

# An analysis of laypeople's beliefs regarding the origins of their worst nightmare

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**Summary.** While many studies have examined the aetiological underpinnings and psychological correlates of nightmares, very few have focused on laypeople's conceptions of the underlying causes of their own nightmares. The present study investigated laypeople's causal beliefs about their worst nightmare experience and examined whether these beliefs varied as a function of participants' gender, age of nightmare occurrence, and recurrence of the nightmare itself. Five hundred and eighty-three adult participants completed a series of questionnaires and their beliefs categorized according to a coding protocol. The results showed that: 1) The three most frequently reported explanations for people's worst nightmare were difficult interpersonal relationships, attributions of unknown or nonexistent causality, and mediums of entertainment; 2) Women were more likely than men to attribute their worst nightmare to factors related to interpersonal relationships; 3) Some attributions varied depending on whether the worst nightmare had occurred during childhood, adolescence, or adulthood; and 4) Worst nightmares that were recurrent in nature were more likely to be attributed to phobias and negative emotions than non-recurrent worst nightmares. Interestingly, many of the lay beliefs endorsed in the present study were in line with empirical and theoretical studies on the aetiology of nightmares.

**Keywords:** Dreams, nightmares, lay beliefs, gender

## 1. Introduction

Nightmares are formally defined as "lengthy, elaborate, storylike sequences of dream imagery that seem real and that incite anxiety, fear, or other dysphoric emotions. ... [and] usually terminate with awakening and rapid return to full alertness" (5th ed.; Diagnostic and Statistical Manual of Mental Disorders [DSM-5]; American Psychiatric Association, 2013, p. 404-405). Nightmares are common in the general population. As detailed by Levin and Nielsen (2007) in their review of studies on nightmares, approximately 85% of adults experience at least one nightmare per year, while 8 to 29% report monthly nightmares and 2 to 6% report weekly nightmares (see also D. Belicki & Belicki, 1982; Haynes & Mooney, 1975; Levin, 1994; Sandman et al., 2013; Zadra & Donderi, 2000).

Given the high prevalence rate of nightmares, many studies have examined their aetiology and psychological correlates. In fact, researchers have proposed six broad non-mutually exclusive categories that may contribute to people experiencing nightmares: 1) genetics (e.g., Hublin, Kaprio, Partinen, & Koskenvuo, 1999, 2001); 2) drugs and alcohol (e.g., Hall & Zador, 1997; Pagel & Helfter, 2003; Thompson & Pierce, 1999); 3) disruptions of neurocognitive networks (e.g., Levin & Nielsen, 2007, 2009); 4) personality variables (e.g., K. Belicki & Belicki, 1986; Blagrove & Fisher, 2009; Duval, McDuff, & Zadra, 2013; Soffer-Dudek & Shahar, 2011);

5) impoverished physical and psychological well-being (e.g., Ohayon, 2004; Zadra & Donderi, 2000); and 6) media exposure (e.g., Garrison, Liekweg, & Christakis, 2011; Van den Bulck, 2004). Despite this work, the extent to which people's personal beliefs about the sources of their nightmares correspond to these broad categories remains unknown as few studies have investigated people's own conceptions of nightmare causes.

Hearne (1991) studied a sample of 39 people comprised mostly of women (95%), ranging in age from 13 to 76 years, who experienced nightmares at least once a month and found that 54% held a common belief that their nightmares began as a result of a traumatic incident, including sexual abuse, witnessing death or injury, experiencing violence, being raped, and being jilted. Correspondingly, in a similar study of adult nightmare sufferers, Kales et al. (1980) found that a majority of participants (60%) reported a major life event to have preceded the onset of their nightmare problems. Moreover, these participants interpreted an increase in the frequency of their nightmares as resulting from one of the following factors, in descending order of importance: mental stress (90%), fatigue (33%), and change in one's sleep environment (13%). Furthermore, in a subsample of 335 adults composed of mostly women experiencing an average of 12 nightmares per month, inner conflicts, stress and trauma were the most frequently given causes for nightmare occurrence as expressed by over 70% of participants, while attributions to genetics and random processes were among the least frequent, as indicated by less than 20% of the sample (Thünker, Norpoth, von Aspern, Özcan, & Pietrowsky, 2014). Lastly, in one study (Dunn & Barrett, 1988) of 79 undergraduate students' enumerations of factors believed to precipitate nightmare occurrence, the most common elements were, in descending order of importance: school or job pressure (64%), conflict in important relationships (44%), bad news (35%), frightening experiences, including scary movies (29%), and illness or unusual tiredness (24%).

