

**Investigating the Links Between Socioeconomic Status and Sleep Problems in Australian Children: the Underlying Influence of Hostile Parenting**

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## **Investigating the Links Between Socioeconomic Status and Sleep Problems in Australian Children: the Underlying Influence of Hostile Parenting**

It is well-recognised that sleep is essential for healthy functioning and overall well-being. Children's sleep is of particular interest due to its effect on development. Dahl (1996) argues that sleeping is the brain's primary activity during the first two years of life. Problems with childhood sleep are related to problems in behaviour (Fallone et al., 2002; Hall et al., 2012; Paavonen, 2009), cognitive deficits (Astill et al., 2012; Touchette et al., 2007; Walker & Stickgold, 2006), obesity (Cappuccio et al., 2011) and lower quality of life (Magee et al., 2014). Tara and Potts-Datema (2005) reviewed 20 articles on sleep and student performance and found that adolescents' self-reported sleep problems were consistently negatively associated with academic performance. Longitudinal findings suggest that sleep problems persist from infancy through early preschool ages (Byars et al., 2012), and sleep problems in children have been shown to persist into adolescence and adulthood (Matricciani et al., 2017; Sadeh et al., 2000). The harmful and persistent effects of childhood sleep problems emphasise the importance that should be placed on this as a public health issue (Perry et al., 2013). Further, they demonstrate the need to better understand the causes of poor sleep and who is most at risk so more can be done to prevent or improve it.

Several studies (Acebo et al., 2005; Bagley et al., 2014; Baker et al., 2009; Grandner et al., 2010; Hall et al., 2009; Marco et al., 2012; McLaughlin et al., 2005; Nomura et al., 2010; Patel et al., 2010) have demonstrated that lower socioeconomic status is associated with more sleep problems. The studies on children show this finding to be relatively consistent across varying ages, with sleep problems identified at ages 1-5 years (Acebo et al., 2005), 2-7 years (McLaughlin et al., 2005), and during adolescence (Marco et al., 2012). Children from lower socioeconomic families have been shown to have more environmental

conditions that are unfavourable to sleep (Wilson et al., 2014). These studies have identified the link between low socioeconomic status and children's sleep problems, but the reasons why this relationship exists remains largely under-researched and warrants further investigation into the underlying processes causing this link.

There is considerable research and theory into the causes of sleep problems. Using an opponent-process theory on sleep, Dahl (1996) suggests that sleep and vigilance are opposing processes, and that deep sleep relies on diminished vigilance in response to the external environment. Additionally, evolutionary theoretical perspectives imply that in order to achieve deep sleep, a child must consider their sleeping environment to be free from impending dangers or threats, and perceive it as predictable and controllable: creating a sense of security and lowering vigilance (Dahl, 1996; Dahl & El-Sheikh, 2007; Worthman & Melby, 2002). Furthermore, the emotional security theory (Cummings & Davies, 2010; Davies & Cummings, 1994) provides a plausible rationale for a link between a low socioeconomic family environment and children's sleep. It suggests that hostile or high conflict family relationships undermine a child's sense of safety and security, leaving them to feel unsafe and emotionally insecure, with elevated levels of vigilance that make it difficult to achieve good sleep. It may be that low socioeconomic families experience more conflict and hostility (Conger et al., 2010; Miller & Chen, 2013), causing children to have higher vigilance which interrupts the process of achieving good quality sleep.

Bagley et al. (2014) demonstrated that high levels of stress can cause more vigilance, and 'pre-sleep worries' can make children more likely to have problems with their sleep. Research from Graham et al. (2013) suggests the effects of a hostile environment on stress and vigilance may operate at a very young age, even during infancy. Functional magnetic

resonance imaging (fMRI) conducted on sleeping infants demonstrated neural processing of happy and angry speech as well as tone. An angry voice heightened brain activity in regions thought to be associated with stress response and emotional processing. These findings linking hostility with emotional development, and the possibility that this relationship could emerge in children as young as infancy, warrants further research in this area. In a sample of 140 children ages 7, 9 and 11 years old, Sadeh et al. (2000), found one of the best predictors of sleep quality was reported family stress. Additionally, family conflict between the ages of 7 and 15 has been found to predict insomnia at age 18 (Gregory et al., 2006). Whilst these studies highlight the necessity of considering the broad topic of a stressful family environment in the study of children's sleep, they lack a deeper search into what specific underlying mechanisms of family stress have the largest influence. Some studies have taken on this approach, with many focusing on the impact of marital instability (El-Sheikh et al., 2006; Mannering et al., 2011; Rhoades et al., 2012), but there is a lack of research on the contribution of parenting styles on a stressful family environment which may lead to sleep problems.

