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Longitudinal Association Between Peer Victimization and Sleep Problems in Preschoolers: The Moderating Role of Parenting

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This study examined the moderating role of parental behaviors in the longitudinal link between peer victimization and sleep problems during preschool. The sample consisted of 1,181 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. 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. 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.

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Victimization by peers is a severe problem for many children. Sadly, this phenomenon already affects preschoolers, especially those attending formal day care (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, & Hodges, 2001). Research to date has identified several risk factors that increase the likelihood of peer victimization. These include children's personal characteristics, such as internalizing (e.g., anxiety, depression) or externalizing (e.g., hyperactivity/inattention, aggression) problems, as well as familial factors, such lower socioeconomic status (SES) or harsh and reactive parenting (Barker et al., 2008; Hodges, Malone, & Perry, 1997; Wiener & Mak, 2009). Studies have also shown that peer victimization is an important stressor that can seriously compromise victims' mental and physical health (Reijntjes et al., 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). Thus, repeated peer victimization predicts the development of posttraumatic stress disorder symptoms (Idsoe, Dyregrov, & Idsoe, 2012). Bullying victims are also twice as likely to suffer from psychosomatic symptoms (e.g., headaches, stomachaches, loss of appetite, dizziness) than other youths (Gini & Pozzoli, 2009).

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 (e.g., anxiety or depression symptoms) and externalizing (e.g., aggression or inattention) problems, a higher risk of injury and a disrupted family life (American Academy of Sleep Medicine, 2001; Gregory & O'Connor, 2002; Gregory, Rijsdijk, Dahl, McGuffin, & Eley, 2006; 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 (Touchette et al., 2012; Touchette et al., 2009; Touchette et al., 2007; Touchette et al., 2008). Important to note, some of the effects of persistent sleep problems in childhood may even last until adulthood (Gregory et al., 2005). 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 life span but are particularly prevalent during childhood. Parasomnias (e.g., nightmares, night terrors, somnambulism, sleep talking) are sleep-related, repetitive undesirable behaviors that 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, 2001). Although parasomnias are especially common in young children, with up to 88% of preschoolers showing at least one type of parasomnia (Petit et al., 2007), they generally decrease with age (American Academy of Sleep Medicine, 2001). Persisting parasomnias can lead to sleep deprivation and restriction, however, and eventually result in insomnia (American Academy of Sleep Medicine, 2001). During early childhood, insomnia is usually indicated when the child wakes up more than once during the night or takes more than 30 min to fall asleep (Gaylor, Goodlin-Jones, & Anders, 2001). Although insomnia-related sleep problems are observed in a non-negligible portion of preschoolers (nighttime waking: 13.2%–36.6%; difficulty falling asleep: 7.4%–16%), these problems also generally tend to decrease over the course of childhood (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 children's preexisting anxiety, hyperactivity-inattention, difficult temperament, obesity, chronic illness (e.g., allergies, asthma), and other concurrent sleep problems (e.g., preexisting insomnia or parasomnias; Alvaro, Roberts, & Harris, 2013; Chung, Park, An, Kim, & Kim, 2013; Laberge, Tremblay, Vitaro, & Montplaisir, 2000; Petit et al., 2007; Smaldone, Honig, & Byrne, 2007; Touchette et al., 2009; Touchette et al., 2008). Being a girl has also been associated with higher levels of insomnia during childhood and preadolescence (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). In line with this notion, several studies have noted the role of hypothalamic-pituitary-adrenal (HPA) axis dysregulation, attributable to acute or chronic stress, in the development of sleep problems among children (Capaldi, Handwerger, Richardson, & Stroud, 2005; El-Sheikh, Buckhalt, Keller, & Granger, 2008). Among family-related stressors, a low SES, parental separation or divorce, and maternal depression and anxiety are known to increase children's risk of developing sleep problems (Petit et al., 2007; Stoléru, Nottelmann, Belmont, & Ronsaville, 1997; Touchette et al., 2005). However, in many Canadian families (53%), preschool children spend a large portion of the day away from their families, such as in day care 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