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Finally, with respect to children's nightmares, Fisher and Wilson (1987) examined parents' causal attributions of their offspring's nightmares, using a sample of 1695 children ranging in age between 5 and 18 years. Items that were endorsed the most frequently included: overtiredness (22%), other (e.g., febrile illness, frightening events such as fearsome television content; 16%), no idea (14%), and overexcitement (13%). Moreover, nightmare causes related to stress (viz., school stress or family stress) were endorsed about 10% of the time, while factors related to changes in the child's sleep environment (viz., sleeping in a different place) were endorsed only 3% of the time. Additionally, Muris et al., (2000) found that 69% of the 190 four- to twelve-year-old children they studied attributed their scary dreams to something frightening that they had recently seen on television whereas only 15% believed that they stemmed from conditioned experiences (i.e., having experienced a similar event in real life) and 10% from modeling experiences (i.e., having seen another person being afraid of the same dreamt element).

Furthermore, given that nightmares can be experienced differently by men and women along a number of dimensions, including frequency (Levin & Nielsen, 2007; Nielsen & Zadra, 2011; Schredl & Reinhard, 2011), content (Robert & Zadra, 2014; Schredl, 2010), and emotional consequences upon waking (Bixler, Kales, Soldatos, Kales, & Healey, 1979; Klink & Quan, 1987; Nguyen, Madrid, Marquez, & Hicks, 2002; Purvey, 2001), it would be relevant to examine whether gender differences also exist in the factors believed to underlie nightmare occurrence. Age-related effects on nightmare attributions may similarly be important to consider. For instance, when parents convey their causal understandings of their child's nightmares (Fisher & Wilson, 1987), they are less inclined to speak of certain factors (viz., conflicts in relationships and changes in sleep environment) and emotions (viz., stress and pressure) even though these explanations are endorsed by adults when referring to the precipitants of their own nightmares (Dunn & Barrett, 1988; Kales et al., 1980). Lastly, the reoccurrence of nightmares may also impact people's appraisals of their origins. For example, traumatic or major life events seem to be frequently provided as causal explanations for nightmares by samples of participants who have suffered from persistent nightmares problems (Hearne, 1991; Kales et al., 1980; Krakow & Zadra, 2010), an observation that is in line with scientific understandings of recurrent nightmares (e.g., Krakow et al., 2002; Ohayon & Shapiro, 2000; Ross, Ball, Sullivan & Caroff, 1989; Wittmann, Schredl, & Kramer, 2007) and that hints at potential differences in laypeople's views of the reasons for recurrent nightmare difficulties.

The first goal of the present study was thus to address the paucity of findings on people's conceptions of the causes they view as underlying nightmare experiences by focusing on their worst nightmare. Specifically, we aimed to determine the extent to which people's beliefs diverge from the ideas put forth in the literature by researchers and clinicians. A secondary goal of this study was to examine whether people's views regarding the origins of their worst nightmare varied as a function of participants' gender, age of nightmare occurrence and whether the nightmare itself was recurrent. Given the scarce literature on these questions, this work was exploratory in nature and no specific hypotheses were formulated.

## 2. Method

### 2.1. Participants

Participants were non-paid volunteers from undergraduate classes ( $n = 463$ ) and the general population ( $n = 122$ ) recruited through media announcements for a study on general dream content. Prospective participants were told that the study concerned the relation between dreams and measures of personality and that we were interested in both high and low dream recallers and in all types of dreams.

