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Nightmares, Dreaming, and Emotion Regulation: A Review

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INTRODUCTION

A satisfactory explanation of nightmares remains elusive. Theorists since Freud have speculated on mechanisms that produce nightmares, but no single, widely accepted explanation has emerged (see Nielsen & Levin, 2007b; Levin & Nielsen, 2007). This continuing uncertainty stems, in part, from the fact that nightmares, like dreams more generally, are expressions of human emotional memory—which itself is a complex and intransigent phenomenon. The inner workings of emotional memory have yet to be completely decoded, and the transformations of emotional memory that produce nightmares are even less well understood. This chapter provides a brief survey of theories and empirical research that have addressed the notion that dreaming serves an emotional regulation function and that nightmares are expressions of this function. We further suggest new directions for exploring nightmares and propose that emotional function may be linked especially to the socioemotional imagery of dreaming.

In the clinical literature, the emotional nature of nightmares is emphasized as a defining criterion. Nightmares are described as emotionally disturbing and highly realistic mental experiences that arise from rapid eye movement (REM) sleep (and occasionally from Stage 2 sleep) and are clearly recalled (American Academy of Sleep Medicine, 2005; American Psychiatric Association, 2000). The emotional component of nightmares typically consists of anxiety, fear, or terror, although other dysphoric emotions such as anger and sadness also occur less frequently (Belicki & Cuddy, 1991; Zadra, Pilon, & Donderi, 2006). These

emotions are typically embedded in contexts that portray imminent danger to the individual. Idiopathic nightmares, for which the specific causes are unknown, are now distinguished from posttraumatic nightmares, which contain and cause a very high degree of emotional distress and are frequently comorbid with posttraumatic stress disorder (PTSD) (American Academy of Sleep Medicine, 2005; American Psychiatric Association, 2000). In sum, the clinical severity of nightmares is closely linked to their emotional content.

Epidemiological studies (Belicki & Belicki, 1982; Bixler, Kales, Soldatos, Kales, & Healy, 1979; Haynes & Mooney, 1975; Levin, 1994; Ohayon, Morselli, & Guilleminault, 1997) indicate that nightmares occur weekly among 2 to 6 percent of the population. Contrary to popular belief, frequent nightmares are not prevalent among preschoolers (Simard, Nielsen, Tremblay, Boivin, & Montplaisir, 2006) but become more prevalent in later childhood and adolescence (American Psychiatric Association, 2000; Fisher, Pauley, & McGuire, 1989; MacFarlane, Allen, & Honzik, 1954; Mindell & Barrett, 2002; Nielsen, Laberge, Tremblay, Vitaro, & Montplaisir, 2000; Partinen, 1994; Salzarulo & Chevalier, 1983; Simonds & Parraga, 1982; Vela-Bueno et al., 1985). They are also not prevalent in elderly populations (Nielsen & Levin, 2005; Partinen, 1980, 1994; Salvio, Wood, Schwartz, & Eichling, 1992; Wood, Bootzin, Quan, & Klink, 1993). A genetic influence has been described (Hublin, Kaprio, Partinen, & Koskenvuo, 1999) and a substantial gender difference demonstrated, with females at all ages reporting nightmares more often than males (Claridge, Clark, & Davis, 1997; Feldman & Hersen, 1967; Hartmann, 1984; Hersen, 1971; Hublin et al., 1999; Levin, 1994; Nielsen & Levin, 2005; Nielsen et al., 2000; Ohayon et al., 1997; Schredl & Pallmer, 1998; Tanskanen et al., 2001). A large literature, not reviewed here (for reviews see Levin & Nielsen, 2007; Spoormaker, Schredl, & Bout, 2005), is consistent in demonstrating that both the frequency of nightmares and the distress caused by them are associated with a variety of pathologies, symptoms, and personality characteristics that share the common attribute of emotional distress.

Considered together, these findings support the prominent clinical view that nightmares are a common emotional disturbance. However, many nightmare theorists go further, considering them to be implicated in a functional system of emotional regulation.

THEORIES ABOUT NIGHTMARES AND EMOTION REGULATION

A majority of nightmare theories converge on the view that a principal function of dreaming is the regulation of emotion and that some alteration of this emotion regulation leads to nightmares. Freud (1900/1953)

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stimulated subsequent theorists to broaden their conception of the emotional function of dreaming by suggesting that nightmares constitute a masochistic variation of wish fulfillment, that is, the preservation of sleep by containment of libidinally linked anxiety. Although few neopsychoanalytic models (apart from Jones, 1951) reflected such a strictly sex-centric interpretation of his nightmare theory, most nevertheless did maintain Freud's emphasis on affect transformation. For example, adaptive functions of nightmares have been described as assimilating repressed anxiety (Fisher, Byrne, Edwards, & Kahn, 1970) or transforming shame into fear (Lansky & Bley, 1995). Nightmares have also been considered as emotionally maladaptive, for example, as failing to master trauma (Greenberg, Pearlman, & Gampel, 1972). The theme of emotion regulation recurs in models of nightmare etiology to the present day.

Charles Fisher and his colleagues at the Mount Sinai Hospital in New York (Fisher et al., 1970) examined such psychoanalytical speculations about emotion regulation by recording nightmare sufferers polysomnographically in the sleep laboratory. Their recordings revealed that nightmares occur primarily during REM sleep (very occasionally during Stage 2 sleep) and are accompanied by less autonomic activation than might be expected from subjects' accounts of the fear and anxiety they felt during the nightmares. To illustrate, twelve of twenty recorded nightmares involved mild, moderate, or marked levels of anxiety yet were associated with *no* concomitant increases in respiratory, cardiac, or eye movement indicators of autonomic activity (see Figure 9.1). Similarly low levels of activation were found in our study of nightmares that occurred spontaneously in the laboratory to otherwise healthy subjects (Nielsen & Zadra, 2005). This apparent separation of fearful dream imagery from its psychophysiological concomitants prompted Fisher and colleagues (1970) to propose a mechanism akin to the psychoanalytic conceptions popular at the time. He suggested that REM dreaming possesses a mechanism for modulating affect by "desomatizing" anxious dream imagery of its physiological concomitants (p. 770). Similar to Freud's sleep-preservation function, Fisher suggested that desomatization preserves REM sleep by diminishing the intensity of anxiety and its self-perpetuation (at times, to panic levels) and contributing to the mastery of traumatic experiences (Fisher et al., 1970). Severe nightmares thus occur when anxiety exceeds REM sleep's capacity to contain it, and the desomatization mechanism breaks down.