Although mostly based on cross-sectional data, existing research provides clear evidence for an association between peer victimization and sleep problems in youths. Thus, a

recent meta-analysis based on 21 cross-sectional studies revealed a positive link between peer victimization and insomnia (e.g., difficulty falling asleep and nighttime waking) among children and adolescents between 7 and 18 years of age (odds ratios ranging from 2.14 to 2.25, with stronger effect sizes in younger children; van Geel, Goemans, & Vedder, 2016). In addition, three longitudinal studies found that chronic peer victimization at ages 5 to 10 years predicted more frequent parasomnias (notably 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 (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 aforementioned 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 errors (American Academy of Sleep Medicine, 2001). Moreover, although many sleep problems are related to stress and anxiety, these studies assessed a very limited number of 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 (Stoléru et al., 1997). 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 from both 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 youths (Ladd, Profilet, & Hart, 1992). Indeed, several studies have shown that coercive parenting behaviors (i.e., hostile actions such as mocking, threats of punishment, or actual physical punishment) in early and middle childhood are associated not only with increased externalizing and internalizing problems in children but also with a greater risk of peer victimization, whereas the opposite pattern is observed for positive (i.e., warm and supportive) parenting (Barker et al., 2008; de Graaf, Speetjens, Smit, de Wolff, & Tavecchio, 2008; Finnegan, Hodges, & Perry, 1998). High levels of coercive and low levels of positive parenting have also been linked to sleep-related problems in children and adolescents (Brand, Hatzinger, Beck, & Holsboer-Trachsler, 2009; Kelly, Marks, & El-Sheikh, 2014). In addition, parental behavior appears to moderate the link between peer victimization and later adjustment problems. For instance, positive 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 thus possible that parental behaviors may also moderate the link between peer victimization and sleep problems in the offspring. Such a moderating effect could, at least in part, work via physiological stress-regulation pathways. Indeed, several studies have shown that coercive parenting among preschool children is linked to HPA dysregulation as indicated by cortisol secretion, whereas a greater stability of cortisol levels has been associated with the use of positive parenting practices (Dougherty, Tolep, Smith, & Rose, 2013; Pendry & Adam, 2007). Moreover, positive parenting behaviors have been found to moderate (i.e., mitigate) the predictive link between stressful life events, such as exposure to interpersonal conflict, caregiver distress and parental death, and children's HPA axis dysregulation (Hagan et al., 2011). Considering the important role of HPA axis dysregulation in the development of sleep problems (El-Sheikh et al., 2008), a similar moderating effect of parenting behaviors might be observed in the link between peer victimization and elevated levels of parasomnias and insomnia in children.

The Present Study

The main objective of this study was to examine (a) the association between peer victimization and the development of parasomnias and insomnia during the preschool years (i.e., between the ages of 3 and 6 years) and (b) 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 preexisting sleep problems; internalized, externalized, and physical health problems in children; and 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.

METHODS

Sample

Participants were part of the Quebec Longitudinal Study of Child Development (QLSCD), 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, 2,223 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 of 3 years between the ages of 3 and 5 years. These criteria resulted in a final study sample of 1,181 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 SES ($t = -1.31$, *ns*) or the father's age at birth ($t = 1.57$, *ns*). 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 firstborn 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 of at least $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

Children's parasomnias during the last 12 months were assessed through mother reports when the children were 3 years, 4 years, 5 years, and 6 years old. Specifically, the frequency of (a) somnambulism, (b) night terrors, (c) nightmares, (d) bruxism, (e) sleep talking, (f) sleep enuresis, and (g) 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 also examined parasomnias using a similar combined score (Goodlin-Jones, Sitnick, Tang, Liu, & Anders, 2008). *Insomnia* during the last 12 months was also evaluated by the mother when the children were 3, 4, 5, and 6 years old. Insomnia was assessed with two items rated on a 5-point scale: (a) difficulty falling asleep (ranging from 1 [*within 15 minutes*] to 5 [*over 60 minutes*]) and (b) 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) hit or pushed by other children?, c) called names by other children?" Items were developed by Boivin, Hymel, and Hodges (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 cutoff point set at the 75th percentile of the distribution of all participating subjects. A similar cutoff 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 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*) to 9 (*all the time or several times a day*). The *coercive* parenting scale included five or seven 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 five 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 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 (four items) and depression (four items) symptoms were evaluated when children were 3, 4, 5, and 6 years old with items from the Preschool Behaviour Questionnaire (Behar & Stringfield, 1974) and the Child Behavior Checklist (Achenbach & Edelbrock, 1991) on a 3-point scale 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 when children were 3, 4, 5, and 6 years old with nine items from the Child Behavior Checklist, the Preschool Behaviour Questionnaire, and the Ontario Child Health Study Scale (Achenbach & Edelbrock, 1991; Behar & Stringfield, 1974; Boyle et al., 1993) on a 3-point scale 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 seven items from the Infant Characteristics Questionnaire (Bates, Freeland, & Lounsbury, 1979) rated on a 7-point scale from 0 (*very little, much less than average*) to 6 (*enormously, much more than the average*); Cronbach's alpha ranged from .79 to .80. For each child, respective scale scores were averaged across the different time points to create a total score for anxiety, depression, hyperactivity-inattention, and difficult temperament, respectively. A child's chronic illness index (min = 0, max = 3) was calculated by summing the presence of three chronic health problems (asthma, allergies, and other chronic problems) when the child was 3 years old. 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 SES, family structure, and the mother's depressive symptoms was added to create a composite Family Adversity index (min = 0, max = 3). The SES was obtained by combining the parents' education levels, their professional prestige, and their salary (Desrosiers, 2000). Maternal depression was measured using six items developed by the Epidemiological Center for Depression (Radloff, 1977) on a 4-point scale from 1 (*never*) to 4 (*always*) when the child was 3 and 5 years of age; Cronbach's alpha ranged from .81 to .82. Single parents 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 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 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 data sets (Azur, Stuart, Frangakis, & Leaf, 2011). Descriptive statistics and bivariate associations between the study variables are presented in Tables 1 and 2, respectively.

