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# Intensified Daydreams and Nap Dreams in Frequent Nightmare Sufferers

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*Nightmares (NM) are characterized by intense negative emotion. Research suggests that frequent NM sufferers also have greater inclinations to fantasy and dream-like daydreams, although it is not known whether they experience intense negative emotion as part of these waking state cognitions. We assessed the daydreams and nap dreams of NM participants to determine whether they have more negative daydream content and more vivid imagery overall. NM and control (CTL) participants completed a daydream procedure followed by a nap targeted to contain 80 min total sleep time and an awakening 10 min into rapid eye movement (REM) sleep. For both daydreams and nap dreams, participants completed a questionnaire regarding 4 factors: negativity, positivity, body sensation, and bizarreness. Results revealed the NM group had elevated positivity, body sensation and bizarreness ratings for daydreams compared with the CTL group, but did not differ from them for negativity ratings. NM participants also had elevated body sensation ratings for nap dreams, but did not differ for negativity, positivity, or bizarreness. Thus, while NMs themselves are characterized by negative affect, NM sufferers nonetheless have higher than*

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*normal positivity, body sensation, and bizarreness in their daydreams and specifically more body sensation in their laboratory nap dreams. This may reflect some change in the affective structure of imagery among NM sufferers (e.g., altered experiences of bodily arousal), the differential influence of circadian factors on the 2 groups, or the fact that sleeping in the laboratory tends to suppress NMs.*

**Keywords:** nightmares, emotion, REM sleep, daydreams, nap dreams



The nightmare is an intensely unpleasant dream occurring in rapid eye movement (REM) sleep and often awakening the dreamer (American Psychiatric Association, 2013). A nightmare's content typically deals with threat and is characterized by fear or other negative emotions such as sadness or anger. While occasional nightmares are nearly ubiquitous, frequent nightmares—occurring about once per week or more—affect 4–6% of the population (American Psychiatric Association, 2013; Levin & Nielsen, 2009). Idiopathic nightmares have no known cause and, when they occur only occasionally, appear to be a normal and even adaptive response to ongoing stress or current concerns. However, frequent nightmares are usually associated with persistent waking distress and lower psychological well-being (Zadra & Donderi, 2000). Further, individuals experiencing frequent nightmares are more likely to suffer from anxiety, depression, and other affective difficulties, such as alexithymia, and are at higher risk of suicide (Levin & Nielsen, 2009). Many frequent nightmare sufferers do not seek treatment and often report that they do not consider their nightmares to be a problem (Schredl, 2013).

In fact, nightmare sufferers may possess an enriched dreaming life of which nightmares are only a part. For example, frequent nightmare sufferers have higher than average recall of non-nightmare dreams, and report heightened affect and vividness in these dreams (Levin, 1994). Further, while nightmares may well be intensified dreams marked by negative affect, frequent nightmare sufferers are also more likely to experience intensified dreams marked by positive affect, including archetypal or lucid dreams (Spadafora & Hunt, 1990). All these findings suggest that nightmare sufferers may be characterized by an intensification of dreaming processes that may be expressed either positively or negatively depending on factors such as current levels of stress or different personality characteristics (Nielsen, 2011a).

Such an intensification of the dreaming process may also have counterparts in waking cognition, particularly waking daydreams. Models relating dreaming to waking fantasy and "mind-wandering" suggest that a continuum of cognitive activity ranges from focused thought on one extreme, through daytime mind-wandering (i.e., daydreaming, fantasy, or imagination), to dreaming on the other extreme (Domhoff & Fox, 2015; Fox, Nijeboer, Solomonova, Domhoff, & Christoff, 2013; Hartmann, 2007; Klinger, 1971). In other words, dreaming is considered to be an intensified form of mind-wandering (Domhoff & Fox, 2015). Accordingly, individuals who frequently experience nightmares and other forms of intensified dreams should also be prone to intensified daydreams. Some research supports this notion, including findings that attributes of waking fantasies are similar to those of REM dreams, particularly in regards to their affective tone (Kramer, Roth, Arand, & Bonnet, 1981; Starker, 1977). Furthermore, daydreaming styles are reflected in elements of nighttime dreams; for example, a daydreaming style characterized by anxiety and distractibility is correlated

