Longitudinal Association Between Peer Victimization and Sleep Problems in Preschoolers:

The Moderating Role of Parenting

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Abstract

Objective: This study examined the moderating role of parental behaviors in the longitudinal link between peer victimization and sleep problems during preschool. Method: The sample consisted of 1181 children (594 girls) attending day care between the ages of 3 and 6 years. Participants were part of the Quebec Longitudinal Study of Child Development, a longitudinal study of child development led by the Institut de la Statistique du Quebec. Results: Controlling for potential confounders, latent growth curve analyses revealed that the association between peer victimization and sleep problems varied depending on parents' behaviors. Coercive parenting exacerbated the link between peer victimization and parasomnias. In contrast, positive parenting mitigated the link between peer victimization and insomnia. Conclusion: The findings suggest that persistent sleep problems at a young age may be an indicator of chronic peer victimization, but that parents' behaviors can play a key role in victimized children's sleep problems.

Longitudinal Association Between Peer Victimization and Sleep Problems in Preschoolers:

The Moderating Role of Parenting

Peer victimization is a severe problem for many children. Sadly, this phenomenon already affects preschoolers, especially those attending formal daycare (Vlachou, Andreou, Botsoglou, & Didaskalou, 2011). Indeed, between 16% and 22% of preschool children between ages 3 and 6 years are harassed by agemates and 4% experience chronic victimization, especially boys (Barker et al., 2008; Crick, Casas, & Ku, 1999). Peer victimization is characterized by repetitive physical (e.g. hitting), verbal (e.g. insulting) or relational (e.g. social exclusion, spreading rumors) aggressive behaviors by one or more individual(s) with more power than the victim (Boivin & Hymel, 2001). Peer victimization is considered an important stressor that can seriously compromise victims' mental and physical health (Reijntjes et al., 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). Several studies have shown that repeated peer victimization predicts the development of post-traumatic stress disorder symptoms (Idsoe, Dyregrov, & Idsoe, 2012). Bullying victims are also twice as likely to suffer from psychosomatic symptoms (e.g., headaches, stomach aches, loss of appetite, dizziness) than other youth (Grills & Ollendick, 2002).

Sleep problems are among the most common physiological symptoms related to stress, especially in young children (Sadeh, 1996). Insomnia-related sleep problems and persisting parasomnias in childhood predict increased internalizing problems (e.g., anxiety and depression symptoms), a higher risk of injury and a disrupted family life (American Academy of Sleep Medicine, 2014; Sheldon, Kryger, Ferber, & Gozal, 2014; Touchette et al., 2012). Insomnia-related sleep problems have also been linked to impaired cognitive (e.g., attention problems), social-emotional (e.g., emotional dysregulation) and physical (e.g., growth retardation) development (Seegers et al., 2016; Touchette et al., 2012; Touchette et al., 2009; Touchette et al.,

2007; Touchette et al., 2008). However, research on the possible association between peer victimization and young children's sleep is still lacking. It is also unclear whether this association is mitigated or exacerbated (i.e., moderated) by other contextual factors, notably parental behavior.

Sleep Problems During Early Childhood

Sleep problems are common across the lifespan, but are particularly prevalent during childhood. Parasomnias (e.g., nightmares, night terrors, somnambulism, sleep talking) are sleep-related, repetitive undesirable behaviors, which occur during different stages of sleep and different periods of the night and are generally accompanied by an alteration in emotions, perceptions and dreams (American Academy of Sleep Medicine, 2014). While parasomnias are especially common in young children, with up to 88% of preschoolers showing at least one type of parasomnia (Petit et al., 2015; Petit et al., 2007), they generally decrease with age (American Academy of Sleep Medicine, 2014). Persisting parasomnias can lead to sleep deprivation and restriction, however, and eventually result in insomnia (American Academy of Sleep Medicine, 2014). During early childhood, insomnia is usually considered when the child wakes up more than once during the night or has difficulty falling asleep (+30 minutes) among children older than 2 years of age (Gaylor, Goodlin-Jones, & Anders, 2001). Insomnia affects several preschoolers (nighttime waking: 13.2% to 36.6%; difficulty falling asleep: 7.4% to 16%), but their frequency also usually decreases over time (Petit et al., 2007).

Research has uncovered a number of risk factors that contribute to sleep problems among children. Some of these risk factors include individual characteristics, such as child pre-existing anxiety, hyperactivity-inattention, obesity and other concurrent sleep problems (e.g., pre-existing insomnia or parasomnias) (Alvaro, Roberts, & Harris, 2013; Cappuccio et al., 2008; Chung, Park, An, Kim, & Kim, 2013; Cortese, Faraone, Konofal, & Lecendreux, 2009; Laberge, Tremblay,

Vitaro, & Montplaisir, 2000; Petit et al., 2007). Being a girl has also been associated with higher levels of insomnia during childhood and pre-adolescence (Calhoun, Fernandez-Mendoza, Vgontzas, Liao, & Bixler, 2014). One of the most important causes of sleep problems among young children, however, seems to be exposure to stress (Sadeh, 1996). Among family-related stressors, a low socioeconomic status, parental separation or divorce, as well as maternal depression and anxiety are known to increase children's risk of developing sleep problems (Petit et al., 2007; Stoléru, Nottelmann, Belmont, & Ronsaville, 1997; Tippett & Wolke, 2014; Touchette et al., 2005). However, in most Canadian families (53%), preschool children spend a large portion of the day away from their families, such as in daycare centers (Statistics Canada and Human Resources Development Canada, 2006). Another potential important source of stress may thus stem from stressful experiences with peers, notably peer victimization.

