

Dreaming: a narrative review

Abstract

Both positive and negative effects have been reported for dreaming. The positive effects include theta waves and relaxation, having positive affect the morning after a joyful dream, having several senses activated by dreaming, experiencing mind wandering the next day and blocking out tinnitus. The negative effects of dreaming that appeared in this literature include insomnia, nightmares, sleep talking and depression. The absence of dreaming has been noted in those with dementia, Parkinson's and Alzheimer's. Pre-sleep material has been incorporated into dreams including Intentions, complex narratives and visual media. Only two dream induction studies appeared in this current literature including inducing dreams of remote emotional memories and adding sensory cues. Methodological limitations included the questionable reliability of surveys for dream reports given the short-term dream recall and the potential substitution of pre-sleep thoughts and experiences for dream reports during sleep awakenings.

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Introduction

Dreaming: a narrative review

Dreaming has been defined as an involuntary mental activity including thoughts, images and emotions that occur primarily during sleep. Dreams typically occur during rapid eye movement (REM) sleep and play a critical role in memory consolidation, emotional processing and neural development. Typical dreams feature familiar settings or daily tasks. Lucid dreams are a state in which you become consciously aware that you're dreaming while still being asleep. This can occasionally enable the dreamer to actively guide the direction of the dream.

New strategies for the cognitive science of dreaming have been outlined in a recent paper.¹ These authors suggested that observable dreaming, neural decoding and real time reporting have led to more direct measures of the content of dreams. In addition, dream engineering, targeted stimulation and lucidity have led to the experimental manipulation of dream content. Further, with computational dream analysis, the generation and exploration of large dream report databases have become possible.

Dream research is dependent on **dream recall** by the participants. However, in a study on dream recall in 16 countries (N= 15,854, 18–99 years old, mean= 42 years), only 54% reported frequent dream recall.² Surprisingly, nightmares were reported by as few as 11% of the participants.

This narrative review includes current research on the positive and negative effects of dreaming, a few predictor variables for dreaming, and a couple dream induction studies. This research was found on PubMed and PsycINFO by entering the term dreaming and the years 2024-2026. Exclusion criteria were protocols, case studies, and non-English language papers.

The 17 papers in this current literature review can be categorized as positive effects of dreaming (6 papers), negative effects of dreaming (3 papers), comorbidities of dreaming (2 papers), pre-sleep material incorporated into dreams (4 papers), and inductions for dreaming (2 papers). These sections are followed by a discussion on methodological limitations of this current literature.

Positive effects of dreaming

Both positive and negative effects have been reported for dreaming. The positive effects include theta waves and relaxation, having positive affect the morning after a joyful dream, having several senses activated by dreaming, experiencing mind wandering the next day and blocking out tinnitus (Table 1). Dreams of deceased loved ones have also had positive effects.

Table 1 Positive effects of dreaming (and first authors)

Positive effects	First authors
Theta waves and relaxation	Pagel
Positive affect next morning	Zhang
Different senses	van der Heiden
Mind wandering	Simor
Blocking out tinnitus	Guillard
Dreams of deceased loved ones	Mamatt

In a study entitled, “The persistent paradox of rapid eye movement sleep, brain waves, and dreaming”, dreaming was noted to occur during rapid eye movement sleep.³ Dreaming during rapid eye movement sleep was accompanied by **theta waves** which have typically indicated a **relaxation state**, and delta waves have frequently been associated with deep sleep. This difference in brain waves highlights REM sleep as being a more active sleep state, often characterized by darting eye movements and vivid dreaming.

At least two research groups have reported that **dreaming affect leads to the next morning affect**. In one study, frightening dreams led to negative morning affect.⁴ This finding was not surprising, but that this only occurred in those “with more adaptive emotion regulation” was difficult to interpret. Those with more adaptive emotion regulation might be expected to be less affected by frightening dreams or better able to cope with them and experience less negative morning affect. In the second study, the authors reported that more positive dreams led to more positive affect the next day.⁵ This experience was reputedly only reported by dream recallers. This effect would seem obvious given that the dreams were being reported by the dream recallers.

Different senses have also been noted for dreams. In a study entitled “Sensational dreams: the prevalence of sensory experience in dreaming”, dream diaries with direct questions about sensory

experiences were written for seven days (N= 3476 diaries).⁶ Vision was the most frequently reported sense in dreams followed by hearing, and in turn followed by touch. In that way, dreams can be likened to movies that are also experienced mostly by vision and hearing and less by touch. The strong senses of smell and taste may have had low rates of occurrence because they may require direct stimulation or being in a more conscious state than dreaming.

Not surprisingly, multisensory dreams were more frequent than unisensory dreams, as they more closely simulate the experience of wakefulness. The continuity hypothesis of sleep and wakefulness similarities may be a relevant interpretation of these data. The same interpretation could be applied to the finding that sensory richness and emotional intensity contributed to the clarity of dream recall for both positive and negative dreams just as they contribute to the clarity of remembering daily events.