with nighttime dreams that are highly bizarre and emotional. Finally the personality construct of boundary thinness, characterized by a tendency to be more sensitive to emotions and sensations, is correlated both with nightmare frequency and with a propensity to experience immersive and bizarre daydreams (Hartmann, 2007). Nonetheless, dreams, particularly from REM sleep, are typically more bizarre than are daydreams (Carr & Nielsen, 2015a) and contain more negative affect, whereas daydreams and mind-wandering have been associated with higher levels of positive affect (Fox et al., 2013).

Despite these general findings controlled laboratory comparisons of the dreams and daydreams of frequent nightmare sufferers have not been conducted. In particular, it remains unknown if the intense negative emotion defining nightmares is also a common characteristic of their waking state mind-wandering. Moreover, retrospective studies that have assessed both dreams and daydreams have not adequately defined the daydreaming state. Our recent study used a novel method of collecting morning nap dreams and daydreams in order to control for many of these factors, providing a more consistent method of mentation sampling (Carr & Nielsen, 2015a). For example, participants reported their daydreams and dreams within the same environment (the laboratory bedroom), near the same time of day, and with clear and repeated instructions for reporting. Further, our finding of high dream recall rates from morning REM sleep naps (96%) is higher than the average for nocturnal sleep studies (80%; see Nielsen, 2011b for review) and more similar to that of late night REM sleep awakenings (95%; e.g., Cicogna, Natale, Occhionero, & Bosinelli, 1998). This, and the fact that nightmares and other intensified dreams are more likely to occur during later REM periods and closer to the circadian peak of REM sleep propensity suggests that a morning nap protocol is particularly well-suited for the study of nightmare sufferers.

## Objectives

We compared waking daydream and REM dream reports collected within a morning nap protocol for both nightmare (NM) sufferers and controls (CTL), using participants' ratings of levels of affect, body sensation, and bizarreness in these reports. We predicted that NM sufferers would have more intensified waking daydream and nap dreams, as indicated by greater positively and negatively valenced affect and body sensations, and bizarre attributes. We also expected to replicate findings that REM dreams are more intense than waking daydreams, for both groups.

## Materials and Method

### Participants

Twenty-eight participants (20 women) between the ages of 18 and 35 ($M_{age}$ = 23.3 ± 3.43) were recruited using advertisements and posters. NM participants ($N$ = 14) recalled at least two nightmares per week for the past 6 months whereas CTL participants ($N$ = 14) recalled at least two dreams per week and less than one

nightmare per month for the past 5 years. Potential participants were screened for self-reported sleep, neurological, or psychological disorders, or the use of certain medications. All participants signed informed-consent forms which had been approved by the ethics committee of the Hôpital du Sacré-Coeur de Montréal.

## Procedures

Participants arrived at 8:00 a.m., completed the consent form and filled out a series of questionnaires that took approximately 30 min to complete. At 9:00 a.m. participants were given instructions for a brief cognitive task that they would complete both before and 1 hr after a morning nap (results reported elsewhere). They then completed the daydream procedure and responded to a 12-item questionnaire about their daydream content. After this, a technician attached an electrode montage for polysomnography and between 10:00 a.m. and 12:00 p.m. participants were given a 2-hr opportunity to nap. A different technician with substantial experience in sleep staging awakened them 10 min into REM sleep provided that a minimum of 50 min and a maximum of 2 hr of total sleep time had elapsed.

Upon awakening, participants immediately typed out their dream report and then completed a 12-item questionnaire about dream content (see Figure 1).

## Questionnaires

A packet of questionnaires was administered to assess participant characteristics, including recall frequency of dreams, bad dreams (without awakening), and nightmares (with awakening), anxiety levels (State Trait Anxiety Inventory; Spielberger, Gorsuch, & Lushene, 1970), depression (Beck Depression Inventory; Beck, Steer, & Brown, 1996), nightmare distress (Nightmare Distress Questionnaire; Belicki, 1992), and alexithymia (Toronto Alexithymia Scale; Taylor, Bagby, & Parker, 1992).