### 2.2. Procedure

Participants first completed a series of questionnaires including measures of personality and well-being as part of a separate program of research. They were then required to provide upon awakening a complete written description of each remembered dream in a daily log for two to five consecutive weeks. A series of questions on one of the paper and pencil instruments, the Sleep and Dream Questionnaire (SDQ), required participants to provide a narrative of their worst nightmare, to indicate at what age or year it first occurred, to specify whether it was recurrent, and to describe any events or situations that they thought could explain its origin.

In keeping with the literature, nightmares were defined as very disturbing dreams in which the unpleasant visual imagery and/or emotions woke you up (i.e., the dream's unpleasant content woke you up while the dream was still ongoing). Participants provided written consent and the study was approved by the ethics committee at the Université de Montréal.

### 2.3. Measures

**Coding protocol for beliefs about worst nightmare origins.** Categories for the classification of beliefs about the causes underlying the occurrence of one's worst nightmare were based on descriptive findings (e.g., Dunn & Barrett, 1988; Fisher & Wilson, 1987; Kales et al., 1980), clinical observations (e.g., Krakow & Zadra, 2010) and empirical literature (e.g., Owens et al., 1999; Pagel & Helfter, 2003; Rains, 2008; Schredl, Biemelt, Roos, Dünkler, & Harris, 2008; Tanskanen et al., 2001; Van den Bulck, 2004). A preliminary list of factors was thus created encompassing categories related to mediums of entertainment (e.g., TV, video games), health (e.g., substance use, physical problems or illness, mental illness), major or traumatic life events (e.g., death of a loved one, sexual abuse), interpersonal conflicts or difficulties (e.g., with family members, friends), and negative emotions (e.g., stress, anxiety). In addition, categories related to fatigue and eating were also included as these kinds of explanations were commonly enumerated as causes of nightmares on popular websites catering to the general public (e.g., "Nightmare", 2014; "Nightmares in adults", 2012; Taylor, 2012).

Whenever possible, conceptually related categories were grouped to avoid overlap and only categories capturing more than 4% of the expressed beliefs were retained. Table 1 presents the final 13 categories used to classify beliefs about the origins of people's worst nightmare narratives. To avoid over-representing participants who provided multiple causal explanations for multiple worst nightmares, only the explanation pertaining to the most detailed narrative (or to

the first narrative reported, if both narratives were equally detailed) was included in the study. Moreover, when an answer for a single worst nightmare contained more than one causal explanation, raters could categorize each explanation separately only if they were considered to be mutually exclusive (e.g., if the worst nightmare was attributed to “illness” as well as “spiritual” factors as opposed to an illness that was a direct consequence of a physical attack). Otherwise, only the main causal explanation was tabulated (e.g., “illness” in the case of a worst nightmare being attributed to an illness brought on by a physical attack).

Categories were scored independently by two raters who were first trained on a separate set of 63 worst nightmares. Approximately 37% (n = 218) of the participants' responses were scored by both judges. Disagreements were resolved through discussion. Since kappa coefficients are unreliable when applied to variables with infrequent occurrences (as is the case with several of the present categories), inter-judge reliability was assessed with Gwet's AC1 statistic for interrater reliability (Gwet, 2008). Results showed an AC1 value of .84 indicating a very strong agreement between the two judges.

### 3. Results

Out of the initial 585 participants, two were excluded from the study as they reported the origins of a dream that was not their worst nightmare. Two other participants were excluded for not providing an accurate age of onset for their worst nightmare. The final sample thus comprised 581 participants, including 95 men and 486 women ranging in age from 17 to 74 years (M = 26.11; SD = 10.31). The 5 to 1 female to male ratio was consistent with the average 6 to 1 sex ratio observed in class enrolment as well as with previous research indicating that women in the general popu-

lation are usually more apt to take part in dream-related studies than are men (e.g., Levin, 1994; Levin & Fireman, 2002; Wood & Bootzin, 1990). Mann-Whitney U-tests were used to examine potential gender differences in age since the variable distributions were positively skewed and high in kurtosis. Results showed no significant difference in age between the men (M = 26.03, SD = 10.48) and women (M = 26.12, SD = 10.29) of this sample (U (579) = 22833.50; Z = -0.17, p = .87, two-tailed).

