

Longitudinal Study of Bad Dreams in Preschool-Aged Children: Prevalence, Demographic Correlates, Risk and Protective Factors

Valérie Simard, MSc^{1,2}; Tore A. Nielsen, PhD^{1,3}; Richard E. Tremblay, PhD⁴; Michel Boivin, PhD^{4,5}; Jacques Y. Montplaisir, MD, PhD^{1,3}

¹Centre d'étude du sommeil, Hôpital du Sacré-Cœur de Montréal, Canada; ²Department of Psychology, Université de Montréal, Canada;

³Department of Psychiatry, Université de Montréal, Canada; ⁴Research Unit on Children's Psychosocial Maladjustment, Université de Montréal, Canada; ⁵Department of Psychology, Laval University, Canada

Study objectives: To (1) clarify the epidemiology of bad dreams in children and investigate risk and protective factors related to (2) the child's sleep, (3) parental sleep-enabling practices, and (4) the child's temperament.

Design: Longitudinal with 6 time points from 5 months to 6 years.

Setting: Subjects' homes.

Participants: Representative sample of 987 children in the Province of Quebec.

Interventions: None.

Measurements and Results: Longitudinal logistic regression analysis models with primary endpoints of presence or absence of parent-rated bad dreams at 29 months, 41 months, 50 months, 5 years, and 6 years and predictor variables of demographic characteristics, parent ratings of child's sleep characteristics, parental sleep-enabling practices (e.g., cosleeping), and child's psychological characteristics at 5 and 17 months (anxiousness, temperament). Mothers' ratings indicated lower than expected prevalence of frequent bad dreams (1.3% to 3.9%). Demographic correlates of bad dreams were high family income, ab-

sence of siblings at 29 months, and a non-immigrant mother. The best predictor at 41 and 50 months was the presence of bad dreams the preceding year, whereas at 5 and 6 years, it was their earlier presence at 29 months. Early protective factors were parental practices favoring emotional nurturance after night awakenings (29 and 41 months); early risk factors were sleep-onset emotional nurturance (29 months), difficult temperament (5 months), and anxiousness (17 months).

Conclusions: Bad dreams in preschoolers are less prevalent than thought but, when present, are trait-like in nature and associated with personality characteristics measured as early as 5 months. A stress-diathesis model may best account for the observed pattern of predictive factors.

Keywords: Bad dreams, nightmares, parental sleep practices, temperament, children, risk and protective factors

Citation: Simard V; Nielsen TA; Tremblay RE; Boivin M; Montplaisir JY. Longitudinal study of bad dreams in preschool-aged children: prevalence, demographic correlates, risk and protective factors. *SLEEP* 2008;31(1):62-70.

INTRODUCTION

DISTURBING DREAMS ARE REPORTED TO BE COMMON IN EARLY CHILDHOOD (E.G., *DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS, FOURTH EDITION* [DSM-IV] *International Classification of Sleep Disorders-2*) even though there is a scarcity of cross-sectional research—and a complete absence of longitudinal research—on this question. The possibilities that bad dreams reflect a stable personality trait originating in early childhood or that risk and protection factors for bad dreams reside in a child's early temperament and sleep quality or in parental sleep-enabling behaviors also remain speculative because of a lack of targeted research. Meanwhile, the

nature and correlates of early childhood sleeplessness are being traced to factors assessed as early as 5 months of age.¹ The present study aims to redress this situation by evaluating the prevalence, demographic correlates and risk and protection factors of bad dreams in a large sample of preschool-aged children representative of the Canadian province of Quebec.

Defining Bad Dreams in Children

Although there is considerable discussion and debate over the definition of disturbed dreaming among adults,² little attention is paid to optimizing definitions or measures of bad dreams among the very young. Different operational terms are employed across studies: *bad dreams*, *anxiety dreams*, *scary dreams*, *nightmares*.³ Definitional criteria, such as whether or not disturbing dreams cause awakenings, are frequently cited as a means of distinguishing nightmares, which produce awakenings, from bad dreams, which do not.⁴ However, such self-report criteria are not clearly appropriate or feasible for population studies of preschool-aged children in which parents must respond on behalf of the child. In the present study, parents were queried about the frequency of their child's bad dreams without requiring that they attempt to judge whether or not awakenings occurred.

Prevalence of Children's Bad Dreams

Most prevalence studies concern adolescents and children aged 5 years or older—with longitudinal studies being conspicu-

Disclosure Statement

This was not an industry supported study. Dr. Montplaisir has received research support from GlaxoSmithKline, Aventis, Sanofi-Synthelabo, Orphan Medical, and Pharmacia/Pfizer; has consulted for Boehringer Ingelheim, Servier, Shire BioChem, and Aventis; and has participated in speaking engagements for Boehringer Ingelheim, Shire BioChem, and GlaxoSmithKline. The other authors have indicated no financial conflicts of interest.

Submitted for publication August, 2006

Accepted for publication July, 2007

Address correspondence to: Tore Nielsen, PhD, Centre d'étude du sommeil, Hôpital du Sacré-Cœur de Montréal, 5400 boul. Gouin Ouest, Montreal, Quebec, Canada H4J 1C5; Tel: (514) 338-2222, Ext: 3350; Fax: (514) 338-2531; E-mail: tore.nielsen@umontreal.ca

ously absent. One small retrospective study suggests that 13.5% of nursery-school-aged children have bad dreams at least once per week.⁵ A cross-sectional study of 4- to 12-year-olds³ suggests a peak prevalence between 7 and 9 years, with 87% and 95.7% of children retrospectively reporting bad dreams *often* or *sometimes*. A similar study⁶ found a peak nightmare prevalence (41%) between 6 and 10 years. Other retrospective estimates are that 28% of 5- to 8-year-olds, 23% of 9- to 11-year-olds, and 10% of 12- to 14-year-olds have nightmares once every 6 months.⁷ Thus, although infrequent bad dreams are relatively common for children, complaints of bad dreams as an enduring problem may reflect a relatively stable characteristic emerging in early childhood.