## Polysomnography

Participants slept in bedrooms with continuous audio-visual surveillance and a two-way intercom. They were recorded with an electrode montage of six standard

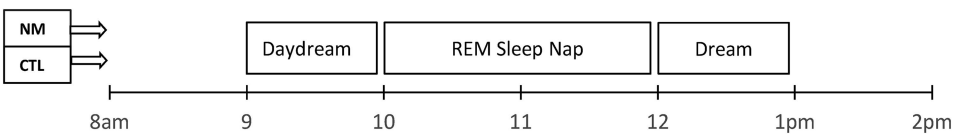


*Figure 1.* Study protocol. Participants arrived at 8:00 a.m. and completed questionnaires. At 9:00 a.m. they completed a daydream task and responded to a 12-item questionnaire about daydream content. Between 10:00 a.m. and 12:00 p.m. they took a polysomnography recorded nap with an awakening 10 min into rapid eye movement (REM) sleep. Upon awakening they completed a dream report and responded to the 12-item questionnaire about dream content.

10–20 EEG channels (F3, F4, C3, C4, O1, and O2) referenced to A1, 4 EOG channels (two vertical, two horizontal), 4 EMG channels (chin, corrugator), and 3 EKG channels. Biosignals were recorded using a Grass M15 Neurodata Acquisition Systems (−6 dB filters with cut-offs at 0.30 and 100 Hz) and archived under the control of Harmonie 5.4 software (Natus Medical Inc., Montreal, Canada). Polysomnography tracings were visually monitored during the nap and participants awakened 10 min into REM sleep after a minimum of 50 min and a maximum of 2 hr sleep had elapsed. Tracings were later scored according to current AASM standards (Berry et al., 2012) and standard sleep variables (REM min, %REM, NREM min, %NREM, TST) were calculated by in-house software (detailed results are reported in Carr, Blanchette-Carrière, Marquis, Ting, & Nielsen, 2016).

## Daydream and Dream Report Collection

Participants were given a set of instructions at the beginning of the experiment informing them of the daydream and nap dream report procedures. The instructions were presented on a computer screen that swiveled out from beside the bed:

> At the beginning of the experiment you will be asked to sit with your eyes closed for 3 min and to think or daydream about anything. After 3 min you will hear a beep, at which point you can open your eyes and immediately fill in a 'mentation report' about any daydreams or thoughts you had while your eyes were closed. You will then answer some questions about your daydream.
>
> This procedure will be exactly the same upon awakening from your nap, when you will be asked to immediately fill in a dream report and answer questions about your dream.

**Daydream report collection.** Before the daydream report, participants received specific instructions to sit in a relaxed position on the bed for 3 min, keeping their eyes closed while their mind was free to think or daydream about anything. If participants opened their eyes during this session, the screen continued to display instructions to keep their eyes closed until the beep. After 3 min, an 80 dB 500-Hz tone was sounded and participants were instructed to immediately type in a report of whatever was going through their mind before the tone, with a reminder to include as much detail as possible ("*Please describe what was going through your mind prior to the beep. Include details on characters, settings, objects, actions and emotions. If you have no recall, type -no recall-*"). They were given unlimited time to write the report. After this, participants completed a 12-item questionnaire using 1–9 response scales about specific imagery attributes such as negative and positive emotion, and bizarreness.

**Dream report collection.** Participants were awakened from REM sleep with the same nonstressful, 80 dB 500-Hz tone that had been used for the daydream procedure and were given the same instructions to immediately type in a report of whatever was going through their mind before the beep. They were given unlimited time to type out their dream report including as much detail as possible, before responding to the same 12-item questionnaire about specific imagery attributes.