Harsh or emotionally negative parenting can be distressing for children by teaching the use of negative emotions and reducing a child's ability to manage emotional distress (Scaramella et al., 2008; Scaramella & Leve, 2004). Children's emotional insecurity has been shown to affect sleep, which consequently influences children's adjustment (El-Sheikh et al., 2007). Literature has examined hostile parenting behaviours using other terms such as 'negative emotionality' (Bell & Belsky, 2008), 'harsh parenting' (Kelly et al., 2021) and 'dysfunctional parenting' (McQuillan et al., 2019). Despite the various terminologies used, there is a relative agreement that it is characterised as an array of adverse parenting

behaviours such as, aggression, irritability, negative affect, harsh criticism and anger (Kemmis-Riggs et al., 2020). In low socioeconomic families, parenting has been observed to be harsher, with more punishment (Hoffman, 2003).

In Australian studies that focus attention specifically on hostile parenting, they largely emphasise its effect on overall child development rather than on sleep (Kemmis-Riggs et al., 2020; Mullan & Higgins, 2014; Rioseco et al., 2020). Of the limited research that does concentrate on the effect of hostile parenting on sleep, most focus on parents rather than children, and the ways in which children's sleep problems impact the mental and physical health of parents (Bayer et al., 2007; Giallo et al., 2011; Martin et al., 2007; Smart & Hiscock, 2007). Additionally, they most commonly employ a cross-sectional study design, providing evidence of an association without investigating the direction of the relationship. For example, Giallo et al. (2011), found that mothers of children with sleep problems to report moderate levels of fatigue, which was significantly associated with low parenting warmth and high parenting hostility. However, this study was cross-sectional, implying that the relationship could go in either direction. Whilst it could be the case parents become fatigued, and so more hostile, due to their children's difficulties with sleep, it could also be the case that parenting fatigue and hostility actually contributes to their children's sleep difficulties.

In addition to being relatively rare, studies investigating the effects of hostile parenting on children's sleep problems are inconsistent in their results. In a longitudinal study, Bell and Belsky (2008) found that children's sleep problems increased more over time when the mother-child relationship was characterised by less closeness/more conflict. It is important to note that their sample only included children in middle childhood, and so the

findings cannot be generalised to children of all ages. Kelly et al. (2021) found a relationship between maternal 'harsh parenting' and sleep problems, such as daytime sleepiness, insufficient sleep duration and night waking. Rhoades et al. (2012) assessed the relationship between marital hostility and child sleep problems and found an indirect association via hostile parenting of fathers, but no such finding was made in the hostile parenting of mothers. However, the study was limited in terms of socio-economic diversity and cannot be used to imply causality due to its cross-sectional design. Looking at parenting more generally, Bates et al. (2002) investigated mother-reported behavioural sleep patterns of 202 children aged 4-5 years old and found no significant relations between children's sleep and multiple measures of parenting. Likewise, a study of 449 children ages 8-11 years old found very few associations between childhood sleep and parenting practices (Spilsbury et al., 2005). In addition to their rarity, the inconsistency across the literature on hostile parenting and children's sleep warrants further research to be done. Additionally, with these studies being most commonly cross-sectional, they lack the ability to explore the direction of the relationship: a gap this study hopes to fill.

