

# Understanding posttraumatic nightmares: An empirical and conceptual review

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Received 24 November 2006; received in revised form 15 June 2007; accepted 19 June 2007

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## Abstract

Posttraumatic nightmares (PTNMs) are a highly prevalent and distressing symptom of posttraumatic stress disorder (PTSD), yet have been subject to limited phenomenological investigation. As a result, the parameters of the symptom required to meet diagnostic criterion for PTSD are unclear and their relationship with normal dreams following trauma is not known. A categorical distinction between PTNMs and normal dreams has been assumed, explicitly within dreaming theories and perhaps implicitly within the PTSD field, but lacks empirical support. This paper reviews the current understanding of PTNMs and normal dreams following trauma within the PTSD and dreaming fields respectively. It is argued that models of PTSD can readily account for repetitive PTNMs that accurately replay the traumatic event, but not those that are symbolic of the traumatic event. On the other hand, theories of dreaming that propose a psychologically adaptive function of dreams can account for both replay and symbolic nightmares that evolve over time, but not those that are stuck in repetition. It is concluded that there is no adequate explanation for the range of dreams following trauma including the PTNM of PTSD that is both symbolic and repetitive. Three alternate explanatory models are proposed that draw on existing knowledge within both the PTSD and dreaming fields to explain the full range of nightmares following trauma.

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*Keywords:* Trauma; Posttraumatic stress disorder (PTSD); Nightmares; Dreams; Phenomenology

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## 1. Introduction

Repetitive and distressing trauma-related dreams are recognised as a core symptom of posttraumatic stress disorder (PTSD) in DSM IV (Criterion B2: “Recurrent distressing dreams of the event”) and ICD 10 (“Persistent remembering of the stressor in recurring dreams”). They have been referred to as a hallmark of PTSD (Hartmann, 1998; Wilmer, 1996). The significance of trauma-related dreams in PTSD is supported by their high prevalence and impact on the sufferer. Six-month prevalence rates in treatment seeking populations of 61% (Kilpatrick et al., 1997) and 67% (Schreuder, Kleijn, & Rooijmans, 2000), and point prevalence rates in a community sample of 25%, second only amongst the re-experiencing symptoms of PTSD to daytime intrusions at 33% (Ohayan & Shapiro, 2000) have been reported. Trauma-related dreams are not only very distressing in their own right (Coalson, 1995), but are associated with frequent nocturnal awakenings (Germain & Nielsen, 2003; Woodward, Arsenaault, Murray, & Bliwise, 2000). Beyond the general adverse effect of poor sleep on daytime functioning, Mellman and colleagues (Mellman, 1997; Mellman, Knorr, Pigeon, Leiter, & Akay, 2004) have proposed that disrupted sleep in PTSD may prevent the normal and potentially adaptive memory-processing function of REM sleep and thereby have a role in the development and maintenance of the disorder. The importance of increasing our understanding of the trauma-related dreams of PTSD has been highlighted in several recent review articles (Harvey & Jones, 2003; Pillar, Malhotra, & Lavie, 2000; Wittman, Schredl, & Kramer, 2007). However the phenomenology of trauma-related dreams remains little understood, with Wittman et al. (2007) concluding that there is “alarmingly little reliable information characterising the phenomenology of the disturbing dream in PTSD”. At the most basic level, there is no apparent consensus on the parameters of the symptom. How distressing, and how trauma-related, do the dreams need to be, to meet criterion?

Of particular importance, from both a theoretical and clinical perspective, is the question of the relationship between the recurrent distressing dreams of PTSD and normal dreams following exposure to a traumatic event. Among the majority of people exposed to a traumatic event who do not develop PTSD, the occurrence of trauma-related dreams is also common in the early aftermath of trauma (Lavie, 2001). Are they a categorically distinct phenomena (for example, a normal dream rather than an intrusive symptom of PTSD) or do they differ only qualitatively along a continuum of dream types? To date these types of dream have been studied independently within the fields of PTSD and dreaming respectively. With different foci of enquiry and research methodologies, little is known about the relationship between them.

Within the PTSD field, these fundamental questions about the nature of posttraumatic nightmares in PTSD are important for a number of reasons. First, more clearly defined parameters of this core symptom of PTSD would help clinicians to distinguish them from normal trauma dreams that are associated with recovery, and thereby improve consistency in assessment and diagnostic practices. Secondly, in a research setting greater specificity about the phenomenon under investigation would improve the methodological rigour of research into the symptom and allow comparisons between studies. Thirdly, if a range of trauma-related dreams that differ in important phenomenological ways can be reliably differentiated, future research may lead to the capacity to predict the course of trauma-related dreams at assessment and recommend optimal intervention tailored to the dream type.

As a first step towards a better understanding of trauma-related dreams in PTSD and their relationship with normal dreams following trauma, this paper will a) summarise the empirical evidence reported in both PTSD and dreaming

fields regarding the phenomenology of posttraumatic dreams, b) describe the theoretical understanding of those dreams in both fields, c) consider the extent to which the respective theories can account for the observed phenomena, and d) identify any gaps between observed phenomenology and theoretical explanations. Following this review, and in an attempt to address gaps identified, three alternative models of posttraumatic dreams derived from knowledge across the fields of PTSD and dreaming will be proposed.

## 2. Literature overview

### 2.1. *Dreams and nightmares: definitions*

There has been inconsistency in the use and definition of terms to denote the dreams experienced after a traumatic event, with trauma dreams, trauma-related dreams, distressing dreams, traumatic nightmares, posttraumatic anxiety dreams and posttraumatic nightmares variously used. Schreuder et al. (2000) suggest that the spectrum of dreams and nightmares be classified and defined as follows:

Dream: any form of reportable mental activity that occurs during sleep

Nightmare: a frightening dream from which the person wakes immediately (this definition is consistent with Nightmare Disorder criterion specified in DSM-IV)

Anxiety dream: a frightening dream experience remembered only after waking up in the morning

Posttraumatic dream: the person associates the content of the dream with traumatic events experienced

Posttraumatic anxiety dream: a frightening dream that the person associates with traumatic events experienced, remembered only after waking up in the morning

Posttraumatic nightmare: a frightening dream that the person associates with traumatic events experienced, from which they awaken immediately

Replicative posttraumatic nightmare: a posttraumatic nightmare in which the actual traumatic event is re-experienced.

Nonreplicative posttraumatic nightmare: a posttraumatic nightmare in which the content is trauma-related but not a replay of the traumatic event.

This classification system offers useful distinctions between different types of dream experiences. Routine application of this type of nosology to dreams following trauma would lead to greater consistency of terminology and facilitate comparisons across studies. However, this particular classification system is derived from the dreams of people many years following their trauma and does not include the distinction important for this review: that is, between dreams that resolve over time and those that persist as unchanged replications of the event. For the purpose of this paper the term ‘normal dreams following trauma’ will be used to describe the former. Defining the latter is more complex, since the diagnostic criteria in PTSD do not stipulate that the person be woken from their dream and it is ambiguous whether the dream must be an exact replication of the event. For simplicity, and to reflect common usage, the term repetitive posttraumatic nightmare (abbreviated to PTNM) will be used to refer to the latter.

Unfortunately, with inconsistent use of terms in the literature, there is no direct correspondence between Schreuder et al.’s (2000) dream types and the available phenomenological evidence. Notwithstanding this limitation, the current state of knowledge regarding types of dreams will be presented here. The section begins with important background information on the nature of dreaming *per se* before summarising what is known about dreams in general and posttraumatic dreams specifically.

### 2.2. *The phenomenon of dreaming*

When it was first established that sleep proceeded in cycles of four stages characterized by varying EEG and ocular activity (Dement & Kleitman, 1957) it was believed that dreaming occurred almost exclusively during the Rapid Eye Movement (REM) period associated with light sleep (Stage 1) when brain activity was most similar to the waking state. It was assumed that deep sleep (Stages 3 and 4), most dissimilar to the brain activity of the waking state, was associated with the suspension of, or very low level consciousness during sleep. A few years later, however, Foulkes (1962) investigated dream reports across stages of sleep in a laboratory based study in which subjects were awoken from

different stages of sleep and asked a series of questions about any dreams or thoughts they were having immediately prior to being woken. Foulkes (1962) established that dreaming (or some form of mentation) can occur in all stages of sleep, but with important differences in form and content according to the stage of sleep in which dreaming occurred. Similarly, in a study investigating the psychophysiology of nightmares, Fisher, Byrne, Edwards, and Kahn (1970) found that nightmares can occur across the stages of sleep, with their typical characteristics varying accordingly.

### 2.2.1. *Typical REM dreams*

With increasing REM periods towards the end of the sleep cycle, most dreaming associated with REM occurs towards the end of the sleep period. Foulkes' (1962) study found that dreams during REM sleep are characterised by being well integrated and having good continuity. These dreams were typically longer than non-REM dreams and involved more than one distinct part and a number of scene shifts. REM dreams were also found to be more likely to involve other people, to incorporate gross physical movement in the dream (without corresponding *actual* bodily movement), to have more and stronger visual imagery, and to involve the dreamer emotionally. The content of typical REM dreams was found to be more distorted and bear less relationship to the waking life of the dreamer than were dreams from non-REM periods. In a psychophysiological study investigating nightmares specifically, Fisher et al. (1970) found that nightmares which occur during REM sleep were characterised by their elaborate dream content and a gradual increase in anxiety (with or without physiological changes) that eventually awoke the dreamer over the approximately 20 minute dreaming period. Heart and respiration rates were found to return to normal on awakening.

