



## Reviews for Literature Support on Sleep and Dream Disorder

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## Abstract

There are many studies that discuss the lives of people with frequent dreams in which a clinically violent and traumatic experience plays a role. Dream reports and the findings of the psychological evaluation are included in our explanations. In just six weeks, he was able to begin to change the narratives of his dreams and improve several psychological measures. In this example, we argued that normal treatment procedures for mental problems should include paying more attention to sleep and especially nightmares, not just in patients suffering from it. Therefore, we support our argument with research that details the many advantages of non-pharmaceutical treatments, especially those designed to address issues related to insufficient sleep. Dreams can appear at any time during sleep. Having nightmares is common. They are linked to poor sleep quality, which can result in decreased performance throughout the day. In most teenagers and some "creative" adults, recurrent nightmares are not due to any underlying psychopathology. However, having recurring nightmares is the hallmark of post-traumatic stress disorder (PTSD) and may be associated with other mental illnesses as well. Nocturnal nightmares are a type of arousal disorder that is most common in teenagers and usually occurs in the initial stages of the sleep cycle. Patients suffering from rapid eye movement behavior disorder often present with nighttime injuries because of fulfilling their fantasies. However, behavioral therapy techniques have shown remarkable results, especially in patients with post-traumatic stress disorder and recurrent nightmares. Medication can be effective at treating dream problems, but behavioral treatment approaches have also shown excellent results. The recollection of the mental activity that takes place while sleeping is what we



call a dream. This study consists of a literature support, which is a combination of literature reviews and our arguments.

**Keywords:** *Sleep, Dream, Sleep Disorder, Sleep and Dream Disorder, Dream Disorder, Nightmare, Sleep Terror*

## 1. Introduction

Sleep can be divided into non-rapid eye movement (REM) phases using polysomnography. These non-REM stages include stage 1 (onset of sleep), stage 2 (light sleep), stages 3 and 4 (deep sleep), and stage 5 (dreaming). REM sleep is characterized by periods of intense brain activity, spontaneous rapid eye movements, and suppression of voluntary motor activity at regular intervals of 90 minutes throughout the night. Dreaming is a normal part of every stage of the sleep cycle.

It is reported by eighty percent of people awakening during rapid eye movement (REM) sleep and sleep onset (stages 1 and 2), but only by forty percent of those awakening from deep sleep. According to patient testimonies, the nature of their dreams changes according to the stage of sleep they wake up when they wake up. The dreams that patients describe during REM sleep are often bizarre and very vivid, and often have story-telling connections. In contrast, dreams that people have when they are in the deeper stages of sleep are hazier (for example, dreams about a color or emotion). Dreams that occur during sleep stages 1 and 2 are less complex, less comprehensive, and less relevant to real life than dreams that occur during REM sleep.

The ease with which a dream is remembered may reflect how close or far the dream is to conscious thinking.

*The greatest recall levels tend to occur during sleep stages with electroencephalographic patterns most like those seen in the waking state.*

There are researchers who think that dreams serve no purpose. Some people believe that dreaming is either a continuation of conscious mental processing that occurs during waking hours, or that it is a reprogramming of the central nervous system for conscious function to occur the next day.



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*There is evidence to suggest that dreaming, like most other physiological processes, is vital to the processing of learning and memory, provides cognitive feedback on one's mental functioning, and helps a person adapt to both emotional and physical stress.*

## 2. Horrible Experience in Nightmares

Nightmares are terrifying nighttime events that are often quite vivid. During a nightmare, the dreamer wakes up from his sleep. In most cases, after the dreamer awakens from REM sleep, they can recall vivid, associative, and sometimes illogical, nighttime adventures. In most cases, the dreamer has trouble falling asleep or staying asleep. Nightmares are another common occurrence. A two-week prospective study of college students found that 47% of participants had experienced at least one nightmare.

One hundred and forty-nine people with insomnia participated in one study, and the findings showed that 18.3 percent of these people had nightmares.

According to the findings of this research, women are more likely to have nightmares than men, and these nightmares are linked to an increased risk of waking at night, insomnia during sleep, impaired daily memory, and increased anxiety after a bad night's sleep. According to studies of the public, between 5 and 8 percent of the adult population now report having a problem with nightmares. Dreams are mental representations of events that occur when we are not consciously aware of our surroundings during sleep. As a result of recent advances in neuroimaging methods, it is now possible to link certain aspects of a dream to certain patterns of brain activity.

