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# Is Visual Perception Required for Dreaming?

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Once upon a time, dreams were considered to be premonitions of the future or a way for the gods to commune with us.[1] Since the late 19th century, that definition has become a bit more scientific.[1] Now, there is a plethora of information on how and why we dream. Some neural mechanisms include the activation-synthesis model, PGO waves, the activation, input, and modulation model, and the dopaminergic forebrain mechanism.[1] Furthermore, dreams are known to play a crucial role in emotional and cognitive development, the security of personality, and the integration and promotion of creativity and divergent thinking.[1] However, most of the above information is merely a hypothesis, as dreams are difficult to define, and, therefore, are perplexing to understand.[1] Furthermore, dreams are often forgotten, so any information reliant on humans' communication is hard to produce.[1] While dream research in itself is extremely interesting, I thought it would be fascinating to better understand the mechanisms behind dreams in blind people. If you can't see, can you still dream? In this podcast, that is the very question I aim to answer. Throughout the course of this video, I will be discussing different studies done to determine if the blind can dream.

There are two different types of visual impairment: congenital blindness and late blindness. Late blindness occurs in individuals who aren't born blind, as opposed to congenital blindness, in which individuals are blind at birth.[2] In this first study, researchers performed an observational study to evaluate the content of dreams in sighted controls, late blind participants, and congenitally blind participants.[2] Researchers collected written reports daily for four weeks entailing the sensory elements of the dream, thematic and emotional details, and if they had a nightmare instead of a dream.[2] Furthermore, they assessed sleep quality, level of anxiety and/or depression, and their ability to visualize images. It was concluded that blind participants had a decrease in visual representations in their dreams, but had more nonvisual (auditory, gustatory, olfactory, and tactile sensations)

representations than seeing individuals.[2] These findings were most extreme in the congenitally blind individuals. However, there was no difference found in thematic and emotional details.[2] Furthermore, congenitally blind individuals experienced more nightmares than the other two groups.[2] Another conclusion was the blind people had poorer sleep quality than the control group.[2]

In this next experiment, they specifically focused on measuring nonvisual imagery in congenitally blind individuals.[3] While it is known that blind people can experience visual dreams, these researchers thought to analyze keywords from a dream database, DreamBank.[3] They predicted they would find fewer visual keywords and more keywords relating to auditory, olfactory, gustatory, and haptic senses.[3] They proved their hypothesis true: blind subjects were more likely to describe the above listed sensations than sighted subjects.[3] Blind individuals still were able to use adjectives including color and aesthetic discernments, but not as frequently as sighted subjects.[3] Interestingly, there was no difference found in the subject of luminosity.[3] It is known that blind individuals have stronger senses due to their inability to see, so it is understandable this reflects in their dreams.[3]

This final study investigates a congenitally blind individual's ability to produce visual imagery.[4] In addition to interviews and drawings regarding imagery, researchers also measured EEG components, a test that measures the brain's electrical activity, during sleep and produced graphs involving dream image representations.[4] Recordings were made while the subjects were sleeping as well as scheduled times where subjects were awoken to collect data. In the morning, subjects were asked to draw visuals from their dreams with their eyes closed.[4] While both groups were able to produce visuals from their dreams, blind subjects recalled a lower number of dreams than sighted individuals.[4] It is extremely interesting to find that not only could blind subjects describe their dreams verbally but also produce drawings of them.[4] Furthermore, blind individuals had significantly lower EEG alpha power.[4] The results of this study indicate blind people have the ability to visualize, and that visualization is independent from optical perception.[4]

So, the answer to my question is yes, blind people can dream. Even without visual perception, individuals can compensate with other senses in order to create imagery in their dreams.[3] Whether the person is congenitally or late blind, oneiric visualization is still possible.[2]

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