

Child Sleep Problems and Parental Depression: Testing a Risk and Resistance Model

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Abstract Although extensive studies demonstrate a link between infant sleep problems and parental depression, limited research explores this relation in parents of primary school aged children. Using cross-sectional data, we investigated direct, moderating and mediating risk and resistance factors in the relation between child sleep problems and parental depressive symptomatology in a sample of 145 Australian parents of primary school aged children. Parents completed the children's sleep habits questionnaire, the short temperament scale for children, the perceived stress scale and the depression sub-scale of the depression, anxiety and stress–short form. Correlational analyses confirmed bivariate relations between parental stress and parental depressive symptomatology, and between child sleep problems and parental depressive symptomatology. Multiple regression analyses identified parental stress as a mediator of the relation between child sleep problems and parental depressive symptomatology, and the approach component of child temperament as a moderator of the relation between child sleep problems and parental depressive symptomatology. Findings suggest that parents of children with sleep problems experience increased stress levels and increased levels of depressive symptomatology and may be at increased risk of depression if their child has a difficult temperament characterized by low approachability. Implications for clinical intervention and future research are discussed.

Keywords Sleep · Children · Parental depression · Parental stress · Child temperament

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Introduction

Childhood sleep disturbances such as sleep onset difficulties and frequent night waking have been associated with a range of negative outcomes both for children and their parents. Children's cognitive functioning, academic performance, and personal and family well-being have been shown to suffer as a result of childhood sleep problems (Bell and Zimmerman 2010; Dahl 1996; Sadeh et al. 2003; Touchette et al. 2009). There is also evidence for associations between child sleep problems and internalizing disorders such as depression and anxiety (Alfano et al. 2009; Forbes et al. 2008; Hudson et al. 2009). Sleep disturbances among children are surprisingly common, affecting 37% of children in America aged 4–11 years ($N = 494$; Owens et al. 2000) and over 25% of 5–17 year old Australian children ($N = 361$; Blunden et al. 2004), with one study suggesting that sleep difficulties lasting for periods of more than 6 months are present in up to 43% of preadolescent children from Belgium ($N = 972$; age 8–10 years; Kahn et al. 1989). Childhood sleep problems, together with difficult child temperament, have been identified as risk factors for heightened parental and family stress and parental psychopathology, including depression (e.g., Doo and Wing 2006; Gelman and King 2001; Moore 1989; Sadeh et al. 2000). Conversely, an easy child temperament and low family stress have been shown to act as resistance factors against the deleterious influences of childhood sleep problems (Carr 2006).

Prior et al. (2000) define child temperament as “individual differences in attentional, emotional, and behavioural self-regulation, along with the relative level of emotional reactivity, which together give a unique flavour to an individual” (p. 3). Broadly explained, temperament is usually considered to refer to the ‘how’ of a child's

behavioural style (Thomas and Chess 1977) rather than the content or ‘what’ of the behaviour. Thomas and Chess (1977) described difficult children as being high on negative mood, withdrawal, adaptability, intensity, and low on rhythmicity, whereas easy children were defined by the opposite pattern. Although it is generally acknowledged temperament is biologically founded and mostly stable, a child’s interaction with their environment is likely to modify their expression of temperament, and its nature (Kochanska et al. 1997). It is also likely that people in a child’s environment shape their reactions according to the child’s temperament (Prior 1992).

Understanding the links between children’s sleep problems, temperament, parental stress and depression is crucial to inform intervention and prevention strategies. The theoretical and empirical work of Lazarus and Folkman (1984) and the conceptual models developed by Wallander and Varni (1998) both provide a useful foundation for exploring relationships between these variables. Lazarus and Folkman (1984) challenged the traditional thoughts and research on coping with stress, which generally assumed a linear and unidirectional relationship from the environmental stimulus to the response. Their cognitive theory of stress was founded on the transactional model, where the person and their environment are considered to be in a “dynamic, mutually reciprocal, bidirectional relationship” (p. 293). The process-oriented research outlined by Lazarus and Folkman (1984) examined the mediating effects of variables. Emanating from this theoretical work, later research (e.g., Doo and Wing 2006; Leigh and Milgrom 2008; McLean et al. 2004) investigating the relations between pairs of variables, including children’s sleep habits, temperament, parental stress and depression, has indeed supported this view. Bidirectional relations between variables were observed under different circumstances. The underlying assumption is that factors interrelate to influence parental well-being.

