Dream content associated with the development of PTSD

Wilfred R. Pigeon[1,2], Michelle Carr[1], and Thomas A. Mellman[3]

[1]Sleep & Neurophysiology Research Laboratory, University of Rochester, Rochester, NY, USA

[2]U.S. Department of Veterans Affairs Center of Excellence for Suicide Prevention, Canandaigua, NY, USA

[3]Department of Psychiatry, Howard University, Washington DC, USA

Summary. Forty-seven participants with trauma-related injuries from life-threatening events recorded their dreams for two week periods during the two months following their injuries. At the conclusion of the two-month monitoring interval subjects were assessed for Posttraumatic stress disorder (PTSD). The dream content of all participants was analyzed using the Hall and Van de Castle system. The sample was compared to a normative dream sample and found to differ in several thematic areas. In addition, those patients who went on to develop PTSD had dreams that were significantly more negative in affective tone and content than that of their counterparts who did not develop PTSD. These findings are consistent with several theories regarding how dreaming may serve an adaptive function in relation to mood regulation. The findings from the present study also suggest that attention to dream content may provide a window on to which individuals are at risk for PTSD and as such may represent an opportunity for early intervention in recent trauma survivors.

Keywords: Posttraumatic stress disorder, PTSD, trauma, dreams, dream content

1. Introduction

Posttraumatic stress disorder (PTSD) is a psychiatric condition that develops in some but not all individuals who experience severely threatening traumatic experiences. The diagnosis is based on persisting symptoms that include re-experiencing the trauma with intrusive images, flashbacks or nightmares; emotional numbing and avoidance behaviors; and heightened arousal. Nightmares are considered a 'hallmark' of PTSD, with specific emphasis on the repetitive re-enactments of traumas as a feature of PTSD-specific dreaming (Ross, Ball, Sullivan, & Caroff, 1989). The DSM-5 lists "recurrent distressing dreams in which the content and/or affect are related to the traumatic event" among the intrusive symptoms of PTSD (American Psychiatric, 2013).

Several studies support the ongoing representation of trauma memories in dreams as being a feature of PTSD (van der Kolk, Blitz, Burr, Sherry, & Hartmann, 1984; Mellman, Kulick-Bell, Ashlock, & Nolan, 1995; Neylan et al., 1998). About half of PTSD patients experience trauma-replicating nightmares and another 20-25% experience non-replicative nightmares (Creamer, Brock, Matsangas, Motamedi, & Mysliwiec, 2018; Davis, Byrd, Rhudy, & Wright, 2007; Gehrman, Harb, Cook, Barilla, & Ross, 2015; Wittmann, Schredl, & Kramer, 2007). The presence of nightmares is also associated with higher PTSD severity in combat veterns (Pigeon, Campbell, Possemato, & Ouimette, 2013); and PTSD symptoms were associated with nightmare distress, nightmare frequency, and nightmare replicativeness in hospitalized German soldiers (de Dassel, Wittmann, Protic, Höllmer, & Gorzka, 2018). Thus, chronic PTSD is associated with recurring dreams that represent specific memories of a traumatic experience.

Beyond veteran populations, other studies have found an association between civilian trauma exposure and subsequent dream content, for instance in survivors of a Hurricane (Pagel, Vann, & Altomare, 1995) and from a wildfire (Siegel, 1996) compared to controls who were near, but not threatened by the natural disasters. Mellman and colleagues (Mellman, David, Bustamante, Torres, & Fins, 2001) found that during the acute aftermath of traumatic injury, about half the sample reported dreams that were 'highly similar' to the traumatic event, and went on to develop PTSD. Those who did not develop PTSD either did not recall dreaming or reported dreams that did not depict memories of the trauma. These data form Veteran and non-veteran groups suggest that exposed populations tend to have dream content that is specific, or thematically related, to the trauma during the acute aftermath of such traumas, and that this may predict PTSD.