There is no sex difference in bad-dream prevalence among children under 12 years of age,^{3,8} but the dreams are more prevalent in girls than in boys at 13 years—a gap that becomes more pronounced at 16 years.⁹ No other sociodemographic correlates of bad dreams in young children have been explored.

Bad Dreams and Sleeplessness

The only study examining sleep-related predictors of children's bad dreams⁶ found nightmares (not defined) to be almost twice as common in children with circadian-rhythm disorders in their first year of life (46%) than in normally sleeping children (29%). This marginal difference supports the possibility that sleeplessness symptoms may predict bad dreams in young children and parallels studies of adults and adolescents finding comorbidity of sleeplessness/insomnia symptoms and bad dreams/nightmares.^{10,11} Studies also show that patients who have nightmares and those who have insomnia have similar psychological profiles (e.g., obsessive, ruminative, anxious),^{12,13} are at greater risk for suicide,¹⁴⁻¹⁶ hold irrational thoughts about sleep,^{17,18} and have low perceived control over sleep problems. Nonetheless, comorbidity between sleeplessness and nightmares has not been thoroughly studied in children.

Parental Practices and Sleep Problems in Children

Parental practices aiming to facilitate the child's sleep, such as how the child is put to bed or how the child is comforted after awakening at night, may constitute risk factors for developing sleep problems. Generally, parental behaviors interfering with development of the child's ability to self-comfort when awake at night are associated with increased risk of sleep disturbances. Many studies suggest an association between reactive cosleeping and night waking in infants and young children.¹⁹⁻²⁰ Similarly, a parent's presence while the child falls asleep is associated with frequent night awakenings and difficulties in returning to sleep.^{21,22} Excessive physical comforting of 1-year-olds (e.g., settling in parent's bed, cuddling in arms) is associated with sleep problems²³ and partly explains the maintenance of sleep problems from age 1 to 2.²⁴ The factor most strongly associated with not sleeping at least 6 consecutive hours per night at 17 and 29 months is a parent's presence while the child falls asleep.¹ To our knowledge, no study has similarly investigated parental sleep practices as predictors of children's bad dreams. We expect that practices favoring dependency would be associated with more bad dreams than would practices favoring autonomy.

Psychological Correlates of Bad Dreams in Children

The association of bad dreams or nightmares in adults with a variety of pathologic symptoms, including psychological distress, anxiety, and depression,²⁵ leads us to hypothesize that children with psychological distress or emotional disorder are also more likely to have bad dreams. Studies reveal such links in school-aged children,^{9,26} but similar studies in very young children are lacking.

Bad dreams or nightmares are commonly associated with separation anxiety, possibly because the DSM-IV-TR lists repeated nightmares with separation themes as a manifestation of separation anxiety. However, only 1 empiric study⁹ reports that frequent bad dreams (age 16) are associated with DSM-III-R-defined separation anxiety. These considerations lead us to hypothesize that separation anxiety will predict bad dreams in young children.

Finally, difficult temperament in infants is associated with sleep problems.^{24,27} Mothers' ratings of difficult temperament predict sleeplessness at 1 year and the persistence of sleep problems to age 2.²⁴ This, and evidence of similar psychological profiles for sleeplessness and bad-dream or nightmare sufferers among adults, leads us to hypothesize that difficult temperament as early as age 1 will predict bad dreams.

METHODS

Sample Extraction

This research is part of the Quebec Longitudinal Study of Child Development (1998-2004) conducted by the Quebec Institute of Statistics.²⁸ Children were recruited from the Quebec Master Birth Registry of the Ministry of Health and Social Services and assessed annually from 5 months to 6 years of age. A randomized, 3-level, stratified survey design was used to generate a representative sample of children born in the province of Quebec in 1997 and 1998. Structure of the sample and subject exclusions are described in the supplement.

Of the 2940 children initially selected, 2120 were included in the data-collection phase and 1997 remained at 29 months of age, the first endpoint in the study. Subjects remaining at each subsequent time point were: 41 months ($n=1950$), 44 to 56 months ($M=49.8$ months, $SD=3.07$; $n=1944$), 5 years ($n=1759$), and 6 years ($n=1492$), with a total of 1434 participating at all 5 time points. There was greater age variability at 44-56 months (henceforth labelled 50 months) because the design required children be assessed at entry into preschool. The sample was further reduced due to incomplete responses to sleep outcome measures at each time point, i.e., numbers were 1934, 1897, 1877, 1444, and 1319; 1075 subjects participated at all 5 time points. A technical translation error necessitated excluding the small cohort with English-speaking mothers ($n=88$). The final sample for analyses was 987.

Sample Description

Most children (95.4%) have a Canadian non-immigrant mother; 4.6% have a first-generation immigrant mother. The majority of mothers are Caucasian (96.7%); the remainder are

African (0.9%), Asian (0.4%), Arab (0.7%), Latin American (0.5%), and Native Amerindian (0.3%). Most speak French as a first language (94.5%), 1.7% speak English, and 3.7% speak another language. The mother's highest education level attained was university (30.6%), college (48.6%), high school degree (8.5%) and high school incomplete (12.3%).

At 29 months, 48.4% were boys, 50.3% girls, and 1.3% did not have a sex indicated. Most lived in a 2-parent family (80.3%), 10.5% lived in a blended family, 8.9% in a single-parent family, and 0.3% did not indicate status. Most children had a sibling (69.9%); 50.5% had 1 brother or sister, 14.9% had 2, 3.5% had 3, and 1.0% had 4 or more.

