Two-Way Communication Between Dreamers and Experimenters

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Introduction

- A lucid dream is when a dreamers is aware that they are dreaming while still asleep

- Prearranged signals, such as eye movements, can be detected with PSG during REM sleep, and allow **communication out of dreams** [1]
- Simple tones and flashing lights have been used to **communicate into dreams**, but transmit minimal information[2]
- Some evidence of incorporation of verbal stimuli in lucid dreams[2]

- By combining these methods, we converse with lucid dreamers in real time

Procedure

1. At their normal morning wake time (cases 1-3, 6) or an hour before their normal bedtime (cases 4-5), participants are wired up with electrodes

2. For 20 minutes before sleep, participants undergo Targeted Lucidity Reactivation training to associate sound and light (cases 2-5) cues with a lucid mindset

3. Cues are presented again during REM sleep every 15-60 seconds to trigger lucid dreams[3]

4. After participant signals lucidity, or after ~15 cues are played without response, questions presented softly

5. If response apparent, participant woken for dream report

References

1. LaBerge, S.P, Nagel, L.E., Dement, W.C., Zarcone, V.P. Jr. (1981). Lucid dreaming verified by volitional communication during REM sleep. *Perceptual Motor Skills, 52(3)*, 727-732.
2. Stumbrys, T., Erlacher, D., Schadlich, M., Schredl, M. (2012). Induction of lucid dreams: a systematic review of evidence. *Consciousness and cognition, 21(3),* 1456-1475.
3. Carr, M., Konkoly, K. Mallett, R., Edwards, C., Appel, K., Blagrove, M. (2020). Combining pre-sleep cognitive training and REM-sleep stimulation in a laboratory morning nap for lucid dream induction. *Psychology of Consciousness: Theory, Research, and Practice.* In press.

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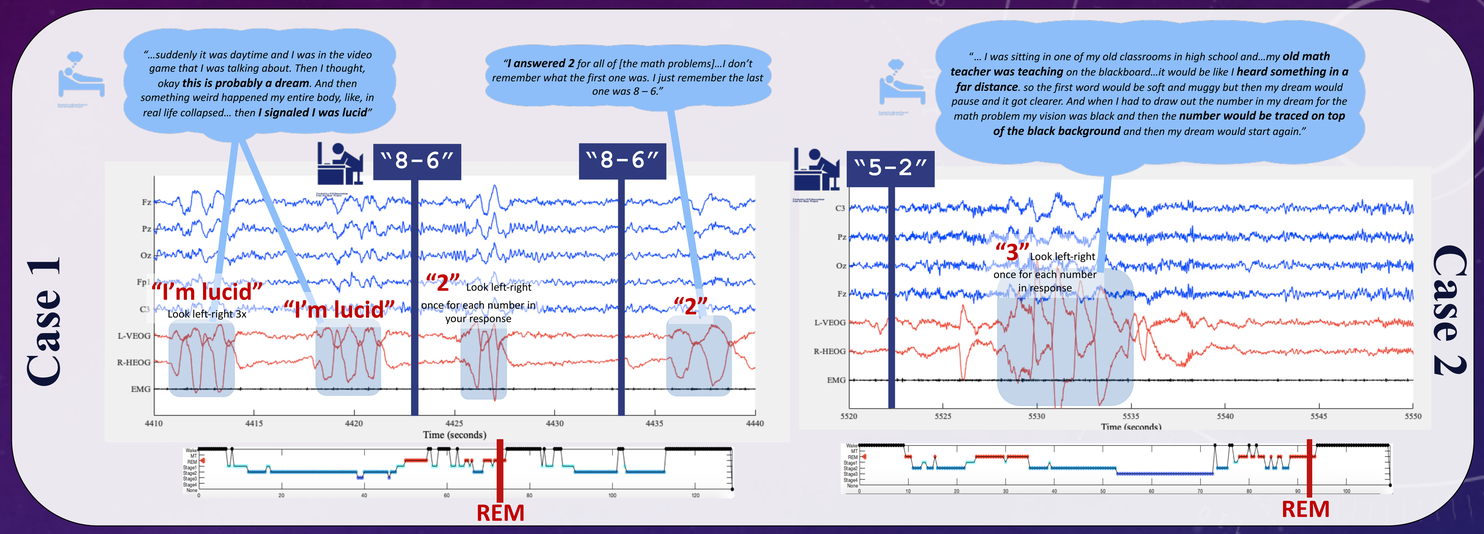
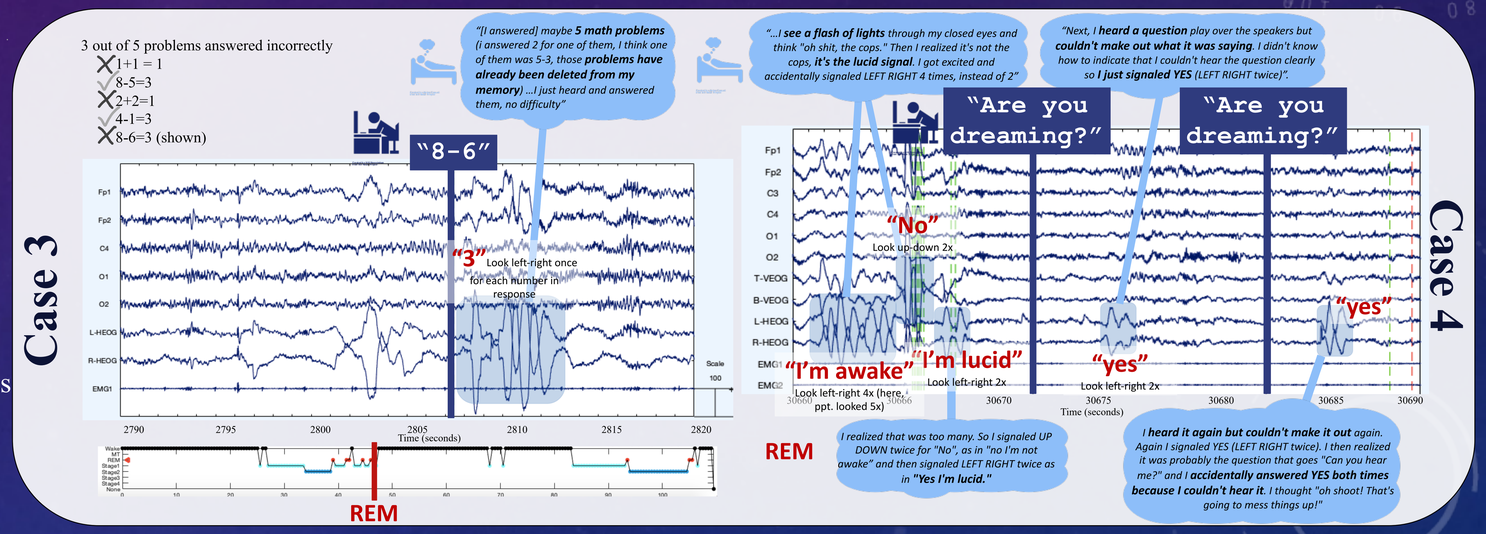
Proof of concept

