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Children's separation anxiety and nightmare frequency, distress, and separation-related content

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Abstract

Repeated nightmares involving separation are a DSM-5 symptom criterion for separation anxiety disorder. However, research on nightmares and separation anxiety in clinical or non-clinical samples is scarce. To verify whether children's separation anxiety predicted nightmares' characteristics (frequency, distress and separation-related content), we conducted an online survey among 237 mothers of a 4- to 12-year-old child. Children's separation anxiety as assessed by a modified version of the Separation Anxiety Symptoms Inventory predicted frequent nightmares and bad dreams, dreaming of the parents' death (odds ratio [OR] = 2.65 [1.41, 4.98]) or of any separation theme (OR = 5.97 [2.64, 13.50]) during the last year, and dysphoric dream distress. The association between children's separation anxiety and dysphoric dream distress was mediated by dysphoric dream frequency. Our findings suggest that dysphoric dream distress may be a better marker of separation anxiety compared with frequency. Future studies in clinical samples are needed to determine whether the DSM-5 nightmare symptom criterion should be reviewed to emphasize the occurrence of any type of dysphoric dreams (bad dreams and nightmares), the presence of distress in relation to these dreams, and their specific content.

Keywords Separation anxiety · Nightmares · Bad dreams · Dream content · Child

Separation anxiety disorder (SAD), which is characterized by the excessive fear of separation from loved ones, is one of the most common anxiety disorders in childhood and adolescence. Its prevalence ranges from 4.1 to 7.7% before age 18 (Shearet al., 2006; Kessler et al., 2012; Spence et al., 2018). Retrospective assessment of SAD among adults suggests a median age of onset in the late teen years (Kessler et al., 2012; Silove et al., 2015). However, a prospective Australian study revealed an increased prevalence among children (4–11 years) compared with adolescents (12–17 years; Spence et al., 2018). Childhood onset SAD is associated with comorbidities, mainly anxiety and mood disorders, family dysfunction and with an increased risk of separation, divorce or not being married in adulthood (Shear et al., 2006; Spence et al., 2018).

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According to the DSM-5 (American Psychiatric Association, 2013), the diagnosis of SAD requires meeting three out of eight symptom criteria, including excessive distress, worries or fears regarding the experience or anticipation of separation from attachment figures, and repeated nightmares involving the theme of separation. In addition, for SAD to be diagnosed, the symptoms must be persistent (> 4 weeks in children), cause clinically significant distress, and not be better explained by another mental disorder. Per DSM-5 criteria, SAD can be diagnosed at any age from childhood through adulthood, whereas DSM-IV-TR required an age of onset before 18 (American Psychiatric Association, 2000). Aside from this modification, the diagnostic criteria remained largely unchanged from DSM-IV-TR to DSM-5, and the wording of Criterion A7 on "repeated nightmares involving the theme of separation" remained the same.

Research on nightmares among children with SAD is scarce. One study used a diagnostic interview for children and parents based on DSM-IV-TR to examine the prevalence of SAD symptom criteria and revealed that repeated nightmares involving the theme of separation were the least frequently endorsed by parents (11.5%) and children (7.2%; Allen et al., 2010). Although all children in this study (n = 106) had a diagnosis of SAD, they were recruited in the community. Another study investigated the diagnostic utility of

SAD symptom criteria among children and adolescents from an outpatient center for emotional disorders, using a validated structured interview (Cooper-Vince et al., 2014). Repeated nightmares regarding separation were reported by 28.1% of youths diagnosed with SAD and 34.5% of parents. Nightmares about separation exhibited the highest threshold value of all symptom criteria, i.e., nightmares required the highest level of SAD severity to have a 50% chance of being endorsed (Cooper-Vince et al., 2014).

These studies' findings suggest that repeated nightmares involving separation are not highly prevalent among children and adolescents with SAD and may be associated with increased severity of the disorder. However, studies based on diagnostic interviews may underestimate the real prevalence of this type of nightmares, in which separation may be represented implicitly rather than explicitly. For instance, nightmares of being alone and lost imply separation from the attachment figures, although it does not depict separation per se. Therefore, parents and children may not think of these nightmares as involving separation and not report it as a symptom of SAD. In addition, because the DSM does not define nightmares in the section on SAD, it is possible that the interviewer's or interviewees' own definitions are too restrictive (e.g., involving very intense fear, provoking awakening). Although some authors differentiate nightmares from bad dreams based on an awakening criterion (Zadra & Donderi, 2000), nightmares may be broadly defined as dreams that include any type of intense negative emotions, which are also labeled dysphoric dreams in DSM-5's section on Nightmare Disorder (APA, 2013).

Indirect evidence of an association between separation anxiety and nightmares of separation is found in studies that assessed dream content in relation to abandonment fears. The intensity of the abandonment and instability early maladaptive schema (Young et al., 2003) predicted the presence of the same schema in the most recent dreams of 141 adult women (Simard et al., 2018), suggesting that abandonment fears in the waking life are represented in dream content. Based on the hypothesis that rapid eye movement sleep and dreaming serve to promote attachment (Zborowski & McNamara, 1998), several studies investigated the relationship between attachment and dream content. The results from these studies suggest that the abandonment anxiety dimension of adult attachment, which is defined as intense interpersonal needs to be close, accepted, supported and reassured (Shaver & Mikulincer, 2002), is associated with negative dream emotions (Sándor et al., 2018; Selterman & Drigotas, 2009) and feeling less safe in dreams (Contelmo et al., 2013). It also predicted wishes for interpersonal proximity or closeness, i.e., wishes to be loved, respected, understood, accepted, liked, and closed to others, in dream content (Mikulincer et al., 2011). Overall, these results suggest that waking life abandonment fears and preoccupations are also expressed during the dreaming state. Assuming that individuals with SAD have abandonment fears, their dreams are more likely to depict such fears. However, the aforementioned studies were all conducted among adults, focused on dream content and did not assess SAD or nightmares.

