The Nightmare Proneness Scale as a measure of the propensity to experience frequent nightmares

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Summary. The Nightmare Proneness Scale (NPS; Kelly, 2018) has been described as a measure of the propensity to experience frequent nightmares. However, previous research has only examined the NPS in relation to a continuum of lower to higher nightmare frequencies rather than its relationship to frequent (i.e., at least weekly) nightmares. The current study examined differences in high and low NPS scores across different frequencies of nightmares and dream recall among 824 university students. A significant 71% of individuals reporting frequent nightmares were classified as high on the NPS. Similarly, 71% of individuals reporting never experiencing nightmares were classified as low on the NPS. Dream recall had little relationship with NPS scores. The results support the proposal that high NPS scores indicate a tendency to experience frequent nightmares. Suggestions for additional research on the NPS and understanding differences in mechanisms of dreams and nightmares are discussed.

Keywords: Nightmare frequency, Nightmare Proneness, Dream recall frequency

1. Introduction

The Nightmare Proneness Scale (NPS; Kelly, 2018) ostensibly measures a trait-like disposition to experience frequent nightmares – disturbing and easily remembered dreams that awaken the sleeper (Levin & Nielsen, 2007). Initial evidence for validity of the NPS has been supported from several findings of generally moderate correlation coefficients (i.e., r's=.25–.51) between the NPS and various measures of nightmare frequency (Kelly, 2018, 2022, 2023; Kelly & Daughtry, 2022; Kelly & Mathe, 2019; Kelly & Yu, 2019). However, previous studies assessed nightmare frequency as a continuous variable making it difficult to ascertain if NPS scores represent a tendency for frequent nightmares rather than relating to relative frequency of nightmares. Frequent nightmares (i.e., at least weekly) are reported by about 4% of community samples and have been associated with negative mental health outcomes (Sandman et al., 2013).

The NPS was developed by selecting items from a larger pool of maladjustment markers based on their ability to discriminate between individuals reporting nightmares and controls (Kelly, 2018). As such, several items are like those on measures of neuroticism and psychological distress (Kelly & Mathe, 2019). Yet, the NPS accounts for nightmare frequency incremental of neuroticism and distress suggesting it involves other processes (Kelly & Yu, 2019). These processes have yet to be examined adequately though previous research and speculation provide some possibilities. For instance, NPS scores are associated with lower levels of physical activity (Arbinaga et al., 2019) and an evening chronotype (Toscano-Hermoso et al., 2020) suggesting possible psychophysiological processes. Further, NPS scores have been posited to suggest a concretization process whereby vague, perturbing mental states are represented more tangibly in dream imagery (Kelly, 2023; Kelly & Daughtry, 2022; Kelly & Mathe, 2019).

It should be noted that representation of inner states in dreams is not specific to nightmares. The continuity hypothesis of dreams implies that dreams contain imagery representing waking states (Schredl, 2017). Indeed, "normal" dreams, in general, can be defined as non-disturbed mental activity during sleep which often includes representations from waking states (Levin & Nielsen, 2007; Pagel et al., 2001). What appears to differentiate normal dreams from nightmares is that nightmares are more associated with perturbation, difficulty dis-embedding imagery from strong negative affect, and inclusion of recognizable whole (vs. disguised fragments) of fear-related memories (Levin & Nielsen, 2007). Despite theorized differences and different patterns of correlates for dreams and nightmares (Schredl & Rauthmann, 2022), their similarities leave open the possibility that the NPS is tapping a tendency to dream rather than nightmares specifically. To date only one study (Kelly, 2023) examined the relationship between the NPS and dream recall. Findings were mixed: continuous dream recall and NPS scores were not correlated significantly; however, individuals categorized with high NPS scores scored significantly higher on dream recall.

The aim of the current study was to examine if levels of nightmare frequency (i.e., never, a few a year, weekly) are different among individuals scoring high and low on the NPS. Such findings would support the validity of the NPS. Further, this study aimed to extend the findings of Kelly (2023) by examining if the NPS is sensitive to different frequencies of dream recall. It was hypothesized that significantly more individuals reporting frequent nightmares would be classified as having high NPS scores. Further, considering that the NPS was designed to assess a tendency to experience nightmares rather than dreams, it was predicted that levels of dream recall frequency would not be significantly different for individuals classified as having high or low NPS scores.

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2. Method

2.1. Participants and Procedure

Participants included 824 (576 female, 247 male, 1 unidentified) students enrolled in undergraduate psychology courses at a university in the United States. The average age of the sample was 19.83 (*SD*=4.27) years, *Mdn* = 19.00. After obtaining informed consent, participants recruited from a psychology participants pool completed questionnaires on "Sleep and Personality" using an online system. Data were collected across two years. No time limit was set for questionnaire completion and no exclusionary criteria were used. Nominal extra credit was offered in exchange for participation.