With regard to dream content that extends beyond the replication or representation of trauma, studies have consistently found increased aggression and anxiety in the dreams of PTSD populations compared to various control groups (Esposito et al., 1999; Dow, Kelsoe, & Gillin, 1996; Lavie, Katz, Pillar, & Zinger, 1998; Lavie & Kaminer, 1991), although it is not clear whether such dream content is associated with the development of PTSD. Other recent work has assessed language use in dream reports and found that post-trauma nightmares have increased use of negative emotion words, hearing and feeling words, and risk words (Paquet, Cogan & Davis, 2020a); futher, words related to perceptual and cognitive processes are associated with PTSD symp-

Corresponding address:
Wilfred R. Pigeon, Ph.D., Sleep & Neurophysiology Research Laboratory, Department of Psychiatry, University of Rochester, 300 Crittenden Blvd., Rochester, NY 14642 USA
Email: Wilfred_Pigeon@urmc.rochester.edu

Submitted for publication: October 2020
Accepted for publication: February 2021
DOI: 10.11588/ijodr.2021.1.75883

tom severity, nightmare distress, and nightmare frequency (Paquet, Cogan & Davis, 2020b).

Based on the reviewed literature, we hypothesized that the dream content of patients recently exposed to severe trauma requiring hospitalization for injuries would differ from that of normative dream samples on a number of domains such as greater frequencies of content related to aggression, physical aggression, misfortune, bodily harm/misfortune and negative emotions. We also hypothesized that even among trauma survivors, the dream content of those developing subsequent PTSD would be more likely to exhibit more negative features than those who did not develop PTSD (more aggression relative to friendliness, and more misfortune, bodily harm, self-negativity, and negative emotions). To test these hypotheses, we analyzed the dream content of 47 participants who were injured and hospitalized from life-threatening events over the first two months following their trauma and then assessed their PTSD status.

2. Method

2.1. Participants

Participants were recruited from two Level One Trauma Centers (one located in Miami-Dade County, FL and one in Lebanon, NH) during their hospitalization for life-threatening injuries. Patients were approached and screened as soon as they had been stabilized, on average 9.0 (8.1) days after the trauma. Patients received full explanation of the study and willing participants signed an informed consent form, approved by the Dartmouth College and University of Miami internal review boards. 160 subjects were eligible, consented to participate and completed the baseline descriptive portion of the parent study. The parent studies' primary focus was on memory processing and assessing REM sleep as measured by polysomnography (PSG) within one month of the traumas (Mellman, Pigeon, Nowell & Nolan, 2007).

2.2. Inclusion-Exclusion Criteria

All participants were screened to be alert and oriented and have recall of most aspects of the event assessed on the Brief Traumatic Interview and Initial Reactions Scale. Patients who incurred a head injury, had a Glasgow Coma Scale score of below 15 at the scene of the event (Teasdale & Jennett, 1974), or were intoxicated from alcohol or drugs were excluded from the study (blood-alcohol levels taken at hospital admission). Diagnoses of psychosis, depression, PTSD, panic disorders, substance use disorders as assessed by the Structured Clinical Interview for DSM-IV (SCID) (First, Spitzer, Gibbon & Williams, 1994) and use of psychotropic medication during the month preceding the trauma were also bases for exclusion.

2.3. Dream Assessment

A dream diary and rating scale was administered at the initial assessment and participants continued to fill out additional diaries when dreams were recalled for the two-month interval following the initial trauma assessment. The diaries requested that the participant provide, upon awakening, a written description of his/her recalled dreams. Some participants were unable to write due to injury and others preferred to orally report, rather than write, their dreams (69% of the dreams collected were reported orally). Regardless of the manner in which dreams were reported, if the content was a mere statement (e.g., "I had a dream"), participants were questioned in order to promote more elaborate characterizations of their experience.