- Participants can correctly answer math problems during REM sleep
- Veridical perception of external stimuli during sleep
- Sufficient working memory to compute mathematical responses



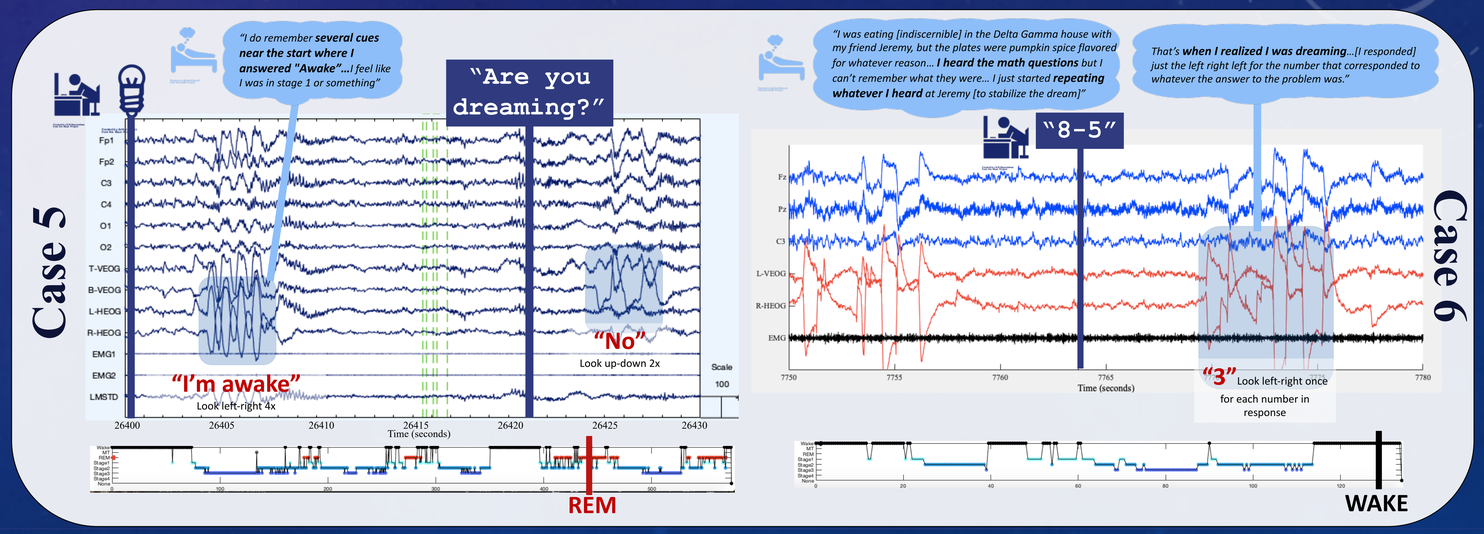
Two-way (Mis?)-communication

- In case 3, participant answered 3/5 math problems incorrectly during sleep
  - Error in perception or computation
- In case 4, participant did not have the eye-signal vocabulary to express what she needed to say– "never mind!" and "speak up- I can't understand you!"



Misperceptions of sleep and wake

- In case 5, participant was in REM sleep, but communicated that they were awake and not dreaming
- In case 6, participant reported a dream in which she answered lucid signals and math problems, yet according to standard criteria, she was awake



Want to talk more? E-mail me at karenk@u.northwestern.edu or
Zoom me from 2-5pm EST on 5/4. Meeting ID: 406-99–9446