Outcome Measures

Responses were collected using the Self-Administered Questionnaire for the Mother given to the biologic mother in most cases (99.7%). It was part of a much larger interview and questionnaire battery completed by the mother or father, required about 20 minutes, and provides information on the child's sleep characteristics. Six questions pertained to sleeplessness symptoms (see Table 1), 3 to parental sleep-enabling practices, and 1 to bad dreams. Some questions were not asked at each time point, and response scales for 2 questions were changed at some point (see Table 1).

Four psychological predictors of bad dreams at 29 months were considered: difficult temperament, separation anxiety, emotional distress, and anxiety—a subset of emotional distress. All 4 measures were available for both mothers and fathers at 17 months (intraclass correlations: difficult temperament = 0.51; separation anxiety = 0.32; emotional distress = 0.25; anxiety = 0.22), whereas only difficult temperament was available at 5 months (intraclass correlation = 0.61). Variables used standardized Likert-type scales (0-to-10 responses). Items are detailed in the supplement.

The study was approved by the ethics review board of the Montreal Sacré-Coeur Hospital (Canada) and was centrally managed at the Quebec Institute of Statistics, which conducted the interviews. Before participation, families received detailed information on the research's aims and procedures and gave signed consent.

Statistical Analyses

SPSS software v10 (SPSS Inc, Chicago, Ill) was used. Weights representing population characteristics were applied to subject scores for all analyses (see Supplement).

Considerable discrepancies in subject distributions across the 4 levels of the bad-dreams variable were observed, e.g., only 1.5% to 3.9% of children aged 29 months to 6 years had frequent bad dreams (*often+always*). Thus, for most analyses, this variable was dichotomized to assess the presence (*sometimes+often+always*) or absence (*never*) of bad dreams. χ^2 tests assessed the presence or absence of bad dreams at each time point for demographic variables assessed at 29 months. χ^2 tests also assessed demographic variables among "extreme" groups, i.e. children with bad dreams at each of the 5 time points from 29 months to 6 years (*bad-dream-consistent* group) and children without bad dreams during the same period (*bad-dream-free* group).

Logistic regression analyses assessed sleeplessness and parental practice variables best predicting the presence or absence of bad dreams. Four longitudinal models were constructed (Table 2).

Analyses were conducted sequentially, with variables forced in the following order: (1) bad dreams in previous year(s), (2) parental practices in previous year(s), (3) night sleep latency in previous year(s), (4) night sleep continuity or fragmentation in previous year(s), and (5) night sleep duration in previous year(s). Variables hypothesized to be better predictors were entered first. The bad-dreams variable was introduced first because of its hypothesized stability over time. Parental-practices variables were entered in a block because of evidence that parental attitudes explain children's sleep disorders.¹⁹⁻²⁴ Sleeplessness variables were entered in chronologic order, for example, in predicting bad dreams at 50 months, sleeplessness variables were entered for 29 and then 41 months (see Supplement Table S1 for regression details available on www.journalsleep.org). This procedure was prompted by evidence that sleep difficulty is a stable characteristic from as young as 1 year.^{24,29,30} The classification cut-off was 0.65, and the α significance level was set at 0.01.

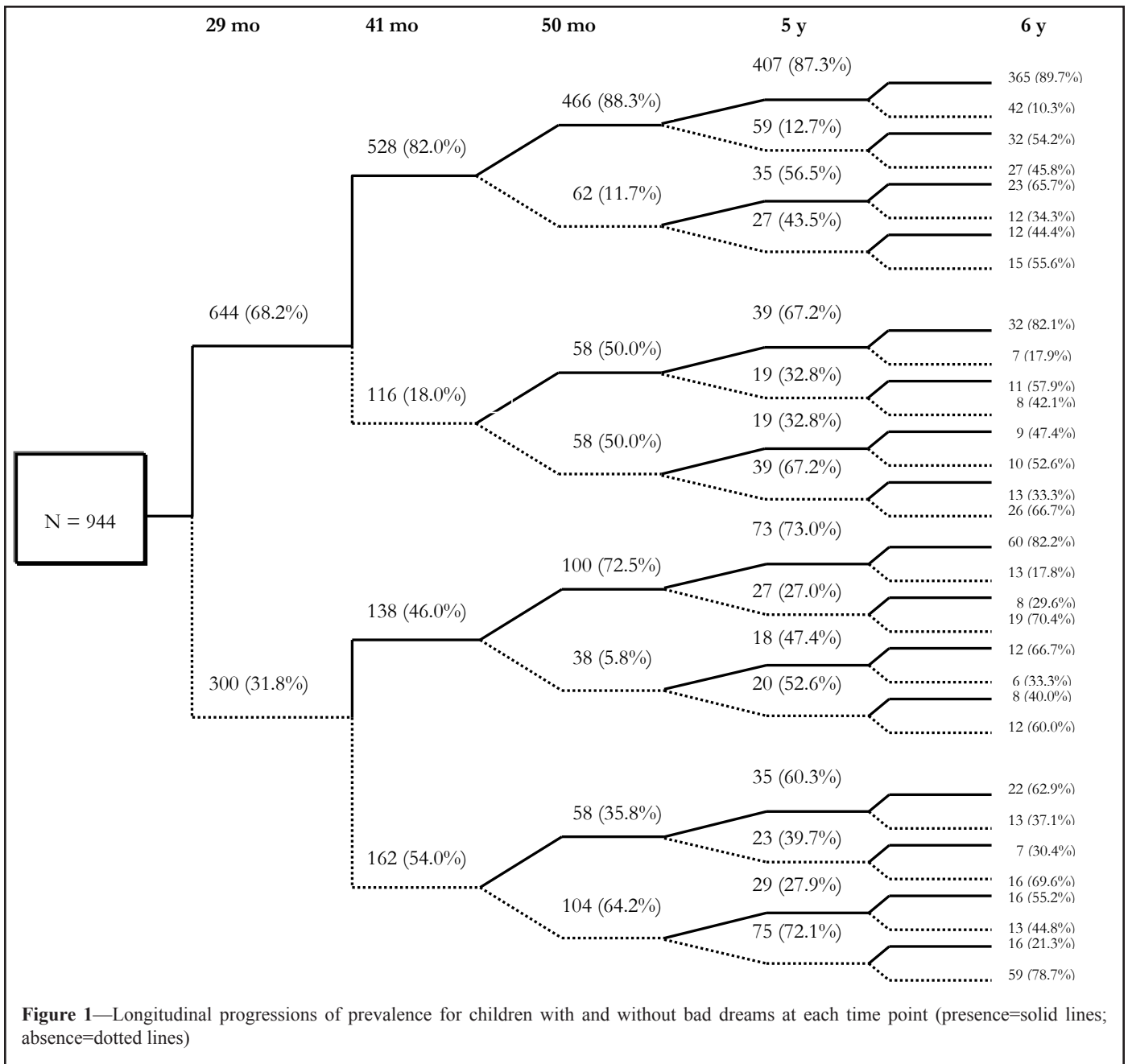
An additional logistic regression was conducted to determine if psychological variables collected at 5 and 17 months predicted the presence or absence of bad dreams at time point 1 (29 months). All predictors were standardized 0-to-10 Likert-type scales, and a forward stepwise likelihood ratio method was used. Student *t* tests compared psychological variables for *bad-dream-free* versus *bad-dream-consistent* groups. Finally, a post hoc logistic regression analysis was performed to specify which difficult-temperament items measured at 5 months predicted the presence of bad dreams at 29 months. The *t* tests also compared difficult-temperament items (measured at 5 and 17 months; 1-to-7 Likert-type scales) between *bad-dream-free* and *bad-dream-consistent* groups.