2.4. Dream Content Analysis & Data Management

Dream reports were scored for content using a scale developed by Hall & Van de Castle (Hall & Van de Castle, 1966) in which the presence or absence of major themes and their subcategories are coded. Major themes include: aggression, physical aggression, friendliness, sexuality, misfortune, good fortune, bodily misfortune, torso or anatomical features, success, failure, dreamer-involved success, negative emotions, and self-negativity. Three investigators independently rated ten dreams with this scale to assess reliability and achieved an intra-class correlation of .82. Once coded, the data was entered into a Microsoft Excel-based program provided by Domhoff & Schneider (Domhoff & Schneider, 1998). This program tabulated content domain frequencies and provides a measure of relative frequency of each domain (e.g., percent of dreams with misfortune).

2.5. Group Assignment

The Clinician Administered PTSD Scale (CAPS; Blake et al., 1990) was used to assess PTSD at 2 months post-trauma. The PTSD group (N=20) had a means CAPS score of 62.1 (18.2) compared to 17.0 (10.1) in the No PTSD group (N=27).

2.6. Statistical Considerations

The relative frequency of the major themes/subcategories of the present sample were compared to a normative sample, in which the Hall and Van de Castle system of content analysis was applied to the dream reports of 100 male and 100 female college students between the age of 18 to 25 (5 dreams per person, n=1000 dreams total; Hall and Van de Castle, 1966, cited in Domhoff, 1996). The h-statistic was used to test for group differences between the present sample and the normative sample (Cohen, 1977), which corrects for the unknown sample standard deviation in distributions of percentage scores based on arcsine transformations. Results are graphically represented by an h-profile. In addition to the comparison of the entire trauma sample to the normative data, between-group comparisons (PTSD vs. No PTSD) were conducted in the same manner as described above. All analyses were two-tailed with a .05 alpha level.

3. Results

3.1. Sample Composition

Given the primary focus of the parent study on obtaining PSG within one month of trauma, study resources were devoted to accruing a sample undergoing PSG and the majority of patients were not followed longitudinally because they were discharged prior to undergoing PSG or were still on narcotic pain medications at the one month time point. Ultimately, 47 participants completed the two-month assessment of PTSD and reported at least one dream during the two-month study period. The mean age of participants was 34.0 (10.2). Of the 32 male subjects and 15 female subjects, 57% (N=27) were Euro-American, 9% (N=4) were Afro/Ca-

ribbean-American and 34% (N=16) were Hispanic. All participants were exposed to life-threatening events, reacted with fear, helplessness or horror, and sustained injuries for which they were hospitalized. Sixty-six percent of the participants (N=31) were injured in motor vehicle accidents, 15% (N=7) experienced work-related accidents, and 19% (N=9) were assaulted by assailants unknown to them. There were no cases in which the traumas were due to domestic or sexual violence.

3.2. Dream Report Frequency

An average of 1.8 (1.4) dreams were reported per person. Dream reporting frequency did not differ by post-hoc group assignment (1.85 dreams in the PTSD group and 1.81 in the No PTSD group). If participants reported more than 3 dreams during the two-week assessment during the two month post-trauma period, only the first 3 dreams reported were included in the analyses.

3.3. Dream Content Frequency (vs Hall and Van de Castle norms)

Compared to the data from the Hall and Van de Castle normative sample (n=1000), the dream content of the trauma patients (n=47) contained significantly less: aggression (h=-.37, p=.001), friendliness (h=-.54, p<.0001), sexuality (h=-.56, p <.0001), good fortune (h=-.27, p=.016), and contained significantly more: physical aggression (h=.67, p<.0001), torso/anatomy (h=.93, p=.004), bodily misfortune (h=.47, p=.005), and self-negativity (h=.26, p=.027). The dream content of the trauma sample did not differ from the normative population with respect to ratio of aggression to friendliness, negative emotions or overall misfortune. Table 1 displays to what extent the dream content of participants differed from the norms.