### 2.2.2. *Typical non-REM dreams*

In the study described by Foulkes (1962), dreams were recalled in 70% of cases when subjects were woken from non-REM sleep, but the content was generally more thought-like than dream like, less likely to be distorted and more likely to be manifestly related to their waking life. Consistent with this, in their study of nightmares, Fisher et al. (1970) found that awakenings from non-REM sleep produced mental activity, generally less dreamlike and more thought-like in nature.

Fisher et al. (1970) found that nightmares occurring in Stage 4 sleep were characterised by sudden onset of intense anxiety/panic with increased heart rate, respiration, perspiration, body movement and waking EEG pattern. On awakening, little dream content was recalled and physiological arousal was maintained. These investigators noted that threatening external stimulation, anxiety or discomfort could trigger stage 4 nightmares. These authors describe nightmares arising from Stage 4 sleep (non-REM sleep) as more pathological than those arising from REM sleep. They argue that the individual's normal defences are not available to them during deep sleep, with the result that stage 4 nightmares deal with "uncontrolled anxiety". REM nightmares, on the other hand, are described as "desomatized" and thought to deal with "controlled anxiety". Fisher et al. (1970) conceptualise nightmares arising from Stage 2 sleep (which falls midway between Stage 4 and REM sleep in terms of brain activity) as somewhat more severe than REM nightmares but much less intense than Stage 4 nightmares, with no change in heart or respiratory rate prior to waking, but moderate increases following waking.

Fisher et al. (1970) found the Stage 4 nightmare to be relatively rare and considered it to be associated with a history of trauma or general psychopathology. In their study, Stage 4 nightmares and REM nightmares were found to co-exist in some individuals following trauma.

There are two key findings from this research that, in combination, have potential importance for an understanding of the phenomenology of posttraumatic nightmares. The first is that dreams and nightmares can occur across all stages of sleep with typical characteristics varying accordingly. The second is that nightmares following trauma have been observed in both REM and non-REM sleep. This raises the possibility that the phenomenology of PTNMs varies according to the stage of sleep in which they occur.

## 2.3. *Observations on the nature of everyday dreams*

For much of the past century, the study of dreams has been influenced by the prevailing wish fulfilment theory of Freud (1900; 1920) and Jung's notion of archetypal dreams (Jung, 1974). For both theorists the manifest content of dreams was less important than the underlying meaning assumed to be reflected in the symbolism of the dream. Since the development of a method of content analysis of dreams (Hall & Van de Castle, 1966), the content of ordinary dreams has been extensively researched with normative data available on the frequency with which common dream elements occur

in each of the following categories: characters, social interactions, aggression, friendliness, sexuality, activities, success and failure, misfortune and good fortune, emotions, settings and objects. Negative emotions such as anger and fear are more common than positive emotions (Hall & Van de Castle, 1966) and everyday mundane experiences such as reading and writing are rare (Hartmann, 2000). Recurrent dreams – dreams with the same content that have been observed to arise during times of stress or reflect unresolved conflict and then disappear when the stressor or conflict is resolved (Cartwright, 1979) – have also been identified. These dreams are not uncommon, with various questionnaire surveys reporting between 60 and 75% lifetime prevalence of recurrent dreams in adults (Zadra, 1996). Common dream themes such as being endangered, pursued, flying and falling have been identified (cf, Delaney, 1991).

#### 2.4. *The nature of dreams following trauma*

##### 2.4.1. *Normal dreams following trauma*

Hartmann (1998) reports on a consistent pattern of dreaming following trauma observed in the dream series of forty patients. Unfortunately, the PTSD status of patients was not reported but, as Hartmann makes a clear distinction between these trauma dreams and the repetitive posttraumatic nightmare of PTSD (elaborated below), it may be assumed that the patients were not suffering PTSD. The dream series were recorded in the immediate aftermath of trauma and lasted between two weeks and two years following the trauma. The earliest dreams following trauma were generally about the event, with only a minority of those being exact replays of the event. Within the first few days the dreams changed from the replay of trauma, to various images (for example, tidal waves or being attacked by a gang) associated with terror or fear. In the next stage, Hartmann observed that dream images changed again to ones associated with guilt, for example being the only survivor of an accident. The next common stage noted by Hartmann was grief, reflected in dreams about loss. Finally, the dreams evolved so that no single image representing the dominant emotion could be discerned.

Existing information about the phenomenology of non-PTSD dreams following trauma, based on Hartmann's study, is limited to dream content (including replay and symbolic content) and dominant emotions. Other features such as somatic involvement, physiological arousal and behavioural responses were not reported. In terms of Schreuder et al.'s classification system, the dreams described by Hartmann may include posttraumatic anxiety dreams and non-replicative posttraumatic nightmares.

##### 2.4.2. *The posttraumatic nightmare of PTSD*

The "hallmark" PTNM of PTSD is characterised as a repetitive, replay of the traumatic event, complete with accompanying cognitive, affective, physiological, and behavioural responses (Hartmann, 1996; Mellman, Kulick-Bell, Ashlock, & Nolan, 1995; Van der Kolk, Blitz, Burr, Sherry, & Hartmann, 1984). These behavioural responses (bodily movement that may re-enact the dream), in particular, are considered a distinct feature of the posttraumatic nightmare of PTSD (Mellman, David, Kulick Bell, Hebding, & Nolan, 1995; Van der Kolk et al., 1984). In some sufferers, these nightmares have been found to recur for decades with little or no change (Coalson, 1995).

In reference to the research cited above, which identifies the typical features of dreams across different stages of sleep, the PTNM of PTSD has been observed to combine features of typical REM and non-REM dreams (Mellman, David et al., 1995; Mellman, Kulick-Bell et al., 1995; Mellman, Kumar, Kulick-Bell, Kumar, & Nolan 1995; Van der Kolk et al., 1984). They are like typical REM dreams in their elaborate storyline but like typical non-REM dreams in their intense physiological activation, body movement and occurrence earlier in the sleep cycle. Van der Kolk et al. (1984) suggest that PTNMs in PTSD may occur in different stages of sleep with key characteristics varying accordingly. This thesis is supported by a number of studies that have found that nightmares following trauma can occur within both REM and non-REM sleep. In Fisher et al.'s (1970) early study, stage 4 nightmares and REM nightmares were found to co-exist in some individuals following trauma. Kramer, Schoen, and Kinney (1984) investigated the dreams of eight veterans with PTSD in the laboratory setting and found that disturbing dreams with military references occurred on spontaneous awakenings from both REM and non-REM sleep. Phenomenological differences or similarities in the dreams arising from REM and non-REM sleep were not reported. Van der Kolk et al. (1984) observed PTSD nightmares in both REM and stage 2 sleep in two subjects, while Kramer and Kinney (1988) found the stage of sleep of disturbed dreams to vary between the individuals, with some of their eight subjects experiencing them only in non-REM sleep, some only during REM sleep, and others in both REM and non-REM sleep. Again, phenomenological differences were not reported.

While it is widely agreed that accurate replays of the traumatic event are the hallmark PTNMs of PTSD (Hartmann, Rosen, & Rand, 1998; Wilmer, 1996), these dreams represent only a subset of the range of recurrent and distressing dreams experienced by individuals with PTSD. This broader range of dreams include those that are understood by the dreamer to symbolise or be related to the traumatic event while varying in the extent to which the actual event is replayed (Esposito, Benitez, Barza, & Mellman, 1999). Esposito and colleagues investigated the content of trauma-related nightmares of Vietnam Veterans with PTSD and found that they varied with respect to their similarity to the actual trauma, the degree of reality distortion, their time setting (future, present or past) and the degree of threat contained. Similarly, Wilmer (1996) described three types of trauma-related dreams in 304 treatment seeking veterans seven to 16 years after their service in Vietnam and labelled them “actual” (the replay of a traumatic event, “the hallmark of PTSD”), “variable” (plausible but not actual traumatic events) and “hallucinatory” (metaphorical or symbolic dreams that are identified with the trauma). The point prevalence of these types of trauma-related dreams in the sample of 304 combat veterans was 53%, 21% and 26% respectively. Wilmer conceptualised the dream types as lying on a continuum and reflecting the process of recovery from trauma.

Thus, on the basis of existing studies, information about the phenomenology of dreams in PTSD includes dream content (ranging on a continuum from replication of the traumatic experience to symbolic content that the dreamer associates with the traumatic experience), associated physiological activation and body movement, and stage of sleep. Beyond Esposito et al.’s (1999) reference to perception of threat, little attention has been paid to the dominant emotions contained in dreams. This is in contrast to existing information pertaining to normal dreams following trauma, which is restricted to information about dream content and dominant emotions.

