Clarifying negative affect and distressing past imagery in predicting nightmare frequency

William E. Kelly

Neumann University, Aston, Pennsylvania, USA

Summary. Relationships among nightmare frequency, distressing past imagery, i.e., distressing memories, and negative affect remain unclear. This preliminary study examined these relationships while accounting for posttraumatic stress among a sample of 103 university students. Results indicated that nightmare frequency was significantly correlated with negative affect, posttraumatic stress, and distressing past imagery. However, after accounting for distressing past imagery, neither negative affect nor posttraumatic stress significantly predicted nightmare frequency. The findings were consistent with theories postulating that nightmares result from attempts to decathect and consolidate distressing memories. The results and areas of future research are discussed.

Keywords: Nightmare Frequency, Negative Affect, Imagery, Memory, Posttraumatic Stress

1. Introduction

It has been suggested that nightmares manifest partly from attempts to consolidate distressing past images, i.e., imagery from unpleasant memories (Levin & Nielsen, 2007; Murkar et al., 2014). Hartmann (2014) theorizes that one mechanism the mind uses to decathect and consolidate distressing past images during dream states is combining them with non-distressing images. However, this process could make some non-distressing imagery initiate nightmares after it has been associated with distressing images (Spoormaker, 2008).

Consolidation of distressing past imagery in nightmares may occur in conjunction with negative affect, though directionality is not clear. Levin and Nielsen (2007) take a middle ground and assume that negative affect both activates and is activated by distressing past imagery to form nightmares. While previous research longitudinally supports the role of negative affect in nightmares (Schredl & Göritz, 2021), it does not clarify the sequence of how negative affect and distressing past imagery occur in nightmares. Outside of dream research, it has been suggested that negative affect activates implicit negative memories (LeMoult & Gotlib, 2019). Therefore, negative affect might be a precursor to distressing imagery in nightmares. The purpose of this preliminary study is to examine the relationships between nightmares, negative affect, and distressing past imagery.

A potential approach to understanding the association between distressing imagery in nightmares and negative affect is to examine observed outcomes of nightmare imagery. However, these findings have been contradictory. Köthe and Pietrowsky (2001) prospectively found that individuals, particularly those high in trait negative affect, reported more negative emotions the day following nightmares. However, a recent prospective study found that idiopathic nightmares decrease next day negative affect unless combined with other bad dreams across the night (Tousignant et al., 2022). Therefore, nightmare imagery might or might not increase negative affect depending on other variables.

One additional variable to consider regarding distressing past imagery, negative affect, and nightmare frequency is posttraumatic stress. Indeed, all three might reflect posttraumatic stress (An et al., 2021). It should be clarified that posttraumatic stress reactions are not necessarily indicative of posttraumatic stress disorder (PTSD). In one study only 9.1% of the 78.9% individuals in a community sample reporting traumatic events could be diagnosed with PTSD (Roberts et al., 2011). Given that mere exposure to traumatic events may elicit nightmares (Wood et al., 1992) and the large percentage of adults reporting traumatic events, it is possible that many nightmare reports reflect posttraumatic stress even among nonclinical samples. This could also be salient when studying distressing imagery and affect, which are also influenced by posttraumatic stress (Lang & Stein, 2005).

The above findings and speculations suggest that negative affect and distressing past imagery are related in the initiation of nightmares and could be influenced by posttraumatic stress. This might occur through several mechanisms. Based on Hartmann's (2014) theory, it might be that nightmares result from attempts to weaken the association between negative affect and distressing past imagery. As such, the continued initiation of distressing past imagery, perhaps through re-combinations with other imagery, might lessen the relationship between negative affect and nightmare frequency. It was hypothesized that 1) negative affect would be significantly correlated with nightmare frequency and distressing past imagery, and 2) after accounting for distressing past imagery negative affect would not significantly relate to nightmare frequency.

2. Method

2.1. Participants

Participants included 103 (68 males, 35 females) students enrolled in introductory psychology courses at a small university in the United States. The average age of the sample was 20.48 years (SD=2.43).

2.2. Measures

Nightmare Frequency. Based on two previous measures (Sandman et al., 2013; Schredl, 2003), an item was developed to measure nightmare frequency: "How often do you experience nightmares?" Nightmares were defined for participants as disturbing dreams that awaken the sleeper and can be clearly recalled after waking. Participants responded using a 3-point scale: 0=*"rarely (i.e., once a year or less)";* 1=sometimes (i.e., a few times a year); 2=*often (i.e., several times a month or more)."* To examine its psychometrics a separate sample of university students (*N*=57; 67% females; *M*$_{age}$=19.93) completed the nightmare item and two other measures for validity. Two weeks later they completed the nightmare item again. The nightmare item had a retest reliability of .757. It significantly correlated with Krakow et al.'s (2002) Disturbing Dream and Nightmare Severity Index (*r*=.640, p<.001) and Kelly and Mathe's (2019) Nightmare Experience Scale (*r*=.724, p<.001), but not with age (*r*=-.010, p=.941). These results provide preliminary support for the retest reliability and convergent and discriminant validity of the item.