This research project will build upon the theoretical contributions provided by Bagley et al. (2014) and Kelly et al. (2021), by asking whether children from lower socioeconomic families are more at risk of sleep problems as a result of hostile parenting. It will utilise longitudinal data to assess an association in a specific direction. That is, to explore the influence of parenting on children's sleep problems later in life, as opposed to the more commonly studied effect of children's sleep on parents health and behaviour. This may help to better understand why sleep problems occur in this population. This study will focus on children at 2-5 years of age, prior to school transition, as sleep problems can make this time

more difficult (Rhoades et al., 2012). It has the ability to contribute knowledge on the outcomes of hostile parenting, making a theoretical contribution to the study of parenting outcomes on children's health. Furthermore, by taking advantage of a large-sample of longitudinal nation-wide data, this research project seeks to aid in knowledge for the prevention or treatment of behavioural sleep problems in everyday Australian families, not just those with clinical sleep disorders or diagnoses.

### **Aims**

The overall aim is to determine whether hostile parenting plays a role in the link between low socioeconomic status and children's sleep problems. This research project addresses a gap in current literature by investigating an area of recognised importance that lacks considerable investigation. This study addresses the following research questions:

1. Are there relationships between socioeconomic status, hostile parenting, and children's sleep problems?
2. Do hostile parenting and socioeconomic status predict children's sleep problems?
3. Does hostile parenting have a moderating effect on the relationship between socioeconomic status and children's sleep problems?



## **Method**

### **Participants and Study Design**

This study employed data from the Longitudinal Study of Australian Children (LSAC). Commencing in 2004, LSAC recruited a large representative sample of Australian children which comprised the birth cohort (B cohort) of 5107 infants, and the kindergarten cohort (K cohort) of 4938 children aged 4 years. Two-stage cluster sampling was utilised to randomly select the participating families, first by selecting Australian postcodes, and then selecting children living in those postcodes enrolled in the Medicare universal health care database. For detailed information on the sampling, recruitment, and data collection methods employed in the LSAC, see Mohal et al. (2021).

The current study uses data from the B cohort collected at wave 2, when the children were aged 2-3, and wave 3, when children were aged 4-5.

### **Measures**

#### ***Demographics and Covariates***

The age and gender of each child were included as demographic indicators. The presence or absence of a chronic medical condition or disability at waves 2 and 3 was included as a covariate.

#### ***Socioeconomic Status***

The socioeconomic status of each study child's family was taken from the measure of socioeconomic position in the LSAC at wave 2, reported as a Z-score for socioeconomic position among all families.

### ***Hostile Parenting***

A continuous measure of hostile parenting was created to reflect a score of hostility by each study child's primary parent (almost always the biological mother) at wave 2. The hostile parenting scale measured the primary parent's self-report on a 10-point Likert scale on 5 items. All 5 items were included in the hostile parenting measure for this study: 'I have been angry with this child'; 'I have raised my voice with or shouted at this child'; 'when this child cries, he/she gets on my nerves'; 'I have lost my temper with this child'; and 'I have left this child alone in his/her bedroom when he/she was particularly upset'.

### ***Child Sleep Problems***

A measure of children's sleep problems, for both wave 2 and 3, ranging from 0-8 was created by summing multiple reported behavioural sleep problems, measured in the LSAC as 'types of regular sleeping problems': getting to sleep, sleeping alone, waking during the night, restless sleep, bed wetting, nightmares/terror, seeming tired, and 'other' problems. Sleep problems more indicative of medical rather than behavioural issues were not included (wheezing/asthma and snoring/breathing).

### ***Child Stress***

Children's stress levels were assessed by summing the data from the Paediatric Quality of Life Inventory (Peds QL) emotional functioning measure at wave 2. Parents reported on a 5-point Likert scale how often their child has problems with feeling afraid or scared, or worrying. Parents' reports are used over children's self-report as those as young as 2-3 did not self-report their worries.

## Results

Participants with missing data were removed prior to the analyses reported below. The final sample consisted of 4177 study children (Male = 2139, and Female = 2038) and their parents. All analyses were conducted using R Studio.

