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To cite this article: Christopher C. Cranston PhD, Katherine E. Miller MA, Joanne L. Davis PhD & Jamie L. Rhudy PhD (2017) Preliminary validation of a brief measure of the frequency and severity of nightmares: The Trauma-Related Nightmare Survey, Journal of Trauma & Dissociation, 18:1, 88-99, DOI: 10.1080/15299732.2016.1191578

To link to this article: http://dx.doi.org/10.1080/15299732.2016.1191578
Preliminary validation of a brief measure of the frequency and severity of nightmares: The Trauma-Related Nightmare Survey

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\textbf{ABSTRACT}

Nightmares and sleep disturbances are gaining attention as targets of treatment interventions for trauma-exposed populations. Measures in trials evaluating these interventions tend to utilize proprietary measures of nightmare characteristics, which makes it challenging to compare findings across studies. The Trauma-Related Nightmare Survey is a questionnaire that was initially developed for utilization in efficacy studies of Exposure, Relaxation, and Rescripting Therapy. Preliminary examinations of the psychometric properties have demonstrated good test–retest reliability and convergent validity. The present brief report provides an updated examination of these properties and offers the first open publication of the measure for general use. Results support previous findings that the Trauma-Related Nightmare Survey demonstrates good test–retest reliability ($r = .73$) and moderate to strong convergent validity ($r_s = .44$–.78) with other commonly utilized measures of sleep and mood symptoms.

The role of sleep disturbances and nightmares among trauma-exposed individuals has become an important focus of research over the past three decades. Indeed, sleep disturbances have been defined as the hallmark of posttraumatic stress disorder (PTSD; Germain, 2013; Ross, Ball, Sullivan, & Caroff, 1989). The extant literature provides strong support for the influence that sleep disturbances have on posttraumatic symptom severity in addition to their tendency to be treatment resistant (Davis, de Arellano, Falsetti, & Resnick, 2003; Davis & Wright, 2007; Forbes, Creamer, & Biddle, 2001; Johnson et al., 1996; Scurfield, Kenderdine, & Pollard, 1990). For this reason, treatments have been developed in an effort to target sleep and nightmares. Such approaches have demonstrated (a) reduced frequency and severity of nightmares and related symptoms and (b) improved sleep (e.g., Davis et al., 2011).
Despite the attention given to nightmares and other sleep disturbances, there has yet to be a published, validated measure specific to trauma-related nightmares. Several assessments of nightmares that target different characteristics of nightmares have been developed. The Nightmare Distress Scale (Belicki, 1985, 1992) assesses the estimated frequency of nightmares for the year and the degree of distress (e.g., the impact of nightmares on daily functioning) associated with experiencing nightmares. Although this measure highlights the importance of delineating between nightmare frequency and distress, Spoormaker and colleagues (2006) pointed out that nightmare distress is assessed on a frequency scale, which may confound nightmare distress with nightmare frequency. Another measure of nightmares is the Nightmare Frequency Questionnaire, which was originally developed for use in research trials of imagery rehearsal therapy (Krakow et al., 2000). Although this measure includes questions about nights with nightmares and number of nightmares and has reported good reliability (Krakow et al., 2001), the Nightmare Frequency Questionnaire does not distinguish between trauma-related nightmares, idiopathic nightmares, and night terrors. A 7-item addendum version of the Pittsburgh Sleep Quality Index (PSQI-A; Germain, Hall, Krakow, Shear, & Buysse, 2005) was developed to assess disruptive nocturnal behaviors often associated with PTSD (e.g., trauma-related nightmares, bad dreams not related to the trauma, hot flashes). Psychometrics on a sample of women yielded satisfactory internal consistency and demonstrated convergent validity with scores on clinician-administered interviews of PTSD severity. Despite these strengths, the question assessing the frequency of nightmares also asks about the frequency of memories of the trauma (“During the past month, how often have you had trouble sleeping because you . . . had memories or nightmares of a traumatic experience?”; Germain et al., 2005, p. 242). Therefore, it is unclear whether responses would reflect the occurrence of nightmares, memories, or both.

