

Pre- and post-sleep stress levels and negative emotions in a sample dream among frequent and non-frequent nightmare sufferers

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Summary

Aim. This study examined whether self-identified frequent nightmare sufferers report stronger negative emotions in their everyday dreams and higher stress levels in the evening and in the morning than reported non-frequent nightmare sufferers.

Method. Sixty participants ranging in age from 13 to 58 selected on the basis that they self-reported having more than one nightmare a week, or less than one nightmare a month. For the assessment the authors used four questionnaires: a demographic questionnaire, daily report summary questionnaires, dream diaries, and post-dream diary questionnaires.

Results. A MANOVA performed on a dream recalled by frequent nightmare sufferers revealed an overall significant difference in negative emotions ($p < 0.01$), which was significantly attributable to higher levels of dream fear and anxiety (both, $p < 0.01$). Frequent nightmare sufferers also reported experiencing significantly more negative mood and higher stress levels before and after sleep ($p < 0.01$).

Discussion. Results support the continuity hypothesis between waking and dreaming.

nightmare sufferers / dream emotions / stress

INTRODUCTION

While the average person rarely experiences nightmares, a considerable number of people frequently suffer from them [1, 2, 3, 4] with estimates at eight percent or more of the population [5, 6]. For the average person, a nightmare does not necessarily impinge on overall psychological health, but people with frequent nightmares have been linked to low psychological well-being [7], sleep disturbance [8] including insomnia, sleep onset latency, reduced amount and quality of sleep, and higher levels of depression and

anxiety [1, 9, 10]. There is widespread research on nightmares among frequent nightmare sufferers, but comparably less have been conducted on the regular dreams of this population, irrespective of their nightmares. Nightmares have also been extensively studied among frequent and non-frequent nightmare sufferers as individual groups, but there is little comparative research between these two groups on their evening and morning stress levels and moods.

Among the postulated reasons of nightmares, there is the dream continuity hypothesis, which states that current waking-life experiences, such as stress, are integrated into succeeding dreams [11]. This theory has been implicated in and supporting of predictions of state and trait factors [4], previous interpersonal difficulties [12], and the strong influence of acute, current stressors [13, 4] playing an important role in frequency of nightmares. Perlis and Nielsen [14] observed that pre-sleep anxiety and stress affect

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REM sleep and dream content of their subjects, as stressful daytime elements were incorporated into their dreams. The continuity hypothesis also functions inversely, as dreams also exert effects on waking behaviours [15]. Zadra and Donderi [6] indicated that people who experience bad dreams are low on self-reported measures of well-being, but not to the degree exhibited by those who have nightmares. Nightmares are singular in that they tend to involve more intense negative emotions, a lingering sense of fear or anxiety, and vivid recall of the dream content [16, 17, 18]. Also, Blagrove et al. [9] found that the frequency of unpleasant dreams was significantly correlated with the level of well-being. These observations fit well with the neurocognitive model proposed by Levin and Nielsen [19] which shows that nightmare sufferers have higher levels of *affect distress*, a disposition to experience events with distressing, highly reactive emotions, which leads to nightmares in situations when their affect load is higher due to daily emotional experience. It would thus seem that a trait established higher stress level would be present in nightmare sufferers so that their levels of stress would still be high at bedtime even on nights that are not affected by nightmares.

The present study aims therefore to investigate a sample dream of frequent nightmare sufferers in order to verify whether their experienced emotional tone is also more negative than that of the dreams of non-nightmare sufferers. Furthermore, in order to test the continuity hypothesis between waking and dreaming, the study examined evening stress, morning stress, and dream emotions in nightmare sufferers compared to non-nightmare sufferers.

More specifically, it was predicted that participants who report a nightmare frequency of once a week or more are expected to report having experienced more negative emotions (fear and anxiety) in their dreams than those who report a nightmare frequency of less than once a month. It was also predicted that nightmare sufferers would report higher evening and morning stress levels and more negative morning moods (more worry, fear, anxiety, anger, sadness, disappointment, guilt, and disgust) than non-nightmare sufferers.