Some studies investigated the association between nightmares and a history of early separation from caregivers. In a large sample of adults (N = 5020), a retrospective report of early (< age 12 months) maternal separation (> one-month duration) was associated with a greater likelihood of having frequent nightmares and oppressive bad dreams (Csóka et al., 2011). In another study, early separation adversity (ages 0 to 6 years) assessed in adulthood correlated with a sleep anomaly (low sleep spindle density), which is known as an index of early nightmare onset (Nielsen et al., 2019). Findings from these studies provide strong evidence of an association between early separation and life-long nightmares and underlying sleep anomalies. However, the retrospective assessment of early separation impedes drawing conclusions about the co-occurrence of separation and nightmares. Most importantly, separation events do not necessarily trigger separation anxiety (Bandelow et al., 2001; Helmut et al., 2005).

In summary, a corpus of studies suggests that separation-related fears or adversity are reflected in dream content and associated with frequent nightmares. However, there is a dearth of research examining the relationship between nightmares and separation anxiety. Moreover, two studies revealed that having nightmares involving separation is the least prevalent and sensitive SAD symptom (Allen et al., 2010; Cooper-Vince et al., 2014). The DSM-5's requirements for the nightmare criterion (repeated occurrence, involving separation) may result in an underestimation or misunderstanding of the nightmare phenomenon among individuals with SAD. For instance, these individuals may experience frequent nightmares that do not depict separation or infrequent separation-related nightmares that nonetheless cause significant distress. The fact that nightmare frequency and distress are only slightly to moderately correlated (Belicki, 1992a, 1992b) highlights the importance of studying the predictors of each of these constructs, especially in clinical studies (Belicki, 1992b). Indeed, nightmare distress is more correlated with psychopathology symptoms (Belicki, 1992a), interest in therapy (Belicki, 1992b), and childhood and lifelong adversity (Nielsen et al., 2019) than nightmare frequency. The present study tested the following hypotheses: (a) children's separation anxiety is positively correlated with dysphoric dream distress, and to a lesser extent, frequency, (b) dysphoric dream distress and frequency are positively correlated, and (c) dysphoric dream frequency partly mediates the association between children's separation anxiety and dysphoric dream distress (mediation model). In other words, the association between separation anxiety and dysphoric dream distress may be explained by more frequent dysphoric dreams in some

children, but not in others, who may experience either low-distress frequent nightmares or high-distress infrequent nightmares.

Finally, the relatively low prevalence of nightmares of separation among children with SAD may be explained by the effect of a third variable. Several sleep researchers have suggested that parents' reluctance to separate from their child at night due to their own attachment insecurity, overprotective caregiving style or anxiety contributes to poor sleep in childhood (e.g., Benoit et al., 1992; Tikotzky et al., 2010). The lack of proximity with the child at night may activate the parent's caregiving system, even more so in the presence of high parental separation anxiety, which subsequently leads to overprotective parental behaviors that interfere with the child's ability to self-sooth (Sadeh et al., 2010). In support of this idea, one study reported associations between higher scores on the *Maternal Separation Anxiety Scale* (Hock et al., 1989) and more nocturnal awakenings and less efficient sleep among infants (Scher, 2008). Whether maternal separation anxiety, which is defined as the unpleasant emotional state tied to the experience of separating from the child (Hock et al., 1989), is also related to sleep among school-aged children and specifically to nightmares remains unexplored. It is feasible to hypothesize a moderator effect of maternal separation anxiety on the association between children's separation anxiety and dysphoric dreams. On the one hand, children with separation anxiety may be less prone to report nightmares regarding separation or to manifest nightmare distress to mothers with higher separation anxiety. On the other hand, maternal separation anxiety, which is associated with nocturnal awakenings, may thereby increase dysphoric dream recall in anxious children.

This study's first objective was to explore the associations between children's separation anxiety and several dimensions of dysphoric dreams (bad dreams and nightmares), including their frequency, associated distress, and separation-related content. Specifically, we hypothesized that children's separation anxiety would be associated with all aspects of dysphoric dreams, and moderated by maternal separation anxiety, controlling or not for a variety of demographic and health (e.g., history of mental health disorders, melatonin intake) variables. Melatonin intake was considered a potentially important covariate given its probable associations with dysphoric dreams. Indeed, nightmares were reported as a side-effect of melatonin (Guardiola-Lemaitre, 1997), which is one of the most common medication recommended by psychiatrists to treat sleep problems in children suffering from a variety of disorders, including anxiety (Owens et al., 2010). We also hypothesized that dysphoric dream frequency would mediate the association between children's separation anxiety and dysphoric dream distress. Because there is, to our knowledge, no validated questionnaire that explores all aspects of dysphoric dreams in children (nightmares vs. bad dreams, frequency, distress, content), the present study also contributes to the field by introducing a new parent-reported questionnaire, i.e., the Dysphoric Dreams of Separation Questionnaire, developed by the authors. This new questionnaire may facilitate further studies on separation anxiety and dysphoric dreams among children.