**Frequency of origin categories.** To prevent an overrepresentation of participants reporting several mutually exclusive origin explanations for their worst nightmare, only the first two explanations were retained. In total, 70 participants provided answers that were grouped into two categories while 511 participants provided answers that were grouped into one. The frequency distribution of the origin categories is presented in Table 2. The interpersonal relationships category was the most frequent category, followed by the no origin / unknown, missing, entertainment, death / fear of death, specific phobias, negative emotions and states, other, and health categories. As for the remaining categories, each one was contained in less than 6% of the answers, with the physical environment category being the least frequent. It should be noted that 12 of the 60 participants (20%) who did not provide an origin explanation (missing) clearly stated that they could not remember their nightmares or specifically their worst nightmare.

**Gender differences.** Chi-square analyses were conducted in order to examine whether origin categories were endorsed differently by men and women. This was the case for the interpersonal relationships category which typified women's origin answers significantly more often than men's, with a small effect size (Cohen, 1988; see Table 3).

**Age of occurrence differences.** Chi-square analyses were also conducted to examine whether origin catego-

Table 1. Description of Categories Offering Causal Explanations for Worst Nightmares

Category	Description
Entertainment	References to movies, TV shows, newscasts, video games, readings, and stories.
Health: Physical or mental	References to medical conditions or illnesses and to mental health issues (including addiction and being under the influence).
Death / fear of death	References to an actual death or to the fear of dying.
Interpersonal relationships	References to: 1) conflictual or tense relationships; 2) the absence of a loved one; 3) fears about a loved one getting hurt or a relationship ending.
Significant event / period / situation	References to traumatic or emotional occurrences that may also include societal hardships such as war or criminal activity.
Physical environment	References to the memory or fear of specific objects and places, or to changes in location.
Spiritual / paranormal	References to elements such as malevolent creatures, invisible presences, premonitory messages, past lives, and other types of religious and spiritual beliefs.
Specific phobias	References to fears that include insects and animals, natural occurrences and disasters, specific objects and modes of transport, and fears of being in dangerous situations.
Helplessness / insecurity / self-discovery	References to general feelings of vulnerability and lack of control as well as to feelings of insecurity regarding oneself and one's role in different life domains (e.g., school, work, etc.) that may include the subsequent acquirement of a greater sense of self-understanding.
Negative emotions and states	References to negative emotional states such as anxiety, stress, and sadness as well as to negative physical states such as fatigue and physical discomfort.
Other	Answers that do not belong to any of the categories mentioned above (e.g., interests, values, positive emotions, food consumption, vague answers such as « childhood », etc.)
No origin / unknown	Answers that claim that there is no origin, that do not clearly state an origin, or that assert that the origin is unknown.
Missing	Answer section is left blank.

Table 2. Frequency Distribution of Categories Offering Causal Explanations for Worst Nightmares

Category	N (%)
Entertainment	52 (9)
Health: Physical or mental	37 (6.4)
Death / fear of death	47 (8.1)
Interpersonal relationships	105 (18.1)
Significant event / period / situation	28 (4.8)
Physical environment	26 (4.5)
Spiritual / paranormal	30 (5.2)
Specific phobias	47 (8.1)
Helplessness / insecurity / self-discovery	32 (5.5)
Negative emotions and states	46 (7.9)
Other	45 (7.7)
No origin / unknown	96 (16.5)
Missing	60 (10.3)
Total	651 (112.1)

Note. Frequency total exceeds final sample size (n = 581) given that origin answers could contain up to two categories.

ries differed depending on the age intervals at which participants first experienced their worst nightmare. Due to a technical problem on the printing of a sub group of questionnaires, the question pertaining to the first time of occurrence of the worst nightmare was not available for 110 (19%) participants, although 14 of them still provided this information unprompted. The remainder of the sample was provided with this question and only 46 participants (10%) omitted to answer it. Hence, the results of these analyses are based on a subsample of 439 participants.

