The perceptions of nightmare sufferers regarding the functions, causes, and consequences of their nightmares, and their coping strategies: A qualitative study

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Summary. The administration of treatments for nightmares, and more broadly, clinical work with patients reporting dysphoric dreams as a concomitant psychological difficulty, could be improved based on a better understanding of the experience of nightmare sufferers. The objective of this study was to explore the perceptions of nightmare sufferers regarding the functions, causes, and consequences of their nightmares, as well as their strategies for coping with nightmares. Twenty university students with frequent nightmares took part in an individual semi-structured interview constructed by the research team. The interviews were recorded and transcribed verbatim. Verbatim were analysed using a content analysis method. Four major findings emerge from this study. Firstly, the main perceived causes of nightmares, including one's occupational and social life, support the hypothesis that dreams reflect waking concerns. Secondly, nightmares tend to decrease sleep quality and to provoke sleep fragmentation, which may be aggravated by sleep avoidance and voluntary awakening from lucid nightmares. In turn, the fatigue that results from a disturbed sleep can negatively affect concentration, daily functioning and mood. Thirdly, nightmares can impact emotions upon awakening and during the day, directly and indirectly, through various mechanisms. Fourthly, nightmares are frequently perceived as a source of personal insight: half of the participants believe that their dreams can reveal information about themselves, searching for the meaning of nightmares is one of the most common coping strategies, and many participants experienced a reflection or realization following a nightmare. A model is proposed to integrate the findings and explain how the nightmare problem might perpetuate itself.

Keywords: Sleep disorders, mental health, lived experience, psychological issues, young adults

1. Introduction

Nightmares are defined as prolonged and extremely dysphoric dreams that usually awaken the dreamer. The most prevalent emotion experienced in nightmares is fear, but other emotions such as sadness and anger are also frequent (Robert & Zadra, 2014; Zadra, Pilon, & Donderi, 2006). A nightmare disorder involves frequent nightmares that result in clinically significant distress or impairments in important areas of functioning (American Academy of Sleep Medicine, 2014). The prevalence of weekly nightmares in the general adult population varies between 2% and 5% in most studies (Li, Zhang, Li, & Wing, 2010; Sandman et al., 2013; Schredl, 2013a). A recent integrative model of nightmare etiology (Gieselmann et al., 2019), which is partly inspired from the theoretical work of Levin and Nielsen (2007), focuses on three variables: physiological factors, trait affect distress, and cognitive factors. Physiological factors include sleep-disordered breathing and drugs (either drug use or withdrawal). Trait affect distress is defined as a tendency to experience heightened negative emotions in reaction to stressors. Cognitive factors include maladaptive beliefs about nightmares and thought suppression. These three variables are hypothesized to impair fear extinction and to cause hyperarousal, which in turn would contribute to the experience of nightmares. Impaired fear extinction implies that fear memories are no longer extinguished in dreams. Hyperarousal in waking is manifested in the form of heightened threat perception and high affect load (i.e., the influence of negative emotion-eliciting events on the capacity to effectively regulate emotions). Hyperarousal at night is reflected by increased beta activity and REM-sleep fragmentation.

Due to the consequences that can result from nightmares, many treatments have been developed or adapted specifically for this psychological difficulty (Aurora et al., 2010;

Morgenthaler et al., 2018). The administration of treatments for nightmares, and more broadly, clinical work with patients reporting dysphoric dreams as a concomitant psychological difficulty, could be improved based on a better understanding of the experience of nightmare sufferers. Unfortunately, little information is available on the perceptions of nightmare sufferers regarding the functions, causes, and consequences of their nightmares, or the strategies they use to cope with their nightmares.

Clinicians and patients may have different perceptions regarding the function of dreams and nightmares. Several functions of dreaming have been proposed in the literature (for a partial review, see Zink & Pietrowsky, 2015). These include the consolidation, integration and generalization of information in memory, emotional regulation and fear extinction, problem solving and creativity, the practice of motor or social skills in a realistic simulation of the world, and dreaming as a costly signal facilitating social bonding (Barrett, 2007; Hartmann, 1996; Levin & Nielsen, 2007; Malinowski & Horton, 2015; McNamara & Szent-Imrey, 2007; Revonsuo, 2000; Revonsuo, Tuominen, & Valli, 2015). Clinicians are likely to form their perceptions of the function of dreams and nightmares based on the scientific literature, while patients may be more likely to form their perceptions based on their own experiences, folklore, or anecdotal literature. If patients believe that their nightmares have a specific function, they may fear the loss of them, which can be an obstacle during the course of a nightmare treatment (Krakow & Zadra, 2006). Therefore, clinicians should be aware of beliefs that their patients may have. Perceived functions of nightmares include communicating important messages, providing an indication that something is wrong with the individual or his/her life, reminding the individual of an unsolved problem, processing negative events, and providing clues to unconscious fears; predicting future events or negative events generally is a function that is rarely attributed to nightmares (Köthe & Pietrowsky, 2001; Pietrowsky & Köthe, 2003; Schredl, Holyba, Köllmer, Körfer, & Proß, in press). Besides, it is known that personality traits such as thinness of boundaries (Beaulieu-Prévost, Charneau Simard, & Zadra, 2009; Schredl, Kleinferchner, & Gell, 1996), neuroticism and openness to experience (Schredl & Göritz, 2017) are associated with attributing more significance or importance to dreams. This suggests that individuals who present these traits may be more likely to attribute a function to their dreams and nightmares.

Only a few studies (Cohen & Zadra, 2015; Dunn & Barrett, 1988; Thünker, Norpoth, von Aspern, Özcan, & Pietrowsky, 2014) have documented individuals' perceptions regarding the causes of their nightmares. In a study with nightmare sufferers (Thünker et al., 2014), the most endorsed causes of nightmares were traumas and inner conflicts, followed by personality, whereas genes and random processes were endorsed by less than 20% of the sample. Furthermore, Cohen and Zadra (2015) questioned 581 participants about the origin of their worst nightmare. The most endorsed items were interpersonal relationships, entertainment (e.g. television, video games), negative emotions and states, death or fear of death, and specific phobias (Cohen & Zadra, 2015). Dunn and Barrett (1988) asked 36 university students with frequent nightmares (i.e. at least four per month) about events that could precipitate their nightmares. Participants mentioned job pressure, conflicts in relationships, bad news, recent frightening experiences, and physical illness or

unusual tiredness (Dunn & Barrett, 1988). In summary, two studies (Cohen & Zadra, 2015; Thünker et al., 2014) used predefined items, which may not cover all the perceived causes of nightmares. Furthermore, the study by Dunn and Barrett (1988), which dedicates a single paragraph to the perceived causes of nightmares, do not offer fine-grained data.