Speculations similar to these appeared sporadically in the literature shortly after publication of this landmark work; for example, a short note was published on a desensitization function of dreaming (Beavers, 1973) as well as an empirical study on a speculative anxiety-extinction function of

FIGURE 9.1

Levels of anxiety (ANX) and autonomic (ANS) activity in 20 labora-
tory recorded nightmares (11 subjects); 12 of the nightmares (white
bars) show no ANS activity despite mild to marked levels of anxiety
in the dream content—suggesting that anxious dream imagery may
be stripped of its autonomic correlates.
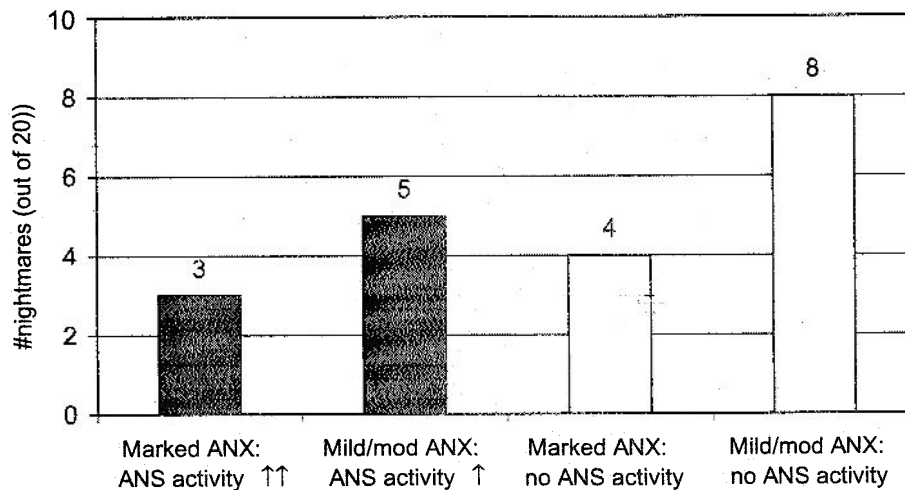
Source: Fisher et al., 1970.

nightmares (Haynes & Mooney, 1975). Haynes and Mooney proposed an
extinction function by which cognitive exposure to fear-inducing stimuli
during nightmares extinguishes fear responses over time in a manner similar
to implosion therapy. In a similar vein, a desensitization function was sug-
gested for the eye movements of REM sleep (Shapiro, 1989; Stickgold,
2002) and for REM sleep muscle atonia (Nielsen, 1991; Nielsen, Kuiken, &
McGregor, 1989). Some evidence was also consistent with the notion that
dream emotion is inhibited by REM sleep processes related to the orienting
response (Nielsen et al., 1989). This notion was further expanded upon
(Perlis & Nielsen, 1993) with the suggestion that anxious dream imagery is
desensitized during REM sleep by the pairing of dysphoric dream imagery
and atonia of the musculature in a manner analogous to systematic desensi-
tization therapy. From this perspective, nightmares reflect either interrup-
tions of the desensitization process (producing waking sensitization and
distress) or amplification of it (producing an effect similar to flooding
therapy).

Investigation of an emotion regulation function for dreaming was under-
taken for several decades by Milton Kramer, then of the Bethesda Hospital
Sleep Center in Cincinnati (Kramer, 1991, 1993, 2006). Kramer characterized

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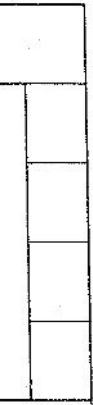
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the physiological profile of each REM sleep period as consistent with an affective "surge" unfolding over time, and the psychological accompaniment of dream content as a mechanism for adaptively regulating or "containing" this surge. The result is a measurable evening-to-morning improvement in mood. Functional containment of the affective surge consists of decreasing affect intensity and variability within a dream series that unfolds over successive REM periods of the night—a so-called "progressive-sequential" pattern of emotional problem-solving. This pattern is distinguished from a "repetitive-traumatic" pattern during which an emotional conflict is simply stated and restated but with no adaptive change in affect. Nightmares occur when the capacity of dreaming to assimilate the emotional surge in this fashion is exceeded.

Although the physiological description of REM sleep as surge-like remains debatable,[1] evidence that dreams are influenced by presleep thoughts and emotions (Kramer, 1993; Nielsen, Kuiken, Alain, Stenstrom, & Powell, 2004; Piccione, Thomas, Roth, & Kramer, 1976) and that dreams as related to waking state mood the next day (Kramer, 1982) is consistent with the claim that intervening dream activity regulates mood across the night. More specific evidence that dreaming is causally implicated in this regulation is still mixed. One pilot study (Kramer & Roth, 1973b) employing only two subjects each sleeping twenty nights (four awakenings for recall/night) demonstrated that evening-to-morning changes in Clyde Mood Scale (CMS) scores correlated significantly with Hall and Van de Castle ratings of the intervening dream content. Most (92 percent) of the fifty-four significant correlations uncovered implicated either ratings of non-self characters or scores on the CMS Unhappiness subscale; 26 percent of the correlations were specifically between character ratings and the CMS Unhappiness subscale. In contrast, CMS Sleepiness scores (but not Unhappiness scores) correlated significantly with intervening measures of sleep physiology, suggesting that dreaming, not sleep, is necessary for the regulation of affect across the night (whereas intervening sleep regulates sleepiness feelings). The findings were replicated in a larger study of twelve college students on the same twenty-night protocol (Kramer & Roth, 1980). In this case, a number of ratings of intervening dream content were again correlated with CMS subscale ratings, and again, a disproportionate number of the relationships was between character scale ratings and CMS Unhappiness subscale scores (Kramer, 1993). However, a further replication study by Kramer's group failed to replicate the same mood regulatory effect (Kramer, 1993).

Nonetheless, findings consistent with these were later reported by Cartwright and colleagues (Cartwright, 1991, 2005; Cartwright, Agargün, Kirkby, & Friedman, 2006; Cartwright, Luten, Young, Mercer, & Bears, 1998). One study (Cartwright, 1991) demonstrated that depressed,

untreated divorcees who successfully adapted to their situations of divorce at follow-up one year later had more emotionally intense incorporations of their ex-spouse character in the REM dreams of their first laboratory night at intake than did divorcees who were later less successful in their adaptation. Cartwright concluded that this pattern of dreaming helped the successful patients "work through" their states of depression. A more recent study replicated and extended these results (Cartwright, 2005). Twenty depressed and ten control subjects, all living through a divorce, were studied for five months, including repeated assessments of current concerns and laboratory polysomnograms with REM sleep awakenings for dream reporting. The findings confirmed an apparent mediating role for non-self dream characters in that (1) degree of waking concern about the ex-spouse is associated with the number of dreams containing the ex-spouse as a character, and (2) subjects in remission at follow-up (versus those not in remission) have more dreams in which the ex-spouse character is associated with emotions and is linked to other memories within the dream. Furthermore, (3) remitted subjects in early stages of separation dream more about their children than do nonremitted subjects, and the number of these dreams is correlated significantly with the degree of waking concern subjects express about their children.