The Trauma-Related Nightmare Survey (TRNS; Davis, Wright, & Borntrager, 2001) was originally developed for use in clinical research studies examining the efficacy of Exposure, Relaxation, and Rescripting Therapy (ERRT), a cognitive–behavioral treatment for posttrauma nightmares and related sleep problems. At that time, there was a lack of measures assessing a wide array of characteristics of chronic nightmares specifically related to trauma exposure. Therefore, items were chosen for clinical use when assessing treatment outcome. Davis (2009) proposed a three-factor theory of trauma nightmare acquisition and maintenance that includes the consideration of predisposing (e.g., pretrauma psychological conditions, personality factors), precipitating (e.g., trauma event), and perpetuating (e.g., physiological, behavioral, and cognitive components that maintain nightmares) factors in understanding chronic trauma-related nightmares. Figure 1 illustrates
how items on the TRNS assess these maintaining components of trauma-related nightmares.

The TRNS offers a combination of response styles (i.e., Likert-type, dichotomous, and open-ended response options) in order to maximize utility. Items include self-report responses for the onset, course, frequency, duration, and severity of nightmares (i.e., the level of distress associated with the nightmare) as well as emotions, cognitions, and behaviors related to nightmares in the past month. Given the variability in item response types, the items on the TRNS do not function as a scale; thus, no total score is derived.

Although the TRNS was unpublished at the time, initial validation was conducted prior to its use. Within a sample of primarily Caucasian female trauma survivors \( (n = 22) \), Davis and Wright (2007) found that the TRNS demonstrated adequate 2-week test–retest reliability for nightmare frequency \( (r = .64) \), nightmare severity \( (r = .63) \), fear of going to sleep \( (r = .77) \), number of hours slept per night in the past week \( (r = .72) \), and depression symptoms on awakening \( (r = .72) \). Results also demonstrated good convergent validity when compared to daily sleep logs for number of nightmares \( (r = .81) \) and number of nights with nightmares \( (r = .82) \) as well as to the Modified PTSD Symptom Scale–Self-Report (MPSS-SR; Resick, Falsetti, Resnick, & Kilpatrick, 1991) for nightmare frequency \( (r = .64) \) and moderate convergence for nightmare severity \( (r = .45) \).
Given that the TRNS has demonstrated acceptable validity and has been utilized across a number of clinical research studies (Davis et al., 2011; Davis & Wright, 2005, 2007; Rhudy et al., 2010), a formal validation and publication is merited. This brief report seeks to report updated preliminary validation results for the TRNS as well as to publish the measure for general availability.

**Method**

**Participants**

Participants included in the present study were drawn from two larger randomized controlled trials for Exposure, Relaxation, and Rescripting Therapy (Davis et al., 2011; Davis & Wright, 2007). A total of 59 participants (75% female) were included in convergent validity analyses. Participants ranged in age from 19 to 63 (M = 38.22, SD = 12.08). With regard to race, participants were predominantly Caucasian (81.4%), although 11% endorsed being both Caucasian and Native American, 5% endorsed African American, and 2.6% endorsed “other.” Participants reported between 1 and 11 (M = 6.48, SD = 2.80) traumatic events, including automotive accidents, witnessing someone being seriously injured or violently killed, and unwanted sexual experience, across the lifetime. A range of 1 to 7 nightmares per week (M = 3.11, SD = 2.25) was reported. Finally, 39 of the 59 participants were included in the waitlist control condition and their data were used for the test–retest analyses.

**Measures**

**TRNS (Davis et al., 2001)**

The TRNS is a 16-item trauma-focused survey developed to measure and track sleep and nightmare-related information, including nightmare frequency, nightmare severity, sleep onset and maintenance, and subjective emotions on awakening. The survey contains Likert-type, dichotomous, and open-ended response options. The full version of the TRNS is available in the Appendix.

**MPSS-SR (Falsetti, Resnick, Resick, & Kilpatrick, 1993)**

The MPSS-SR is a 17-item scale adapted from the PTSD Symptom Scale (Foa, Riggs, Dancu, & Rothbaum, 1993) to include both frequency and severity of PTSD symptoms. Items on the scale correspond to PTSD symptom criteria in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000). Frequency and severity of PTSD symptoms are assessed
on a Likert-type scale. The MPSS-SR has demonstrated strong internal consistency in both treatment and community samples (Falsetti et al., 1993). The MPSS-SR has also demonstrated strong overall convergence ($r = .97$) with the Structured Clinical Interview for DSM-IV Disorders, PTSD module (Wright, Davis, Inness, & Stem, 2003).