The perceptions of nightmare sufferers regarding the consequences of their nightmares were studied in relation to waking emotions and sleep. In two studies (Köthe & Pietrowsky, 2001; Pietrowsky & Köthe, 2003), participants endorsed many consequences of nightmares on waking mood, such as feeling distressed, nervous, discouraged, frightened or guilty. In the study by Köthe and Pietrowsky (2001), about half of the participants reported that at least one nightmare resulted in nocturnal awakening during the four week period of the study, while a similar proportion described their sleep as restless after a nightmare. In continuity with these results, a nightmare sufferers can experience difficulties falling back to sleep after a nightmare (Hinton, Hinton, Pich, Loeum, & Pollack, 2009). In the same line, another study (Krakow, 2006) reported that 65% of patients with a complaint of nightmares believe that nightmares disrupt their sleep. Although these data are informative, they leave many unanswered questions. For instance, the effect of nightmares on waking emotions could be either direct or indirect. If an indirect effect exists, one or more mechanisms of action could be involved. Moreover, although the memory of the nightmare can disrupt attention in waking (Pietrowsky & Köthe, 2003; Schredl, 2013b), little is know about the perceived consequences of nightmares on cognitions.

Nightmare sufferers are reluctant to seek professional help for their problem, while favoring the use of informal strategies. Only two out of seven individuals with weekly nightmares seek professional help for this issue (Schredl, 2013b). In contrast, informal strategies are frequently used to cope with nightmares. The most popular informal strategies include interpreting the dream, reading literature on dreams, distracting oneself by doing activities, talking about the nightmare with somebody, writing down the nightmare, using relaxation techniques, and remodeling the nightmare through one's imagination (Köthe & Pietrowsky, 2001; Pietrowsky & Köthe, 2003; Schredl & Göritz, 2014; Thünker et al., 2014). Again, these studies used predefined items, which may not cover all the strategies used to cope with nightmares.

Despite the prevalence and health implications of nightmares, there is limited information in the scientific literature regarding the perceptions of nightmare sufferers and their coping strategies. Not only are studies on these topics scarce, but they almost exclusively make use of quantitative methods, with closed-ended questions and predefined items. This approach prevents the identification of novel perceptions and strategies, which can only be discovered with the use of open-ended questions.

The objective of the present study is to explore the perceptions of nightmare sufferers regarding the functions, causes, and consequences of their nightmares, as well as their strategies for coping with nightmares. In order to achieve this objective, we use a qualitative design. More precisely, individual semi-structured interviews with nightmare sufferers are conducted. We expect to identify novel perceptions and coping strategies beyond those already documented in the literature.

2. Method

2.1. Participants

Twenty university students (18 women) with a mean age of 23.6 ± 3.7 years old (range: 19 to 33) participated in the study. Fourteen were undergraduates and six were graduates. Inclusion criteria were: (a) being 18 years of age or older; (b) studying at Université Laval, Québec, Canada; (c) experiencing at least one nightmare per week for four consecutive weeks during the past 12 months; (d) reporting at least one of nine consequences of nightmares listed in the International Classification of Sleep Disorders, Third Edition (ICSD-3; American Academy of Sleep Medicine, 2014); and (e) reporting the use of one or more strategies for coping with nightmares or their consequences. The later criterion was used since we were interested in documenting coping strategies. Eligible students were excluded if they were diagnosed with a neurological problem, including head trauma, cerebrovascular accident and epilepsy. We did not exclude participants based on the presence of a mental disorder (e.g., post-traumatic stress disorder, depressive disorders, anxiety disorders) since the later are highly comorbid with nightmares (for a review, see Lemyre, Bastien, & Vallières, 2019). Excluding participants based on a diagnosis of mental disorder might have precluded the identification of perceptions and coping strategies that are common among nightmare sufferers.

2.2. Procedure

An e-mail invitation to participate in the study was sent to all students of Université Laval during the fall of 2015. Ninety-four students communicated their interest in participating. Among them, students were randomly selected for a telephone interview that aimed to ascertain their eligibility for the study. In total, 46 telephone interviews were conducted. Twenty-six students were excluded for the following reasons: (a) they did not meet the criteria for nightmare frequency (n = 4); (b) they did not experience any consequence resulting from their nightmares (n = 19); (c) they did not use any strategy to cope with their nightmares (n = 2); or (d) they reported a history of head trauma (n = 1). In total, twenty participants were included in the study before saturation was reached. In qualitative research, saturation occurs when the collected information becomes redundant (Marshall & Rossman, 2016). Most qualitative studies in sleep research report similar sample sizes (Araújo, Jarrin, Leanza, Vallières, & Morin, 2017).

The participants were met individually by the first author. The meetings took place in a room of the École de psychologie (School of psychology) at Université Laval. At the beginning of the meeting, a consent form was given to the participants and signed. They were informed that they could withdraw from the study during the interview or afterward. Then, the participants underwent a semi-structured interview about nightmares. Pamphlets about the university's counseling services and emergency numbers were made available. A financial compensation of $20 was given to all participants for their involvement in the study.

The Université Laval ethics committee waived the evaluation of the present study since it was conducted in the context of a research internship. Nevertheless, as described above, every effort was made to ensure free and informed consent and to promote the safety of the participants.

2.3. Materials

2.3.1 In-depth semi-structured interview about nightmares.

Table 1 presents the semi-structured interview about nightmares. This interview was built to cover a wide range of experiences related to nightmares, exploring eight themes: 1) evolution of nightmare frequency and intensity during the past 12 months; 2) description of well remembered nightmares; 3) meaning and causes of nightmares; 4) general consequences of nightmares as well as their consequences on identity; 5) utility or function of nightmares; 6) participants' reactions within their nightmares, as well as their reactions while awake, after remembering a nightmare; 7) strategies used to cope with nightmares during the past 12 months; and 8) lucid dreams/nightmares (i.e. dreams in which the dreamer is aware of dreaming). All but one interview lasted for between 35 and 70 minutes.

2.3.2 Qualitative Data Analysis

The interviews were recorded and transcribed verbatim. The first author transcribed the first four interviews. All other interviews were transcribed by undergraduates in psychology, then revised by the first author.

All verbatim were analyzed by the first author using content analysis (L'Écuyer, 1990). Based on reading the verbatim, four categories were established before codification began: (a) perceived functions of dreams and nightmares; (b) perceived causes of nightmares; (c) perceived consequences of nightmares; and (d) strategies used to cope with nightmares. Within two days before the codification of a given interview, the first author revised the verbatim one more time to increase his familiarity with the data. During the codification process, verbatim extracts were grouped into codes. When appropriate, codes were grouped into sub-categories. A codification journal was produced, which included the four predetermined categories, the sub-categories, the codes, the codes' definitions and the verbatim extracts.