METHOD

Participants

The population for the present study was selected from a larger, normative Canadian dream study, conducted at the University of Ottawa Sleep Laboratory. The study received approval from the University of Ottawa Ethics Committee. A total of sixty participants ranging in age from 13 to 58 were selected on the basis that they self-reported having more than one nightmare a week, or less than one nightmare a month. Thus, participants were split into two samples on this basis: thirty were classified as frequent nightmare sufferers and thirty as non-frequent nightmare sufferers. Both groups contained a comparable number of males and females, and number of participants per age group (i.e. roughly equal numbers of adolescents, young adults, and middle-aged adults). All participants gave informed consent (co-signed by parents in the case of adolescents), and received a document summarizing information about the study prior to participating.

Measures

For this study, four questionnaires were used: a demographic questionnaire, daily report summary questionnaire, dream diary, and post-dream diary questionnaire.

General information questionnaire. Participants completed a comprehensive demographic questionnaire which comprised questions about age, marital status/number of children, level of education, employment history, present use of medication, general sleep habits, dream recall, and frequency of nightmares.

Daily report summary sheet & mood checklist. Participants were asked to complete a daily report summary sheet every night prior to bedtime, briefly describing the main events of their day. These sheets were also accompanied by a mood checklist, which is a descriptive instrument created by Folkman and Lazarus [20], modified by Delorme [21]. For the purpose of this study, only negative emotions (wor-

ried, fearful, anxious, angry, sad, disappointed, guilty, and disgusted) were used. The daily report summary sheets also contained inquiries as to whether or not the participant experienced a stressful moment in their day, and to specify the highest level of daytime stress experienced on a five-point Likert scale.

Dream diary and post-dream diary questionnaires. The dream diary calls for a detailed description of the participant's dream, requesting that participants be specific on the location, events, persons, feelings, and activities of the dream. These diaries conformed to the suggestions of Domhoff [22]. Participants were required to answer various Likert-type questions evaluating dream recall, dream vividness, experienced emotions, and general dream content. As mentioned, for the purpose of this study, only experienced negative emotions were examined.

Procedures

Participants were asked to complete the general information questionnaire and were then invited to complete the daily report summary sheet each night before bedtime during a three-week period. If participants were able to recall a dream upon awakening the next morning, they were asked to put it in writing in the dream diary. Following their dream report, participants were invited to answer questions about their dream in the post-dream questionnaire. Participants were instructed to record a maximum of four dreams in their dream questionnaire over the three week period. For the present analysis, given the unequal number of dreams reported, only the first dream was used. None of the participants identified their dream as being a nightmare.

RESULTS

A first observation is that there was a significant difference between the two groups on dream recall frequency as measured by the questionnaire, $t(56)=2.23$, $p<0.05$. A score of one denotes a dream recall of "almost every night," a score of two denotes "many times a week," and

a score of three denotes "approximately once a week." Frequent nightmare sufferers ($M=1.97$, $SD=1.03$) on average reported better dream recalls than non-frequent nightmare sufferers ($M=2.65$, $SD=1.33$).

In order to test the first hypothesis, ANOVAs were conducted on the self-reported levels of fear and anxiety in participants' dreams. The ANOVA on fear was significant, $F(1,59)=21.07$, $p<0.01$, $\eta^2=0.21$, as well as anxiety, $F(1,59)=8.31$, $p<0.01$, $\eta^2=0.19$, both with frequent nightmare sufferers scoring higher.

In order to test the second hypothesis, ANOVAs were conducted to determine whether frequent nightmare sufferers differed in pre-sleep and post-sleep stress levels and mood. Tab. 1 – next page summarizes the results. An ANOVA revealed that nightmare sufferers experienced higher stress levels than non-nightmare sufferers ($p<0.01$) both at bedtime and in the morning. ANOVAs also revealed significant differences between the two groups on four of the eight pre-sleep and one of the eight post-sleep mood variables using an error rate of 0.01 (Bonferroni family-wise correction of $\alpha 0.10/8=0.01$)

DISCUSSION

This investigation sought to determine whether a sample dream of frequent nightmare sufferers involved more negative emotions compared to non-nightmare sufferers. It was also initiated to explore whether bedtime and morning stress levels and moods differed between these two groups. Results supported the first hypothesis and were consistent with previous findings [e.g., 9] that have indicated that the overall dream experience of frequent nightmare sufferers is more negative. Specifically, frequent nightmare sufferers were found to report more fear and anxiety in their regular dream than the control group. This may be explained by previous findings indicating that high-nightmare individuals respond with higher levels of emotional intensity in general [23] to stimuli, and that they tend to have thinner boundaries than normal [4]. This might place them at a higher inclination to interpret dream experiences in general more negatively.