Method

Sampling Procedures and Participants

Respondent mothers were recruited through online advertisements on Facebook and Instagram using a Facebook post sponsored at low cost to be displayed to French-speaking women aged at least 18 years living in the province of Quebec with an interest in parentality. The post mentioned that the research team was searching for mothers of 4- to 12-year-olds to participate in a study on anxiety and nightmares in children. A total of 367 respondents provided informed consent. Of these, 125 did not complete the survey, and 5 had a child younger than 4 years or older than 12 years, 11 months.

The final sample included 237 mothers aged 24 to 50 years (M = 35.73, SD = 4.84).With respect to education level, 4.6% of mothers had an elementary school diploma, 19.4% had a high school diploma, 35.1% had a college-level diploma and 40.9% had a university degree. A larger proportion of mothers had a university degree than in the general population of the Province of Quebec, Canada (25.5%). Annual family income ranged from 4000 to 650,000 CAD (M = 93,974, SD = 60,051), which is similar to the average family income in Quebec. Children were aged from 4 to 12 years (M = 6 years 5 months, SD = 2 years). Most children live with both parents (66.2%), 19.0% live in a reconstituted family, 14.3% live in a single-parent family and one child lives with the mother and two uncles (.4%). With respect to gender, 121 children were girls (51.1%) and 115 were boys (48.5%). In addition, one child (.4%) was born male but identified as a girl. Because we were interested in gender, this child was included in the group of girls for the purpose of statistical analyses.

In the Dysphoric Dreams of Separation Questionnaire (described below), mothers were asked to report any diagnosed mental disorder of their child. Single or multiple diagnoses of mental disorders were present in 30 children (12.7%). The most prevalent mental disorder was attention-deficit/hyperactivity disorder (6.75%; n = 16). Six children (2.11%) had a diagnosed anxiety disorder. Finally, the distribution of children's melatonin intake in the last year was as follows: never (71.3%), occasionally (8.9%), at least once a month (4.6%), and at least once a week (15.2%).

Measures

Sociodemographic Questionnaire

This home-made questionnaire comprises 12 items on relevant sociodemographic variables (e.g., child's age and gender, family income, and maternal education) and health information (e.g., history of physical and mental health disorders and melatonin intake during the last year).

Dysphoric Dreams of Separation Questionnaire

The Dysphoric Dreams of Separation Questionnaire (DDSQ) was developed for the purposes of the present study and comprises 10 questions on bad dream and nightmare frequency, distress and separation-related content (Appendix). The four items assessing dysphoric dream distress exhibited acceptable internal consistency (Cronbach's alpha = .71) and were averaged to produce a single distress score for inclusion as a dependent variable in the analyses.

Separation Anxiety Symptoms Inventory

Children's separation anxiety symptoms were measured using a modified version of the Separation Anxiety Symptoms Inventory (SASI; Silove et al., 1993), which was originally developed to retrospectively assess adults' memories of 15 separation anxiety symptoms before age 18. The SASI has been translated in French and slightly adapted to measure current separation anxiety symptoms in adolescents (Brandibas et al., 2010). Both versions of the SASI exhibit adequate internal consistency (Cronbach's alphas from .82 to .88). The original version also demonstrates good test-retest reliability over a 3-month interval and discriminates adults with and without a history of SAD or overanxious disorder diagnosis (Silove et al., 1993).

For the purposes of this study, the SASI was further adapted from the validated French version to be completed by mothers; hence, the formulation of some items was slightly modified. This version of the SASI also includes 15 items each assessing a symptom of separation anxiety (e.g., *Your child does not want to go to school or daycare*, *When your child is away from home, he/she is afraid that an accident or something bad happens to his parents*) on the 4-point Likert scale (*Always, Often, Sometimes, Never*). The present version also has satisfying internal consistency (Cronbach's alpha = .84). The average SASI total score in the present sample (M = 13.48, SD = 7.61) was similar to the average score in the non-clinical sample of Silove et al.'s validation study (1993) (M = 11.00, SD = 6.8). In this study, the SASI total score was computed without the item assessing nightmares (*Your child has nightmares about violence toward him/her or his/her family*) to avoid artificially inflating common variance with the DDSQ.

Maternal Separation Anxiety Scale

Mothers' anxiety regarding separation from the child was assessed with the Maternal Separation Anxiety Scale (MSAS; Hock et al., 1989), which includes 35 items on feelings, thoughts and beliefs in relation to everyday mother-child separation events. The degree of agreement with each item is measured on a 5-point Likert scale, ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). In addition to the total scale score, the MSAS generates three subscale scores: maternal separation anxiety, perception of separation effects on the child, and employment-related separation concern (Hock et al., 1989). The MSAS predicts overprotective parenting and poor socioemotional development in 2- to 3-year-olds (Cooklin et al., 2013) and a high-increasing trajectory of anxiety among 5- to 12-year-old girls (Zerwas et al., 2014). Originally intended for mothers of infants (Hock et al., 1989), the MSAS was also used with mothers of toddlers (Zerwas et al., 2014). All items also apply to mothers of preschool- and school-aged children in their original formulation. The French version of the MSAS used in this study includes 26 items already validated in French (Robin et al., 1999) and 9 items translated by the main researcher. In the present sample, internal consistency was satisfying for the global scale (Cronbach's alpha = .91), the maternal separation anxiety (Cronbach's alpha = .91), the effects on the child (Cronbach's alpha = .77), and employment-related separation (Cronbach's alpha = .81) subscales. Only the maternal separation anxiety subscale was included in this study's analyses because it exhibits slightly higher internal consistency and is more relevant to the study's objectives.