Latent growth curve analyses describe interindividual differences in intraindividual 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

TABLE 1
Descriptive Statistics for Key Variables

Variable	*Range*	*M*	*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
Chronic Illness	0–3	0.11	0.33	1.64	1.31
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

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 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 squared, 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, chronic illness 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 2a, b, and c added two-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 three-way interactions between peer victimization, parental behaviors, and the child's sex were also tested. However, no significant three-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 dependent 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 indicate, respectively, 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 $M = 1.36$, $p = .001$; linear slope $M = -0.04$, $p = .001$; quadratic slope $M = 0.01$, $p = .01$). However, there were also significant interindividual differences in both the intercept ($s = .04$, $p = .001$) and the linear slope ($s = .01$, $p = .001$), albeit not in the quadratic slope. In subsequent models, predictors were therefore included only 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 faster decrease of sleep problems over time than others.

Table 3 shows the results of 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 ($b = .02$, $p = .01$) 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 ($b = .04$, $p < .001$). Model 2 showed no significant main

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	22
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	
22.	.07*	.08†	.11†	.08*	.04	.07*	.11†	.06	.07*	.10†	.06†	.08†	.08†	.08†	.08†	.09†	.03	−.00	.01	.01	.02	1

Note: 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; 22 = Chronic illness index.

*$p < .05$. †$p < .01$.

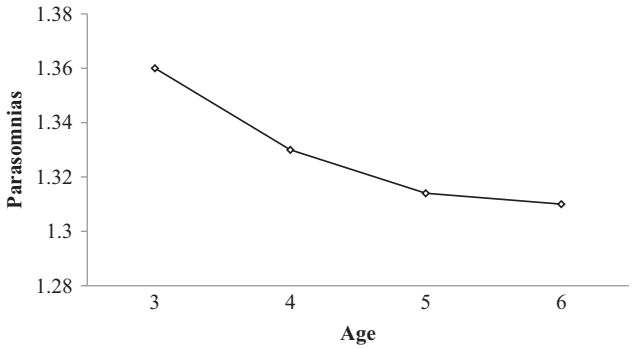

FIGURE 1 Average developmental course (growth curve) of parasomnias from age 3–6 years.

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 ($b = .05$, $p = .03$). 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 (+1 *SD*) of coercive parenting ($b = .07$, $p = .03$), but no association emerged at low levels (−1 *SD*) of coercive parenting ($b = -.04$, $p = .33$). Figure 2 illustrates the trajectories of parasomnias from ages 3 to 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 children 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 data (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