Peer Victimization and Sleep Problems

To date, only a few studies have documented an association between peer victimization and sleep problems in youths. For instance, two cross-sectional studies of children and adolescents aged between 6 and 17 years revealed a higher rate of insomnia-related sleep problems such as difficulty falling asleep and nighttime waking in peer victimized children compared to nonvictimized youth (Kubiszewski, Fontaine, Potard, & Gimenes, 2014; Wolke, Woods, Bloomfield, & Karstadt, 2001). Associations were also found in three longitudinal studies, with chronic peer victimization at ages 5 to 10 years predicting more parasomnias such as frequent nightmares and night terrors at ages 12 to 18 years, especially among girls (Biebl, DiLalla, Davis, Lynch, & Shinn, 2011; Wolke & Lereya, 2014, 2015). As previously noted, however, peer victimization is already prevalent during the preschool years (Barker et al., 2008; Vlachou et al., 2011), and it is still unclear whether the same predictive link between peer victimization and sleep

problems can be observed at that age. Moreover, the above-mentioned studies used youths' self-reports to assess sleep problems. This is an important limitation, as some sleep problems such as night terrors and sleepwalking are often accompanied by a loss of memory about the event, thus potentially leading to recall error (American Academy of Sleep Medicine, 2014). Moreover, although many sleep problems are related to stress and anxiety, these studies assessed a very limited number of the possible sleep problems affecting young children. In addition, some of these studies did not control for some important known predictors of childhood sleep problems that may be confounded with peer victimization, such as hyperactivity-inattention (Touchette et al., 2009) or maternal depression and anxiety (Shang, Gau, & Soong, 2006; Veenstra et al., 2005). Finally, these studies did not explore whether certain factors can moderate (e.g., exacerbate or mitigate) the predictive effect of peer victimization on sleep problems. This question is important both from a practical and a clinical standpoint, especially in early childhood, when one of the most important moderating factors may be parenting behavior.

The Potential Moderating Role of Parenting Behavior

Particularly in early childhood, parents are arguably the most important socializing agents for most aspects of their children's development, including how their children connect with other youth (Profiler & Hart, 1992). Indeed, several studies have shown that coercive parenting behaviors in early and middle childhood are not only associated with increased externalizing and internalizing problems in their children, but also with a greater risk of peer victimization (Barker et al., 2008). In addition, parental behavior appears to moderate the link between peer victimization and later adjustment problems. Thus, positive (i.e. warm and supportive) parenting has been shown to mitigate the predictive association between peer victimization and both internalizing and externalizing problems during childhood and adolescence, whereas coercive behavior exacerbates

this association (Bilsky et al., 2013; Bowes, Maughan, Caspi, Moffitt, & Arseneault, 2010; Cole et al., 2016). It is unknown, however, whether such parental behaviors also moderate the link between peer victimization and sleep problems in the offspring.

The Present Study

The main objective of this study was to examine 1) the association between peer victimization and the development of sleep problems (i.e., parasomnias and insomnia) during the preschool years (i.e., between the ages of 3 and 6 years) and (2) whether this association is moderated by positive or coercive parental behaviors. We also investigated whether these associations differ for girls and boys. In line with previous findings (Petit et al., 2007), we expected that the frequency of sleep problems would generally decline over the course of early childhood. However, because sleep problems are frequently among the first reactions to stress in young children, we hypothesized that a high and persistent level of peer victimization would be associated with a higher level and less or no decline over time of sleep problems. We also expected that this association would be exacerbated in girls and when parents employ coercive parenting. Conversely, this link should be reduced when parents use positive parenting behavior. These associations were examined while controlling for the effects of pre-existing sleep problems, internalized, externalized and physical health problems in children, as well as familial stressors. Co-sleeping with parents was also controlled, as it can influence children's sleep (Simard, Nielsen, Tremblay, Boivin, & Montplaisir, 2008). Finally, as in previous studies (Petit et al., 2007), the respective other "concurrent" sleep problem was controlled (i.e. controlling for insomnia when examining parasomnias and vice versa) to examine whether predictions equally applied to both parasomnias and insomnia.

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Methods

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Sample

Participants were part of the Quebec Longitudinal Study of Child Development (QLSCD), a longitudinal study of child development led by the Institut de la Statistique du Quebec (Quebec Longitudinal Study of Child Development, 1998). The QLSCD consists of families that had a child born in the Canadian province of Quebec (with the exception of Northern Quebec and Indian reserves) between October 1997 and July 1998. In the first phase of the study, which included an annual home-visit with the mother when the child was between 5 months and 6 years old, 2223 families accepted to participate. Attrition in the QLSCD was very low (3.6 % on average per year) and 92.8 % of the families included in the study in 1998 continued longitudinal follow-up to 2002.

The present study is based on participants for whom data for peer victimization and sleep problems were available for at least two times points between the ages of 3 and 6 years. In addition, to ensure that participating children had indeed been exposed to peers during early childhood, families were included in the present study only if the child had attended a preschool childcare setting during at least 2 out of 3 years between the ages of 3 and 5 years. These criteria resulted in a final study sample of 1181 children (594 girls, 587 boys). Compared to participants included in the present study, participants who were excluded had mothers who were younger at the birth of their child ($t = 2.96$, $p < .05$), who were less likely to be born in Canada ($\chi^2 = 7.54$, $p < .05$), and who were less likely to speak French or English as a first language ($\chi^2 = 31.75$, $p < .05$). They did not differ in terms of socio-economic status (SES) ($t = -1.31$, $n.s.$) or the father's age at birth ($t = 1.57$, $n.s.$). Regarding demographics of the final sample, 95% of parents were married or in a civil union at the birth of the target child, 66% of mothers and 63% of fathers were between 25 and 34 years old at the birth of their child and 45% of target children were the first born of the family; 12% of mothers and 14% of the fathers had not completed high school, whereas 28% of mothers

and 27% of fathers had a university degree. In terms of yearly household income, 29% of the

families declared making less than $30,000 per year, 43% made between $30,000 and $59,999 per

year, and 29% reported a yearly income above $60,000. The sample comprised 91.2% Whites,

3.7% Blacks, 2.2% Asians, and 2.6% Native Indians. Most (84%) mothers spoke French as a first

language, 7% spoke English, and 9% had another first language.

Procedure

Mothers signed informed consent for each data collection phase. The ethical approval for

the study was given by the ethics board of Santé Québec, the research agency of the Ministry of

Health and Social Services. Trained interviewers conducted annual visits at home with the mother.

Data were collected via self-administered paper-and-pencil questionnaires and a face-to-face

computerized structured interview. All instruments were administered in either English or French.

Bilingual judges verified the semantic similarity between the back-translated items and the original

items.

