P total score) and child sleep disturbances (parent-reported SDSC total score). Before running mediational analyses, distributions of the predictors, proposed mediators, and outcome variables were examined. All variables were normally distributed, determined using absolute cutoffs of skewness and kurtosis. Distribution plots of normality indicated no extreme outliers for any of the variables of interest. Additionally, preliminary analyses detected no significant differences between child age and gender on the measure of child sleep problems.

Results

Mediation analyses were utilized to examine the relationship between the independent variable of child anxiety (SCARED-P total score) and child sleep problems (SDSC total score), particularly explained through symptoms of parent psychopathology (DASS subscale scores). All results are based upon parent reports of their own psychiatric symptoms as well as reports of their child's anxiety symptoms and sleep. Results of the mediations are exhibited in Figure 1 and are described further in the Results section.

Initial standard regression results demonstrated a significant, positive relationship between child anxiety and sleep problems indicating that greater child anxiety predicted greater child sleep problems ($b = .36$, $\beta = .39$, $p < .001$). The overall regression model explained 15.5% (Adjusted $R^2 = 14.4\%$) of the variance in child sleep problems, $F(1, 81) = 14.82$, $p < .001$ (see Path 'C' in Figure 1). Results of indirect effects from the three mediation models are further described below and shown in Figure 1.

Parental Depression

In order to assess the presence of mediation, both child anxiety (predictor variable) and parental depression (potential mediator) were included in a regression model predicting child sleep problems (outcome variable). With child anxiety controlled for, parental depression (potential mediator) was not a significant predictor for child sleep problems, $b = .27$, $\beta = .19$, $t(80) = 1.79$, $p = .078$. Using the Sobel test calculation (http://quantpsy.org/sobel/sobel.htm) to assess the presence of mediation, no significant indirect effect was detected, $z = 1.52$, $p = 1.27$, indicating no mediation present.

Parental Anxiety

To assess the presence of mediation, both child anxiety (predictor variable) and parental anxiety (potential mediator) were included in a regression model predicting child sleep problems (outcome variable). After controlling for child anxiety, parental anxiety significantly predicted child sleep problems, $b = .60$, $\beta = .29$, $t(80) = 2.75$, $p < .01$. Using the Sobel test to assess mediation, a significant indirect effect

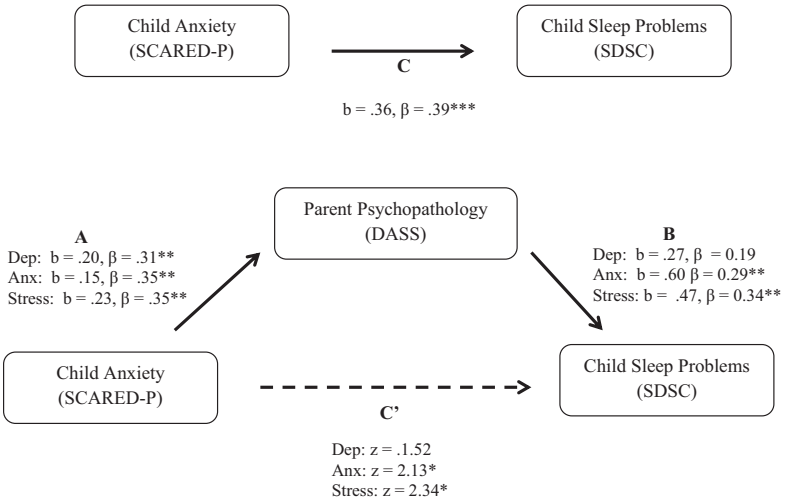

Figure 1. Child anxiety mediates the relationship between parent psychopathology and sleep problems in children. Path C shows the direct effect of child anxiety on child sleep problems before the mediation. Path A shows the direct effect between the predictor variable (SCARED total) and the mediator (DASS subscales). Path B shows the direct effect between the mediator (DASS subscales) and the outcome variable (SDSC total), after controlling for the predictor variable (SCARED). Path C' shows the indirect effects, indicating the presence of mediation. DASS = Depression Anxiety Stress Scales; SCARED-P = Screen for Childhood Anxiety Related Emotional Disorders—Parent Report; SDSC = Sleep Disturbances Scale for Children. * $p < .05$. ** $p < .01$. *** $p < .001$.

was found, z = 2.13, $p < .05$, indicating a significant mediation. Specifically, parental anxiety accounted for 68.16% of the direct effect in the mediation model.

Parental Stress

Child anxiety (predictor variable) and parental stress (potential mediator) were included in a regression model to predict child sleep problems (outcome variable). Parental stress significantly predicted child sleep problems, after controlling for child anxiety, b = .47, $p < .05$, indicating a significant mediation. Specifically, parental stress accounted for 30.73% of the direct effect in the mediation model.

Discussion

This is the first study to examine the triadic relationships between child anxiety, parent psychopathology, and child sleep problems. This study also adds to the scant literature base of studies examining parent psychopathology as a predictor of sleep problems in children. Findings from the current study demonstrated that parent-reported child anxiety predicted parent-reported sleep problems in children. Moreover, results from this study suggest that self-reports of parental psychopathology—specifically anxiety and stress—serve as mediators of this relationship. Although prior research has demonstrated a positive relationship (i.e., increases in child anxiety associated with increases in sleep problems) between child anxiety and sleep problems (Alfano et al., 2007; Kendall & Pimentel, 2003; Masi et al., 2004; Pina et al., 2002), the present study not only adds to this prior, albeit relatively small, literature base but also examines the novel—and apparently important—role that parent psychopathology plays as a mechanism by which this relationship may occur. Consequently, the results of this study are both novel and suggest several clinical implications to be explored in greater detail.