3.4. Dream Content Frequency (PTSD vs No PTSD)

When the dreams of the group of patients who developed PTSD (N=20) were compared to the dreams of those who did not develop PTSD (N=27), some additional differences emerge. Specifically, as compared to the No PTSD group, the PTSD group had significantly more: aggression/friendliness (h=.60, p=.037), self-negativity (h=.70, p=.012), negative emotions (h=1.02, p<.001), and misfortune (h=.60, p=.002). There were also trends for more bodily misfortune (h=.49, p=.063) and aggression (h=.39, p=.093) in the dream content of the PTSD group. Figure 1 is a graphical representation of how those who did develop PTSD and those who did not develop PTSD differ from each other and the norms.

4. Discussion

The aims of this study were twofold: first, to compare dream content of trauma patients to normative dream data, and second, to identify dream content that distinguished between trauma patients that develop PTSD and those that recovered from trauma without developing PTSD. Overall, our combined sample of recent trauma patients had dream content that contained, as compared to normative dreams, less aggression, sexuality and friendliness and more body/torso and misfortune references. More importantly, the dreams of patients who eventually developed PTSD were significantly more negatively toned than the dreams of those who recovered from their trauma without developing PTSD.

Table 1. Occurrence of Hall and Van De Castle Dream Content Themes and Categories for Entire Trauma Sample and by Group

Social Interaction or Theme	Group	Sample	Norms	h	p-value	
Aggression/Friendliness Ratio	All	66%	55%	+.22	.164	
	NP	53%	55%	-.04	.862	
	P	84%	55%	+.65	.005	**
Physical Aggression	All	74%	42%	+.67	.000	**
	NP	73%	42%	+.65	.005	**
	P	72%	42%	+.63	.037	*
Self-Negativity	All	77%	65%	+.26	.027	*
	NP	63%	65%	-.06	.738	
	P	88%	65%	+.54	.001	**
Bodily Misfortunes	All	55%	32%	+.47	.005	**
	NP	30%	32%	-.05	.887	
	P	64%	32%	+.65	.002	**
Negative Emotions	All	78%	80%	-.07	.637	
	NP	58%	80%	-.50	.032	*
	P	96%	80%	+.53	.007	**
Torso/Anatomy	All	70%	25%	+.93	.004	**
	NP	67%	25%	+.86	.139	
	P	71%	25%	+.96	.012	*
% Dreams with at least one						
Aggression	All	28%	46%	-.37	.001	**
	NP	21%	46%	-.54	.001	**
	P	38%	46%	-.16	.340	
Friendliness	All	16%	40%	-.54	.000	**
	NP	21%	40%	-.43	.008	**
	P	08%	40%	-.80	.000	**
Sexuality	All	00%	08%	-.56	.000	**
	NP	00%	08%	-.56	.001	**
	P	00%	08%	-.56	.001	**
Misfortune	All	38%	35%	+.07	.509	
	NP	23%	35%	-.26	.112	
	P	57%	35%	+.44	.008	**
Good Fortune	All	01%	06%	-.27	.016	*
	NP	03%	06%	-.16	.313	
	P	00%	06%	-.49	.004	**

All = Entire Sample; NP = No PTSD; P = PTSD.

Taken together, these results suggest that dreams in the early aftermath of trauma may reflect the broader emotional processing that is taking place. That is, there is a focus on the trauma (misfortune) and its physical consequences (body/torso references). In addition, it would appear that participants that go on to develop PTSD tend to have dream content that is even more negatively valenced (more aggression, negative emotions, misfortune, and self-negativity).

