**Do Blind People See in Their Dreams?**

*A recent paper looks at visual activity in blind subjects' dreams.*

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During [sleep](https://www.psychologytoday.com/us/basics/sleep), one type of electrical oscillation in the brain called PGO waves (Ponto-Geniculate-Occipital) are thought to activate the visual cortex and serve as a visual dream generator during REM sleep. These particular brain oscillations appear just before REM sleep begins (about 30-90s), and they project from the brainstem to the occipital cortex and visual system.

The location of PGO waves seems to indicate where and when eye movements will occur, and these eye movements in turn are thought to indicate where one is viewing visual dream content. For instance, PGO waves on the right side of the brain will precede an eye movement, and visual dream content, in the right visual field; PGO waves on the left side predict eye movements to the left. It seems that these electrical oscillations are thus stimulating eye movements and exciting corresponding areas of visual cortex, with dream visuals being ‘seen’ where the activity has occurred.

A recent research paper (Bértolo, Mestre, Barrio, & Antona, 2017) was designed to answer the question of whether blind subjects exhibit eye movements and visual activity during REM sleep similar to sighted subjects, and if so, whether this is the case even in blind subjects who have been blind since birth. In fact, studies have shown that the dreams of blind subjects who lost vision later in life contain colors, movement, and visual patterns similar to reports of sighted individuals. This is not unexpected, since subjects who became blind later in life would still have [memories](https://www.psychologytoday.com/us/basics/memory) of visual experience and thus maintain a capacity for visual imagery.

But what about those who have been blind since birth, and thus have no visual memories at all?

“When a blind man is asked if he dreams the answer is immediate: "Yes!" But if we ask him if he sees anything in the dream, the answer is always doubtful because he does not know what it is to see. Even if there were images and colours in his brain during the dream how could he recognize them? There is, therefore, no direct way, through the dream reports, to evaluate the presence of visual activation in the dream of congenitally blind subjects.” --Bértolo, Mestre, Barrio, & Antona, 2017

Because the researchers felt it impossible to know for sure the visual quality of imagery based on dream reports, they decided to additionally study the eye movements during dreams of congenitally blind subjects. 20 adult subjects were recruited for the study, including 10 congenitally blind and 10 sighted subjects. All of the subjects underwent two consecutive nights of polysomnographic recordings at home, with several awakenings for dream recall.

The initial results found that the frequency of dream recall did not differ between the two groups, with an average of 60% dream recall reported following REM sleep awakenings.

The dream reports of the blind subjects were reported as perceptually vivid and contained reference to visual, tactile, auditory and kinesthetic sensation. There was no difference between the two groups in the vividness of the dreams or even in the quantity of visual content reported.

Nevertheless, the blind subjects had fewer rapid eye movements than the sighted subjects, although they did have eye movements, and these eye movements did correlate with visual dream recall. The authors argue that “The fact that blind subjects present [rapid eye movements] and that these are correlated with visual dream recall is another result supporting our argument that they do activate visual areas during dream, being able to generate their own visual imagery.”

To explain the finding, that subjects who have been blind since birth still seem to exhibit visual activity during REM sleep and [dreaming](https://www.psychologytoday.com/us/basics/dreaming), the authors turn to another study of eye movements in individuals who have never experienced any visual input: human fetuses.

Schöpf et al. (2014) conducted a study comparing in utero eye movements to [neural](https://www.psychologytoday.com/us/basics/neuroscience) activity using fMRI data acquired from seven fetuses. During the study, fetal eye movements were recorded and corresponded with fMRI data. Results showed that already in utero, fetal eye movements correspond with activity in visual and frontal cerebral areas. This suggests that the human visual system is active even prior to birth.

The authors thus argue that “…if fetuses can dream, presumably with visual imagery, without ever having visual experience, who’s to say the same cannot happen with blind subjects. Therefore, we propose that our results support the hypothesis that congenitally blind [rapid eye movements] during dreams …are able to generate visual imagery without visual experience.”