Exploring the dynamic influences between children and family members throughout development, Wallander and Varni (1998) later developed generic conceptual models of risk and resistance factors associated with adjustment among children and their parents. Their framework has allowed complex models beyond typical simple linear relations to be considered, and nonlinear and indirect mediator and moderator influences on adjustment to be explored.

Identification of psychosocial variables associated with parental depression has proved useful in highlighting potential target areas for intervention for parents of school aged children. Consequently, this has important practical implications for health professionals who are able to monitor and provide timely intervention for parents who may be at risk of adjustment problems. The majority of our

knowledge about the relations between children’s sleep problems, parental stress and parental depression comes from studies exploring a direct link between variables, most commonly samples of parents of infants or pre-school children. For example, Doo and Wing (2006) examined the direct link between children’s sleep problems and parental stress in a sample of 193 Chinese children ($M = 3$ years 6 months, $SD = 1$ year 4 months) with pervasive developmental disorders. They found parents of children with sleep problems experienced greater stress than those whose children had no sleep problems. An Australian population study by Hiscock et al. (2007) also examined the relation between child sleep problems and parental well being in young children. Sleep problems in infants ($N = 5,107$) and preschool children ($N = 4,983$) were associated with poorer parental mental health.

Considering up to 43% of primary school aged children experience significant sleep problems (Kahn et al. 1989), this age group should not be overlooked in research. There is debate in the literature regarding measurement and definition of sleep disturbances. Most research has relied on parental or self report on some measure of sleep duration and/or night wakings (e.g., Sadeh and Anders 1993; Smaldone et al. 2009; Touchette et al. 2005). Measurement tools such as the Children’s Sleep Habits Questionnaire (CSHQ; Owens et al. 2000) provide ‘cut-off’ scores to define sleep disturbance. They have been increasingly utilized (e.g., Liu et al. 2003), although they are notably also reliant on parent report. Cost and practicalities of objective measures such as actigraphy and polysomnography have limited their use in research.

Children with sleep problems have been found to have poorer child health-related quality of life, more behaviour problems, and higher rates of attention deficit/hyperactivity disorder (Hiscock et al. 2007). It has also been suggested that improvement in child sleep may function as a protective factor to reduce the risk of later academic performance difficulties (Keller et al. 2008). When considering age of onset of internalising disorders in childhood and adolescence, there has been conflicting empirical data as to whether child sleep problems may be related to depression in adolescence and anxiety in the primary school years (Alfano et al. 2009), thus supporting a separate focus for these two age groups.

Until recently, research on the effects of psychosocial variables on Australian parents’ adjustment predominantly focused on infants and preschool aged children (Carey 1974; Doo and Wing 2006; Goyal et al. 2009; Grazioli and Terry 2000; Martin et al. 2007; O’Connor et al. 2006; Saisto et al. 2008; Stright et al. 2008; Touchette et al. 2005). Although research is beginning to extend to sleep problems in primary school aged children (Blader et al. 1997; Liu et al. 2003; Meltzer and Mindell 2007; Sadeh

et al. 2000; Smaldone et al. 2009), few studies have focused on Australian parents of school aged children despite the potential importance of research in this field.

Few studies have attempted to assess how much of the relation between children's sleep problems and parental depression is in fact mediated by parental stress. The magnitude of this relation holds clinical significance in terms of strategies for parents suffering depression who have children experiencing sleep problems. In Hiscock's (2010) editorial on parenting and infant sleep, she highlighted the effect of parental interactive behaviours. Child sleep problems may influence parental behaviours, and child sleep problems appear to be a parental stressor and a risk factor for parental depression (Sadeh et al. 2010).