2.2. Measures

2.2.1 Nightmare Proneness

The 14-item Nightmare Proneness Scale (NPS; Kelly, 2018) is purported to measure a tendency to experience frequent nightmares. Items appear largely to represent dysregulated mentation (Kelly & Mathe, 2019). Participants responded to items using a (1) strongly disagree to (7) strongly agree scale. Higher total scores indicate more nightmare proneness. Retest reliability of the NPS was reported to be .72 (1 week; Kelly, 2018).

2.2.2 Nightmare Frequency

Nightmare frequency was measured using the item "About how often do you experience nightmares?" Nightmares were defined for participants as "disturbing, easily remembered dreams that awaken you from sleep." Response options were (0) never, (1) 1 a year or less, (2) 2-12 a year, (3) 2-3 a month, and (4) at least once a week. Retest reliability of a similar item was reported to be .75 (2 weeks; Schredl et al., 2014).

2.2.3 Dream Recall Frequency

Assessment of dream recall frequency was measured by the item "In the past several weeks, how often have you recalled your dreams?" In attempts to reduce possible common method variance between nightmare frequency and dream recall items, response options for the dream recall item were presented differently from the nightmare item (Podsakoff et al., 2003). Participants responded (0) never, (1) rarely, (2) sometimes, (3) usually, (4) very often. Retest reliability of a similar item with was reported to be .76 (2 weeks; Schredl et al., 2014).

2.3. Statistical Analysis

SPSS 28 for Windows was used for analyses. Given the ordinal measure of nightmare frequency, Spearman correlations were used to examine relationships between variables. A median split of NPS scores from the current sample was used to create high and low NPS groups. The frequency of high and low NPS scorers for each level of nightmare and dream recall frequency were compared using χ^2. Findings were considered significant if p<.05 (two-tailed). Cohen's w (Cohen, 1988) was used for effects size: .10, .30, and .50 are considered small, medium, and large effects, respectively.

3. Results

NPS descriptive data from this sample are as follows: *M*=46.67, *SD*=16.89, *Mdn*=46.00, and *α*=.89, skewness=.12. These findings indicate good internal consistency reliability and a relatively normal distribution. Nightmare frequencies are presented in Table 1 and dream recall frequencies are presented in Table 2. Spearman correlations revealed that the NPS was significantly related to nightmare frequency, r_s=.261, p<.001, but not dream recall frequency, r_s=.054, p=.122. Nightmare frequency and dream recall were significantly related, r_s=.340, p<.001. An exploratory partial correlation found NPS scores remained significantly related to nightmare frequency when controlling gender and dream recall, r=.255, p<.001.

As presented in Table 3, significant differences were found between individuals classified as high or low on the NPS and all nightmare frequencies except the intermediate category 1-12 a year. Medium effects were observed for the extreme nightmare frequencies where 71.2% of individuals reporting frequent nightmares (at least once a week) scored high on the NPS and 71.4% of individuals reporting never having nightmares scored low on the NPS. With small effects, but still significant, were differences in frequencies of high and low NPS scorers for the 2-3 nightmares monthly category (60.4% high NPS) and fewer than one nightmare a year (56.8% low NPS). As presented in Table 4, there were no significant differences between number of high and low NPS scorers for any frequency of dream recall.

4. Discussion

Consistent with the hypotheses and previous research (Kelly, 2018, 2023), significantly more individuals classified as high on the NPS reported frequent nightmares. Also of note, low NPS scores corresponded with reporting never having nightmares. The results supported the validity of the NPS. Given that a substantial number of individuals with low NPS scores also reported frequent nightmares, it should be em-

Table 1. Nightmare Frequency.

Categories	Frequency	Percentage
Never	56	6.8
1 a year or less	382	46.4
1-12 a year	180	21.8
2-3 a month	154	18.7
At least once a week	52	6.3
Total	824	100

Table 2. Dream Recall Frequency.

Categories	Frequency	Percentage
Never	32	3.9
Rarely	202	24.5
Sometimes	361	43.8
Usually	151	18.3
Very often	78	9.5
Total	824	100

Table 3. Nightmare Frequency x Nightmare Proneness Scale (NPS) Group.