In other studies of divorced women (Cartwright, 1996; Cartwright, Newell, & Mercer, 2001; Cartwright, Young, & Mercer, 1998; Cartwright, Baehr, Kirkby, Pandi-Permual, & Kabat, 2003) and suicidal patients (Agargün & Cartwright, 2003), presleep emotional measures (for example, depression) were shown to be associated with altered patterns of both REM sleep and dreaming. For example, among subjects undergoing marital separation, a "progressive" pattern of more negative dreams occurring early versus later in the night predicts remission a year later compared with the opposite, more typical, pattern of positive dreams early and negative dreams late (Cartwright et al., 1998). Among depressed patients, a "progressive" pattern of increasing dreamlike quality from early to late in the night is also associated with a *lack* of suicidal tendency compared with the opposite pattern of decreasing dreamlike quality (Agargün & Cartwright, 2003). Although suicidal individuals also report a greater frequency of nightmares (Agargün et al., 1998, 2003; Bernert, Joiner, Cukrowicz, Schmidt, & Krakow, 2005; Liu, 2004; Tanskanen et al., 2001), relationships between nightmares and these altered dreaming patterns have not been studied.

Other findings for depressed subjects are consistent with the latter findings. The dreams of depressed but untreated college women contain less anger and fewer characters—fewer strangers in particular—than do the dreams of nondepressed women (Barrett & Loeffler, 1992). Similarly, patients in

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the grips of a depression have neutral to positive dream emotions, whereas those recovering from depression have negative dreams with much interpersonal conflict (Miller, 1969). Other studies of depression and dreams are consistent with the preceding in that they demonstrate similar alterations of either person imagery (Kramer, Baldridge, Whitman, Ornstein, & Smith, 1969; Langs, 1966) or emotions (Beck & Hurvich, 1959; Beck & Ward, 1961; Hauri, 1976; Kramer, Whitman, Baldridge, & Lansky, 1965).

Some studies of objective sleep measures are also consistent with these types of studies except that dreaming is implicated only indirectly. Studies of REM density are of particular interest because (1) eye movement density correlates positively with the active participation of subjects in their dreams (Rotenberg, 1988; Berger & Oswald, 1962), (2) patterns of eye movement across the night distinguish depressed subjects from controls (Wichniak, Antczak, Wierzbicka, & Jernajczyk, 2002), and (3) eye movement density increases as a function of recent learning (Smith, Nixon, & Nader, 2004). One study of evening-to-morning mood change revealed that eye movement densities increase across successive REM episodes on nights when mood improves but decrease on nights when mood deteriorates or stays the same (Indursky & Rotenberg, 1998). A second study (Germain, Buysse, Ombao, Kupfer, & Hall, 2003) found that presleep notification of having to give a speech in the morning (which presumably produces a deterioration of morning mood) leads to a decrease in eye movement density.

Together, the preceding findings support the notion that dreaming contributes to an emotion regulation function and that specific attributes of dream content may predominate in mediating this function. Presumably, the presence of emotions and characters depicting significant others mediate emotion regulation in the case of depressed subjects. Cartwright et al. (2006) link this mediating role to "image contextualization" or the interweaving of character images with many other memory elements (see next paragraph). However, evidence supporting a specific role for dream content is not yet definitive given the dearth and inconsistencies of replication studies. Nonetheless, the work achieved to date is strongly suggestive and lays out clear templates for experimental designs and methods that could serve in future studies.

Yet another variation of the emotion regulation function of dreaming was elaborated by Ernest Hartmann of Tufts University and the Newton Wellesley Hospital Sleep Disorders Center (Hartmann, 1996, 1998a, 1998b). His *image contextualization* model of nightmares proposes that emotional adaptation is facilitated when an individual's predominant emotional concerns are contextualized within a dream, that is, depicted in a visual context consisting of new associations (see Figure 9.2) that are conceptually linked to the

FIGURE 9.2
Two types of connectionist nets in cognitive functioning. Feed-forward nets process information unidirectionally from input, through layered connections, to output, and are characteristic of waking thought. Autoassociative nets process information through symmetric connections, with no input and output, but settling into more or less stable patterns, and are characteristic of dream mentation. The latter formation of broad connections underlies image contextualization.

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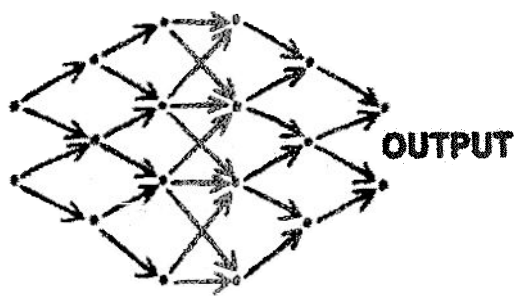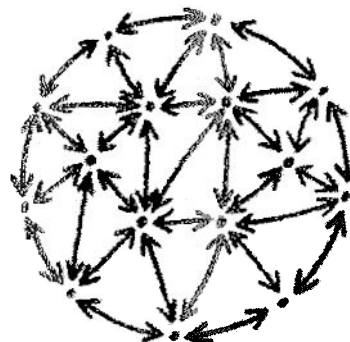
A Feed-Forward Net   An Autoassociative Net

Source: Hartmann, 1998a, p. 85.

emotion (Hartmann, 1998a). These contextualizing images are fundamental to the dream narrative even though the events portrayed may be quite different from those that initially gave rise to the emotions. For example, a dream image of being swept up in a tornado may contextualize an individual's feelings of helplessness, fear, and foreboding that stem—not from a previous tornado experience—but from a previous physical assault. Hartmann's group demonstrated that such images are, in fact, more frequent after trauma (Hartmann, 1998a; Hartmann, Rosen, & Grace, 1998) and are related to a history of trauma (Hartmann, Zborowski, & Kunzendorf, 2001; Hartmann, Zborowski, McNamara, Rosen, & Gazells, 1999). Some features of the model were recently replicated by independent groups (Davidson, Lee-Archer, & Sanders, 2005; Levin & Basile, 2003). The claim that memory systems become hyperassociative and more flexible during REM sleep has also been supported by studies on sleep and learning (Stickgold, Scott, Rittenhouse, & Hobson, 1999; Walker, Liston, Hobson, & Stickgold, 2002), although no direct links to dream content have yet been reported. A general relationship between "insecurely attached" participants and the presence of more frequent and intense dream images that contextualize strong emotions has been reported (McNamara, Andresen, Clark, Zborowski, & Duffy, 2001). This model's emphasis on context formation during dreaming is also broadly consistent with recent suggestions that sleep-related changes in context-building functions of the

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hippocampus influence the consolidation of episodic memories (for review, see Nielsen & Stenstrom, 2005). For example, Hartmann's model predates the notion that a central function of REM sleep is to create contextual memories (Johnson, 2004, 2005), and recent research demonstrating that implicit contextual learning is facilitated during sleep (Spencer, Sunm, & Ivry, 2006).