Strelau (2008) only recently proposed that temperament acted as a moderator of the relation between a situation (e.g., sleep difficulties) and the outcomes evoked by that situation (e.g., parental depressive symptomatology). A moderator is defined as a variable that affects the strength of the association between an independent variable (e.g., child sleep problems) and a dependent variable (e.g., parental depressive symptomatology; Baron and Kenny 1986). Significant studies (Hiscock and Wake 2001; Lam et al. 2003; Martin et al. 2007) have demonstrated the strong relation between child sleep problems (stimulus) and parental depression (response), and a relation between children's sleep habits and child temperament has been determined (Owens-Stively et al. 1997; Touchette et al. 2005). The current study investigated whether a child's temperament moderated the association between child sleep problems and parental depressive symptomatology.

Studies linking both child sleep problems and child temperament with parental depression suggest that both may be important predictors of parental depression (Gelman and King 2001; Meltzer and Mindell 2007; Saisto et al. 2008). On the other hand, research has demonstrated that not all parents with children who experience sleep disturbances have an equal likelihood of experiencing parental depression (e.g., Jimmerson 1991). Thus the child's temperament type may dictate the conditions under which child sleep problems relate to parental depression. For example, parents may be at a lower risk of negative adjustment outcomes associated with their child's sleep problems when the child displays an easy-going temperament. Conversely, a child's difficult temperament may intensify the negative influence of the child's sleep disturbances and consequently increase parental depression.

Although studies on the direct impact of child sleep problems, child temperament, and parental stress on the adjustment of parents exist, literature on indirect effects is limited. The current study was unique because it sought to add to our understanding of parental symptoms of depression within an Australian sample of parents by

exploring statistically indirect effects of variables previously shown to have a statistically direct effect on adjustment. Guided by Wallander and Varni's (1998) risk and resistance model and on the basis of theoretical considerations and previous research findings (e.g., Doo and Wing 2006; Martin et al. 2007; Sadeh et al. 2010; Strelau 2008), it was hypothesized that: (a) children's sleep problems would be positively associated with parental depressive symptomatology, (b) parental stress would be positively associated with parental depressive symptomatology, (c) parental stress would mediate the relation between children's sleep problems and parental depressive symptomatology, and (d) child temperament would moderate the relation between children's sleep problems and parental depressive symptomatology such that increased sleep problems would be related to increased parental depressive symptomatology only for those parents whose children have increased levels of difficult temperament.

Methods

Participants

This study was part of a wider project focusing on the direct and indirect impact of psychosocial risk and resilience variables on the well-being of Australian parents of school aged children. The sample for the current study consisted of 145 parents of primary school aged children. Participating parents' ages ranged between 30 and 56 years ($M = 40.3$, $SD = 5.0$). Predominantly mothers (80%) participated in this study, and most of the parents included in this research were married or living with their partner (87%). Primary school-aged children ($N = 145$) included in this research were aged between 4 and 13 years ($M = 8.9$, $SD = 2.3$). Sample characteristics and descriptive data are presented in Table 1.

Procedure

This study was approved by the university ethics committee. A snowball and purposive recruitment method was utilized (Huck 2008). Explanatory statements, questionnaires and reply paid envelopes were distributed by researchers to parents of primary school-aged children in the community. Initially, potential participants known to the researchers via family, sporting, work and social networks were invited to participate. These participants were then asked to add to the sample by recruiting via similar networks.

A total of 184 out of 700 questionnaires were returned (26% response rate). Despite the low response rate, the

Table 1 Sample demographics and descriptive data ($N = 145$)

Demographic characteristics	%
Gender of parent	
Female	80.0
Male	20.0
Parental age (range)	
30–39 years	46.9
40–49 years	49.0
50–59 years	3.4
Marital status	
Married/living with partner	86.9
Sole parent	12.4
Highest level completed education	
Primary school	1.4
Secondary school	18.6
Trade certificate	16.6
University	63.4
Employment status	
Employed full time	33.8
Employed part time	42.1
Unemployed	2.1
Student	3.5
Homemaker	17.2
Annual household income	
< \$20,000	4.8
\$20,000–\$40,000	6.2
\$41,000–\$60,000	13.1
\$61,000–\$80,000	11.0
\$81,000–\$100,000	16.6
Above \$100,000	44.8
Total number of children	
One	13.1
Two	49.0
Three	26.9
Four	9.7
Five	1.4
Gender of primary school-aged child	
Female	41.4
Male	56.5