Negative Affect. Trait negative affect was assessed using the 10-item negative affect scale of the Positive and Negative Affect Schedule (Watson et al., 1988). Participants respond the extent to which they typically experience various negative emotions using a 5-point scale (1=*"very slightly"* to 5=*"extremely"*). Psychometric information was presented previously (Watson et al., 1988). Internal consistency reliability in the current sample was .85.

Distressing Past Imagery. Based on a previous measure (Lang & Stein, 2005), an item was developed to measure distressing past imagery: "How much have you been bothered in the past month by repeated, distressing images of an experience from the past?" Participants responded using a 5-point scale (1=*"not at all"*, 5=*"extremely"*). To examine its psychometric properties another university student sample (*N*=53; 59% male; *M*$_{age}$=20.17) completed the distressing past imagery item and three other measures for validity. One week later they completed the distressing past imagery item again. The distressing past imagery item had a retest reliability of .760. It correlated significantly with responses to an experimental item, "About how often do you have frightening, uncontrollable daydreams or fantasies" (*r*=.396, p=.003), and John & Srivastava's (1999) Big Five Inventory neuroticism scale (*r*=.273, p=.048), but not with Hays et al.'s (1989) measure of Social Desirability (*r*=.062, p=.660). These results provide preliminary support for the retest reliability and convergent and discriminant validity of the item.

Posttraumatic Stress. Posttraumatic stress was assessed using the 4-item Short Form of the PTSD Checklist-5 (Zuromski et al., 2019). Participants reported how much they have been bothered by each item over the past month using a 5-point scale (0=*not at all* to 4=*extremely*). Psychometric information was presented previously (Zuromski et

al., 2019). Internal consistency reliability in the current sample was .78.

2.3. Procedure

After providing informed consent participants completed a "paper and pencil" survey as part of a larger, unrelated study. Questionnaires were completed in group settings before lectures during regular class times, not during exam weeks. No time limits were imposed, and no exclusionary criteria were used. Participants were voluntary and received no compensation. Data was manually entered into SPSS for Windows for analysis.

Pearson correlations were used to examine the relationships between variables. A linear regression was calculated using nightmare frequency as the criterion. Gender was entered as a covariate on Step 1 along with negative affect. Distressing past imagery was entered on Step 2 and posttraumatic stress on Step 3. An alpha level of *p*<.05 (two-tailed) was set for statistical significance.

3. Results

Among the sample, 34.0% reported having nightmares "rarely", 46.6% "sometimes", and 19.4% "often". All variables were relatively normally distributed, skewness <.70. No significant gender differences were found for negative affect, posttraumatic stress, or distressing past imagery, *t*'s<0.889. However females (*M*=1.057) reported more frequent nightmares than males (*M*=0.750), *t*(101)=2.085, *p*=.020, *d*=.434. As presented in Table 1, nightmare frequency was significantly related to negative affect, distressing past imagery, and posttraumatic stress. Negative affect and distressing imagery were also significantly related. The strongest relationship was between negative affect and posttraumatic stress.

Table 2 presents regression models predicting nightmare frequency. On Step 1, gender and negative affect combined to predict a significant 7.9% of the variance in nightmare frequency. Only negative affect independently predicted nightmare frequency. On Step 2, distressing past imagery accounted for an additional 19.1% of the variance. On this step, after accounting for distressing past imagery, negative affect was no longer significant. On Step 3, posttraumatic stress accounted for an additional 1.5% of the variance, which was not significant. On this step, distressing past imagery continued to significantly predict nightmare frequency after accounting for posttraumatic stress.

For exploratory purposes, a second regression was calculated. Again, nightmare frequency was the criterion. As

Table 1. Correlations Between Measures.

Scale	Night-mares	Negative Affect	Distressing Imagery	M	SD
Nightmares				0.854	0.720
Negative Affect	.211*			19.751	6.904
Distressing Imagery	.459**	.352**		2.262	1.275
Posttraumatic Stress	.356**	.658**	.549**	5.155	3.722

Note: N=103. *p<.05 **p<.01.

Table 2. Regression Models Predicting Nightmare Frequency.

