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The Nightmare Frequency Index-3: Reliability and Validity of a Brief Measure of Nightmares

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Abstract

The present research evaluated the psychometric properties of the Nightmare Frequency Index-3 (NFI-3), a brief self-report measure of nightmare frequency. Across 3 independent studies, the NFI-3 demonstrated a clear single-factor structure, acceptable internal consistency, and good temporal stability over an approximately 1-month interval. Evidence of construct validity followed the expected gradient, with strong associations with other multi-item nightmare measures, moderate associations with theoretically related constructs including trauma symptoms, negative affect, and psychological distress, and weak associations with hypothetically unrelated variables. Overall, the findings support the reliability and validity of the NFI-3 as a parsimonious instrument for assessing perceived nightmare frequency in research settings where brief measurement is desirable.

Keywords: Nightmare frequency; nightmare measurement; sleep disturbances; psychometric validation; reliability and validity

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1. Introduction

Nightmares have been described as disturbing, clearly remembered dreams that typically awaken the sleeper, after which the individual rapidly becomes alert [1,2]. Although nightmares frequently co-occur with psychiatric diagnoses [3,4], they also occur commonly in nonclinical populations. Occasional nightmares are relatively normative, while approximately 4–11% of adults in community samples report frequent nightmares, typically defined as occurring weekly or more often [5,6]. Research on nightmare etiology has emphasized the role of adverse life experiences, state and trait negative affect, sensory sensitivity, and permeable mental boundaries [7–9].

Assessment of nightmare frequency has primarily relied on two approaches: retrospective self-report questionnaires and prospective diary methods [10]. Diaries have often been considered the most accurate method for estimating nightmare frequency [11]. However, retrospective estimates have been shown to yield comparable results over relatively short reporting intervals [12]. Most retrospective assessments of nightmare frequency reported in the literature have relied on single-item measures, although response formats have varied, including ordinal category scales as well as continuous frequency estimates [13,14].

Only one identified single-item measure has employed a Likert-type response format (e.g., “strongly disagree” to “strongly agree”) to assess perceived nightmare frequency, with nightmares explicitly defined using a waking criterion [15]. Although single-item nightmare frequency measures have demonstrated acceptable stability in retest studies [16,17], reliance on single items presents limitations

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for psychometric evaluation in questionnaire-based studies, e.g., calculating internal consistency [see 18]. Consequently, multi-item measures are generally preferable when reliability estimation is required within broader questionnaire batteries.

Several established instruments incorporate nightmare frequency alongside related dimensions such as distress or intensity [19–21]. Because nightmare frequency and nightmare distress represent partially distinct constructs [22], such item mixing may be helpful clinically but obscure the specific construct being assessed in other contexts. Measures that isolate nightmare frequency are therefore of particular value for basic research.

In addition to objective occurrence, perceived nightmare frequency may have independent relevance, as it reflects the salience, burden, and lived impact of nightmares on the individual. Prior research indicates that retrospective reports of nightmare frequency are associated with distress, trauma-related symptoms, and functional impairment, suggesting potential utility for screening and risk stratification in both research and applied settings [3,10,23].

Four multi-item measures designed to assess nightmare frequency were identified. Two rely on response formats requiring recall of specific numbers of nightmares: Krakow's Nightmare Frequency Questionnaire [24] and a subscale of Yu's Dream Intensity Scale [25]. Both demonstrated adequate psychometric properties, although the Nightmare Frequency Questionnaire employs a response format that may be difficult for respondents to interpret, and the Dream Intensity Scale does not provide a clear operational definition of nightmares, despite referencing awakening and recall in one item. Another instrument, the SLEEP-50 Nightmare subscale [26], includes five Likert-type items assessing frightening dreams and associated features such as awakening, recall, and physiological arousal, thereby capturing a broader nightmare experience rather than frequency alone.

