LuciEntry: A Modular Lab-Based Lucid Dreaming Induction Prototype

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ABSTRACT

Lucid Dreaming, a unique state of consciousness whilst asleep where dreamers can engage in volitional actions not limited by the constraints of the physical world and control their dream contents, offers various mental and physical health benefits. Current research combining multiple lucid dreaming induction techniques is often conducted in a lab setting, lacking autonomy by relying on researchers to monitor manually. Recent studies also advocate for a modular system that can integrate multiple lucid dreaming induction techniques. We present LuciEntry, a prototype that includes a mobile app that guides users through pre-sleep cognitive training and a system that assesses the user's sleep stage and triggers the external stimuli automatically to induce lucid dreams. We hope that this modular autonomous system will improve the research process, aiding in further research into lucid dreams.

CCS CONCEPTS

• **Human-centered computing → Interaction devices**.

KEYWORDS

Lucid dreaming; induction; portable; autonomous; modular; interactive devices; prototype; system

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1 INTRODUCTION AND RELATED WORK

Lucid Dreaming, a unique state of consciousness whilst asleep [1] where dreamers can engage in volitional actions not limited by the constraints of the physical world and are able to control their dream contents [6], offers various mental and physical health benefits [5]. Some of these benefits include gaining self-confidence and self-control [3]. Therapies focused on lucid dreams can also be useful for treating sleep disorders [4].

Recent research has trended towards combining induction techniques in a lab setting to induce lucid dreams. Examples are where cognitive training is combined with external stimuli to help improve the success rate of inducing lucid dreams [2]. However, researchers need to manually trigger the external stimuli at the appropriate time, which is when continuous Rapid Eye Movement (REM) sleep is detected [2]. Furthermore, whenever researchers want to try a different combination of stimuli, a new system and protocol have to be developed to test out the success of the combination in inducing lucid dreams. These limitations present difficulties for the research of lucid dream induction.

2 LUCIENTRY

Therefore, we designed LuciEntry, an autonomous and modular lucid dreaming induction prototype. This system includes a mobile app for pre-sleep cognitive training and a modular autonomous system for triggering external stimuli. This modular system provides researchers with a platform to try different combinations of lucid dreaming induction techniques and even add new devices in the future easily when newly developed lucid dream induction techniques are discovered. The system also includes a sleep tracker headband that senses users' brain and eye signals using electroencephalography (EEG) and electrooculography (EOG) sensors to determine the sleep stage of the user. When the REM stage is detected, LuciEntry autonomously delivers stimulation, such as visual, auditory, and electrical stimulation to induce lucid dreams. This

automation eases the process of lucid dream induction, removing the need for researchers to manually trigger external stimulation devices.

3 CONCLUSION

With LuciEntry, we hope to reduce the dependency on researchers to activate any stimulus manually. Instead, researchers have the opportunity to conduct lucid dreaming induction studies with more ease, with the use of our autonomous system. With this novel lucid dream induction system, we hope to aid further research into lucid dreams and their associated benefits.

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REFERENCES

[1] Benjamin Baird, Sergio A. Mota-Rolim, and Martin Dresler. 2019. The cognitive neuroscience of lucid dreaming. *Neuroscience & Biobehavioral Reviews* 100 (2019), 305–323. https://doi.org/10.1016/j.neubiorev.2019.03.008

[2] Michelle Carr, Karen Konkoly, Remington Mallett, Christopher Edwards, Kristoffer Appel, and Mark Blagrove. 2020. Combining presleep cognitive training and REM-sleep stimulation in a laboratory morning nap for lucid dream induction. *Psychology of Consciousness: Theory, Research, and Practice* (2020).

[3] Daniel Erlacher and Michael Schredl. 2010. Practicing a motor task in a lucid dream enhances subsequent performance: A pilot study. *The Sport Psychologist* 24, 2 (2010), 157–167.

[4] Brigitte Holzinger, Bernd Saletu, and Gerhard Klösch. 2020. Cognitions in sleep: lucid dreaming as an intervention for nightmares in patients with posttraumatic stress disorder. *Frontiers in Psychology* 11 (2020), 1826.

[5] Stephen LaBerge. [n. d.]. *Benefits of Lucid Dreaming.* https://www.altered-states.net/barry/newsletter482/

[6] Donald W Stewart and David Koulack. 1989. A rating system for lucid dream content. *Imagination, Cognition and Personality* 9, 1 (1989), 67–74.