

Inducing lucid dreams with optimized sensory cues

ABSTRACT:

Background

Methods for reliably inducing lucid dreams could help open the door to this unique state for exploration by humanity. This is widely desired but remains elusive. Here we tested stimuli and physiological variables to move scientific research forward toward this goal.

Aims

The primary aim of this grant was to conduct psychophysiological research on lucid dreaming to optimize techniques to successfully induce lucid dreams. In part 1, we tested the effect of cue stimulus salience and physiological parameters on external cue incorporation into dreams. In part 2, we evaluated the physiological conditions optimal for lucid dreams.

Method

Participants were recorded with EEG and polysomnography. Visual stimuli were delivered at 2 Hz and 4 Hz through LED lights in a sleep mask during REM sleep. Participants signaled lucidity by means of eye movements. Upon awakening, they completed a questionnaire that assessed incorporation and lucidity.

Results

Study 1: 16/49 (32.6%) of visual stimuli were incorporated. No significant difference between 2 and 4 Hz was observed and no participants achieved lucidity from the cue. Pre-stimulus oscillatory power in the 8-30 Hz band was reduced at occipital sites in incorporation ($p < 0.05$).

Conclusions

Together these findings lay the foundation for a synergistic approach to lucid dream induction combining physiological criteria for lucidity and successful cue incorporation. Continued development of technology to deliver sensory cues with optimized physiological targeting is the next step toward realizing this goal.

Keywords

Lucid dreaming, Dreaming, REM sleep, Sensory induction

Published Work:

Baird, B., Aparicio, M. K., Alauddin, T., Riedner, B., Boly, M., & Tononi, G. (2021). Episodic thought distinguishes spontaneous cognition in waking from REM and NREM sleep. *Consciousness and Cognition*, 97, 103247. doi: 10.1016/j.concog.2021.103247

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Baird, B., LaBerge, S., & Tononi, G. (2021). Two-way communication in lucid REM sleep dreaming. *Trends in Cognitive Sciences*, 25(6), 427–428. doi: 10.1016/j.tics.2021.04.004

Baird, B., Tononi, G., & LaBerge, S. (2022). Lucid dreaming occurs in activated rapid eye movement sleep, not a mixture of sleep and wakefulness. *Sleep*, 1-15, 103247. doi: 10.1093/sleep/zsab294

LaBerge, S., Baird, B., & Zimbardo, P. G. (2018). Smooth tracking of visual targets distinguishes lucid REM sleep dreaming and waking perception from imagination. *Nature Communications*, 9: 3298. doi: 10.1038/s41467-018-05547-0

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