The fourth identified measure is the Nightmare Frequency Index (NFI) [27]. The original four-item NFI included both positively and negatively worded items; however, the negatively worded items exhibited weak factor loadings. These items were subsequently replaced with a positively worded item, resulting in the three-item Nightmare Frequency Index–3 (NFI-3) [28]. Although the NFI-3 has demonstrated adequate internal consistency and meaningful associations with neuroticism, self-structure, nightmare proneness, and somatosensory processes across multiple studies [28,29,30], its internal structure and core psychometric properties have not yet been systematically evaluated.

The present research addresses this gap by providing a psychometric evaluation of the NFI-3 across three samples. Study 1 examined the internal structure and internal consistency reliability of the NFI-3. Study 2 evaluated convergent and discriminant validity using theoretically relevant constructs. Study 3 assessed temporal stability through test–retest reliability. Together, these studies were designed to evaluate foundational psychometric properties necessary for establishing the NFI-3 as a brief, reliable research instrument [31]. To permit estimation of internal consistency across all constructs, only multi-item measures were used.

2. Study 1: Factor Structure

2.1 Methods

2.1.1 Participants

Data for this study were drawn from a dataset previously reported by Kelly [28]. A total of 276 adults were initially recruited to complete an online survey. Following initial data screening, cases in which participants failed to complete all study items or were identified as likely duplicate responses were excluded, resulting in 247 cases. Of these, 59 participants failed one or more of three embedded attention checks (e.g., "Respond strongly disagree to this statement") [32] and were omitted from further analyses.

The final analytic sample consisted of 188 adults (108 women, 80 men) with a mean age of 35.05 years (SD = 9.43), ranging from 21 to 65 years. Participants self-identified primarily as White/Caucasian (93.1%), with smaller proportions identifying as Black or African American (3.7%), Asian (2.7%), or

Other (0.5%). Educational attainment was diverse: 8.0% reported a high school diploma as their highest level of education, 9.0% reported some college, 36.7% reported a college degree, and 46.3% reported a graduate degree.

2.1.2 Measure

2.1.2.1 Nightmare Frequency Index–3

The revised Nightmare Frequency Index-3 (NFI-3) [28] consists of three items assessing perceived nightmare frequency across different retrospective timeframes (e.g., "I have nightmares several nights a month"). Using standard instructions for the NFI-3, participants were instructed that "nightmares are defined as unpleasant and clearly remembered dreams that awaken you; after waking you quickly become alert." Items are rated on a 5-point Likert-type scale ranging from 0 (strongly disagree) to 4 (strongly agree). Consistent with prior research [28,30], item scores are averaged, with higher values indicating more frequent nightmares.

Preliminary studies have demonstrated adequate internal consistency reliability for the NFI-3, with reported estimates ranging from .76 to .87 [28,29]. The original four-item NFI showed convergent associations with other nightmare measures and related criteria comparable in magnitude to established instruments [27].

2.1.3 Procedure

Participants were recruited through Amazon Mechanical Turk (MTurk; Amazon, Seattle, WA) to complete a larger study titled "Sleep and Personality." MTurk is a crowdsourcing platform commonly used for behavioral research and other tasks. There were no time limits, exclusionary criteria, or compensation for participation. Inclusion criteria were MTurk registration and age 18 years or older. Participants provided informed consent and completed all questionnaires using a secure online platform. Participation was voluntary and the study was approved by the local Institutional Review Board.

2.1.4 Data Analysis

All analyses were conducted using SPSS version 30 (IBM, Armonk, NY, USA). The suitability of the data for factor analysis was evaluated using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. Exploratory factor analysis (EFA) was conducted using principal axis factoring to examine the internal structure of the NFI-3. Factor retention decisions were based on eigenvalues greater than one and the interpretability of the resulting factor solution. Internal consistency was assessed using Cronbach's alpha (α). McDonald's omega (ω) was calculated as a complementary estimate of internal consistency.

