How does music influence our dreams?

Beliz Dora Yaldiz

Abstract

We all know that strong emotions and significant events during the day can shape dream scenarios, but can music have a similar effect? There is a potential avenue for exploring this connection-- for example, whether falling asleep to music generally improves our sleep, which would in turn influence the frequency of dreaming. Additionally, the valence of music (positive or negative) might influence our dream content. While doing that research, the context was "it was commonly observed that sounds in our environment, while we slept, could affect our dreams." Besides, the results we obtained as a result of the research are anticipated and these results will be that there's a relationship between music beats per minute (BPM) and dream valence (positivity or negativity). Prospective mechanisms linking music to dream quality and content may be related to heart rate, blood pressure, and anxiety levels. These factors may be additionally influenced by the type, BPM, or genre of the music a person listens to. The changes in the content of the dreams people have are the emotions that the music reflects on them, emotions such as happiness, excitement, sadness, and anger that we can actively feel inside us. In addition, we will make use of the physiological, psychological, and neurological mechanisms of music in order to be able to make a more accurate analysis during this study.

Keywords: Neuroscience, Music, Sleep, Dream, Music Therapy

Introduction

Sleep is a naturally recurring state of reduced consciousness and physical activity in most animals, including humans. Dreams are images, thoughts, or feelings that occur during sleep [1]. Dreaming can happen during any stage of sleep, but dreams are the most prolific and intense during the rapid eye movement (REM) stage. Dreams during REM sleep are typically more vivid, fantastical, and/or bizarre even though they may involve elements of waking life [2]. Dreams with intense emotions, whether positive or negative, tend to be more memorable as they leave a more profound impression. The content of dreams can be influenced by several factors, such as emotional events, preoccupations, memories, and creative activities [3]. Strong emotions and noteworthy events during the day can shape dream scenarios, leading to content that mirrors one's waking life experiences [4]. Effects of emotion on memory specificity: Memory trade-offs elicited by negative visually arousing stimuli. Dreams may also facilitate problem-solving and creativity by allowing the brain to explore new connections and possibilities [5].

Music can affect sleep quality positively by promoting relaxation and reducing stress, leading to improved sleep onset and continuity. Music is a form of art and cultural expression that combines sound, rhythm, and melody to create an emotional and aesthetic experience for the

listener [6]. Music can evoke various emotions, trigger memories, and serve as a means of communication and storytelling [7]. Slow-tempo music with a low volume can help reduce heart rate, lower blood pressure, and decrease stress and anxiety levels, all of which can contribute to better sleep [8]. Different types or genres of music can evoke a wide range of emotional responses, from happiness and excitement to sadness and nostalgia. Music enhances memory and learning by engaging multiple brain areas simultaneously, as musical rhythms and patterns aid in information retention and cognitive processing [9]. Additionally, music has therapeutic effects, as relaxing melodies can lower stress levels and promote emotional well-being, which can contribute to better sleep quality. Music therapy, a review of the potential therapeutic benefits for the critically ill [10].

Music becomes a conduit for healing and transformation in the hands of skilled music therapists. Music therapists should have knowledge of a wide variety of music history and the power of musical elements [11]. These practitioners harness the harmonious interplay of melodies, rhythms, and emotions to guide individuals on a profound journey of self-exploration and healing. In short, music can impact sleep by reducing anxiety and stress and promoting restful sleep. It can also shape dream experiences, with soothing music potentially leading to more pleasant dreams. Music therapists use their knowledge to help individuals achieve peaceful pre-sleep states, indirectly influencing sleep quality and dream content.

Both music therapy and the most fundamental measurement method are used to detect brain waves during sleep, which is an electroencephalogram (EEG). Studies have confirmed the effectiveness of this synchronization, leading to an increase in delta brainwaves connected with deep sleep. Delta brainwaves are a type of brainwave that is characterized by their slow frequency and high amplitude. They are one of the four primary types of brain waves, the others being alpha, beta, and theta waves. Each type of brain wave is associated with different states of consciousness and mental activity. They are most commonly observed during deep, dreamless sleep stages, particularly during the stage known as slow-wave sleep (SWS) or deep sleep [12].

Methods

The field of neuroscience has provided valuable insights into the relationship between music, dreams, and sleep. Through rigorous research methods, researchers have been able to identify key findings and address common inquiries. This review sheds light on the connection between these three phenomena, providing a comprehensive understanding of the complex interplay between music, dreams, and sleep.