## 2.5. *The current understanding of posttraumatic dreams*

Dreams following trauma are understood in different ways in the fields of PTSD and dreaming respectively. Within the PTSD field, theoretical models of the disorder conceptualise PTNMs as one of the re-experiencing symptoms. Within the dreaming field, dreams following trauma are generally understood to serve an adaptive function in promoting emotional adaptation to the experience. It is important to note that these conceptualisations of dreams following trauma have been derived in different ways. In the PTSD field, the conceptualisation of PTNMs is theoretically driven. In contrast, within the dreaming field, the dominant theoretical explanation has followed observed phenomenology. Both models, and their respective empirical support, will be outlined here.

### 2.5.1. *Dreaming theories*

The explanation of posttraumatic dreams within the field of dreaming needs to be understood within the broader context of theories of dreaming. These will be summarised here.

Within the field, the question of why we dream and whether dreams serve any adaptive purpose is the subject of ongoing debate. It is argued by some (e.g. Hobson, Pace-Schott, & Stickgold, 2000) that dreams have no meaning but are the random product of brain stem activity during sleep. These authors developed the activation-synthesis theory of dreams, which proposes that the bizarre and discontinuous nature of dreams arises from the individual’s attempt to make sense of signals received from random brain stem activity. Domhoff (2000) takes the contrary view, arguing that the coherence, consistency over time, and relationship with past and current waking concerns show that dreams are not random but are psychologically meaningful. The premise that dreams are psychologically meaningful has, of course, underpinned the dream theories and methods of dream analysis that have dominated over many years (e.g. Freud, 1900, 1920; Jung, 1974). A number of contemporary researchers in the field of dreaming (e.g. Cartwright & Lloyd, 1994; Hartmann, 1998) argue that dreams are not only psychologically meaningful, but serve an adaptive function in the emotional processing of experiences. This notion was first introduced by Breger (1969) and was implicit in Fisher et al.’s (1970) view that the low incidence of stage 4 nightmares pointed to the importance of the controlled REM anxiety dream in the mastery of traumatic experience. Cartwright (1986) tested the theory that the function of dreams is to process and organise in memory, information of an emotionally relevant nature by studying the dreams of women going through divorce. She found that the dreams of women who were coping better with divorce reflected more adaptive dream work (that is, the women had longer dreams, with a wider time perspective and addressed needs of self-esteem and control), than the dreams of depressed women. On the basis of the finding that increased REM activity associated with dreaming following stressful life events is associated with better adaptation, Cartwright and Lloyd (1994) argue that REM sleep and dreaming assist in emotional adaptation through the integration of distressing memories.

In an extension of this work to the field of trauma, it has been proposed that dreams serve an adaptive function in the emotional processing and cognitive integration of traumatic experiences (e.g. Hartmann 1998; Newell & Cartwright, 2000; Wood & Bootzin, 1992). Hartmann (1998) proposes specifically that connections in the mind (between people, memories, experiences, etc.) are made more broadly during dreaming than during wakefulness and that this making of connections facilitates the integration of new material following trauma. Hartmann argues that this is not a random process, but is guided by the dreamer's emotional concerns as represented in the imagery (or *contextualising image*) of the dream. Thus, as the traumatic experience is processed and integrated, dreams evolve from accurate replay to dream images that reflect the progression of emotions, typically fear followed by guilt and then grief. Hartmann's theory was derived empirically, as described above, but has not been empirically validated. Specific predictions about the evolving content and emotional valence of dreams following trauma that arise from the theory need to be tested. The assumption that dream content reflects the current emotional concerns of the dreamer would be supported by finding differences between the emotion and content of PTNMs in PTSD and that of normal dreams. Further, if symbolic trauma dreams are understood to reflect progress in the emotional processing of trauma (Hartmann, 1998; Wilmer, 1996), the content and emotional valence of symbolic trauma dreams would be predicted to fall midway between that of accurate replay and non-trauma dreams.

Notwithstanding the absence of empirical support, Hartmann's (1998) theory can account for both accurate replay and symbolic PTNMs, so long as there is a process of evolution apparent. However, the model cannot account for repetitive nightmares that are stuck in an early stage of replay. Hartmann argues that these nightmares are not dreams at all, but intrusive symptoms of PTSD and does not seek to account for the repetitive PTNM of PTSD as a dreaming phenomenon.

Revonsuo (2000) has developed an alternative theory of dreaming, the Threat Simulation Theory (TST) that Revonsuo and colleagues (Valli, Revonsuo, Palkas, & Punamaki, 2006) claim can account for the persistent PTNM of PTSD. Rather than proposing an adaptive psychological function of dreams (which inherently cannot explain the repetitive PTNM of PTSD) TST proposes that dreams serve a biological function in evolutionary terms. According to Revonsuo (2000) an individual's exposure to threatening situations in real life activates the threat simulation response and leads to more threatening dreams, thereby providing opportunity for rehearsal of threat detection and avoidance. Amongst our early ancestors it is argued that those who were more successful in their avoidance of threat were more likely to survive and hence, reproduce (Valli et al., 2005). The authors do not claim that dreams serve the same function in a contemporary sense, but that threat simulation dreams still occur as evidenced by the prevalence of posttraumatic nightmares (Valli et al., 2005). Unfortunately the central tenant of this theory, that the threat simulation dreams of our ancestors contributed to their survival, is essentially untestable. Further, the indirect evidence claimed by the prevalence of PTNM's would require that PTNMs are threat simulation dreams in which threat detection and avoidance are rehearsed. Evidence to date does not support this. In the only study reporting specifically on the degree of threat in PTNMs of adults with PTSD, Esposito et al. (1999) found the degree of threat contained in dreams to be variable, and two studies of the dreams of children exposed to trauma (Valli et al., 2005; Valli et al., 2006) found that while their dreams contained more threatening themes, there was little evidence of adaptive threat detection and avoidance in the dreams. Furthermore, TST does not explain why, if threat simulation in dreams has an adaptive evolutionary function, the dreams of some individuals resolve over time instead of persisting as the theory would predict. The theory is therefore of limited value in furthering our understanding of the phenomenology of PTNMs and factors that distinguish dreams that resolve over time from those that persist.

### 2.5.2. PTSD models

Beginning with Horowitz (1976), the three symptom clusters in PTSD (re-experiencing symptoms, avoidance/numbing symptoms and hyperarousal symptoms), have been understood to interact with each other in such a way that the disorder is perpetuated. Horowitz (1976) developed the notion that, when an individual is confronted with an overwhelming traumatic experience, there is competition between two opposing psychological processes. On the one hand, in order to "work through" and integrate the experience, traumatic material is brought to mind in the form of re-experiencing symptoms. However, the associated distress triggers protective psychological defences of avoidance and denial, which serve to prevent the emotional processing of the experience. The result is that the memory is suppressed and remains unprocessed, but continues to break into consciousness in the form of intrusions and nightmares. Thus, the cycle is perpetuated. A simplified model of PTSD that illustrates this relationship between the symptom clusters is presented in Fig. 1.

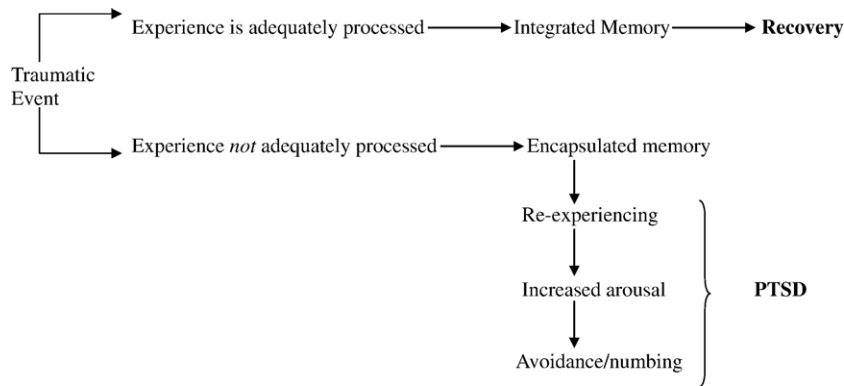


Fig. 1. Proposed perpetuating relationship between symptom clusters in PTSD.

From the earliest psychological models of PTSD to the most current (see Brewin & Holmes, 2003 for a comprehensive review), memory for the traumatic event has been central to an understanding of the disorder. Current cognitive models of PTSD (Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000; Foa & Rothbaum, 1989, 1998) continue to emphasise the centrality of intrusive recollections and their sequelae. A comprehensive review of these models and their respective explanatory power with respect to PTSD more generally is beyond the scope of this paper; the interested reader is referred to recent critical reviews by Dalgleish (2004) and Taylor (2006). Our interest here is specifically the extent to which the models can account for the observed range of phenomenology in PTNMs of PTSD.

Unfortunately, the Foa and Brewin models appear to make no conceptual distinction between intrusive symptoms that occur during waking and sleeping states, and while the Ehlers and Clark model (Steil & Ehlers, 2000) does acknowledge the potential influence of sleep related factors on the phenomenology of PTNMs, these are not elaborated. Consequently, discussion of the models is based on the broad conceptualisation of PTNMs as re-experiencing symptoms.