Data Analysis

First, frequency distributions are presented to describe bad dreams and nightmares frequency, and the presence or absence of separation-related dream themes. Then, t-tests and chi-square and Pearson correlation analyses were conducted to identify the covariates, i.e., demographic and health variables (e.g., maternal education, child's age and gender, diagnosed mental disorders, melatonin intake) that are significantly associated with the main dependent variables (bad dream and nightmare frequency, distress, and separation-related content). The first study hypothesis was tested by running regression analyses to verify whether children's separation anxiety (independent variable) is associated with (a) the presence of frequent bad dreams and nightmares and of separation themes (dichotomous dependent variables; binary logistic regression), and (b) dysphoric dream distress (continuous dependent variable; linear regression). All these regression analyses also

tested the moderation effect of maternal separation anxiety, and were performed with and without controlling for previously identified covariates. The moderation models were tested using the PROCESS macro for SPSS (version 3.5; processmacro.org). Finally, we also used the PROCESS macro to test the mediation effect of dysphoric dream frequency on the association between children's separation anxiety and dysphoric dream distress. To minimize the risk of type I error, the critical alpha level was set at .01 for all analyses.

Results

Main Study Outcomes: Descriptive Statistics and Covariates

As displayed in Table 1, a majority of mothers reported that their children had dreams and bad dreams more than once a month. However, a minority reported nightmares more than once a month. A small proportion of mothers reported that their children "never" had dysphoric dreams or had them "once a week or more" (Table 1), which resulted in reduced variability on these ordinal scales assessing bad dream and nightmare frequencies. Therefore, these variables were dichotomized (< once a month, > once a month) for use in the main analyses. The presence of frequent bad dreams and nightmares (> once a month) was not associated with mother's age, family income, child's gender or age, or having a mental disorder (child). However, children with frequent bad dreams, compared with those experiencing it infrequently (< once a month), had mothers with lower education (M = 5.36, SD = 1.80 vs. M = 5.97, SD = 1.77; $t(235)$ = 2.64, p = .009). Children with frequent (vs. infrequent) nightmares were more likely to take melatonin (38.5% vs. 21.1%; X^2 (1, N = 237) = 8.65, p = .003). Therefore, maternal education was included as a covariate in the regression analyses predicting frequent bad dreams, while melatonin intake was included as a covariate in the models predicting frequent nightmares.

Regarding separation-related dream themes, the most prevalent were "parent dying or being dead" and "being alone" (Table 1). To maximize statistical power, only these two themes were included in subsequent analyses. These separation-related dream themes were not associated with demographic and health variables except for child's age; children who have dreamt of their parent's death, compared with those who have not, were older (M = 87.9 months, SD = 23.9 vs. M = 78.8 months, SD = 24.4; $t(215)$ = 2.63, p = .009). Children had from 0 to 6 separation-related dream themes in the last year (Md = 1.00). Specifically, 59.5% of the sample had 0 or 1 of the listed separation themes, 40.5% had at least two, and 13.1% had three or more. To maximize statistical power, this variable was dichotomized to represent children who had at least one separation-related theme (40.5%) and those who had none (59.5%). Children who have experienced at least one separation-related theme, compared with those who did not, had mothers with lower education (M = 5.35, SD = 1.69 vs. M = 6.10, SD = 1.88; $t(235)$ = 3.23, p = .001), were older (M = 85.98, SD = 24.00 vs. M = 76.08, SD = 24.36; $t(215)$ = 2.96, p = .003), and more likely to have a diagnosed mental disorder (17.7% vs. 5.2%; X^2 (1, N = 237) = 8.10, p = .004). Child's age was included as a covariate in the model predicting the presence of the "parent's death" theme, whereas child's age, maternal education and having a diagnosed mental disorder (child) were included as

Table 1 Frequencies of Bad Dreams, Nightmares and Separation-related Dream Themes

	Never *n* (%)	< Once a month *n* (%)	> Once a month *n* (%)	Once a week *n* (%)
Dreams (last 6 months)	26 (11.0)	63 (26.6)	85 (35.9)	63 (26.6)
Bad dreams (last 6 months)	32 (13.5)	81 (34.2)	89 (37.6)	35 (14.8)
Nightmares (last 6 months)	41 (17.3)	92 (38.8)	68 (28.7)	36 (15.2)
Separation themes in dreams (last year)				
	Yes *n* (%)		No *n* (%)	
Being kidnapped	40 (16.9)		197 (83.1)	
Parent is dead	83 (35.0)		154 (65.0)	
Parent had an accident	47 (19.8)		190 (80.2)	
Being lost	51 (21.5)		186 (78.5)	
Being alone	83 (35.0)		154 (65.0)	
Dying	16 (6.8)		221 (93.2)	
Any separation theme	141 (59.5)		96 (40.5)	

covariates in the model predicting the presence of any separation dream theme.