Measures

Sleep problems. *Parasomnias* during the previous year were assessed when the children

were 3 years, 4 years, 5 years and 6 years old. Specifically, the frequency of (1) somnambulism,

(2) night terrors, (3) nightmares (4) bruxism (5) sleep talking, (6) sleep enuresis and (7) sleep–

related rhythmic-movement disorder was assessed on a 4-point scale (ranging from 0 = never to 3

= always) (Laberge et al., 2000). For each child, the seven items were averaged to create a total

parasomnias score. Previous research have also studied parasomnias by using a combined score

(Goodlin-Jones, Sitnick, Tang, Liu, & Anders, 2008). *Insomnia* was also evaluated when the

children were 3, 4, 5 and 6 years old. Insomnia was assessed with two items rated on a 5-point

scale: (1) difficulty falling asleep (ranging from 1 = within 15 minutes to 5 = over 60 minutes) and

(2) night waking (ranging from (1 = no wake to 5 = 5 wakes or more). Item scores were averaged

to create a total insomnia-related sleep problems score over that period.

Peer victimization. *Peer victimization* was also assessed when the children were 3, 4, 5

and 6 years old. The mother answered the following three items on a 3-point scale (ranging from

0 = never to 2 = often): "how often would you say that your child was a) made fun of by other

children? b) was hit or pushed by other children? c) was called names by other children?". Items

were developed by Boivin and Hymel (2001) and used in other QLSCD studies (Barker et al.,

2008). For each child, the three items were averaged to create a total victimization score

(Cronbach's alpha ranged from .60 to .84). The combined victimization score was dichotomized

based on a cut-off point set at the 75th percentile of the distribution of all participating subjects. A

similar cut-off point was used in other studies to identify highly victimized children (Skrzypiec,

Slee, Askell-Williams, & Lawson, 2012). A variable was then calculated to represent, in

percentage terms, the degree of chronicity of peer victimization throughout the assessment period,

with a possible range from 0 to 100 (e.g., a value of 50 was assigned to a child that was highly

victimized for 2 out of 4 years).

Parenting behavior. Two parenting behaviors (coercive and positive) were assessed via

mother reports when the children were 3, 4, 5 and 6 years old. The items were developed during

the first and second phase of QLSCD (Quebec Longitudinal Study of Child Development, 1998)

and were rated on a 10-point scale ranging from (0 = never, 9 = all the time or several times a day).

The *coercive* parenting scale included 5 or 7 items, depending on the age of the child (e.g., "how

often did you hit your child when he/she was difficult?"); Cronbach's alpha ranged from .71 to .74

and cross-year correlations ranged from .46 to .53. *Positive* parenting included 5 or 10 items

depending on the age of the child (e.g., "how often did you do something special with your child

that he/she enjoys?"); Cronbach's alpha ranged from .72 to .74 and cross-year correlations ranged from .42 to .67. For each child, respective scale scores were averaged across the different time points to create a total score for each of the two parenting scales.

Control variables assessed via mother-reports. *Previous parasomnias* and *previous insomnia* were assessed when the children were 29 months old using the same instruments as the follow-up period. *Concurrent parasomnias* and *concurrent insomnia* for control purposes were obtained by averaging the scores obtained at each measurement time during the follow-up period. Also, a single item was assessed annually in order to determine whether the child was sleeping in the same bed as the parents (0 = no, 1 = yes). The percentage of time (ranging from 0% to 100%) of *co-sleeping with parents* between the ages of 3 and 6 was calculated. Child *anxiety* (4 items) and *depression* (4 items) symptoms were evaluated with items from the *Preschool Behaviour Questionnaire* (PBQ) (Behar & Stringfield, 1974) and the *Child Behavior Checklist* (CBCL) (Achenbach & Edelbrock, 1991) when children were 3, 4, 5 and 6 years old on a 3-point scale (ranging from 0 = never to 2 = often); Cronbach's alpha for anxiety symptoms ranged from .68 to .72; Cronbach's alpha for depression symptoms ranged from .71 to .76. Child *hyperactivity-inattention* was evaluated with 9 items from the CBCL, the PBQ and the *Ontario Child Health Study Scale* (1, 15, 27) when children were 3, 4, 5 and 6 years old on a 3-point scale (ranging from 0 = never to 2 = often); Cronbach's alphas ranged from .81 to .85. Child *difficult temperament* was evaluated when children were 5 and 17 months old with 7 items from the *Infant Characteristics Questionnaire* (Bates, Freeland, & Lounsbury, 1979) rated on a 7-point scale (ranging from 0 = very little, much less than average to 6 = enormously, much more than the average); Cronbach's alpha ranged from.79 to .80. Child *obesity* was determined when the body mass index exceeded

the 95th percentile rank compared to other children of the same age and sex between the ages of 3 and 6 (Dietz & Bellizzi, 1999).

Finally, information on family socioeconomic status (SES), family structure and the mother's depressive symptoms was added to create a composite *Family adversity* index (min = 0, max = 3). SES was obtained by combining the parents' education levels, their professional prestige and their salary (Desrosiers, 2000). Maternal depression was measured using 6 items on a 4-point scale (ranging from 1 = never to 6 = always) developed by the *Epidemiological Center for Depression* (Radloff, 1977) when the child was 3 and 5 years of age (Cronbach's alpha ranged from .81 to .82). Single parent or recomposed family status was considered as a risk, as were mother's depressive symptoms and family SES when the scores were below the 25th rank percentile of their respective distribution. Several studies have used a similar composite family adversity index to predict sleep problems in children (Sadeh, Raviv, & Gruber, 2000).

Analytic Strategy

Latent growth curve (LGC) analyses based on structural equation modeling were performed, separately for parasomnias and for insomnia, using the MPlus statistical software (Muthén & Muthén, 2010) to test a) whether growth curves for each of the two dependent variables (parasomnias and insomnia) from ages 3 to 6 years were predicted by chronicity of peer victimization during that time period, and b) whether these predictive associations were moderated by parenting behaviors and/or the child's sex. Covariates were included when they were significantly correlated with sleep problems at least one time during the assessment period. The only covariate that was excluded from the final models based on this criterion was obesity. Missing data (9% of data points) were imputed using multiple imputations based on 20 imputed datasets (Azur, Stuart, Frangakis, & Leaf, 2011). Descriptive statistics and bivariate associations between

the study variables are presented in Tables 1 and 2, respectively.