In what continues to be an important and influential theory, Foa and colleagues (Foa & Rothbaum, 1989, 1998) proposed that high arousal at the time of the trauma contributes to memory for the event being stored in a different form to memory for everyday events. Non-traumatic experiences are processed and integrated into autobiographical memory where they are available for deliberate recall. In contrast, memory for traumatic experience, in individuals who develop PTSD, is stored in an unprocessed way – an encapsulation of stimuli, response and meanings experienced at the time of the trauma – and termed the trauma memory network. The trauma memory network comprises stimulus information (sensory details of the traumatic event), response information (cognitive, emotional, behavioural, physiological responses at the time of the trauma) and meaning information (assumptions about the self and others arising from the traumatic experience). It is proposed that connections between the elements of the network are made at the time of the trauma (through classical conditioning) but the elements are fragmented in the individual's awareness and deliberate recall. According to this theory, the entire trauma memory network may be activated by any one of the elements. When this occurs, the trauma is re-experienced in the form of daytime intrusions, psychological and physiological reactivity to reminders, flashbacks, and trauma-related nightmares during sleep. During sleep the network could theoretically be activated by ongoing hyperarousal (Germain & Nielsen, 2003) or threatening external stimuli (Fisher et al., 1970).

The conceptualisation of posttraumatic nightmares (undifferentiated amongst other re-experiencing symptoms) as an encapsulated memory of the trauma, would predict that phenomenologically it would resemble other intrusive symptoms with stimulus, response and meaning consistent with that experienced at the time of the trauma. As noted above, however, this type of PTNM is reported alongside a range of other PTNMs that vary in similarity to the traumatic event in storyline, sensory details and response. Symbolic PTNMs, or those associated with different emotions than were experienced at the time could arguably be explained by Foa's model as elaborations on the original elements of the trauma memory network. However to date no reference has been made to the application of Foa's model to symbolic PTNMs.

Brewin et al.'s (1996) "dual representation" theory of PTSD argues that, rather than being stored in a single trauma memory network, memory for trauma is stored in two memory systems, distinguished according to whether the memory is accessible verbally or situationally. Verbally accessible memories (VAMs) are described as ordinary autobiographical memories that can be retrieved at will and reflect conscious appraisal of the trauma and its consequences. Memories stored thus can be accessed at will and do not evoke strong emotional responses. Situationally



accessible memories (SAMS), on the other hand, are described as involuntary intrusive memories that involve intense reliving, triggered by internal or external cues. Within this framework, posttraumatic nightmares are conceptualised as SAMS and may be triggered by internal cues such as physiological arousal outlined above, or external cues such as noise or movement.

PTNMs are consistent with key features of SAMS in that they:

- 1) involve bodily responses such as increased heart rate, flushing, temperature change, pain
- 2) contain low level perceptual information which is rich in sensory detail, sights, sounds, etc.
- 3) may be triggered by external or internal reminders
- 4) are emotion-laden

However, PTNMs are not typical of SAMS in some important ways. First, unlike SAMS, PTNMs often contain an elaborate storyline. Secondly, SAMS are not updated by other autobiographical knowledge. PTNMs vary in this respect — replicative nightmares do not change over time but symbolic nightmares may incorporate details of other life experiences. Thirdly, the emotions associated with SAMS are restricted to those experienced at the time of trauma (e.g., fear, helplessness, horror and, possibly, anger and shame). Further research into the phenomenology of PTNMs is required to determine the range of emotions associated with them but the finding of [Esposito et al. \(1999\)](#) that posttraumatic nightmares vary in the degree of threat contained suggests that there is variability in the associated emotions. In summary, the accurate replay nightmare with physiological arousal and emotional response consistent with that experienced at the time of the trauma is consistent with Brewin et al's concept of SAMS, but the broader range of posttraumatic nightmares observed in PTSD are more difficult to accommodate within that theoretical framework.

In essence, then, the capacity of these two cognitive models of PTSD to account for posttraumatic nightmares depends upon how one defines the parameters of the symptom. The models can more readily explain replicative nightmares than those that are symbolic or associated with different emotions than were experienced at the time of the trauma.

[Ehlers and Clark \(2000\)](#) have proposed a cognitive model of PTSD that leads to specific predictions about the phenomenology of re-experiencing symptoms and the individual's response to their symptoms. The central tenant of the model is that PTSD persists when the traumatic experience is processed in a way that leads to a sense of current threat. This may come about through excessively negative appraisals of the trauma or its consequences (e.g., "I must be going mad", "bad things happen to me"). It may also be attributable to the nature of the memory itself — being triggered involuntarily, being experienced as happening again "now", and involving the re-experiencing of the original senses and emotions felt during the trauma. Ehlers and colleagues ([Ehlers et al., 2002](#); [Michael, Ehlers, Halligan, & Clark, 2005](#); [Steil & Ehlers, 2000](#)) have undertaken detailed investigations of daytime intrusive recollections and found support for their theory. As noted above however these investigators have not assumed that posttraumatic nightmares share the phenomenology of daytime intrusions. On the contrary, they specifically note that different mechanisms may be involved in intrusions during sleep ([Steil & Ehlers, 2000](#)). Unfortunately the authors do not elaborate on what those mechanisms might be or how they may impact on PTNM phenomenology. Thus, for our purposes the explanatory power of the Ehlers and Clark model is again limited to conceptualisation of PTNMs as one of the re-experiencing symptoms of PTSD. On this basis, the model would predict that PTSD PTNMs may be distinguished from non-PTSD PTNMs by their association with threat, through negative appraisal and/or the individual experiencing the nightmare as though it were the actual traumatic event. To date, individuals' appraisals of their nightmares has not been investigated in a systematic way, although there is some evidence ([Esposito et al., 1999](#)) that the degree of threat associated with PTSD nightmares is variable. In this context, it is worth noting that proponents of Imagery Rehearsal Therapy have speculated that one of the active ingredients of that approach may be the changed appraisals of the nightmare, as much as changes to the content of the nightmare itself ([Forbes, Phelps, & McHugh, 2001](#); [Marks, 1978](#)).

### 2.5.3. Explanatory power of existing models

The explanatory power of models of PTSD and dreaming theories as described in the previous two sections can be summarised thus. Models of PTSD ([Brewin et al., 1996](#); [Foa & Rothbaum, 1998](#)) can explain the repetitive replay PTNM as an intrusive symptom of the disorder, but cannot readily account for other posttraumatic dreams, such as the repetitive symbolic PTNM, as the same phenomenon. Perhaps constrained by the circular argument that posttraumatic nightmares of PTSD must be accurate replays of the event because theoretical models can only account for accurate replay nightmares, theoretical explanations of symbolic posttraumatic nightmares have not been pursued. The Ehlers

and Clark model raises the possibility that the individual's appraisal of the nightmare may be just as important as phenomenological features of the nightmare itself, but this remains to be empirically tested.

Psychological theories of dreaming can explain the occurrence of both replay and symbolic nightmares following trauma as reflecting the emotional concerns of the dreamer (e.g. Domhoff, 2003) and even reflecting an adaptive emotional processing function of dreams (Hartmann, 1998; Newell & Cartwright, 2000). They cannot, however, (and, indeed, do not seek to) account for the repetitive nightmare that does not resolve over time.

An adequate explanation of the repetitive and symbolic posttraumatic nightmare of PTSD thus represents a significant gap across the PTSD and dreaming literatures. Phenomenologically, in terms of content and repetition, these nightmares fall between the hallmark PTSD PTNM and normal adaptive dreams following trauma and so have not been the primary focus of either field. However their existence, and absence of a theoretical explanation, highlights the question of the relationship between PTNMs of PTSD and normal dreams following trauma. When the repetitive replay PTNM of PTSD and the normal adaptive dream following trauma are compared as discrete phenomenon, they appear to differ categorically on the dimensions of accurate replay and repetition, and can be readily categorised as intrusive symptom and dream respectively. However when the full range of nightmare experiences that include those that are both repetitive and symbolic is considered, a categorical distinction is harder to maintain. This issue is critical to our understanding of the PTNM of PTSD and whether it is better understood as a dream, an intrusive symptom or as a unique phenomenon with mixed features of dreams and intrusive symptoms.

### 3. Methodological issues in existing research

Several methodological issues in existing research limit our capacity to draw conclusions about the nature of posttraumatic nightmares in PTSD and their relationship with normal dreams following trauma.

In general terms, the overall body of research is relatively small, terminology is inconsistent, sample sizes have generally been small, and there is an absence of clearly defined parameters of the posttraumatic nightmare of PTSD. Investigations into the phenomenology of normal dreams and trauma-related dreams in PTSD have been undertaken independently within the fields of dreaming and PTSD respectively, with no reference to the state of knowledge in the other field. Guided by the dominant theoretical models within each field, the research has inevitably differed in focus and methodology. Within the PTSD field, researchers have assessed the PTSD status of participants and focused on the extent to which dreams accurately replay the traumatic event and are repetitive, as stipulated by the DSM-IV diagnostic criterion. Within the dreaming field, the focus of enquiry has been the content (with importance often placed on the latent rather than manifest themes) and emotional quality of trauma-related dreams, reflecting the dominant emotional processing theory. Typically, the PTSD status of subjects is not reported. Consequently, comparisons of findings across fields of research are of limited value.

Furthermore, the inherent difficulties of gathering reliable information about a mental phenomenon that occurs during sleep should be noted. The gold standard method of monitoring EEG and EMG activity during sleep, then waking participants at specific points during the sleep cycle and asking a series of structured questions about the presence and nature of mentation immediately prior to waking (Fisher et al., 1970; Foulkes, 1962), has rarely been applied to subjects with PTSD. Several authors have noted the difficulty in investigating the psychophysiology of posttraumatic nightmares in PTSD, as they tend not to occur in the sleep laboratory environment. It has been suggested that this may be due to perception of safety in that environment (Woodward et al., 2000).