In a study on REM (rapid eye movement) sleep and dreaming, EEG (electroencephalography) headbands were worn for seven nights (N= 67).⁷ Greater wakefulness and N2 sleep (stage 2, light non-REM sleep that comprises 50% of a total sleep cycle) and less intense dream experiences led to **mind wandering** the next day. The self-stimulation of the mind wandering brain the next day may have compensated for the less intense dreaming stimulation the night before.

In a study entitled “Tinnitus, lucid dreaming, and awakening” as many as 76% of the participants (N= 195) could recall their **lucid dreams** (being asleep but consciously aware that you’re dreaming).⁸ As many as 95% of those who had lucid dreams said they had no tinnitus (ringing in their ears) during their lucid dreams. Tinnitus typically occurs in folks with hearing deficits during quiet conditions. Lucid dreaming would be considered a stimulating condition and therapeutic for tinnitus for that reason, as in an unconscious healing state.

Dreams of deceased loved ones have also had surprisingly positive effects and even across cultures.⁹ In this review of as many as 186 publications (74% qualitative studies), dreams of the deceased were prevalent. According to the researchers, these dreams gave the participants feelings of comfort, guidance and continued connection with the deceased loved ones. This in turn led to positive feelings and emotional healing. That 74% of these studies were qualitative suggests that the participants may have been “faking good” or giving the interviewers what they might consider socially desirable responses. One might expect some negative responses from at least those who were experiencing the “anger stage” of the mourning process.

Negative effects of dreaming

The negative effects of dreaming that appeared in this literature include insomnia, nightmares, sleep talking and depression (Table 2). In a systematic review of literature on the relationships between insomnia, nightmares and dreams, 67 articles were included.¹⁰ Across these studies, dreams were related to **insomnia and nightmares**. These are likely reciprocally related as insomnia may derive from fear of nightmares and nightmares may awaken individuals who could then experience insomnia. The authors suggested that Imagery Rehearsal Therapy (rewriting the nightmare’s script while awake) was effective in reducing insomnia and nightmares. This therapy reputedly works by changing the storyline of a disturbing dream to a neutral or positive one while awake and mentally rehearsing the new version so that the brain learns an alternative response.

Table 2 Negative effects of dreaming (and first authors)

Negative effects	First authors
Next morning negative affect	Zhang
Insomnia and nightmares	Delage
Sleep talking	Camaioni
Depression	Carr

COVID – 19 affected dreams by increasing the frequency of **sleep talking** and decreasing bizarre dreams.¹¹ The sleep talking was related to the emotional intensity of dreams and may have been an attempt to decrease the emotional intensity. The sleep talking may have also compensated for the reputedly less talking during COVID wakefulness due to the isolation of the lockdown. The less bizarre dreams may have related to the COVID isolation experience itself being bizarre enough for a given day/night.

In another study on lucid dreaming and nightmares, mental health outcomes were affected (N=1332).¹² In this sample, nightmares and a combination of nightmares and lucid dreaming led to **depression**. If these negative experiences of nightmares and lucid dreaming led to negative affect the next morning, as was suggested in other research, it is not surprising that both the nighttime and daytime negative affect contributed to depression.

Comorbidities of dreaming

Dreaming has been absent in at least three neurodegenerative comorbidities. These include dementia, Parkinson’s and Alzheimer’s (Table 3).

Table 3 Comorbidities of dreaming (and first authors)

Comorbidities	First authors
Dementia and Alzheimer’s	Lipnicki
Dementia and Parkinson’s	Perez-Carbonell

The absence of dreaming has been associated with biomarkers of **dementia and Alzheimer’s disease** in at least two studies in this current literature. In one study, less dream recall was associated with dementia risk and Alzheimer’s disease biomarkers (N=1049).¹³ Less dream recall would be expected for individuals with these diseases just as memory lapses during daytime hours are associated with these diseases.

In another study, REM Sleep Behavior Disorder (RBD) was associated with nightmares and increased EMG activity during sleep (electromyography, a measure of electrical activity of muscles and the nerves controlling them).¹⁴ These data were not surprising given that REM Sleep Behavior Disorder is a condition characterized by individuals physically acting out vivid, often violent dreams. Normally muscles are paralyzed during REM sleep, but in RBD, the paralysis fails resulting in yelling, flailing, punching etc. The REM Sleep Behavior Disorder in this study was a predictor of **dementia and Parkinson’s**. It was also associated with PTSD (posttraumatic stress disorder), repeated traumatic head injury and taking antidepressants. That REM Sleep Behavior Disorder has contributed to these severe conditions highlights the need for including an assessment of nightmares and EMG activity (that can be conveniently measured by a Fitbit) in clinical assessments of sleep.

Pre-sleep material incorporated into dreams

Pre-sleep material has been incorporated into dreams (Table 4). The materials have included individual traits and experiences, intentions, complex narratives on audiobooks and visual media.