RESULTS

Prevalence of Bad Dreams

Prevalence estimates were based on the following samples: 29 months (n=977), 41 months (n=971), 50 months (n=979), 5 years (n=984), and 6 years (n=978) with nonresponse rates of 1.0%, 1.6%, 0.7%, 0.3%, and 0.9%, respectively. Proportions of participants in each bad-dreams frequency category were quite stable over time. For those reporting *never*, proportions were 31.4%, 29.0%, 27.7%, 30.7%, and 31.4% for the 5 times. Most fell into the *sometimes* category: 65.2%, 65.5%, 69.3%, 66.4%, and 66.3%, with marginal proportions in the *often* (1.7%, 3.9%, 2.1%, 1.8%, 1.3%) and *always* (0.7%, 0.0%, 0.1%, 0.8%, 0.2%) categories.

As shown in Figure 1, the longitudinal progression of the presence or absence of bad dreams suggests an increasingly stable characteristic; of the 68.2% of children having bad dreams at 29 months, 82.0% still had them at 41 months, and, of these, 88.3% still had them at 50 months, 87.3% at 5 years, and 89.7% at 6 years. A similar pattern of increasing stability was obtained for children without bad dreams (31.8%, 54.0%, 64.2%, 72.1%, 78.7%; Figure 1). Finally, at any time point, the probability of having bad dreams, given their presence at the previous time



point, was usually greater than the probability of the absence of bad dreams; 87.3% of children with bad dreams at 50 months still had them at 5 years, whereas 12.7% no longer had them.

A similar pattern was observed for the longitudinal progressions of children with frequent bad dreams (*often+always*), compared with those with infrequent bad dreams (*never+sometimes*) (Supplement Figure S1). Few children had frequent bad dreams at 29 months (2.6%), and, at any given time point up to 6 years, a greater proportion of children having frequent bad dreams tended to remit, except for 3 cases. Similarly, children with infrequent bad dreams tended to remain in the same category at each time point between 29 months and 6 years.

Demographic Correlates of Bad Dreams at 29 Months

The ratios of the presence or absence of bad dreams remained similar from 29 months to 6 years for both boys and girls (χ^2 :

0.031 to 2.441, NS). The *bad-dream-consistent* (n=365) and *bad-dream-free* (n=59) groups also did not differ based on sex ($\chi^2 = 0.394$, ns). Additional demographic results appear in the Supplement.

Sleep-related Predictors of Bad Dreams

The 4 regression models explained 19%, 43%, 17%, and 32% of the total variance, respectively (Supplement, Table S2). They correctly classified 77.2%, 84.9%, 80.4%, and 82.0% of subjects overall and 87.8%, 90.8%, 94.5%, and 89.2% of subjects with bad dreams. Significant predictors are displayed in Table 3. At 41 and 50 months, the best predictor for bad dreams was having had bad dreams in the immediately preceding time period (odds ratio [OR]=6.80; 11.32). However, at 5 years and older, having had bad dreams early (29 months) was the best predictor (5 years: OR=4.17; 6 years: OR=3.50). Three parental practices concern-

