

Dreaming and Their Role in the Body

Introduction

Dreams are definitely a common phenomenon amongst humans when sleeping and studies about the purpose of dreams and how they function have shown some revolutionary breakthroughs. With that being said, there is still much to discover in the field of dreams that leaves many researchers and students of biology like myself very curious about what dreams are and mean, how they work and what purpose they serve to the overall body.

Dreams and their Psychological Meaning

Dreams themselves are images or stories created during sleep. These images are most vivid during REM sleep, also known as Rapid Eye Movement and the stories created in dreams can sometimes be uncannily detailed and descriptive of one's life and while it might be an out-of-body experience it is perfectly normal to notice much of one's real life to be in their dreams in a distorted setting¹. When it comes to the meaning of dreams, however, this is when we see more competing theories. A neurobiological study suggested the Activation Synthesis model of dreaming which proposed that dreams do not generally mean anything proposed by Harvard University psychiatrist John Allan Hobson and Robert McCarley². This theory proposes that dreams serve the purpose of trying to truly internalize and understand the events of the day prior to rest and as you are dreaming and in the REM state. The substance for this comes from the observation that circuits in the brain stem are activated during REM sleep that indicates systems involved in emotions, sensations and memories all become active³. This is in stark contrast to the original theory on the meaning of dreams proposed by Sigmund Freud who stated that dreams do definitely have a meaning and it generally represents unresolved conflicts on

unsatisfied wishes and the dreams are a means to satisfy these problems. An alternative theory of the meaning of dreams compared to both the Activation Synthesis theory and Freudian theory was that of Threat Simulation Theory². Threat Simulation Theory states that dreams are a mechanism of defense to simulate threatening events that allows the person to basically undergo trial and error in threatening situations in order to protect themselves outside the dream. This theory also has substance as in a study performed by Katja Valli that took seriously traumatized children and tested brain activity compared to children that have not faced similar trauma and the study found that kids that faced more trauma had much more brain activity in the brain stem indicating higher dream activity and longer periods of dreaming⁴. Overall between all of these theories, the general consensus is that to pinpoint one sort of meaning for our dreams and what they do to us is difficult.

How Dreams Come About

After discussing the premise of dreams and why they may occur, it is necessary to harken back and discuss how dreams work. Dreams generally occur during the REM stage of sleep as described earlier. REM (aka Rapid Eye Movement) sleep occurs around halfway into the sleep cycle and what happens physically is just as it sounds, your body is in complete rest and is not moving but signals or emotions are evoked by certain images in one's mind during the dream⁵. While one is dreaming, it is very interesting that cortical parts of the brain that contribute to higher-order functions such as language combined with the lower part of the brain like the brain stem connected to the spine are the two most active parts of the brain during the dream state. The cortical part of the brain functions to create the images and the general story of the dream and this is demonstrated through its high activity. Because the cortical region of the brain controls

information processing⁶, with the observed high activity in that area it makes sense that this is the area of the brain that is fabricating the dream based on the past day's experience. Now the other part of the brain that stays active during this is the lower area or the brain stem. This is to keep the body in little to no movement during the events of a dream because of the brain stem's connection to the spine to keep things limited.

Conclusion

The science behind how dreams work seems to make some level of sense at this point. We at least understand how dreams are generally made in the mind and how they work through REM sleep and what parts of the brain are active and what purpose each part might be serving. However, there are still questions when it comes to the science of dreams such as why do we dream. What the evolutionary advantage is for us as humans to dream and for this there are 3 equally prevalent competing theories in the Freudian theory, the Activation Synthesis Model and the Threat Prevention model. With 3 competing theories as to why we dream, it begs to question which one is the prevailing theory and to answer such a question more research needs to be done in this field of the purpose of dreaming.

References

- [1] WebMD. (n.d.). *Dreams: Why We Dream, Nightmares, and Lucid Dreams*. WebMD.
<https://www.webmd.com/sleep-disorders/dreaming-overview>
- [2] *Dream Meanings 101: What Dreams Mean & Why We Have Them?* The Sleep Matters Club.
(2021, June 2).
<https://www.dreams.co.uk/sleep-matters-club/do-people-actually-believe-dreams-mean-something-to-us/>
- [3] Cherry, K. (2020, April 17). *How Does the Activation-Synthesis Model Explain Dreams?*
Verywell Mind.
<https://www.verywellmind.com/what-is-the-activation-synthesis-model-of-dreaming-2794812>
- [4] Valli, K., Revonsuo, A., Pääkäs, O., Ismail, K. H., Ali, K. J., & Punamäki, R.-L. (2003, March 25). *The threat simulation theory of the evolutionary function of dreaming: Evidence from dreams of traumatized children*. *Consciousness and Cognition*.
<https://www.sciencedirect.com/science/article/abs/pii/S1053810003000199>
- [5] Details, A., & Thompson, — L. (2018, October 4). *Your guide to sleep disorders*. Vital Record. <https://vitalrecord.tamhsc.edu/sleep-disorders-guide/>
- [6] Neurosci. (2021, January 26). *Know Your Brain: Cerebral Cortex*. Neuroscientifically Challenged.
<https://www.neuroscientificallychallenged.com/blog/know-your-brain-cerebral-cortex>