	Model 1			Model 2			Model 3		
Variable	β	t	p	β	t	p	β	t	p
Gender	.186	1.931	.056	.240	2.766	.007	.244	2.821	.006
Negative Affect	.194	2.016	.046	.024	0.257	.798	-.074	0.648	.519
Distressing Imagery				.470	5.085	<.001	.404	3.937	<.001
Posttraumatic Stress							.184	1.445	.152
	F=4.272, *p*=.017, Δ *R²*=.079			*F*=25.862, *p*<.001, Δ *R²*=.191			*F*=2.088, *p*=.152, Δ *R²*=.015		

in the first regression, gender and negative affect were entered on Step 1. However, this time posttraumatic stress was added on Step 2 while distressing past imagery was added on Step 3. Of course, being the same model, the results for Step 1 were the same as the previous regression. Negative affect significantly predicted nightmare frequency (see Table 2, Model 1). On Step 2, posttraumatic stress accounted for an additional 9.3% (*F*=11.107, *p*=.001) of the variance. After accounting for posttraumatic stress (*β*=.406, *t*=3.333, *p*=.001), negative affect (*β*=-.075, *t*=0.613, *p*=.541) was no longer significant. On Step 3, distressing past imagery contributed an additional 11.3% (*F*=15.500, *p*<.001) of the variance. After adding distressing past imagery (*β*=.404, *t*=3.937, *p*<.001) neither negative affect (*β*=-.074, *t*=0.648, *p*=.519) nor posttraumatic stress (*β*=.184, *t*=1.445, *p*=.152) significantly predicted nightmare frequency.

4. Discussion

Consistent with the hypotheses, negative affect was correlated with both nightmare frequency and distressing past imagery. Further, negative affect did not independently predict nightmares after accounting for distressing past imagery. Though directionality using this data cannot be determined, taking both regressions together, it seems possible that distressing past imagery is a mechanism for the relationship between both nightmare frequency and negative affect and nightmare frequency and posttraumatic stress. It should also be noted that posttraumatic stress better accounted for nightmare frequency than negative affect. This might be because posttraumatic stress tends to include negative affect (An et al., 2022).

These results are consistent with previous findings and speculation that nightmares are often experienced concurrently with negative affect, posttraumatic stress, and distressing past imagery (Levin & Nielsen, 2007). These results are also consistent with theories that nightmares result from attempts to lessen negative affect associated with, and consolidate, distressing memories (Hartmann, 2014; Levin & Nielsen, 2007; Murkar et al., 2014). Alternatively, the current findings are also consistent with the hypothesis that nightmares result from attempts to concretize vague unpleasant inner states into more tangible imagery (Kelly & Daughtry, 2022). In this case, concretization might involve accessing distressing past imagery to represent inner states. Additional research using more sophisticated methodology is needed to examine these possibilities.

Levin and Fireman (2001-2002) found that daydreams with dysphoric themes were associated with nightmares

whereas daydreams resulting from uncontrolled attention were not. This might indicate that content of imagery is more influential in nightmares than intrusiveness. Because themes of imagery were not assessed, this cannot be clarified from the present data. However, given that posttraumatic stress, which typically includes an element of intrusiveness (Lang & Stein, 2005), was controlled, the current results do not exclude the possibility that imagery content takes precedence over intrusiveness. Additional research is needed to examine this.

The current study has several limitations. For instance, the sample was small and may not represent the population. All measures were self-report with no validity checks to ensure accuracy of responses. Further, the measure of nightmares did not differentiate between traumatic and idiopathic nightmares, nor was the content of the nightmares examined to understand if there is continuity between waking distressing past imagery and nightmare imagery. Similarly, information on the content of the distressing past images, their recency, intrusiveness, and how impactful they were was not elicited. Future research should include more particulars about the distressing past imagery.

Additional research also is needed to examine if the current findings generalize to the population as a whole and clinical samples. Additional research might also examine the influence of hyperarousal. Emotionally hyper aroused individuals might be more likely to recall unpleasant imagery and wake from and recall unpleasant dreams (Murkar et al., 2014). Also, future research might examine if other variables are involved in the association between distressing past imagery and nightmares. For instance, Levin and Fireman (2001-2002) found that individuals with a personality style making them susceptible to immersion in waking imagery were more likely to have nightmares.

References

An, Y., Zhao, J., Shi, J., & Hou, W. K. (2022). Network analysis of posttraumatic stress disorder symptoms among adolescent survivors of a major disaster in China. Psychological Trauma: Theory, Research, Practice, and Policy, 14(1), 132–140. https://doi.org/10.1037/tra0001053

Hartmann, E. (2014). The nature and functions of dreaming. Oxford University Press.