Finally, the level of dysphoric dream distress as measured by the DDSQ (i.e., child seeking comfort, feeling distressed or anxious, or needing parental presence to fall back to sleep; Appendix) was not associated with mother's age, maternal education, family income or type, child's age or gender, or the presence of a mental disorder (child). However, children who take melatonin at least occasionally (n = 68), compared with those who never take it (n = 169), have higher dysphoric dream distress as reported by the mother (M = 2.98, SD = .80 vs. M = 2.50, SD = .85; $t(235) = 3.97$, $p < .0001$). Melatonin intake was included as a covariate in subsequent analyses with dysphoric dream distress as a dependent variable.

Associations between Separation Anxiety and Dysphoric Dreams

Independent samples t-tests revealed that higher separation anxiety was found among the children with frequent (vs. infrequent) bad dreams and nightmares, as well as among those who had dreamt at least once of the parent being dead, being alone (medium effect sizes) or of any separation-related theme (large effect size; Table 2). However, maternal separation anxiety only varied according to dream content, i.e., having dreamt of the parent's death or of any separation-related theme (small effect sizes; Table 2). Bivariate correlation analyses revealed that dysphoric dream distress was associated with children's separation anxiety (r (235) = .47, p < .0001), but not with maternal separation anxiety.

Predicting Frequent Bad Dreams and Nightmares

Binary logistic regression analyses revealed that children's separation anxiety was a significant predictor of frequent bad dreams and nightmares, controlling or not for relevant demographic and health variables. However, there was no moderation effect of maternal separation anxiety on the association between children's separation anxiety and frequent bad dreams or nightmares (Table 3).

Predicting Separation-Related Dream Themes

As displayed in Table 4, children's separation anxiety was a significant predictor in all models, controlling or not for relevant covariates. More precisely, for each unit increase in the separation anxiety score, a child was twice as likely to have dreamt of the parent's death and six times as likely to have reported any separation theme in the last 12 months. The model predicting the theme of the child being alone showed poor fit (Table 4) and hence should be interpreted with caution. Finally, maternal separation anxiety was not a significant predictor of separation dream themes. The moderation analyses using PROCESS macro for SPSS revealed that maternal separation anxiety was not a significant moderator in any of the models predicting dream content.

Predicting Dysphoric Dream Distress

Multiple linear regression analyses were conducted to verify whether children's and maternal separation anxiety predicted dysphoric dream distress, controlling or not for melatonin intake. The assumptions of multiple linear regression were met

Table 2 Differences in Maternal and Children's Separation Anxiety according to the Presence/Absence of Frequent Dysphoric Dreams and of Separation-Related Dream Themes (N = 237)

		Children's separation anxiety (SASI – total score[a]) M (SD)	t value	Cohen's d	Maternal separation anxiety (MSAS – separation anxiety subscale score) M (SD)	t value	Cohen's d
Frequent bad dreams (> once a month)	Present (n=124)	2.07 (.52)	4.45***		2.44 (.60)	1.26	
	Absent (n=113)	1.78 (.48)		.58	2.34 (.60)		.17
Frequent nightmares (> once a month)	Present (n=104)	2.10 (.50)	4.55***		2.40 (.58)	.06	
	Absent (n=133)	1.80 (.51)		.59	2.39 (.63)		.02
Dream theme: parent dead	Present (n=83)	2.12 (.55)	4.22***		2.54 (.67)	2.68**	
	Absent (n=154)	1.83 (.48)		.56	2.32 (.56)		.36
Dream theme: child alone	Present (n=83)	2.08 (.48)	3.38**		2.48 (.63)	1.50	
	Absent (n=154)	1.84 (.52)		.48	2.35 (.59)		.21
Any separation dream theme	Present (n=141)	2.09 (.53)	6.21***		2.50 (.63)	3.24**	
	Absent (n=96)	1.69 (.41)		.84	2.24 (.53)		.45

Note. SASI = Separation Anxiety Symptoms Inventory; MSAS = Maternal Separation Anxiety Scale; M = Mean; SD = Standard deviation

[a] The total score does not included the item on nightmares (#9)

** p < .01. *** p < .001

Table 3 Binary Logistic Regression Models Predicting Frequent (> Once a Month) Bad Dreams and Nightmares

	Likelihood ratio test	Nagelkerke R^2	*b*	SE	*p*
Model 1: Bad dreams > once a month [a]	22.52**	.12			
SASI [b]			2.81	1.02	.006
MSAS [c]			.97	.77	.21
SASI x MSAS			−.57	.35	.11
Model 2: Bad dreams > once a month [a]	26.63**	.14			
SASI [b]			2.72	1.04	.009
MSAS [c]			.81	.77	.30
SASI x MSAS			−.55	.36	.13
Maternal education			−.16	.08	.044
Model 3: Nightmares > once a month [a]	27.99**	.15			
SASI [b]			3.23	1.03	.002
MSAS [c]			.77	.79	.33
SASI x MSAS			−.65	.36	.07
Model 4: Nightmares > once a month [a]	31.29**	.17			
SASI [b]			3.10	1.03	.003
MSAS [c]			.78	.79	.32
SASI x MSAS			−.64	.36	.07
Melatonin at least occasionally [d]			.57	.31	.07

Note. SE = Standard error; SASI = Separation Anxiety Symptoms Inventory; MSAS = Maternal Separation Anxiety Scale

[a] The reference category was "less than once a month or never". [b] Total score without the item on nightmares (#9). [c] Maternal separation anxiety subscale. [d] The reference category was "never". ** $p < .01$

for the models with and without the covariate. There was no multivariate outlier according to Mahalanobis distance and no multicollinearity between predictors. Children's separation anxiety significantly predicts dysphoric dream distress, controlling ($B = 1.26$ [.60, 1.92], $p = .0002$) or not ($B = 1.33$ [.67, 1.99], $p = .0001$) for melatonin intake. However, maternal separation anxiety was not a significant predictor or moderator in either model.