Age of primary school-aged children = 4–13 years

$M = 8.9$ years, $SD = 2.3$ years

sample's demographics are comparable to those reported in other studies of parents of primary-aged children (e.g., Dunstan and Todd 2009; Goh and Dolnicar 2006). Of the returned questionnaires, 39 were discarded due to incomplete information, or because the child/ren were not of primary school age. Altogether, 145 parent responses regarding primary school-aged children were included in the final data analysis.

Measures

A battery of parent- and self-report questionnaires including measures of child sleep problems, child temperament, parental stress, parental depressive symptomatology and child characteristics were administered. The questionnaires were counterbalanced to reduce possible bias. This was achieved by alternating the order in which the scales appeared in every other questionnaire. Thus those listed in the second half of the booklet were listed first in the subsequent booklet.

Demographics

Demographic variables were parental age, sex, marital status, education, employment, income and health status, as well as the number, age, sex and health status of their children.

Children's Sleep Habits Questionnaire (CSHQ)

The abbreviated CSHQ (Owens et al. 2000) is a retrospective, 33-item parent questionnaire designed to examine sleep behaviour in children over the previous week (Owens et al. 2000). Items including 'child awakes more than once during the night' are rated on a 3-point scale ranging from 1 (rarely) to 3 (usually). The CSHQ consists of eight subscales, namely bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night wakings, parasomnias, sleep disordered breathing and daytime sleepiness. The reliability and validity of the CSHQ measure have been well established. Psychometric properties are sound for internal consistency (.68–.78) and test–retest reliability (range .62–.79), and have been examined in both clinical and community samples of primary school-aged children (Owens et al. 2000). In the current study, the Cronbach alpha coefficient was .79. A diagnostic cut-off score of 41 was proposed for the CSHQ by Owens et al. (2000). In this research, 46% of cases had total CSHQ scores of 41 or over.

Short Temperament Scale for Children (STSC)

The STSC (Prior et al. 2000) is a 12-item questionnaire which assesses the temperamental characteristics of children. It is based on a factor analysis of the childhood temperament questionnaire of Thomas and Chess (1977). Parents rate their child's personality and behaviour on a 6-point Likert scale from 1 (almost never) to 6 (almost always) on each item (Prior et al. 2000). Larger total scores indicate increased difficult temperament. Subscales include inflexibility (4 items) or how the child deals with anger and frustration and adjusts to challenges (e.g., 'When my child

is angry about something, it is difficult to sidetrack him/her'), persistence (4 items), or the child's capacity to remain focused on an activity or a task (e.g., 'My child likes to complete one task or activity before going on to the next'), and approach (4 items), or how comfortable the child is in new situations (e.g., 'My child is shy when first meeting new children'). The STSC has been used reliably in Australia as a measure of childhood temperament (e.g., Harrison and McLeod 2010; Prior et al. 2000; Sanson et al. 1987) and has been shown to be reliable across a range of child ages and populations (e.g., Bouldin and Pratt 2010; Harrison and McLeod 2010). Test–retest reliability has been reported ranging from .77 to .90 (Prior et al. 2000; Sanson et al. 1987). In the current study, the Cronbach alpha coefficient for the total temperament scale was .72, and .82, .69 and .74 for the subscales approach, inflexibility and persistence, respectively.