Table 4 Pre-sleep material (and first authors)

Pre-sleep material	First authors
Traits and experiences	Elce
Intentions	Fechner
Complex narratives	Palmieri
Stimulus-related incorporation rates	Diushekeeva

In a study entitled “Individual traits and experiences predict the content of dreams”, 3,366 reports were received from 207 adults between 2020 and 2024.¹⁵ These reports suggested that dreams shifted from self-referential thought centered narratives to **perceptual experiences dominated by visuo-spatial details**, multiple characters and bizarre events. Stable traits, including attitudes toward dreaming, mind-wandering propensity and subjective sleep quality selectively influenced the dream content. During the COVID lockdown, dreams showed increased references to limitations and heightened emotional intensity. These may have been continuous with the expressed limitations and heightened emotional intensity experienced during the daytime hours of the COVID lockdown.

In a study on the influence of **intentions on dreams**, three conditions were presented.¹⁶ These included a completed intention, an incomplete intention and an interrupted intention. Active intentions increased the likelihood that dream content would be similar to the intention. These data are consistent with other reports that the content of dreams frequently simulates pre-sleep experiences and thoughts including, in this case, intentions.

Complex narratives have also been incorporated into dreaming.¹⁷ In this study, participants were exposed to audiobook material prior to sleep. The audiobook material was reproduced in dreams based on sleep awakening reports during both REM and non-REM sleep. It’s not clear, however, if the awakened dreamer simply remembered the pre-sleep audiobook but reported it as if it had occurred during the dream.

Incorporation of pre-sleep material was also reported in 29 studies summarized in a scoping review.¹⁸ **Stimulus-related incorporation rates** varied according to the sleep state. Incorporation rates varied from 3% to 43% for REM dream reports, 4% to 30% for non-REM sleep and 11% to 35% for home dream reports. The authors might have determined whether these incorporation rates differed across these three different dream reports.

Dream inductions

Only two dream induction studies appeared in this current literature (Table 5). They included inducing dreams of remote emotional memories in one study and adding sensory cues in another study.

Table 5 Dream inductions (and first authors)

Dream inductions	First authors
Remote emotional memories	Frost
Targeted lucidity reactivation	Konkoly

In the study entitled “Experimentally inducing dreams of remote emotional memory”, the findings are in the title (N= 34).¹⁹ This research involved an autobiographical emotional memory task performed before nap time to determine whether that memory would appear in the subsequent nap time dreams. The control group was given the task of designing a college course before nap time. **Remote emotional memory** appeared in the dreams of the experimental

group. Designing a college course did not appear in the dreams of the control group, possibly because that task lacked the intensity of an emotional memory.

The other dream induction study was entitled “Provoking lucid dreams at home with sensory cues paired with pre— sleep cognitive training”.²⁰ This procedure was called **Targeted Lucidity Reactivation** which has been defined as pre-sleep conditioning to associate sensory cues like specific sounds with dream awareness and then re-playing those cues during REM sleep to trigger the lucid state. This protocol highlights the complexity of dream induction.

That only two dream induction studies appeared in this current literature raises the possibility that recruiting for these studies may be difficult because potential participants would not like their dreams being induced/ manipulated. Engaging in these protocols might be more attractive for those who are having frequent nightmares and could view dream induction as potentially therapeutic.

Methodological limitations of this literature

Several methodological limitations can be cited for this literature. They include limitations of sampling, measures, and interpretation of results.

The samples have been primarily **convenience samples**, for example, university students. Some of the control groups seem questionable because they are not similar to dreaming, for example, the control group that was asked to design a college course. **Sample sizes were also small**. For example, only 54% of the participants in one sample had frequent dream recall, thus limiting the dream sample size.

Self-report surveys relied on accurate recall of dreams which are often forgotten in a matter of minutes. **More wake-up studies are needed** in which participants can immediately report their dreams. **Physiological data were limited**, for example, monitoring of EEG and EKG, which could have been recorded non-intrusively at home by Fitbits.

Surprisingly, none of the dream content in these studies was focused on **problem-solving**. Some have suggested that dreams are in the service of solving daytime problems. Also surprisingly, dreams have not been compared across **sleeping alone versus co-sleeping** and co-sleeping with a partner, relative, child or children. And **sleep lab dreaming** versus home dreaming have not been compared. Further, day dreams and wet dreams are missing from this literature.

It’s not clear whether participants reported **recall of nightmares** as well as dreams in these current studies, as nightmares were rarely mentioned, and they appear to be the focus of a different literature. Future studies might report both pleasant dreams and nightmares and comparisons between them.

Although two dream induction studies appeared in this literature, **no intervention studies** appeared, perhaps because the primary focus was on pleasant dreams, not nightmares. If these were pleasant dreams that had positive effects, interventions could have been conducted to facilitate dream recall. Despite these methodological limitations, this literature has been informative and suggestive of future research on the effects of dreaming.

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Conflicts of interest

The author declares there is no conflicts of interest.

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