Given the present findings, it would appear that typical dream content in response to trauma is the incorporation of themes related to trauma and that greater degrees of this phenomenon are associated with a more morbid clini-

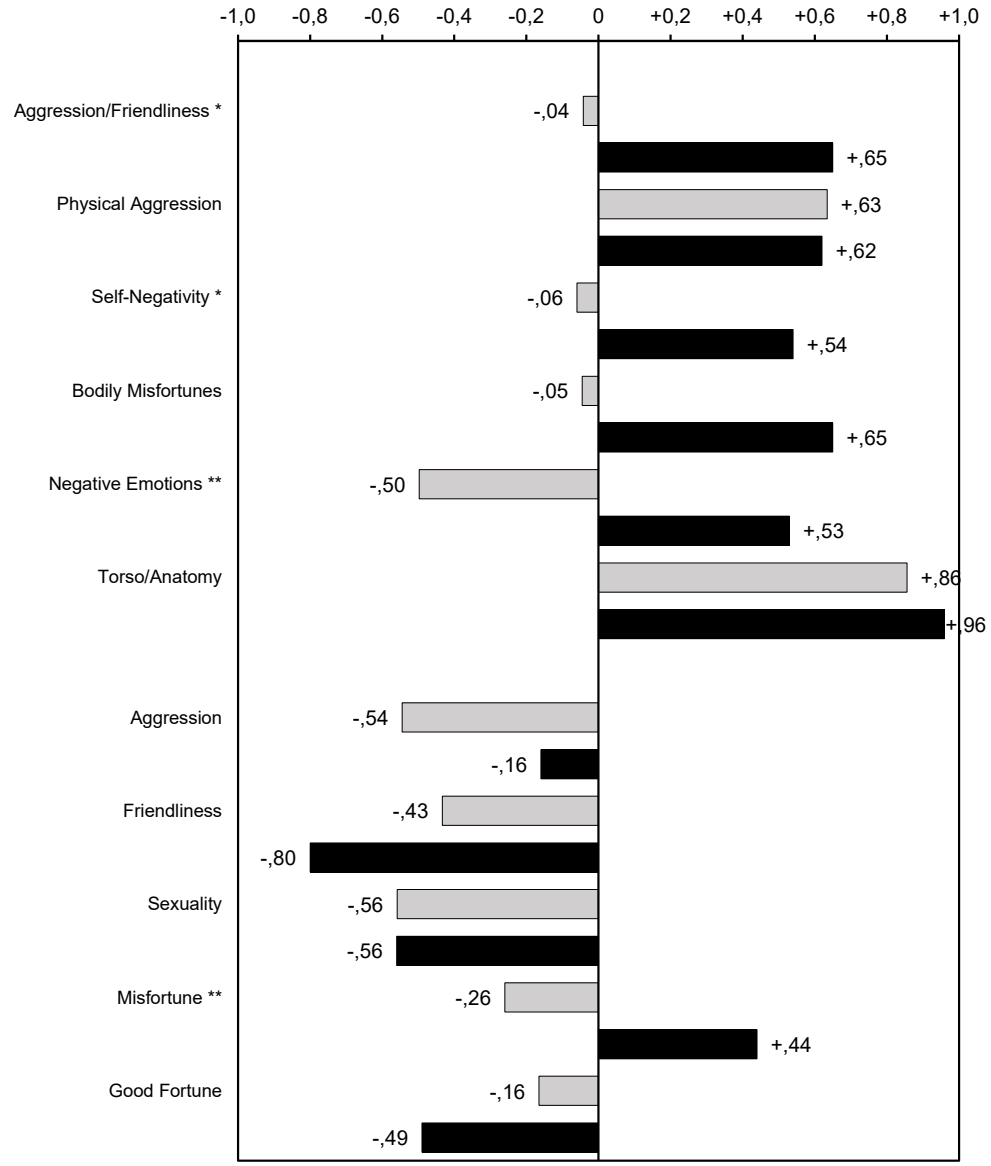

Figure 1. H-Profile for the Dream Content of PTSD and No PTSD Groups Relative to Norms
The vertical abscissa in the center of the profile where h=0 represents the norm. Gray bars represent values for the No PTSD group and black bars the PTSD group. *Denotes between group differences of p<.05, **Denotes between group differences of p<.01.

cal course. These findings complement our previous report from an overlapping sample, showing that individuals who developed PTSD exhibited shorter REM duration and more REM fragmentation (Mellman et al., 2002) than those who did not develop PTSD. It has been suggested that REM sleep serves a functional role in adaptation to emotional experiences (van Der Helm & Walker, 2009). It may be that increased negativity and physiological arousal in dream content coincides with or exacerbates REM sleep interruption following trauma, interfering with adaptation to a traumatic experience.