Three different strategies were used to ensure the validity of the analysis. Firstly, after the codification of ten verbatim, the first and second authors performed an inter-rater agreement based on a selection of 180 extracts. This procedure allowed the codification journal to be adjusted. Regarding the second validation strategy, the twentieth codified verbatim was entirely revised by the second author. Based on her commentaries, minor modifications were made to the codification journal. Afterward, all codified verbatim were read one more time by the first author to ensure that the extracts were properly codified. Finally, as a third validation strategy, the last version of the codification journal, which included 394 verbatim extracts, was revised by the first and second authors together.

Tables 1, 2, 3 and 4 were built based on the final version of the codification journal. Each table represents one of the four predetermined categories. They contain the sub-categories, the codes and the codes' definitions. Verbatim extracts are presented directly in the text. Numbers ranging from 1 to 20 are included at the beginning of each extract to identify the interviewed participant. To improve parsimony and to focus on the most important results, codes represented by only one participant are not reported in the present article.

Table 1. Content of the semi-structured interview

Questions asked to the participants in each section of the semi-structured interview

Section 1: Evolution of nightmares in the past 12 months

  Tell me about the evolution of your nightmares, in terms of quantity and intensity, starting from *the same month of the interview, but in the past year* up to now?

Section 2: Description of well-remembered nightmares

  Do you have a precise memory of some nightmares? If so, could you describe them to me?

Section 3: Meaning and causes of nightmares

  "Do you think that your nightmares represent something?"
  "In your opinion, is there one or many causes to you nightmares?"

Section 4: Consequences of nightmares

  "Do your nightmares have consequences? If so, what are they? Note that these consequences can be positive or negative."
  "Do your nightmares have an effect on your identity? In other words, do they impact the way that you perceive yourself?"

Section 5: Utility or function of nightmares

  "Some mention that nightmares have a function, a utility. What about you?"

Section 6: Reactions in the nightmares and in waking

  "In what ways do you react in your nightmares?"
  "What effects do your reactions have on the scenario of your nightmares?"
  "What are your reactions when you remember a nightmare, or a scene from a nightmare? Note that these reactions can be emotional or behavioral."

Section 7: Strategies used to cope with nightmares in the past 12 months

  Specify that strategies include therapy, medication, and informal strategies
  "In the past 12 months, how many strategies did you use to cope with your nightmares?"
  "Could you name these strategies?"
  "Could you describe me the most effective strategy (*the first time the question is asked*); Could you describe me another strategy (*the subsequent times the question is asked, until there is no more strategy to describe*)?"
  The following questions are asked after the description of each strategy
  "Did this strategy modify the frequency of your nightmares?"
  "Did this strategy modify the intensity of your nightmares?"

Section 8: Lucid dreams/nightmares

  Provide a definition of lucid dreams
  "Do you experience lucid dreams?"
  "Are you able to control your lucid dreams?"
  "Do you have a strategy to experience more lucid dreams?"

Note. Sentences in italics between asterisks (*) are notes for the interviewer.

3. Results

3.1. Nightmare Frequency

In order to be included in the present study, participants had to report experiencing at least one nightmare per week for four consecutive weeks during the past 12 months. However, for almost all participants, the experience of nightmares far exceeded this four-week window. Eight participants experienced nightmares weekly – often more than one per week – during the past 12 months, and one participant had nightmares weekly for at least six months. Four participants reported a pattern of alternation between weeks with nightmares – often more than one per week – and respites lasting between one and three weeks. Four participants reported two periods of at least one month with multiple nightmares per week, separated by a respite of a few months. One participant reported a gradual increased in nightmare frequency, reaching two nightmares per week at the time of the interview. One participant reported a rapid onset of nightmares in the weeks preceding the interview. Finally, one participant experienced an onset of nightmares – reaching multiple nightmares per week – followed by a gradual recovery that resulted in less than one nightmare per week at the time of the interview.

3.2. Perceived Functions of Dreams and Nightmares

Half of the participants believe that their dreams can reveal information about themselves. This perception is either explicitly communicated, or implicit when a nightmare is attributed to an internal cause the participant was not fully aware of before. As such, nightmares were perceived to provide insights regarding these causes, namely stress and fears, worries related to school, guilt related to a significant past event, psychological traits, the self destructive character of certain behaviors, and interpersonal issues.

  15. […] it (the dream) allows me to be at the cutting edge of what my head and body feel at the moment. I don't know how to explain it. It's like I'm really listening to myself.

A similar number of participants believe that nightmares might release negative emotions that were experienced while awake, either recently or in the more distant past.

Table 2. The perceived functions of dreams and nightmares

Codes	Description of the perceived functions of dreams and nightmares
To reveal information (n = 10)	To reveal to the individual information about himself/herself that he/she did not know or was not fully aware of. For the individual, this information comes from within rather than from the outside.
To release emotions experienced while awake (n = 9)	To release emotions that have been experienced while awake. These emotions might have been repressed or avoided.
To offer advice or a warning (n = 3)	To advise on the resolution of inner conflicts or to warn of potential dangers that the individual may unconsciously fear.
To offer a sign or a premonition (n = 3)	To offer information about present or future reality. For the individual, this information comes from outside of himself/herself rather than from within.
To process information (n = 3)	To process information in memory.
To compensate for waking frustrations (n = 2)	To respond to a need that is frustrated in waking hours.
To prepare for hardships (n = 2)	To prepare the individual for possible hardships.

Most of them believe that these emotions were expressed in nightmares because they were repressed or avoided:

2. […] I experienced a lot of instability when I was young, and to have kept all of that at a distance, to have forced myself to forget, well I think that lately it's all been coming up in my dreams.

Other functions of dreams and nightmares are reported by a small number of participants. For some, a nightmare is an attempt by the unconscious to advise on the resolution of inner conflicts or to warn against potential dangers.

14. […] I considered my dream almost as an alarm signal that said "be careful, you are not ready to relive that kind of things, are you ready to move forward with that person?"

According to others, dreams and nightmares can provide information about the outside world or about the future. It was also reported that dreams and nightmares process information in one's memory. Another perceived function of dreams and nightmares is to compensate for needs that are frustrated during waking hours.

1. […] things were lacking in my relationship, thus I dreamed about things that went well with my ex (ex-boyfriend). Perhaps I compensated in my dream.

Finally, some participants believe that nightmares might prepare them for potential hardships.

16. Perhaps unconsciously it (the dream) prepares me for hardhips in life. Things that I must experience, that everyone experience: death, diseases, these kind of things.

3.3. Perceived Causes of Nightmares

A majority of participants report that some nightmares are triggered by stress or worries related to school or work.

01. […] when I started my new job, I was dreaming all the time about the worst thing - well, maybe not the worst thing that could happen, but I dreamed it did not go well at all.

Interpersonal issues are also one of the most frequently reported causes of nightmares. More precisely, some nightmares are attributed to separations, relational difficulties, fear of the actions of others, and solitude or isolation.

12. I have to think about my ex while talking about that, but I had a lot of nightmares in which we were quarreling, because I never really understood the reasons behind our separation.