### **Socioeconomic Position, Hostile Parenting and Sleep Problems**

Aim 1 was to examine the relationships between family socioeconomic position, hostile parenting, and children's sleep problems. As can be seen in Table 1, socioeconomic position was significantly related to sleep problems at both wave 2 and 3, and the strength of both relationships was very weak. Both relationships were negative, indicating that as socioeconomic position decreases, sleep problems increase. Socioeconomic position was significantly and positively related to hostile parenting, indicating that as socioeconomic position increases, hostile parenting also increases. However, the strength of the relationship was very weak. Hostile parenting was significantly, positively related to sleep problems at wave 2, but not at wave 3. This suggests that these variables are related when occurring at the same time point, but not related longitudinally. As hostile parenting increases, sleep problems also increase. The size of the relationship was very weak.

**Table 1***Pearson's Correlation Coefficients for All Study Variables*

	1	2	3	4	5	6
1. Gender	-					
2. Sleep Problems Wave 2	-0.01	-				
3. Sleep Problems Wave 3	0.00	0.42***	-			
4. Socioeconomic Position	-0.01	-0.06***	-0.11***	-		
5. Hostile Parenting	0.00	0.04**	-0.01	0.12***	-	
6. Children's Stress	0.00	0.09***	0.02	0.17***	0.70***	-

Note: \*\*\*  $p < .001$ , \*\*  $p < .05$

Additionally indicated by Table 1, there was a significant positive relationship between sleep problems at wave 2 and sleep problems at wave 3. The size of this relationship was weak – moderate. Children’s stress was significantly, positively related to socioeconomic position, and the strength of this relationship was very weak. Children’s stress was significantly related to concurrent sleep problems at wave 2, but not longitudinally with sleep problems at wave 3. The relationship was positive, indicating that as stress increases, sleep problems also increase, and the size of the effect was very weak. Children’s stress was further significantly, positively related to hostile parenting, with increases in stress indicating increases in hostile parenting, and the strength of this relationship was high. Gender was unrelated to all variables and so was not considered a covariate in further analyses.

**Table 2***Quasi-Poisson Regression Model for Sleep Problems at Wave 2*

	Estimate	Exp (Estimate)	Robust Std. Error	t value	<i>p</i>	95% CI	
Intercept	-0.23	0.79	0.04	-5.88	<.001	-0.31	-0.15
Hostile Parenting	0.01	1.01	0.002	3.23	.001	0.00	0.01
Socioeconomic position	-0.09	0.91	0.02	-4.23	<.001	-0.13	-0.05
Chronic Medical Condition	0.31	1.37	0.07	4.71	<.001	0.18	0.44

Note: Dependent Variable: Sleep Problems at Wave 2.

Aim 2 was to examine socioeconomic position and hostile parenting as predictors of sleep problems. The outcome variable (sleep problems) was measured as discrete count data of the number of sleep problems in a week, and showed a Poisson distribution. Preliminary analyses indicated over-dispersion, and so Quasi-Poisson regression was used to account for this. This regression was conducted to predict the number of sleep problems a child experiences (at wave 2) based on the child's experience of hostile parenting and family socioeconomic position, while controlling for chronic medical condition or disability. The results of this analyses are shown in Table 2. Incidence rate ratios are obtained by exponentiating the regression coefficient. Hostile parenting was significant in the model. However, the rate ratio indicates very small - no effect, with a one unit increase in hostile parenting predicting an increase of 0.01 in the number of sleep problems in a week. Socioeconomic position was a significant predictor in the model. It predicted a reduction (rate ratio) of 0.09 in the number of sleep problems in a week, for each one unit increase in socioeconomic position. The covariate, chronic medical condition, was also a significant predictor in the model with a chronic medical condition or disability predicting a rate ratio

increase of 0.37 in the number of sleep problems experienced in a week. The model explains very little of the total variance of sleep problems at wave 2 (1.19%).

Quasi-Poisson Regression was additionally run in order to predict the number of sleep problems a child experiences based on family socioeconomic position, this time with sleep problems experienced at wave 3. Hostile parenting was ruled out as a predictor of sleep problems at ages 4-5 due to the lack of relationship found in prior analysis. The results are shown in Table 3. While controlling for chronic medical condition or disability, socioeconomic position at wave 2 (2-3 years) was a significant predictor of sleep problems at wave 3 (4-5 years). Each one unit increase in socioeconomic position, holding other variables fixed, predicted a reduction (rate ratio) of the number of sleep problems experienced in a week by 0.13. The covariate, chronic medical condition, was also a significant predictor in the model. With a chronic medical condition or disability, the increase (rate ratio) in number of sleep problems experienced in a week was 0.65. The model explains very little of the total variance of sleep problems at wave 3 (2.68%).