**PSQI (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989)**
The PSQI assesses qualities and problems associated with sleep in the month prior to assessment. The PSQI consists of open-ended items (e.g., “During the past month, when have you usually gone to bed at night?”) and 14 Likert-type items rated on a 4-point scale. A global sleep quality index is derived from seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Buysse and colleagues (1989) reported good internal homogeneity (Cronbach’s $\alpha = .83$) and test–retest reliability ($r = .85$). Unfortunately, the PSQI-A was not included in the present study, as it had not been released at the start of data collection for the first randomized controlled trial.

**Fear of Sleep Inventory–23 (FoSI; Zayfert, DeViva, Pigeon, & Goodson, 2006)**
The FoSI was developed to assess trauma-related thoughts and activities associated with sleep and the occurrence of traumas associated with the bedroom or sleep. The measure consists of 23 items rated on a 5-point scale ($0 = \text{not at all}$ to $4 = \text{nearly every night}$) and four true/false items to assess traumas associated with the bedroom, the dark, sleep, and the necessity of staying on guard at night. Total scores examine changes in fear of sleep. Pruiksma and colleagues (2014) reported good internal consistency ($\alpha = .95$) and test–retest reliability ($r = .89$).

**Modified Daily Sleep Activities Log (DSAL; Thompson, Hamilton, & West, 1995)**
The modified DSAL consists of seven dichotomous and Likert-scale questions developed to assess sleep and nightmare experiences each night. Items include total sleep time, subjective sleep quality, how depressed one feels on awakening, how rested one feels on awakening, and the number and severity of nightmares. The DSAL has been utilized in a number of sleep-related treatment studies (Davis et al., 2003; Long et al., 2011; Wanner, Long, & Teng, 2010), and previous reports of convergent validity with the TRNS were .82 for nights with nightmares and .81 for nightmare frequency (Davis & Wright, 2007).

**Modified Trauma Assessment for Adults: Self-Report Version (TAA; Resnick, Best, Kilpatrick, Freedy, & Falsetti, 1993)**
The TAA assesses 14 types of traumatic events, and four items were added to also assess for hate crimes and childhood physical abuse. Follow-up items
assess perceived threat and age of occurrence. Additional items were added to ascertain whether the individual experienced nightmares related to each type of event. Saunders, Kilpatrick, Resnick, and Tidwell (1989) found similar rates of trauma reported on the TAA and other structured traumatic event assessments. Gray, Elhai, Owen, and Monroe (2009) reported a test–retest reliability of $r = .80$ among a college student sample and a convergent validity of $r = .65$ with an established assessment measure among a clinical sample. The TAA was utilized to determine the number and type of traumatic events experienced.

**Procedure**

A university institutional review board approved all procedures. Participants were recruited via flyers and radio advertisements. At the initial screening visit following the provision of informed consent, eligible participants were assigned to either the treatment group (Exposure, Relaxation, and Rescripting Therapy) or a waitlist control group. Following randomization, participants were given a structured interview and a packet containing self-report measures as part of a baseline assessment. Whereas the treatment group attended 3 weeks of treatment, the waitlist control had no contact during the treatment period and was given the follow-up assessment 1 week following the completion of treatment with the active group.

**Data analysis**

For the present study, all baseline data ($n = 59$) were utilized to obtain convergent validity. For examining test-retest reliability, only those in the control group ($n = 39$) were included, as these individuals were not exposed to the treatment, which aims to reduce trauma-related nightmares and sleep disturbances. Furthermore, we conducted test-retest reliability on quantitative items believed to be important nightmare-related constructs (nightmare frequency, nightmare severity, number of nights with nightmares, fear of sleep, sleep latency, feeling of restfulness after awakening, and depression on waking), leaving open-ended follow-up items (e.g., “What do you do to help you get back to sleep?”) out of analyses. Item-level Pearson product–moment correlation coefficients were used to examine test–retest reliability and convergent validity. Following recommendations for the magnitude of correlation coefficients suggested by Cohen (1988), correlations between .10 and .30 were considered small/weak, .30 and .50 moderate, and >.50 large/strong.
Results