## 3. Neurological Illnesses such as Luminous Dreams and Parasomnias

Some conditions that occur in people with neurological disorders, such as lucid dreams and parasomnias, are not only of diagnostic importance, but also provide a window into the dream process. (“Dreams and nightmares in healthy adults and in patients with sleep and ...”) These



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symptoms can be helpful in determining if a patient has a neurological problem. These findings suggest that dreaming is represented in physiological signals, behavior, and activity patterns in the brain and that the body can enact the content of a dream. However, the dream body may differ from the real body; People with congenital paraplegia may walk in their dreams, while those with sleep apnea rarely choke on their dreams, and phantom limb pain may disappear in their dreams. These situations serve as useful models for future research projects that will explore the processes underlying imaginary experiences. Children between the ages of five and twelve have nightmares between 20 and 39 percent of the time.

Common dreams in teenagers do not indicate underlying psychopathology, despite widespread belief to the contrary. People who are creative and score well on psychological exams tend to have "fine boundaries" that can lead to vivid nightmares.

People with few personal boundaries are less likely than other people to have a solid understanding of the world around them. Instead of describing subjects as having a clear black-and-white duality, they perceive themselves and the world as having various shades of gray.

The use of certain drugs, particularly those that alter the levels of neurotransmitters in the central nervous system, such as antidepressants, opioids, or barbiturates, has also been associated with the occurrence of nightmares. In the process of withdrawing from substances that cause REM sleep, such as alcohol, barbiturates, and benzodiazepines, a person may have very vivid and terrifying nightmares.

*a. Drugs that affect the number of neurotransmitters in the central nervous system*

- i. antidepressants*
- ii. tricyclic*
- iii. Monoamine Oxidase Inhibitors*
- iv. Selective Inhibitors for Serotonin Reuptake*



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- v. *Antihypertensives Working on the Central Nervous System*
- vi. *Beta Blockers*
- vii. *Rauwolfia Alkaloids*
- viii. *Alpha Agonists*
- ix. *Antiparkinson Agents*
- x. *Levodopa (Larodopa)*
- xi. *Selegiline (Eldepryl)*
- xii. *Various Drugs Known to Cause Scary Dreams*
- xiii. *Flutamide (Eulexin)*
- xiv. *Procarbazine (Matulan)*
- xv. *Ketamine (Ketalar)*
- xvi. *Short-acting barbiturates*
- xvii. *Withdrawal Symptoms Related to Nightmares*
- xviii. *ethanol*
- xix. *barbiturates*
- xx. *Benzodiazepines*

PTSD symptoms include both nightmares and traumatic stress disorder. The presence of recurrent nightmares is one of the hallmarks of post-traumatic stress disorder (PTSD).

#### 4. A Psychiatric Illness with Nightmares

Patients suffering from mental illness are not immune to the possibility of nightmares. Depression is sometimes linked to recurring dream themes of masochism and a negative perception of oneself. Patients with schizophrenia and dissociative disorders may have particularly vivid nightmares during their relapse. Those suffering from panic disorders and depression, as well as those suffering from asthma and respiratory abnormalities that occur during sleep, are more likely to have panic attacks during REM sleep. The rebound of REM sleep, which occurs after chronic



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withdrawal of substances that inhibit REM sleep, such as alcohol and sedative-hypnotics, can manifest as disturbing nightmares.

## 5. Disorder Associated with Rapid Eye Movement Sleep

There is a close connection between rapid eye movement (REM) sleep and dreaming. The worst nightmares tend to occur during REM sleep, and many of the diseases and drugs that alter REM sleep also affect dreaming. Dreaming can be affected by several parasomnias associated with REM sleep. REM sleep is a time when symptoms of underlying diseases can potentially manifest. When a person awakens from REM sleep, which is electrophysiologically akin to awakening, he or she usually remembers the mental and physical symptoms associated with the REM sleep state.