TABLE 3
Coefficients and Fit Indices From Growth Curve Analyses of Parasomnias

	Model 1		*Model 2*		*Model 2a*	
Intercept	1.33 (.01)**		1.33 (.01)**		1.33 (.01)**	
Linear Slope	−.03 (.01)**		−.03 (.01)**		−.03 (.01)**	
Quadratic Slope	.01 (.00)*		.01 (.00)*		.01 (.00)*	
			Regression Coefficients			
Parameters	*Intercept*	*Slope*	*Intercept*	*Slope*	*Intercept*	*Slope*
Sex	.02 (.01)	.00 (.00)	.02 (.01)	.00 (.00)	.02 (.01)	.00 (.00)
Difficult Temperament	.00 (.01)	−.00 (.00)	−.00 (.01)	−.00 (.00)	.00 (.01)	−.00 (.00)
Previous Parasomnias	.09 (.01)**	−.01 (.00)**	.09 (.01)**	−.01 (.00)**	.09 (.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)
Chronic Illness	.03 (.02)	−.01 (.01)	.03 (.02)	−.01 (.01)	.03 (.02)	−.01 (.01)
Co-Sleeping With Parents	.01 (.03)	.01 (.01)	.01 (.03)	.01 (.01)	.02 (.03)	.01 (.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)**	−.00 (.00)	.04 (.01)**	−.00 (.00)	.04 (.01)**	−.00 (.00)
Positive Parenting			.01 (.01)	.00 (.00)	.01 (.01)	.00 (.00)
Coercive Parenting			.01 (.01)	−.00 (.00)	−.00 (.01)	.00 (.00)
Peer Victimization			.03 (.03)	.01 (.01)	.01 (.03)	.01 (.01)
Two-Way Interactions						
Peer Victimization/Coercive Parenting					.05 (.03)*	−.01 (.01)
			Fit Indices			
TLI	.97		.96		.96	
CFI	.98		.98		.98	
RMSEA	.04		.04		.04	
SRMR	.03		.02		.02	

Note: Standard errors are in parentheses. Only significant interactions are shown for parsimony. TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

*$p < .05$. **$p < .01$.

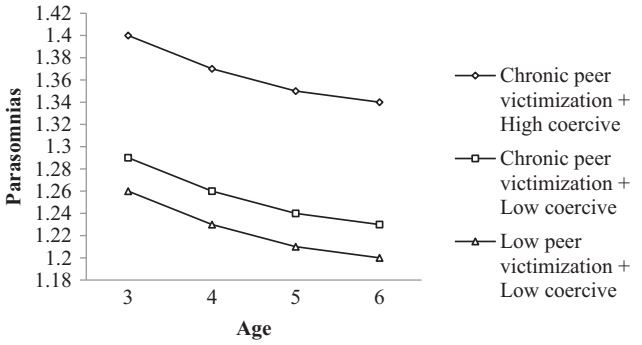

FIGURE 2 Interaction effect between coercive parenting and peer victimization on the developmental course of parasomnias from age 3–6 years.

(Figure 3; intercept $M = 1.98$, $p = .001$; linear slope $M = -0.09$, $p = .001$; quadratic slope $M = -0.02$, $p = .01$). Nevertheless, there were also significant interindividual differences in both the intercept ($s = .28$, $p = .001$) and the linear slope ($s = .01$, $p = .001$), albeit not in the quadratic slope. In subsequent models, predictors were therefore included only for the intercept and the linear slope. Intercept and linear slope were negatively correlated ($r = -.71$, $p < .001$), indicating that children with initial high levels of insomnia at age 3 showed a faster decrease of sleep problems over time than others.

Table 4 shows the results of 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 ($b = .20$, $p < .001$) but a stronger decrease thereafter ($b = -.02$, $p = .001$). Co-sleeping with parents was associated with higher levels of insomnia at age 3 ($b = .22$, $p = .01$), as was having chronic illnesses ($b = .10$, $p = .04$). Children with high levels of depression also suffered higher levels of insomnia at age 3 ($b = .05$, $p = .03$), and girls had higher levels of insomnia at age 3 compared to boys ($b = -.09$, $p = .02$), whereas children with greater family adversity showed a slower decrease of insomnia over time ($b = .02$, $p = .05$). Model 2 showed that children whose parents used coercive behaviors showed higher levels of insomnia at age 3 ($b = .05$, $p = .01$). 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 ($b = -.15$, $p = .03$). Peer victimization did

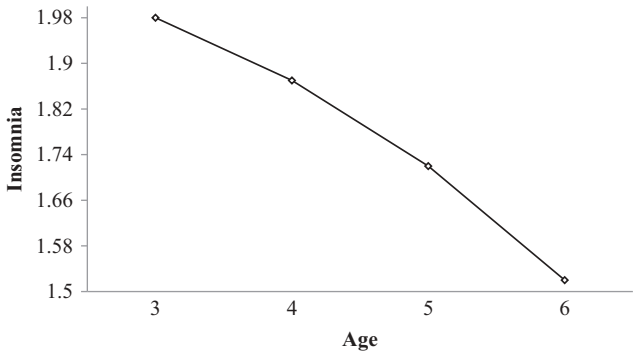

FIGURE 3 Average developmental course (growth curve) of insomnia from age 3–6 years.