From this perspective, nightmares are not necessarily dysfunctional. Rather, they are similar to dreams in that they constitute attempts to create image context for problematic memories. In fact, Hartmann considers nightmares to be exemplary instances of this regulatory function.

Most recently, Ross Levin of Yeshiva University in New York City and I proposed a model of nightmares that ascribes a very specific function to normal dreaming, that of *fear memory extinction*. We further suggest that various disturbances in the component processes of this function produce different types and degrees of disturbing dreams including, especially, bad dreams and idiopathic and posttraumatic nightmares (Levin & Nielsen, 2007; Nielsen & Levin, 2007a, 2007b). This model explains the emotion regulation mechanism of fear memory extinction at two levels: cognitive and neural.

Cognitive Level Explanation

At the cognitive level, fear extinction entails the activation of fear memory elements that are isolated and removed from their episodic (real-world) contexts, the recombination of these into novel "here-and-now" simulations of reality, the expression of alternate emotional reactions to this virtual context, and the production of new *fear extinction memories* (Davis, Myers, Chhatwal, & Ressler, 2006; Kim & Jung, 2006). The latter compete with and, if sufficiently maintained over time, supersede the original fear memories. In short, fear extinction during dreaming is achieved by the coupling of fear memory elements with nonaversive contexts, that is, virtual worlds that are emotionally incompatible with fear, to produce competing fear extinction memories.

This sequence of image-based processes is assumed to obey the widely accepted principles of fear memory learning and extinction described by Pavlov (1927) and elaborated in numerous recent animal and human studies (for reviews, see Barad, Gean, & Lutz, 2006; Bouton, Westbrook, Corcoran, & Maren, 2006; Hermans, Craske, Mineka, & Lovibond, 2006; Kim & Jung, 2006). The fact that the fear memories are replaced rather than eliminated altogether means that they may be reinstated under various conditions. Appropriate reinstatement of a fear memory is itself, in fact, a vital aspect of emotional adaptation. Nightmares occur as a result of dysfunctional activity in any of these processes. For example, if an entrenched fear

memory resists recombination with new, incompatible contexts (as might be the case in a nightmare with recurrent themes), new extinction memories may not be formed. Or, if an extinction memory is not properly maintained, an old fear memory may return. Furthermore, an individual's temperament may interact with these basic extinction processes to attach varying levels of *affect distress* to the emotional responses produced (see next section).

Neuronal Level Explanation

At the neural level, fear extinction is supported by a network of four brain regions that control the representation and expression of emotions in both sleeping and waking states: the amygdala, the medial prefrontal cortex (MPFC), the hippocampal complex, and the anterior cingulate cortex (ACC). Each region can be roughly equated with a particular domain of processing in the fear extinction process (Table 9.1), although the normal functioning of these regions is more likely to be as interactive components in the larger integrated network.

During nightmares, the amygdala becomes increasingly responsive to fear-related memory elements portrayed in the dream, while processes in the

TABLE 9.1
Brain Regions Implicated in the Production of Dreams and Nightmares

Brain Region	Proposed Function	Sample References
Medial prefrontal cortex (MPFC)	Inhibition of fear memories (in the amygdala) via storage and recall of extinction memories	Kalisch et al., 2006; Milad et al., 2005; Phelps, Delgado, Nearing, & LeDoux, 2004
Hippocampus	Regulation of virtual simulation (context); evaluation of fear memory context to regulate extinction and reinstatement of fear memories (in the amygdala, MPFC)	Maren, 2005; Eichenbaum, 2004; Nielsen & Stenstrom, 2005
Amygdala	Activation of subjective and autonomic correlates of emotion	Maren & Quirk, 2004; McGaugh, 2004
Anterior cingulate cortex (ACC)	Regulation of affect distress (in autonomic NS)	Blumberg et al., 2000; Eisenberger & Lieberman, 2004; Kalisch et al., 2006; Whittle, Allen, Lubman, & Yucel, 2006

Sources: Adapted from Levin & Nielsen, 2007; Nielsen & Levin, 2007a.

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MPFC, hippocampus, and ACC that normally downregulate amygdala activity are disrupted. The result is an abnormally high expression of fear. This aspect of the neural model is similar to empirically supported models of PTSD pathology (Nutt & Malizia, 2004; Rauch, Shin, & Phelps, 2006). However, the present model also explains the distress caused by nightmares as a result of a separate, trait-like factor (*affect distress*) thought to be controlled by the ACC. Affect distress is shaped by the emotional history of the individual (for example, childhood family stress) and is akin to the *negative affect* and *negative emotions* personality dimensions (Chorpita & Barlow, 1998; Watson & Pennebaker, 1989). Its role in the fear extinction mechanism derives from evidence linking the ACC to subjective distress associated with pain (Qiu et al., 2006, Rainville, 2002), social exclusion (Eisenberger & Lieberman, 2004; Eisenberger, Lieberman, & Williams, 2003; Panksepp, 2003), romantic separation (Najib, Lorberbaum, Kose, Bohning, & George, 2004), bereavement (Gundel, O'Connor, Littrell, Fort, & Lane, 2003), and caregiver separation (see review in Eisenberger & Lieberman, 2004; Lorberbaum et al., 2002), as well as evidence that dysfunctional connections between ACC and other regions of the proposed network underlie a negative affect temperament (Whittle et al., 2006) and difficulties with emotional expression (Mériau et al., 2006).

This is a new model whose assumptions have not yet been tested experimentally. Nonetheless, it is broadly consistent with the diverse literature on sleep, PTSD, fear memory learning and extinction, personality, and psychopathology, and it is amenable to empirical testing on a number of fronts.

Summary

Theoretical and empirical work on nightmares from Freud to the present day converges on and supports to some extent the notions that (1) emotion regulation is a function of dreaming and (2) nightmares are either exemplary expressions or psychopathological disturbances of this function. The work also brings to light several possible mechanisms that may be central to emotion regulation during dreaming, including desomatization, contextualization, progressive emotional problem-solving, and fear memory extinction. It also provides suggestive evidence that some aspects of dream content (for example, characters and emotions), and not simply the physiological state of REM sleep per se, are implicated in the emotion regulation function. However, the empirical support for the existence of an emotion regulation function for dreaming is still provisional, and many questions about the possible roles of specific dream and nightmare contents in such a function remain unanswered. Nonetheless, the territory that has been covered on the

question of nightmares and dream function does hold clues as to where we might look next for evidence of emotion regulation.