- i. Arousal disorders (often associated with deep sleep)*
- ii. Confusing arousals*
- iii. Sleepwalking*
- iv. sleep terror*
- v. Parasomnias (usually associated with REM sleep)*
- vi. nightmares*
- vii. sleep paralysis*
- viii. Penile erection problems exacerbated by sleep deprivation*
- ix. Unpleasant and sleep-related erections*
- x. Sinus arrest associated with rapid eye movement sleep*
- xi. REM sleep behavior problem*
- xii. REM stands for rapid eye movement*
- xiii. Angina (for example, coronary artery disease)*
- xiv. Apnea associated with rapid eye movement sleep (for example, chronic obstructive pulmonary disease)*
- xv. Abdominal discomfort (eg, peptic ulcer disease, gastrointestinal reflux)*



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Middle-aged men are most affected by REM behavior disorder. Patients suffering from this condition often report a history of injury during sleep, either to themselves or to a sleeping companion. REM behavior disorder is characterized by vivid dreams of action and violence, which are then activated by the dreamer, which can sometimes harm the dreamer or their sleeping partner. These individuals have an increased submental and extremity electromyographic tone during polysomnography. This tone can be phasic or tonic and is associated with marked shaking of the limbs or trunk areas.

REM behavior disorder usually occurs in the absence of any concomitant pathology but is sometimes associated with neurodegenerative diseases and diseases of the nervous system. Parkinson's disease, primary dementia, and narcolepsy are three of these most diagnosed conditions. Brain scans using computed tomography or magnetic resonance imaging may reveal diffuse hemisphere lesions, bilateral thalamic abnormalities, or brainstem lesions in people with this condition.

## 6. Nightmare Dream

Night terrors are episodes of great fear and panic that occur during the night and usually occur in the initial stages of the sleep cycle. These can be compared to other forms of arousal during deep sleep, such as somnambulism (also known as sleepwalking) and confusional arousals. Night terrors are characterized by autonomic discharge, bewilderment, and vocalizations that are often a scream described as "blood-chilling." People with night terrors often have trouble waking up and have trouble remembering the details of their dreams.

Night terrors are a type of arousal disorder that can occur along with other arousal disorders associated with deep sleep. Night terrors affect between one and four percent of the population and are most common in young people between the ages of four and twelve. Studies using polysomnography on these patients often reveal an increase in the number of awakenings from a deeper sleep phase. - Adult night terror patients are more likely to have psychopathology, especially drug addiction and emotional disorders, than children with the same problem. Like other





types of parasomnias that can affect adults, night terrors are more likely to occur in conjunction with other forms of sleep pathology, such as periodic limb movements and obstructive sleep apnea. (“Psychology Skripta | PDF | Sleep | Nonverbal Communication - Scribd”)

## 7. Diagnostic Test

Nightmares and night terrors can usually only be diagnosed based on the patient's past experiences and symptoms. Polysomnography is necessary when trying to identify REM behavior disorder or nocturnal seizures in patients with a prior history of nocturnal trauma. The use of extra electromyographic arm tips is necessary to accurately identify REM behavior disorder. Night shifts may be the only symptom of epilepsy in a quarter of all people with the disorder.

Incontinence, a family history of this condition, and nighttime stereotypical behavior can all point to a diagnosis of night shifts. There are several diverse types of seizures that can occur during the night, including major mal, minor mal, partial complex, vegetative, and paroxysmal nocturnal dystonias. People who have trouble breathing while sleeping are more likely to experience all kinds of parasomnias. Any patient presenting with symptoms or indicators of obstructive sleep apnea such as excessive daytime sleepiness, nocturnal hypoxia, loud snoring, or an increase in neck circumference should be evaluated by polysomnography. It is common for people with REM behavior disorder to also have degenerative neurological disorders, which may require further testing. The occurrence of arousal problems such as somnambulism and night terrors in adults may be indicative of an underlying neurological condition. Consequently, it is possible that a neurological evaluation including imaging of the central nervous system will be necessary.

## 8. Nightmares and Night Terrors in Children

Nightmares and night terrors in children often upset the child's parents and other family members; Consequently, accurate diagnosis and education of affected family members are critical components of treatment. It is vital to maintain control of the environment by removing potentially



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dangerous items and installing barriers to prevent a person from escaping from a safe sleeping area. Because these diseases rarely indicate an underlying disease and often disappear with maturation, reassurance and support are often the only treatment needed to treat them. In most cases, pharmacological intervention is not necessary; It should be avoided as it may even lead to more sleep disturbances. This is because sleep disorders can be caused by medications. Treatment of recurrent nightmares in older children can be accomplished successfully using behavioral techniques.

