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ORIGINAL CONTRIBUTION

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Factors affecting nightmares in children: parents' vs. children's ratings

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Abstract *Objective* The present study investigated the relationship between daytime symptomatology and nightmare frequency in school-aged children by eliciting daytime symptoms and nightmare frequency from children directly in addition to questionnaires completed by their parents. *Methods* A sample of 4,834 parents and 4,531 of their children (age range: 8–11 years) completed each a sleep questionnaire and the strengths and difficulties questionnaire (SDQ). *Results* The results of the study clearly indicate that there is an underestimation of nightmare frequency in the parents' ratings compared to the children's data (effect size: $d = 0.30$) and the closeness between influencing factors and nightmare frequency is considerably higher for the data based on the children's responses; the proportion of explained variance was twice as high. *Conclusions* Therefore, it seems important for research and clinical practice to not to rely on parents' information but to ask the children about the occurrence of nightmares.

Key words nightmares – children

Introduction

Nightmares are defined as dreams with strong negative emotions which awaken the dreamer and that are vividly recalled upon awakening [4]. They are common during childhood; 70–90% of young adults reported that they experienced nightmares at some time during their childhood [8, 33].

The frequency of children suffering from nightmares (often used cutoff: once a week or more) is estimated as being as much as 5% (overview: [34]). Many large-scaled surveys [3, 30, 36, 41] are based on questionnaires or interviews completed by the child's parents. Several studies [17, 23, 24, 26–28], however, reported a marked underestimation of nightmare occurrence in the parents' responses in comparison to the answers of the child, so that epidemiological studies based on data obtained from the parents have to be interpreted with caution. Lapouse and Monk [17], for example, reported an exact agreement for the occurrence of nightmares of 54%, in 17% the parents'

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responses were positive and the children's responses negative and 30% of the children reported having nightmares whereas the parents indicated no nightmares. Muris et al. [24] carrying out interviews with children aged 4–12 and their parents separately reported that the agreement is quite good in the youngest age group (4–6 years) but considerable underestimation was present in the older children. For nightmares this seems plausible since nightmares do not occur in a setting supervised by the parents (own bedroom, second half of the night) and the majority of children in the age group of 10–16 years reported in a study that they try to forget the bad dream and did not talk about it with her/his parents [35].

The common model in the etiology of nightmares implies an interaction between disposition (genetic factors; [16]; personality; [15]; trait anxiety, [23]) and acute stressors [31] and trauma (kidnapping: [38, 39]; war experiences: [40]; natural disasters: [7]; severe burns: [37]). Most of the studies investigating the relationship between trait anxiety or psychopathological symptoms, however, are based on data obtained from the parents (cf. [1, 2, 6, 20–22, 25]). Mindell and Barrett [23], for example, demonstrated that the relationship between trait anxiety and nightmare frequency was only present in the data reported by the children but not in the data reported by the parents; a finding that might be associated with the underestimation of nightmare occurrence in parents.

The present study investigated the relationship between daytime symptomatology and nightmare frequency in school-aged children by eliciting daytime symptoms and nightmare frequency from the children directly in addition to questionnaires completed by parents. First, an underestimation of nightmare frequency by parents was expected. Secondly, it was predicted that the relationship between nightmare frequency and daytime symptomatology is more pronounced in the data obtained from the children than within the dataset obtained from the parents.

Method

Participants

Overall, 8,599 children of the forth grade in all schools of the city of Cologne (with the exception of two schools ($N = 74$) and their parents were asked to participate in the present study. 4,834 parents responded; the response rate was 56%. The mean age of the total sample was 9.49 ± 0.61 years (range: 8–11 years). The small difference in the mean age of boys ($N = 2{,}318$) and girls ($N = 2{,}516$) was statistically significant (9.50 ± 0.62 [boys] vs. 9.46 ± 0.60 [girls], $t = 4.1$, $P < 0.0001$). 303 children did not complete their questionnaires. i.e., in 4,531 cases data from parents and their respective child were available for analyses.

