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Dreaming Disorders

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Because most dreaming disturbances involve a perturbation of emotional expression during sleep, their study may help clarify the role of emotion in dream formation, dream function, and sleep mechanisms. Physiological evidence for emotional activity during rapid eye movement (REM) sleep is substantial. Autonomic system variability increases markedly in conjunction with central phasic activation,[1] as seen especially in measures of cardiac function,[2, 3] respiration,[4] and skin and muscle sympathetic nerve activity.[5, 6] Brain imaging, too, demonstrates increases in metabolic activity in limbic and paralimbic regions during REM sleep (e.g., see references 7, 8), activity similar to that seen during strong emotion in the waking state.[9] These dramatic autonomic fluctuations globally parallel dreamed emotional activity, which is detectable throughout most dreaming when appropriate probes are employed.[10] Most dreamed emotion is negative,[11] primarily fearful,[10] and it may conform to a "surge-like" structure within REM episodes.[12] Isomorphic relationships between physiological and subjective attributes of dreamed emotions have been reported (e.g., see references 13, 14) but are still poorly understood. Nevertheless, many theorists interpret the various peripheral manifestations of phasic ponto-geniculo-occipital (PGO) activity as indicative of dream-related affective activity.[12, 15, 16]

Emotional processes during wakefulness are also implicated in dream disturbances. For the most common disturbances, such as nightmares, dreamed emotion becomes unbearably intense and provokes an awakening; this may lead to further distress which continues to influence waking behavior and mood and may even impair subsequent sleep. Perturbation of dream-related emotion may thus lead to a cycle of sleep disruption and avoidance, insomnia,[17] and psychological distress.[18] This often leads the individual to seek treatment.

However, causal relationships between emotion, dreaming, and other associated symptoms are not well understood. In some instances (e.g., nightmare disorder), emotional disruption may affect primarily sleep-related processes—in which case the dreaming process itself might be considered pathological in some sense.[19] However, the widespread belief in dreaming as an emotionally *adaptive* mechanism also leaves room for the possibility that some dream disturbances are adaptive reactions to more basic pathophysiological factors, rather than signs of a pathological disorder per se. As the pathophysiologies of dream disturbances are still only poorly understood, in this chapter we use the terms *dream disturbance* and *disturbed dreaming* in a neutral sense with respect to this question of etiology.

IDIOPATHIC NIGHTMARES

Historical Aspects

Although the most prevalent form of dream disturbance is the idiopathic nightmare, its cause and psychopathology remain largely unstudied. The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV)[20] criteria for *nightmare disorder* (Table 66–1) have not changed substantially since the disorder was described as *dream anxiety disorder* in the third, revised (DSM-III-R) and as *dream anxiety attack* in third (DSM-III) editions. This is due, in part, to the fact that little new basic or clinical information about idiopathic nightmares has been published since the initial studies of Fisher et al.[21] and the detailed clinical analyses by Hartmann.[22]

The widely accepted definition of a *nightmare* is a frightening dream that awakens the sleeper, but not all researchers adopt the "awakening" criterion. Some[23] argue that disturbing dreams that awaken merit the designation nightmare, whereas those that do not should be labeled "bad dreams;" whether the person awakens is presumably an indirect measure of the dream's severity. However, the awakening criterion may be an overly conservative estimate of severity. First, among various psychosomatic patients, even the most macabre and threatening dreams do not necessarily produce awakenings.[24, 25] Second, fewer than one fourth of chronic nightmare patients report "always" awakening from their nightmares, and these do not correlate with either nightmare intensity or psychological distress.[17] Third, among subjects with *both* nightmares and bad dreams, approximately 45% of bad dreams have emotional intensities equal to or exceeding those of the average nightmare.[26] Similarly, many researchers define nightmares as disturbing dreams involving *any* unpleasant emotion.[18] This is consistent with many patients' reports that their nightmares involve intensification of unpleasant emotions

Table 66–1. CLINICAL CRITERIA FOR NIGHTMARE DISORDER

DSM-IV Diagnostic Criteria for Nightmare Disorder (307.47)	ICSD-R Diagnostic Criteria for Nightmares (307.47-0)
A. Repeated awakenings from the major sleep period or naps with detailed recall of extended and extremely frightening dreams, usually involving threats to survival, security, or self-esteem. The awakenings generally occur during the second half of the sleep period.	A. The patient has at least one episode of sudden awakening from sleep with intense fear, anxiety, and feeling of impending harm.
B. On awakening from the frightening dreams, the individual rapidly becomes oriented and alert (in contrast to the confusion and disorientation seen in Sleep Terror Disorder and some forms of epilepsy).	B. The patient has immediate recall of frightening dream context
C. The dream experience, or the sleep disturbance resulting from the awakening, causes clinically significant distress or impairment in social, occupational, or other important areas of function.	C. Full alertness occurs immediately upon awakening, with little confusion or disorientation.
D. The nightmares do not occur exclusively during the course of another mental disorder (e.g., a delirium, Posttraumatic Stress Disorder) and are not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition.	D. Associated features include at least one of the following: • Return to sleep after the episode is delayed and not rapid • The episode occurs during the latter half of the habitual sleep period
	E. Polysomnographic monitoring demonstrates the following: • An abrupt awakening from at least 10 min of REM sleep • Mild tachycardia and tachypnea during the episode • Absence of epileptic activity in association with the disorder
	F. Other sleep disorders, such as sleep terrors and sleepwalking, can occur.

Data from American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, DC: American Psychiatric Association Press; 1994; and International Classification of Sleep Disorders-Revised: Diagnostic and Coding Manual. Rochester, Minn: American Sleep Disorders Association; 1997.

such as extreme sadness or anger; fear nevertheless remains the most frequently reported emotion.[26]

Prevalence and Frequency

Estimates of nightmare prevalence are complicated by the variety of populations studied and variations in the use of frequency criteria. Lifetime prevalence for a nightmare experience in the general population is unknown but may well approach 100%. If we consider only attack dreams, which are one of the most common nightmare themes, the lifetime prevalence varies from 67%[27] to 90%.[28] Pursuit, a closely related, highly disturbing theme, has a lifetime prevalence of 92% among women and 85% among men.[28] Age is clearly a mediating factor; children, young adult, and adult and elderly groups have nightmares "at least sometimes" with a prevalence of 30 to 90%, 40 to 60% and 60 to 68% respectively.[29]

Nightmares are both more prevalent and more frequent in childhood. In a clinical context,[30] where nightmare problems were defined as lasting for longer than 3 months, their prevalence was 24% for ages 2 to 5, 41% for ages 6 to 10, and 22% for age 11 years. Figures of 5 to 30% (for "often or always") and 30 to 90% (for "at least sometimes") have also been reported for children.[29] Two surveys[31, 32] indicate that 20 to 30% of 5- to 12-year-old children have at least one nightmare in any 6-month period. We found a large gender difference in the recall ("sometimes" or "often") of disturbing dreams at age 13 (boys: 25% vs. girls: 40%) and age 16 (20% vs. 40%) in the same cohort.[33]

Among adults, prevalence nevertheless is high (8 to 25%) when frequencies of "one or more per month" are considered, as in several studies of college and university students.[34–36] Even for higher frequencies—which likely correspond to much of the underdiagnosed adult *nightmare disorder* population (e.g., "one or more nightmares per week")—prevalence estimates are consistently elevated, for example, 2 to 6% in college students[34, 35] and about 4% in adults sampled randomly in Iceland, Sweden, Belgium,[37] and Austria.[38] When the question is put as "often or always," young adult prevalence is still 2 to 5%, whereas that of adult and elderly samples is only 1 to 2%.[29] These figures are completely in line with estimates that 4 to 8% of the general population have a "current problem" with nightmares, about 6% have a "past problem,"[39–41] and about 4% of patients spontaneously report a complaint of nightmares to their physicians.[42]

Nightmare prevalence may be elevated in clinical populations, for example, 25% of both chronic male alcoholic patients and female alcohol and drug users report nightmares "every few nights" on the Minnesota Multiphasic Personality Inventory (MMPI).[43, 44] However, other findings of elevated prevalence are difficult to assess because a frequency criterion is not specified, for example, approximately 24% of nonpsychotic patients seen in psychiatric emergency services report nightmares, but with an unknown frequency.[45]

Nightmare frequency is almost always assessed by retrospective self-report, for example, the number of nightmares in the previous week, month, or year. When compared to results from daily home logs, however, *retrospective self-reports underestimate current nightmare frequency by a factor of 2.5 in young adults*[36] *to a factor of over 10 in the healthy elderly.*[46] In general, a 1-month retrospective estimate is closer to the estimate provided by daily logs than is a 12-month retrospective estimate, and is thus the preferred standard for retrospective assessment. Note, however, that because nightmare prevalence and frequency are both seriously underestimated by such instruments, daily logs are the method of choice.

Pathophysiology

The one available laboratory study of nightmares[21] indicates moderate arousal—in the form of increased heart (HR) and respiration (RR) rates—during some nightmare episodes, but unexpectedly low arousal in most others. Although these early findings constitute the principal empirical basis for diagnostic guidelines such as the DSM-IV, there are serious problems with the work, such as the inclusion of psychiatric and post-traumatic stress disorder (PTSD) patients in the study sample.