Hays, R. D., Hayashi, T., & Stewart, A. L. (1989). A Five-Item Measure of Socially Desirable Response Set. Educational and Psychological Measurement, 49(3), 629–636. https://doi.org/10.1177/001316448904900315

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In

L. A. Pervin & O. P. John (Eds.), Handbook of personality: Theory and research (pp. 102–138). Guilford Press.

Kelly, W. E., & Daughtry, D. (2022). Elucidating nightmare proneness: Relationships with emotional dysregulation and psychological vulnerability. Dreaming, 32(3), 281–291. https://doi.org/10.1037/drm0000207

Kelly, W. E., & Mathe, J. R. (2019). A brief self-report measure for frequent distressing nightmares: The Nightmare Experience Scale (NExS). Dreaming, 29(2), 180–195. https://doi.org/10.1037/drm0000106

Köthe, M., & Pietrowsky, R. (2001). Behavioral effects of nightmares and their correlations to personality patterns. Dreaming, 11(1), 43–52. https://doi.org/10.1023/A:1009468517557

Krakow, B. J., Melendrez, D. C., Johnston, L. G., Clark, J. O., Santana, E. M., Warner, T. D., Hollifield, M. A., Schrader, R., Sisley, B. N., & Lee, S. A. (2002). Sleep Dynamic Therapy for Cerro Grande Fire evacuees with posttraumatic stress symptoms: a preliminary report. Journal of Clinical Psychiatry, 63(8), 673–684. https://doi.org/10.4088/jcp.v63n0804

Lang, A. J., & Stein, M. B. (2005). An abbreviated PTSD checklist for use as a screening instrument in primary care. Behaviour Research and Therapy, 43(5), 585–594. http://dx.doi.org/10.1016/j.brat.2004.04.005

LeMoult, J., & Gotlib, I. H. (2019). Depression: A cognitive perspective. Clinical Psychology Review, 69, 51–66. https://doi.org/10.1016/j.cpr.2018.06.008

Levin, R., & Fireman, G. (2001-2002). The relation of fantasy proneness, psychological absorption, and imaginative involvement to nightmare prevalence and nightmare distress. Imagination, Cognition and Personality, 21(2), 111–129. https://doi.org/10.2190/C11Q-VQAW-G3YH-KCQD

Levin, R., & Nielsen, T.A. (2007). Disturbed dreaming, posttraumatic stress disorder, and affect distress: A review and neurocognitive model. Psychological Bulletin, 133(3), 482–528. https://doi.org/10.1037/0033-2909.133.3.482

Murkar, A., Smith, C., Dale, A., & Miller, N. (2014). A neuro-cognitive model of sleep mentation and memory consolidation. International Journal of Dream Research, 7(1), 85–89. https://doi.org/10.11588/ijodr.2014.1.10306

Roberts, A. L., Gilman, S. E., Breslau, J., Breslau, N., & Koenen, K. C. (2011). Race/ethnic differences in exposure to traumatic events, development of post-traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. Psychological Medicine, 41(1), 71–83. https://doi.org/10.1017/S0033291710000401

Sandman, N., Valli, K., Kronholm, E., Ollila, H. M., Revonsuo, A., Laatikainen, T., & Paunio, T. (2013). Nightmares: Prevalence among the Finnish general adult population and war veterans during 1972–2007. Sleep, 36(7), 1041–1050. http://dx.doi.org/10.5665/sleep.2806

Schredl M. (2003). Effects of state and trait factors on nightmare frequency. European Archives of Psychiatry and Clinical Neuroscience, 253(5), 241–247. https://doi.org/10.1007/s00406-003-0438-1

Schredl, M., & Göritz, A.S. (2021). Stability of nightmare frequency and its relation to neuroticism: A longitudinal study. Journal of Sleep Research, 30, e13126. https://doi.org/10.1111/jsr.13126

Spoormaker, V.I. (2008). A cognitive model of recurrent nightmares. International Journal of Dream Research, 1(1), 15–22. https://doi.org/10.11588/ijodr.2008.1.21

Tousignant, O.H., Glass, D.J., Suvak, M.K., & Fireman, G.D. (2022). Nightmares and nondisturbed dreams impact daily change in negative emotion. Dreaming, 32(3), 292–313. https://doi.org/10.1037/drm0000213

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. Journal of Personality and Social Psychology, 54(6), 1063–1070. https://doi.org/10.1037//0022-3514.54.6.1063

Wood, J. M., Bootzin, R. R., Rosenhan, D., Nolen-Hoeksema, S., & Jourden, F. (1992). Effects of the 1989 San Francisco earthquake on frequency and content of nightmares. Journal of Abnormal Psychology, 101(2), 219–224. https://doi.org/10.1037/0021-843X.101.2.219

Zuromski, K. L., Ustun, B., Hwang, I., Keane, T.M., Marx, B. P., Stein, M.B., Ursano, R.J., & Kessler, R.C. (2019). Developing an optimal short-form of the PTSD Checklist for DSM-5 (PCL-5). Depression and Anxiety, 36(9), 790–800. https://doi.org/10.1002/da.22942