The age of occurrence variable was divided into three groups: childhood (0-12 years), adolescence (13-17 years), and adulthood (18-45 years). Four of the categories (physical environment, spiritual / paranormal, significant event / period / situation, and missing) contained values that were too small to permit adequate frequency comparisons, thereby excluding 61 participants from such analyses. As for the remaining categories, entertainment, health, death / fear of death, and specific phobias all displayed significant associations with the age of occurrence variable, albeit with small effect sizes (Cohen, 1988; see Table 4).

Table 3. Crosstabulation of Gender and the Interpersonal Relationships Origin Category

Interpersonal relationships category	Gender		$\chi^2$	$\Phi$
	Male	Female		
No	86 (90.5%)	390 (80.2%)	5.00*	.10
Yes	9 (9.5%)	96 (19.8%)		

Note. \* = p < .05. Column percentages appear in parentheses below group frequencies.

More specific findings included the following: 1) Participants were more likely to attribute their worst nightmare to modes of entertainment if it had occurred in infancy while they were less likely to attribute it to such explanations if the worst nightmare had occurred in adulthood; 2) Subjects were less likely to attribute their worst nightmare to health-related explanations if it had occurred in childhood but were more likely to do so if said nightmare had occurred in adulthood; 3) Answers belonging to the death / fear of death category were more frequently endorsed by subjects whose worst nightmare occurred in adolescence; and 4) Answers belonging to the specific phobias category were more frequently endorsed by participants whose worst nightmare occurred in childhood.

#### Differences based on worst nightmare recurrence.

The possibility that explicative categories showed differential patterns of endorsement as a function of whether or not people's worst nightmare was described as being recurrent was also investigated. Of the 92% of participants (n = 534) who provided this information, 56% indicated that their worst nightmare was recurrent. Chi-square tests showed that the specific phobias and negative emotions and states categories were more likely to be ascribed to recurrent worst nightmares than non-recurrent ones, with small effect sizes (Cohen, 1988; see Table 5).

## 4. Discussion

To summarize the main findings of the present study: 1) The three most frequently reported categories regarding the origins of people's worst nightmare were, in descending order of importance: interpersonal relationships, no origin / unknown, and entertainment; 2) Women were more likely than men to attribute their worst nightmare to factors pertaining to interpersonal relationships; 3) The origins given for people's worst nightmare varied depending if the worst nightmare had occurred during childhood, adolescence or adulthood; 4) Worst nightmares attributed to specific phobias and negative emotions and states were more likely to be identified as recurrent.

That the category pertaining to interpersonal relationships was the most frequently reported causal explanation for people's worst nightmare is consistent with several findings in the literature. A recent prospective study (Robert & Zadra, 2014) on the content of disturbing dreams (i.e., bad dreams and nightmares) showed that interpersonal conflicts (i.e., conflict-based interaction between two characters involving hostility, opposition, insults, humiliation, rejection, infidelity, lying, etc.) was the second most frequently reported theme in nightmares and the most frequently reported theme in bad dreams. Moreover, in their study of undergraduate students, Dunn and Barrett (1988) also found interpersonal relationships to be the second most frequently reported explanation for nightmare precipitants (44%), after school or job pressure (64%). However, this category of explanation was not reported in other studies of nightmare beliefs involving samples with wider age ranges (Hearne, 1991; Kales et al., 1980; Thünker et al., 2014).

In addition, other prevalent categories found in the present study (e.g., negative emotions and states, health, specific phobias, death / fear of death, entertainment) are consistent with the types of beliefs described in previous studies (Dunn & Barrett, 1988; Hearne, 1991; Kales et al., 1980; Thünker et

Table 4. Significant Crosstabulations of Worst Nightmare Age of Occurrence and Origin Categories

Category	Age of Occurrence			$\chi^2$	$\phi$
	Infancy	Adolescence	Adulthood		
<b>Entertainment</b>					
No	174 (86.6%)	78 (92.9%)	147 (95.5%)	8.80*	.14
Yes	27 (13.4%)	6 (7.1%)	7 (4.5%)		
<b>Health: Physical or mental</b>					
No	192 (95.5%)	81 (96.4%)	134 (87.0%)	11.47**	.16
Yes	9 (4.5%)	3 (3.6%)	20 (13.0%)		
<b>Death / fear of death</b>					
No	182 (90.5%)	70 (83.3%)	145 (94.2%)	7.36*	.13
Yes	19 (9.5%)	14 (16.7%)	9 (5.8%)		
<b>Specific phobias</b>					
No	174 (86.6%)	79 (94.0%)	144 (93.5%)	6.42*	.12
Yes	27 (13.4%)	5 (6.0%)	10 (6.5%)		