Mediation Effect of Dysphoric Dream Frequency

To test the hypothesis that the association between children's separation anxiety and dysphoric dream distress is mediated by having frequent bad dreams or nightmares a composite score of dysphoric dream frequency (bad dreams + nightmares) was created to obtain a continuous mediator. A simple mediation model was tested using the PROCESS macro for SPSS. Melatonin intake was entered as a covariate because of its significant association with the dependent variable (dysphoric dream distress). Assumptions of multiple linear regression were verified for paths *a* and *c* in the models because they implied multiple predictors. All assumptions were met, and there was no multivariate outlier according to Mahalanobis distance and no multicollinearity between predictors.

A significant mediation effect of dysphoric dream frequency on the relationship between children's separation anxiety and dysphoric dream distress was noted after controlling for melatonin intake (indirect effect = .27, bootstrapped 95% CI [.15, .40]). The direct effect of children's separation anxiety on dysphoric dream distress was significant (*c'* path, Fig. 1). The indirect effect accounts for 38% and the direct effect for 62% of the variance in the association between child separation anxiety and distress (total effect = .71, $t(234) = 7.30$, $p < .001$).

Discussion

This study investigated the associations between children's separation anxiety and several aspects of dysphoric dreams (frequency, distress and separation-related content). It also tested the hypotheses that (a) mothers' own anxiety when separating from their child would moderate the association between children's separation anxiety and dysphoric dreams, and (b) dysphoric dream frequency would mediate the association between children's separation anxiety and dysphoric dream distress. Our findings partially confirmed the study hypotheses. First, as hypothesized, children's separation anxiety was associated with

Table 4 Binary Logistic Regression Models Predicting the Presence of Separation-related Dream Themes during the Last Year

	Model chi-square	Nagelkerke R^2	Hosmer-Lemeshow chi-square [a]	*OR*	[95% CI]	*p*
Model 1: Has dreamt that parent dies or is dead [b]	17.51**	.10	7.49			
SASI [c]				2.64	[1.45, 4.81]	.002
MSAS [d]				1.27	[.77, 2.12]	.35
Model 2: Has dreamt that parent dies or is dead [b]	21.30**	.13	7.06			
Child's age				1.01	[1.00, 1.03]	.032
SASI [c]				2.65	[1.41, 4.98]	.003
MSAS [d]				1.19	[.70, 2.02]	.53
Model 3: Has dreamt that he/she is alone [b]	10.88**	.06	11.47			
SASI [c]				2.38	[1.40, 4.04]	.001
Model 4: At least one separation dream theme [e]	39.31**	.21	5.08			
SASI [c]				6.07	[2.92, 12.61]	.0001
MSAS [d]				1.30	[.75, 2.23]	.35
Model 5: At least one separation dream theme [e]	46.94**	.26	2.65			
Maternal education				.86	[.72, 1.03]	.11
Mental disorder (child) [f]				1.27	[.72, 2.24]	.40
Child's age				1.01	[1.00, 1.03]	.065
SASI [c]				5.97	[2.64, 13.50]	.0001
MSAS [d]				1.16	[.64, 2.10]	.62

Note. SASI = Separation Anxiety Symptoms Inventory; MSAS = Maternal Separation Anxiety Scale. [a] A significant result means poor model fit; [b] Reference category = never; [c] Without the item on nightmares (#9); [d] Maternal Separation Anxiety subscale; [e] Reference category = no separation-related dream theme (last year); [f] Reference category = absence of a mental disorder

**$p < .01$

frequent (> once a month) bad dreams and nightmares, separation-related dream content, and dysphoric dream distress, even after controlling for relevant covariates (melatonin intake, maternal education, child's mental disorder or age). However, contrary to our hypothesis, there was no moderator effect of maternal separation anxiety. Finally, our findings revealed that dysphoric dream frequency is a mediator of the association between children's separation anxiety and dysphoric dream distress, as hypothesized.

Children's Separation Anxiety and Dysphoric Dream Frequency and Content in Relation to Children's Separation Anxiety

Children's separation anxiety was a stronger predictor of nightmares than bad dreams in models without covariates. The odds of having frequent bad dreams and nightmares were 2.8- and 3.2-fold increased, respectively, for each unit increase on the separation anxiety scale. These effects remain when controlling for demographic and health variables. Thus, among children from this non-clinical sample, higher separation anxiety was associated with a greater likelihood of having frequent dysphoric dreams, whatever the type. Therefore, separation anxiety is not *specifically* associated with nightmares, as specified in DSM-5. Although the present findings are from a non-clinical sample, they warrant further research among children with SAD. The wording of Criterion A7 on "repeated nightmares involving the theme of separation" may be too restrictive and lead to false negative for children who rather report bad dreams or dreams perceived as less intense. Such false negatives may explain the low endorsement rate of this SAD symptom (Allen et al., 2010; Cooper-Vince et al., 2014). In addition, the nightmare symptom criterion may lack specificity regarding the requirement of content that involve separation theme. For instance, when questioned on whether the nightmares "involve the theme of separation", parents and children may try to remember nightmares that directly depict separation, whereas dream content may *imply* separation (e.g., child is alone rather that waving goodbye). Thus, the occurrence of "nightmares involving separation themes" may be underestimated.

