Physiological Indicators of Chronic Nightmares in Trauma-Exposed Persons

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Introduction

- Research suggests that trauma cues elicit increased heart rate (HR), blood pressure (BP), skin conductance response (SCR), and facial electromyogram (EMG) in individuals with PTSD.
- Chronic nightmares in trauma-exposed persons are associated with self-reported neuroticism and psychological distress.
- It is likely that exposure to CN content elicits physiological arousal and could play a part in the maintenance of nightmares.
- To date, however, no one has examined the influence of NM-related cues on physiological reactivity.

The Present Study

- The present study examined physiological and subjective reactivity to CN content in trauma-exposed persons.
- To do so, participants underwent a script-driven imagery protocol in which 30-s scripts were presented by computer.
- Participants heard a script that was constructed from their own individualized nightmare content and was presented in repeated cycles.
- HR, SCR, lateralis frontalis EMG, corrugator EMG and subjective (valence and arousal) reactions to the imagery were assessed.
- For comparison, participants were also asked to imagine in familiarizing a standard-orientation, control script (pleasant, neutral, action, and fear) and physiological and subjective reactions were assessed.

Hypotheses

- **Hypothesis 1:** Physiological reactivity will be greater during NM-related imagery than standard control scripts.
- **Hypothesis 2:** Physiological reactivity to NM-related imagery will be independent of current PTSD status.
- **Hypothesis 3:** Physiological reactivity to NM-related imagery will be associated with other measures of trauma- and NM-related distress.

Methods

Participants

- 37 (21 female, 9 male) people who participated in baseline physiological evaluations from a larger study evaluating the efficacy of cognitive behavioral treatment (CBT) for chronic nightmares in trauma-exposed persons.
- Age Range: 22 to 63 (M=40, SD=12.18)
- 26% were single, 36% married, and 20% divorced.
- 67% had at least some college education.
- 68% Caucasian, 15% African American, and 12% “other”
- 29% of the sample met criteria for PTSD based on the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995).

Recruitment / Screening / Inclusion / Exclusion

- Participants were recruited via flyers, email, and radio ads.
- Potential participants were screened for trauma history, exclusion criteria, and frequency and duration of nightmares.
- Inclusion criteria consisted of experiencing a traumatic event and having nightmares at least one time per week for the previous 3 months.
- Exclusion criteria consisted of apparent psychosis or mental retardation, age less than 18 years, or active substance abuse or current drug dependence.
- Participants were provided a $20.00 certificate for each assessment.

Materials

- Participants completed a full diagnostic screening, including measures of trauma- and NM-related distress, before the physiological assessments were conducted.

Measures of Trauma- and NM-Related Distress

- Depression: Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961)
- Global Sleep Quality and Number of Sleep Problems: Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989)
- Nightmare Symptoms: Trauma Related Nightmare Survey (TRNS; Davis, Wright, & Borntrager, 2001)
- Scripts for Generating Imagery
- Lateralis frontalis was not affected by imagery type (F=1.15, p=.30).
- Corrugator EMG was affected by imagery type (F=9.09, p=.001). NM imagery increased EMG, however the activity was greater during fear and action imagery.

Hypothesis 1.2 & 3:

- Zero-order correlations between physiological reactions to nightmare-related imagery and measures of nightmare- and trauma-related distress.

Analyses

- 5 (Imagery Type: Pleasant, Neutral, Action, Fear, Nightmare) x 2 (Current PTSD Status) Repeated Measures ANOVA
- Greenhouse-Geisser correction was used to overcome sphericity violations.
- Fisher’s LSD comparisons were used for a priori comparisons between imagery reactivity and other imagery. Bonferroni adjustments were made for post-hoc comparisons.

Hypothesis 3:

- NM-related distress, before the physiological assessments was conducted

Lateralis Frontalis EMG

<table>
<thead>
<tr>
<th>Condition</th>
<th>NM</th>
<th>Neutral</th>
<th>Action</th>
<th>Fear</th>
<th>Pleasant</th>
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<tbody>
<tr>
<td>Baseline</td>
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<tr>
<td>Scripted</td>
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<tr>
<td>Imagery</td>
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<tr>
<td>Recovery</td>
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</tbody>
</table>

Skin Conductance Response

- SCR was significantly influenced by imagery type, but not PTSD status.
- NM-related imagery resulted in the greatest HR increase for persons with and without current PTSD. However, pleasant and neutral scripts led to deceleration in PTSD participants relative to PTSD negative individuals (p<.001).

Subjective reactions were significantly influenced by imagery type, but not PTSD status.

- Image type was significant for valence (F=78.81, p<.001) and arousal ratings (F=38.27, p<.001). NM-related imagery resulted in the lowest pleasant and the highest arousal ratings.
- Image type explained 76% of the variance in valence ratings, and 61% in arousal ratings.

Table 1. Correlations between physiological reactivity to nightmare-related imagery and subjective measures of distress.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>Scripted</th>
<th>Imagery</th>
<th>Recovery</th>
<th>Rating</th>
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<tr>
<td>HR</td>
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<tr>
<td>SCR</td>
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<tr>
<td>Valence</td>
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<td>Arousal</td>
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</table>

Conclusions

- Nightmares imagery led to significant autonomic arousal (SCR, HR) relative to other control imagery. However, measurement of facial EMG were relatively unaltered.
- Physiological reactivity to NM imagery was generally independent of PTSD status.
- Physiological reactivity to nightmares imagery was associated with measures of nightmare-related distress, but not trauma-related distress.
- Physiological reactivity to nightmares imagery may be a valuable outcome measure for studying response to chronic nighttime treatment.

**Table 1. Correlations between physiological reactivity to nightmare-related imagery and subjective measures of distress.**