### Daydream and Dream Attributes

The imagery attributes questionnaire consisted of 12 items that were all rated with 1–9 scales with 1 = *very little* and 9 = *extremely high* amounts of the designated attribute. The first item, about image clarity, included an optional response of 0 to indicate no recall ("*How clearly can you recall your experience?*"). All other items used only the 1–9 scales. There were three items about negative imagery content ("*What was the extent of negative emotion intensity/negative emotion frequency/fear in this experience?*"), two items about positive imagery content ("*What was the extent of positive emotion intensity/positive emotion frequency in this experience?*"), two items about body sensations ("*What was the extent of positive/negative body sensations in this experience?*"), and four items about bizarre dream content ("*To what extent was this experience unfamiliar/bizarre/discontinuous/confusing?*"). Attribute ratings were averaged within categories to give a single score each for negativity, positivity, body sensations, and bizarre content, for both daydream and dream conditions. High values on any of these average scores was taken to indicate intensification of the imagery for that particular attribute.

### Statistical Analyses

Analyses tested if NM sufferers had more intensified dream and daydream experiences in all four attribute categories (negativity, positivity, body sensations, and bizarre), and if dreams were more intense than daydreams, particularly in negative and bizarre attribute categories. A 2 group (NM, CTL) × 2 condition (daydream, dream) × 4 attribute (negativity, positivity, body sensations, bizarre) ANOVA was conducted to test for the main effect of group, the main effect of condition, and the Condition × Attribute interaction. A corrected $p$ value of 0.007 was used to control for the multiple comparisons of the design (a 2 × 2 × 4 ANOVA with seven effects: corrected $p = .05/7 = 0.007$). Secondarily, exploratory $t$ test analyses were conducted to compare the specific attribute categories by group.

## Results

### Questionnaires

Participants did not differ in age, $t(26) = -0.43$, $p > .67$. NM participants recalled significantly more dreams, $t(26) = 2.21$, $p = .04$, bad dreams, $t(26) = 6.24$, $p < .001$, and nightmares per week than did CTL participants, $t(26) = 6.24$, $p < .001$. Groups did not differ in State or Trait Anxiety measures ($p > .15$). NM participants tended to score higher on the depression index, $t(26) = 2.05$, $p = .05$; they also had higher Nightmare Distress scores, $t(26) = 3.15$, $p < .005$. NM participants had higher Alexithymia scores for the Difficulty Identifying Feelings subscale, $t(26) = 2.19$, $p = .04$, but not the Difficulty Describing Feelings, Externally Oriented Thinking, or Total Alexithymia Score (all $p > .24$). See Table 1 for means and *SD*s.

Table 1
*Demographics and Questionnaire Measures for Nightmare and Control Groups*

| | NM | CTL | *t* | *p* |
|---|---|---|---|---|
| *N* | 14 | 14 | | |
| Sex ratio | 10: 4 | 10: 4 | | |
| Age | 23.29 ± 3.29 | 22.71 ± 3.67 | .43 | .67 |
| D/week | 6.75 ± 3.24 | 4.32 ± 2.52 | 2.21 | .04* |
| BD/week | 2.79 ± 1.42 | .29 ± .47 | 6.24 | .00** |
| NM/week | 1.96 ± 1.37 | .00 ± .00 | 5.38 | .00** |
| ASTA-state | 36.50 ± 10.59 | 31.71 ± 6.13 | 1.46 | .16 |
| ASTA-trait | 44.43 ± 11.57 | 38.64 ± 8.79 | 1.49 | .15 |
| BDI | 14.71 ± 12.98 | 6.71 ± 6.70 | 2.05 | .05† |
| NM-distress | 33.29 ± 8.20 | 24.71 ± 6.01 | 3.15 | .00** |
| TAS | 48.14 ± 10.76 | 43.85 ± 7.07 | 1.22 | .24 |
| DIF | 17.43 ± 5.37 | 13.69 ± 3.12 | 2.19 | .04* |
| DDF | 12.86 ± 4.44 | 12.23 ± 2.74 | .44 | .67 |
| EOT | 17.86 ± 4.57 | 17.92 ± 3.64 | −.04 | .97 |

*Note.* Values presented as mean ± *SD*. NM = nightmare; CTL = control; D/week = dreams per week; BD/week = bad dreams per week; NM/week = nightmares per week; STAI = State Trait Anxiety Inventory; BDI = Beck Depression Inventory; NM-distress = Nightmare Distress Questionnaire; DIF = difficulty identifying feelings; DDF = difficulty describing feelings; EOT = externally oriented thinking; TAS = Toronto Alexithymia Scale.
† $p < .06$. * $p < .05$. ** $p < .005$.