Perceived Stress Scale (PSS)

The PSS (Cohen et al. 1983) is a 14-item self-report questionnaire designed to measure the degree to which situations in the participant's life are appraised as stressful (Cohen et al. 1983). In the PSS, participants are asked about their feelings during the last few weeks. Items on the PSS, including 'How often have you dealt successfully with irritating life hassles', are rated from 0 (never) to 4 (very often). Cohen et al. (1983) demonstrated adequate internal and test–retest reliability for the PSS (.85). In addition, validity of the PSS is supported by small to moderate correlations with relevant constructs. For example, significant correlations were reported with life event scores, depressive and physical symptomatology and utilization of health services (Cohen et al. 1983). In the current study, the Cronbach alpha coefficient was .89.

Depression, Anxiety and Stress Scale-Short Form (DASS 21)

The depression sub-scale of the DASS 21 (Lovibond and Lovibond 1995a) consists of 7 items designed to measure a range of symptoms common to depression: dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. Participants indicate the presence of a symptom over the previous week. Items such as 'I felt that I had nothing to look forward to' are scored from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Lovibond and Lovibond (1995b) assessed the psychometric properties of the DASS and found, using coefficient alpha, sound reliability for the depression sub-scale (.91). Cronbach alpha coefficient for the depression sub-scale in this study was .92.

Statistical Analysis

Statistical analysis was performed using PASW Statistics 18, Release Version 18.0.0 (© SPSS, Inc., 2009, Chicago, IL, USA <http://www.spss.com>). Data were screened for errors and negatively worded items were reverse scored. Questionnaires with substantial non-random missing data (>5%) were excluded from analysis. Scales with random missing items (<5%) were replaced with scale means (Tabachnick and Fidell 2007). Preliminary analyses indicated that the distribution of all variables was substantially normal. The few identified outliers were deemed within the intended population and retained for analysis. The large sample size ensured the data was robust against minor violations of normality (Tabachnick and Fidell 2007).

Preliminary analyses to identify potential covariates of the study variables were conducted with all demographic variables. Independent-samples *t* tests and one-way, between-groups analyses of variance were employed with categorical variables, and Pearson's product-moment correlation with continuous variables. Examined for this purpose were parental, child and sibling age, parent and child gender and parental employment status, marital status, income and education level. No significant differences or relations were found. Due to the under-representation of fathers in the sample, parent gender was included as a covariate in the multivariate analysis. Consistent with the recommendations of Baron and Kenny (1986), regression analysis was utilized to test parental stress as a mediator of the relation between child sleep problems and parental depressive symptomatology. Moderation testing was conducted using Aiken and West's (1991) methodology. Predictor variables and potential moderator variables were mean centered prior to the calculation of interaction terms. Significant interaction terms were probed further using post hoc analyses (see Holmbeck 2002) to identify the level of the moderator (temperament) under which the relation between child sleep problems (predictor) and parental depressive symptomatology (outcome) was significant.

Results

Descriptive Analysis and Direct Relations

Means, standard deviations and correlations are presented in Table 2. As can be seen in Table 2, hypotheses one and two were supported. Increased child sleep problems were significantly associated with increased parental depressive symptomatology and a strong association was found between increased parental stress and increased parental depressive symptomatology. In addition, a moderate significant relation between high levels of difficult child

Table 2 Means, standard deviations, and bivariate correlations among study variables ($N = 170$)

Measure	1	2	3	4	5	6	7	<i>M</i>	<i>SD</i>
1. Child sleep problems	–	.29**	.34**	.00	.25**	.35**	.26**	41.05	5.74
2. Child temperament	–	–	.72**	.60**	.55**	.31**	.26**	35.73	7.33
3. Child inflexibility	–	–	–	.09	.36**	.39**	.30**	10.02	3.59
4. Child approach	–	–	–	–	-.17	.03	.03	13.27	4.66
5. Child persistence	–	–	–	–	–	.21*	.16	12.45	3.52
6. Parental stress	–	–	–	–	–	–	.65**	23.24	7.96
7. Parental depressive symptomatology	–	–	–	–	–	–	–	5.93	7.74

1 = Children’s sleep habits questionnaire; 2 = Short temperament scale for children (STSC); 3 = STSC-Inflexibility subscale; 4 = STSC-approach subscale; 5 = STSC- Persistence subscale; 6 = Perceived stress scale; 7 = DASS 21-Depression subscale

* $p < .05$

** $p < .01$

temperament characteristics and high levels of parental stress, and a small significant relation between high levels of difficult child temperament characteristics and high levels of parental depressive symptomatology were found.