LGC analyses describe inter-individual differences in intra-individual change over time in the dependent variable of interest by estimating the mean levels and variances of the initial level (i.e., the intercept) and of the rate of change (i.e., the slope) of that variable (Willett & Sayer, 1994). Predictors of the intercept and the slope can also be included in the analyses. The dependent variables (i.e., parasomnia and insomnia) were tested separately in two series of analyses that each comprised four successively more complex model steps. First, a baseline model without predictors was specified, where the four different time points of the dependent variable (i.e., either parasomnia or insomnia) were used as indicators of three latent growth coefficients: (a) the intercept, which indicates the average level of the dependent variable at age 3 years, (b) the slope, which describes the yearly rate of change in the dependent variable, and (c) the $slope^2$, which describes the acceleration or decrease in the yearly rate of change. The squared growth coefficient was included to test for the possibility of curvilinear trajectories of sleep problems during early childhood. Predictors were included in subsequent models. In Model 1, all sleep control variables (sex of the child, difficult temperament, previous parasomnias and previous insomnia, child hyperactivity-inattention, child anxiety, child depression, co-sleeping with parents, family adversity index, and concurrent parasomnias or concurrent insomnia) were added as predictors of the latent growth coefficients. In Model 2, we added peer victimization and the two types of parenting behaviors as predictors of the latent growth coefficients. Subsequent alternate Models 3a, b and c added 2-way interactions to test whether peer victimization interacted with parental behaviors (i.e. coercive or positive) or with the child's sex in predicting the latent growth coefficients. Models including 3-way interactions between, peer victimization, the parental behaviors and the child's sex were also tested. However, no significant 3-way interactions emerged

and these models are thus not presented for parsimony. Significant interaction effects were examined according to the simple slope procedure proposed by Jaccard and his colleagues (1990). This method allowed us to examine the predictive effect of peer victimization on insomnia and parasomnias at high (+1 SD) and low (-1 SD) levels of parenting behavior. Study variables (except child sex and the dependant variables) were standardized prior to analyses to facilitate interpretation. Model fit was evaluated based on the Tucker–Lewis Index (TLI), the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). Values greater than .90 for CFI and TLI are considered to indicate adequate model fit, although values approaching .95 are preferable. Values smaller than .08 or .06 for the RMSEA and smaller than .10 and .08 for the SRMR, respectively, indicate acceptable and good model fit (Hu & Bentler, 1999).

Results

Growth Curve Analysis: Parasomnias

The baseline model (without any predictors) showed adequate fit to the data (TLI = .98, CFI = .98, RMSEA = .06, SRMR = .09). Growth coefficients indicated that parasomnias steadily decreased over the course of early childhood following a slightly positive curvilinear trend (Figure 1; Intercept *Mean* = 1.36, p = .001; Linear Slope *Mean* = -0.04, p = .001; Quadratic Slope *Mean* = 0.01, p = .01). However, there were also significant interindividual differences in both the Intercept (σ = .04, p = .001) and the Linear Slope (σ = .01, p = .001), albeit not in the Quadratic Slope. In subsequent models, predictors were therefore only included for the Intercept and the Linear Slope. Intercept and (Linear) Slope were negatively correlated (r = -.50, p < .001), indicating that children with high initial levels of parasomnias at age 3 showed a slightly faster decrease of sleep problems over time than others.

Table 3 shows the results from the subsequent growth curve analyses including predictors of parasomnias. Control variables introduced in Model 1 showed that children with previous parasomnias at age 29 months showed higher levels of parasomnias at age 3 ($b = .09$, $p < .001$) but a stronger decrease of parasomnias thereafter ($b = -.01$, $p < .001$). Child hyperactivity-inattention was associated with higher levels of parasomnias at age 3 ($b = .02$, $p = .02$) and a slower decrease of parasomnias thereafter ($b = .01$, $p = .03$). Children experiencing concurrent insomnia also suffered from higher levels of parasomnias at age 3 ($b = .04$, $p < .001$), whereas those co-sleeping with parents showed a slower decrease of parasomnias over time ($b = .02$, $p = .05$). Model 2 showed no significant main effects of peer victimization or the two parenting behaviors on parasomnias at age 3 (Intercept) or the rate of change thereafter (Slope). However, interaction effects tested in subsequent models revealed a significant interaction effect between peer victimization and coercive parenting on parasomnias at age 3 ($b = .06$, $p = .03$). Peer victimization did not interact with either positive parenting or with sex of the child in the prediction of the Intercept or the Slope of parasomnias.

Probing of the significant interaction revealed that peer victimization was associated with significantly higher levels of parasomnias already at age 3 at high levels (+1SD) of coercive parenting ($b = .07$, $p = .02$), but no association emerged at low levels (-1SD) of coercive parenting ($b = -.04$, $p = .32$). Figure 2 illustrates the trajectories of parasomnias from age 3 to age 6 for three sample cases: a) high peer victimization and high coercive parenting, b) high peer victimization and low coercive parenting, and c) low peer victimization and low coercive parenting for comparison. As can be seen, although parasomnias decreased for all children, those exposed to chronic peer victimization and a high level of coercive parenting showed higher levels of parasomnias throughout early childhood compared to chronically peer victimized children with a

low level of coercive parenting. In contrast, parasomnia levels of the latter group were not much

higher than those of children with low levels of both peer victimization and coercive parenting.

Growth Curve Analysis: Insomnia

The baseline model showed adequate fit to the date (TLI = .95, CFI = .94, RMSEA = .07,

SRMR = .08). Growth coefficients indicated that insomnia continually decreased over the course

of early childhood following a slightly negative curvilinear trend (Figure 4; Intercept *Mean* = 1.98,

p = .001; Linear Slope *Mean* = -0.09, p = .001; Quadratic Slope *Mean* = -0.02, p = .01).

Nevertheless, there were also significant interindividual differences in both the Intercept (σ = .28,

p = .001) and the Linear Slope (σ = .01, p = .001), albeit not in the Quadratic Slope. In subsequent

models, predictors were therefore only included for the Intercept and the Linear Slope. Intercept

and (Linear) Slope were negatively correlated (r = -.71, p < .001), indicating that children with

high initial levels of insomnia at age 3 showed a slightly faster decrease of sleep problems over

time than others.