Interpersonal interactions between the anxious or stressed parent and the anxious child may be, at least partially, contributory to resulting sleep problems in children. That is, child anxiety alone appears insufficient to fully explain sleep problems in children; rather, it is

important to consider the apparent interplay among child anxiety and parental psychopathology in providing a richer conceptualization of this relationship. Although several potential explanations for this complicated relationship exist, modeling of ineffective coping mechanisms is a plausible and salient explanation. For example, previous research has hypothesized that the symptoms of hypervigilance and hyperarousal associated with generalized anxiety disorder may be responsible for trouble initiating and maintaining sleep (Alfano et al., 2007; Saletu-Zyhlarz et al., 1997). Parents who are unable to control their own symptoms of hypervigilance and hyperarousal may inadvertently model poor coping strategies and may be unable to teach their children positive coping strategies. Consistent with Bronfenbrenner's (1994) social ecological model, researchers have proposed that parents may also contribute to the maintenance of sleep disturbances in children and adolescents by reinforcing nighttime fears and reinforcing avoidance of adaptive coping mechanisms (Alfano et al., 2007). For example, parents of children with sleep problems often provide excessive reassurance to their children when they experience nightmares or nighttime fear, extend bedtimes in order to avoid sleep-related distress and difficulties, and permit co-sleeping with parents and siblings (Dadds, Barrett, Rapee, & Ryan, 1996). In the context of the current study's findings, it is possible that, in response to how parents have grown accustom to coping with their own psychiatric symptoms, parents exhibiting increased psychiatric symptoms may be more likely to engage in sleep-problem-maintaining behaviors in relation to their children. Future research should examine this possibility further by assessing coping strategies utilized by parents with respect to their own psychiatric symptoms—regardless of whether these symptoms reach diagnostic levels. However, it should also be noted that the biological contributions to sleep problems (e.g., genetics) also warrant consideration and should be examined in future research.

Despite the novel and intriguing findings described herein, limitations to the current study should be discussed. First, information about parent psychopathology, child anxiety, and child sleep problems was obtained using Internet sampling procedures. This methodology prohibits the opportunity to assess and verify data collected via clinical assessment (i.e., structured interview) or observational methods (i.e., sleep study, actigraphs). Although a noteworthy limitation, this methodology also provides an opportunity to recruit a large sample size within a relatively short period of time so as to formulate hypotheses utilizing clinical samples. Internet-based methodology has been used frequently and effectively in the past with a variety of other behavioral problems during childhood (Sadeh, 2004). Future research may seek to examine the triadic relationship studied herein in clinical versus control samples, utilizing face-to-face interviews and direct observation methodology. Second, data obtained in this study were entirely based upon parent report. In addition, respondents were self-selected (i.e., must have visited web sites in which a link to the survey was provided) for participation in the study. However, the use of such procedures was employed in order to maximize sample size and is, in part, consistent with prior research examining sleep problems in children utilizing self-report measures as the primary outcome (Alfano et al., 2007; Coulombe et al., 2010; Meltzer & Mindell, 2007; Moore et al., 2012). Future studies would be well-advised to utilize a multi-informant response format (i.e., parent and child reports) as well as observation (behavioral) data (i.e., actigraphs measuring sleep onset, latency, quality, and/or duration). In addition, the demographic characteristics of the current sample (i.e., high SES, primarily mothers reporting on daughters, largely college educated, primarily Caucasian) may limit the generalizability of the current findings. A final limitation to the present study is that components of the mediation model can be conceptualized in multiple directions. For example, several studies have examined the ability of child sleep problems to exert an impact on parent psychopathology (Eckerberg, 2004; Hiscock & Wake, 2001; Wolfson, Lacks, & Futterman, 1992), suggesting, within the context of this study's findings, that the relationship between parent psychopathology and child sleep problems is likely reciprocal. In addition, future replication studies might benefit from the use of a shorter, simplified version of the current online survey. The current survey version took approximately 45 min to complete, which may have reduced the consistency and thoroughness with which participants responded.

Taken within the context of prior research, findings from the current study suggest that understanding both parent- and child-related variables of interest may be important for fully understanding sleep problems in children. Consequently, treatment approaches for sleep problems should focus not only on child factors but also on parent and family factors (e.g., cosleeping, excessive reassurance) that might maintain disordered sleep. Reducing parental stress and/or symptoms of anxiety may exert a positive impact both on parent mental health as well as child-related sleep problems. Future research may seek to examine the efficacy of family-based sleep interventions utilizing therapeutic approaches targeting, at least in part, both parent- and child-related psychiatric symptoms in a transdiagnostic fashion (i.e., interventions targeting reduction in negative affect and/or an increase in positive affect). For example, techniques—tailored to the appropriate developmental level—such as progressive muscle relaxation, cognitive strategies, and behavioral activation may be especially beneficial for both children and parents presenting with a broad array of psychiatric symptoms as part of a modularized sleep intervention. Despite its limitations, examining the relationship between child anxiety, parental psychopathology, and child sleep problems in the manner undertaken in the current study provides an important addition to the sleep literature, provides a novel way to conceptualize this relationship, and contributes to a more comprehensive understanding of the triadic relationship among these variables in youths.

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Received August 25, 2014
Revision received January 28, 2015
Accepted February 9, 2015 ■