Indirect Effects

In all tests of mediation and moderation, parent gender was entered at step 1. Parent gender did not make a significant unique contribution to depressive symptomatology in any of the analyses.

Mediator Analyses

The third hypothesis was tested utilizing Baron and Kenny’s (1986) test of mediation. All preliminary criteria for mediation were met. Regression analysis identified a significant moderate direct effect with child sleep problems accounting for 6% ($R^2 = .06$ $t = 3.07$, $p < .01$) of the variance in parental depressive symptomatology. When the parental stress variable was controlled, the variance accounted for by child sleep problems was reduced to almost zero ($R^2 = .001$, $t = .53$, $p = .60$). Post hoc analysis using Sobel’s test indicated a significant indirect effect ($z = 3.85$, $p < .001$). As shown in Fig. 1, the association

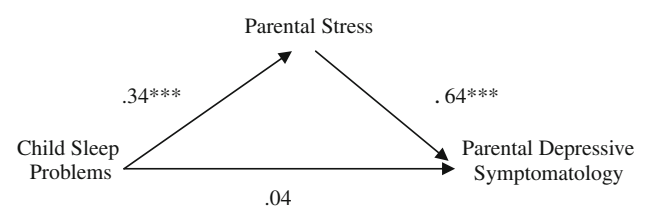


Fig. 1 Mediating effects of parental stress between child sleep problems and parental depressive symptomatology with parent gender controlled. Direct Effects of child sleep problems on parental depressive symptomatology with parent gender controlled. $\beta = .25$, $p < .01$. Numbers are beta weights. *** $p < .001$

between child sleep problems and parental depressive symptomatology was mediated by parental stress.

Moderator Analyses

The final hypothesis of this research predicted child temperament would moderate the relation between child sleep problems and parental depressive symptomatology. To this end, total temperament and subscale scores were tested as moderators of this relation. A significant interaction was found between child sleep problems and the approach subscale of the STSC (Table 3). No other significant interactions were found.

Post hoc probing of the significant moderator was conducted in order to identify whether the relation between child sleep problems and parental depressive symptomatology is significant for those low in approach temperament, high in approach temperament or both. The significance test of child sleep problems for each slope (t) indicated that the simple slope for the low approach temperament regression line was significant ($b = .64$, $t = 3.50$, $p = .001$.) The high approach temperament regression line was not significant ($b = .16$, $t = 1.14$, $p = .26$.) The direction of the slope indicated that increases in child sleep problems were related to increases in parental depressive symptomatology scores for parents of children who were low in approach temperament. There was no significant relation between child sleep problems and parental depressive symptomatology for parents of children who were high in approach temperament. These regression lines were plotted and appear in Fig. 2.

Discussion

This study examined the direct and indirect relations between psychosocial risk and resistance factors and depressive symptomatology in parents of Australian

Table 3 Multiple regression of child temperament as a moderator of the relation between child sleep problems and parental depressive symptomatology

Predictors	<i>b</i>	<i>SE</i>	β	<i>T</i>	<i>R</i> ²	<i>R</i> ² _{inc}	<i>F</i> _{inc}	<i>F</i>
Step 1: Parent gender	-.82	1.576	-.04	-5.2		.01	.87	
Step 2: Child sleep problems	.30	.12	.22	2.48*				
Child temperament	.20	.09	.19	2.29*				
Child sleep problems × child temperament	-.02	.02	-.09	-1.08	.11	.10	5.12**	4.08**
Step 1: Parent gender	-.72	1.56	-.04	-.46		.01	.87	
Step 2: Child sleep problems	.22	.12	.16	1.86				
Child temperament: inflexibility	.52	.18	.24	2.84**				
Child sleep problems × inflexibility	.01	.04	.03	.31	.12	.11	5.92**	4.68**
Step 1: Parent gender	-1.17	1.61	-.06	-.73		.01	.87	
Step 2: Child sleep problems	.40	.12	.30	3.48**				
Child temperament: approach	.05	.14	.03	.40				
Child sleep problems × approach	-.05	.03	-.18	-2.10*	.10	.09	4.6**	3.68**
Step 1: Parent gender	-.49	1.6	-.03	-.31		.01	.87	
Step 2: Child sleep problems	.30	.12	.23**	2.64**				
Child temperament: Persistence	.21	.19	.10	1.13				
Child sleep problems × persistence	.01	.03	.03	.31	.08	.07	3.5*	2.86*