Studies focused on the interplay between music, dreams, and neuroscience employ a range of methodologies, encompassing psychological investigations, questionnaires, and dream diaries. Such research typically involves the exposure of participants to music prior to or during sleep, the maintenance of dream journals, and the administration of diverse neurological assessments. Typically, this research is conducted using a broad spectrum of study populations, including:

- *Healthy Adults:* The majority of research in this area centers on healthy adults. Studies reveal that music has a profound influence on dream content.
    - *Healthy Non-Musicians:* The bulk of research in this field is centered on healthy non-musicians. Music possesses a profound ability to influence the content of dreams, with factors like tempo and emotional tone significantly shaping nocturnal experiences.
    - *Healthy Musicians:* Musicians, a unique population with a deep connection to music, have also been a subject of study. The impact of music on the dream content of musicians is nuanced and may differ from that in non-musicians. Their musical expertise and familiarity with complex musical structures can lead to more intricate dream experiences. Neuroimaging studies indicate that the neural responses to music during dreams in musicians may exhibit distinct patterns compared to non-musicians.
- *Individuals with Sleep Disorders:* Studies targeting populations with sleep disorders, such as insomnia and sleep apnea, have sought to uncover how music interventions can enhance sleep quality and alleviate insomnia-related symptoms. Music-assisted sleep therapies have demonstrated promise in improving sleep architecture, known as the pattern of sleep as it progresses through various stages during a typical sleep cycle, and reducing disturbances.
- *Trauma Survivors:* Trauma survivors, including those with post-traumatic stress disorder (PTSD), have been the focus of many studies. Music therapy, often combined with dream journaling, is utilized to help individuals process traumatic experiences and decrease the frequency of nightmares [13].
- Music therapy often improves sleep quality, reduces sleep latency, and decreases night awakenings for individuals with sleep disorders [14]. Music therapy enhances motor coordination, cognitive engagement, and emotional well-being for patients with neurological conditions like Parkinson's and Alzheimer's [15].
- Besides, research indicates that music can influence both the content and quality of dreams [16]. Factors such as tempo, emotional valence (negativity or positivity associated with a particular emotion and experience), and personal associations with music can shape the emotional tone and narrative of dreams [17]. For instance, a dreamer's deep personal connection to a slow, nostalgic song might lead to dream scenarios that mirror the song's emotions, with the dream's tempo and emotional valence shifting to match the dreamer's feelings and experiences within the dream.

Dreams are highly subjective, and their interpretation can be influenced by individual differences, personal experiences, and cultural factors [18].

Music has a powerful impact on human emotions, and it can be used to convey a wide range of feelings. In dreams, music can serve as a source of emotional expression, mirroring the

dreamer's emotional state. Some people report experiencing sadness, nostalgia, or even anxiety when they are listening to music, depending on the context and the specific music involved [19]. Music can also significantly reduce anxiety, stress, and other factors that can interfere with good-quality sleep [20]. However, the effectiveness of music in promoting better sleep can depend on various factors, including the type of music and individual preferences. Individual preferences play a significant role in determining how effective music is in influencing emotions and mood. People's emotional connections, musical tastes, cultural backgrounds, personal associations, and current psychological states all contribute to the effectiveness of music. What resonates emotionally is highly personalized and varies from person to person, making music a subjective and individualized experience. To use music effectively for emotional regulation or therapeutic purposes, it's essential to consider an individual's unique musical preferences and associations [21]. Slow-tempo, calming music can help relax the mind and reduce stress and anxiety. Music with a gentle melody and soothing harmonies can have a calming effect on the nervous system. Music with a slow tempo can help lower heart rate and blood pressure, promoting a more relaxed physiological state conducive to falling asleep.

Contextualizing

The idea that dreams involving music are connected to positive emotions is a topic of interest in the field of dream research. While it is important to note that dreams are highly subjective experiences and can vary widely from person to person, there is some evidence to suggest a connection between music in dreams and positive emotions.