Table 4 shows the results from the subsequent growth curve analyses including predictors

of insomnia. Control variables introduced in Model 1 revealed that children with previous

insomnia at age 29 months showed higher levels of insomnia at age 3 (b = .21, p < .001) but a

stronger decrease thereafter (b = -.04, p = .001). Co-sleeping with parents was associated with

higher levels of insomnia at age 3 (b = .19, p = .02) and a slower decrease of insomnia thereafter

(b = .10, p = .003). Children with high levels of depression also suffered higher levels of insomnia

at age 3 (b = .06, p = .03) and girls had higher levels of insomnia at age 3 compared to boys (b = -

.08, p = .03), whereas children with high levels of anxiety showed a slower decrease of insomnia

over time (b = .03, p = .02). Model 2 showed that children whose parents used coercive behaviors

showed higher levels of insomnia at age 3 (b = .05, p = .02). There were no significant main effects

of peer victimization or positive parenting on insomnia at age 3 (Intercept) or the rate of change thereafter (Slope). However, interaction effects tested in subsequent models revealed a significant interaction effect between peer victimization and positive parenting on insomnia at age 3 (b = -.14, p = .05). Peer victimization did not interact with coercive parenting or with sex in predicting the Intercept or the Slope of insomnia.

Probing of the significant interaction revealed that peer victimization was associated with significantly higher levels of insomnia already at age 3 at low levels (-1SD) of positive parenting (b = .19, p = .05), but no association emerged at high levels (+1SD) of positive parenting (b = -.09, p = .44). Figure 4 illustrates the trajectories of insomnia from age 3 to age 6 for three sample cases: a) high peer victimization and low positive parenting, b) high peer victimization and high positive parenting, and c) low peer victimization and high positive parenting for comparison. As can be seen, although insomnia decreased for all children, those exposed to chronic peer victimization and a low level of positive parenting showed higher levels of insomnia throughout early childhood compared to chronically victimized children with a high level of positive parenting. In contrast, insomnia levels of the latter group were not much higher than those of non-victimized children with a high level of positive parenting.

Discussion

The main goal of our study was to investigate whether peer victimization is associated with children's sleep problems during the preschool years and the potential moderating effect of parental behaviors in this context. Potential sex of the child moderation was also examined. In line with previous studies, both parasomnias and insomnia gradually declined over time for most children (Petit et al., 2007). As expected, however, chronically victimized children experienced more sleep problems than others and in some cases no decrease at all. The extent of the association

between peer victimization and sleep problems depended on the extent of parents' coercive or positive behaviors.

The Relation Between Peer Victimization, Sleep Problems and Parents Behaviors

In line with findings from studies with older children and teenagers (Wolke & Lereya, 2014, 2015), being victimized by peers was related to higher levels of parasomnias and insomnia. Our study is the first to show, however, that this association also holds for young children prior to school entry. In fact, repeated peer victimization during the preschool years did not only hamper the normative decline of sleep problems in young children, it even promoted a further increase of these problems. Sleep disturbances are often among the first symptoms of internalizing problems such as anxiety (Sadeh, 1996). However, since previous sleep problems as well as anxiety and other behavior problems were controlled in our analyses, peer victimization also seems to be uniquely linked to parasomnias and insomnia in young children. This finding is in line with other research showing that attending day care with many same-age peers may be stressful for young children (Vermeer & van IJzendoorn, 2006).

Our findings also revealed that the predictive effect of peer victimization on children's sleep problems varies depending on parents' behaviors. Specifically, chronically peer victimized children are at risk of maintaining a higher level or of developing even more frequent parasomnias only when their parents show highly coercive behavior. In contrast, positive parenting seems to reduce chronically victimized children's insomnia. Although we did not find main effects but instead moderating effects of parental behaviors, our results nevertheless concord with other research showing that parents' coercive behavior are associated with poorer sleep quality in their offspring, whereas positive parenting is linked to a healthier sleep pattern (Brand, Hatzinger, Beck, & Holsboer-Trachsler, 2009; Kelly, Marks, & El-Sheikh, 2014). The exacerbating effect of

coercive parenting might be explained by parents' reacting with anger or neglect towards their victimized children's sleep disturbances, thereby preventing children from developing their natural self-regulation capacities that help reduce sleep problems over time. In line with this notion, coercive parenting is negatively related with the child's emotion regulation skills (Chang, Schwartz, Dodge, & McBride-Chang, 2003) and positively linked with later internalizing and externalizing problems (Zeman, Cassano, Perry-Parrish, & Stegall, 2006). Positive parents, for their part, may be able to patiently tend to their children's disturbed sleep patterns without becoming stressed or angry themselves, thus helping to calm their children's worries. Moreover, these parents may also be able to help their victimized offspring solve victimization experiences in a constructive way, eventually also protecting their children from sleep problems. These findings thus add to evidence from other studies showing that positive parenting can mitigate the negative effect of peer victimization on children's developmental adjustment (Bilsky et al., 2013; Bowes et al., 2010).

Why did coercive parenting exacerbate only parasomnias, whereas positive parenting mitigated only insomnia? One possible explanation could lie within the conceptual difference between parasomnias and insomnia. Since insomnia is related to a conscious state compared to parasomnias (American Academy of Sleep Medicine, 2014), it could lead to more interactions with parents. Moreover, recommendations for helping parents deal with their children's insomnia (e.g., parental presence and stability of the family environment) are similar to positive parenting strategies (Moturi & Avis, 2010). Also, unique characteristics of parasomnias could explain why parents may react negatively. For example, they may perceive a lack of control or competence and react with anger to multiple parasomnias that often occur during different periods of the night. Moreover, parents may feel confused or anxious and react negatively towards altered emotions

and perceptions of their children, thus further exacerbating their children's sleep problems. In line with this notion, mothers' anxiety symptoms have been associated with parasomnias in pre-school children (Shang et al., 2006). These explanations are speculative, however, and more research is needed to understand the role of parenting in predicting different forms of sleep problems in victimized children.