2.2 Results and Discussion

The KMO measure of sampling adequacy was .68, indicating acceptable factorability, and Bartlett's test of sphericity was significant, $\chi^2(3) = 139.10$, $p < .001$, confirming that the correlation matrix was suitable for factor analysis. Exploratory factor analysis using principal axis factoring supported a single-factor solution. The first factor yielded an eigenvalue of 2.02 and accounted for 51.75% of the extracted common variance. No additional factors met retention criteria. Standardized factor loadings were moderate to strong, ranging from .61 to .79, indicating that all three items contributed meaningfully to the underlying constructs but were not redundant. Item-level statistics and factor loadings are presented in Table 1.

The NFI-3 demonstrated acceptable internal consistency. McDonald's omega was .764, and Cronbach's alpha was .753. Corrected item–total correlations ranged from .52 to .63, and internal consistency was not improved by deleting any item. The mean and standard deviation of total averaged NFI-3 scores in this sample were 2.84 and 0.81, respectively.

Overall, these findings support the psychometric adequacy of the NFI-3. The measure demonstrated acceptable factorability, a clear single-factor structure accounting for a substantial proportion of common variance, and satisfactory internal consistency, with all items contributing coherently to the latent construct. Taken together, the results suggest that the NFI-3 functions as a parsimonious and internally consistent measure of perceived nightmare frequency suitable for research applications requiring brief assessment.

Table 1: Nightmare Frequency Index-3 Items, Descriptives, and Factor Loadings			
Item	**M**	**SD**	**Factor Loading**
1. I have nightmares often	2.77	0.95	.789
2. I have nightmares several nights a month	2.75	1.14	.746
3. I have had nightmares recently	3.01	0.89	.611

3. Study 2: Convergent and Discriminant Validity

3.1 Methods

3.1.1 Participants

The initial sample consisted of 105 adults. Data screening identified two cases with duplicate responses; in each instance, only the first response set was retained. An additional 16 participants failed embedded attention-check items designed to detect careless responding as described in Study 1 and were excluded from further analyses. The final analyzable sample consisted of 87 participants (51 men, 36 women). Participants ranged in age from 25 to 71 years (M = 36.82, SD = 11.28). The self-identified racial/ethnic composition of the sample was predominantly White/Caucasian (94.3%, n = 82), with smaller representations of Black or African American (2.3%, n = 2) and Asian participants (2.3%, n = 2); one participant (1.1%) did not report race/ethnicity. Educational attainment varied, with 3.4% (n = 3) reporting a high school diploma, 3.4% (n = 3) reporting some college, 40.2% (n = 35) holding a college degree, and 52.9% (n = 46) reporting a graduate degree. Most participants (98.9%, n = 86) indicated English as their native language.

3.1.2 Measures

3.1.2.1 Nightmare Frequency Index–3

The NFI-3 was administered as described in Study 1.

3.1.2.2 SLEEP-50 Nightmare Scale

Nightmare experiences were assessed using the five-item SLEEP-50 Nightmare Scale (S50-N) [26], an established measure of nightmare disturbance (e.g., “I have frightening dreams”). The scale assesses multiple features of nightmare experiences, including occurrence, nocturnal awakening, and associated arousal, with reference to clearly recalled dysphoric dreams experienced during the past month. Items are rated on a 4-point scale ranging from 1 (not at all) to 4 (very much). Responses are summed to yield a continuous total score, with higher scores indicating greater nightmare disturbance. Prior research has supported the scale’s validity and reported a 3-week test–retest reliability of .89 [26].

3.1.2.3 Dream Intensity Scale—Nightmare Subscale

Nightmare frequency was additionally assessed using the two-item Nightmare subscale of the Dream Intensity Scale [25]. Items assess retrospective estimates of how often respondents experience nightmares that are clearly recalled and result in nocturnal awakening (e.g., “How often do you experience nightmares that are so disturbing they wake you and after awakening are still vivid?”). Although the original instrument employed a 10-point frequency scale ranging from “never” to “almost every night,” the response format was simplified for the present study to a 5-point scale: 0 (never), 1 (one time per year or less), 2 (two to eleven times per year), 3 (one to three times per month), and 4 (at least once per week). Item responses were summed, with higher scores indicating greater nightmare

frequency. Retest reliability estimates were not located. Previous studies have supported the measure's validity and reported an internal consistency reliability of .75 [25,33].