The present study is limited methodologically by its use of oral, in addition to written, dream reports, although the use of oral reports is often necessary in a sample of patients with injuries, and was made to be as consistent as possible with the protocol for collecting written dream reports. It should also be reiterated that although these were not exclusionary criteria, our sample did not include patients with traumas related to combat, sexual assault or assaults by persons familiar to the patient (e.g. domestic violence). Thus, we cannot generalize to these populations.

Overall, the existence of negatively laden dream content may provide a window of opportunity for early intervention in PTSD, which may be targeted to individuals demonstrating this risk during the early pathogenesis of PTSD (rather than years after it has become activated). The nature and utility of such interventions can be the subject of further inquiry and could provide further evidence for one pathophysiological pathway to PTSD.

Acknowledgments

This work was funded in part by the National Institutes of Health; NIMH R01 MH-54006 to author TM and K12 funding for author MC from training award GM106997.

References

American Psychiatric, A. (2013). Diagnostic and Statistical Manual of Mental Disorders (Vol. 5th). Arlington, VA: American Psychiatric Association.

Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (1994). (4th ed.) Washington, D.C.: American Psychiatric Association.

Blake, D. D., Weather, F. W., Nagy, L. M., Kaloupek, D. G., Klauminzer, G., Charney, D. S. et al. (1990). A clinician rating scale for assessing current and lifetime PTSD: The CAPS-1. Behav Therapist, 13, 187-188.

Cohen, J. (1977). Statistical Power Analysis for the Behavioral Sciences. New York: Academic Press.

Creamer, J. L., Brock, M. S., Matsangas, P., Motamedi, V., & Mysliwiec, V. (2018). Nightmares in United States military personnel with sleep disturbances. J Clin Sleep Med, 14(03), 419-426.

Davis, J. L., Byrd, P., Rhudy, J. L., & Wright, D. C. (2007). Characteristics of chronic nightmares in a trauma-exposed treatment-seeking sample. Dreaming, 17(4), 187-198.

de Dassel, T., Wittmann, L., Protic, S., Höllmer, H., & Gorzka, R. J. (2018). Association of posttraumatic nightmares and psychopathology in a military sample. Psychol Trauma, 10(4), 475-481.

Domhoff, G. W. (1996). Finding meaning In dreams: a quantitative approach. New York: Plenum.

Domhoff, G. W. & Schneider, A. (1998). New rationales and methods for quantitative dream research outside the laboratory. Sleep, 21, 398-404.

Dow, B. M., Kelsoe, J. R., & Gillin, J. C. (1996). Sleep and dreams in Vietnam PTSD and depression. Biological Psychiatry, 39, 42-50.

Esposito, K., Benitez, A., Barza, L., & Mellman, T. (1999). Evaluation of dream content in combat-related PTSD. J Trauma.Stress, 12, 681-687.

First, M.B., Spitzer, R.L., Gibbon, M., Williams, J.B.W. (1994). Structured Clinical Interview for DSM-IV Axis I Disorders (SCID). New York, New York State Psychiatric Institute, Biometrics Research.

Gehrman, P. R., Harb, G. C., Cook, J. M., Barilla, H., & Ross, R. J. (2015). Sleep diaries of Vietnam War veterans with chronic PTSD: the relationships among insomnia symptoms, psychosocial stress, and nightmares. Behav Sleep Med., 13(3), 255-264.