## 9. REM Behavior Disorder

Clonazepam (brand name: Klonopin), taken at 0.5 to 1.0 milligrams just before bedtime, has shown to be an effective treatment for REM behavior disorder. In addition to reports of relapse after discontinuation of therapy, there are reports of both long-term efficacy and safety. It has been noted that response to various drugs, most often antidepressants, is associated with effects theorized to be associated with reduced REM sleep. 31 This pharmaceutical strategy is effective in the treatment of a wide variety of parasomnias in adults, including night terrors.

### a. Post Traumatic Stress Disorder

is a spectrum of severity associated with post-traumatic stress disorder (PTSD), ranging from a brief, manageable problem to a lifelong chronic condition that can lead to repeated hospitalizations, poor social connections, and violent or self-harming behavior . Psychotherapy is widely recommended, either on an individual basis or in the context of a group setting, and can assist the resocialization process, although many different treatment modalities have only limited effectiveness. Patients diagnosed with PTSD who participate in cognitive restructuring, eye movement desensitization and reprocessing therapy, prolonged exposure therapy (also known as flooding), and nightmare imagery may experience a reduction in symptoms for months after treatment. Fluoxetine, commonly known as Prozac, is an effective medication for treating the



symptoms of post-traumatic stress disorder (PTSD). This syndrome is often accompanied by feelings of anxiety and irritability, both of which may require medication.

## **b. Repetitive Terrors of the Mind**

When a patient experiences a traumatic or stressful situation, they may begin to have nightmares later, which can lead to interpersonal integration of the event. On the other hand, prolonged persistence, which refers to a pattern of recurring nightmares not related to a recent traumatic event, can lead to decreased daytime functioning without discernible benefit. More than 70 percent of patients who receive behavioral therapy for nightmares have a reduced frequency of nightmares, both in the short and long term. All that is required for this type of therapy is an exceedingly small number of sessions, either individually or as a group, with a psychologist or in a sleep medicine clinic. This case study is one of many collected as part of the "Sleep Cognitions — Conscious Dreaming as an Intervention for Nightmares in Patients with PTSD" project to be published in *Frontiers of Psychology* in 2020. (Holzinger et al., 2020). In 2009, we had the opportunity to present the lucid dream (LD) program, also known as Sleep Cognition (CIS), to patients with PTSD as part of the research project to evaluate nightmare treatment in patients with Post Traumatic Stress Disorder (PTSD). Inpatient rehabilitation clinic in Europe (for additional protection of identities, we do not indicate specific countries in this article).

The research project was conducted in the context of nightmare treatment evaluation in patients with PTSD at an inpatient rehabilitation clinic in Europe. LD is defined as a person's awareness that they are dreaming and that their dreams have a deliberate influence on their story (Holzinger, 2008). Using lucid dreaming as a therapy for nightmares is a component of our comprehensive approach to sleep coaching built on Gestalt Therapy (Holzinger and Klosch, 2013; Holzinger et al., 2019a,b). This treatment is part of our comprehensive approach to sleep coaching . Sleep training and sleep hygiene, cognitive behavioral therapy for insomnia (CBT-I), relaxation methods including medical hypnosis, and dream work including LD techniques are the four components that make up sleep coaching. Sleep training and sleep hygiene are sometimes known as "sleep



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training." LD strategies were the main topic we discussed throughout this tutorial. Even so, it included certain components of healthy sleep habits and instructions about sleep. A three-month psychotherapy approach was used to treat individuals suffering from PTSD, addiction problems, and various comorbidities. As a result of the extremely elevated risk of suicide, many of the patients overdosed on their medication. After experiencing a traumatic event or a series of situations, some people develop PTSD, a mental health condition. These events or situations cause the affected individual to have intense feelings of hopelessness. A persistent feeling of lethargy and emotional stupor are two of the most common symptoms of post-traumatic stress disorder (PTSD). Other symptoms include re-experiencing an event, intervening recollections of the event, dreams, and nightmares. In addition, it is possible to have symptoms comparable to depression, such as a lack of pleasure, decreased activity, and inattention. If such feelings are allowed to persist for a long time, they can also lead to suicidal thoughts (World Health Organization, 2017).