3.1.2.4 Negative Affect

Negative affect was measured using the 6-item Negative Affect subscale of the Scale of Positive and Negative Experience [34]. The subscale assesses how often participants have experienced negative emotional experiences over the previous 4 weeks (e.g., "Afraid"). Items are rated on a 5-point scale ranging from 1 (very rarely or never) to 5 (very often or always), with higher scores indicating greater negative affectivity. Prior research has supported the subscale's validity and reported a 1-month test–retest reliability of .63 [34].

3.1.2.5 Trauma Symptoms

Trauma symptoms were assessed using the 4-item Primary Care Posttraumatic Stress Disorder Screen (PC-PTSD) [35]. The scale evaluates the presence of core trauma-related symptoms experienced during the past month, referenced to a "frightening, horrible, or upsetting" event occurring at any point in the respondent's lifetime (e.g., "Remembered or thought about it when you did not want to?"). Items are scored dichotomously (0 = no, 1 = yes), with higher total scores indicating greater trauma symptom endorsement. Previous research has supported the measure's validity and reported a 1-month test–retest reliability of .83 [35].

3.1.2.6 Psychological Distress (PHQ-4)

General psychological distress was assessed using the 4-item Patient Health Questionnaire-4 (PHQ-4) [36]. The PHQ-4 indexes core symptoms of depression and generalized anxiety experienced over the previous 2 weeks (e.g., "Feeling nervous, anxious, or on edge"). Items are rated on a 4-point scale ranging from 0 (not at all) to 3 (nearly every day), with higher total scores reflecting greater overall distress. Prior studies have supported the measure's validity and reported internal consistency reliability estimates ranging from .78 to .85 [36–38].

3.1.2.7 Social Desirability

Social desirability was assessed using the 5-item Socially Desirable Response Set-5 (SDRS-5) [39]. The scale evaluates the tendency to endorse socially desirable responses across self-descriptive statements (e.g., "I am always courteous even to people who are disagreeable"). Items are presented with a 5-point response format; however, only extreme responses indicative of socially desirable responding are scored. Total scores range from 0 to 5, with higher scores reflecting greater social desirability. Prior research has supported the scale's validity and reported a 1-month test–retest reliability of .75 [39].

3.1.2.8 Friendship Closeness

Friendship closeness was assessed using the 5-item Friendship Closeness subscale of the Friendship Qualities Scale [40]. Participants were instructed to consider their closest friendship when responding (e.g., "I feel happy when I am with my friends"). Responses are recorded on a 5-point scale ranging from 1 (not at all true) to 5 (really true), with higher scores reflecting greater perceived closeness. Though retest reliability estimates were not located, prior research has supported the subscale's validity and reported internal consistency estimates ranging from .77 to .90 [40,41].

3.1.3 Procedure

A priori power analysis indicated that a sample size of 84 would be sufficient to detect a medium effect size (r = .30) with power of .80. Participants were recruited through MTurk for a study titled "Validity of a Sleep Scale." There were no time limits or exclusionary criteria. Inclusion criteria were MTurk registration and age 18 years or older. Participants provided informed consent and completed all questionnaires using a secure online platform. Participation was voluntary, and participants were compensated $0.50 for completing the survey. The study was approved by the local Institutional Review Board.

3.1.4 Data Analysis

Analyses were conducted using SPSS version 30. Internal consistency was evaluated using Cronbach's alpha. Pearson correlations were computed among measures as estimates of convergent, nomological, and discriminant validity. Confidence intervals were calculated for correlation coefficients to characterize the magnitude and precision of associations and to facilitate interpretation of the expected validity gradient. Convergent validity was inferred from correlations ≥ .50, discriminant validity from small or nonsignificant correlations, and nomological validity from significant correlations of small-to-moderate magnitude [31,42,42]. The two nightmare estimates were used to provide convergent evidence, social desirability and friendship closeness as discriminant evidence, and negative affect, trauma symptoms, and distress as nomological evidence.