Materials

Sleep questionnaire (parents and child version)

For the purpose of the study, a sleep questionnaire for children (28 items) and a parental questionnaire (33 items) were developed. The items followed a three-point format (1 = not present, 2 = sometimes, 3 = often). Several areas concerning sleep and related-waking behavior were elicited. Nightmare frequency was measured as follows: "I have nightmares." and "My child has nightmares that she/he remembers." Other items measure problems at sleep onset, problems of maintaining sleep, watching TV prior to bedtime, night terrors and sleep walking (the latter two only in the parents), playing computer games prior to bedtime (only child version), stress in the family. Night terrors were defined as sudden cries during the night and without recollection of the event by the child.

Strengths and difficulties questionnaire SDQ (parents and child version)

Both versions of the instrument consisted of five 5-items subscales that assess conduct problems (e.g., often lies or cheats), hyperactivity-inattention (e.g., constantly fidgets and squirms), emotional symptoms (e.g., nervously clingy in new situations), peer problems (e.g., rather solitary, tends to play alone), and prosocial behavior (e.g., considerate of other people's feelings; [13, 14]). A three-point response format was used to record respondents' level of agreement that the item described the child's behavior of the past 6 months. Scores are allocated on the basis of 0 for items checked as being "not true", 1 for items checked as being "somewhat true," and 2 for items checked as "certainly true." A small number of negatively worded items were reverse scored. Each of the five subscales is obtained by adding the responses to the constituent items (range: 0–10), and a total difficulties score (range 0–40) is obtained by adding the scores for all but the prosocial subscale. Reliability coefficients for the total score and the subscales were high: internal consistency coefficients ranged from $r = 0.60$ to $r = 0.87$ and retest reliabilities (4–6 months retest interval) were also within that range

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from $r = 0.51$ to $r = 0.80$ [14]. The fairly high inter-informant correlations (teacher, child, parent, other children) ranging from $r = 0.30$ to $r = 0.43$ suggest that the SDQ is a sound measurement instrument [19].

Design and procedure

In all schools of Cologne (school type "Grundschule"), teachers distributed the information, written consent forms, and the questionnaires to the children of the fourth grade. The questionnaires (coded with identical numbers) were completed by the child and his/her parents separately at home and returned to the teacher.

The questionnaire data were coded and analyzed with the statistical software package SAS for Windows 8.02. The rating scales were analyzed by nonparametrical methods (Sign Rank test and Spearman Rank correlations) given the three-point ordinal nightmare scale. One-tailed tests were applied if the hypothesis was directed. Effect sizes based on formula given in Rosenthal [29] were calculated because in large samples even very small effects reach statistical significance and the effect size is independent from sample size and, thus, comparable to other findings.

Results

Nightmare frequency

About 2.3% of the parents indicated that their child often has nightmares, whereas about 26.9% checked the "sometimes" category (Table 1). For the children's ratings, the values are higher: 3.5% of the sample stated that nightmares occur often and 40% stated that they occur sometimes. The difference between the two measures was statistically significant (Sign Rank test: $S = 213550.5$, $P < 0.0001$). The effect size for the difference in percentages concerning the often category (3.5% vs. 2.3%) amounted to $d = 0.07$; for the collapsed data (sometimes and often) the difference (43.5% vs. 29.2%) the effect size was $d = 0.30$. The intercorralation between the items was fairly high ($r = 0.474$, $P < 0.0001$). For comparison, the intercorrelation coefficients for the SDQ subscales varied between $r = 0.535$ (prosocial behavior) and $r = 0.704$ (hyperactivity).

In order to study the possible effect of occurrence of night terrors on the discrepancy between parental data and children's data regarding nightmare frequency, the night terror ratings of the group with parental ratings lower than the children's ratings regarding nightmare frequency (night terrors: often: 0.82%, sometimes: 6.39%, not present: 92.78%, $N = 970$) were compared to the rest of the group (night terrors: often: 0.70%, sometimes: 4.50%, not present: 94.80%; $N = 3{,}848$). The difference was significant ($\chi^2 = 6.2$, $P = 0.0449$, effect size: $d = 0.089$), i.e., in cases children reported nightmares whereas the parents did not, parents significantly more often reported that their children had night terrors.