08. […] since you don't know anyone, you don't talk to people, because I come from a place three hours from here, there aren't many people. So, often, […] there are nightmares that will refer to that: I find myself all alone in the classroom, that can happen.

The influence of psychological traits on nightmares is also emphasized by many participants, namely, a propensity to experience anxiety, fear of rejection, and low self-esteem.

15. […] in my opinion, being anxious as a person, I think it has an influence on the number, on the frequency (of nightmares) and all of that.

20. […] even if I trust my partner, I would judge that my self-esteem isn't high enough, which will produce these nightmares.

Some participants also attribute their nightmares to physiological causes, i.e. the intake of medication, the intake of melatonin, or eating before sleeping.

04. I had noticed, when I took a lot of it (referring to melatonin) – well, a lot, still in accordance with the dose she (her physician) recommended, […] I didn't take four times the dose she recommended. Well, I really had a lot of nightmares.

Furthermore, participants often attribute their nightmares to affects for which no cause was specified. These affects are stress and fear.

01. I'm sure that some nightmares are associated with stress.

Not surprisingly, many participants report that some of their nightmares are caused by disturbing past events. Three types of past events can be distinguished: one-time life threatening events, one-time non-life-threatening events, and prolonged non-life-threatening events.

11. I made a suicide attempt, so my nightmare depicts this event every time, but I see myself from an outside point of view.

Table 3. Perceived causes of nightmares

Sub-categories	Codes	Description of the perceived causes of nightmares
Occupational causes	School (n = 12)	Stress or worries related to school.
	Work (n = 6)	Stress or worries related to work.
Interpersonal issues	Separation (n = 12)	Separations can be caused by: 1) death; 2) a breakup; or 3) geographical distance. The separation involves a parent, a lover, a friend or a pet.
	Relational difficulties (n = 8)	Relational difficulties include the following: 1) questioning a relationship; 2) interpersonal conflicts; or 3) unhealthy relationships, including psychological abuse.
	Fear of the actions of others (n = 4)	Fear that a person will commit certain actions or react in a certain way in the future.
	Solitude or isolation (n = 4)	Solitude or isolation that is experienced in the present, that has been experienced in the past, or that is anticipated.
Psychological traits	Anxiety (n = 4)	A general propensity to experience anxiety.
	Fear of rejection (n = 3)	N/A
	Low self-esteem (n = 2)	N/A
Physiological causes	Medication (n = 2)	The side effects of a medication.
	Melatonin (n = 2)	N/A
	Food before bedtime (n = 2)	N/A
Negative affects	Stress (n = 10)	Nightmares are attributed to stress, but the source of this stress is not specified.
	Fears (n = 3)	Nightmares are attributed to fears, but the nature of these fears is not specified.
Significant negative events	One-time event that threatens life (n = 4)	One-time events that threaten life are: 1) a car accident; 2) a suicide attempt; 3) being the victim of a sexual assault; or 4) major health complications during a trip.
	One-time event that does not threaten life (n = 3)	One-time events that do not threaten life are: 1) an abortion; 2) dropping out of school; 3) potentially dangerous situations during a trip; or 4) parents' divorce.
	Prolonged event that does not threaten life (n = 2)	Prolonged events that do not threaten life are: 1) frequent relocations during childhood; or 2) prolonged exposure to the criminal milieu.
Other causes	Use of screen-based electronics (n = 5)	Use of cell phones or television before bedtime, especially the viewing of television series and movies.
	Anticipation of events (n = 4)	Anticipation of anxiety-provoking events.
	Self-Destructive behaviors (n = 3)	Self-destructive behaviors are: 1) excessive alcohol use; 2) drug use; or 3) self-harm.
	Lack of control (n = 3)	Nightmares are attributed to a lack of control, but not to a general need for control.

The other reported causes of nightmares are the use of screen-based electronics, the anticipation of events, self-destructive behaviors, and a perceived lack of control.

05. So the dream is clear enough for me, in connection with what I did, when I used drugs: I was doing something I didn't want to do, but I was going to do it anyway.

3.4. Perceived Consequences of Nightmares

It is clear from the interviews that nightmares are perceived to impact behaviors. More precisely, many participants report that nightmares can interfere with daily functioning, mainly through an increased degree of fatigue or difficulty focusing on tasks.

19. [...] before, I was able to go out on a Friday night. I can't go out on a Friday night anymore, I'm too tired.

Moreover, some participants mention that nightmares motivated behavioral changes in a relationship. Finally, it is noteworthy that a small number of participants adopted proactive behaviors because their nightmares helped them realize that they had destructive behaviors or psychological difficulties.

06. It was thanks to my nightmares that I could make the decision to go and get my antidepressants, that I was able to initiate the means to getting better [...]

The results suggest that nightmares can directly impact the participants' waking emotions. Indeed, a majority of participants report that nightmares influence their mood negatively upon awakening.

Interviewer. How do you feel when you wake up from a nightmare? 19. I feel, well depending on the situation, I would say that sometimes I feel angry, sometimes I feel melancholic, sometimes I feel sad, sometimes I feel frustrated. It depends.

Also in support of a direct impact of nightmares on waking emotions, half of the participants report that the emotions experienced in their nightmares can persist or reappear during the day. A similar proportion of participants report