3.2 Results and Discussion

Evidence of construct validity followed the expected gradient. The NFI-3 demonstrated strong convergent associations with established multi-item nightmare measures (S50-N, r = .77; DIS-N, r = .77). Associations with theoretically related constructs within the broader nomological network were generally moderate, including trauma symptoms (r = .31), negative affect (r = .22), and psychological distress (r = .41). In contrast, associations with theoretically unrelated constructs were weak and nonsignificant (p > .05), including social desirability (r = .17) and friendship closeness (r = .05).

This pattern of findings indicates that the NFI-3 effectively differentiates between closely related nightmare constructs, broader distress-related correlates, and theoretically distinct variables, thereby supporting convergent, discriminant, and nomological network validity. Confidence intervals further indicated that convergent validity coefficients were consistently large, nomological associations fell in the small-to-moderate range, and discriminant associations clustered near zero.

Table 2: Scale Descriptives and Correlations of the Nightmare Frequency Index-3 with Convergent, Nomological, and Discriminant Measures

	r	95% CI for r	M	SD	α
NFI-3			2.76	0.85	.786
Convergent validity					
S50-N	.77**	[.67, .85]	13.29	3.56	.834
DIS-N	.77**	[.67, .84]	5.63	1.73	.621
Nomological validity					
Trauma	.31**	[.10, .49]	2.40	1.30	.585
Negative affect	.22*	[.01, .41]	17.90	5.99	.917
Distress	.41**	[.22, .57]	6.43	2.94	.834
Discriminant validity					
Social desirability	.16	[-.04, .37]	0.47	0.71	.697
Friendship closeness	.05	[-.17, .26]	19.19	3.09	.735

Note: N = 87. NFI-3 = Nightmare Frequency Index-3; S50-N = SLEEP-50 - Nightmare Scale; DIS-N = Dream Intensity Scale - Nightmare Scale.

4. Study 3: Retest Reliability

4.1 Methods

4.1.1 Participants

The initial sample consisted of 78 adults recruited through Amazon Mechanical Turk (MTurk) who completed a set of questionnaires on two occasions. Data were screened for careless responding using embedded attention-check items at both time points, resulting in the exclusion of 3 participants. No duplicate cases were identified. The final sample consisted of 75 participants (42 men, 33 women).

Participants ranged in age from 25 to 76 years (M = 43.00, SD = 11.19). The self-identified racial/ethnic composition of the sample was 53.3% White/Caucasian (n = 40), 26.7% Asian (n = 20), 8.0% Black or African American (n = 6), 6.7% Latinx (n = 5), 2.7% Other (n = 2), 1.3% Middle Eastern or North African (n = 1), and 1.3% preferred not to report (n = 1). With respect to educational attainment, 8.0% (n = 6) reported a high school diploma as their highest level of education, 13.3% (n = 10) reported some college, 61.3% (n = 46) held a college degree, and 17.3% (n = 13) reported a graduate degree. Most participants (96.0%, n = 72) indicated that English was their native language.

4.1.2 Measure

4.1.2.1 Nightmare Frequency Index–3

The NFI-3 was administered as described in Studies 1 and 2.

4.1.3 Procedure

After providing informed consent, participants completed a larger questionnaire titled "Personality and Sleep Experiences." Approximately 3 weeks later, participants were contacted through Amazon and asked to complete the questionnaire a second time. Participants were compensated $0.50 for each occasion. Participation was voluntary and the study was approved by the local Institutional Review Board.

4.1.4 Data Analysis

Test–retest reliability was estimated using a Pearson correlation between NFI-3 scores at Time 1 and Time 2. Internal consistency was assessed at each time point using Cronbach's alpha.

4.2 Results and Discussion

Participants completed the NFI-3 an average of 33.96 days apart (SD = 5.64), with intervals ranging from 24 to 54 days. Mean scores and internal consistency estimates were similar across both administrations: Time 1, M = 1.44, SD = 1.23, α = .900; Time 2, M = 1.33, SD = 1.26, α = .932.