Table 1 Nightmare occurrence

Children	Not present	Sometimes	Often	Total
Parents				
Not present	50% (2,264)	18.9% (850)	1.4% (62)	70.9% (3,176)
Sometimes	5.2% (235)	20.3% (908)	1.4% (62)	26.8% (1205)
Often	0.5% (21)	1.1% (47)	0.8% (34)	2.3% (102)
Total	56.2% (2520)	40.3% (1805)	3.5% (158)	100% (4483)

Spearman rank correlation: $r = 0.474$ ($P < 0.0001$)

Correlations with nightmare occurrence

For both measures, nightmares occurred slightly more often in girls than in boys (parents' ratings: often: 2.7%, sometimes: 29.0%, not present: 68.3% [girls] vs. often: 2.3%, sometimes: 25.2%, not present: 72.5% [boys], $z = 4.1$, $P = 0.0015$; children's ratings: often: 4.0%, sometimes: 41.9%, not present: 54.1% [girls] vs. often: 3.1%, sometimes: 38.7%, not present: 58.3% [boys], $z = 3.0$, $P = 0.0030$).

Problems falling asleep, problems maintaining sleep and other parasomnias like sleepwalking and night terrors were significantly associated with the occurrence of nightmares (see Table 2). Sleep problems were significantly closer associated for the children's data in comparison to the data obtained by parents. All four problem scores and the total score of the strength and difficulties questionnaire (SDQ) were positively related to nightmare occurrence (see Table 2). Again, the associations were stronger for the

Table 2 Correlations with nightmare occurrence

Variable	Parents	Children	Statistical test[a]
Sleep variables			
Problems falling asleep	0.176***	0.302***	$z = -7.5$, $P < 0.0001$
Problems maintaining sleep	0.194***	0.314***	$z = -6.5$, $P < 0.0001$
Night terrors	0.143***	–	–
Sleepwalking	0.089***	–	–
SDQ Scales			
Emotional symptoms	0.218***	0.345***	$z = -7.7$, $P < 0.0001$
Hyperactivity-inattention	0.063***	0.169***	$z = -6.2$, $P < 0.0001$
Conduct problems	0.106***	0.208***	$z = -5.3$, $P < 0.0001$
Peer problems	0.126***	0.186***	$z = -3.7$, $P < 0.0001$
Prosocial behavior	0.004	−0.059***	$z = 3.4$, $P < 0.0001$
Total score	0.167***	0.308***	$z = -8.8$, $P < 0.0001$

***$P < 0.0001$ (Spearman rank correlations)
[a]Comparing the magnitude of the correlation coefficients

Table 3 Logistic regression (cumulative logit model) for nightmare occurrence

Variable	Parents		Children	
	Standard estimate	χ^2 test, Probability	Standard estimate	χ^2 test, Probability
SDQ scales				
Emotional symptoms	0.263	175.2, $P < 0.0001$	0.370	315.6, $P < 0.0001$
Hyperactivity-inattention	−0.059	7.9, $P = 0.0049$	0.003	0.0, $P = 0.8860$
Conduct problems	0.067	9.6, $P = 0.0019$	0.096	21.1, $P < 0.0001$
Peer problems	0.055	7.8, $P = 0.0053$	0.050	6.4, $P = 0.0116$
Prosocial behavior	0.075	13.9, $P = 0.0002$	0.012	0.4, $P = 0.5244$
R^2 (max. rescaled)	0.0775		0.1623	

children's ratings. Prosocial behavior was not correlated with nightmare occurrence (parents' data) but negatively for the children's data.

Logistic regression for nightmare occurrence

Due to the format of the nightmare scale (three-point ordinal format) logistic regressions have been computed. The proportion of explained variance for the parents' data was 7.75%, with significant effects of all five SDQ subscores. The model for the children's data yielded a higher proportion of explained variance (16.23%), with significant effects of the emotional symptoms score, the conduct problems score and the peer problems score (Table 3).

Discussion

The results of the study clearly indicate that there is an underestimation of nightmare frequency in the parents' ratings compared to the children's data and the closeness between influencing factors and nightmare frequency is considerably higher for the data based on the children's responses.

First, the difference between parents' and children's estimates regarding the occurrence of nightmares was of small to medium effect size (often category: $d = 0.07$ and often and sometimes combined: $d = 0.30$). For the prevalence rates, the often category was 50% more often reported by children than by parents (3.5% vs. 2.3%), so that large-scaled surveys based solely on parents' data clearly underestimate the occurrence of nightmares in children.