We[47, 48] undertook a replication and extension of this early work with a nonpsychiatric sample. Recordings of HR and RR during nine subjects' nightmare and non-nightmare REM sleep episodes confirmed a moderate level of sympathetic arousal during some nightmares. Mean HR for nightmare REM sleep was elevated (by about 6 bpm) only for the 3 mins prior to awakening (Fig. 66–1). Most subjects (78%) showed HR acceleration during nightmare sleep, whereas the same number showed HR *decelerations* during non-nightmare REM sleep. Mean RR was only marginally higher for the last 3 min before awakening.

We also found changes in cortical activity during nightmares.[47] EEG samples from the last 2 min of nightmare sleep, when compared with control samples using a *linked-ear reference montage*, had generally higher absolute and relative alpha (8 to 13 Hz) power, but especially over posterior sites. Using a *scalp-average reference montage*, nightmare sections had higher fast beta (21 to 31 Hz) power over frontotemporal regions. The alpha pattern appears to be an amplification of the "classical posterior alpha" of quiet rest[49] that has been observed for normal REM sleep with an atypical extension from posterior into frontal sites.[50]

Our subjects demonstrated even less sympathetic arousal during nightmares than did those of Fisher et al., likely because they were relatively healthy and untraumatized. The co-occurrence of cortical activation with minimal autonomic change during nightmares may reflect a type of adaptive dissociation between imagery and emotion similar to that attained by behavioral therapies such as systematic desensitization and flooding. Sympathetic inhibition during cortical processing of *potentially* anxiogenic imagery may, in fact, "desomatize" that imagery.[21, 51]

Personality

Although many studies suggest weak to moderate relationships between nightmare frequency and measures of psychopathology,[22, 52, 53] others do not.[18, 36, 54] The seemingly weak relationships between nightmares and psychopathology likely reflect mediating factors, among which two—chronicity and distress—have been given some attention.

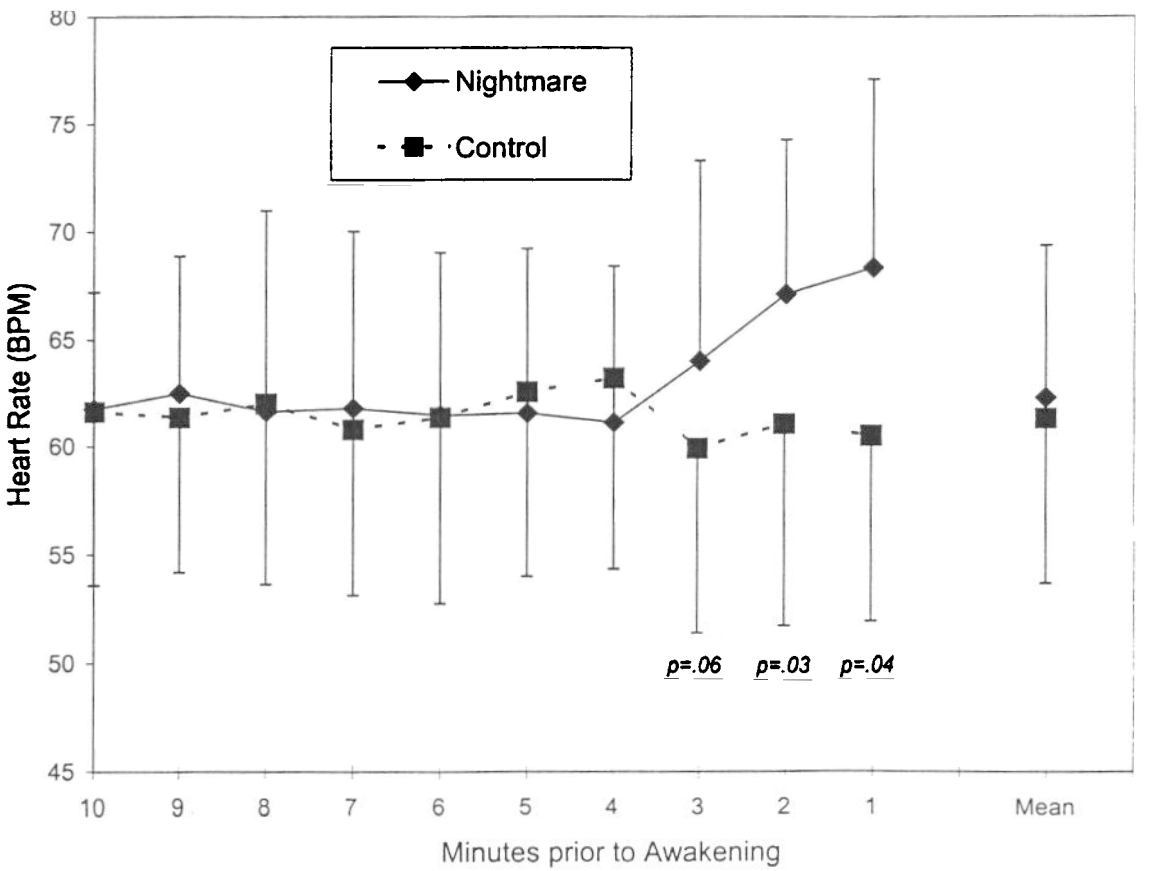

Figure 66–1. Average (SE) heart rate for 10 min before awakening in nightmare and non-nightmare REM episodes.

Nightmare Chronicity. Adults with a lifelong history of frequent nightmares compose a subgroup of idiopathic nightmare sufferers who manifest more psychopathological symptoms than matched controls without nightmares, for example, higher neuroticism and MMPI psychopathology scores.[52, 55] However, Hartmann[22] found that no one measure of psychopathology adequately describes these individuals. He and his colleagues proposed[22, 56] a general "boundary permeability" personality dimension, which at one extreme ("thin boundaries") characterizes lifelong sufferers. "Thin boundary" individuals are more open, sensitive, and vulnerable to intrusions than "thick boundary" subjects, rendering them more sensitive to events not usually viewed as traumatic.[22] Nightmare frequency is positively related to "thin boundary" scores,[57, 58] as well as to hypnotic ability, absorption in fantasy and aesthetic experiences, and creativity.[59]

Nightmare Distress. Nightmare frequency and waking distress over one's nightmares are not equivalent. Nightmare frequency is only moderately related to nightmare distress.[18, 36] Subjects may have only few nightmares (e.g., one per month) yet report high levels of distress, or report many nightmares (e.g., one or more per week) yet low levels of distress. It is the nightmare distress factor that is significantly related to psychopathology, not necessarily the frequency factor.[18]

Effects of Drugs and Alcohol

Numerous classes of drugs trigger nightmares and bizarre dreams, including catecholaminergic agents, beta blockers, some antidepressants, barbiturates, and alcohol. Among catecholaminergic agents, reserpine, thioridazine, and levodopa (L-dopa) are all occasionally associated with vivid dreams and nightmares,[60–63] as are beta blockers such as betaxolol, metropolol, bisoprolol, and propranolol.[64–68] Among the antidepressants, bupropion leads to more vivid dreams and nightmares than do other antidepressants.[69, 70] Bedtime administration of tricyclic and neuroleptic agents leads to a higher recall of frightening dreams than when these are taken in two daily doses,[71, 72] even though normal dream recall remains the same. Neuroleptic and tricyclic drugs appear to render dream affect more dysphoric, rather than to increase dream recall per se. Withdrawal from barbiturates is associated with REM rebound, vivid dreaming, and nightmares.[73, 74] A hypothesis has been advanced that barbiturate suppression of REM sleep, much as with alcohol, causes REM sleep rebound after discontinuation of the drug and consequently longer and more vivid dreams.[75] Several case studies have alerted physicians to the nightmare-inducing effects of specific substances (Table 66–2).

Sleep and dream disturbances follow alcohol withdrawal. Alcoholic patients report more vivid dreams and nightmares following withdrawal than they do during ingestion; although these are more frequent in the week following withdrawal, they are still present in subsequent weeks. The nightmares and insomnia of withdrawal can lead to resumed drinking in an attempt to normalize sleep. In fact, 29 (29%) of a group of 100 alcoholic patients reported further drinking to alleviate nightmares.[76] To illustrate, one 39-year-old man had no difficulty initiating sleep while abstaining, but he was awakened often by nightmares that prevented him from returning to sleep. "The nightmares were of somebody trying to hurt him. He would wake up thrashing and in a sweat and spend the rest of the night pacing and smoking. After he had started drinking . . . he could get no sleep unless he was drunk."[77(p499)] This relationship is also of critical importance because of the danger of alcohol self-medication for PTSD[78, 79] and for other nightmare-producing disorders.