Table 4. The perceived consequences of nightmares

Sub-categories	Codes	Description of the perceived consequences of nightmares
Behavioral consequences	Interference with functionning (n = 6)	The experience of nightmares, the fatigue that results from disturbed sleep, and a difficulty focusing on tasks interfere with functioning at school, at work, or in other domains.
	Change of behaviors in a relationship (n = 6)	After a nightmare, the individual adopts different behaviors towards one or more persons. This may aim to: 1) avoid an event similar to the one that occurred in the nightmare; 2) ask the same questions that they asked in the nightmare; or 3) act on the basis of a realization regarding the unhealthy nature of a relationship.
	Adoption of proactive behaviors (n = 3)	The individual's nightmare motivates him/her to mobilize. This mobilization involves: 1) a decrease in the use of substances; or 2) seeking help for psychological difficulties.
Emotional consequences	Negative emotions upon awakening (n = 15)	The nightmare provokes negative emotions upon awakening. *This subcategory does not include emotions experienced during the day.*
	Irritability (n = 10)	The experience of nightmares and the fatigue that results from disturbed sleep produces irritability during the day.
	Negative emotions of the nightmare during the day (n = 10)	The nightmare produces one or more negative emotions during the day. These emotions are the same as those experienced in the nightmare.
	General negative emotions during the day (n = 9)	The nightmare produces one or more negative emotions during the day. It was not specified whether these emotions are the same as those experienced in the nightmare.
	Reaction to the stimuli encountered in the nightmare (n = 8)	While awake, the individual presents an emotional response to a stimulus (e.g. a person) that was present in the nightmare.
	Satisfaction (n = 6)	A nightmare can bring satisfaction for the following reasons: 1) the nightmare fills a need for disorder, chaos; 2) the individual seeks or finds the meaning of a nightmare; 3) the individual shares his/her nightmare with others; and 4) a deceased relative is encountered in the nightmare.
	Negative emotions related to waking memories (n = 5)	The nightmare is associated with a past event; It is uncertain whether the negative emotion experienced in waking comes from the nightmare or the memory of the event.
	Reaction to the unreal nature of the nightmare (n = 4)	Upon awakening, realizing the unreal nature of the nightmare produces one of the following emotions: 1) anger, since the energy spent in the nightmare in relation to a person had no impact in reality; 2) disappointment following the realization that a deceased relative present in the nightmare is no longer alive; 3) relief, since the events of the nightmare did not happen in reality.
	Accountability (n = 4)	While awake, the individual considers himself/herself accountable for the actions he or she has committed in his or her nightmare or for experiencing a nightmare.
	Projection of the nightmare into reality (n = 4)	The individual imagines the events of the nightmare occurring in reality, which may generate negative emotions.
	Negative mood (n = 2)	The experience of nightmares and the fatigue that results from disturbed sleep produce a negative mood during the day.
	Addition to personal past experiences (n = 2)	The individual considers that the experience of the nightmare has a value similar to real experiences.
Cognitive consequences	Reflection or realization (n = 8)	The dream allows the individual to begin reflection, which can help him or her to realize or accept something. *This subcategory does not include realizations pertaining to the perceived source (or cause) of the dream.*
	Decreased concentration (n = 7)	The experience of nightmares and the fatigue that results from disturbed sleep decrease concentration during the day.
	Negative change in self-perception (n = 5)	The nightmare negatively affects the individual's self-image because: 1) the nightmare features rejection; 2) in the nightmare, the dreamer is unable to do certain tasks that he or she can do while awake; or 3) the experience of nightmares affects the degree of energy as well as the functioning of the individual during waking hours.
	Recovering the memory of the nightmare (n = 4)	The individual tries to recover as much of the memory of the nightmare as he or she can.
	Psychological fatigue (n = 2)	The nightmare produces psychological fatigue during the day, which is attributed to intense mental activity during the night.
Consequences on sleep	Decreased sleep quality (n = 10)	Nightmares impair the quality of sleep. For the same number of hours of sleep, the individual feels less rested than if he or she had not experience a nightmare.
	Sleep fragmentation (n = 9)	Nightmares produce nocturnal awakenings usually followed by a difficulty falling back to sleep.

negative waking emotions as a result of their nightmares; however, they do not clarify whether these emotions are the same as those experienced in their nightmares.

In addition, it appears that nightmares can influence waking emotions in many indirect ways. Firstly, irritability after a night with nightmares is common, and most participants

experiencing this symptom attribute it to a bad sleep. Similarly, the fatigue resulting from a bad sleep can produce a negative mood. Secondly, negative emotions can be experienced in reaction to persons or situations that were encountered in a nightmare.

03. […] in my nightmare I'm not able to serve my clients, then my boss says to me: "Ah, I know you can't do it, I don't even know why I hired you, you can never do it, we have complaints all the time". Then I'll go to work (in real life), I'll see my boss, and I'll be stressed. I'll say to myself, "Well, I have to do things well because otherwise she'll be angry at me" […]

Thirdly, the content of a nightmare can bring back negative memories. As a result, during the day, these negative memories can produce unpleasant emotions. Fourthly, upon awakening, the realization that the nightmare is not real can produce either negative emotions or a feeling of relief. Fifthly, negative emotions can result from taking responsibility for the actions committed in a nightmare, or from having experienced a nightmare. Sixthly, negative emotions can be experienced while imagining what it would be like if the events from the nightmare occurred in reality. Seventhly, memories of events experienced in nightmares can harbor an emotional value similar to real life memories.

02. Having a nightmare, it's like, "Ah it's crazy what I dreamed – the emotion." I could say, it's absurd, but I consider that I already survived having my throat cut, or being shot at, or being in an explosion while I was stuck in a car, for example.

On a brighter note, some participants report that their nightmares can be a source of satisfaction, for instance, when they discover the significance of a nightmare or share a nightmare with friends.

05. […] when I realized the meaning of my dream about the prostitute, listen, it wasn't necessarily a great time of my life, […] I used a lot of substances, but still, I was happy to understand it (the nightmare) that much […]

Results indicate that nightmares are also perceived to impact cognition. In this regard, nightmares sometimes allow one to initiate a reflection or to make a realization that goes beyond mere identification of the nightmare's cause.

01. For example, the dream I experienced repeatedly, in which my aunt died no matter what I did. Well, I ended up having, not a realization, but I thought about that, and considering that the dream went from bad to worse, it made me understand that no matter what I would have done, it (the actual death of her aunt) would have happened anyway.

Other consequences of nightmares on cognition are also reported. Expectedly, the memory of a nightmare or the fatigue resulting from a disturbed sleep can interfere with concentration. Similarly, a waking psychological fatigue is sometimes attributed to intense mental activity during the night. Besides, some participants mention that they sometimes attempt to recover as many memories of a nightmare as they can after remembering it spontaneously. Finally, being repeatedly rejected or depicted as helpless in nightmares is perceived to impair self-perception.

06. […] I often dreamed that my boyfriend did not love me any more, that my friends had no more respect for me, that my family rejected me, things like that. So, during the day, I said to myself; well, unconsciously, when you think that the world rejects you, you ask why you are being rejected, so you say "I'm not good enough, I'm not nice enough, I'm not beautiful enough, I'm not enough in anything.

As expected, many participants report that nightmares affect their sleep. Two mechanisms are involved: reduced sleep quality and nocturnal awakenings, often followed by a difficulty falling back to sleep.

17. […] I think that when I have nightmares, it's disturbing, it agitates my mind. So, I really feel that even though I do not wake up or move, it impairs my restful sleep […]

3.5. Strategies Used to Cope with Nightmares or their Consequences

We define the term "coping strategy" broadly by refering to any overt behavior or covert behavior (i.e., unobservable behaviors such as mental ones) aimed at avoiding the experience of nightmares, reducing their aversive nature, or alleviating their consequences.

Communication is one of the most reported strategies for coping with nightmares. It sometime involves sharing the nightmare with a friend, relative or professional (e.g. a social worker).

03. […] I do not feel like there are strategies, except perhaps to exteriorize, you know, to speak, to communicate, to exteriorize it all […]

Another communication strategy consists of contacting a friend, a lover or a relative who was encountered as a character in the nightmare. The later behavior often aims to ascertain that the nightmare content (i.e. the death of the friend or relative, or abandonment by the lover) does not correspond to reality.

17. […] when I have a nightmare in which I am no longer with my boyfriend, well the next day I tend to […] ask for validation, like "Do you still love me?" or other things that are irrational, because nothing has changed for him.