The absolute prevalence rates obtained in this study lies within the range of figures reported in the literature, nevertheless immediate comparison to other studies is not possible because each study used different definitions of nightmares, for example, [3] applied the complete criteria of the nightmare disorder of the DSM IV [4]. In addition, answering categories differed across the studies: In this study sometimes/often were presented to the participants whereas in the Simonds and Parraga [36] study the cutoff was once a week. A topic discussed in the recent literature is the awakening criterion in the definition of nightmares [5], i.e., whether the dreamer explicitly states that he/she wakes up because of the dream. It is still debated whether nightmares with awakening differ regarding their correlations with waking-life variables from bad dreams (disturbing dreams without awakening, cf. [5, 43]). This research, however, was limited to adults only. Interestingly, Schredl and Pallmer [35] asking for the most recent bad dream obtained many reports of typical nightmares (falling, being chased) where the dream action is terminated by awakening, e.g., by waking up before touching the ground or before the persecutor is reaching the dreamer. One might speculate that the terms nightmare/bad dream/disturbing dream are somewhat interchangeable, at least in children studies. For comparing results from epidemiological studies, however, it will be necessary to use standard criteria for the definition of nightmares (vivid, good recall upon awakening, mostly in the second half of the night) and comparable answering categories (e.g., once a week etc.).

Since the items were slightly differently worded (parental questionnaire included "that she/he remembers"), it was studied whether the child might overestimate nightmare frequency due to mistaken night terrors for nightmares (which could only have happened if the parents or other family members told the child about the night terrors because the child itself is amnesic for the attacks in most of the cases, cf., [9]). There was a small but significant effect, i.e. parents who underestimate the nightmare frequency in comparison to their child more often reported night terrors. But the small effect size ($d = 0.089$) and the small difference in percentages between the two groups of parents (underestimating vs. others) can only partly explain the difference between children's and parents' responses because the difference in nightmare ratings is larger ($d = 0.30$).

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On the other hand, it might be an alternative explanation that children tend to overestimated the occurrence of nightmares due to, for example, being susceptible to a recent very vivid nightmare or an affirmative response bias for the positively formulated questionnaire items. Based on the findings of Schredl and Pallmer [35] that children in this age group often do not talk about their nightmares, it seems plausible that the lower prevalence rates reported by parents might be a consequence of the child's reluctance to report nightmares. This line of thinking is supported by the SDQ data provided by Mellor [19]. He reported that parent-child discrepancies were minimal for the hyperactivity scale but considerably high for the emotional symptom scores (with parents' rating being lower on average). One might hypothesize that "internal" symptoms might be underestimated by parents if the children don't talk about them but this is not the case for observable behavior like hyperactivity (the highest parent-child intercorrelation in this study was found for the hyperactivity subscale). Therefore, it seems important for research as well as clinical practice (cf. [12]) not to rely only on information obtained from parents but to ask the children about the occurrence of nightmares directly.

As reported in previous studies, nightmare frequency was related to the occurrence of other parasomnias (e.g., [11, 32]), sleep problems (e.g., [10, 27]) and waking-life psychopathology (see introduction). The highest correlation was found for the emotional problems score of the SDQ which encompasses the occurrence of headaches, worries, anxieties and being unhappy and nervous. Comparing sizes of correlation coefficients and the coefficients derived from the logistic regression, the emotion symptoms subscale yielded substantial effect whereas the other factors are of minor importance despite their statistical significance due to large sample size. Expanding the research in adults (e.g., [18, 31]), it would be interesting to study whether factors like fantasy proneness, psychological absorption, dysphoric imaginative involvement, everyday stress is also related to nightmare frequency in children.

Although the overall pattern of influencing factors was fairly similar, the correlation coefficients for the factors were significant larger for the children's ratings compared to the coefficients based on the parents' data; the proportion of explained variance (logistic regressions) was twice as high (16.23% vs. 7.75%). This underlines the importance of using children's data in research regarding nightmare etiology. Overall, more research is needed looking into the discrepancies between children's and parents' ratings regarding the occurrence of nightmares in order to support the hypothesis of Schredl and Pallmer [35] that non-reporting is the major underlying factor in the parental underestimation. This might also play a role in other sleep complaints (the data regarding sleep disorders of this sample are presented elsewhere [42]). One might also speculate that the child's estimates of nightmare frequency or daytime behavior might be biased or deficient, which means that more sophisticated methods of eliciting these variables are necessary, e.g., interviews or sleep diaries.

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