Table 66–2. DRUGS REPORTED TO INCREASE FREQUENCY OF NIGHTMARES

Drug	Function	Reference
Thiothixene	Neuroleptic	88
Betaxolol	Beta blocker	89
Carbachol	Cholinergic agent	89
Fluoxetine	Antidepressant	90
Naproxen	Nonsteroidal anti-inflammatory agent	92
Verapamil	Antimigraine agent	93
Triazolam	Benzodiazepine hypnotic	238, 239 240
Nitrazepam	Benzodiazepine hypnotic	94
Erythromycin	Antibiotic	95 96

Vivid and macabre dreaming may be central to the delirium tremens (DTs) of acute alcohol withdrawal.[80] Because alcohol suppresses REM sleep, and the percentage of REM sleep (particularly at sleep onset) is extremely elevated in patients with DTs,[77, 81, 82] a theory of DTs hallucinations emphasizing REM rebound and intrusion of dreaming into wakefulness has been proposed.[83] Case studies strongly suggest that hallucinations may seem to continue *uninterrupted* from an ongoing nightmare.[77] DTs sleep appears to be a mixture of REM sleep with "stage 1 REM sleep with tonic EMG [electromyography]," which distinguishes it from the sleep of alcoholic patients without DTs.[84] Some have failed to observe this pattern, however.[85, 86] The similarity of the sleep of patients with DTs to that of REM sleep behavior disorder (RBD) has also been noted.[87]

The neuropharmacological basis of drug-induced or withdrawal-associated disturbed dreaming remains unclear. There may be an imbalance among various neurotransmitter systems such that nightmares are produced by reduced brain norepinephrine and serotonin or increased dopamine and acetylcholine, or a combination of these.[22]

Recurrent Dreaming and Nightmares

Many theories converge on the view that recurrent dreams reflect a lack of progress in resolving daytime emotional preoccupations. Failures in an adaptive function of dreaming may be indicated by a dream series

with a repetitive pattern, such as the stating and restating of a problem, yet no depiction of progress. Four points on the "repetition dimension" of dream content[97] may, in fact, reflect different degrees of psychopathological severity. *Repetitive dreams*, such as posttraumatic nightmares, depict—over numerous, highly similar versions—an unresolved experience, for example, a motor vehicle accident or war trauma. *Recurrent dreams* depict conflicts or stressors metaphorically over time, and are also primarily unpleasant in nature.[98, 99] The most frequent recurrent dreams of adults are pseudonightmarish: being endangered (e.g., chased, threatened with injury), being alone and trapped (e.g., in an elevator), facing natural forces (e.g., volcanic eruptions), losing one's teeth. Dreams with less recurrence—*recurrent themes* and *recurrent contents*—both extend over long series and are not so clearly associated with psychopathology. However, they may still have adaptive functions.[97]

Case studies have described changes in repetitive dream elements toward a progressive pattern as a function of successful psychotherapy,[100] as have laboratory studies of women dealing successfully with depressive reactions to divorce.[101, 102] Similarly, subjects with recurrent dreams show less successful adaptation on measures of anxiety, depression, personal adjustment, and life-events stress than those without recurrent dreams.[103, 104] The maintained cessation of recurrent dreaming may also reflect an upturn in well-being.[104]

Treatment

A wide variety of treatments for nightmares have been reported.[23, 105] Although psychotherapy aimed at conflict resolution has traditionally been the treatment of choice,[106, 107] it lacks empirical support. On the other hand, there is much support for diverse cognitive-behavioral interventions that require six or fewer sessions. Systematic desensitization and relaxation techniques, used to countercondition a relaxation response to anxiety-provoking nightmare contents, have been effective in several case studies and in two controlled studies.[54, 108] Imagery rehearsal, which teaches patients to change their remembered nightmares and to rehearse new scenarios, has reduced both nightmare distress and frequency in a recent series of controlled studies.[17, 109, 110] Other treatments with some empirical support are lucid dreaming,[111] eye movement desensitization and reprocessing,[112] and hypnosis.[113]

DISTURBED DREAMING IN OTHER SLEEP DISORDERS

The full extent to which dreaming and various sleep disorders influence one another remains largely unstudied. For several sleep disorders, disturbed dreaming has been identified as a primary symptom (Table 66–3). There are also a number of sleep problems for which disturbed dreaming is a salient factor even though its pathophysiological importance has not been determined. Finally, there are conditions for which dreaming is disturbed, but which nevertheless fall within the normal range of functioning. In all likelihood, whether patients with a particular condition spontaneously disclose that they also suffer from disturbed dreaming will be mitigated by various psychological, sociological, and cultural factors. Many patients

Table 66–3. SLEEP DISORDERS IN WHICH DREAMING IS DISTURBED

Sleep Disorder	Code	Stage	Prevalence	Essential Features
Nightmare disorder	307.47-0 (ICSD)	REM, 2	Children: 5–30%; young adults: 2–5% (see text)	Frightening dreams; awakening
Sleep terrors	307.46-1 (ICSD)	3, 4	Children: 3%; adults: ≤1%	Sudden arousal; piercing scream or cry; autonomic and behavioral manifestations of intense fear
Terrifying hypnagogic hallucinations	307.47-4 (ICSD)	Sleep onset	Rare; narcolepsy: 4–8%	Terrifying dreams similar to those from sleep
Post-traumatic stress disorder nightmares	309.81 (DSM-IV)	REM, 2, 3, 4	Lifetime: 1–14%; at-risk subjects: 3–58%	Persistent reexperiencing of a traumatic event, including recurrent nightmares
Narcolepsy dreams	347 (ICSD)	REM	0.03–0.16%	Excessive sleepiness, cataplexy, sleep paralysis, hypnagogic hallucinations
Sleep paralysis	780.56-2 (ICSD)	Sleep onset or offset	Isolated, normals; 1/lifetime in 40–50%; familial: rare	Paralysis of voluntary muscles; acute anxiety (with or without dreams) is common
REM sleep behavior disorder	780.59-0 (ICSD)	REM	Rare	Intermittent loss of REM sleep; muscle atonia; elaborate motor activity associated with dream (nightmare) mentation
Sleep starts	307.47-2 (ICSD)	Sleep onset	Lifetime: 60–70%; extreme form: rare	Sudden brief jerks associated with sensory flash, hypnagogic dream, or feeling of falling

DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*[20]; ICSD, International Classification of Sleep Disorders.[160]

attribute personal or spiritual significance to dreams or consider them to reflect their "state of sanity" and may therefore hesitate to speak openly about them. Sensitivity to such factors could substantially facilitate research on, and treatment of, dream disturbances.

Post-Traumatic Stress Disorder Nightmares

Recurrent anxiety dreams plague the vast majority of PTSD patients.[114] Disturbed dreaming may, in fact, be the hallmark of delayed PTSD[115, 116]; the content of disturbing dreams (e.g., reliving combat), as well as associated sleep disruptions (e.g., nocturnal awakenings, fear of sleep),[117, 118] may reinforce the illness. A related hypothesis is that disruption of REM sleep control mechanisms—including those governing dreaming—is central to PTSD pathophysiology.[119] Evidence that PTSD produces a variety of changes in REM sleep architecture and in the recall, content, and affective quality of dreaming is consistent with both of these hypotheses. There is evidence of decreased dream recall from REM sleep,[120, 121] as well as increased nightmares or sleep terrors in early REM sleep episodes[122] and in stages 2, 3, and 4 nonrapid eye movement (NREM) sleep.[120, 123, 124] There is also either a decrease[121, 125] or an increase[120, 123] in REM sleep latency, an increase in REM sleep density,[120, 121] a decrease in the number and length of REM sleep periods,[126, 127] and a decrease in total REM sleep time.[120, 128] Any of these associated changes in REM sleep might account for, or be a consequence of, the characteristic dream disturbance in PTSD. The fact that therapeutic interventions directed specifically at nightmares (e.g., imagery rehearsal) can significantly reduce their frequency and associated sleep problems[129] is also consistent with the notion that PTSD is, at root, a disturbance of dreaming or REM sleep, or both.

It is noteworthy that PTSD patients sometimes report nightmares after awakenings from early in the sleep episode,[130] including after awakenings from NREM sleep,[120] which is where sleep terrors are typically found.[131] In fact, PTSD nightmare-associated behaviors, such as autonomic activation, gross body movements, confused arousal, and partial amnesia, greatly resemble those of sleep terrors,[132] suggesting that they may be a phenomenon intermediate between idiopathic nightmares and sleep terrors. A more comprehensive definition of overlapping parasomnic states may be required to fully explain PTSD.[133]

Dream-Interruption Insomnia

Greenberg[134] proposed a subcategory of insomnia, dream-interruption insomnia, on the basis of five patients who reported awakening from sleep "every hour or so" throughout the night. Four of these patients reported a period of intense nightmares just before onset of their insomnia; nightmares then disappeared but subsequently reappeared after treatment with either chlordiazepoxide (Librium) or diazepam (Valium) in three of four cases. This pattern suggested that the awakenings might be a means of defending against anxious dream content, a type of "preemptive strike" against impending nightmares. In the laboratory, Greenberg's patients demonstrated repeated spontaneous awakenings from REM sleep, that is, on an average of 70% of REM episodes, but no consistent reduction in REM sleep time. Treatment reduced the number of REM awakenings almost by half and reduced REM sleep time slightly.