The trauma of reliving traumatic experiences, not only in the form of flashbacks during the day, but also in the form of sleep dreams, can create significant mental stress. These disturbing dreams and nightmares are hallmark symptoms of post-traumatic stress disorder (PTSD) and are quite common. The incidence of nightmares is 60 percent, the highest prevalence rate among mental health disorders. The prevalence of PTSD in the general population is between 8 and 9 percent (Krakow et al. 2002). Patients suffering from PTSD are more likely to have one of two main types of nightmares:

- *Frequent recurring nightmares that relive some aspects of the traumatic event and make it difficult to fall or stay asleep.*
- *A type of nightmare that corresponds to the re-experiencing and hyperarousal symptom cluster that defines post-traumatic stress disorder (PTSD). (Levin and Nielsen, 2007).*

The term "nightmare" refers to "long and deeply dysphoric" dreams that "often involve attempts to avoid dangers to life, safety, or bodily integrity". This definition applies to nightmares in general. They usually occur during REM sleep and have the effect of shaking the dreamer, causing them to remember the dream in detail (American Academy of Sleep Medicine, 2014). The case of



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PTSD described in the following sections illustrates how dream therapy, including LD education, can produce changes in nightmare and other symptoms in a brief period. In addition, it symbolizes the severe and numerous traumatizations that condition the patient with a long history of PTSD, as well as various sleep disorders and other comorbidities.

## 10. Clinical History or Intra-Laboratory Polysomnogram

Your clinical history or in-lab polysomnogram (also known as an in-lab sleep study) will confirm that episodes occur during REM sleep. Polysomnography showed that the episodes consisted of sleep without atonia. There is no evidence to suggest that episodes are caused by anything else, such as a different sleep or mental health disorder, adverse reaction to medication, or substance abuse.

It is important to seek medical advice if you have any doubts that you may be suffering from REM sleep behavior disorder. After that, your primary care doctor may recommend that you see a specialist in sleep medicine. When you get together with them, the following things are likely to happen. Your primary care doctor will start by performing both a physical and neurological examination. The aim of this is to rule out other probable causes such as alcohol, drugs or narcolepsy, a sleep disorder often seen in patients with REM sleep behavior disorder. As Parkinson's syndromes<sup>6</sup> and REM sleep behavior disorder often occur together, your doctor will also look for signs of Parkinson's disease, such as tremors in the hands or stiffness in the muscles, as part of the diagnostic process. If you share your bed with someone, your doctor may ask if they have ever witnessed you reenacting any dreams while you were unconscious. They will question the dream-enacting behaviors witnessed by the individual and ask them to describe them. Your primary care doctor may recommend that you undergo a polysomnogram, often known as an overnight sleep study, in a sleep lab. During the research, sensors will monitor your breathing, eye movements, arm and leg movements, brain, and heart activity, as well as your blood oxygen levels. (“REM Sleep Behavior Disorder | Sleep Foundation”) It is usual practice to film the examination to document any dreamlike behavior. After the exam, a sleep doctor will look at your medical



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history, symptoms, and results of your polysomnogram to determine if a diagnosis of REM sleep behavior disorder is right for you.

Scientists do not know what causes REM sleep disorder. Animal studies suggest it has to do with certain neural pathways in the brain. In an individual without RBD, certain neural pathways inhibit muscle activity during REM sleep, and disruption of these neural pathways leads to REM sleep without atony. (“REM Sleep Behavior Disorder | Sleep Foundation”) REM sleep behavior disorder often coexists with other neurological conditions such as Parkinson's disease, dementia with Lewy bodies, and multiple system atrophy.

## 11. Risk factors

Risk factors for REM sleep disorder include:

- *being a man*
- *be over 50 years old*
- *Having another neurological disorder such as Parkinson's disease, Lewy body dementia, or multiple system atrophy*
- *having narcolepsy*
- *using certain medications or antidepressants*
- *Using or quitting drugs or alcohol*

The average age of onset is about 61 and 87 percent are male. More research is needed to understand the environmental contributors to REM sleep behavior disorder. (“REM Sleep Behavior Disorder | Sleep Foundation”) Sleep deprivation, smoking, head injury, and exposure to pesticides may be environmental risk factors. About 80% of patients with post-traumatic stress disorder (PTSD) suffer from nightmares or dysphoric dreams that cause great distress and affect day or night functioning. Lucid dreaming (LD) is a learnable and effective strategy for coping with nightmares and has positive effects on other sleep variables. In LDs, the dreamer is aware of the



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dreaming state and can control the dream content. (“Cognitions in Sleep: Lucid Dreaming as an Intervention for Nightmares ...”)