Not surprisingly, many participants try to influence the perceived causes of their nightmares. This means modification of their bedtime routine. In this regard, some participants use relaxation strategies to lower their stress level before lights-out, or avoid the use of screen-based electronics before sleep.

04. […] I was doing relaxation techniques to help me fall asleep, to reduce my stress. I told myself, "Well, if I'm less stressed, if I sleep better, I'll have fewer dreams, I'll have fewer nightmares, I'll have a more restful sleep."

Some participants use dream lucidity to cope with their nightmares. These participants report trying (often successfully) to wake themselves up or rationalizing about the unreal nature of the nightmare.

20. […] I will be able to react differently or to reason with myself while I dream, to tell myself: "It's a nightmare, I'm dreaming, it'll be alright."

Table 5. Strategies used to cope with nightmares or their consequences

Sub-categories	Codes	Description of strategies used to cope with nightmares or their consequences
To communicate	To verbalize the experience of the nightmare (n = 9)	The individual shares his or her nightmare with someone close to him/her or with a professional. The individual does not mention that this person was part of his/her nightmare.
	To communicate with an "actor of the dream" (n = 5)	While awake, the individual contacts a person who was seen in the dream.
To alleviate the perceived cause of nightmares	To promote relaxation before sleep (n = 9)	The individual tries to reduce his or her stress before falling asleep by using one or more strategies: 1) practicing a breathing technique; 2) meditating; 3) coloring; 4) taking a shower; 5) listening to music or watching a movie; 6) using natural products (e.g. herbal tea, hot milk, etc.); or 7) promoting a relaxing environment (e.g. lighting a candle).
	To avoid the use of screen-based electronics before sleep (n = 4)	N/A
To adopt strategies in lucid nightmares	To wake up from the nightmare (n = 6)	When the individual (i.e. the dreamer) realizes that he or she is in a nightmare, he/she tries to wake up, often by attempting to die in the nightmare.
	To rationalize that it is only a dream (n = 2)	N/A
To monitor sleep	To avoid sleep (n = 9)	The individual delays bedtime, uses an alarm clock to get up earlier, or refuses to go back to bed even if he or she still has time to sleep.
	To stay awake for a while after a nightmare (n = 5)	After a nightmare, the individual tries to stay awake for a period of time before going back to sleep.
Other strategies	To search for the source or meaning of the nightmare (n = 11)	N/A
	To use sleeping pills (including melatonin) (n = 8)	N/A
	To control thoughts before falling asleep (n = 5)	Before falling asleep, the individual adopts positive or neutral thoughts, or thinks of a dream he or she would like to experience.
	To write or draw the nightmare (n = 4)	The individual writes or draws his or her nightmare for one of the following reasons: 1) to facilitate his/her search for the meaning of the nightmare; 2) to eliminate his/her nightmares; or 3) to ascertain that the nightmare really occurred (i.e. that it is not just a false memory).
	To isolate oneself (n = 2)	The individual isolates himself/herself so as not to bother others because of the fatigue or irritability caused by his or her nightmares.

Sleep management strategies are also prevalent. Many participants avoid sleep at the beginning or at the end of the night, as they fear experiencing nightmares.

11. Well, for sure there are nights when I really do not want to sleep, so I try to study as much as possible because it keeps me awake.

Another sleep management strategy consists of staying awake after a nightmare, to avoid returning to the nightmare after falling back to sleep.

18. Sometimes when I go back too fast, when I go back to sleep right away, I return to my dream. And it's not cool. […] I'm going to stay awake and look at my cell phone.

Other coping strategies do not fall within a specific sub-category. Among them, the most prevalent strategies are identification of the source or the meaning of a nightmare and the use of sleeping pills or melatonin.

15. Let's say I'm in a period where I have a lot of nightmares and everything, well I will tend to stop myself and say "Ok (participant's name), why are you having more nightmares right now?" Then I look at, "Are you over-

working, are you sleeping enough, are you eating well, are you…?"

Another strategy consists of adopting positive or neutral thoughts before falling asleep, or thinking of a dream that would be pleasant. Interestingly, writing or drawing a nightmare is sometimes used to facilitate the search for the nightmare's significance, or to eliminate nightmares in general. Finally, a small number of participants isolate themselves after a nightmare, in part to avoid being unpleasant toward others.

14. It is true that I will be a bit unpleasant with everyone, at least in my entourage. So I prefer to isolate myself in those cases rather than get mad at these people.

4. Discussion

The objective of the present study was to explore the perceptions of nightmare sufferers regarding the functions, causes, and consequences of their nightmares, as well as the strategies they use to cope with nightmares. Semi-structured interviews were conducted with 20 university students who had experienced frequent nightmares within

the past 12 months. The results reveal a rich set of perceptions and strategies.

4.1. Perceived Functions of Nightmares

Half of the participants perceive that a function of dreaming is to reveal information about themselves. Individuals with this belief are more likely to attribute their nightmares to internal causes such as stress and fears, psychological traits, or interpersonal issues, to name a few. For these individuals, dream analysis in the context of individual therapy (Pesant & Zadra, 2004) might be especially helpful. For instance, some dreams may be used to better understand waking concerns (Malinowski, Fylan, & Horton, 2014). These individuals could also benefit from group dream sharing and interpretation, which has been shown to promote insight (Edwards et al., 2015; Edwards, Ruby, Malinowski, Bennett, & Blagrove, 2013).

Many participants believe that dreams, especially nightmares, might serve to release (negative) emotions experienced in waking hours. Individuals with this belief could be reluctant to use strategies that aim to eliminate nightmares, including searching for professional help. Indeed, these individuals could fear being overwhelmed with negative emotions in the event that their nightmares disappear, which might constitutes a barrier for treatment adherence (Krakow & Zadra, 2006). In contrast with this belief, treating nightmares usually results in a better emotional state. Indeed, meta-analyses (Casement & Swanson, 2012; Hansen, Höfling, Kröner-Borowik, Stangier, & Steil, 2013) reports that psychological interventions for nightmares concurrently reduce depressive symptoms, anxiety, and post-traumatic stress disorder symptoms.

4.2. Perceived Causes of Nightmares

In the present study, three of the most commonly reported causes of nightmares were stress or worries related to study or work, interpersonal issues, and affects – stress and fears – for which no source was specified. Similarly, previous studies found that frequently perceived causes were "school and job pressures", "conflicts in relationships" (Dunn & Barrett, 1988), "interpersonal relationships", "negative emotions and states" (Cohen & Zadra, 2015), "work and studies", "relationships", and "worries and emotions" (Malinowski, 2016). These similarities between the present study and previous ones appear despite methodological differences. Indeed, while Dunn and Barrett (1988) focused on nightmares in general, Cohen and Zadra (2015) focused on the worst nightmare ever experienced, and Malinowski (2016) focused on the most recent dream (not limited to nightmares). According to the continuity theory, dreams emphasize an individual's waking conceptions and concerns (Domhoff, 1996, 2011). The results of the present study, in addition to previous investigations, suggest that nightmares are manifestations of concerns related to school, work, and relationships. The fact that nightmares are perceived to be triggered by stress and fears, which by definition are related to concerns, also supports the continuity hypothesis.