No Moderation by the Sex of the Child

In line with other studies, girls suffered more sleep problems (specifically insomnia) than boys (Calhoun et al., 2014). However, neither the main effects nor the interactive effects between peer victimization and parenting behavior on children's sleep problems differed between girls and boys. Whereas some studies showed that chronically peer victimized girls experienced more subsequent sleep problems than boys (Wolke & Lereya, 2014, 2015), others found that peer victimization was associated with the development of post-traumatic stress symptoms (including sleep problems) to the same extent in both sexes (McKenney, Pepler, Craig, & Connolly, 2005). Moreover, similar to our results for parasomnias, positive parenting has been found to mitigate the link between peer victimization and internalizing problems for boys and girls (Bowes et al., 2010; Desjardins & Leadbeater, 2011). Nevertheless, further research is necessary before drawing conclusions regarding sex differences in the links between peer victimization, parental behaviors and children's sleep problems.

Strengths, Limitations, and Implications

Our study shows that peer victimization in preschool is negatively related to the development of children's sleep over time, but that this link is moderated by parental behaviors. In doing so, our study also expanded on previous research with older children by examining a larger number of parasomnias and controlling for a host of important confounding variables (Wolke & Lereya,

2014). Further strengths include the study's longitudinal design covering 4 years and the large sample size. Our study also has several limitations. For instance, whereas a large number of parasomnias were evaluated, insomnia was only assessed with two items, thus potentially limiting variability. However, our operationalization of insomnia is in line with that used in other research (Gaylor et al., 2001). Similarly, peer victimization was only assessed with three items. Furthermore, the fact that variables were based only on mother reports might have led to an underestimation of some children's level of peer victimization, while at the same time inflating associations with outcome variables. Previous research has shown, however, that peer victimization from ages 3 to 6 assessed with our mother-rated measure predicts later peer victimization in primary school as assessed by teachers and children themselves (Barker et al., 2008). Still, future studies should include multiple raters, such as fathers and day-care educators, to minimize potential bias. Finally, although only children attending formal day-care were included in our study to ensure that participants regularly interacted with multiple peers, the peer victimization measure did not allow us to determine where exactly the harassment incidences took place. Thus, in addition to day-care establishments, peer victimization can also occur in other settings, including between siblings at home (Menesini, Camodeca, & Nocentini, 2010). Future studies should differentiate victimization occurring in different settings to gain a more detailed portrait of young children's bullying experiences and their potential impact on sleep problems.

Despite these limitations, our study offers important new insights for parents, pediatricians, educators and other practitioners about the risk associated with peer victimization for young children's healthy development. Our results suggest that persistently high parasomnias and insomnia in young children may be due to peer victimization in the childcare setting. However, parental behaviors may play an important role in mitigating the negative impact of peer

victimization on young children's sleep quality. Together, such efforts may not only help detect chronic peer victimization early on, but also prevent potentially serious sequelae for children's subsequent developmental adjustment.

Tables and Figures

Table 1

Descriptive Statistics for Key Variables

Variable	Range	Mean	SD	Skewness	Kurtosis
Control variables					
Hyperactivity-inattention	0 – 10	3.79	1.71	0.28	0.06
Anxiety	0 – 10	2.35	1.46	0.63	0.15
Difficult temperament	0 – 10	2.56	1.31	0.58	0.15
Depression	1 – 3	1.56	0.24	0.13	-0.26
Co-sleeping with parents	0 – 1	0.16	0.22	1.18	0.31
Family adversity	0 – 3	0.85	0.89	0.72	-0.44
Obesity	0 – 1	0.02	0.15	1.27	0.38
Parental behaviors					
Coercive	0 – 9	2.95	1.02	0.50	0.33
Positive	0 – 9	6.18	0.89	-0.11	0.11
Peer victimization	0 – 1	0.17	0.25	1.52	1.67
Parasomnias					
T0 (29 months)	1 – 3	1.52	0.24	0.22	0.34
T1 (age 3)	1 – 3	1.35	0.23	0.80	1.12
T2 (age 4)	1 – 3	1.32	0.23	0.82	1.14
T3 (age 5)	1 – 3	1.31	0.21	0.81	0.78
T4 (age 6)	1 – 3	1.30	0.21	0.76	1.07
Concurrent parasomnias	1 – 3	1.33	0.19	0.80	0.98
Insomnia					
T0 (29 months)	1 – 5	2.06	0.71	0.34	-0.44
T1 (age 3)	1 – 5	2.02	0.70	0.58	-0.08
T2 (age 4)	1 – 5	1.97	0.74	0.73	0.27
T3 (age 5)	1 – 5	1.70	0.60	0.97	1.88
T4 (age 6)	1 – 5	1.50	0.55	1.30	1.85
Concurrent insomnia	1 – 5	1.80	0.53	0.81	0.66

Table 2

Pearson's Bivariate Correlation Matrix for Key Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1.	1																				
2.	.41†	1																			
3.	.38†	.62†	1																		
4.	.40†	.54†	.70†	1																	
5.	.32†	.48†	.59†	.67†	1																
6.	.19†	.21†	.20†	.19†	.14†	1															
7.	.16†	.23†	.17†	.21†	.17†	.35†	1														
8.	.15†	.19†	.24†	.20†	.17†	.31†	.45†	1													
9.	.13†	.19†	.18†	.23†	.17†	.20†	.37†	.46†	1												
10.	.11†	.25†	.26†	.25†	.25†	.33†	.42†	.43†	.46†	1											
11.	.10*	.11†	.12†	.13†	.15†	-.00	-.01	-.01	.05	.04	1										
12.	.11†	.17†	.16†	.18†	.21†	.12†	.13†	.16†	.19†	.18†	.11†	1									
13.	.09*	.17†	.18†	.24†	.23†	.09*	.12†	.12†	.13†	.10*	.19†	.31†	1								
14.	.17†	.20†	.21†	.20†	.20†	.09*	.12†	.13†	.14†	.20†	.01	.28†	.40†	1							
15.	.10†	.13†	.16†	.18†	.17†	.13†	.10†	.14†	.16†	.15†	-.02	.23†	.33†	.67†	1						
16.	.16†	.12†	.10*	.11*	.09*	.12†	.08*	.13†	.10*	.15†	.06	.05	.15†	.16†	.18†	1					
17.	-.04	.02	.02	-.01	.02	-.02	.02	-.02	-.04	-.04	.00	-.07	-.09*	-.02	-.06	-.04	1				
18.	.09*	.16†	.13†	.15†	.16†	.12†	.18†	.18†	.14†	.15†	.12†	.26†	.38†	.23†	.16†	.12†	-.20†	1			
19.	.06	.09*	.09*	.13†	.15†	.20†	.17†	.19†	.25†	.32†	.04	.07	.05	.05	-.01	.03	-.03	.13†	1		
20.	.04	.09*	.03	.08	.08	.06	.05	.08	.09*	.14†	.04	.17†	.17†	.20†	.15†	.01	-.15†	.19†	.14†	1	
21.	.07	.04	.01	.06	-.01	-.01	-.04	-.01	.03	.02	.04	.01	.02	.03	.04	-.01	-.08	.04	.01	.12†	1

Note. *$p < .05$. †$p < .01$.