Table 1—Sleep variables from the Self-Administered Questionnaire for the Mother

Question	Response choices	Age administered
In your opinion, does your child sleep undistracted through the night?	Yes/No	29 mo
In general, how many hours in a row does your child sleep at night?	< 4 h 4 - 5 h 5 - 6 h 6 - 7 h 7 - 8 h 8 - 9 h 9 - 10 h > 0 h	29 mo
In general, how long does it take to your child to go to sleep at night?	< 15 min 15 ≤ 30 min 30 ≤ 45 min 45 ≤ 60 min ≥ 60 min	All
On average, over the past month, how many times per night has your child woken up?	Does not wake up Less than once a night 1-2 times 3-4 times 5 times or more	All
Indicate how long in total he/she sleeps during the night (on average)	Continuous variable	All
Indicate how long in total he/she is awake during the night (on average)	Continuous variable	All
When you put your child to bed for the night, most often you...	Lull him/her to sleep before putting him/her down	29 mo
	Put him/her to bed awake and stay with him/her	41 mo
	Put him/her to bed awake and let him/her fall asleep on his/her own	50 mo
Does your child sleep with you?	Yes, generally: same bed	5 years
	Yes, generally: same room, but not same bed	6 years
	Sometimes	
	Never or exceptionally	
At the present time, when your child is healthy, what do you currently do when he/she wakes up at night?	You let him/her cry	29 mo
	You comfort him/her but leave him/her in his/her bed	50 mo
	You let him/her sleep in your bed	
	You give him/her something to eat or drink	
	You take him/her out of bed to comfort him/her	
	You do something else	
	Your child does not wake up at night	
Does your child have bad dreams?	Never	All
	Sometimes	
	Often	
	Always	

ing nocturnal awakenings were also predictive; all were protective factors: (1) comforting the child out of bed at 29 months (vs comforting in the child's bed) predicted a lower risk of bad dreams at 50 months (OR=0.18); (2) letting the child sleep in the

mother's (or parents') bed at 29 months predicted a lower risk of bad dreams at 5 years (OR=0.38); and (3) letting the child sleep in the mother's (or parents') bed at 41 months predicted a lower risk of bad dreams at 6 years (OR=0.31). The only parental

Table 2—Structure of Longitudinal Models for Predicting the Presence or Absence of Bad Dreams From Sleeplessness and Parental Practice Variables

Model	Bad dream measure	Predictor variables
1.	41 mo	29 mo
2.	50 mo	29, 41 mo
3.	5 y	29, 41, 50 mo
4.	6 y	29, 41, 50 mo, 5 y

practice concerning sleep onset was a risk factor: lulling the child before putting him or her to bed (vs putting child to bed awake to fall asleep on his or her own) predicted a higher risk of bad dreams at 6 years (OR=4.74). As shown in Table 3, only early parental behaviors (29 months and 41 months) predicted bad dreams in subsequent years. No sleeplessness-related variables predicted bad dreams.

Psychological Predictors of Bad Dreams at 29 Months

As shown in Table 4, logistic regression revealed that a higher mother's rating of the child's anxiety at 17 months was the best of 10 psychological predictors of bad dreams at 29 months (OR=1.21, 95% confidence interval [CI]: 1.07-1.37), followed by the father's rating (OR=1.18, 95%CI: 1.06-1.30). Mother's ratings of the child's difficult temperament at 5 months were associated with a small, but significant, increased risk of having bad dreams at 29 months (OR=1.11, 95%CI: 1.01-1.23).

As shown in Table 5, *bad-dream-consistent* children were rated by their mothers as having more difficult temperaments

at 5 months ($t_{420}=-2.12$, $P < 0.05$) and 17 months ($t_{420}=-2.65$, $P < 0.01$), as being more emotionally disturbed at 17 months ($t_{420}=-3.59$, $P < 0.01$) and as being more anxious at 17 months ($t_{420}=-4.90$, $P < .001$) than were *bad-dream-free* children. They were also rated by their fathers as more anxious at 17 months ($t_{377}=-3.97$, $P < 0.001$).

A post hoc binary logistic regression examining difficult-temperament items (as rated by the mother) at 5 months revealed that only the child's general level of difficulty predicted bad dreams at 29 months (OR=1.25, CI: 1.07-1.46, $P=0.005$). Other items concerning restlessness, ease of annoyance, or attention-getting and crying were not predictive. However, compared with *bad-dream-free* children, *bad-dream-consistent* children were (1) more frequently restless in a day at 5 months ($M=2.33/7$, $SD=0.877$ vs $M=2.05/7$, $SD=0.90$; $t_{422}=-2.311$, $P < 0.05$); (2) more likely to cry and be restless in general at 5 months ($M=2.21/7$, $SD=1.33$ vs $M=1.77/7$, $SD=1.05$; $t_{422}=-2.420$, $P < 0.05$); (3) more difficult to calm at 17 months ($M=2.50/7$, $SD=1.39$ vs $M=1.94/7$, $SD=1.10$; $t_{422}=-3.519$, $P=0.001$); and (4) more frequently restless in a day at 17 months (mean 2.59, $SD=0.95$ vs $M=2.17$, $SD=0.80$; $t_{422}=-3.686$, $P < 0.001$).

DISCUSSION

Epidemiology of Children's Bad Dreams

Counter to expectations from previous studies,^{3,5} having bad dreams *often* or *always* is relatively rare at any age between 29 months and 6 years, with rates ranging between 1.7% and 3.9% and a peak occurring at 41 months (3.9%). These values are

Table 3—Significant Predictors for the Presence or Absence of Bad Dreams by Sleep Variables at 41 Months, 50 Months, 5 Years and 6 Years