Three cases of dream-interruption insomnia were described by Cartwright[135] and two by Lavie et al.[128] In the latter study, 2 of 11 patients under study for trauma manifested REM-related awakenings; these were also the only two patients who experienced war-related nightmares in the laboratory. Interestingly, most REM interruptions in this study were preceded by increased HR, as is the case for nightmare awakenings.[21] Cartwright[135] reported that psychotherapy focusing on the content of patients' dreams and nightmares is successful in alleviating their insomnia. The notion that insomnia may be due to the expression of conflicts in dreams has been observed by clinicians, even prior to the discovery of REM sleep.[136]

Out of 983 consecutive patients seen at the Sacré-Coeur sleep clinic in Montreal from March 1994 to August 1997, 14 (1.4%) were found to conform to a pattern suggestive of dream-interruption insomnia (mean age: 53.5 ± 15.7 years). Twelve of these patients (85.7%) were male; 2 (14.3%) were female. Of 10 patients who had neither apneas (n = 1; index greater than 5) nor periodic limb movements in sleep (n = 3; index greater than 10), two distinct, but not necessarily independent, patterns of REM interruption were observed (Fig. 66–2). One (panel A) consists of recurrent awakenings early in the REM episode and subsequent curtailment of the episode. This appears as low sleep efficiency, low REM percentage, and high REM efficiency. The second pattern (panel B) is the more common of the two and consists of repeated shorter arousals throughout the REM episode. This appears as moderate to high sleep efficiency, high REM percentage, and very low REM efficiency.

With so few clinical reports of dream-interruption insomnia, its exact prevalence is not known. However, if the problem is, indeed, a variant of nightmare disorder, its prevalence may be substantial, given the high co-morbidity of insomnia with nightmares in the general population. In one sample of 1049 French insomnia patients, 18.3% suffered from nightmares.[137] Many others have confirmed relationships between nightmares and variables associated with insomnia (e.g., sleep-onset latency, night awakenings, restless sleep).[35, 117, 138] Successfully treated nightmare patients also often report improvements in sleep quality.[17, 139]

Whether or how nightmares may trigger dream-interruption insomnia is not known. Although it is clear that nightmares may generate "sleep distress"[18] or a disproportionate fear of the dark,[140] which later may generalize into sleep-onset difficulties, an ability to preempt nightmares would seem to require sustained vigilance or self-monitoring throughout sleep. Another possibility is that inhibitory REM sleep pro-

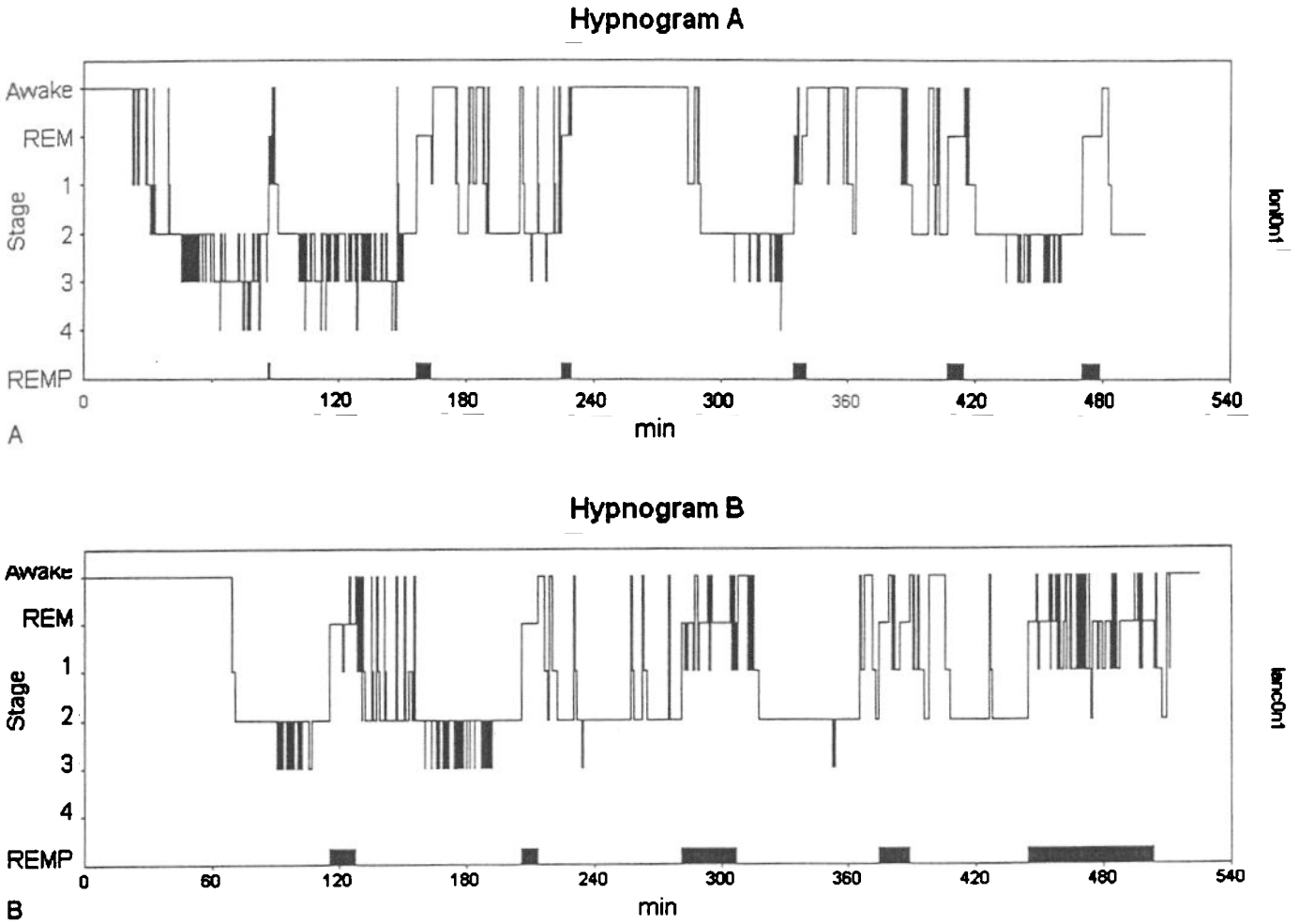

Figure 66–2. Hypnograms of two forms of dream-interruption insomnia. *A* illustrates a form consisting of recurrent awakenings early in the REM episode with subsequent curtailment of the episode. This appears polysomnographically as low sleep efficiency, low REM percentage (REMP), and high REM efficiency. *B* illustrates the more common of the two forms: a pattern of repeated brief arousals throughout the REM episode. This appears as moderate to high sleep efficiency, high REMP, and very low REM efficiency.

cesses are unable to completely suppress the "surge-like" nature of anxious dream content[12] or that some particularities of the dream content are more prone to provoke REM sleep microarousals or awakenings. The dream content of some insomniac patients may also be so tightly coupled to activating processes that even minor dream anxieties may trigger an arousal. This idea is supported by the finding that for insomnia patients vivid, frightening, and disrupted dreaming is correlated with shorter REM segments and higher REM densities, whereas for narcolepsy patients it is not.[141] Yet another possibility is that insomnia produces nightmares, particularly insomnia that involves sleep fragmentation and maintenance difficulties. Sleep fragmentation is also known to characterize subjects with frequent snoring—the latter, in turn, is strongly correlated with nightmares.[38, 142, 143] Induced sleep fragmentation also produces sleep paralysis experiences, most of which involve anxiety or terror.[144]

Existential (Grief) Dreams

Employing a method of polythetic (multiattribute) classification, Kuiken and co-workers identified a category of experiences referred to as *existential* dreams.[16, 145] They are characterized by distressing emotions (e.g., sadness, despair, guilt), salient bodily feelings (e.g., ineffectuality of action, paralysis), and failures in goal attainment. There is also separation and loss, the appearance of deceased family figures, and an increased sensory vividness that may culminate in an intensely real ending—often with an awakening. This dream type is distinct from the *anxiety* type, identified by the same analytical procedure, which resembles the classic idiopathic nightmare. Existential dreams resemble nightmares in their emotional and sensorial intensity and in their association of vivid apparent reality with arousals from sleep. They differ from them primarily in the specific emotions, bodily feelings, and typical themes that they depict. The clinical importance of existential dreams is their appearance during bereavement, which involves a range of distressing emotions other than fear. Bereavement is also characterized by hallucinations and vivid feelings of the presence of the deceased in both dreaming and waking states.[146, 147] These closely resemble the *presence* dreams of persons with narcolepsy and sleep paralysis (see Narcolepsy).