## Sleep Structure

Four CTL participants were excluded for not sleeping or for awakening well before target time. Groups did not differ in minutes of NREM sleep ($p = .80$), minutes of REM sleep ($p = .31$), or TST ($p = .55$) in the nap. However, the NM group had significantly lower REM efficiency, $t(22) = -2.21$, $p = .04$. See Table 2 for means.

## Daydream and Dream Measures

Two CTL participants reported no dream recall and were excluded (in addition to 4 CTL participants who did not have REM sleep). Therefore, analyses were conducted

Table 2
*Sleep Stage Measures for Naps of Nightmare and Control Groups*

| | NM | CTL | *t* | *p* |
|---|---|---|---|---|
| TST | 82.11 ± 21.31 | 88.20 ± 27.86 | −.61 | .55 |
| Sleep efficiency | 91.35 ± 7.99 | 90.09 ± 12.30 | .31 | .76 |
| NR1 (min) | 13.75 ± 6.38 | 14.60 ± 11.06 | −.24 | .81 |
| NR2 (min) | 38.36 ± 18.14 | 37.10 ± 20.56 | .16 | .88 |
| NR3 (min) | 13.14 ± 16.03 | 16.10 ± 12.08 | −.49 | .63 |
| NREM (min) | 65.25 ± 22.24 | 67.80 ± 27.62 | −.25 | .80 |
| REM (min) | 16.86 ± 8.28 | 20.40 ± 8.10 | −1.04 | .31 |
| REM efficiency | 83.01 ± 17.76 | 95.84 ± 4.86 | −2.21 | .04* |
| NREM in REM (min) | 3.46 ± 4.33 | 1.05 ± 1.52 | 1.68 | .11 |

*Note.* Values presented as mean ± *SD*. NM = nightmare; CTL = control; TST = total sleep time; NREM = nonrapid eye movement; NR1 = NREM stage 1; NR2 = NREM stage 2; NR3 = NREM stage 3; REM = rapid eye movement.
* Values significantly differ $p < .05$.

with 7 CTL participants. All NM participants ($N = 14$) completed daydream and dream recall tasks successfully and were included in all analyses. Average daydream and nap dream attribute ratings used in the analyses are reported in Table 3.

## Daydream and Dream Comparisons

A 2 group (NM, CTL) × 2 condition (daydream, dream) × 4 attribute type (negativity, positivity, body sensations, and bizarre) repeated measures ANOVA revealed no significant three-way interaction, $F(3, 57) = 0.64$, $p = .59$. However, as expected, there was a group effect, $F(1, 19) = 13.04$, $p = .002$ revealing that the NM group had higher attribute ratings overall. There was also, as predicted, an interaction between condition and attribute type, $F(3, 57) = 14.032$, $p < .00001$, revealing that dreams were specifically more bizarre, $t(19) = 6.49$, $p = .000003$, whereas daydreams were specifically more positive, $t(19) = -2.92$, $p = .008$, while the two did not significantly differ in body sensations, $t(19) = 1.19$, $p = .25$ or negative affect, $t(19) = 19.05$, $p = .06$. The main effects of condition, $F(1, 19) = 6.64$, $p = .02$ and attribute type, $F(3, 57) = 3.49$, $p = .02$ did not withstand the corrected $p$ value of 0.007. Interaction effects between condition and group, $F(1, 19) = 3.98$, $p = .06$, and attribute type and group, $F(3, 57) = 2.96$, $p = .04$ also did not withstand correction.

Exploratory $t$ test comparisons revealed that, within daydreams, the NM group had higher positivity, $t(19) = 3.25$, $p = .004$, body sensation, $t(19) = 2.73$, $p = .01$, and bizarreness ratings, $t(19) = 2.45$, $p = .02$, but did not significantly differ in negativity ratings, $t(19) = 0.59$, $p = .56$; see Table 3 and Figure 2.