Our findings indeed indicate associations between children's separation anxiety and the most prevalent separation dream themes in the sample, which indirectly depict separation, i.e., parent dying or being dead, child being alone, or any separation theme. Notably, the odds of having dreamt of any of the listed separation themes during the last year were six-fold increased for each unit increase in the child's separation anxiety score. Children's separation anxiety was also twice as likely to have dreamt of their parent's death or of being alone. To our knowledge, the present study was the first to investigate specific separation-related dream themes in relation to separation anxiety. If replicated in clinical samples of children

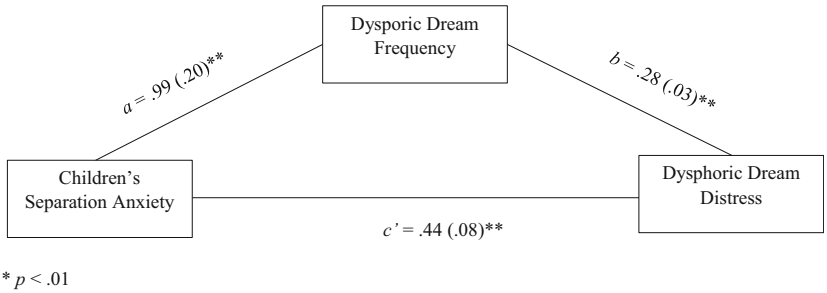

Fig. 1 The Mediation Effect of Dysphoric Dream Frequency on the Associaton Between Children's Separation Anxiety and Dysphoric Dream Distress

and adults with SAD, the present findings may help to specify DSM-5 nightmare symptom criterion with respect to dream content.

On the other hand, our findings suggest a high prevalence of some separation-related dream themes in children from the general population. Some of the investigated separation themes (being kidnapped, parent dying or being dead, and parent having an accident) were more prevalent among older children, which is consistent with a previous study reporting an increased prevalence of the dream theme "being kidnapped" after 7 years of age (Muris et al., 2000). Because separation anxiety was independent of the child's age in the present study, the increased frequency of separation dream themes in older children likely reflects a developmental phenomenon rather than an increased prevalence of separation anxiety symptoms. In normally developing children, such content may serve to promote the relation with attachment figures (Zborowski & McNamara, 1998) in a period of reorganization of attachment relationships. In middle childhood, the goal of the attachment system moves from seeking physical proximity with the caregivers to ensuring that they remain psychologically available when needed (Kerns & Burmariu, 2016). Clinicians should therefore exercise caution when assessing SAD to avoid falsely interpreting separation nightmares as a manifestation of separation anxiety because they may reflect normal developmental processes. However, separation-related dreams may elicit higher distress among children with SAD than among their non-anxious counterparts. The present study indeed revealed that higher separation anxiety is associated with higher distress, as discussed below.

Children's Separation Anxiety and Dysphoric Dream Distress

As hypothesized, children's separation anxiety was associated with dysphoric dream distress (i.e., is distressed, seeks comfort, appears anxious, and needs parental presence to fall back to sleep), even when controlling for melatonin intake. This association between children's separation anxiety and dysphoric dream distress was partially, and not completely, explained by dysphoric dream frequency. In other words, separation anxiety symptoms may be associated with dysphoric dream distress, even if the latter do not occur frequently. These results are consistent with a corpus of studies showing that nightmare distress is more strongly related to psychopathology, including fearfulness and anxiety in adults (e.g., Belicki, 1992a; Blagrove et al., 2004; Levin & Fireman, 2002; Miró & Martínez, 2005) and school-aged children (Secrist et al., 2019) compared with nightmare frequency. Although we did not assess clinical separation anxiety, our findings suggest that nightmare distress may be a better marker of separation anxiety than nightmare frequency.

Dysphoric dream distress as defined in the present study encompasses behaviors that promote proximity with the attachment figure (comfort seeking, need for parental presence) and hence may be viewed as an attempt to end the nighttime separation. Parental presence and reassurance may inadvertently reinforce the child's expression of such distress and impede the development of self-regulatory strategies at night. Dysphoric dream distress could thus be viewed as maintaining the child's separation anxiety by preventing exposure to nighttime fears and by interfering with the emergence of self-regulation strategies in separation contexts. Alternately, bad dreams or nightmares at the source of the distress may create or exacerbate separation fears. Indeed, dysphoric dream distress as defined in the present study also includes regularly speaking about the same dysphoric dream, being afraid of having this dream again or developing fears because of this dream. This form of distress is likely to trigger or maintain anxiety by repeatedly exposing the child to the frightening dream content when awake. In line with this idea, many studies on imagery rehearsal therapy have shown that working on distressing dream content is associated with reduced nightmare frequency and psychiatric distress, including anxiety (Krakow & Zadra, 2010).