Model	Significant predictors	Regressor(s) statistics		
		Beta (S.E.)	Wald (df=1)	Exp(B) (95% CI)
1. Bad dreams at 41 months	Bad dreams at 29 mo	1.92 (0.20)	92.95***	6.80 (4.60-10.03)
2. Bad dreams at 50 months	Bad dreams at 29 mo	0.95 (0.35)	7.58**	2.59 (1.32-5.11)
	Parental attitude at 29 mo: when child awakens at night, take him/her out of bed to provide comfort ^a	-1.70 (0.45)	14.29***	0.18 (0.08-0.44)
	Bad dreams at 41 mo	2.43 (0.34)	50.15***	11.32 (5.79-22.17)
3. Bad dreams at 5 years	Bad dreams at 29 mo	1.43 (0.32)	20.43***	4.17 (2.24-7.74)
	Parental attitude at 29 mo: when child awakens at night, let him/her sleep in mother's bed ^a	-0.98 (0.36)	7.18**	0.38 (0.19-0.77)
4. Bad dreams at 6 years	Bad dreams at 29 mo	1.25 (0.39)	10.57**	3.50 (1.64-7.43)
	At 29 mo, lull the child before putting him/her to bed ^b	1.56 (0.54)	8.26**	4.74 (1.64-13.71)
	Parental attitude at 41 mo: when child awakens at night, let him/her sleep in mother's bed ^a	-1.17 (0.42)	7.68**	0.31 (0.14-0.71)

^aThe reference parental practice was "You comfort him/her but leave him/her in his/her bed."

^bThe reference parental practice was "Put him/her to bed awake and let him/her fall asleep on his/her own."

** $P < 0.01$; *** $P < 0.001$

Table 4—Significant Psychological Predictors of Bad Dreams at 29 Months Using Binary Logistic Regression

	Beta (S.E.)	Wald (df=1)	Exp(B) (95%CI)
Mother's rating of child's anxiety level at 17 mo	0.20 (0.063)	9.39**	1.21 (1.07-1.37)
Father's rating of child's anxiety level at 17 mo	0.16 (0.052)	9.88**	1.18 (1.06-1.30)
Mother's rating of child's difficult temperament at 5 mo	0.10 (0.051)	4.22*	1.11 (1.01-1.23)

*P < 0.05 ; **P < 0.01 ; ***P < 0.001

Final model statistics: 2 log likelihood = 980.11; Omnibus $\chi^2(3) = 34.67$, P < 0.001 ; Nagelkerke R² = 0.06.

Table 5—Comparison of *Bad-Dream-Free* (Never Had Bad Dreams Between 29 Months and 6 Years) and *Bad-Dream-Consistent* (Always Had Bad Dreams Between 29 Months and 6 y) Children on Psychological Variables Using Independent Sample *t* Tests.

Variable	Group (n)	Mean (SD)	t value (df)
Mother's rating of child's difficult temperament at 5 mo	<i>Bad-dream-free</i> (59)	2.38 (1.63)	-2.12 (420)*
	<i>Bad-dream-consistent</i> (364)	2.87 (1.68)	
Mother's rating of child's difficult temperament at 17 mo	<i>Bad-dream-free</i> (59)	2.00 (1.41)	-2.65 (420)**
	<i>Bad-dream-consistent</i> (364)	2.55 (1.51)	
Father's rating of child's difficult temperament at 5 mo	<i>Bad-dream-free</i> (58)	2.81 (1.37)	-0.84 (385)
	<i>Bad-dream-consistent</i> (329)	2.99 (1.52)	
Father's rating of child's difficult temperament at 17 mo	<i>Bad-dream-free</i> (55)	3.12 (1.68)	-0.60 (376)
	<i>Bad-dream-consistent</i> (323)	3.13 (1.46)	
Mother's rating of child's emotional disorder at 17 mo	<i>Bad-dream-free</i> (59)	0.60 (0.76)	-3.59 (420)**
	<i>Bad-dream-consistent</i> (364)	1.01 (1.06)	
Mother's rating of child's anxiety level at 17 mo	<i>Bad-dream-free</i> (59)	0.71 (0.89)	-4.90 (420)***
	<i>Bad-dream-consistent</i> (364)	1.40 (1.49)	
Mother's rating of child's separation anxiety at 17 mo	<i>Bad-dream-free</i> (59)	2.54 (2.17)	-0.41 (422)
	<i>Bad-dream-consistent</i> (365)	2.67 (2.16)	
Father's rating of child's emotional disorder at 17 mo	<i>Bad-dream-free</i> (56)	0.70 (1.11)	-0.42 (381)
	<i>Bad-dream-consistent</i> (327)	0.78 (1.21)	
Father's rating of child's anxiety level at 17 mo	<i>Bad-dream-free</i> (55)	0.72 (1.29)	-3.97 (377)***
	<i>Bad-dream-consistent</i> (324)	1.50 (1.67)	
Father's rating of child's separation anxiety at 17 mo	<i>Bad-dream-free</i> (55)	3.07 (2.74)	0.08 (377)
	<i>Bad-dream-consistent</i> (324)	3.04 (2.23)	

*P < 0.05 ; **P < 0.01 ; ***P < 0.001

much lower than the 13.5% (at least once per week) reported in the only available comparison study.⁵ This discrepancy might be due to methodologic differences such as our choice of response scale, sample size, and reduction of overestimation biases (see Supplement). Moreover, since our estimates are based on questions using the term *bad dream*, which is more general and inclusive than *nightmare*, nightmare prevalence among very young children may be even lower than what we found. Nonetheless, a limitation of the current methodology is our use of a single recall item with generic response anchors. It is also possible that some mothers unknowingly included sleep terrors in their estimates of bad dreams, since the 2 phenomena can be confused.