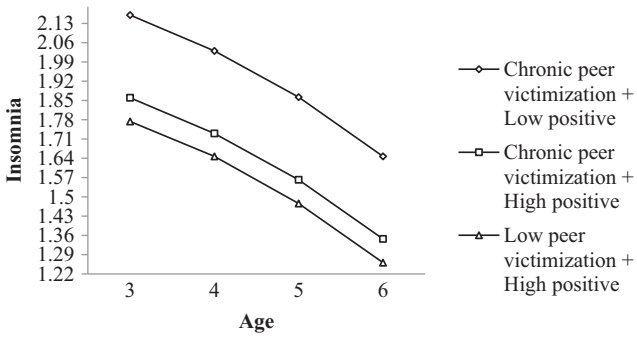

FIGURE 4 Interaction effect between positive parenting and peer victimization on the developmental course of parasomnias from age 3–6 years.

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 (−1 *SD*) of positive parenting (b = .19, p = .04), but no association emerged at high levels (+1 *SD*) of positive parenting (b = −.11, p = .33). Figure 4 illustrates the trajectories of insomnia from age 3 to 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 nonvictimized 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 moderation effects of the sex of the child were 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. Nevertheless, 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 that this association also holds for young children prior to school entry. In fact, repeated peer victimization during the preschool years not only hampered the normative decline of sleep problems in young children but also promoted a further increase of these problems. Sleep disturbances are often among the first symptoms of internalizing problems such as anxiety (Sadeh, 1996). Nevertheless, because 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.

Our findings also revealed, however, that the predictive effect of peer victimization on children's sleep problems varied depending on parents' behaviors. Specifically, chronically peer-victimized children were at risk of maintaining a higher level or of developing even more frequent parasomnias only when their parents showed highly coercive behavior. In contrast, positive parenting seemed to reduce chronically victimized children's insomnia. Although we did not find main effects but instead moderating effects of parental behaviors, our results nevertheless agree with other research showing that parents' coercive behaviors are associated with poorer sleep quality in their offspring, whereas positive parenting is linked to a healthier sleep pattern (Brand et al., 2009; Kelly et al., 2014). The exacerbating effect of coercive parenting might be explained by parents' reacting with anger or neglect toward 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 has been 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. These findings thus add to evidence from other studies showing that positive parenting can mitigate the negative

TABLE 4
Coefficients and Fit Indices From Growth Curve Analyses of Insomnia

	Model 1		*Model 2*		*Model 2a*	
Intercept	1.97 (.03)**		1.97 (.04)**		1.97 (.04)**	
Linear Slope	−.10 (.02)**		−.11 (.03)**		−.11 (.03)**	
Quadratic Slope	−.02 (.01)*		−.02 (.01)*		−.02 (.01)*	
			Regressions Coefficients			
Parameters	*Intercept*	*Slope*	*Intercept*	*Slope*	*Intercept*	*Slope*
Sex	−.09 (.04)*	.01 (.01)	−.09 (.04)*	.01 (.01)	−.09 (.04)*	.01 (.01)
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	.20 (.02)**	−.02 (.01)**	.20 (.02)**	−.02 (.01)**	.20 (.02)**	−.02 (.01)**
Hyperactivity/Inattention	.02 (.02)	−.01 (.01)	.01 (.02)	−.00 (.01)	.00 (.02)	−.00 (.01)
Anxiety	−.03 (.03)	.02 (.01)	−.04 (.03)	.02 (.01)	−.05 (.03)	.02 (.01)
Chronic Illness	.10 (.05)*	−.00 (.02)	.11 (.05)*	−.01 (.02)	.12 (.05)*	−.01 (.02)
Co-Sleeping With Parents	.22 (.08)*	.04 (.03)	.21 (.08)*	.04 (.03)	.21 (.08)*	.04 (.03)
Family Adversity	−.00 (.02)	.02 (.01)*	−.01 (.02)	.02 (.01)*	−.01 (.02)	.02 (.01)*
Depression	.05 (.02)*	−.01 (.01)	.05 (.02)*	−.01 (.01)	.05 (.03)*	−.01 (.01)
Concurrent Parasomnias	.09 (.02)**	.01 (.01)	.09 (.02)**	.01 (.01)	.09 (.02)**	.01 (.01)
Positive Parenting			−.02 (.02)	.01 (.01)	.01 (.02)	.01 (.01)
Coercive Parenting			.05 (.02)*	−.01 (.01)	.05 (.02)*	−.01 (.01)
Peer Victimization			.07 (.08)	.00 (.03)	.04 (.08)	.00 (.03)
Two-Way Interactions						
Peer Victimization/Positive Parenting					−.15 (.07)*	.00 (.03)
			Fit Indices			
TLI	.93		.93		.93	
CFI	.96		.96		.96	
RMSEA	.04		.04		.04	
SRMR	.03		.02		.02	