Nightmares are vivid dream experiences of anxiety or fear that typically occur during rapid eye movement (REM) sleep and less commonly during N2 sleep (American Academy of Sleep Medicine, 2014). Common themes are failure and helplessness, physical aggression, accidents, chases, health concerns and death, and interpersonal conflicts (Robert & Zadra, 2014; Schredl & Göritz, 2018). If these dysphoric dreams are frequent enough, cause great distress, and affect day or night functioning, they can be classified as a nightmare disorder (American Academy of Sleep Medicine, 2014). According to the International Classification of Sleep Disorders, Third Edition (American Academy of Sleep Medicine, 2014), the minimum diagnostic criteria are as follows: (1) the patient suffers from recurrent, prolonged, extremely dysphoric, and well-remembered dreams:

- *Contain threats to survival, security, or physical integrity.*
- *upon waking from dysphoric dreams, the person quickly becomes orientated and alert and*
- *The dream experience itself or the sleep disturbance resulting from it causes significant distress or impairment in social, occupational, or other key areas of functioning.*

Comprehensive diagnosis is required to assess potential comorbidities such as depression and other psychiatric disorders, or contributing factors such as medications, substances, and recent or past stressful life events. Affecting approximately 4% of the adult population (Levin and Nielsen, 2007) and up to 20% of children and adolescents (American Academy of Sleep Medicine, 2014), frequent nightmares are quite common and affect quality of life, daytime sleepiness, fatigue, and it has an enormous impact on anxiety.

Nightmare distress can lead to problems at work, social and cognitive impairments, and has even been associated with a higher risk of suicide (Nadorff et al., 2018). Zadra and Donderi (two thousand) and Robert and Zadra (2014) describe the occurrence of nightmares as follows:

*A combination of a given affective load and a tendency to experience increased distress and negative affect.*



## 12. Brain Physiology

Regarding brain physiology, it has been suggested that nightmares are a result of high amygdala and hippocampus activation and the failure of the prefrontal regions to suppress this activation of the limbic system (Levin and Nielsen, 2007). This activity pattern is typical for REM sleep and may reflect visual hallucinations, emotional condensation, and cognitive abnormalities (Hobson and Pace-Schott, 2002). While REM sleep is characterized by wakefulness-like high-frequency electroencephalographic activity (Siclari et al . 2017), reports of dream experiences are also associated with a reduction in low-frequency EEG in posterior cortical regions in both REM and NREM sleep (Siclari et al., 2017). Nightmares are more common during times of stress and may occur in association with traumatic experiences, as in post-traumatic stress disorder (PTSD; Zak et al., 2019). PTSD is a delayed and prolonged response to a traumatic event or situation that is likely to cause widespread distress in everyone (World Health Organization, 1992). About 80% of the general population experience at least one related trauma in their lifetime (NIH, 2012), and the lifetime prevalence of PTSD is 7.4%.

The disorder is defined by a tendency to avoid people, places, memories, and other stimuli related to the traumatic event, with recurrent distressing memories of the event and mood changes and hyperarousal (American Psychiatric Association, 2013). In addition, approximately 80% of PTSD patients suffer from nightmares (Morgenthaler et al., 2018) that are often emotionally related to the original trauma (Nadorff et al., 2014). Nightmares related to PTSD are equally likely to occur during N1/N2 and REM sleep (Phelps et al. 2018). Because nightmares represent a chronic and persistent symptom of PTSD and cause great distress, various treatment options have been discussed.

## 13. Conclusion





Since the positive effects of LDT on nightmares have been achieved before (Spoormaker and van den Bout, 2006; Holzinger et al., 2015) and it is reasonable to believe that some of the results of this study are not significant due to methodological shortcomings, it is necessary. To further explore the positive effects of LDT. Nightmares are present as symptoms of various psychological disorders such as eating disorders, schizophrenia, depression, personality disorders, borderline disorder, substance use disorder (especially alcohol; Fiss, 1980) and various organic diseases (Holzinger & Stefani, 2020). LDT is worth investigating because it can provide a useful tool for those affected. To address this, Gavie and Revonsuo (2010) propose more intense aperture interventions over longer time periods and with larger sample sizes. Despite the limitation due to the small sample size, the study has a natural design and strength in hotspot retrieval, reporting actual word data to achieve higher external validity and some generalizability. The reduction of symptoms (anxiety or depression) is therefore interesting. It should be noted that LDT as an intervention technique belongs to factors or variables that explain 10-15% of the variance of therapy outcome. There is a need for much more research on this subject, especially in the Turkish language in the literature.

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