Additionally, studies have demonstrated that sleep plays a crucial role in maintaining overall health, particularly concerning the brain and the body. Insufficient or poor-quality sleep can have detrimental effects on various physiological processes and increase the risk of various health conditions [22]. So, the lesson to be drawn from this is that sleep is important for both brain development and the body. Music can have an impact on brain development during sleep in various ways. It can enhance memory consolidation (the process by which newly acquired information is converted into long-term memories in the brain), regulate emotions, influence dream content, and stimulate auditory processing (means to engage and activate the brain’s ability to process and make sense of auditory information or sounds).

There is evidence that sleep is linked to the functioning of neural circuits involved in mood and emotion regulation. A review in “The Role of Sleep in Emotional Brain Function” [23] discusses the neurobiological mechanisms underlying the relationship between sleep and mental health, such as memory consolidation, emotion regulation, neurotransmitter balance (refers to the equilibrium of chemical messengers in the brain, like serotonin and dopamine), brain plasticity (signifies the brain's ability to adapt, rewire, and reorganize itself in response to new experiences, learning, and recovery from injury), stress hormone regulation (involves the control of hormones like cortisol, ensuring they are released appropriately to manage stress and maintain bodily equilibrium), frontal lobe activity (pertains to the functioning of the brain's frontal lobes, responsible for executive functions such as decision-making, problem-solving, and emotional regulation), and neural network connectivity (refers to the interconnectedness of brain regions,

highlighting how various parts of the brain communicate and collaborate to support different cognitive and emotional processes), all of which highlight the crucial role of sleep in maintaining mental well-being. It delves into the neurobiological mechanisms that underpin the connection between sleep and emotional brain processing, investigating how sleep affects the brain's ability to handle emotions.

On top of that, sleep disturbances are often related to mental health disorders such as depression, anxiety, and bipolar disorder and can impact stress management and resilience [24]. However, chronic poor sleep can also increase the risk of developing these conditions by disrupting neurobiological processes shared between sleep regulation and mental health. Sleep-related functioning in euthymic patients with bipolar disorder, patients with insomnia, and subjects without sleep problems [24].

Moreover, research in neuroimaging has demonstrated the brain-activating effects of soothing music, particularly in regions associated with stress reduction and relaxation like the prefrontal cortex and limbic system. The term "brain-activating" typically refers to activities, stimuli, or substances that stimulate or activate the brain's neural activity. In addition, music with a slow tempo of around 60-80 beats per minute can synchronize with the brain's natural rhythms, aiding in the transition from wakefulness to sleep [25]. Moreover, music has a direct impact on the amygdala, a crucial center for emotional processing, such as emotional activation, emotion regulation, enhanced memory, and stress reduction. It is possible to say, "To define emotional activation and regulation, music has the power to evoke a wide range of emotions in listeners." [26] [27]. Positive, calming music can help individuals manage emotional stressors that may otherwise hinder sleep initiation [28]. It should be taken into consideration that the impact of music on sleep is subject to personal variation and can be affected by individual preferences, musical inclinations, previous encounters, and underlying neurological conditions, including sleep disorders.

Conclusion

The connection between music and dreaming varies between individuals.

Although some empirical studies imply that there is a relationship between music and dreaming, others do not support this conclusion. Researchers measured the frequency and the dream content during sleep with music compared to sleep without music.

This literature review sheds light on the potential influence of music, with its diverse qualities and genres, on the content and quality of our dreams. The interplay between music and the dream world is complex, with factors such as tempo, emotional valence, and personal associations with music playing a role. The connection between music and dreams presents intriguing possibilities for future studies that delve deeper into the specific mechanisms underlying this relationship.

Additionally, the therapeutic potential of music in the context of sleep disorders and mental health is noteworthy. Slow-tempo, calming music can effectively reduce anxiety, stress, and promote relaxation; thus enhancing the conditions conducive to sound sleep. Music therapists, with an understanding of music's profound impact, have harnessed its power to guide individuals on journeys of healing and self-exploration.

Recognizing the significance of sleep in maintaining overall health and well-being, it is essential to acknowledge the intricate neural and emotional processes that occur during this essential state. Sleep disturbances have been linked to various mental health disorders, further emphasizing the importance of exploring avenues like music therapy to improve sleep quality and emotional regulation.

In essence, the relationship between music, dreams, and sleep is multifaceted and dynamic, with each element influencing the other in intricate ways. As our understanding of this connection continues to evolve, it presents exciting prospects for improving sleep, enhancing emotional well-being, and harnessing the therapeutic potential of music in our lives.

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