Exploratory analyses comparing the two groups' dream attributes revealed that the NM group had higher body sensations, $t(19) = 3.44$, $p = .003$ than the CTL group, but did not differ in positivity, $t(19) = 1.53$, $p = .14$; negativity, $t(19) = 0.07$, $p = .95$; and bizarreness, $t(19) = -0.13$, $p = .90$ attribute ratings (see Table 3 and Figure 3).

## Discussion

The present results provide partial support for our hypotheses that nightmare sufferers would have more intensified daydreams and nap dreams and suggests some

Table 3
*Average Daydream and Nap Dream Attribute Ratings for Nightmare and Control Groups*

| | NM ($N = 14$) | CTL ($N = 7$) |
|---|---|---|
| Daydream | | |
| Negative | 2.64 ± 2.04 | 2.10 ± 1.87 |
| Positive | 6.25 ± 2.22 | 3.29 ± 1.25 |
| Sensation | 4.04 ± 1.50 | 2.14 ± 1.49 |
| Bizarre | 2.82 ± 1.44 | 1.43 ± .53 |
| Dream | | |
| Negative | 3.83 ± 2.18 | 3.76 ± 2.73 |
| Positive | 3.36 ± 1.46 | 2.36 ± 1.31 |
| Sensation | 3.71 ± 1.38 | 1.64 ± 1.11 |
| Bizarre | 5.39 ± 1.85 | 5.50 ± 1.51 |

*Note.* Values presented as mean ± *SD*.

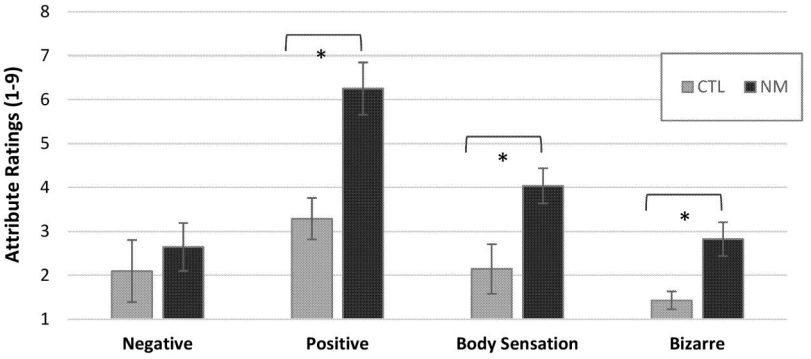


*Figure 2.* Mean (±*SEM*) daydream attribute rating. The nightmare (NM) group had significantly higher positivity, body sensations, and bizarreness than the control (CTL) group, but did not differ in negativity. * $p < 0.05$.

new possibilities for explaining the pathological mechanisms of frequent nightmares. Consistent with our hypothesis, the nightmare group reported higher positivity, body sensation, and bizarreness ratings in their daydreams, but only higher body sensation ratings in their nap dreams. These findings agree with prior research showing that nightmare sufferers have generally intensified imagery, including more vivid and immersive daydream experiences, despite being characterized by the typically negative emotional intensity of their nightmares and their affect distress (Levin & Nielsen, 2007; Spadafora & Hunt, 1990). Indeed, the questionnaire analyses revealed our nightmare group to have certain affective symptomology including higher nightmare-distress and alexithymia (DIF) as well as a tendency toward depression.

Contrary to predictions, however, the nightmare group did not show overall higher negativity in either their nap dreams or daydreams. This finding, in fact, runs counter to our previous findings that nightmare sufferers report more anxiety in dreams recorded in home logs (Nielsen, Paquette, Solomonova, Lara-Carrasco, Colombo, et al., 2010; Nielsen, Paquette, Solomonova, Lara-Carrasco, Popova, et