Having bad dreams, regardless of frequency, is a relatively stable characteristic and becomes even more stable over time. At any age, more than 80% of children having bad dreams will continue to have them the following year. The rate of spontaneous cessation is relatively low; the presence of bad dreams in our study increased from an 82% overlap for ages 29 to 41 months to an 89.7% overlap for ages 5 to 6 years. This relative stability parallels findings for sleeplessness in children under 2 years of age,^{29,30} as well as findings for adults' bad dreams. In the latter case, bad dreams persisted for more than 1 year

in 87% of subjects and for more than 5 years in 47%.³¹ Our slightly lower 5-year persistence rate (38.7%) might indicate that the tendency for bad dreams to increase in stability over time continues through adolescence and adulthood. That bad dreams are stable from a very young age raises the possibility that early treatment, especially among children distressed by their dreams, could avert more serious and longer-lasting suffering. On the other hand, because a majority of the frequent (*often+always*) bad dream group spontaneously remits, such treatment should be based upon additional tests confirming the presence of bad dream-related distress.

Finally, the finding that having bad dreams infrequently (*never+sometimes*) is also a relatively stable characteristic raises the possibility of identifying protective factors against developing problems with bad dreams. Some predictors, primarily demographic characteristics and parental practices, appear to reflect such protective factors.

Demographic Correlates of Bad Dreams

Several findings either replicate prior findings or suggest new unexpected relationships for further study. The absence of

sex differences, even when comparing *bad-dream-consistent* and *bad-dream-free* children, replicates previous findings for preadolescents; at adolescence, bad dreams become more prevalent among girls.^{3,9} Other demographic variables are discussed in the Supplement.

Sleep Predictors of Children's Bad Dreams

Little evidence related bad dreams to sleeplessness symptoms. The strongest predictor of bad dreams at every time point up to 5 years, independent of their frequency, was having bad dreams at the preceding time point. After 5 years, having had bad dreams at even younger ages (29 months) was more predictive. It is possible that a propensity for bad dreams that was preexistent since 29 months is only expressed at 5 to 6 years in reaction to higher levels of stress and challenge at this age, e.g., starting kindergarten. According to such a diathesis-stress view,²⁵ a child manifesting bad dreams at 29 months may retain heightened vulnerability to future stress until later years.

Some parental practices related to the child's nocturnal awakenings may mitigate this vulnerability. One practice assessed at 29 months (*after awakening, take child out of bed to provide comfort*) predicted a lower risk for bad dreams at 50 months, whereas reactive cosleeping (*after awakening, let him/her sleep in parental bed*) assessed at both 29 months and 41 months predicted a lower risk at 5 and 6 years, respectively. On the other hand, 1 sleep-onset practice assessed at 29 months (*lull the child before putting him/her to bed*) predicted a higher risk at 6 years. This is consistent with studies of sleeplessness in which behaviors favoring dependency at sleep onset put the child at greater risk of developing sleep disturbances.^{1,22-24} Thus, practices favoring dependency at sleep onset may interfere with the development of self-soothing and emotional security that could buffer the child against a vulnerability to bad dreams, whereas practices favoring dependency after a child has awakened at night might encourage such development.

Contrary to expectations, sleeplessness did not predict bad dreams at any age. This may indicate that relationships between bad dreams or nightmares and sleeplessness or insomnia among adults arise only later in development. Or, it might reflect differences in the nature of sleep disturbances and sleeplessness in adults and children.

Psychological Predictors of Bad Dreams at 29 Months

That bad dreams appearing at 29 months remain a relatively stable characteristic up to age 6 years underlines the importance of identifying which prior factors predict them at 29 months. The hypothesis that children with difficult temperaments are at risk for having bad dreams at 29 months was confirmed for mothers' ratings at 5 months but not at 17 months. However, *bad-dream-consistent* children had more difficult temperaments at both 5 months and 17 months than did *bad-dream-free* children. These results parallel findings of sleep problems in infants under 2 years of age that are explained, in part, by ratings of difficult temperament.^{24,27} The fact that mothers', but not fathers', temperament ratings predicted bad dreams converges with findings from another study in which parents' temperament ratings differed.³²

Group temperament differences observed at 5 months may reflect early differences in anxiety or distress. *Bad-dream-consistent* children were reported by mothers to be more frequently restless at 5 and 17 months, to cry more at 5 months, and to calm down less easily at 17 months. These items reflect a certain nervousness in children that could reflect an anxious or distressed temperament. Similarly, emotional disorder at 17 months, which predicted inclusion in the *bad-dream-consistent* group, contains some anxiety items and likely measures general distress. Thus, difficult temperament at 5 months may presage anxiety indicators at 17 months. The latter were more salient predictors of bad dreams at 29 months in that increased risk was predicted by both mothers' and fathers' anxiety ratings; mothers' and fathers' anxiety ratings also distinguished the *bad-dream-consistent* and *bad-dream-free* groups. If these findings withstand replication, they will support the suggestion that pathologic symptoms appearing as early as 5 months constitute a precocious sign of risk for developing chronic distressing bad dreams.

These results therefore support the suggestion that young children who develop chronic bad dreams are similar to adult nightmare sufferers, for whom links with general distress and emotional psychopathology are well established (see review³³). They also support diathesis-stress models of disturbing dream development and experimental psychopathology more generally.³⁴ Carefully targeted treatments of early anxiety symptoms (at 5-17 months), as well as promotion of early, protective parental practices (at 29-41 months) may thus help prevent a cascade of changes leading, over the years, to bad dreams, nightmares, and associated psychopathologies.