Table 1. Means and standard deviations of evening and morning mood dimensions and dream negative emotions among both groups

variable	frequent nightmare sufferers		non-frequent nightmare sufferers	
	M	SD	M	SD
night psychological mood				
worry	1.47*	0.94	0.65*	0.80
fear	0.73*	0.91	0.06*	0.25
anxiety	1.37*	0.96	0.55*	0.62
anger	0.80	0.96	0.26	0.68
sadness	0.87	0.97	0.35	0.61
disappointment	1.07	0.98	0.45	0.81
guilt	0.57	0.90	0.23	0.50
disgust	0.47	0.78	0.23	0.76
stress level	1.77*	1.07	1.00*	0.89
self-reported negative dream emotions				
fear	2.63*	1.30	1.39*	0.76
anxiety	2.80*	1.19	0.88*	0.16
morning psychological mood				
worry	0.93*	0.83	0.29*	0.53
fear	0.60	0.86	0.06	0.36
anxiety	1.07	0.91	0.52	0.72
anger	0.27	0.69	0.13	0.34
sadness	0.67	0.92	0.48	0.68
disappointment	0.80	0.96	0.23	0.56
guilt	0.30	0.75	0.16	0.52
disgust	0.10	0.31	0.00	0.00
stress level	1.50*	0.97	0.70*	0.92

* $p < 0.01$

Results have also revealed that frequent nightmare sufferers experience significantly more worry and stress the morning after a dream, and significantly more worry, fear, anxiety, and stress the night before a dream. These findings suggest that frequent nightmare sufferers have poorer psychological well-being, which is consistent with several studies in this domain [6, 9, 12, 15]. They also give support for the continuity hypothesis, as frequent nightmare sufferers also reported feeling more fear and anxiety in their dreams; their pre-sleep anxiety and stress seem to be in continuity with their dream content [14], and their dream emotions seem to be reflected in their waking emotional state [24].

Though it is impossible to determine the precise cause of this relationship, there are many theories that may shed light on this phenomenon. It is possible that stressful daytime experiences were incorporated into the dreams of frequent nightmare sufferers. Schredl [4] and Blagrove et al. [9] have suggested that nightmare sufferers have a higher predisposition to stress. It is also possible that the nightmare distress that often surrounds the experience of nightmares [3] predisposes frequent nightmare sufferers to go to bed with poorer moods in anticipation that they might experience a nightmare or negative dream. Results have also revealed that frequent nightmare sufferers are better able to recall their

dreams, in keeping with Levin's [25] research. This may further explain the affliction of nightmare sufferers; not only is the emotional content of their dreams more negative, but they also remember them better. Finally, also as reported by Levin [25], nightmare sufferers are more affected by their dreams.

This study has some limitations that need to be acknowledged. Only one dream per participant was analyzed for the purpose of this study. A larger sample size that includes dream diaries with more dream reports would provide a more valid and reliable indication of the experienced emotions in the routine dreams of nightmare sufferers, findings of which might then be generalized on a larger scale to similar groups. The use of more scales such as the Hall and Van de Castle scales [22] to analyze dream content would provide more information on the characteristics of the non-nightmare dreams of nightmare sufferers. The sample population was fairly homogenous, with females being overrepresented, which could restrict generalization of the present findings to males. Finally, since the least frequent option for having nightmares in the general information questionnaire was "less than once a month," it is possible that this limited description included participants who have nightmares several times a year, as well as others who have them only on a yearly basis or less. Future studies should provide a more broad-ranging scale in this category to allow for better differentiation of the groups.

The present data do not allow us to establish directions of causality for the relationship between frequency of nightmares and morning and evening stress level and mood, and these significant relations may be modulated by individual factors, for example, anxiety [10] or boundary thinness [26]. While this study has demonstrated that even the regular dreams of nightmare sufferers induce more fear and anxiety than those of non-frequent nightmare sufferers, future studies of an experimental nature would be invaluable in clarifying the precise relationship between nightmares and poor psychological well-being, and nightmares and the emotional experience of regular dreams.

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