Hall, C. S. & Van de Castle, R. L. (1966). The content analysis of dreams. New York: Meredith.

Kramer, M., Schoen, L. S., & Kinney, L. (1984). Psychological and behavioral features of disturbed dreamers. Psychiatric Journal of the University of Ottawa, 9, 102-106.

Krakow, B., Schrader, R., Tandberg, D., Hollifield, M., Koss, M. P., Yau, C. L., & Cheng, D. T. (2002). Nightmare frequency in sexual assault survivors with PTSD. J Anxiety Disord., 16(2), 175-190.

Lavie, P. & Kaminer, H. (1991). Dreams that poison sleep: Dreaming in Holocaust survivors. Dreaming, 1, 11-21.

Lavie, P., Katz, N., Pillar, G., & Zinger, Y. (1998). Elevated awaking thresholds during sleep: characteristics of chronic war-related posttraumatic stress disorder patients. Biological Psychiatry, 44, 1060-1065.

Mellman, T. A., David, D., Bustamante, V., Torres, J., & Fins, A. (2001). Dreams in the acute aftermath of trauma and their relationship to PTSD. J Trauma.Stress, 14, 241-247.

Mellman TA, Pigeon WR, Nowell PD, Nolan B. (2007) Relationships between REM sleep findings and PTSD symptoms during the early aftermath of trauma. J Traumatic Stress, 20:893-901.

Mellman, T. A., Kulick-Bell, R., Ashlock, L. E., & Nolan, B. (1995). Sleep events among veterans with combat-related posttraumatic stress disorder. Am.J Psychiatry, 152, 110-115.

Neylan, T. C., Marmar, C. R., Metzler, T. J., Weiss, D. S., Zatzick, D. F., Delucchi, K. L. et al. (1998). Sleep disturbances in the Vietnam generation: findings from a nationally representative sample of male Vietnam veterans. Am.J Psychiatry, 155, 929-933.

Paquet, C., Cogan, C. M., & Davis, J. L. (2020a). A quantitative text analysis approach to describing posttrauma nightmares in a treatment-seeking population. Dreaming, 30(1), 54.

Paquet, C., Cogan, C., & Davis, J. (2020b). An examination of the relationship between language use in post-trauma nightmares and psychological sequelae in a treatment seeking population. International Journal of Dream Research, 173-181.

Pagel, J. F., Vann, B. H., & Altomare, C. A. (1995). Reported association of stress and dreaming: Community background levels and changes with disaster (Hurricane Iniki). Dreaming, 5, 43-50.

Pigeon, W. R., Campbell, C. E., Possemato, K., & Ouimette, P. (2013). Longitudinal relationships of insomnia, nightmares, and PTSD severity in recent combat veterans. J Psychosom Res., 75(6), 546-550.

Ross, R. J., Ball, W. A., Sullivan, K. A., & Caroff, S. N. (1989). Sleep disturbances as the hallmark of posttraumatic stress disorder. Am J Psychiatry, 146, 697-707.

Siegel, A. (1996). Dreams of firestorm survivors. In D.Barrett (Ed.), Trauma and Dreams (Harvard University Press.

Teasdale, G. & Jennett, B. (1974). Assessment of coma and impaired consciousness. A practical scale. Lancet., 2, 81-84.

van Der Helm, E., & Walker, M. P. (2009). Overnight therapy? The role of sleep in emotional brain processing. Psychological bulletin, 135, 731-748.

van der Kolk, B., Blitz, R., Burr, W., Sherry, S., & Hartmann, E. (1984). Nightmares and trauma: A comparison of nightmares after combat with lifelong nightmares in veterans. American Journal of Psychiatry, 141, 187-190.

Wittmann, L., Schredl, M., & Kramer, M. (2007). Dreaming in posttraumatic stress disorder: A critical review of phenomenology, psychophysiology and treatment. Psychother Psychosom., 76(1), 25-39.