4.3. Perceived Consequences of Nightmares

According to the participants, nightmares impact sleep, which in turn can affect cognition, behaviors, and emotions. Most participants reported that nightmares reduced their sleep quality or produced nocturnal awakening (often followed by a difficulty falling back to sleep), which resulted in fatigue during waking hours. These consequences of nightmares on sleep were also highlighted in previous studies (Hinton et al., 2009; Köthe & Pietrowsky, 2001). In the present study, many participants also mentioned that their fatigue or the memory of their nightmares had a negative impact on their concentration. This result is consistent with previous findings (Pietrowsky & Köthe, 2003). In fact, nearly 40% of nightmare sufferers experience dreams so intense they cannot stop thinking about them during the day (Schredl, 2013b). Moreover, the present study highlights that the experience of nightmares and the resulting fatigue or difficulty focusing on tasks is perceived to interfere with daily functioning, in addition to cause waking irritability.

It is clear from the results of the present study that nightmares influence daily emotions both directly and indirectly. Previous studies have reported an effect of nightmares on mood upon awakening (Dunn & Barrett, 1988; Hochard, Heym, & Townsend, 2015; Köthe & Pietrowsky, 2001) and during the day (Köthe & Pietrowsky, 2001; Pietrowsky & Köthe, 2003). A direct effect of nightmares on mood during waking hours could be explained by a priming effect, i.e. the emotions that are experienced in a nightmare could remain primed in the waking state (Selterman, Apetroaia, Riela, & Aron, 2014). In addition, the present study reveals many mechanisms through which nightmares could exert an indirect effect on emotions during waking hours. For instance, nightmares could activate painful memories. Also, within a nightmare, stimuli (e.g. persons) could be associated with fear through classical conditioning. These stimuli or persons would then trigger a reaction of fear in the waking state. As a final example of an indirect consequence of nightmares on waking emotions, it was reported that nightmares can result in relief upon realizing that "it was just a dream".

4.4. Strategies Used to Cope with Nightmares or their Consequences

Sleep management strategies were reported. Almost half of the participants avoided sleep at the beginning or at the end of the night. Considering that dreams are more frequent in rapid eye movement sleep (REM) than in slow wave sleep (Nielsen, 2000), and that REM sleep increases through the night (Carskadon & Dement, 2005), reducing sleep time could effectively lower nightmare frequency. Another strategy reported by participants consisted of staying awake after a nightmare to avoid returning into the nightmare. Although these sleep management strategies might help in the short term, they are likely to increase waking fatigue.

Some participants used dream lucidity to cope with their nightmares. More precisely, they tried to wake themselves up or to rationalize (within the nightmare) about the unreal nature of the nightmare. Lucidity came naturally in all cases reported, which supports the hypothesis that nightmares tend to trigger lucidity (Schredl & Erlacher, 2004). According to a previous study (Thünker et al., 2014), about one in ten nightmare sufferers uses dream lucidity as a coping strategy. Although lucidity induction techniques (for a review, see Stumbrys, Erlacher, Schädlich, & Schredl, 2012) can be used in the treatment of nightmares (Aurora et al., 2010; Morgenthaler et al., 2018), voluntary awakening from a dream is not recommended. Indeed, this technique increases sleep fragmentation and could disrupt the sleep

structure in ways that are yet unknown. Instead, if the nightmare features a threatening dream character, it has been recommended to confront it (e.g., to communicate with it), which can make the dream less threatening (Spoormaker & van den Bout, 2006). In our own qualitative study with lucid dreamers (Lemyre, Légaré Bergeron, Bolduc Landry, Garon, & Vallières, manuscript in preparation), we found that reacting positively (e.g., with a compassionate attitude) to a threatening dream character can be effective in transforming the nightmare into a non-threatening dream.

4.5. Integrated Model

Figure 1 depicts the perceptions and strategies that were reported, as well as their potential links. As shown in the figure, the perceived functions of nightmares could influence the perceived causes of nightmares, as well as the choice of coping strategies. The perceived causes of nightmares also influence the choice of coping strategies. In turn, coping strategies can alleviate or worsen the perceived consequences of nightmares. Although not specified by the par-

ticipants, the perceived consequences of nightmares are likely to influence some perceived causes of nightmares, creating a recursive loop. Finally, the perceived causes of nightmares could exert an influence on one another, in the same way that the perceived consequences of nightmares can produce or worsen other perceived consequences.