WHERE TO LOOK NEXT: SOCIAL IMAGERY AND EMOTION REGULATION

Much of the previous research is consistent with the possibility that a prerequisite for emotion regulation during dreaming is the realistic simulation of *character-self interactions* (CSIs) and that nightmares reflect anomalies of this form of simulation. Of the many features of waking experience that are simulated during dreaming (Levin & Nielsen, 2007; Nielsen, Powell, & Cervenka, 1994; Revonsuo, 2000), CSIs are of particular interest for at least two reasons: (1) emotional concerns are largely social in nature (Cartwright et al., 2006; Klinger, 1977) and (2) one's predominant social relationships and conflicts continue to be portrayed during dreaming (Bilu, 1989; Cartwright et al., 2006; Eudell-Simmons, Stein, Defife, & Hilsenroth, 2005; McNamara, McLaren, Smith, Brown, & Stickgold, 2005; Popp et al., 1996). The fact that the predominant relationship themes that recur in dreams tend more often to be negative in nature than do themes in reports of waking experiences (Nielsen, Deslauriers, & Baylor, 1991b; Popp et al., 1996) and that dream emotions tend to turn from positive to negative significantly more often than they do the opposite (Merritt, Stickgold, Pace-Schott, Williams, & Hobson, 1994; Nielsen, Deslauriers, & Baylor, 1991a), suggests that the activation of negative emotions related to social relationships is privileged during dreaming—as would be expected if it played some role in regulating negative emotions.

But there is much more evidence that points in the direction of CSI simulation as a possible mediator of emotion regulation. Some attributes of dream characters are particularly apt to qualify them as mediators of emotion, including their consistent presence and stability, realism, apparent autonomy and ability to evoke reactions from the dream self, and reactivity to daytime socioemotional events and situations. These attributes are considered in turn.

Dream Characters are Consistently Present and Stable

Characters maintain a more or less constant presence in dream narratives. While they are as prevalent as the dream ego or as dream settings, appearing in over 95 percent of adult reports (Hall & Van de Castle, 1966), the average number of non-self characters in every dream is 2.6 to 3.7 for adults (Hall, 1951; Kahn, Stickgold, & Hobson, 2000) and 2.2 for children aged

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four to ten (Resnick, Stickgold, Rittenhouse, & Hobson, 1994). The self is usually active during dreaming, even in children (Resnick et al., 1994; although Foulkes, 1982b), engaging in some form of interaction with these non-self characters. In fact, social interactions are even more frequent in dream reports than they are in reports of randomly selected daytime experiences (McNamara et al., 2005). Characters are more often familiar than unfamiliar in both children's dreams (70 versus 30 percent, respectively) (Resnick et al., 1994) and adults' dreams (52 versus 48 percent) (Hall & Van de Castle, 1966; Kahn, Pace-Schott, & Hobson, 2002), although the proportion of unknown characters may be as low as 22 percent if "generic" characters, for example, "policeman," or "a friend" are separately tallied (Kahn et al., 2002).

Dreamed characters are spatially and temporally stable, especially in the lengthy dreams of REM sleep. Spatially, dream characters show a lower overall incidence of distortion relative to their waking state referents than do other features of dreams, like settings (Dorus, Dorus, & Rechtschaffen, 1971). Only 14 percent of characters reveal any sign of bizarreness (Kahn et al., 2000); nonetheless, over 60 percent of known characters deviate in some manner from their waking counterparts—usually in how they behave or in the feelings they evoke (Kahn et al., 2002). Temporally, characters from REM sleep dreams demonstrate less moment-to-moment variation relative to actions performed than do characters from non-REM sleep dreams (Foulkes & Schmidt, 1983). In fact, the longer a dream report from REM sleep, the less there is variation in character composition (Foulkes & Schmidt, 1983). Foulkes and Schmidt note a striking instance of a dream report from REM sleep in which the same character persists over fifteen episodes. These observations prompted the conclusion that characters ". . . are central, and generally highly concretely portrayed features of REM dream narratives. . ." (Foulkes & Schmidt, 1983, p. 279).

The stability of character images in dreams is demonstrated also by the fact that their representation does not depend exclusively upon imagery of any particular sense modality—or of any sense modality whatsoever. Characters are usually identified by appearance, face, or behavior (Kahn et al., 2000) either visually or by sounds, speech content, and prosody (Heynick, 1983, Snyder, 1970), but in many instances (12 percent) are "just known" to be present (Kahn et al., 2002). Moreover, characters also occur frequently in the dreams of the blind (Kerr, Foulkes, & Schmidt, 1982; Kirtley & Sabo, 1984). Helen Keller, who was both deaf and blind, provided very vivid descriptions of the nonvisual, nonauditory character images pervading her dreams (Jastrow, 1900). In sighted subjects, the most vivid example of this type of dream character is the "sensed presence" that appears frequently

during sleep paralysis episodes (Cheyne, 2001; Solomonova et al., 2007). The sensed presence does not depend upon visual, auditory, or other pseudosensory attributes for its recognition; rather, it appears to be a form of purely spatial character representation (Solomonova et al., 2007).

Dream Characters are Realistic and Engaging

Characters appear quite autonomous in dreams and tend easily to incite emotional reactions from the dreamed self. They evoke feelings in the dreamed self whether they are known (81 percent) or unknown (69 percent) to the dreamer, with feelings of caring and affection being the most frequently evoked (Kahn et al., 2002). Content analysis of aggressive and friendly social interactions in dreams (Hall & Van de Castle, 1966) indicate that among the aggressive encounters for which an initiator of the action can be identified, 68.2 percent are perpetrated by other characters—only 31.8 percent by the dreamed self. Friendly interactions are also frequently initiated by other characters (52.4 versus 47.6 percent). In the case of "attack nightmares," where the dream-ego is chased, threatened, or assaulted, the intention of the attacker is clearly apparent 59 percent of the time; moreover, 75 to 85 percent of the time, the dream ego does nothing to clearly incite the attack (Hall, 1955). The autonomy of characters may be at its highest during lucid dreams, when they appear to demonstrate independence of mind and feeling, separate perspectives, creative thoughts, and command of information that was previously "unknown" to the dreamer (Tholey, 1989).

Not only do dream characters appear to initiate emotional encounters with the dream-ego, they communicate their emotional meanings through channels that closely resemble those used by real individuals in the waking world. They display facial expressions and emotional gestures, express concerns in speech rich with inflection and prosody, and touch or manipulate the dreamed self in provocative and intimate ways. One study of 635 REM sleep dream reports (Snyder, 1970) found that almost every interaction between the self and another character involved talking (see also Foulkes, 1982a; Heynick, 1983). A second study (Heynick, 1983) found that 40.4 percent of verbal communications in dreams were produced by characters, and these communications were syntactically well formed, occasionally complex, and considered appropriate to the dream scenario; the majority (85.3 percent) were experienced as vocalized utterances that were completely "sayable" or "hearable" in waking life.