Beta weights reported are from the final step of the equation and represent the unique contribution of each variable. All other statistics represent each step

* $p < .05$

** $p < .01$

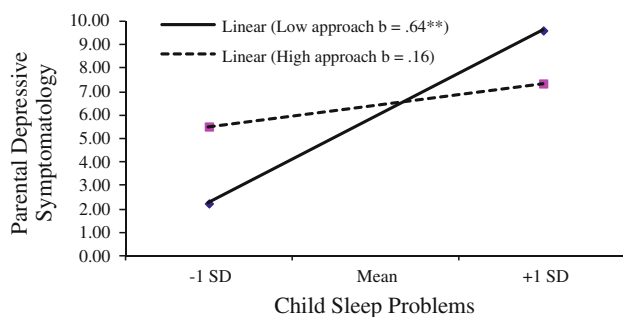


Fig. 2 Regression lines for the relation between child sleep problems and parental depressive symptomatology as moderated by child temperament (approach)

primary school aged children. Overall the data provide support for the study hypotheses. As predicted, significant relations between child sleep problems and parental depressive symptomatology, and between parental stress and parental depressive symptomatology were found. In addition, parental stress was found to mediate the relation between child sleep problems and parental depressive symptomatology with higher levels of reported child sleep problems associated with greater parental stress and increased parental depressive symptomatology. Finally, the hypothesis that child temperament would moderate the association between children's sleep problems and parental depressive symptomatology was partially supported with

sub-scale analysis identifying the approach sub-category of temperament as a significant moderator of the relation between child sleep problems and parental depressive symptomatology.

The strong correlation found between parental stress and parental symptoms of depression is consistent with previous investigations of risk factors for parental depression (Leigh and Milgrom 2008; Orr et al. 1989; Quittner et al. 1990). This finding is of particular clinical importance because, unlike demographic factors, it may be possible to provide interventions to reduce or remove exposure to parental stressors that could in turn reduce parental depression. If clinicians are able to effectively identify potential parental stressors, preventative interventions could be implemented.

Reinforcing the notion that parents who report child sleep problems are more likely to exhibit depressive symptomatology, this study found children's sleep problems were positively associated with parental mood. This significant direct relation is consistent with a number of earlier studies that reported the negative effect of child sleep problems on parental adjustment (Gelman and King 2001; Hiscock and Wake 2001; Meltzer and Mindell 2007) and affirms this continued relation in older children. Given that up to 43% of primary school aged children experience sleep difficulties lasting more than 6 months (Kahn et al. 1989), the significant relation between child sleep problems

and parental symptoms of depression is clinically relevant. When working with clients who are parents of primary school aged children, initial clinical interviews should include assessment of child sleep problems. Early identification of child sleep disturbances may then be treated, thus reducing the risk of the parent developing increased depressive symptomatology. It should be emphasized that causality cannot be determined by the current results and, reciprocal effects between parental symptoms of depression and child sleep problems are possible.