Item-level test–retest reliability ranged from $r = .60$ to $r = .88$, with an overall average test–retest correlation of $r = .73$. With regard to convergent validity, the TRNS generally demonstrated strong convergence with other measures. On the TRNS, number of hours to fall asleep and number of hours actually asleep converged strongly with these specific items on the PSQI ($r_s = .76$ and .75, respectively), how fearful to go to sleep was strongly convergent with the FoSI total score ($r = .78$), and depression on awakening and how rested one feels on awakening were moderately to highly convergent with these specific items on the modified DSAL ($r_s = .52$ and .44, respectively). Lastly, the TRNS nightmare frequency, number of nights with nightmares, and nightmare severity items demonstrated strong convergence with the MPSS-SR total score ($r_s = .54$, .54, and .58, respectively).

Discussion

Given the high reports of nightmares and other sleep disturbances among trauma-exposed populations, there is both a clinical and research need to have measures that can assess and understand these symptoms. This brief report sought to provide additional preliminary validity of the TRNS, a survey specifically developed to assess trauma-related sleep disturbances, in a clinical sample and to publish the measure. Results indicate that the TRNS demonstrates adequate test–retest reliability and convergent validity with a number of commonly used sleep and trauma-focused measures. In addition, given the limitations of other nightmare measures, which do not capture the wide array of characteristics of chronic nightmares specifically related to trauma exposure, the TRNS has research utility and should be considered in future studies of post-trauma sleep disturbances.

In addition to providing reliable and valid information about nightmare characteristics, the TRNS has utility in routine clinical practice. Given the brevity and structure of the measure (Likert-type and open-ended responses), clinicians can quickly assess symptomatology and treatment progress. Indeed, based on its use in clinical trials (Davis et al., 2011; Davis & Wright, 2005, 2007; Rhudy et al., 2010), the TRNS appears to demonstrate sensitivity to changes in nightmare-related variables from week to week. Moreover, the single item on the TRNS about how fearful the individual is to go to sleep converged highly with the 23-item FoSI total score measuring fear of sleep ($r = .78$). This finding, in addition to the survey’s convergence with other measures of sleep disturbances, demonstrates the value of utilizing the TRNS as a brief screening measure of overall sleep disturbance, significantly reducing the self-report burden in clinical settings. In addition, these
findings lend support to the utility of combining the information gleaned from the TRNS with other measures in research settings.

The public availability of measures like the TRNS also aids in addressing issues with inconsistent measurement across studies, which limit comparability—a problem recognized by the American Academy of Sleep Medicine (Aurora et al., 2010; Cranston, Davis, Rhudy, & Favorite, 2011). Freely available measures with adequate psychometric properties make developing research protocols easier by relieving the burden of permissions and payment. As a result, there is an opportunity to increase consistency in measurement, which ultimately makes cross-study, direct comparisons (e.g., meta-analyses) much more reliable. The TRNS adds to the field as it is designed to be trauma specific while capturing a wide range of nightmare-related characteristics.

Despite the strengths of the present study it is important to acknowledge the limitations. The TRNS was developed based on Davis’s (2009) theory of nightmare acquisition, and that research group conducted the subsequent validation studies. In addition, although our sample size was adequate to detect statistical effects, and community samples used for other psychometric studies (Gray et al., 2009) used comparable sizes, it was still small. Furthermore, although the use of a clinical sample offers better generalizability compared to a student sample, our data were drawn from a larger treatment study and may have been subject to sampling bias (e.g., those who opt into treatment studies may not be representative of the broader population). Another area of potential limitation lies in the sleep log used, in part, to establish convergence. Although the DSAL has been utilized in published research, there are currently no other psychometric data available on the log, which is often a norm for diary-type measures. Similarly, phenomena on the TRNS are captured by single items, which may not be sufficient to distinguish among different aspects of the nightmare experience. Future studies should continue this line of research to validate the TRNS with larger and more diverse samples, including broader clinical populations, and across different research groups. Direct comparisons using the PSQI-A are also warranted. Ultimately, the present findings provide evidence that the TRNS is a reliable instrument with potential benefits in both research and clinical settings.