Note. \* =  $p < .05$ , \*\* =  $p < .01$ . Column percentages appear in parentheses below group frequencies.

al., 2014) as they too contain elements related to people's emotions and mood, stress and pressure, physical states of fatigue and illness, as well as fears, scary experiences and frightening movies.

At the other end of the endorsement spectrum, the least frequently endorsed category of physical environment resembles Kales et al.'s (1980) "change in one's sleep environment" factor which also proved to be the least important element in explaining the frequency of nightmare occurrence among an adult sample of nightmare sufferers. Lastly, it is surprising that the significant event / period / situation category was one of the least prevalent categories (5%) in the present study given that beliefs concerning specific events or traumatic incidents were common in previous studies (Hearne, 1991; Kales et al., 1980; Thünker et al., 2014). However, this discrepancy might be explained by the fact that the events and traumatic incidents mentioned in past studies may have included death, while explanations pertaining to death in the present study were tabulated separately (i.e., death / fear of death) and represented a relatively prevalent category in and of itself.

Taken as a whole, many of the lay beliefs endorsed by our participants were in line with three of the six major categories of scientifically-based explanations for nightmare occurrence: 1) drug and alcohol use; 2) decreased physical and psychological well-being; and 3) media exposure. Hence, laypeople's intuitive attributions for the origins of their worst nightmare appear to correspond to empirically-based correlates of nightmare occurrence. Moreover, it is also important to note that a considerable proportion of our participants (17%) endorsed the view that their worst nightmares did not have a cause or that they could not be

explained (i.e., no origin / unknown), thereby reflecting how nightmares are sometimes assumed to lack significance or to be impossible to understand. This latter result is consistent with Fisher and Wilson's (1987) finding that parents often endorsed (14%) having "no idea" what caused their offspring's nightmares and with Beaulieu-Prévost, Simard, and Zadra's (2009) finding that most undergraduate students (55%) generally show an indifferent attitude towards dream-related topics and activities.

Table 5. Significant Crosstabulations of Worst Nightmare Recurrence and Origin Categories

Category	Recurrence		$\chi^2$	$\phi$
	Non-rec.	Recurent		
<b>Specific phobias</b>				
No	224 (94.9%)	263 (88.3%)	6.47*	.12
Yes	12 (5.1%)	35 (11.7%)		
<b>Negative emotions and states</b>				
No	224 (94.9%)	264 (88.6%)	5.91*	.11
Yes	12 (5.1%)	34 (11.4%)		

Note. \* =  $p < .05$ . Column percentages appear in parentheses below group frequencies.

Additionally, the finding that women were more likely than men to attribute their worst nightmare to explanations pertaining to interpersonal relationships is in line with studies having examined gender differences in relationship concerns. Indeed, when compared to men, women are more likely to be preoccupied with the interpersonal elements of their everyday problems (Strough, Berg, & Sansone, 1996), to experience more intense emotions when faced with interpersonal problems (Birditt & Fingerman, 2003), to be concerned with the potential consequences of emotional expression on their relationships (Timmers, Fischer, and Manstead, 1998), and to experience daily distress stemming from interpersonal conflicts and demands of support from others (Almeida & Kessler, 1998). Therefore, since women seem to be substantially more concerned with, and more emotionally affected by, interpersonal relationships than men, it would follow that they would perceive relational issues as playing a role in noteworthy emotional events in their lives, such as the occurrence of their worst nightmare. This idea is further supported by the fact that women are more likely than men to view dream content as being a reflection of waking experiences (Beaulieu-Prévost et al., 2009) and that themes involving interpersonal conflicts are reported in a significantly greater proportion of women's nightmares than in men's (Robert & Zadra, 2014).