Existential dreams are common throughout the bereavement period (0 to 5 years after a loss), whereas other dream types are more salient either immediately after (anxiety dreams) or from 3 to 5 years after (transcendent dreams) a loss.[148] The sense of presence of the deceased also remains constant throughout bereavement, whereas hallucinations of the deceased diminish over time.[149] Patients report gaining both personal and spiritual insight from existential dreams, especially 6 to 12 months following their loss.[148]

Epic Dreaming

Long, rambling dream narratives are not unusual in laboratory studies. Nor is the occasional patient complaint of "dreaming all night long" and feeling tired in the morning as a result. In a series of 20 patients, Schenck and Mahowald[150] identified a clinical entity—"epic dreaming"—in which relentless dreaming and daytime fatigue are associated in a chronic fashion.[151] These patients feel that they dream all night and complain of marked daytime fatigue. Their dreams typically involve constant, trivial, or banal physical activity, such as repetitive housework or endless walking through snow or mud, although intense sensations of acceleration or spinning can also occur. Patients describe having a "dream motor running all night long," or "not having the mind shut down during the night."[150] These dreams occur nightly in 90% of affected patients and 4 nights a week in the other 10%.[150] The repetitive quality of epic dreams is reminiscent of some recurrent dream themes and even of some nightmares. Nightmares are, in fact, reported by 70% of these patients, but the epic dreaming pattern is the primary complaint in most cases.[150] Emotional arousal is strangely absent from epic dreams. Nonetheless, the associated sensations of fatigue or exhaustion, as well as the seemingly endless repetitiveness of the dreams, may engender distress and motivate a clinical consultation.

In most cases, polysomnographic evaluation reveals no clinical abnormalities, apart from occasional PLMS (10%) and sleep-disordered breathing (10%); the problem is also more common in women (85%) than in men (15%).[150] The underlying mechanisms of the disorder remain unknown. However, comparative studies of epic dreams with normal dreams, nightmares, and recurrent dreams might shed light on possible pathophysiology, for example, whether the recurrent motor imagery differs from that found in normal dreaming[152] or whether epic dreams are simply long nightmares with an absence of affective intensification.

Changes in dreaming that are possibly related to this disturbance occur in brain-lesioned patients[153] and include increases in both the frequency and the vividness of dream imagery.[154, 155] Either of these changes might render dreaming more memorable and more likely to be perceived as having been continuous through the night. For example, Solms's patient 136, who sustained severe bilateral brain damage following a motor vehicle accident, reported dreaming "far more frequently than before" with the periodic impression of "dreaming all night."[153(p180)] Brain-damaged patients also may report more continuous dreaming, that is, dreaming the same content throughout the night, despite intervening episodes of wakefulness.[153–155] Although brain lesions are not typically suspected in epic-dreaming patients, the neuropsychological evidence points to involvement of the anterior limbic system and suggests that further clues to its cause may be found in associated emotional disturbances (e.g., alexithymia, dysthymia) in these patients. Treatments for epic dreaming (cognitive, hypnosis, relaxation, medications) have proved largely ineffective.[150]

Sleep-Wake Transition Disturbances

Several interrelated dream disturbances occur at the transitions into or out of sleep. These share the attributes of vivid, often intensely real, sensory imagery and disturbing affects such as fear. It may be their close proximity to wakefulness that colors these images with a distinctive reality quality, that is, there may be an interleaving or boundary dissociation of sleep-wake processes at this time. There might be, for example, an intrusion of a reality perception into sleep or of a dreamed object or character into wakefulness (cf. references 156, 157). The nature of the intruding components may well determine the distinctiveness of the transition disturbance, including typical or odd combinations such as a frightening hypnagogic image terminating in a sleep start or incomprehensible sleep-talking accompanying sleep paralysis.

Sleep Starts

Sleep starts, also known as predormital or hypnic myoclonus or hypnagogic or hypnic jerks, are brief phasic contractions of the muscles of the legs, arms, face, or neck that occur at sleep onset. They are often associated with brief, albeit vivid and impactful, dream events. Perhaps the most common of these events is the illusion of suddenly falling that incites a vigorous and startling jerk. Brief sensory flashes also occur; sometimes they may be somatic in nature and somewhat difficult to describe. A subject in Oswald's study, for example, reported "a strange sensation of something passing or flowing through his body, something 'hot' and 'bright.'"[158(p94)] The patients of Sander et al. reported "electric shock-like sensations in the chest" and "focal itchy, sharp, pinprick-like sensations that may occur anywhere."[159(p690)] More complex hypnagogic images may also accompany sleep starts.

Mild starts are a normal—even universal—feature of falling asleep, and a prevalence as high as 60 to 70% has been cited.[160] More extreme starts that can engender difficulties in initiating sleep[161] have been described by Critchley:

> I refer to violent, abrupt sensory and motor phenomena which come on quite unexpectedly, so as to shatter the background of sleeping. The sudden event

> of a hallucinatory crash of noise or bang localized within the skull in an explosive fashion is not unfamiliar. Or it may be a sudden blinding flash of light.[162(p105)]

Critchley's claim that these dramatic sensory phenomena are more common in subjects with sensory problems, for example, loud noises among deaf persons, has not been systematically studied.

It is not known whether chronic sleep starts are primarily a disturbance of motor systems, perhaps akin to PLMS, or a disturbance of imagery systems, such that intense images provoke the disruptive reflex activity. Electroencephalographic (EEG) events have been noted to accompany sleep starts,[158] but, more systematic studies of sleep starts and the variety of EEG burst patterns that can accompany drowsiness[163] are needed to clarify this issue.

Terrifying Hypnagogic Hallucinations

Terrifying hypnagogic hallucinations (THHs) are terrifying dreams similar to those from REM sleep; after a sudden awakening at sleep onset there is prompt recall of frightening content.[160] As they arise from sleep-onset REM (SOREM) episodes, they may be aggravated by factors that predispose to this type of sleep, for example, withdrawal from REM-suppressant medication, chronic sleep deprivation, sleep fragmentation, narcolepsy. Other sleep and medical disorders may accompany the condition. Content analyses of THHs are lacking, but clinical and anecdotal reports suggest that the themes of attack and aggression found in REM sleep nightmares are common. THHs are perhaps more anxiety-provoking than most nightmares because of (1) a vivid sense of reality related to their close proximity to wakefulness, and (2) frequently accompanying feelings of paralysis. These features are illustrated in the two following examples.

A Case of Severe THH in a 36-Year-Old Woman With PTSD. At age 19, she was abducted and for more than 3 days, raped, beaten, burned, and subjected to death threats (Russian roulette) by motorcycle gang members. Although she regularly reexperienced these horrors through flashbacks and nightmares, even worse were the THHs with paralysis occurring as she returned to sleep *after* a nightmare. She felt as if she were awake, aroused, and terrified, yet unable to move; time seemed to be extremely drawn out as she experienced "replays" of her torturous experience in slow motion.[166]

THHs in a Healthy 26-Year-Old Practitioner of Esotericism. She reported having had several THHs, but not daytime sleepiness or cataplexy. Her THH included paralysis and vivid tactile, thermal, and auditory images associated with the sense of an assault by an intruder:

> I had just closed my eyes when suddenly I felt the presence of a man behind me. He held me by the hair and pulled it. He had a knife to my throat; I could feel the cold of the blade. He threatened me by saying: "You bitch. If you try to move I will kill you." I tried to scream but was completely unable. I knew it must be an entity of some kind which would harm me if the dream continued, so I made a huge effort to move my arms and woke up out of the dream.

The suffering during such episodes is exacerbated by the victim's simultaneous sense of wakefulness and inability to move or call for help. Further, the intense anxiety may seriously disrupt sleep. For example, recurrent THHs may disrupt sleep onset sufficiently to produce sleep-onset insomnia.[160] And, as the second example illustrates, the realism of the dream leads readily to attributions about "real" assaults by spiritual entities, especially if the individual lives in a context conducive to such beliefs.[165–167] Prevalence figures for THHs are not available, but an estimate for patients with narcolepsy is 4 to 8%.[29]

Sleep Paralysis

Physiological mechanisms of sleep paralysis (SP) have been studied in some detail,[168, 169] but the relationship of SP to disturbed dreaming remains unclear. SP is a cardinal symptom of narcolepsy and also occurs in healthy persons. Patients seldom present for symptoms of SP alone, although they may when the frequency of their episodes increases, for example, to one per day. The clinical disorder of *sleep paralysis*, either *familial* or *isolated*, occurs at sleep onset or upon awakening from sleep, whereas "normal" feelings of paralysis or ineffectuality are a common feature of dreaming more generally[16] and, especially, of nightmares.[170] According to some,[171] paralysis feelings render hypnagogic hallucinations threatening or terrifying in nature. Frightening SP episodes have also been referred to as *sleep paralysis nightmares*, and their role in the misdiagnosis of hysteria and allegations of abuse described.[172]

Although psychopathology does not seem to be a direct cause of SP,[173] sleep-related life habits are associated with their occurrence in non-narcoleptic populations,[174] for example, poor sleep quality, insufficient sleep, and a proclivity to daytime sleep—all factors that may favor the occurrence of SOREM episodes.[174] In fact, isolated SP episodes have been elicited experimentally (on 72% of trials) by a schedule of sleep interruptions producing SOREM.[144] Of the six SP episodes induced by this method, five occurred during a SOREM episode. The one exception suggests that there may nevertheless be other, subtler factors contributing to SP.