The simulated emotional expressions of dream characters appear to be as subtle or overt, direct or indirect, or simple or complex as the expressions

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that are used daily on the social stage. Moreover, these expressions appear to incite the dream self to react emotionally. Such reactions may be in sympathy with those of the character or they may be appropriately complementary, but rarely are they judged by subjects themselves to be inappropriate to the waking-state situation depicted by the dream (Foulkes, Sullivan, Kerr, & Brown, 1988).

Dream Characters are Affected by Daytime Socioemotional Events

While the consistency and stability of interactive characters are dream attributes that may be necessary for emotion regulation to exist as a function of dreaming, the plausibility of such a function would be increased if these characters proved to be influenced by the changing emotional concerns of the individual while awake. Evidence for such influence can, in fact, be found in a variety of different clinical and empirical studies.

Clinically, dreams are used regularly to clarify the nature of a patient's interpersonal relationships, for example, the quality of object relations and patient-therapist transference situations (Carlson, 1986; Hersh & Taub-Bynum, 1985). A patient's level of object representations can be identified in dream narratives as it can in other measures such as the Early Memories scale (Krohn & Mayman, 1974). Popp and colleagues (1996) used a validated system for content analysis of repetitive relationship patterns, the Core Conflictual Relationship Theme (CCRT) method (Luborsky, 1977), to demonstrate that that an individual's most frequent relationship patterns are expressed in their dreams as they are in their waking psychotherapy narratives. Emotionally negative themes are predominant in both types of report. In a similar vein (Eudell-Simmons et al., 2005), dream narratives can be assessed reliably using measures of interpersonal behavior on the Social Cognition and Object Relations Scale (SCORS; Westen, 1991); the SCORS categories of Affect and Relationships are rated with particularly high reliability. Furthermore, SCORS categories are significantly correlated with the degree of similarity between dreaming and waking experiences on the Zepelin Dream Distortion Scale (Winget & Kramer, 1979); less distorted dreams exhibit more complexity of self/other representations, fewer gaps in interpersonal narrative accounts, and more stability or coherence of self-representation.

Laboratory research is consistent with these clinical findings. McNamara and colleagues (2005) randomly sampled mentation in REM and NREM sleep (Nightcap procedure), as well as wakefulness (pager procedure) and scored the resulting reports with Hall and Van de Castle (1966) social interaction scales. REM sleep reports were twice as likely as waking state reports ($p < .04$) to simulate social interactions but were not different from NREM

sleep reports. Also, REM sleep reports contained more aggressive interactions than did either waking state ($p < .02$) or NREM sleep ($p < .06$) reports.

Finally, a study of over 200 "encounter" dreams reported by Jewish and Arab preteens indicates that these children internalize the contents and affective tone of the Jewish/Arab conflict (Bilu, 1989). Children incorporated both stereotypical characterizations of the "other" and the aggression and violence of interactions with them.

In sum, assessments of dream content using a variety of validated measures of socioemotional dynamics reveal that such dynamics are present in dream reports with at least the same frequency as in waking state comparison reports. The fact that these comparison reports are, for the most part, descriptions of personally important relationships (core relationships, psychotherapy narratives, political events) attests to the extent to which dream characters reflect an individual's socioemotional concerns.

These findings are generally consistent with laboratory and home studies that have attempted to identify dream content related to an individual's current concerns (Hoelscher, Klinger, & Barta, 1981; Nielsen, Alain, Kuiken, & Powell, 2003; Nikles, Brecht, Klinger, & Bursell, 1998). First, daytime events identified in dreams (by judges working from subjects' written logs) are rated by subjects themselves to be more emotional than are nonincorporated events (Kramer, 2006; Piccione, Jacobs, Kramer, & Roth, 1977). Second, concern-related themes administered before sleep with suggestions to dream about them also influence dream content—largely the central imagery of dream content—more than either nonconcern themes or themes administered without suggestions (Nikles et al., 1998). Third, when subjects are asked to rehearse a statement about wishing to attain a desired personality attribute, the wished-for attributes are reflected in dreams to a greater extent that are nondesired attributes; in this study, both the self and other characters exhibited this effect (Cartwright, 1974). Fourth, verbal stimuli that are related to subjects' current concerns and presented during sleep influence dream content to a much greater extent than do stimuli that are not so related (Hoelscher et al., 1981). Finally, subjects who rate their recent dreams as having a high personal impact incorporate aspects of their waking experiences into dreams with a particular temporal pattern, for example, events occurring from one to two or five to seven days before the dream but not from days in between (Nielsen et al., 2003).

These findings stand in stark contrast to many laboratory attempts to influence dream content with emotion-provoking stimuli—primarily films—that have produced inconsistent or marginal results (see review in Arkin & Antrobus, 1991). It may be that the latter studies failed because the stimuli used did not resonate sufficiently with the emotional tenor of a subject's

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current concerns. In contrast, studies that were successful may have had just such an effect because of the more general relevance of the stimuli to a subject's concerns. For example, stimulation with an erotically arousing film produces more dreams with a reduced number of opposite sex characters and a higher frequency of only a single character (Cartwright, Bernick, Borowitz, & Kling, 1969). Or, when a painful stimulus is presented during REM sleep, that stimulus may be reflected in attributes of both the dream self and non-self characters (Nielsen, McGregor, Zadra, Ilnicki, & Ouellet, 1993).

The suggestion that an emotional film may have substantially less effect on subjects than an actual interpersonal encounter is consistent with findings from studies that have used emotional stimuli or situations that are more clearly interpersonally engaging. One such situation is the experience of sleeping in a laboratory—which for first-time subjects often constitutes a considerably intense, if not stressful, social encounter. Dreams collected from the first night of sleep in the laboratory contain more unknown than known characters, whereas the opposite is true for dreams collected from the second night (Dorus et al., 1971). This difference may have to do with the "first-night effect," which is known to affect REM sleep (Agnew, Webb, & Williams, 1966; Browman & Cartwright, 1980; Coble, Le Bon O. et al., 2001) and which likely reflects the social stress of encountering laboratory personnel in close quarters for the first time (the first-night effect is attenuated in home sleep recordings). Laboratory subjects regularly dream about the lab personnel; in late-night REM dreams, the proportion of lab characters is higher than it is in NREM dreams (Raymond, Nielsen, Bessette, Faucher, & Germain, 1999). In a related finding, dreams collected in the laboratory contain more characters and more aggressive character interactions than do dreams collected at home (Domhoff & Kamiya, 1964).