Based on the process-oriented research of Lazarus and Folkman (1984) combined with the conceptual risk and resistance framework of Wallander and Varni (1998), it was hypothesized that parental stress would mediate the relation between children's sleep problems and parental depressive symptomatology in parents of primary school aged children. This theoretical ordering of the variables was proposed based on previous studies which examined relations between child sleep problems, parental stress, and parental depression (e.g., Doo and Wing 2006; Gelman and King 2001; Hiscock and Wake 2001; Lam et al. 2003; Meltzer and Mindell 2007; Sadeh et al. 2000; Smaldone et al. 2009). Higher levels of reported child sleep problems were associated with greater parental stress and increased parental symptoms of depression in this investigation. Thus, in this cross-sectional study, parental stress was shown to mediate the relation between child sleep problems and parental depressive symptomatology, highlighting the dynamic influences among children and family members throughout development. These results align with the suggestions of Sadeh et al. (2010) who noted that child sleep problems appear to be a risk factor for parental depression and may influence parental behaviours, thus increasing parental stress. Of clinical relevance, this research illustrates that parental stress may exacerbate the impact of the child's sleep problems on the parent's adjustment, specifically increasing potential depressive symptoms.

Further clarification of the inter-relations between child sleep problems and parental depressive symptomatology comes from the findings of the moderation analyses. In particular, the relation between child sleep problems and parental depressive symptomatology was significant for those parents whose children were reported as having a temperament characterized by low approachability. Child sleep problems were not related to parental symptoms of depression for parents who reported their child's temperament as one that allowed easy approachability. These findings support the contention that having a child with a temperament that makes them difficult to approach may be a risk factor for depression for parents of children with increased sleep related problems.

Several limitations of the present study must be acknowledged. First, no data was obtained on parents who

chose not to participate in the study. Consequently, there is no information showing why non-participating parents made that choice, which may have created an unidentified sample bias. Some sample bias is evident as 61% of this study's sample indicated they had a university education and another 19% had a trade certificate, compared to the 34% of Australians aged 25–64 years who hold a university qualification according to the Australian Bureau of Statistics (ABS 2010).

In addition, parents experiencing depressed mood have been shown to perceive child behaviour or temperament as more deviant than parents with non-depressed mood, and indicated a more intense anticipated behavioural reaction (Krech and Johnston 1992). Thus, it is feasible that depressed parents are more likely than non-depressed parents to interpret child behaviour as temperamental. Likewise, parents experiencing depressive symptoms may inflate self-reported stress. As researchers such as Blader et al. (1997) have highlighted, parental reports hold significance in their own right provided caution is exercised because, in the end, it is generally parental perceptions which define sleep problems and the remedy is usually implemented by parents. Also, whilst a relation between child sleep problems and parental depressive symptomatology has been demonstrated and parental stress has been shown to mediate that relation, causal connections cannot be accurately ascertained in a cross-sectional design such as this study. Possible external factors, such as stressful life events (e.g., difficulties at school, family separation) may be causing either the child's sleep problems, or conversely, the parent's depressive symptomatology. In addition parental symptoms of depression may be unrelated to parenting and due to other external factors or internal factors such as chemical imbalances. Consequently, longitudinal investigation spanning the primary school years should ideally control for external events and utilize repeated measures of child sleep problems, parental stress, and parental symptoms of depression.

The significance of parental stress as both a predictor of parental depressive symptomatology, and as a mediator of the relation between children's sleep problems and parental depressive symptomatology, is very relevant for clinicians. Certainly, it may be possible to educate parents in effective stress management techniques to enhance their resources to cope with parental stress. At a practical level, reduction in the quantity of stressors could likely reduce the likelihood of parental symptoms of depression. Encouraging and possibly referring parents to utilize out of school hours care, parent support groups, financial assistance programs, or other relevant programs may effectively decrease parental exposure to stress and the associated direct risk of depression. In addition, stress reduction would likely provide parents with an increased capacity to manage child

sleep problems, indirectly reducing the risk of developing parental depression.

Despite its limitations, the results of this study draw attention to the clinical utility of assessing parent reports of their children's sleep problems and parental stress levels when examining parental depressive symptomatology. Once identified, child sleep disturbances may be addressed, resulting in improved sleep for the child, lower reported stress levels for the parent and, accordingly, improved parental mood. This may be particularly pertinent for parents of children who are reported as having a difficult temperament as they may be at increased risk of developing depression if their children also display increased levels of sleep problems and subsequent high levels of stress.

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