One such factor may be psychopathological, although this likely influences SP indirectly, by its influence on stress and overwork and its subsequent disruptive effects on sleep.[173] Another factor may be rapid resetting of the circadian clock, as is the case with rapid time zone change,[175] or sleeping in the supine position.[173, 176] However, the nature and intensity of imagery generation in both wakefulness and sleep also appears to play a role in the occurrence and frequency of SP. *Imaginativeness*, as indexed by standardized questionnaires, and *vividness of nighttime imagery*, as measured by self-reported frequencies of nightmares and sleep terrors and vividness of dream imagery, are

two personality factors found to be *most* predictive of SP occurrence and frequency in a large multivariate study of college students.[173]

SP is typically accompanied by vivid hypnagogic hallucinations. In fact, it is rare to find SP in the absence of other hallucinatory activity. Spanos et al.[173] found that 1.6% (of 387) subjects experienced SP without other attributes. Similarly, of the six experimental SP episodes described, all but one included auditory or visual hallucinations and unpleasant emotions.[144] On the other hand, it is not true that most hypnagogic hallucinations are accompanied by SP. Given this association of SP with hypnagogic hallucinations, it is unclear whether SP is, as some have suggested,[166, 177] a *type of perception*, that is, of ongoing REM sleep muscle atonia. Paralysis sensations—much like dreamed emotions and other sensations—*may be at least partially hallucinatory*. This could account for why SP is often reported to be associated with odd feelings of oppression, pressure on the chest and other body parts, even violent choking and beating. It could also explain how paralysis and felt ineffectuality appear in such a variety in routine dreams and nightmares.[16]

Prevalence Considerations. Multiple SP episodes have a low prevalence, occurring "often or always" in only 0 to 1% of young adults and "at least sometimes" in 7 to 8% of young adults.[29] On the other hand, the International Classification of Sleep Disorders-Revised (ICSD-R)[160] cites the lifetime prevalence of SP at 40 to 50%, which is somewhat higher than other estimates. We found rates of 25 to 36% in surveys of three university psychology student groups (Table 66–4), which are similar to the value of 26% reported for 208 Japanese undergraduates,[178] of 21% for 1798 Canadian undergraduates,[173] and of 34% for 200 sleep-disordered patients.[178a]

Simple methodological differences may explain some of the discrepancies among these estimates. Even a minor change in wording on questionnaires (e.g., replacing "transient paralysis" with "condition") can increase estimates by 5% (from 26 to 31%); use of a culturally identifiable term for SP, such as *kanashibari* in Japan, can increase the estimate by an additional 8% (to 39%).[178] The latter estimate corresponds well with those drawn from other cultures, for example, 37% of 603 Hong Kong undergraduates reporting at least one episode of "ghost oppression," the Chinese equivalent of *kanashibari*.[179] One survey of Newfoundland villagers found as many as 62% admitting to "Old Hag" attacks.[180] Much more work is needed to explain this large variability and to clarify the role of sociocultural factors in the experiencing and reporting of SP.

Somniloquy With Dream Content

Sleep-talking has been observed in all stages of sleep, but especially in NREM stages 2, 3, and 4.[181] Arkin[181] identified various orders of concordance between sleep speech and later dream reports. For first-order concordances sleep speech exactly matches content in the dream, for example, a subject shouting "No! No!" who dreamed of shouting these words when seeing her baby fall from the bed. For second-order concordances a conceptual or emotional link between sleep speech and the dream is preserved, for example, a nightmare patient dreamed repeatedly of trying to yell "Burglars!" but in reality called out "Mama!" Absence of concordance is also seen: one study of 28 chronic sleep-talkers found it in 16.7% of REM, 32.9% of stage 2, and 38.5% of stage 3/4 sleep episodes.[181] As with SP, it remains unknown why imagery and behavior are dissociated in this manner.

False Awakening

False awakenings are nowhere classified as pathological per se, but they are nevertheless dreaming disturbances that can produce anxious reactions. Two types of false awakening have been distinguished primarily on the basis of the degree of anxious affect associated.[157, 182] Both types typically depict the person as (falsely) waking up from sleep or, in variations, from a dream, and may engender some confusion while dreaming about whether one is actually awake or asleep.

Type 1 awakenings are the more common type and usually depict realistic instances of the person waking up in his or her habitual bed followed by, in many cases, depictions of activities such as dressing, eating breakfast, and setting off for work. Some discrepancy in the imagery may fully awaken the person with the surprising realization that it was "just a dream." The dreams are often repetitive, depicting a succession of awakenings or of setting off for work. The philosopher Bertrand Russell, after having undergone anesthesia, reported seeming to have awakened hundreds of times.[183]

Type 2 false awakenings are less pleasant than type 1 in that the apparent awakenings in bed are accompanied by a "stressed, electrified or tense" atmosphere

Table 66–4. LIFETIME PREVALENCE IN FOUR SAMPLES OF SLEEP PARALYSIS ITEM "BEING HALF AWAKE AND PARALYZED" (TYPICAL DREAMS QUESTIONNAIRE)

	N	Men	Women	Both	Reference
Clinical sample	200	31.6	37.2	34.0	241
University sample 1	132	31.1	37.9	35.6	242
University sample 2	388	18.8	26.7	24.7	Nielsen, Zadra, & Smith (unpublished data, 1998)
University sample 3	107	26.3	30.4	29.0	243
Totals/Averages	827	27.0	33.1	30.8	

and feelings of "foreboding or expectancy" that may be "apprehensive or oppressively ominous."[157] There may be hallucinations of ominous or anxiety-provoking sounds, or strange apparitions of persons or monsters.

Both type 1 and type 2 false awakening are frequently associated with experiences of separating from the sleeping body, or *out-of-body experience* (OBE), and of becoming aware of dreaming while dreaming, or *lucid dreaming*.[157] False awakenings are clearly not always about a person's own home and bed, because our research team has elicited them in laboratory subjects.

Pathological and Disturbed Lucid Dreaming

Lucid dreaming is occasionally associated with disturbed or pathological reactions. Typically, lucid dreaming is perceptually vivid—the dreamer often feels awake—with a limited capacity to control the unfolding of some dreamed events. It is often spontaneously triggered within a nightmare and can be used in a therapy context to resolve the distressing contents of recurrent nightmares.[111] However, some have reported diverse negative reactions associated with lucid dreaming, including a type of "burnout" resulting from too frequent intentional use of the mental state, mental confusion, and "quasi-psychotic splits with reality" induced by the overlapping of perceptual and dream-like mentation, and intense fear associated with the loss of control of the vivid dream contents.[184]

One reported case with polysomnographic evaluation involved a 28-year-old single man with lifelong lucid dreaming who presented to a clinic because 2 years earlier he began to lose control of his lucid dreams.[185] He could no longer escape from dream aggressors, or avoid their beatings and shootings. He experienced uncontrollable sobbing and "being beaten to a pulp."[185] He would awake feeling that he "had been hit by a truck," with severe headaches, muscle pains, and exhaustion. Polysomnographic and psychiatric tests proved normal, with the exception of some MMPI abnormalities. Psychotherapy and hypnotics were ineffective, but the antiepileptic diphenylhydantoin eliminated his symptoms. Adverse reactions to lucid dreaming appear to be rare, but they have not been studied systematically in either normal subjects or at-risk populations.

Narcolepsy

General. During their nocturnal sleep episodes, people with narcolepsy may experience frequent dreams that are intense, vivid, and bizarre.[20, 186] Compared with those suffering from insomnia, patients with narcolepsy report more frightening, recurrent dreams.[141] These may become so vivid and realistic that the patients confuse dreaming with waking reality, incorrectly remember dreams as real events, and develop concerns about losing their sanity.[171, 187] Although such confusions have led to false allegations of sexual abuse,[188] dream-reality confusions can also occur in healthy subjects.[189]

The cause of disturbed dreaming in narcolepsy likely has more to do with the fragmentation of REM sleep[190] than it does with increases in the intensity of REM sleep phasic activity; REM density in persons with narcolepsy is in the normal range.[191, 192] In this respect, disruption of REM sleep mechanisms in narcolepsy resembles that of dream-interruption insomnia (see above).

Patients with narcolepsy are thought to suffer from frightening and macabre hypnagogic hallucinations to a greater extent than are others.[193] These may be as terrifying as REM sleep nightmares.[171] Studies of their content[191, 194] reveal differences from the nocturnal dreams of healthy subjects: they contain less visual and motor imagery, more negative emotions, and more paralysis feelings. Nevertheless, SP and hypnagogic hallucinations occur almost exclusively during SOREM episodes, as opposed to nocturnal REM sleep.[169] A number of characteristic themes have also been described[193, 195] that seem typically nightmarish in nature, for example, human aggressors; threatening insects, snakes, and other animals; and oppressive presences. The majority of hallucinations reported by patients with narcolepsy concern human beings (76%), animals (29.2%), reptiles (22.4%), and monsters or ghosts (21.6%).[195]

Presence Imagery. Dreaming that a presence has entered the premises is closely associated with SP and is thus one of the most frequent hallucination themes reported by persons with either narcolepsy or isolated or familial sleep paralysis.[170, 196, 197] The intruder is often simply sensed as a presence moving about near the bed but without much visual or auditory detail (see reference 193 for examples). More commonly, the presences are associated with intense emotion. They may be perceived as threatening, ransacking the premises, or physically assaulting the patient.