5. Clinical implications

As discussed in the introduction of this article, trait affect distress, which can be amplified by childhood adversity and traumatic experiences, is thought to play a role in triggering or maintaining nightmares (Gieselmann et al., 2019; Levin & Nielsen, 2007). Our findings indicate that only a few participants had an implicit knowledge of this process. First, four participants reported that trait anxiety (a construct similar to trait affect distress) can contribute to their nightmares. A small number of participants also reported significant negative events, including traumas, as a causal factor. On the other hand, childhood adversity was only reported by one participant (under the label "prolonged event that does not threaten life"). In the light of these results, it appears that
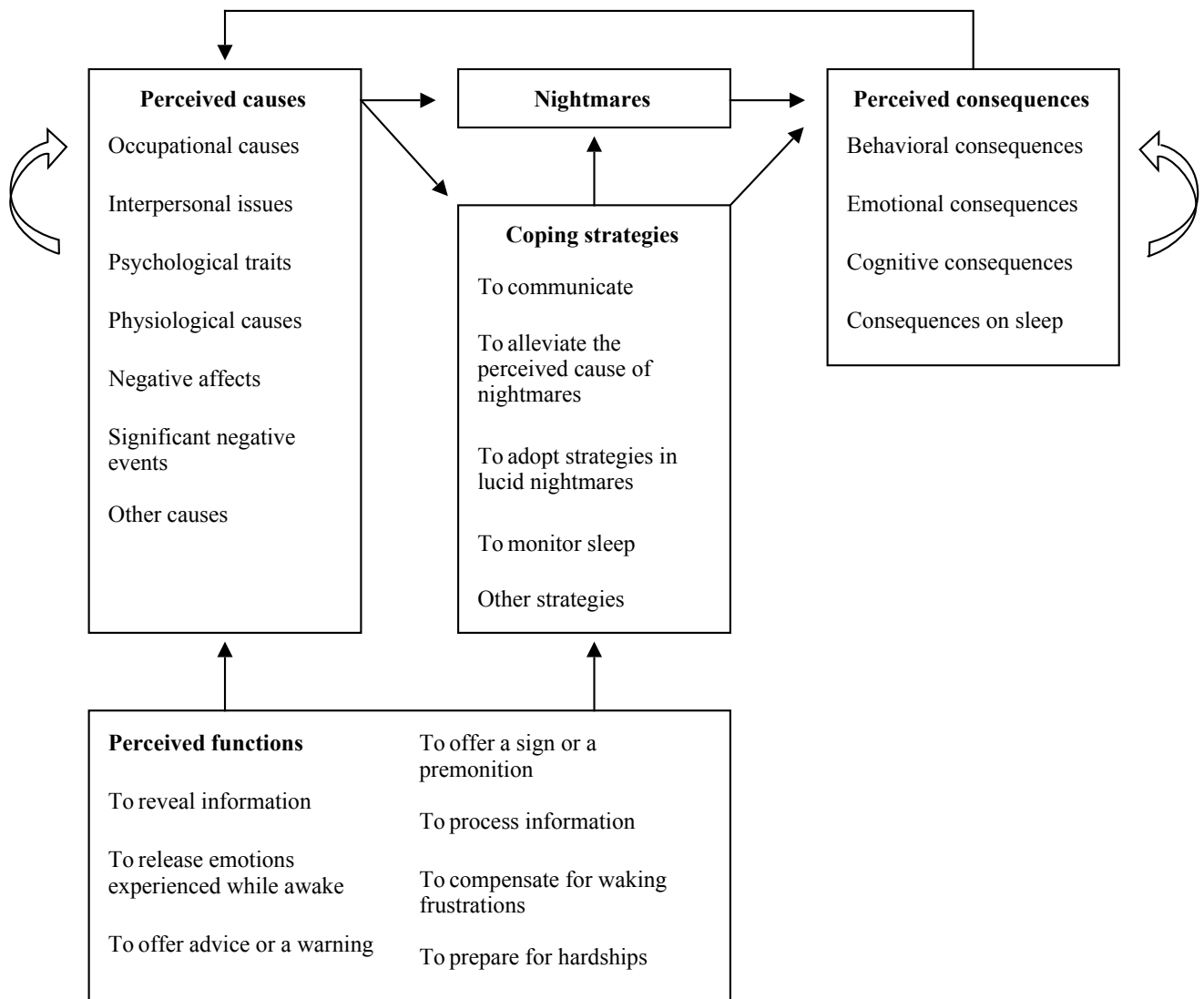

Figure 1. A model depincting the potential links between the perceptions of nightmare sufferers regarding their nightmares, and their strategies for coping with nightmares.

some nightmare sufferers might benefit from psychoeducation regarding the possible impact of trait affect distress on nightmares.

In the literature, hyperarousal (including an elevated affect load) is also hypothetized to be contributive to nightmare etiology (Gieselmann et al., 2019; Levin & Nielsen, 2007). In that regard, more than half of the participants perceived occupational or interpersonal issues – two variables expected to increase affect load – as a cause of their nightmares. Half of the participants also mentioned stress – a construct directly related to affect load – as a cause of their nightmares. In the same vein, nine participants tried to relax before sleep, which could be viewed as an attempt to reduce pre-sleep cognitive or physiological hyperarousal. However, some of the strategies that were used (e.g., reading, listening to music) may have limited effectiveness. For patients motivated to reduce their hyperarousal, more effective relaxation strategies (e.g., progressive muscular relaxation; Morgenthaler et al., 2018) might be taught.

Maladaptive beliefs about nightmares are also hypothetized to play a role in nightmare etiology (Gieselmann et al., 2019). In our study, some participants perceived that dreams and nightmares can offer a sign or a premonition. Such belief can be expected to increase the degree of distress associated with nightmares (Belicki, 1992). Beyond the results of the present study, there is a need to identify maladaptive beliefs about nightmares and to address them in treatment (Rousseau & Belleville, 2018). A recent study (Schredl et al., in press) shed light on this question by developing a scale assessing beliefs about nightmares. Items appear to reflect positive beliefs, neutral beliefs, as well as more maladaptive beliefs (e.g., "Nightmares are a sign that something bad is going to happen"; Schredl et al., in press). Future research could focus on developing a scale that assesses maladaptive beliefs specifically.

6. Limitations and Strengths

The results of this study should be interpreted in the light of methodological limitations. First, the presence of a nightmare disorder in the participants was not ascertained with a diagnostic interview. Secondly, the sample was composed of university students with only two males. Some of the perceptions and strategies that were identified might be more specific to university students, and different findings might be obtained with other populations. Nonetheless, university students appeared to be an appropriate population for this study. Indeed, higher education students face numerous stressors, which is likely to increase their risk of experiencing nightmares. More precisely, higher education brings many challenges, including a significant work load, competitive evaluations, tight schedules and often, limited financial resources (Robotham, 2008; Terriquez & Gurantz, 2015). Consequently, students are at risk of experiencing a significant affect load, which in turn predicts nightmare frequency (Levin, Fireman, Spendlove, & Pope, 2011; Levin & Nielsen, 2007). Overall, 10% of college students present a probable nightmare disorder (Nadorff, Nazem, & Fiske, 2011). Besides, this study also presents strengths. Most importantly, saturation was reached, and three different strategies were used to improve the validity of the codification process.

7. Conclusion

Four major findings emerge from this study. Firstly, the main

perceived causes of nightmares (i.e. stress or worries related to one's professional and social life, and negative affects) support the hypothesis that dreams reflect waking concerns. Secondly, nightmares tend to decrease sleep quality and to provoke sleep fragmentation, which may be aggravated by sleep avoidance and voluntary awakening from lucid nightmares. In turn, the fatigue that results from a disturbed sleep can negatively affect concentration, functioning, and mood. Thirdly, nightmares can directly and indirectly impact emotions, upon awakening and during the day, through various mechanisms. Fourthly, nightmares are often perceived as a source of personal insight: half of the participants believe that their dreams can reveal information about themselves, searching for the meaning of nightmares is one of the most popular coping strategies, and many participants experienced a reflection or realization following a nightmare. This last discovery suggests that most nightmare sufferers would be willing to (and could benefit from) analyzing their nightmares in the context of psychotherapy.

In conclusion, future studies could focus on testing the relationships presented in the integrative model (Figure 1) with quantitative methods. For instance, it could be tested whether the reduced sleep quantity or quality resulting from nightmares, sleep avoidance, or voluntary awakenings potentiates one's emotional reactivity (i.e., trait affect distress) to the perceived causes of nightmares (e.g., stressors such as occupational or interpersonal issues). This would be expected if sleep serves an emotion regulation function (Deliens, Gilson, & Peigneux, 2014; Walker, 2009). The understanding of such mechanisms would have ramifications in clinical practice by allowing the targeting of perceptions or behaviors that contribute to the continuance of nightmares. Another interesting area of research would be to test the relationship between nightmare frequency and the perceptions of nightmare sufferers regarding the causes, consequences, and functions of their nightmares, as well as their coping strategies.

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