Other findings are consistent with the idea that dream characters and their interactions with the self are influenced by daytime emotional situations. Animal dream characters are a case in point. The presence of animal characters in dreams consistently decreases with increasing age, whether measured in a sleep lab (Foulkes, 1985; Foulkes, Hollifield, Sullivan, Bradley, & Terry, 1990) or at home (Resnick et al., 1994; Van de Castle, 1994) (see Figure 9.3). With increasing age, the frequency of generic animal characters and strangers diminishes while the frequency of familiar and family characters increases (Foulkes, 1985). However, in older children, the presence of dreamed animals is associated with social immaturity (Foulkes, 1985). The more predominant animal characters are in dreams, the greater the likelihood that these dreams also contain aggression (Van de Castle, 1994, p. 307; Seidel, 1984). In the dreams of 11- and 12-year-olds, aggression is present

FIGURE 9.3

Decrease in proportion of dreams with animal characters with increasing age.

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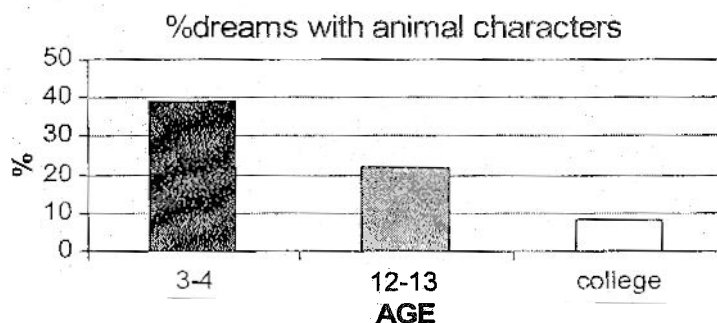
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more often when an animal character is also present (74 percent) than when no animal is present (44 percent; (Seidel, 1984)). In fact, children are four times as likely as adults to be victims of aggression in their dreams, and animal characters are the source of this aggression (Domhoff, 1993). These findings together suggest that the increasing differentiation of emotions and emotional control through childhood is accompanied by a consistent change in the nature of dream characters and how they relate to the dreamed self.

Dream characters and their associated emotions also vary with the symptoms of affective illness. The early dreams of paranoid schizophrenics contain both more strangers than familiar people and more aggressive themes (Kramer, Whitman, Baldridge, & Ornstein, 1970). Chronic schizophrenic's dreams are bland, sterile, and devoid of people and all but individual objects (Dement, 1955). Chronic hebephrenic schizophrenics off medications (and hallucinating) have more sadness, anger, and anxiety and less frequent friendly characters (Okuma, Sunami, Fukuma, Takeo, & Motoike, 1970). The dreams of depressed subjects more often represent family members, and less often strangers, than the dreams of schizophrenic subjects (Kramer & Roth, 1973a; Kramer et al., 1969). Together, such research indicates that dream characters may be responsive to varying emotional conditions induced by affective illnesses and, thus, may be implicated in the elevated need to regulate emotion in these cases.

Perhaps most telling are changes in dream characters that accompany transitional periods in emotional relationships with an important other person ("significant other"), for example, the death of a loved one, making and breaking of new friendships, conflict with family partners, birth of a child, and so forth. During these transitions, mechanisms for emotional regulation may also be in greater demand and, thus, in greater evidence in dream reports. It is also
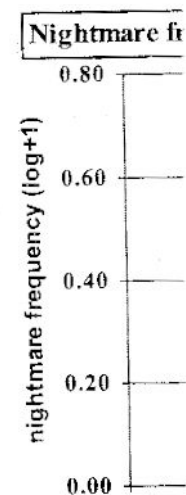
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Log frequency of nightmares in primi- and multiparous new mothers queried at 3, 6, and 12 weeks postpartum. Many reported nightmares depicted the infant in peril and were accompanied by enacting behaviors.

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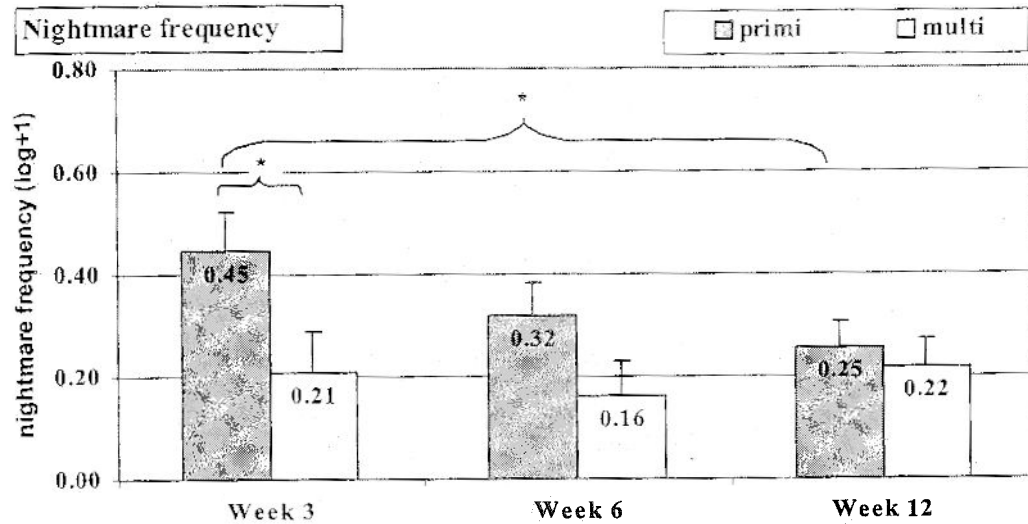
likely that when such transitions are quite severe, nightmares that reflect the social dynamics of the transition will occur. Some evidence linking dream changes with divorce and possible emotion regulation was already presented in an earlier section. Two other transitional periods are of particular interest. One of these is the postpartum period, when mothers report intense dreams and nightmares of their new infants. The other is the aftermath of a loved one's death, when bereavement dreams and nightmares are common.

In the case of postpartum dreams, results from our study of 220 new mothers (Nielsen & Paquette, 2004, 2006) show that of women who are able to recall a dream in the postpartum period, a sizeable number (55.8 percent) reported having had nightmares about the infant (see Figure 9.4). An even larger proportion (86.5 percent) reported dreaming about the new infant and, among those who responded to specific probe questions, 74.8 percent indicated that these dreams contained anxiety. The concern expressed toward the infant character is clear in the fact that, for 64.3 percent of the women, the infant is depicted as injured or in danger, and for 50.4 percent the infant is depicted as lost. In fact, the dreams are often so perceptually vivid that the women believe they are really taking place. Upon awakening, they may stay confused for a short time about whether or not their infants were, in fact, in peril. The dreams are also frequently (63.4 percent) accompanied by overt dream-enacting behaviors, such as motor activity of the limbs or trunk, speaking out loud, and expressing emotions.