The present study also revealed differences in retrospectively assessed worst nightmare attributions depending if the worst nightmare had been experienced during childhood, adolescence, or adulthood. Worst nightmares having occurred in childhood were more likely to be attributed to factors related to entertainment (e.g., movies, TV shows, video games, readings), a result consistent with findings of both children and their parents ascribing children's scary dreams to frightening TV content (Fisher & Wilson, 1987; Muris et al., 2000). Moreover, this finding is also in line with correlational studies linking nightmare frequency and/or content among children with media use (i.e., television, video game, and computer usage; Garrison et al., 2011), particularly TV exposure (Stephan, Schredl, Henley-Einion, & Blagrove, 2012; Van den Bulck, 2004). By comparison, worst nightmares occurring in adulthood were less likely than those occurring in adolescence or infancy to be attributed to elements of entertainment. These results suggest that adult participants looking back on a worst nightmare from childhood are more likely to attribute such a nightmare to pastime activities that likely defined that time period for them whereas they are more likely to attribute more recent worst nightmares to factors unrelated to such mediums of entertainment. This view is also consistent with the study of Lambrecht, Schredl, Henley-Einion, and Blagrove (2013) who found that adults believed that their daily activities had more of an effect on the content of their dreams than watching TV and reading.

In addition, explanations related to the health category were more likely to be given when worst nightmares occurred in adulthood and less likely to be given when they occurred in childhood. These results are in line with findings suggesting that chronic health conditions are more common in adults than in children and that the risk of comorbidities in health-related conditions tends to accumulate with age (Hoffman, Rice, & Sung, 1996). Moreover, physical phobias (e.g., doctors, vomiting, infections) tend to first arise in young adulthood (Becker et al., 2007) while health anxiety, including hypochondriasis, seems to increase with

age (Altamura et al., 1998; Bleichhardt & Hiller, 2007; Rief, Hessel, & Braehler, 2001) rendering older adults more susceptible to suffering from health-related fears (El-Gabalawy, Mackenzie, Thibodeau, Asmundson, & Sareen, 2013; Hunt, Wisocki, & Yanko, 2003; Montorio, Nuevo, Márquez, Izal, & Losada, 2003; Noyes et al., 2000). Also, many mental health problems, including substance use disorders and anxiety disorders, have been found to begin in adolescence and early adulthood (Jacobi et al., 2004; Kessler et al., 2005). Hence, the saliency of health-related issues and worries in adulthood may partially account for why worst nightmares occurring during adulthood are more likely to be attributed to health-related concerns than is the case for worst nightmares from childhood.

The finding that elements related to the death / fear of death category were more frequently endorsed by subjects whose worst nightmare occurred in adolescence is also of interest given the association between frequent nightmare occurrence and suicidal ideation / suicide attempts during adolescence (Choquet & Menke, 1989; Cukrowicz, et al., 2006; Liu, 2004; Tanskanen et al., 2001). Moreover, while they are infrequently exposed to the passing away of peers, adolescents are still exposed to the death of older family members and to countless references to death in various sources of media such as music, books, and television (Noppe & Noppe, 1991). At the same time, thoughts of death become more frequent in early adolescence (Bauer, 1976), generating high anxiety (Hankoff, 1975; Koocher, O'Malley, Foster, & Gogan, 1976) as teenagers move from a childlike biological conceptualization of death (i.e., thinking about death as an event, a moment, or a state) to a metaphysical understanding of dying (i.e., thinking about the meaning of death and the afterlife; Tamm & Granqvist, 1995). Therefore, participants' causal attributions of a worst nightmare having occurred during adolescence correspond to how thoughts surrounding death become more frequent and angst-ridden during this stage of development.

In a related vein, since exposure to the death of a loved one is generally more frequent during late adulthood than in childhood, one might also expect that worst nightmares occurring at such a time would be attributed to death or fear of death, which was not the case in the present study. One possible explanation for this discrepancy is that participants who reported the occurrence of such nightmares in their adult lives were mostly in their twenties and therefore may not have been exposed to as many losses as one would expect in a sample of older adults.