Recent studies (Germain & Nielsen, 2003; Woodward et al., 2000) have made inferences about the relationship between PTNMs and sleep by comparing the sleep of subjects with and without PTNMs. While of considerable interest in their own right, these studies do not report on the phenomenological features of PTNMs as such. The small number of existing laboratory studies of dreams in PTSD subjects are limited by small sample sizes and varying methodologies. Van der Kolk et al.'s (1984) characterisation of the phenomenology of nightmares arising from REM and non-REM sleep was based on the self-report of 15 subjects but laboratory observations of the nightmares of only two subjects, while Kramer et al. (1984) investigated the sleep of only eight veterans with PTSD in the laboratory setting. Phenomenological differences in the dreams arising from REM and non-REM sleep were not reported in that study and it is not clear whether the dreams reported would meet criterion for posttraumatic nightmares. Dow, Kelsoe, and Gillin (1996) investigated the sleep and dreams of 14 veterans with major depression and PTSD, compared to those with major depression alone and those with no axis 1 disorder. Subjects were woken from REM sleep only and asked a series of questions about their dreams. While the rate of dream recall was high (85%), the low level of anxiety associated with

the dreams indicates that the dream experiences were not typical PTSD nightmares. Thus, only limited information on the phenomenology of posttraumatic nightmares can be derived from existing laboratory studies.

In large part, research into trauma-related dreams has relied on retrospective self-report. Within the PTSD field this has varied between cross-sectional enquiry into the nature of nightmares experienced over the many years since traumatic experience (e.g. Schreuder et al., 2000) to daily recording of nightmares in the early aftermath of traumatic exposure (Mellman, David, Bustamante, Torres, & Fins, 2001) or chronic PTSD (Esposito et al., 1999). Within the dreaming field, subjects are typically asked to record their *most recent dream* (e.g. Domhoff, 2003) or to keep a dream log over a period of weeks to years (e.g. Hartmann, 1998). Again, these different methodologies make meaningful comparisons between studies difficult.

#### 4. Discussion and future directions

To summarise, research into the nature of posttraumatic nightmares in PTSD and their relationship with normal dreams following trauma is in its infancy. Studies undertaken within the PTSD and dreaming fields have been conducted without reference to the other field, with different foci of enquiry, and employing different research methods. As such, there is a limited combined body of knowledge. Within the dreaming field, the dominant theory of dreams has been developed on the basis of dream reports following traumatic exposure. The theory does not attempt to account for the repetitive posttraumatic nightmare of PTSD because it is conceptualised as an intrusive symptom of PTSD rather than a dream. Within the PTSD field, investigations into the phenomenology of the posttraumatic nightmare have been limited by the theoretical premise that it is an intrusive symptom of PTSD. The extent to which its phenomenology is influenced by factors related to sleep (e.g., normal dreaming processes, stage of sleep, ongoing arousal during sleep in PTSD) has not been investigated and, consequently, neither has its relationship with normal dreams following trauma. The failure of existing models to account for the full range of repetitive accurate replay and symbolic posttraumatic nightmares reported in PTSD indicates that neither is adequate.

To further advance our understanding of posttraumatic dreams, two important and related issues arising from the literature need to be addressed. First, agreement regarding the parameters of PTNMs in PTSD is critical if the field is to progress. Secondly, the proposed categorical distinction between PTNMs and normal dreams following trauma needs to be empirically tested, alongside the alternative view that the two differ along a continuum rather than categorically. Existing evidence related to these questions and potential directions for future research are discussed in the following two sections.

##### 4.1. Establishing appropriate parameters of the PTNM in PTSD

As a precursor to understanding the distinction between PTNMs in PTSD and the range of normal trauma dreams, there needs to be consensus within the field regarding the parameters of the PTNM in PTSD required to meet the ‘recurrent and distressing dreams of the event’ diagnostic criterion. Various researchers (e.g. Esposito et al., 1999; Mellman et al., 2001; Schreuder et al., 2000) describe replay and symbolic PTNMs as PTSD nightmares, yet the dominant cognitive models of the disorder can only readily account for replicative PTNMs. The extent to which the clinical and research literature in general uses a narrow (accurate replay) or broad (trauma-related) definitions is unclear.

In one of the few studies to explore this issue, Schreuder et al. (2000) found that endorsement of the CAPS nightmare item was more highly correlated with reports of “mostly replicative” posttraumatic nightmares than either “mixed” or “mostly nonreplicative” PTNMs. This finding suggests that the individual sufferer and/or the CAPS rater differentiated between types of posttraumatic nightmares in making their judgement on the “recurrent and distressing dreams” symptom of PTSD. Similarly, Mellman et al. (2001) noted that the CAPS nightmare severity rating correlated with dream type, with participants reporting high similarity/high distress dreams being rated as most severe on this item, followed by low similarity/high distress dreams and low similarity/low distress dreams.

How, then, should the parameters of the PTNM in PTSD be determined? If derived theoretically, the narrowly defined accurate replay nightmares would be required to meet the PTSD diagnostic criterion. Empirical validation of this narrow definition of the PTNM would require that:

1. Accurate replay nightmares are more highly correlated with daytime intrusions and flashbacks than are symbolic nightmares.

2. Accurate replay nightmares are more like daytime intrusions and flashbacks in their sensory and somatic features than are symbolic nightmares.
3. Accurate replay nightmares are accompanied by the same emotions felt during or immediately following the traumatic event.
4. Symbolic, in contrast to accurate, nightmares (reflecting the emotional processing of trauma) are associated with less severe PTSD (or the absence of PTSD).

Empirical support for these predictions would suggest that appropriate parameters of the PTNM in PTSD would include only accurate replay nightmares; that is, those which are readily explained by current theoretical models of PTSD.

#### *4.2. Is the PTNM of PTSD a categorically distinct phenomenon from normal dreams following trauma?*

The relationship between normal dreams following trauma, and PTSD PTNMs has been considered within the dreaming field, historically by Freud (1900) and more recently by Hartmann (1998).

Freud's (1900) dominant theory of dreaming proposed that dreams represent the fulfilment of the dreamer's wishes. Years later, when he was unable to reconcile the recurrent nightmare associated with traumatic neurosis in returning World War I soldiers with his theory of wish fulfilment, Freud (1920) argued that repetitive posttraumatic nightmares arose from "repetition compulsion" – the attempt to psychologically master overwhelming experience by returning to it again and again – and could not be considered normal dreams. The contemporary argument put by Hartmann (1998) is similar. The adaptive function of dreams in promoting emotional processing and integration of the experience proposed by Hartmann clearly does not occur in the repetitive dreams of PTSD. Hartman, therefore, also argues that these should not be considered dreams at all, but intrusive memories of trauma.

In both cases, then, dream theorists have concluded that the repetitive dreams associated with PTSD differ categorically from normal dreams following trauma and are better understood as re-experiencing phenomena than as dreams. Unfortunately, the argument seems to be based on the poor fit of posttraumatic nightmares with proposed theoretical models of dreaming rather a systematic analysis of any empirical differences. Empirical support for the argument that the repetitive PTNM of PTSD is a distinct phenomenon from normal dreams following trauma and better understood as an intrusive symptom than a dream, would require: 1) the presence of key characteristics (repetition and accurate replay of the event) that reliably separate PTSD and non-PTSD dreams; and 2) that the posttraumatic nightmare of PTSD shares key features with other intrusive symptoms of PTSD. Existing evidence in this regard will be considered here.

##### *4.2.1. Empirical support for repetition and accurate replay as distinguishing features*

Two studies within the PTSD field (Mellman et al., 2001; Schreuder et al., 2000) have described the range of nightmares in subjects with and without PTSD in a chronic and acute sample respectively. In the first of these, Schreuder et al. (2000) investigated the dreams of 223 treatment seeking civilians and soldiers, with and without PTSD, 40 years following traumatic exposure. The classification of dream types used in this study has been outlined above. In the total sample, the six-month prevalence of nightmares (minimum of 1 per month) was as follows: 11% reported PTNMs only; 35% reported both PTNMs and posttraumatic anxiety dreams (PTADs); 11% reported PTAD only; and 44% reported neither PTNMs nor PTADs. The group reporting PTNMs (exclusively or together with PTAD) scored significantly higher on the re-experiencing symptoms of the Clinician Administered PTSD Scale (Blake et al., 1995) and the intrusion subscale of the Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979) than those reporting only PTADs or neither PTNMs nor PTADs. Unfortunately the CAPS and IES nightmare items did not appear to be excluded in the analysis, raising the possibility that scores on these items alone accounted for the difference. The study found an association between PTNMs and a diagnosis of PTSD. On the basis of CAPS scores, 124 of the participants met criteria for PTSD. Of that group 67% reported PTNMs. The nightmare status of the remaining 33% was not specified. Similarly, the breakdown of nightmare experiences in those who did not meet criteria for PTSD was not reported. Of those (with and without PTSD) who reported PTNMs, 42% reported that their nightmares were mostly replicative, 28% reported mostly non-replicative and 35% reported mostly mixed. Those with PTSD reported more replicative PTNMs but, importantly, replicative PTNMs were also reported by participants without PTSD. Thus, while this study found an association between PTNMs (particularly replicative) and PTSD,

replicative and other PTNMs were reported by subjects without PTSD and other dream experiences were reported by subjects with PTSD.