References


Appendix

Trauma-Related Nightmare Survey (TRNS)

Instructions: The following questions relate to your experience of nightmares in the past month. Nightmares are dreams with negative emotions that wake you up [if you do not wake up, that is a bad dream, not a nightmare]. Please read each question and answer to the best of your ability. If you need more room, feel free to use the back of the page.

1. Approximately how many hours do you sleep per night? 
2. Approximately how long does it usually take for you to fall asleep?
   - Less than 15 minutes
   - 15 minutes to 1 hour
   - 1 hour to 2 hours
   - More than 2 hours
   if more, how many? 
3. In general, how fearful are you to go to sleep?
   - Not at all
   - Slightly
   - Moderately
   - Very much
   - Extremely
4. In general, how depressed do you feel when you wake up?
   - Not at all
   - Slightly
   - Moderately
   - Very much
   - Extremely
5. In general, how rested do you feel when you wake up?
   - Not at all
   - Slightly
   - Moderately
   - Very much
   - Extremely
6. How long have you experienced nightmares? months OR years
7. Did your nightmares begin after a traumatic event, such as sexual assault, combat, fire or any other stressful event?
   - Yes
   - No
8. Approximately how many nightmares have you experienced?
   - in the past week
   - in the past month (if less than one per week)
   - in the past year (if less than one per month)
9. On how many nights in the past week have you experienced a nightmare?
10. On how many nights in the past week have you experienced more than one nightmare per night?
11. In general, how disturbing have the nightmares been?
   - Not at all
   - Slightly
   - Moderately
   - Very much
   - Extremely
12. How many different nightmares do you generally experience?
13. If you have experienced a trauma (serious car accident, natural disaster, sexual assault, etc.), please indicate how similar your nightmare is to the trauma you experienced. If you have more than one nightmare, please answer for the most frequent nightmare. My most frequent nightmare is:
   - Exactly or almost exactly like the trauma
   - Similar to trauma, but not exact (explain)
   - Unrelated to traumatic events (explain)
14a. How long does it typically take you to return to sleep after a nightmare?

☐ less than 15 min ☐ 15 min to 1 hr ☐ 1 hr to 2 hrs ☐ more than 2 hrs ☐ typically do not return to sleep

14b. What do you do to help you get back to sleep? (e.g., nothing, read, watch TV, consume alcohol or drugs, etc.)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

14c. After waking from the nightmare, do you experience any of the following symptoms? (check all that apply)

☐ Palpitations, pounding heart, or accelerated heart rate ☐ Sweating
☐ Feeling dizzy, unsteady, lightheaded, or faint ☐ Trembling or shaking
☐ Sensations of shortness of breath or smothering ☐ Feeling of choking
☐ Chest pain or discomfort ☐ Nausea or abdominal distress
☐ Numbness or tingling sensations ☐ Fear of losing control
☐ Derealization (feelings of unreality) ☐ Chills or hot flashes
☐ Depersonalization (being detached from oneself) ☐ Fear of dying

14d. What time do you generally wake up from a nightmare?
[if you experience more than one nightmare per night, please indicate the time you wake from the first nightmare]

☐ 0–2 hours after sleep onset ☐ 3–5 hours after sleep onset ☐ 6–8 hours after sleep onset ☐ 9+ hours after sleep onset

15. In general, I have the same nightmare[s] over and over

☐ Not at all ☐ Slightly ☐ Moderately ☐ Very much ☐ Extremely

16. In general, my nightmares are related to themes of

Powerlessness ☐ Not at all ☐ Slightly ☐ Moderately ☐ Very much ☐ Extremely
Trust ☐ Not at all ☐ Slightly ☐ Moderately ☐ Very much ☐ Extremely
Intimacy ☐ Not at all ☐ Slightly ☐ Moderately ☐ Very much ☐ Extremely
Safety ☐ Not at all ☐ Slightly ☐ Moderately ☐ Very much ☐ Extremely
Esteem ☐ Not at all ☐ Slightly ☐ Moderately ☐ Very much ☐ Extremely

Adapted from Davis et al. (2001).