Legend. 1 = Parasomnias at 29 months; 2 = Parasomnias at 3 years; 3 = Parasomnias at 4 years; 4 = Parasomnias at 5 years; 5 = Parasomnias at 6 years; 6 = Insomnia at 29 months; 7 = Insomnia at 3 years; 8 = Insomnia at 4 years; 9 = Insomnia at 5 years; 10 = Insomnia at 6 years; 11 = Sex (Being a boy); 12 = Peer victimization; 13= Hyperactivity-inattention; 14 = Anxiety; 15 = Depression; 16 = Difficult temperament; 17 = Positive parenting ; 18 = Coercive parenting; 19 = Co-sleeping with parents; 20 = Family adversity; 21 = Obesity

Table 3

Coefficients and Fit Indices from Growth Curve Analyses for Parasomnias

	Model 1		Model 2		Model 2a	
	Means					
Intercept	1.33(.01)**		1.33(.01)**		1.33(.01)**	
Linear slope	-.04(.01)**		-.04(.01)**		-.04(.01)**	
Quadratic slope	.01(.00)*		.01(.00)*		.01(.00)*	
	Regression coefficients					
Parameters	Intercept	Slope	Intercept	Slope	Intercept	Slope
Sex	.02(.01)	.002(.01)	.02(.01)	.002(.01)	.02(.01)	.00(.01)
Difficult temperament	.00(.01)	-.00(.01)	.00(.01)	-.00(.00)	.00(.01)	-.00(.00)
Previous parasomnias	.10(.01)**	-.01(.00)**	.10(.01)**	-.01(.00)**	.10(.01)**	-.01(.00)**
Previous Insomnia	.01(.01)	-.00(.00)	.01(.01)	-.00(.00)	.01(.01)	.00(.00)
Hyperactivity/inattention	.02(.01)*	.01(.00)*	.01(.01)	.01(.00)*	.01(.01)*	.01(.00)
Anxiety	.01(.01)	.00(.00)	.01(.01)	.00(.00)	.01(.01)	.00(.00)
Co-sleeping with parents	.01(.03)	.02(.01)*	.01(.03)	.02(.01)*	.01(.03)	.02(.01)
Family adversity	.01(.01)	-.00(.00)	.01(.01)	-.00(.00)	.01(.01)	-.00(.00)
Depression	.00(.01)	.00(.00)	.00(.01)	.00(.00)	.00(.01)	.00(.00)
Concurrent Insomnia	.04(.01)**	-.01(.00)	.04(.01)**	-.01(.00)	.04(.01)**	-.01(.00)
Positive parenting			.01(.01)	.00(.00)	.01(.01)	.00(.00)
Coercive parenting			.01(.01)	-.00(.00)	-.00(.01)	.00(.00)
Peer victimization (PV)			.03(.03)	.01(.01)	.01(.03)	.02(.01)
2-way interactions:						
PV * Coercive parenting					.06(.03)*	-.02(.01)
	Fit indices					
TLI	.97		.96		.96	
CFI	.98		.98		.98	
RMSEA	.04		.03		.03	
SRMR	.03		.03		.03	

Note. *p < .05. ** < .01. *SE* in parentheses. Only significant interactions are shown for parsimony.

Table 4

Coefficients and Fit Indices from Growth Curve Analyses for Insomnia

	Model 1		Model 2		Model 2b	
	Means					
Intercept	1.99(.03)**		1.98(.04)**		1.99(.04)**	
Linear slope	-.11(.03)**		-.12(.03)**		-.12(.03)**	
Quadratic slope	-.02(.01)*		-.02(.01)*		-.02(.01)*	
	Regressions coefficients					
Parameters	Intercept	Slope	Intercept	Slope	Intercept	Slope
Sex	-.08(.04)*	.01(.02)	-.08(.04)*	.01(.02)	-.08(.04)*	.01(.02)
Difficult temperament	.02(.02)	.01(.01)	.01(.02)	.01(.01)	.02(.02)	.01(.01)
Previous parasomnias	.03(.02)	-.02(.01)*	.03(.02)	-.02(.01)	.03(.02)	-.02(.01)
Previous Insomnia	.21(.02)**	-.04(.01)**	.21(.02)**	-.04(.01)**	.21(.02)**	-.04(.01)**
Hyperactivity/inattention	.03(.02)	-.01(.01)	.01(.02)	-.01(.01)	.01(.02)	-.00(.01)
Anxiety	-.04(.03)	.03(.01)*	-.05(.03)	.03(.01)*	-.05(.03)	.03(.01)*
Co-sleeping with parents	.19(.08)*	.10(.03)*	.18(.08)*	.10(.03)**	.18(.08)*	.10(.03)*
Family adversity	-.00(.02)	.01(.01)	-.01(.02)	.01(.01)	-.01(.02)	.01(.01)
Depression	.06(.03)*	-.02(.01)	.05(.03)*	-.01(.01)	.06(.03)*	-.02(.01)
Concurrent Parasomnias	.09(.02)**	-.00(.01)	.09(.02)**	-.00(.01)	.09(.02)**	-.00(.01)
Positive parenting			-.02(.02)	.00(.01)	.01(.02)	-.00(.01)
Coercive parenting			.05(.02)*	-.01(.01)	.05(.02)*	-.01(.01)
Peer victimization (PV)			.08(.08)	.02(.03)	.05(.08)	.02(.03)
2-way interactions:						
PV * Positive parenting					-.14(.07)*	.02(.03)
	Fit indices					
TLI	.91		.92		.91	
CFI	.95		.95		.95	
RMSEA	.04		.04		.04	
SRMR	.03		.02		.02	