The second study (Mellman et al., 2001) investigated the dreams of 60 traumatic injury survivors within the first days following the traumatic event. The nature of their dreams was examined, together with their relationship with concurrent PTSD severity and subsequent PTSD diagnosis. Eighteen of the 60 participants (30%) remembered a dream and 21 dream descriptions were produced. Ten of the 21 dreams (46%) were labelled *trauma dreams* in that the content had a high degree of similarity with the traumatic event and they were associated with a high degree of distress. Four of these ten varied from the actual event and six were exact replications. A further seven of the 21 dreams (33%) had low similarity to the event (threatening but unrealistic scenarios), still associated with a high degree of distress. The remaining four dreams (19%) were rated as low similarity and low distress. Of the eleven low similarity dreams, almost half contained references to the trauma (e.g., representations of a person or pet present during the incident). The severity of concurrent PTSD symptoms was assessed by the CAPS, with significant differences found between those reporting trauma dreams and those reporting either dreams with low similarity and low distress, or no dreams at all. Thirty-nine of the 60 participants were available for follow-up at 6 weeks, ten of whom (26%), met criteria for PTSD. The study found that the likelihood of having PTSD at follow-up was related to the type of dreams reported at the initial assessment. The ten participants with PTSD at six weeks comprised four out of seven (57%) with trauma dreams at baseline, one out of three (33%) with low similarity high distress dreams at baseline, zero out of three (0%) with low similarity low distress dreams at baseline and five out of 26 (19%) with no dream report at baseline. Although limited by small sample size, as well as a relatively low rate and short time period of follow-up, the results of this study suggest an association between the content of dreams in the early aftermath of trauma and subsequent development of PTSD. Of equal importance, however, the study also suggests that replay trauma dreams are not exclusively associated with PTSD; three of the seven participants with trauma dreams at baseline, did *not* develop PTSD at the six week follow-up.

In summary, existing studies demonstrate that repetitive and accurate replay nightmares are associated with a diagnosis of PTSD, but are not specific to that condition. Similarly, non-replay dreams are sometimes reported by individuals with a diagnosis of PTSD. Thus, empirical evidence for a categorical distinction between PTNMs of PTSD and other trauma dreams on the basis of their trauma replay content is lacking.

#### 4.2.2. Empirical support for the PTNM as an intrusive symptom

Support for the argument arising from dominant theories of dreaming, that the PTNM of PTSD is better understood as an intrusive symptom than a dream, would require that the phenomenology of the posttraumatic nightmare was more like daytime intrusive symptoms of PTSD than it was like normal dreams. This question has not been directly addressed in research to date. However, Ehlers et al.'s (2002) finding that daytime intrusive memories tend to be relatively brief sensory fragments (e.g., images, sounds, smells, tastes or bodily sensations such as pain) of events immediately preceding the traumatic experience or the worst aspects of the traumatic experience is at odds with the elaborate storyline associated with some posttraumatic nightmares and suggests that there may be important phenomenological differences between the two.

Furthermore, recent findings that PTNMs in PTSD can be effectively treated in the same way as normal dreams (Forbes et al., 2001; Forbes et al., 2003; Krakow et al., 2001; Krakow et al., 2000) lends support to the notion that they are phenomenologically similar to normal dreams. As an intrusive symptom of PTSD, recommended treatment for PTNMs would be trauma focused exposure therapy (cf. Foa & Rothbaum, 1998), which involves repeatedly confronting the feared stimulus (in this case the traumatic memory) until it no longer evokes distress. Interestingly, a quite different approach – imagery rehearsal therapy or IRT – has demonstrated efficacy in the treatment of PTNMs in PTSD (Forbes et al., 2001; Forbes et al., 2003; Krakow et al., 2000; Krakow et al., 2001). IRT involves changing the storyline of the nightmare, with the aim of increasing the dreamer's sense of mastery or control, in order to render the dream less distressing and less likely to result in awakening. IRT is an established intervention for the treatment of normal dreams (Celluci & Lawrence, 1978; Miller & Di Palato, 1983) and has only recently been applied to PTSD.

In summary, it is argued that advances in our understanding of dreams following trauma require that appropriate parameters of the PTNM of PTSD be empirically derived and following this, the relationship between the PTNM of PTSD and normal dreams following trauma, be pursued. As the proposed categorical distinction between PTNMs of PTSD and normal dreams following trauma is not supported by evidence to date, alternative relationships between the two should be considered.

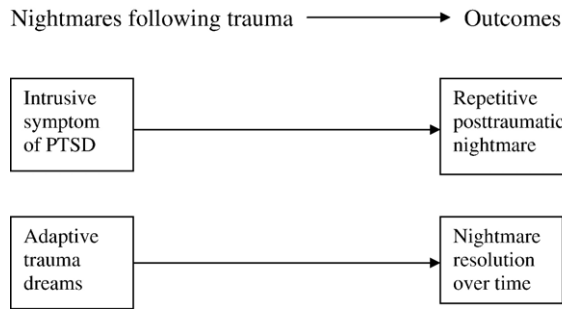


Fig. 2. Differential pathways of dreams as an intrusive symptom and adaptive trauma dreams.

### 4.3. Towards a comprehensive model of posttraumatic nightmares

Once the parameters of the PTNM in PTSD are established, a comprehensive model that can account for the full range of those nightmares and shed light on their relationship with normal dreams following trauma needs to be developed. A comprehensive model would explain the differential course of PTNMs following traumatic exposure and would answer the critical question of why some nightmares resolve over time while others become stuck in chronic repetition. Efforts to develop such a model would need to draw upon the current state of knowledge of sleep and dreaming within both the PTSD and dreaming fields. The phenomenological features of PTNMs compared to normal trauma dreams, as well as the individual’s response to the experience of the nightmare and the sleep factors (e.g., stage of sleep in which the nightmare occurs or presence of other PTSD related sleep disturbance) require consideration. Three possible models are presented here.

The first model proposes that PTNMs in PTSD are best understood as intrusive symptoms and have key phenomenological characteristics that distinguish them from non-PTSD dreams following trauma. On the basis of evidence to date, such key features are unlikely to relate to dream content alone but may, for example, be characterised by sensory or somatic features. More information about the phenomenology of the range of dreams following trauma is therefore required before this hypothesis can be tested. Nevertheless, according to this hypothesis, normal trauma dreams would be associated with recovery, while those that are PTSD memory intrusions (not yet clearly defined) would be associated with continued PTSD. This is illustrated diagrammatically in Fig. 2. To investigate this possibility, key features that distinguish a memory intrusion from a dream need to be established. Support for the model would come from finding that early dreams that were categorised as intrusive symptoms of PTSD on the basis of their phenomenology would persist over time while early dreams that were categorised as normal dreams on the basis of their phenomenology would resolve over time. Potential treatment implications follow from the accurate classification of early dreams as normal dreams or intrusive symptoms of PTSD. Imagery rehearsal therapy has been found to be effective in the treatment of PTSD PTNMs that do not replay the traumatic event (Krakow et al., 2000) while prolonged exposure has been established as the treatment of choice for intrusive symptoms (Foa & Rothbaum, 1998).

The second possibility is that the course of PTNMs is determined not by key phenomenological features but by the individual’s response to the experience of the nightmare, with nightmare related fear and avoidance contributing to the

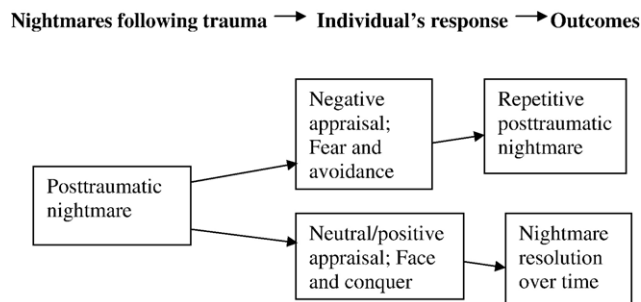


Fig. 3. Individual response as a mediating factor in resolution of nightmares.

maintenance of the phenomenon. In support of this notion, [Inman, Silver, and Doghramji \(1990\)](#) found that individuals with PTSD reported fear of going to sleep, thoughts of the trauma while lying in bed, and difficulty returning to sleep after waking with a bad dream. This notion is also consistent with [Steil and Ehlers' \(2000\)](#) contention that negative appraisals of intrusive symptoms contribute to the maintenance of PTSD by causing increased distress which, in turn, leads to cognitive and behavioural avoidance strategies. Within the dream treatment literature, the power that the nightmare holds over the dreamer is considered critical in the maintenance of the nightmare. [Halliday \(1987\)](#) argues that nightmares are perpetuated by the anxiety, sense of uncontrollability, perceived importance, and realism associated with them. Various studies (see [Halliday, 1987](#) for a review) emphasize the importance of “facing and conquering” the feared nightmare, in order to eliminate it. This possibility would be supported by finding that the course of dreams in the early aftermath of trauma was predicted by the individual’s response regardless of phenomenological features of dreams, support for this model would lead to the recommendation that targeted nightmare interventions that involve “face and conquer” methods should be introduced for all dreams following trauma. The second hypothesis is illustrated in [Fig. 3](#).