Persons with severe narcolepsy may experience such horrors almost daily. Their hallucinatory vividness may cause severe confusion about the objective reality of events. Thus, if a proper diagnosis is not achieved and the patient not informed about the nature of the hallucinations, there may be a substantial emotional toll. Patients (and sometimes even physicians) may take the hallucinations to be evidence of impending madness, they may seriously misinterpret social events, and they may fail to benefit from treatment because of pressure to conceal their symptoms.

The more frequent occurrence of paralysis, hypnagogic hallucinations, presence imagery, and nightmarish dreaming in persons with narcolepsy is likely due to the fact that the latter tend more easily to shift directly into REM sleep. There is thus greater opportunity for the intercalation of dream contents with waking perceptions. Comparisons between SOREM dreams and regular REM dreams of persons with narcolepsy would be helpful in elucidating the mechanisms of these hallucinatory processes as well as evaluating the relative impact of these disturbed dreams on daytime functioning and distress.

REM Sleep Behavior Disorder

RBD occurs primarily in men over the age of 50 years and is characterized by excessive motor activity and dream-enacting behaviors.[198, 199] (See Chapter 64). These behaviors are often violent and related to ongoing nightmarish dream content. Patients do not appear to enact all of their dreams; just those that involve themes of confrontation, aggression, and violence. A "stereotypic nightmare" of pursuit and threat accompanying RBD episodes has been described.[198] It is visually vivid, with motor hyperactivity in both the dreamed self and other characters.[200] Although nightmares are commonly reported by RBD patients, not all patients recall episodes of overt dream enactment behaviors. Spouses, however, can infer dream content by observing the movements of RBD patients.[200]

The theme of pursuit and assault is the most common typical dream theme reported in our surveys of normal and sleep-disordered individuals (cited earlier); it is possible that the stereotyped disturbed dreaming in RBD is an amplified variation of a normal phenomenon and not a central pathophysiological mechanism of the disorder. Or, it may be that the pervasive threat depicted in RBD dreams reflects either the unique physiological substrate of RBD (sudden muscle tone intrusions into REM sleep) or the menacing psychosociological nature of the disorder (ongoing stress on family integrity). Studies of dream content and sleep-dream relationships are severely lacking.

Clonazepam not only suppresses the abnormal behaviors of REM sleep but also reduces the disturbing dreams associated with them[201, 202]; cessation of the medication is followed by a recurrence of both abnormal behaviors and nightmares.[201]

Sleep Terrors, Somnambulism, and Sleep Violence

Two sleep disorders with similar behavioral and psychophysiological features both implicate disturbed dreaming. Both disorders—sleep terrors and somnambulism—occur in NREM sleep, typically stage 4 sleep early in the night. They have been described as disorders of arousal,[203, 204] or more recently as "partial arousals,"[205] because of the autonomic and motor arousal that propels the patient toward an incomplete wakefulness. Gastaut and Broughton described the "arousal response" as a state of mental confusion and disorientation with automatic behavior, nonresponsiveness to external stimuli, difficulty in being awakened, retrograde amnesia for the episode, and fragmentary or absent recall of dreams. Further, the patient appears to be hallucinating yet displays a waking-like alpha pattern.[206] Despite this appearance of dissociated hallucinating, it was thought that the role of dream content in the arousals was minimal.[203] Later evidence (e.g., see reference 206) suggested that some type of dreaming may accompany most arousals, even though recall for it is impaired. In extreme cases of somnambulism with violence, dream content is often suspected as an immediate cause; indeed, in many cases a macabre nightmare parallels the violent act.

Sleep Terrors

The heart-wrenching screams and terrified facial expressions of a child or adult enduring a sleep terror would prompt a naive observer to conclude that some fearful dream had triggered the reaction. However, the physiological characteristics of terrors are substantially different from those of idiopathic nightmares (Table 66–5) and victims of sleep terrors seldom report that elaborate nightmares are the principal cause of their arousal. Many do report cognitive elements that seem scary enough: glimpses of a monster or strange man, the walls "closing in," and so forth. Over 50% of terror awakenings may produce cognitive activity of some form.[206] This estimate is surprisingly similar to the estimate of recall of mental content after awakenings from NREM sleep more generally.[207] The mental component of terrors may thus stem in part from processes also driving NREM dreaming. Fisher et al.[21] identified two

Table 66–5. DIFFERENTIATION OF NIGHTMARE DISORDER FROM SLEEP TERROR

	Nightmare Disorder	Sleep Terror
Sleep stage	Stage REM (or 2) second half of night	Stages 3 and 4 first half of night
Sleep behaviors	Not typical	Screaming, bolting, etc.
Autonomic activation	None to moderate: increased heart rate, mild or no increase in respiration, eye movement density	Moderate to extreme: tachycardia, rapid breathing, sweating
Awakening	Fully alert, continuing distress	Disorientation, confusion Unresponsive to stimuli
Mentation reports	Detailed, story-like dreams	Absent or fragmentary images, dreams in some cases
Emotions	Primarily fear, anxiety, anger or rage, disgust	Primarily terror, fear, disgust
Return to sleep	Sometimes difficult	Usually easy
Experimental elicitation	Not clearly established	With sudden loud buzzer in some subjects
Complications	Insomnia, sleep avoidance, daytime anxiety, distress	Injury to self or other due to nocturnal behaviors

types of terror-associated dream contents: (1) imagery occurring simultaneously with or just before the arousal, and (2) imagery elaborated subsequent to the awakening and associated with the visible physiological manifestations of anxiety (e.g., fear of suffocating related to sudden respiratory changes).

In many of the reports in Fisher et al., specific hallucinatory contents could be identified that appeared to trigger the terror event.[21] For example, one young man's recurrent, terrified awakenings were regularly associated with images of choking, such as swallowing nails or choking on electrodes. The occurrence of such imagery triggers remains consistent with the disorder of arousal model; the arousal trigger may be cognitive, such as a frightening image, rather than either physiological, such as an apnea,[208] or external, such as a loud buzzer.[206] It is also possible that the relative paucity of dream recall after a terror is due to retrograde amnesia accompanying these awakenings rather than to an absence of content per se. It may be that the extreme autonomic activation of a terror arousal disrupts short-term memory to a great extent. Amnesia has also been suggested to account for lower rates of dream recall from NREM (vs. REM) sleep.[209] Some atypical cases of terror[210] demonstrate little disorientation on arousal and dreams with hallucinatory vividness. However, relatively little data exist on this question.

Somnambulism and Sleep Violence

Somnambulistic actions may be complex, such as dressing or driving a car,[211] and may be performed with substantial dexterity[212]; more often, however, they are mundane, stereotyped, and accompanied by amnesia. It is thus difficult to determine the involvement of cognitive activities in these actions. Although somnambulistic episodes—like nightmares—rarely occur in the laboratory,[208, 213] questionnaires in combination with ambulatory recorders have been useful in eliciting brief imagery reports. Some reports are nightmarish, for example, "someone breaking in," "stones shattering my window," "ceiling falling on bed," "earthquake with bed moving," while others are of more commonplace events, for example, "feed the child," "take the dog out."

In more extreme cases of somnambulistic violence, disturbed dreaming is considered to be a contributing factor.[214] Many case reports[215] suggest that disturbed dreaming can play a considerable role, especially in violent incidents involving complex fight-or-flight reactions. Such reactions do suggest that the patient is reacting to a hallucinated threat. A detailed case study[215] illustrates this point. A 43-year-old man with a benign medical and psychiatric history reported sleep behaviors arising at age 5 and continuing to the present (frequency: five to seven per week). These were often violent excursions from the bed, with complex behaviors suggesting nightmares, for example, stabbing at furniture or the air with knives, swinging and throwing baseball bats, running out of the house. He had suffered numerous lacerations, ecchymoses, and sprained ankles; his wife had suffered bruises, strangulation, and being hurled into the air, among other insults. At age 25, the patient enacted a dreamed attack by an intruder in his house. He describes how the behaviors seemed to stem from disturbed dreaming:

> . . . he left the house by running through a screen door, entered his automobile and drove 8 kilometers to his parents' home without an accident, and awakened them by pounding on their door.[215(p766)]

While driving, he remembers being aware only of driving to his parents' house to escape an intruder in his house.