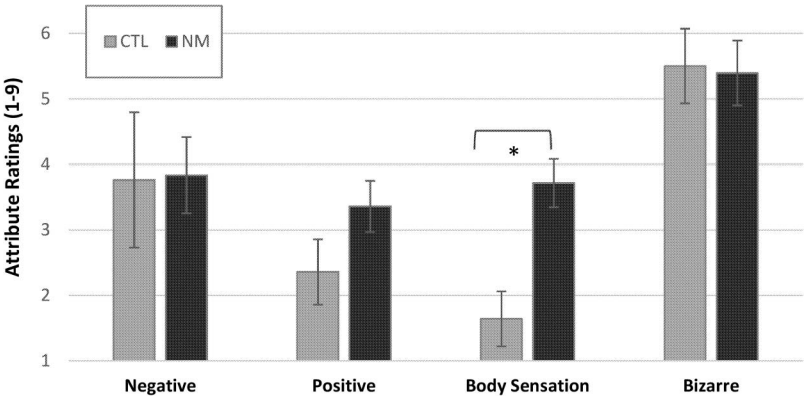


*Figure 3.* Mean (±*SEM*) nap dream attribute ratings. The nightmare (NM) group had significantly higher body sensations than did the control (CTL) group, but did not differ in negativity, positivity, or bizarreness. * $p < 0.05$.

al., 2010). However, the finding of elevated body sensation ratings in the dreams of nightmare sufferers may well be consistent with our previous finding that nightmare sufferers also rate their home dreams as containing more inhibition/ineffectuality (Nielsen, Paquette, Solomonova, Lara-Carrasco, Popova, et al., 2010). Our present findings add to this the observation that body sensations are elevated in the daydreams of nightmare sufferers. Together, the findings are therefore consistent with the possibility that even the non-nightmare dreams of nightmare sufferers, and possibly also their daydreams, are marked by chronic depiction of more salient or more vivid body sensations. These body sensations may contribute to both negative dream imagery, for example, bodily inhibition/ineffectuality, or positive imagery, for example, unrestrained movement or sensual pleasure. Such forms of affective body imagery may heighten emotional experiences, including, in the first case, negative emotions such as anxiety or fear (nightmares), but also, in the second case, more intense positive emotions such as freedom and euphoria (flying dreams, erotic dreams).

There is yet no definitive explanation for the present unexpected finding that nightmare sufferers did not show elevated negative affect in either their waking daydreams or morning naps dreams. One possibility is that dream emotions change across the night because of circadian or sleep-dependent factors (Nielsen, 2011b; Wamsley et al., 2007). As morning nap dreams occur closer to the apex of the circadian REM sleep propensity curve, the emotional content of accompanying dreams relative to nighttime dreams may also differ at this time. Further, some authors have demonstrated that emotional late-night REM dreams may be less negative than early night dreams, particularly in patients dealing with depression (Cartwright, Young, Mercer, & Bears, 1998). Such an affective pattern might also occur for nightmare sufferers, with even less negativity occurring during morning naps. Further assessments of imagery emotions assessed at different times of the day and night are needed to determine how daydream and dream emotions are modulated around the clock among nightmare sufferers and healthy controls.

A second possibility is that some aspect of the current methodology interfered with the depiction of negative affect that we expected to find in daydreams and nap dreams. It is an often cited observation that nightmare sufferers, like other parasomnia sufferers, do not exhibit their symptoms when sleeping in the laboratory (Fisher, Byrne, Edwards, & Kahn, 1970; Woodward, Arsenault, Murray, & Bliwise, 2000). Accordingly, none of our participants reported full-blown nightmares during their laboratory naps. This "nightmare suppression" effect is still unexplained, but some have speculated that nightmare sufferers feel more secure sleeping under the watchful eye of professional sleep researchers (LaBerge & Rheingold, 1990).

Besides emotional content, another finding that is partially consistent with predictions is that nightmare sufferers had higher bizarreness ratings in their daydreams than did control participants. The difference for daydreams might be considered consistent with previous findings that nightmare sufferers are higher in fantasy proneness and creative aptitude (Hartmann, Russ, Van der Kolk, Falke, & Oldfield, 1981; Levin & Fireman, 2001). The result also mirrors our recent finding that nightmare sufferers have higher than normal scores on an emotion-cued associational breadth task, since associational breadth may reflect a broader than usual spread of activation in semantic networks (Carr & Nielsen, 2015b), and imagery bizarreness in both dreams and daydreams has been interpreted to reflect heightened associative memory activation (Carr et al., 2016; Carr & Nielsen, 2015b; Stickgold, Scott, Rittenhouse, & Hobson,