Explanations related to the specific phobias category were more frequently endorsed by participants whose worst nightmare occurred in childhood. This finding is consistent with results showing that the mean age of onset for phobias varies between 7 and 10 years (Becker et al., 2007; Kessler et al., 2005; Lindal & Stefánsson, 1993; Stinson et al., 2007), with younger children reporting more phobia-related symptoms than older children (Muris, Schmidt, & Merckelbach; 1999), and with peaks in new cases occurring at age 5 and, to a lesser extent, at age 10 (Stinson et al., 2007). Hence, participants thinking back to a worst nightmare from childhood may have been more likely to attribute its occurrence to distressing fears arising at that time. This potential explanation is in line with empirical findings linking nightmare occurrence to emotional difficulties in children (Schredl, Fricke-Oerkermann, Mitschke, Wiater, & Lehmkuhl, 2009).

Finally, explanations belonging to the negative emotions and states category and to the specific phobias category were more likely to apply to recurrent worst nightmares. The first finding is consistent with research linking emotional well-being to recurrent dreams, as variables such as life stress, dysphoric mood, and anxiety have been found to be associated with the occurrence of such dreams (Brown & Donderi, 1986; Cartwright, 1979; Domhoff, 1993; Duke & Davidson, 2002; Hartmann, 1998; Zadra, O'Brien, & Donderi, 1997-1998). With regards to the second finding, while the relationship between specific phobias and recurrent dreams remains to be investigated, the correlation between specific phobias and emotional distress may partly explain this association (Stinson et al., 2007). Moreover, most recurrent dreams have been found to contain threatening events such as those of escape and pursuit (Zadra, Desjardins, & Marcotte, 2006), which may reflect some of the particular fears contained in the present study's specific phobias category. Lastly, given the empirical relationship between trauma and repetitive nightmares (e.g., Krakow et al., 2002; Ohayon & Shapiro, 2000; Ross et al., 1989; Wittmann, et al., 2007), it may come as a surprise that the significant event / period / situation and the death / fear of death categories were not significantly associated with recurrent worst nightmares. However, it may be that the emotional anguish (i.e., negative emotions and states category) generated by events such as trauma and death was perceived to play a more causal role in the reoccurrence of nightmares by participants in this study.

## 5. Limitations and Conclusion

Findings from the present study must be considered in light of two key limitations. First, men were underrepresented in our sample of participants and second, although people's worst nightmares are likely more memorable than everyday nightmares, participants' causal attributions may have been subject to memory distortions and biases since many worst nightmares dated back to people's childhood.

That being said, the present study constitutes the largest and most in depth investigation of laypeople's beliefs about causes believed to underlie their own nightmares. Results reveal that many of these beliefs are in line with what has been proposed in the clinical and scientific literature even though a significant proportion of participants in our sample believed that their worst nightmare did not have a cause or that it could not be explained.

Moreover, this study is the first to have systematically examined differences in causal beliefs about worst nightmares as a function of gender and age of occurrence. Viewed from a more global and theoretical perspective, many of the findings described with regards to gender and age of occurrence are in line with the continuity hypothesis of dreaming, which posits that our waking concerns and psychological states are reflected in our dreams (Domhoff, 1996, 2011; Schredl, 2003). Indeed, variations in beliefs between our men and women, and between worst nightmares occurring in childhood, adolescence and adulthood, most often paralleled waking preoccupations and pastimes that have been found to differ as a function of gender and stages of development. Despite these findings and observations, the extent to which laypeople view their nightmares as a result of waking concerns and daily activities warrants further study, although some evidence suggests that this type of conceptualization (i.e., continuity between dream content and wak-

ing state) characterizes the beliefs held by a subgroup of the general adult population (Beaulieu-Prévost et al., 2009) and, that when asked directly, adolescents as well as adults will consider daily events to be related to their dream content (Lambrecht et al., 2013).

Lastly, the findings pertaining to people's attributions of the origins of a repetitive worst nightmare are also partly in line with scientific understandings of recurrent dreams. This again sheds light on how laypeople seem to intuitively comprehend the causes of their nightmares in a way that approximates what has been shown through empirical research.

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