The incorporation of the infant as a character into dreams is more apparent for primiparas, who are undergoing the transition to motherhood for the first time, than it is for multiparas, who have previous motherhood experience. More primiparas (87.4 percent) recall an infant dream than do multiparas (66.4 percent; $p = .0005$), and more primiparas also recall an infant nightmare (52.6 versus 34.6 percent; $p = .010$).

The most severe of these episodes, those involving dream-enacting behaviors, proved to be associated with psychopathological indicators. For the *Expressing Emotions* category of dream-enacting behaviors, relationships were found with low maternal affection scores on the Parental Bonding Instrument (PBI) ($p = .01$), with high PBI-maternal protection scores ($p = .002$), with high PBI-paternal protection scores ($p = .07$), and with high Symptom Check List (90 item) Revised General Symptom Index (SCL90-R-GSI) scores ($p = .04$). For the *Motor Activity* category, behaviors were associated with higher attachment instability ($p = .007$) and lower PBI-maternal affection ($p = .08$) and higher SCL90-R-GSI ($p = .08$) scores.

The observed relationships between infant dreams, sleep behaviors, and disturbed attachment are consistent with the possibility that postpartum infant dreams reflect emotional changes compelled by the arrival of the new infant and the new attachment imagery it entails. As the mother adjusts to the demanding presence of a new infant in her life, she is pressed to encode and consolidate stable, emotion-laden representations of this infant, representations that correspond in many ways to what have been termed *internal working models* of attachment figures (Cicchetti, Toth, & Lynch, 1995; Thompson & Raikes, 2003). The consolidation of such representations may well require sleep and dreaming processes (Nielsen & Germain, 2000) as do other types of learning (Stickgold, 2003). Specific links between emotional memory and sleep have, in fact, been made in some studies (Wagner, Hallschmid, Rasch, & Born, 2006; Wagner, Hallschmid, Verleger, & Born, 2003; Wagner et al., 2005). For example, implicit memory consolidation of human faces is dependent upon intact REM sleep (Wagner et al., 2003).

In the case of bereavement, vivid images of the deceased may persist for years as hallucinations, illusions, and intense dreams (Bowlby, 1980; Cookson, 1990). Dreams of a deceased love one occur in about half of widows and widowers, by whom they are experienced to be extremely vivid and realistic—much as is the sense of the deceased's presence during the waking state (Bowlby, 1980). One widow cited by Bowlby (1980, p. 97) recalled the following dream. "It was just like everyday life ... my husband coming in and getting his dinner. Very vivid, so that when I woke up I was very annoyed." The realness of the characters is part of what renders them so comforting, and a majority of subjects studied describe their dreams of the dead as

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comforting. By the same token, waking up to the harsh reality that the dream was only a dream can also bring back intense feelings of sadness and grief. Many subjects studied by Gorer (1965) reported that they tried to preserve their dreams in memory after they awakened but, being saddened by their fading, they would often end up weeping in the recounting of it. Even more intense reactions to such dreams may occur; in some cases, distressing aspects of the bereaved person's previous relationship with the deceased are depicted, and in others, the trauma of the deceased's illness or death are redramatized.

On the surface, both nightmarish dreams of the dead and sad awakenings from dreams of the dead as alive again may seem quite undesirable; however, they should be appreciated for their possible functional value. Such dreams may serve to help the individual accept the reality of their loss, to express appropriate emotions of loss as well as of renewal towards life, and to gain a sense of closure on the loss. In fact, the comforting nature of such dreams is widely appreciated by bereaved persons. The taking of comfort from dreams of the deceased seems so basic to the resolution of grief that it has prompted Bowlby (1980) to conclude that "Whether on balance a bereaved person finds his dreams comforting seems likely to be a reliable indicator of whether or not mourning is taking a favourable course" (p. 98).

A qualitative study of over 400 dreams about recently deceased persons (Garfield, 1996) identifies many features of dream characters that may be implicated in mediating these dreams' capacity to mitigate an adaptive response to death, for example, features of a character's face, expression, and clothing or their "message" for the dreamer. For example, a transformation in appearance may accompany a profound sense of reassurance (see also Morse, 1994). Embracing a departed dream character appears to be particularly comforting (Garfield, 1996). It is noteworthy that the most common "message" from characters in such bereavement dreams is that the dreamer should not worry, that the deceased is "okay." Feelings subsequent to such dreams are often intense and adaptive, as the following excerpts demonstrate.

> ... I felt so wonderful and happy; the pain in my heart had been kissed away, all my suffering gone; ... he came to say goodbye and it healed me; ... I felt better about his passing for I knew he was at last at peace.... (Garfield, 1995, p. 9)

Two different kinds of emotion regulation effect are illustrated in the following accounts. In the first, a dramatic turning point is achieved within the dream, with the dreamer obtaining an insight about compassion from a particular facial expression on his lost son's face. In the second, mood is enhanced whenever the dream recurs during times of stress.

(1) There he was! Walking toward me as if coming out of a mist. There he was—that lanky 17-year-old whose life I loved better than my own. He looked deeply into my eyes and with a grin on his face, the way he used to do when he was "buttering me up." Not a word was spoken, but everything was said that needed to be said for my turning point to come.

It was time to resume life. I would not be bitter, but in loving memory I would be better. I would live again because I knew that my boy lived again. My own Christian faith was to be retrofitted. It offered meaning and purpose within the shadow of my loss. (Klass, 1992, p. 256)

(2) My father died nine years ago but I often dream that he returns, especially at times of stress in my life. He looks older than he ever got to be in real life and very wise looking. I tell him problems I am having and sometimes he just listens and I feel better but usually he gives me advice, sometimes very clear, sometimes garbled. In the instances where it is clear, it is always good advice but things I already know I should do. But just seeing him and hearing it from him makes me feel better. (Barrett & Loeffler, 1992)

In sum, evidence from a variety of types of studies supports the notion of an emotion regulation function for dreaming and the more specific suggestion that dream characters and their emotion-laden interactions with the dream self may mediate this regulatory effect. Future progress in the testing of this perspective on dream function will clearly require targeted assessments of dream contents that include, but are not restricted to, the variety of character-self interactions that occur in dreaming during a variety of emotionally significant transitional states.

ACKNOWLEDGMENT

NOTE

1. In distinction to the within-period surges suggested by Kramer, a strong case can be made that an affective surge, indexed by a cross-night increase in cortisol, occurs across multiple REM periods of the same night and increasingly favors amygdala-related emotional memory consolidation (Born & Wagner, 2004; Payne & Nadel, 2004; Wagner, Degirmenci, Drosopoulos, Perras, & Born, 2005).

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