1999). The finding of high bizarreness is also consistent with the concurrent high levels of positivity in the daydreams of nightmare sufferers, given that access to semantic networks has been shown to be increased by positive mood in waking state tasks; for example, positive emotion leads to more unusual word associations, along with improved performance on a Remote Associate's Task (Isen, Daubman, & Nowicki, 1987; Isen, Johnson, Mertz, & Robinson, 1985). Thus, positivity during daydreams may have facilitated associative spread, further enhancing imagery bizarreness (Garland et al., 2010). As expected, both groups had higher ratings of bizarreness in their dreams than in their daydreams, which fits with current models of dreaming as being a hyperassociative creation of REM sleep.

While the groups did not differ in emotion or bizarreness ratings of their dreams, it might also be argued that, relative to their history of rich dream experiences, the nightmare participants did not find their laboratory dreams to be especially emotional or bizarre, even though they may have been relatively more so than control participants' dreams by objective standards. We, in fact, found that some of the dream reports from nightmare participants did appear more emotional and bizarre than those of controls, even though they were not rated as such (see Table 4). Consistent with this reasoning, one study showed that patients with schizophrenia spontaneously rated their dream reports as being less bizarre than did blind judges (Lusignan et al., 2009).

In conclusion, our laboratory findings suggest that nightmare sufferers experience more intensified and vivid imagery in their waking daydreams, particularly expressed as

Table 4
*Examples of Affect, Body Sensation, and Bizarreness in Daydream and Nap Dream Reports From NM Sufferers and CTLs*

| NM | CTL | |
|---|---|---|
| Daydreams | | Comments |
| . . . I briefly imagined small people exploring my organs . . . Before this, I imagined a ship sailing in a fresh water lake . . . I could feel and smell the wind. It was generally peaceful. | I started thinking about a friend, to whom I loaned 100$ very recently . . . I was imagining myself questioning him angrily later today. | NM daydream is bizarre and positive (peaceful) with many sensations (feel/smell wind); CTL daydreams is angry but the imagery is not bizarre |
| I was thinking about how fulfilling and beautiful it would be if I gave birth to a plate of chicken wings and a piece of Stilton. The flavors were almost tangible. | I was thinking about a date I'm going on tonight and worrying slightly . . . but justifying that I do not know this person so it is fairly inconsequential if it doesn't work out | NM daydream is bizarre and sensation-filled (positive-flavors, negative-birth); CTL daydream is worrying but the imagery is not bizarre |
| Dreams | | Comments |
| . . . I found myself outside with all the gear (electrodes) still stuck to my face. The sun was excessively bright . . . | . . . MC came in with a lab coat and glasses and the clothes she is wearing today (grey shirt and jeans). She asked about my dream. | NM dream contains more sensations (stuck to face, bright sun) and seems bizarre; CTL dream does not seem bizarre |
| . . . I was trying to fall asleep and not doing very well . . . at one point my bed was in fact outside . . . with cyclists weaving in circles around my bed . . . | I had returned to the table (in the lab) to take the electrodes off. Then I went back to the sleep room trying to find my shoes and purse and bag . . . Felt a little anxious . . . | NM dream has some negative emotion ("not doing very well") and seems bizarre; CTL dream has some negative emotion but does not seem bizarre |

*Note.* NM = nightmare; CTL = control.

increased positivity and bizarreness, as well as elevated body sensations, expressed in both their waking daydreams and morning nap dreams. These findings are in contrast to typical clinical profiles of nightmare sufferers, who are characterized only by their dysphoric symptomology, symptoms that we also found in the form of higher distress, alexithymia, and depression scores and higher retrospective estimates of recalling bad dreams and nightmares. Analyses further point to a predominance of bodily oriented imagery of both positive and negative valence in both daydreams and nap dreams. This partially unexpected pattern of results broadens our view of nightmare pathology and suggests a number of hypotheses about the pathogenesis of nightmares for future research.

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