The NFI-3 demonstrated adequate to good temporal stability over an interval of approximately 1 month, r = .797, indicating that approximately 63.5% of variance was shared across administrations. This level of stability is relatively consistent with other nightmare frequency measures [cf., 17]. Mean score differences between Time 1 and Time 2 were small, and the difference in NFI-3 scores was not significantly related to the number of days between assessments, r = −.17, p = .152. Overall, these findings support the temporal reliability of the NFI-3 over a 1-month period and indicate that the measure yields stable estimates of perceived nightmare frequency across time [44].

5. General Discussion

Across 3 studies, the findings support the reliability and validity of the NFI-3 as a brief measure of perceived nightmare frequency. Results from Study 1 indicated that the 3 items shared substantial common variance and formed a coherent single-factor structure. Study 2 demonstrated strong convergent validity with other multi-item nightmare measures, moderate associations with theoretically related constructs such as trauma symptoms and psychological distress, and weak associations with hypothetically unrelated variables. Study 3 provided evidence of adequate temporal stability over an approximately 1-month interval. Together, these findings indicate that the NFI-3 functions as a psychometrically sound instrument for assessing perceived nightmare frequency.

The pattern of associations observed in Study 2 between NFI-3 scores and trauma symptoms, negative affect, and general distress were comparable to, though somewhat stronger than, those reported for other nightmare frequency measures in college and community samples, including the original NFI [Kelly & Mathe]. Test–retest reliability estimates for the NFI-3 were also consistent with those reported for

single-item nightmare frequency measures across similar time intervals [16,45] and, as expected, exceeded stability estimates (r = .670) observed over longer periods (e.g., 2 years) [46].

It is noteworthy that participants in Study 2 reported distress and trauma symptom levels that were more than 1 standard deviation higher than normative values reported in prior research [35,38], despite negative affect scores being similar to those observed in previous samples [34]. In addition, NFI-3 scores in Studies 1 and 2, but not Study 3, were higher than those reported in a prior college student sample [30]. These findings are consistent with evidence that MTurk samples might report elevated levels of psychopathology relative to community-based samples [47], and they underscore the importance of sample context when interpreting absolute levels of nightmare frequency.

Given its item content and retrospective response format, the NFI-3 likely captures perceived or salience-weighted recall of nightmare frequency, rather than objective frequency alone. In this respect, the measure may reflect aspects of lived nightmare experience in addition to occurrence. This characteristic is not unique to the NFI-3, as retrospective estimates of dream-related phenomena are generally influenced by memory, salience, and affective factors [48]. Future research would benefit from directly comparing NFI-3 scores with prospective diary-based estimates of nightmare frequency and general dream recall clarifying the extent to which affective salience contributes to reported frequency.

Several limitations in the current studies should be acknowledged. First, all studies relied exclusively on self-report measures, which may be influenced by response biases. Second, the samples were not population-representative and were largely drawn from MTurk, which may limit generalizability. Third, though the present analyses relied on relatively standard psychometric approaches appropriate for initial scale validation, additional research employing more sophisticated methods, such as confirmatory factor analysis, would further strengthen evidence for the internal structure of the NFI-3. Larger community-based samples and clinical populations should also be examined to better characterize score distributions and clinical relevance.

Future studies should also evaluate the relationship between the NFI-3 and measures of nightmare distress, and perceived impact and meaning of nightmares [49,50], as well as its correspondence with single-item ordinal frequency measures commonly used in epidemiological research. Use of diary methods and experience-sampling approaches may further elucidate the temporal dynamics of nightmare occurrence and recall [11,51].

In conclusion, the present findings provide evidence supporting the reliability and validity of the NFI-3 as a brief measure of perceived nightmare frequency. Its brevity, internal consistency, and demonstrated validity make it suitable for use in research contexts where assessment burden must be minimized but potentially more sensitive multi-item measures allowing for reliability calculation are desired. Continued validation using prospective designs, clinical samples, and community-representative populations is warranted.

6. References

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