The third possibility is that normal sleep and dreaming are disrupted in individuals with PTSD, thus preventing the adaptive function of dreams and leading to their perpetuation over time. In the case of accurate replay nightmares, normal dreaming may have been interrupted from the outset. In the case of symbolic nightmares, an adaptive emotional processing function may have begun (allowing evolution from the accurate replay nightmare) but subsequently been interrupted (preventing further evolution and final resolution). This possibility is represented in [Fig. 4](#).

This hypothesis emphasises characteristics of the sleep context of the nightmare, rather than its phenomenology or the individual’s response to the experience of the nightmare, in explaining the variable course of posttraumatic nightmares. According to this notion, any process that interferes with normal dreaming may serve to perpetuate the nightmare. This could include the range of sleep disturbed behaviours associated with PTSD that may lead to sleep discontinuity and, therefore, interruption to dreaming, as well as the stage of sleep in which the nightmare occurs.

Reported sleep disturbances in PTSD include profuse perspiration during early night awakenings ([Kramer & Kinney, 1988](#)); waking up with covers torn off, talking during sleep, yelling/shouting during sleep, and waking up confused or disoriented ([Inman et al., 1990](#)); waking with breathing difficulties, hot flushes, bad memories and “nervousness” ([Rosen, Reynolds, Yeager, Houck, & Hurwitz, 1991](#)); waking with startle/panic without dream recall and thrashing movements ([Mellman et al., 1995](#)). These phenomena are consistent with [Fisher et al.’s \(1970\)](#) description of Stage 4 arousal reaction nightmares (described above) in which little dream content is recalled. As such, they may have particular relevance to PTNMs that arise out of non-REM sleep.

REM sleep may also be disrupted in PTSD, with research evidence suggesting a range of potential abnormalities ([Dow et al., 1996; Mellman, 1997; Mellman et al., 1995; Ross et al., 1994](#)). A REM abnormality in PTSD may interfere with the emotional processing function of dreams that is normally associated with REM sleep ([Mellman et al., 2001](#)).

The third model would predict that the course of dreams in the early aftermath of trauma would be determined by the individual’s sleep. The nightmares of those with disrupted sleep would be predicted to persist over time while the nightmares of those with better sleep would be predicted to resolve over time. This effect would be regardless of phenomenological features of dreams. Support for this model would lead to the recommendation that early treatment efforts be directed to minimising sleep disruption rather than targeting nightmares specifically.

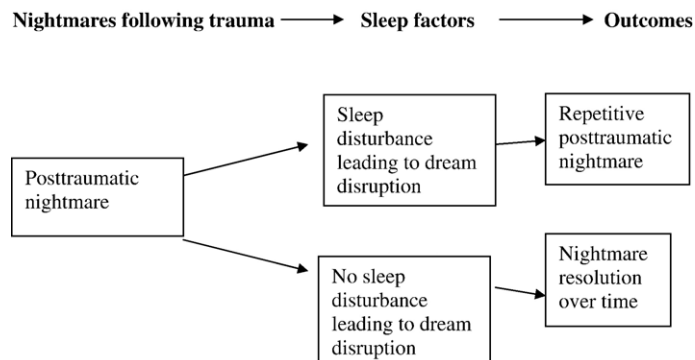


Fig. 4. Sleep disturbance as a mediating factor in resolution of nightmares.

Each of the three models have been presented in their simplest form to illustrate the potential influence of each of the three factors of phenomenology, sleep context and individual response on the course of nightmares. However it may be that all three of the factors are implicated in the course of nightmares. They may be additive, with the presence of each successive factor compounding the effect of the last. Alternatively the factors may be mediated by each other. For example, particular nightmare phenomenology may cause or be caused by sleep disturbance and the combination of the nightmare and sleep disturbance leads to the individual's fear and avoidance. Alternately, phenomenology may determine the individual's response and where the response is fear and avoidance this may cause the sleep disturbance.

## 5. Conclusion

Our current understanding of the posttraumatic nightmare of PTSD and its relationship with normal dreams following trauma is in its infancy. Advances in understanding have been limited by the investigation of repetitive PTNMs within the PTSD field and independent investigation of normal dreams following trauma within the dreaming field. Theoretical models of PTSD can account for the repetitive nightmare in which the traumatic event is replayed, while theoretical models in the dreaming field can account for both accurate replay and symbolic nightmares that evolve over time. Currently, there is no adequate theoretical explanation for the phenomenon of posttraumatic nightmares in PTSD that are both repetitive and symbolic. It is argued that attempts to understand the full range of posttraumatic nightmare phenomena may need to go beyond existing models and consider a range of additional contributing factors. These include phenomenological features of the nightmares themselves, the individual's response to the experience of the nightmares, and factors related to the sleep context in which the nightmares occur.

## References

- Blake, D. D., Weathers, F., Nagy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., et al. (1995). The development of a clinician administered PTSD scale. *Journal of Traumatic Stress, 8*(1), 75–90.
- Breger, L. (1969). Dream function: an information processing model. In L. Breger (Ed.), *Clinical-cognitive psychology* (pp.182–227). Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review, 103*(4), 670–686.
- Brewin, C. R., & Holmes, E. A. (2003). Psychological theories of Posttraumatic Stress Disorder. *Clinical Psychology Review, 23*, 339–376.
- Cartwright, R. (1979). The nature and function of repetitive dreams: a speculation. *Psychiatry, 42*, 131–137.
- Cartwright, R. (1986). Affect and dream work from an information processing point of view. *Journal of Mind and Behavior, 7*(2), 411–427.
- Cartwright, R., & Lloyd, S. (1994). Early REM sleep: a compensatory change in depression? *Psychiatry Research, 51*(3), 245–252.
- Celluci, A., & Lawrence, P. (1978). The efficiency of systematic desensitization in reducing nightmares. *Journal of Behavior Therapy and Experimental Psychiatry, 9*, 109–114.
- Coalson, B. (1995). Nightmare help: treatment of trauma survivors with PTSD. *Psychotherapy, 32*, 381–388.
- Dalgleish, T. (2004). Cognitive approaches to posttraumatic stress disorder: the evolution of multirepresentational theorizing. *Psychological Bulletin, 130*, 228–260.
- Delaney, G. (1991). *Breakthrough dreaming* New York: Bantam Books.
- Dement, W., & Kleitman, N. (1957). Cyclic variations in EEG during sleep and their relation to eye movements, body motility and dreaming. *Electroencephalography and Clinical Neurophysiology, 9*(4), 673–690.
- Domhoff, G. W. (2000). The repetition principle in dreams: is it a possible clue to a function of dreams? In M. K. R. H. A. Moffit (Ed.), *The Functions of Dreaming* (pp. 293–320). Albany: SUNY Press.
- Domhoff, G. W. (2003). The case against the problem-solving theory of dreaming.
- Dow, B. M., Kelsoe, J. R., & Gillin, C. (1996). Sleep and dreams in Vietnam PTSD and depression. *Biological Psychiatry, 39*(1), 42–50.
- Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319–345.
- Ehlers, A., Hackmann, A., Steilb, R., Clohessy, S., Wenninger, K., & Winterb, H. (2002). The nature of intrusive memories after trauma: the warning signal hypothesis. *Behaviour Research and Therapy, 40*(9), 995–1002.
- Esposito, K., Benitez, A., Barza, L., & Mellman, T. (1999). Evaluation of dream content in combat-related PTSD. *Journal of Traumatic Stress, 12*(4), 681–687.
- Fisher, C., Byrne, J., Edwards, A., & Kahn, E. (1970). A psychophysiological study of nightmares. *Journal of the American psychoanalytic Association, 18*, 747–782.
- Foa, E. B., & Rothbaum, B. O. (1989). Behavioural psychotherapy for post-traumatic stress disorder. *International Review of Psychiatry, 1*(3), 219–226.
- Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape: Cognitive-behavioral therapy for PTSD*. New York: Guilford Press.
- Forbes, D., Phelps, A., & McHugh, T. (2001). Treatment of combat-related nightmares using imagery rehearsal: a pilot study. *Journal of Traumatic Stress, 14*(2), 433–442.