Note. *p* < .05. ** < .01. *SE* in parentheses. Only significant interactions are shown for parsimony.
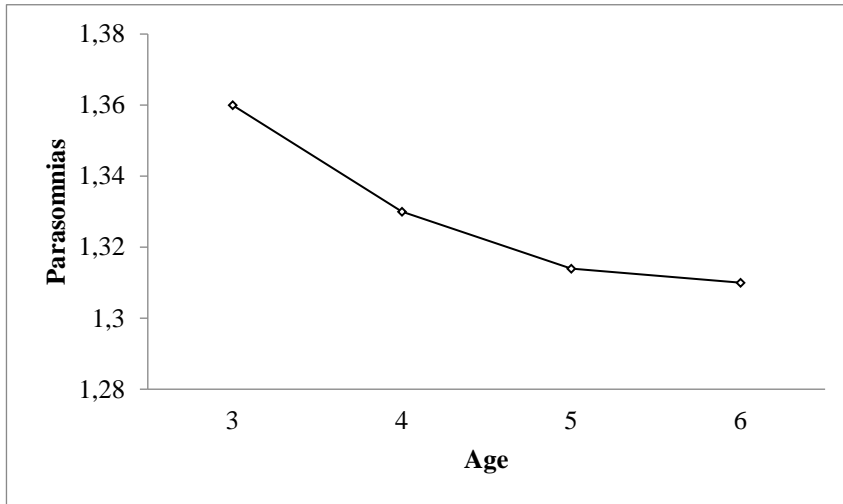
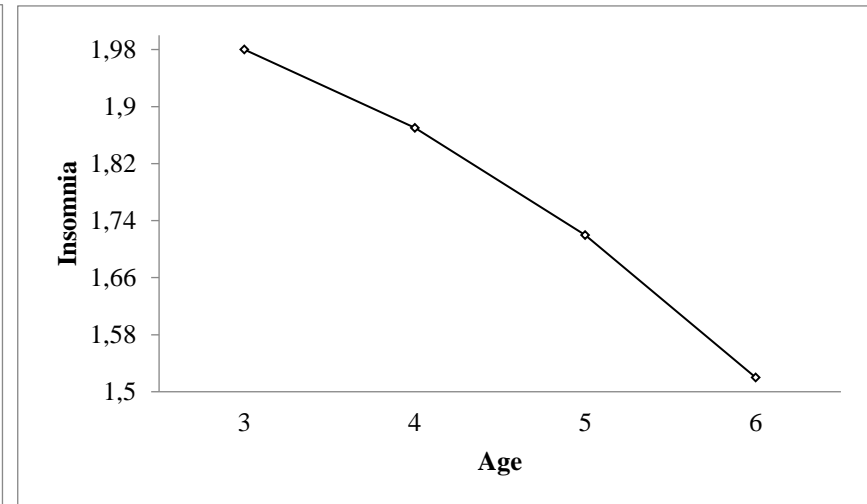*Figure 1.* Average developmental course (growth curve) of parasomnias from age 3 to age 6 years

Figure 3. Average developmental course (growth curve) of insomnia from age 3 to age 6 years
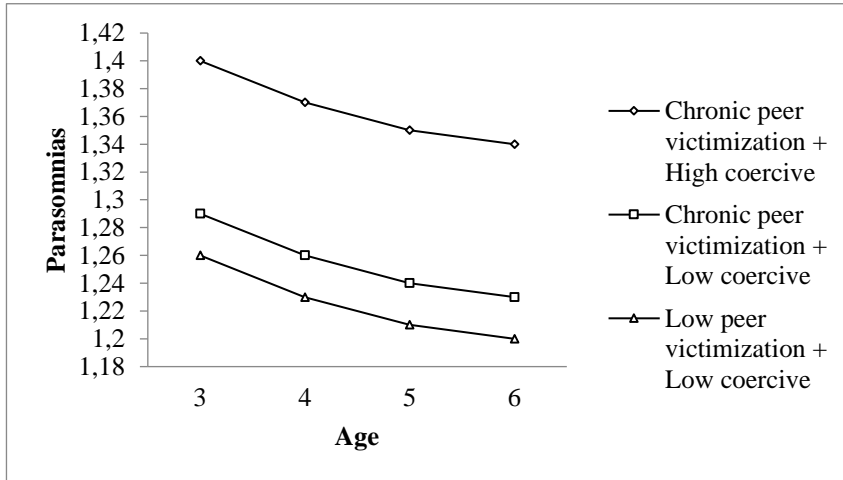

Figure 2. Interaction effect between coercive parenting and peer victimization on the developmental course of parasomnias from age 3 to age 6 years
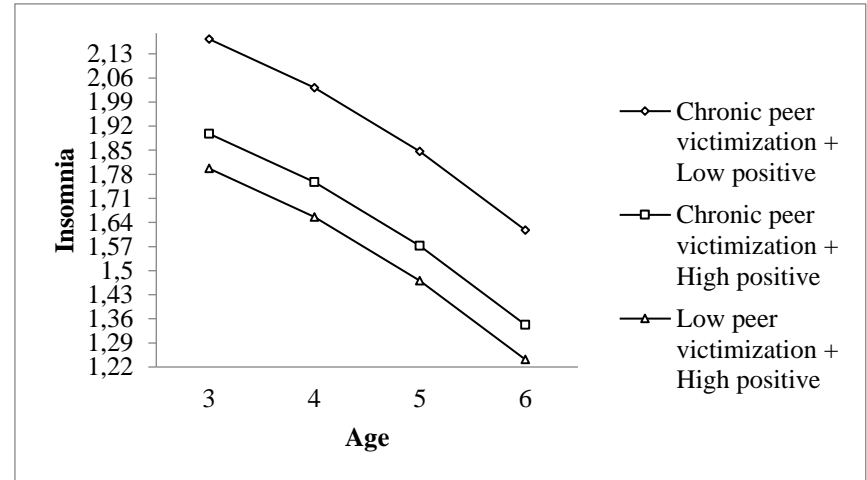

Figure 4. Interaction effect between positive parenting and peer victimization on the developmental course of parasomnias from age 3 to age 6 years

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