Note: Standard errors are in parentheses. Only significant interactions are shown for parsimony. TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

*$p < .05$. **$p < .01$.

effect of peer victimization on children's developmental adjustment (Bilsky et al., 2013; Bowes et al., 2010).

At least in part, these moderating effects of coercive and positive parenting behaviors may be mediated by their influence on children's cortisol secretion (Dougherty et al., 2013; Pendry & Adam, 2007), which not only shows significant alterations in peer victimized children (Ouellet-Morin et al., 2011), but also has been linked to the development of sleep problems (Capaldi, Vincent, Handwerger, Richardson, & Stroud, 2005). In line with this notion, positive parenting behavior has been found to mitigate the predictive link between other stressful experiences, such as exposure to interpersonal conflict, caregiver distress and parental death, and children's cortisol levels (Hagan et al., 2011). Apart from affecting physiological stress-regulation mechanisms linked to sleep, parents showing warm and supportive behavior may also be able to help their victimized offspring solve victimization experiences in a constructive way, eventually also protecting their children from sleep problems.

Why did coercive parenting exacerbate only parasomnias, whereas positive parenting mitigated only insomnia? One possible explanation could be due to the fact that recommendations for helping parents deal with insomnia-related problems in young children (e.g., parental presence at bedtime, patience and a positive attitude, soothing routines, and a peaceful and stable family environment) resemble 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 toward altered emotions and perceptions of their children, thus further exacerbating their children's sleep problems. 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 posttraumatic stress symptoms to the same extent in both sexes (Idsoe et al., 2012). 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 (Bilsky et al., 2013; Bowes et al., 2010). 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. Most important, the fact that all measures were based on mother reports may have artificially inflated associations between variables due to shared source variance while leading to an underestimation of some children's level of peer victimization. Indeed, although especially young children's mothers are usually privy to their children's sleep problems, not all mothers may be adequately informed about their children's peer experiences in day care. However, findings from a large epidemiological study with primary and secondary school-age children suggest that, even for older children, mother reports of peer victimization can be considered as a valid alternative in the absence of child self-reports (Shakoor et al., 2011). Moreover, previous research has shown 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's self-reports (Barker et al., 2008). Nevertheless, future studies should include day care educators' or fathers' assessments of children's peer victimization to minimize potential bias, as well as objective sleep measurement such as actigraphy (Meltzer, Montgomery-Downs, Insana, & Walsh, 2012), to validate the associations observed based on mother reports. In addition, although we controlled for the effect of co-sleeping with parents, future studies should also control for other characteristics of the child's sleep environment, such as co-sleeping or room sharing with a sibling, two factors that have been associated with sleep problems in children (Blader, Koplewicz, Abikoff, & Foley, 1997; Li et al., 2008). Also, whereas a large number of parasomnias were evaluated, insomnia was assessed with only 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 assessed with only three items. Also, our measures of parenting behaviors did not allow us to determine whether coercive and positive parenting occurs outside or inside the sleep context, a limitation that future studies should investigated. 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 child care setting. Parents, educators, and pediatricians should thus be attentive to persistent sleep disturbances as a potential indicator of peer victimization. Our results also indicate that parental behaviors may play an important role in mitigating the negative impact of peer victimization on young children's sleep quality. Family interventions such as the Triple P–Positive Parenting Program (Sanders, 1999) may not only help improve parenting skills but also teach victimized children emotion-regulation and behavioral skills that may protect them from becoming the targets of peer victimization (de Graaf et al., 2008; Nowak & Heinrichs, 2008). Together, such efforts may not only help prevent chronic peer victimization early on but also prevent potentially serious sequelae for children's sleep and subsequent developmental adjustment.

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