He also attempted to strangle his wife while dreaming that he was protecting her. According to his wife:

> He later told me that he was dreaming that someone was trying to strangle me and so he was trying to pry the attacker's hands off me. But actually, his hands were wrapped around my neck, while my hands were around his hands—trying to pry his hands off my neck. It was my screaming that finally woke him up.[215 (p766)]

This patient showed no personality disorder, history of drug abuse, or other pathologic condition that might explain the violence. However, in adult sleepwalkers there is psychopathologic evidence suggestive of difficulties in dealing with aggression.[216] A variety of other clinical features have also been reported,[208] most notably, a DSM-III-R axis II diagnosis of obsessive-compulsive personality disorder in 21% of nonviolent and 50% of violent nocturnal wanderers. Altered sleep has also been noted. Compared with controls, young male somnambulists have more stage 3/4 sleep with hypersynchronous (greater than 10 sec and 150 μV) delta waves, greater stage 3/4 sleep percentage, and more stage 3/4 sleep interruptions.[208, 213] A subgroup also demonstrates theta waves prior to wandering.[208] One seriously violent group revealed less alpha activity and *lower* levels of stage 3/4 sleep compared with nonviolent somnambulists or healthy controls.[217] Although age may explain some discrepant findings for NREM sleep, it remains unknown whether any of these observed sleep characteristics are associated with emotional activity, dream content, or measures of psychopathology in these patients.

DISTURBED DREAMING IN NEUROLOGICAL CONDITIONS

Global Cessation of Dreaming

Changes in the recall of dreams and in their global characteristics as a function of neurological illness have been appreciated ever since Charcot[218, 219] first reported on a patient with complete loss of visual imagery, including loss of visual dreaming. This, and a later case report of complete cessation of dreaming by Wilbrand,[220] stimulated a great deal of interest in dream disturbances under the nosological heading of Charcot-Wilbrand syndrome.[153] In more recent times, interest has been focused on *global cessation of dreaming* (GCD).

Solms's[153] 4-year empirical investigation of dream changes in neurological illness revealed that of the 361 neurological patients seen during this period, 93.4% had undergone a change in some aspect of their dream experience as a function of their condition. Further, 34.9% of the 321 queried about GCD reported that they had ceased dreaming altogether since the onset of their illness. Parietal lobe involvement significantly differentiated patients with and without GCD; 42% of GCD patients had parietal lesions and an additional 7% had lesions in close proximity to parietal lobe ("perparietal"). Parietal involvement in dream recall confirms findings from a previous study on fewer patients.[221] Solms also found that the presence of frontal lobe lesions characterized some patients (8%) with GCD, independent of parietal lobe involvement.[153] This is consistent with the reduced dream recall seen after frontal lobotomy among schizophrenic patients[222] but not with a study[221] finding no such connection. The 43% of GCD cases not linked to either parietal or frontal lesions all had diffuse and nonlocalizable lesions.

Whether there is lateralization of neurological damage in GCD is at present uncertain. Equal distributions of right- and left-sided lesions were found in 45 of 47 cases,[153] whereas the left inferior mesial occipitotemporal cortex has also been implicated.[221] The latter is associated with a syndrome (including right homonymous hemianopia, alexia without agraphia, visual associative agnosia) which is typically explained as a disconnection between right hemisphere visual processes and left hemisphere speech processes. This notion is consistent with the reduced dreaming after corpus callosotomy and in agenesis of the corpus callosum.[223] Our finding of relatively intact dreaming following right hemispherectomy[224] but extremely impoverished recall following left hemispherectomy[225] also clearly supports a left hemisphere lateralization interpretation for GCD. Neuropsychological reviews[226, 227] favor a predominant role for *left* hemisphere processes in dream generation more generally.

Other conditions are known to suppress dream recall, although not to the extent of GCD. In chronic brain syndrome, dream recall from REM sleep deteriorates as the illness progresses from mild (57% recall), to severe (35%), to aged and severe (8%).[228] In Korsakoff's psychosis due to alcoholism, near-normal REM sleep time (29.4%) is seen, but poor dream recall (3%).[229] Patients with permanent amnesia for recent events due to mild encephalitis also have impoverished dreaming; their reports are less frequent than normal (28% vs. 75% of REM awakenings), and simpler, nonsymbolic, repetitious, stereotyped, and lacking in emotions and day residues.[230]

Epilepsy

Disturbances of emotional functioning in the dreams of epilepsy patients are clearly consistent with limbic system participation in the organization of dreaming. Patients with temporal lobe epilepsy who are awakened from REM sleep present more unpleasant emotions in their dreams than do controls[231]; they also have less varied emotions, with a lower frequency but a higher intensity. Although both medicated and nonmedicated patients have higher REM densities than do controls, medicated patients describe their dreams as being more vivid than do the other groups.

The role of the temporal lobe is demonstrated even more specifically by the occurrence of repetitive, painful dream imagery. Case studies[153, 232] indicate that epileptic auras may be incorporated into recurrent nocturnal dreams and that recurrent dream themes may, in turn, appear in the "dreamy state" of a temporal lobe complex partial seizure. REM sleep anomalies, such as rhythmical temporal epileptiform activity, have also been documented.[232] Solms[153] found a 7.9% (out of 114) incidence of recurring nightmares in his neurological sample: five of these presented with definite epilepsy; in two others it was suspected. In six of the seven cases, limbic system involvement could be demonstrated with no evidence of hemispheric predominance.

Dream-Reality Confusions

Intensification and vivification of dreaming to the point of confusion with reality has been described as characteristic of a small (5.3%) subgroup of neurological patients (N = 189)[153] and is illustrated by the following example. A 32-year-old right-handed woman sustained an open skull fracture when a rioter threw a brick through her car window:

> This patient reported that in the first weeks after her injury she experienced frequent and vivid nightmares, which, although bizarre, were very much more realistic than her normal dreams. She had always been a vivid dreamer but she experienced these dreams as being "utterly different." She felt that her dream recall was greatly enhanced, and she stated that she had considerable difficulty convincing herself that the dreams were not real . . . the dreams were always unpleasant . . . one night that there was something wriggling about in her "knickers," so she put her hand down and found (to her extreme horror) a green snake. She then felt something else was there and discovered three smaller snakes. Finally a black snake crawled up into her vagina. She awoke in terror and searched the bed for snakes. . . . On other occasions she would awake from dreams and feel compelled to check all around the house.[153(p192)]

The patient's dreams returned to normal within 2 months of the assault.

There is some evidence consistent with the hypothesis that dream-reality confusions are due to localized anterior limbic lesions. However, there is no one specific pattern of lesions within this region that is selectively associated with the symptom; equal numbers of cases show lesions in the medial prefrontal cortex, anterior cingulate gyrus, basal forebrain nuclei, and anteromedial diencephalic nuclei. The most severe cases also involve medial frontal cortex.

Vivification of dream reality occurs often in a number of other disturbances in which brain damage is not necessarily a contributing factor. For example, dream-reality confusions are well-known in SP and narcolepsy[171] (see above). They also occur in psychotic individuals and were noted as early as 1911 by Ellis to occur in cases of fatal heart disease, hysteria, "some forms of insanity," and "disordered cerebral and nervous conditions."[233(p237)] Indeed, dream-reality confusions can occur in normal persons as a result of dream vivification—what has been referred to as *reality dreaming*.[165] Among the many types of reality dreams are flying dreams, lucid dreams, sexual dreams, urination dreams, and dreams with incorporation of various organic sensations (e.g., pain, hunger).

Prodromal Dreaming and Symptom Incorporation

Many dreams—referred to as *prodromal*—are disturbed by ongoing or anticipated medical conditions (see reference 234 for review). Many direct prodromal expressions of symptoms have been demonstrated in clinical studies. In one study, patients with peripheral or central vestibular diseases reported a selective increase in fearful vestibular imagery (e.g., sensations of flying, rocking, sinking) in their dreams following onset of the illness; home diaries revealed a frequency of 69% of such dreams compared with 20% for control subjects.[235] In a second study,[236] 214 nonacute cardiac patients revealed a strong negative relationship between cardiac ejection fraction and dreamed death references (men) and separation references (women). Garfield[234] also identified a number of dream themes associated with cardiovascular problems; these references were direct (e.g., wounds, pain, or pressure in the arm, heart, chest, or neck), indirect (e.g., clutching or squeezing, references to death, blood, pain), and metaphoric (e.g., explosions). She also proposed that particular illnesses may be associated with certain recurrent themes, for example, gastrointestinal disorders (seeing or eating unpleasant food, dirty water, or feces), pulmonary problems (drowning or moving through polluted water), arthritis (rage or injuring a helpless animal), gynecological or obstetrical problems (difficult birth, pain in the area of the genitals depicted as an attack), dental problems (unusual objects in the mouth), migraine (seeing aura-like patterns, part of the visual field missing). Such themes may often appear in dreams before any overt symptomatology, a phenomenon that has been exploited (and often misunderstood) since the earliest days of medical science.[237]

SUMMARY

Dreaming disturbances implicate perturbation of emotional processes during sleep. They characterize a great variety of sleep disorders and neurological conditions, being at times primary to the etiology and pathophysiology of the disorder (e.g., nightmare disorder), and at other times secondary associated symptoms (e.g., narcolepsy). Often, REM sleep fragmentation or REM sleep intrusion at the sleep-wake transition is implicated in disturbed dreaming. However, some dreaming disturbances are also frequently seen in NREM sleep disorders such as somnambulism. Most disturbances remain poorly understood because of their intractability to laboratory study and because patients are reluctant to report them in clinical settings. Nevertheless, effective treatments are available for many common disturbances and other treatments are presently under development.

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PRINCIPLES AND PRACTICE OF

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