REFERENCES

1. Touchette E, Petit D, Paquet J, et al. Factors associated with fragmented sleep at night across early childhood. *Arch Pediatr Adolesc Med* 2005;159:242-49.
2. Blagrove M, Haywood S. Evaluating the awakening criterion in the definition of nightmares: how certain are people in judging whether a nightmare woke them up? *J Sleep Res* 2006;15:117-24.
3. Muris P, Merckelbach H, Gadet B, Moulart V. Fears, worries, and scary dreams in 4- to 12-year-old children: their content, developmental pattern, and origins. *J Clin Child Psychol* 2000;29:43-52.
4. Zadra A, Donderi DC. Nightmares and bad dreams: their prevalence and relationship to well-being. *J Abn Psychol* 2000;109:273-81.
5. Hawkins C, Williams TI. Nightmares, life events and behaviour problems in preschool children. *Child Care Health Dev* 1992;18:117-28.
6. Salzarulo P, Chevalier A. Sleep problems in children and their relationship with early disturbances of the waking-sleeping rhythms. *Sleep* 1983;6:47-51.
7. Simonds JF, Parraga H. Prevalence of sleep disorders and sleep behaviors in children and adolescents. *J Am Acad Child Adolesc Psychiatry* 1982;21:383-88.
8. Fisher BE, Wilson AE. Selected sleep disturbances in school children reported by parents: prevalence, interrelationships, behavioral correlates and parental attributions. *Percept Mot Skills* 1987;64:1147-57.
9. Nielsen TA, Laberge L, Tremblay R, Vitaro F, Montplaisir J. Development of disturbing dreams during adolescence and their relationship to anxiety symptoms. *Sleep* 2000;23:727-36.
10. Besiroglu L, Agargun MY, Inci R. Nightmares and terminal in-

- somnia in depressed patients with and without melancholic features. *Psychiatr Res* 2005;133:285-87.
11. Ohayon MM, Morselli PL, Guilleminault C. Prevalence of nightmares and their relationship to psychopathology and daytime functioning in insomnia subjects. *Sleep* 1997;20:340-348.
 12. Kales A, Caldwell AB, Soldatos CR, Bixler EO, Kales JD. Biopsychobehavioral correlates of insomnia. II. Pattern specificity and consistency with the Minnesota Multiphasic Personality Inventory. *Psychosom Med* 1983;45:341-56.
 13. Levin R, Fireman G. Nightmare prevalence, nightmare distress, and self-reported psychological disturbance. *Sleep* 2002;25:205-12.
 14. Fujino Y, Mizoue T, Tokui N, Yoshimura T. Prospective cohort study of stress, life satisfaction, self-rated health, insomnia, and suicide death in Japan. *Suicide Life Threat Behav* 2005;35:227-37.
 15. Liu X. Sleep and adolescent suicidal behavior. *Sleep* 2004;27:1351-58.
 16. Tanskanen A, Tuomilehto J, Viinamaki H, Vartiainen E, Lehtonen J, Puska P. Nightmares as predictors of suicide. *Sleep* 2001;24:845-48.
 17. Köthe M, Pietrowsky R. Behavioral effects of nightmares and their correlations to personality patterns. *Dreaming* 2001;11:43-52.
 18. Morin A, Blais F, Savard J. Are changes in beliefs and attitudes about sleep related to sleep improvements in the treatment of insomnia? *Behav Res Ther* 2002;40:741-52.
 19. Crowell J, Keener M, Ginsburg N, Anders T. Sleep habits in toddlers 18 to 36 months old. *J Am Acad Child Adolesc Psychiatry* 1987;26:510-515.
 20. Lozoff B, Wolf AW, Davis NS. Cosleeping in urban families with young children in the United States. *Pediatrics* 1984;74:171-82.
 21. Adair R, Bauchner H, Philipp B, Levenson S, Zuckerman B. Night waking during infancy: role of parental presence at bedtime. *Pediatrics* 1991;87:500-504.
 22. Anders TF, Halpern LF, Hua J. Sleeping through the night: a developmental perspective. *Pediatrics* 1992;90:554-60.
 23. Morrell J, Cortina-Borja M. The developmental change in strategies parents employ to settle young children to sleep, and their relationship to infant sleeping problems, as assessed by a new questionnaire: the Parental Interactive Bedtime Behavior Scale. *Infant Child Dev* 2002;11:17-41.
 24. Morrell J, Steele H. The role of attachment security, temperament, maternal perception, and care-giving behavior in persistent infant sleeping problems. *Infant Ment Health J* 2003;24:447-68.
 25. Levin R, Nielsen TA. Disturbing dreams, PTSD and affect distress: a review and neurocognitive model. *Psychol Bull* 2007;133:529-32.
 26. Mindell JA, Barrett KM. Nightmares and anxiety in elementary-aged children: is there a relationship? *Child Care Health Dev* 2002;28:317-22.
 27. Sadeh A, Anders TF. Infant sleep problems: origins, assessment, interventions. *Infant Ment Health J* 1993;14:17-34.
 28. Petit D, Touchette E, Paquet J, Montplaisir J. The Quebec Longitudinal Study of Child Development (QLSCD 1998-2002) from birth to 29 months. Sleep: development and associated factors vol.2. Québec City: Quebec Institute of Statistics; 2002.
 29. Richman N, Stevenson J, Graham P. *Preschool to school: a behavioral study*. London: Academic Press; 1982.
 30. Zuckerman B, Stevenson J, Baily V. Sleep problems in early childhood: predictive factors and behavioral correlates. *Pediatrics* 1987;80:664-71.
 31. Bixler EO, Kales A, Soldatos CR, Kales JD, Healy S. Prevalence of sleep disorders in the Los Angeles metropolitan area. *Am J Psychiatr* 1979;136:1257-62.
 32. Keener MA, Zeanah CH, Anders TS. Infant temperament, sleep organization, and nighttime parental interventions. *Pediatrics* 1988;81:762-71.
 33. Nielsen T, Levin R. Nightmares: a new neurocognitive model. *Sleep Med Rev* 2007;11:295-310.
 34. Mineka S, Zimbarg R. A contemporary learning theory perspective on the etiology of anxiety disorders: it's not what you thought it was. *Am Psychol* 2006;61:10-26.