**Table 3**

*Quasi-Poisson Regression Model for Sleep Problems at Wave 3*

	Estimate	Exp (Estimate)	Robust Std. Error	t value	p	95% CI	
Intercept	-0.35	0.70	0.02	-14.35	<.001	-0.40	-0.31
Socioeconomic position	-0.14	0.87	0.02	-6.20	<.001	-0.19	-0.10
Chronic Medical Condition	0.50	1.65	0.06	7.88	<.001	0.37	0.62

Note: Dependent Variable: Sleep Problems at Wave 3.

## **The Moderating Role of Hostile Parenting**

Aim 3 was to examine hostile parenting as a moderator in the relationship between socioeconomic position and children's sleep problems. Interactions of hostile parenting and socioeconomic position were added to the Quasi-Poisson models of sleep problems at both wave 2 and 3. The interaction was not significant in either model, indicating no moderation effect of hostile parenting on the relationship between socioeconomic position and children's sleep problems.



## Discussion

The purpose of this study was to explore the relationship between socioeconomic status and children's sleep problems, and to examine whether hostile parenting plays a role in this relationship.

The first aim was to examine whether relationships exist between socioeconomic position, hostile parenting and children's sleep problems. As was indicated, there was significant negative relationships between socioeconomic position and children's sleep problems cross-sectionally at ages 2-3, and longitudinally at ages 4-5. This finding is consistent with literature cited in the introduction (Acebo et al., 2005; Bagley et al., 2014; Baker et al., 2009; Grandner et al., 2010; Hall et al., 2009; Marco et al., 2012; McLaughlin et al., 2005; Nomura et al., 2010; Patel et al., 2010). However, the strength of the effect was very weak and the significant correlation may be a result of a very large sample size.

The general hypothesis of interest was the notion that children from lower socioeconomic families may experience more sleep problems as a result of having more stress and worries. In contrast to this hypothesis, the significant correlation between socioeconomic position and children's stress was positive, indicating higher socioeconomic position was related to higher levels of stress. This result is inconsistent with the hypothesis and the reviewed literature which suggests lower socioeconomic status families experience more parent-child hostility (Bagley et al., 2014; Conger et al., 2010; Miller & Chen, 2013). This correlation was also very weak and so this significant relationship could be explained by the very large sample size.

As was indicated, hostile parenting at ages 2-3 was significantly positively related to sleep problems occurring at the same age, but not two years later at ages 4-5. Consistent

with previous findings (Kelly et al., 2021; Rhoades et al., 2012), this indicates that as hostile parenting increases, so does children's concurrent sleep problems. The lack of longitudinal association is inconsistent with previous research (Bell & Belsky, 2008): potentially differing in findings from this study due to the outcome variable of interest being not only parent-child conflict but also a lack of parent-child closeness. Hostile parenting was additionally significantly associated with socioeconomic position. However, as with the previously mentioned relationships, the correlations were so weak we again cannot rule out the possibility that it was only significant due to the very large sample size. Most notable was the large, significant positive relationship between hostile parenting and children's stress. Higher hostile parenting was related with higher levels of stress. This finding is consistent with the reviewed literature that suggests that hostile parenting can be stressful for children by reducing their ability to manage emotional distress (Scaramella et al., 2008; Scaramella & Leve, 2004). For all mentioned correlations, the effect of a very large sample size on significance values should be considered, although it should also be noted that the significant correlations in the reviewed studies in this area likewise found very small – small correlations with much smaller sample sizes (Kelly et al., 2021; Rhoades et al., 2012). Small correlations in this area may be a result of the multifaceted nature of sleep (Sadeh, 2015).