Category	Nightmare Frequency				
	Never	≤ 1/yr	1-12/yr	2-3/mo	≥1/wk
Low NPS	40 (71.4%)	217 (56.8%)	80 (44.4%)	61 (39.6%)	15 (28.8%)
High NPS	16 (28.6%)	165 (43.2%)	100 (55.6%)	93 (60.4%)	37 (71.2%)
χ^2	10.29, p=.001, w=.43	7.08, p=.008, w=.14	2.22, p=.136, w=.11	6.65, p=.010, w=.21	9.31, p=.002, w=.42

phasized that higher NPS scores seem to represent a tendency to experience frequent nightmares rather than actual nightmare occurrences, and this with only with a medium effect size.

Also consistent with the hypotheses and clarifying previous findings (Kelly, 2023), high and low NPS scores had little relation with dream recall. This suggests whatever mechanisms and processes that are tapped by the NPS are more related to nightmares than normal dreams. More to the point, and consistent with previous findings (Schredl & Rauthmann, 2022), though nightmares are considered dreams, there was divergence in their relationships with nightmare proneness which should be examined further. Aside from the NPS, other possible differences between nightmares and dreams might include nightmares being more related to maladjustment (Levin & Nielsen, 2007), sensory processing sensitivity (Carr & Nielsen, 2017), or schemas that make individuals more sensitive to threatening dream material (Schredl et al., 2019). Further research is needed to examine these possible differences between nightmare frequency and dream recall frequency.

While the current findings support the notion that high NPS scores indicate a tendency to experience frequent nightmares, it remains unclear how. One obvious possibility is some form of maladjustment. This would be consistent with Levin and Nielsen's (2007) Neurocognitive Model and the content of some NPS items. However, the NPS accounts for nightmares incremental of general indices of maladjustment (Kelly, 2018, 2023; Kelly & Mathe, 2019; Kelly & Yu, 2019). Another possibility is that high NPS scorers experience poorer sleep making nightmares more accessible to memory. However, the NPS accounts for nightmares outside of sleep difficulties (Kelly, 2022). Finally, it is possible that the NPS encompasses other processes such as concretization of vague, unpleasant inner states (Kelly & Daughtry, 2022). While there is preliminary indirect evidence supporting this speculation (Kelly, 2023), additional study is needed. Regarding the NPS taps concretization, further in-

vestigation is needed of it and how concretization for nightmares differs from representation of experiences in dreams.

The current findings lead to additional questions regarding the positioning of the NPS in both nightmare etiology and general mental health. First, combining previous research with the current findings there appears to be an interweaving of psychopathology, nightmare proneness, and frequent nightmares (Kelly, 2023; Levin & Nielsen, 2007; Sandman et al., 2013). Given that frequent nightmares may be an indicator of at least moderate levels of psychopathology (Liu et al., 2022), it is possible, especially considering its content, that the NPS simply represents subclinical poor mental health specific to nightmares. However, the NPS is hypothesized to indicate its own processes outside psychopathology (Kelly & Daughtry, 2022). More research is needed to clarify this issue. Either way, the current findings lead to a second, related, issue. That is, whether or not nightmares are an emergent outcome of combinations of the myriad elements reflected by NPS items (see Kelly, 2018) or result more from one, or a subset, of these elements.

It should be noted that the current study has several limitations which should be considered before generalizing the results. For example, the sample included mostly young adults. Young adults tend to report more nightmare frequency than older adults (Levin & Nielsen, 2007). As such, the sample utilized in this study may not reflect the population as a whole. Additionally, nightmares and dream recall were measured retrospectively which might affect accuracy of estimations (Levin & Nielsen, 2007). Additional research is needed to determine if the NPS indicates a tendency to experience frequent nightmares among community and psychiatric samples in addition to university student samples.

In conclusion, higher NPS scores appear to indicate a propensity to experience frequent nightmares, but not normal dreams. This provides additional support for the convergent and discriminant validity of the NPS. Additional research is needed to extend these results by better understanding if the NPS represents a propensity to experience frequent

Table 4. Dream Recall Frequency x Nightmare Proneness Scale (NPS) Group.

Category	Dream Recall Frequency				
	Never	Rarely	Sometimes	Usually	Very Often
Low NPS	20 (62.5%)	106 (52.5%)	176 (48.8%)	74 (49.0%)	37 (47.4%)
High NPS	12 (37.5%)	96 (47.5%)	185 (51.2%)	77 (51.0%)	41 (52.6%)
χ^2	2.00, p=.157, w=.25	0.50, p=.482, w=.05	0.22, p=.636, w=.02	0.06, p=.807, w=.02	0.21, p=.651, w=.05

nightmares among community and psychiatric samples. Additional research is also needed to better understand the different observed relationships of the NPS with normal dreams and nightmares.

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