- Forbes, D., Phelps, A. J., McHugh, A. F., Debenham, P., Hopwood, M., & Creamer, M. (2003). Imagery rehearsal in the treatment of posttraumatic nightmares in Australian veterans with chronic combat-related PTSD: 12-month follow-up data. *Journal of Traumatic Stress, 16*(5), 509–513.
- Foulkes, D. (1962). Dream reports from different stages of sleep. *Journal of Abnormal and Social Psychology, 65*(1), 14–25.
- Freud, S. (1900). The interpretation of dreams. In J. Strachey (Ed.), *The Standard Edition of the Complete Psychological Works of Sigmund Freud, Vol. 4 & 5*. London: Hogarth Press.
- Freud, S. (1920). Beyond the pleasure principle. In J. Strachey (Ed.), *The Standard Edition of the Complete Psychological Works of Sigmund Freud, Vol. 18* (pp. 3–71). London: Hogarth Press.
- Germain, A., & Nielsen, T. A. (2003). Sleep pathophysiology in posttraumatic stress disorder and idiopathic nightmare sufferers. *Biological Psychiatry, 54*(10), 1092–1098.
- Hall, C., & Van de Castle, R. (1966). *The content analysis of dreams*. New York: Appleton-Century-Crofts.
- Halliday, G. (1987). Direct psychological therapies for nightmares: a review. *Clinical Psychology Review, 7*(5), 501–523.
- Hartmann, E. (1996). Who develops PTSD nightmares and who doesn't? In D. Barrett (Ed.), *Trauma and Dreams* (pp. 100–113). Cambridge, Mass.: Harvard University Press.
- Hartmann, E. (1998). Nightmare after trauma as paradigm for all dreams: a new approach to the nature and function of dreaming. *Psychiatry, Interpersonal and biological processes, 61*(3), 223–228.
- Hartmann, E. (2000). We do not dream of the 3 R's: implications for the nature of dreaming mentation. *Dreaming, 10*, 103–110.
- Hartmann, E., Rosen, R., & Rand, W. (1998). Personality and dreaming: boundary structure and dream content. *Dreaming, 8*(1), 31–39.
- Harvey, A. G., & Jones, C. (2003). Sleep and posttraumatic stress disorder: a review. *Clinical Psychology Review, 23*(3), 377–407.
- Hobson, J., Pace-Schott, E., & Stickgold, R. (2000). Dreaming and the brain: toward a cognitive neuroscience of conscious states. *Behavioral and Brain Sciences, 23*, 793–1121.
- Horowitz, M. J. (1976). *Stress response syndromes*. Oxford, England: Jason Aronson.
- Horowitz, M. J., Wilner, N., & Alvarez, W. (1979). Impact of events scale: a measure of subjective stress. *Psychosomatic Medicine, 41*(3), 209–218.
- Inman, D. J., Silver, S. M., & Doghramji, K. (1990). Sleep disturbance in Post-Traumatic Stress Disorder: a comparison with non-PTSD insomnia. *Journal of Traumatic Stress, 3*(3), 429–437.
- Jung, C. (1974). *Dreams*. Princeton, N.J.: Princeton University Press.
- Kilpatrick, D. G., Resnick, H. S., Freedy, J. R., Pelcovitz, D., Resick, P., Roth, S., et al. (1997). The posttraumatic stress disorder field trial: evaluation of the PTSD construct: criteria A through E. In T. A. Widiger, A. J. Frances, H. A. Pincus, M. B. First, R. Ross, & W. Davis (Eds.), *DSM-IV Sourcebook, Vol. IV*. Washington DC: American Psychiatric Press.
- Krakow, B., Hollifield, M., Johnston, L., Koss, M., Schrader, R., Warner, T. D., et al. (2001). Imagery rehearsal therapy for chronic nightmares in sexual assault survivors with posttraumatic stress disorder — a randomized controlled trial. *Jama: Journal of the American Medical Association, 286*(5), 537–545.
- Krakow, B., Hollifield, M., Schrader, R., Koss, M., Tandberg, D., Lauriello, J., et al. (2000). A controlled study of imagery rehearsal for chronic nightmares in sexual assault survivors with PTSD: a preliminary report. *Journal of Traumatic Stress, 13*(4), 589–609.
- Kramer, M., & Kinney, L. (1988). Sleep patterns in trauma victims with disturbed dreaming. *Psychiatric Journal of the University of Ottawa, 13*(1), 12–16.
- Kramer, M., Schoen, L. S., & Kinney, L. (1984). Psychological and behavioral features of disturbed dreamers. *Psychiatric Journal of the University of Ottawa, 9*(3), 102–106.
- Lavie, P. (2001). Current concepts: sleep disturbances in the wake of traumatic events. *New England Journal of Medicine, 345*(25), 1825–1832.
- Marks, I. (1978). Rehearsal relief of a nightmare. *British Journal of Psychiatry, 133*, 461–465.
- Mellman, T. A. (1997). Psychobiology of sleep disturbances in posttraumatic stress disorder. *Annals of the New York Academy of Sciences, 821*, 142–149.
- Mellman, T. A., David, D., Bustamante, V., Torres, J., & Fins, A. (2001). Dreams in the acute aftermath of trauma and their relationship to PTSD. *Journal of Traumatic Stress, 14*(1), 241–247.
- Mellman, T. A., David, D., Kulick Bell, R., Hebding, J., & Nolan, B. (1995). Sleep disturbance and its relationship to psychiatric morbidity after Hurricane Andrew. *American Journal of Psychiatry, 152*(11), 1659–1663.
- Mellman, T. A., Knorr, B. R., Pigeon, W. R., Leiter, J. C., & Akay, M. (2004). Heart rate variability during sleep and the early development of posttraumatic stress disorder. *Biological Psychiatry, 55*(9), 953–956.
- Mellman, T. A., Kulick-Bell, R., Ashlock, L. E., & Nolan, B. (1995). Sleep events among veterans with combat-related Posttraumatic Stress Disorder. *American Journal of Psychiatry, 152*, 110–115.
- Mellman, T. A., Kumar, A., Kulick-Bell, R., Kumar, M., & Nolan, B. (1995). Nocturnal/daytime urine noradrenergic measures and sleep in combat-related PTSD. *Biological Psychiatry, 38*, 174–179.
- Michael, T., Ehlers, A., Halligan, S. L., & Clark, D. M. (2005). Unwanted memories of assault: what intrusion characteristics are associated with PTSD? *Behaviour Research and Therapy, 43*(5), 613–628.
- Miller, W., & Di Palato, M. (1983). Treatment of nightmares via relaxation and desensitization: a controlled evaluation. *Journal of Consulting and Clinical Psychology, 51*, 870–877.
- Newell, P. T., & Cartwright, R. D. (2000). Affect and cognition in dreams: a critique of the cognitive role in adaptive dream functioning and support for associative models. *Psychiatry Today, 63*(1), 34–44.
- Ohayan, M. M., & Shapiro, C. M. (2000). Sleep disturbances and psychiatric disorders associated with posttraumatic stress disorder in the general population. *Comprehensive Psychiatry, 41*(6), 469–478.
- Pillar, G., Malhotra, A., & Lavie, P. (2000). Posttraumatic stress disorder and sleep — what a nightmare! *Sleep Medicine Reviews, 4*(2), 183–200.
- Revonsuo, A. (2000). The reinterpretation of dreams: an evolutionary hypothesis of the function of dreaming. *Behavioral and Brain Sciences, 23*, 877–901.

- Rosen, J., Reynolds, C. F. I., Yeager, A. L., Houck, P. R., & Hurwitz, L. F. (1991). Sleep disturbances in survivors of the Nazi Holocaust. *The American Journal of Psychiatry*, *148*(1), 62–66.
- Ross, R. J., Ball, W. A., Dinges, D. F., Kribbs, N. B., Morrison, A. R., Silver, S. M., et al. (1994). Rapid eye movement sleep disturbance in posttraumatic stress disorder. *Biological Psychiatry*, *35*(3), 195–202.
- Schreuder, B., Kleijn, W., & Rooijmans, H. (2000). Nocturnal re-experiencing more than forty years after war trauma. *Journal of Traumatic Stress*, *13*(3), 453–463.
- Steil, R., & Ehlers, A. (2000). Dysfunctional meaning of posttraumatic intrusions in chronic PTSD. *Behaviour Research and Therapy*, *38*(6), 537–558.
- Taylor, S. (2006). *Clinician's guide to PTSD: A cognitive-behavioral approach* New York: Guilford.
- Valli, K., Revonsuo, A., Palkas, O., Ismail, K., Ali, K., & Punamaki, R. -L. (2005). The threat simulation theory of the evolutionary function of dreaming: evidence from dreams of traumatized children. *Consciousness and Cognition*, *14*(1), 188–218.
- Valli, K., Revonsuo, A., Palkas, O., & Punamaki, R. -L. (2006). The effect of trauma and dream content — a field study of Palestinian children. *Dreaming*, *16*(2), 63–87.
- 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*(2), 187–190.
- Wilmer, H. A. (1996). The healing nightmare: war dreams of Vietnam veterans. In D. Barrett (Ed.), *Trauma and dreams* (pp. 85–99). Cambridge, Mass.: Harvard University Press.
- Wittman, L., Schredl, M., & Kramer, M. (2007). Dreaming in posttraumatic stress disorder: a critical review of phenomenology, psychophysiology and treatment. *Psychotherapy and Psychosomatics*, *76*(1), 25–39.
- Wood, J. M., & Bootzin, R. R. (1992). Effects of the 1989 San Francisco earthquake on frequency and content of nightmares. *Journal of Abnormal Psychology*, *101*, 219–224.
- Woodward, S. H., Arsenault, N. J., Murray, C., & Bliwise, D. L. (2000). Laboratory sleep correlates of nightmare complaint in PTSD inpatients. *Biological Psychiatry*, *48*(11), 1081–1087.
- Zadra, A. (1996). Recurrent dreams: their relation to life events. In D. Barrett (Ed.), *Trauma and dreams*. Cambridge, Mass.: Harvard University Press.