The second aim was to assess whether hostile parenting and socioeconomic position predict sleep problems. As was indicated, hostile parenting, socioeconomic position, and the covariate of a chronic medical condition or disability, were all significant in the model predicting sleep problems at ages 2-3. However, the effect of hostile parenting was so low, with the 95% CI including a value of 0. We can ignore the p value and logically conclude that this variable is not a predictor of sleep problems. In support of the argument specified from the literature review, socioeconomic position was a significant predictor of sleep problems

cross-sectionally at ages 2-3 and longitudinally at ages 4-5, with increases in socioeconomic position predicting reductions in the number of sleep problems experienced in a week at each wave. Although, the size of these reductions were small and the two models explained very little of the variance in sleep problems at each wave. Whilst the effects were small, the reviewed literature highlighted the complex nature of sleep with its numerous causes, correlates and outcomes. When put in theoretical context, it is unsurprising that the effects using these parameters would be small.

Building on the small but growing literature that considers parenting and children's sleep, the final aim was to investigate hostile parenting as a moderator in the relationship between socioeconomic position and children's sleep problems. Contradictory to the hypothesis, there was no indication of a moderating effect, with the interaction of hostile parenting and socioeconomic position not being significantly associated with sleep problems at either wave 2 (2-3 years) or wave 3 (4-5 years). The non-significant interaction was inconsistent with previous findings that assessed the same variables, but with socioeconomic status as the moderator (Kelly et al., 2021). A reason for this may be due to the difference in how the outcome variable (sleep problems) was assessed. Whilst this study looked at a combined variable of multiple types of sleep problems, Kelly et al. (2021) evaluated three different types of sleep problems separately. In their study, the interaction of socioeconomic status and hostile parenting was significantly associated with two out of three individually measured sleep problems. It may be that this interaction relationship only exists for some types of sleep problems and not others.

A limitation to this study is the self-report nature of hostile parenting, thereby assuming that parents are willing to acknowledge and report hostile behaviours toward their children.

Particularly with children aged 2-3 years, ages at which children are still reliant on their parents, parents may be reluctant to state their engagement in hostile parenting behaviours. Likewise, the parent-report approach of child sleep problems involves limitations, such as that parents may not be fully aware of their children's sleep problems. This limitation is potentially increased further due to the reliance on hostile parents reporting their child's sleep problems. It may be that more hostile parents are less involved or attentive with their children, and may have an increased lack of awareness of their child's sleep patterns. Future research should aim to include objective measures of sleep, such as actigraphy. Further, we included chronic illness or disability as a covariate, but with sleep being such a complex construct it is more than likely that other factors not assessed could have influenced the results. This study utilised the parent-report of the study child's 'primary parent' as reported in the LSAC. This was almost always the biological mother and so the influence of father's hostile parenting is not represented. As stated, Rhoades et al. (2012) found a relationship between hostile parenting and children's sleep problems, but only in the parenting of fathers, not mothers. Future studies may benefit from including both parents in the research. Additionally, whilst longitudinal data was assessed to account for the directionality of effects, causality cannot be inferred from the results of this study, and assumptions around causality are completely speculative.

Acknowledging these limitations, this study contributes to the growing literature that examines children's sleep in the family context. This study builds upon the cross-sectional findings of previous research by also assessing the relationships longitudinally, so the direction of effects are clear. The findings indicate that children from lower socioeconomic position may be more at risk for sleep problems. The hypothesis was that these children have more sleep problems due to also experiencing higher levels of hostile parenting that

lead to higher levels of stress, making it difficult for children to lower their vigilance and achieve good sleep. No evidence was found indicating that hostile parenting has this effect. This finding contributes to the growing literature investigating the reasons for increased sleep problems in children from lower socioeconomic status families by rejecting an influence of hostile parenting, and suggesting that there are different factors at play that future research efforts should focus on. The findings partially support the hypothesis by indicating that hostile parenting may play a large role in children's level of stress, making a theoretical contribution to the study of parenting outcomes on children's health. Future research should explore this relationship further and with a deeper look into the specific aspects of hostile parenting that may cause children distress, as well as the outcomes of this distress on child development. Additionally, whilst the interaction of hostile parenting and socioeconomic status on sleep problems was not supported, the relationships between hostile parenting and stress, and the relation of both with concurrent sleep problems, warrants that future research explore this relationship outside of the socioeconomic context. The findings highlight the importance of considering the role of hostile parenting in relation to child health and development.

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