Distressing separation dreams may contribute to daytime anxiety in children who have dysfunction of the fear extinction processes at work during rapid eye movement sleep. In most children, separation dreams may be the result of fear extinction processes by which fearful memories of separation are associated with new, incompatible, contextual elements (Levin & Nielsen, 2009). These authors proposed that such fear extinction processes are the

default function of rapid eye movement sleep, which can be compromised in vulnerable individuals. In such a view, separation dreams may fuel dysphoric dream distress and separation anxiety in vulnerable children, for instance those with a history of childhood adversity or prone to affect distress (Levin & Nielsen, 2009). The present study's cross-sectional design impedes inferences of causality; dysphoric dream distress and separation-related content may be exacerbated by anxiety or fuel it.

Limitations and Conclusions

Some limitations of this study should be acknowledged. The DSM-5 symptom criterion specifies that nightmares involving separation have to occur repeatedly. However, we did not assess the recurrence of any specific separation-related theme. The present sample of children exhibited an increased prevalence of frequent nightmares (at least "more than once a month"; 43.9%) compared with children in a large community-based study (13.8%; Li et al., 2011). The difference in prevalence is even more striking given that we used a more restrictive definition of nightmares than Li et al. (2011), who did not provide any definition to the parents. In contrast, children in our study exhibited a level of separation anxiety similar to adults from the general population using the retrospective version of the SASI (Silove et al., 1993). This finding suggests that the present sample shows a non-clinical level of children's separation anxiety but a higher than expected prevalence of frequent nightmares and hence a selection bias for the inclusion of frequent nightmares sufferers.

This study did not include children's self-reports of their own dreams and nightmares. This limitation potentially resulted in an underestimation of nightmare frequency (Floress et al., 2016; Schredl et al., 2009) and impeded the assessment of their content, even more so in older children, who may no longer report nocturnal fears and nightmares to their parents. However, the fact that nightmare frequency and prevalence were not associated with children's age despite contrary results in previous studies (e.g., Schredl et al., 2009) suggests that older children in the present sample probably keep reporting their dysphoric dreams to their mothers. Finally, the retrospective nature of dream and nightmare reports (last 6 or 12 months) likely underestimated bad dreams and nightmare recall frequencies compared with prospective measures, such as daily dream log (Robert & Zadra, 2008). Future studies should perform in-depth investigations of dysphoric dream frequency, content and recurrence among clinical samples of children with SAD using both mother- and self-reports as well as prospective dream logs.

Nonetheless, this study makes several contributions regarding the association between separation anxiety and dysphoric dreams in children. Both bad dreams and nightmares were associated with children's separation anxiety; therefore, bad dreams, especially those that cause distress, could be viewed as a possible manifestation of separation anxiety. Our findings also suggest that dysphoric dream distress is a better marker of separation anxiety compared with frequency. This study, which was the first to investigate dream content in relation to separation anxiety, revealed that children's separation anxiety is a strong risk factor for having dreams, including those with separation-related themes. Despite requiring replication in a sample of children with SAD, these findings suggest that the DSM-5 nightmare symptom criterion may be reviewed to include both bad dreams and nightmares and to emphasize the presence of distress in relation to these dreams.

Appendix

Table 5 Items of the Dysphoric Dreams of Separation Questionnaire

Themes	Items	Responses
Dream frequency	During the last six months, how frequently has your child reported/mentioned his/her dreams to you?	Never Less than once a month More than once a month, but not each week Once a week or more
Bad dream frequency	During the last six months, how many times has your child reported having a bad dream? *Bad dreams are unpleasant dreams. For instance, your child may remember it after being awakened by you or by an alarm clock.	Never Less than once a month More than once a month, but not each week Once a week or more
Nightmare frequency	During the last six months, how many times did your child have a nightmare (i.e., an intense bad dream that provokes awakening)?	Never Less than once a month More than once a month, but not each week Once a week or more
Separation themes in dysphoric dreams	During the last year, did your child have bad dreams or nightmares that include the following themes: - He/she dreamt that he/she was kidnapped - He/she dreamt that you or his/her other parent was dying or dead - He/she dreamt that you or his/her other parent had an accident - He/she dreamt of getting lost	Tick all the themes that apply

Table 5 (continued)

Themes	Items	Responses
	- He/she dreamt of being alone - He/she dreamt that he/she was dying - None of the above - Other bad dream or nightmare themes (if so, please specify)	
Dysphoric dream distress (seeks comfort)	When your child has a bad dream or nightmare, how frequently does he/she seeks comfort from you? *If your child never has bad dreams or nightmares, please answer "does not apply".	Does not apply Never Rarely Often Always
Dysphoric dream distress (anxiety)	After having a bad dream or nightmare, how anxious does your child look? *If your child never has bad dreams or nightmares, please answer "does not apply".	Does not apply Not anxious A little anxious Very anxious
Dysphoric dream distress (needs parental presence)	After having a bad dream or nightmare, does your child need your presence to fall back to sleep? *If your child never has bad dreams or nightmares, please answer "does not apply".	Does not apply Never Rarely Often Always
Dysphoric dream distress (general)	To what extent does your child show distress related to his/her bad dreams and nightmares (e.g., regularly speaks of the same nightmare, has developed fears after a bad dream or nightmare, is afraid of having the same bad dream or nightmare again). *If your child never has bad dreams or nightmares, please answer "no distress".	No distress Very little distress Little distress Moderate distress Great distress Very great distress Distress always present

Code Availability Not applicable.

Data Availability The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethics Approval This study was approved by the institutional review board of the University of Sherbrooke.

Consent to Participate All study participants provided informed consent.

Consent for Publication All authors consented to the publication of this article.

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