Targeted Memory Reactivation During Sleep with Odours: A Prospective Alcohol Use Disorder Extinction Method

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Background

During sleep, memories are reprocessed and transformed offering a unique opportunity to manipulate them. [1]

Odours can play a major role in accessing and manipulating memories that are replayed during sleep. *Hauner et al.* has shown that during SWS, exposure to the external cues does influence fear memory consolidation; therefore in extent fear extinction can be achieved during sleep. [2]

Addiction develops through basic reward memory mechanisms that enhance learning and maintenance of maladaptive behaviour.

With their findings, *Rasch et al.* report that during SWS, odour-based reactivations boost the consolidation of the declarative memories. Moreover they state that their results indicate that implicit reactivations do have a causal link with the consolidation of hippocampal memories during sleep. [3]

Aim: Extinguishing addiction memory by targeted reactivation cues presented during sleep via olfactory stimuli presentation

Proposed Experimental Methods

Participants

A sample of AUD patients from the addiction clinic of ZI will be admitted to the experiments The in patients will be accepted from the patients who will be, at the time, in the last week of their three week AUD rehabilitation

Experimental stimuli

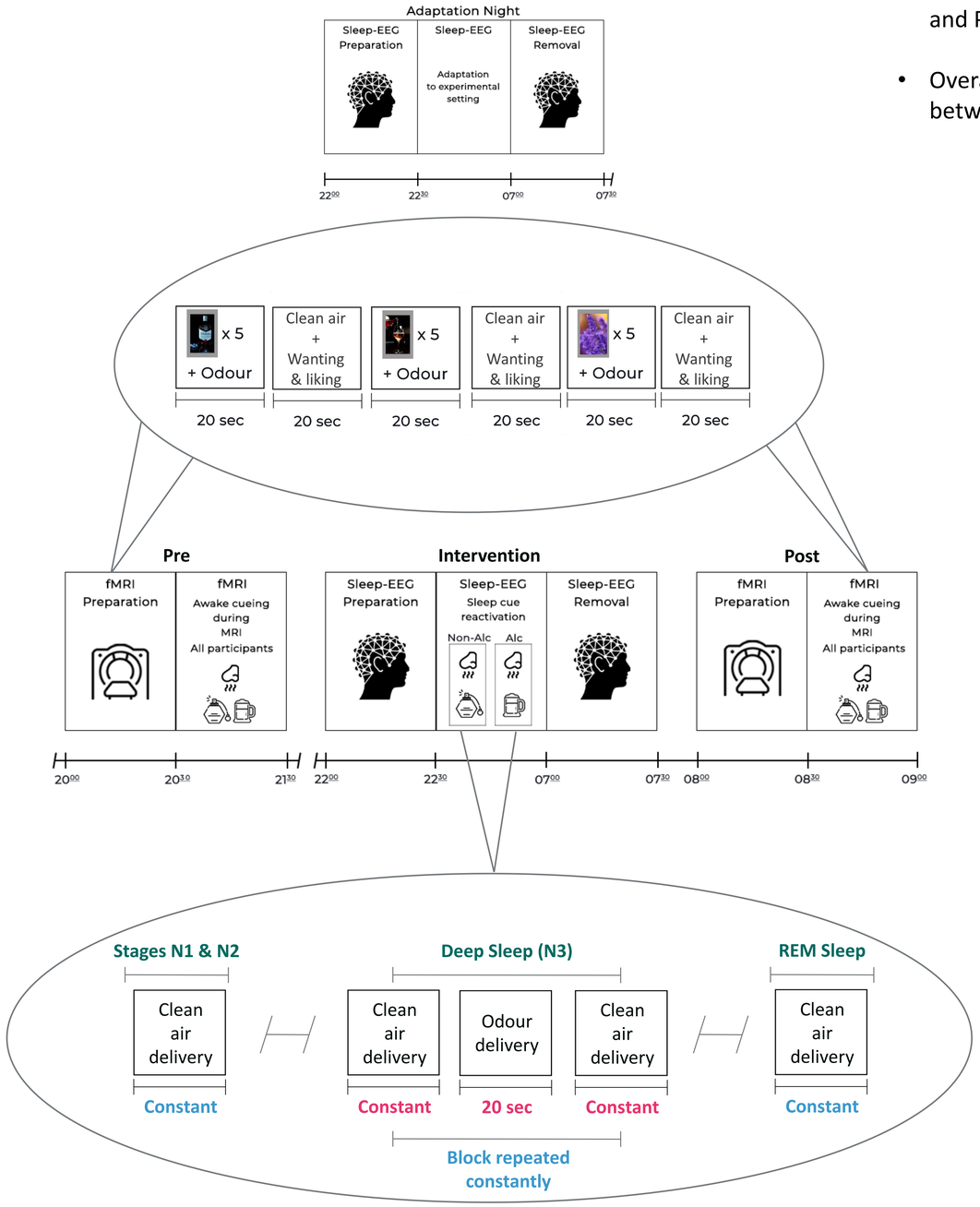
MRI Tasks

All participants will receive both alcoholic and control conditions with a blocked design.
More details: Visit the poster **3.4.16** on Friday 28th of April

Sleep-EEG

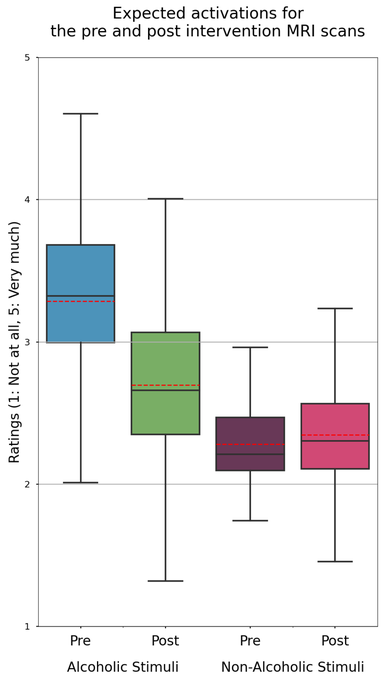
Participants will be blindly assigned to two groups: First group will receive only alcoholic odours and the second group will only receive the control odour.

Proposed Experimental Timeline



Expected Outcomes

- **Decreased** activation toward alcoholic cues between Pre and Post MRI scans.
- Overall **similar** activation toward non-alcoholic cues between Pre and Post MRI scans.



More details here:

Literature

[1] G. B. Feld and J. Born, "Neurochemical mechanisms for memory processing during sleep: basic findings in humans and neuropsychiatric implications," Neuropsychopharmacol., Aug. 2019.

[2] Hauner, K. K., Howard, J. D., Zelano, C., & Gottfried, J. A. (2013). Stimulus-specific enhancement of fear extinction during slow-wave sleep. Nature Neuroscience, 16(11), 1553–1555. https://doi.org/10.1038/nn.3527

[3] Rasch, B., Büchel, C., Gais, S., & Born, J. (2007). Odor Cues During Slow-Wave Sleep Prompt Declarative Memory Consolidation. Science, 315(5817), 1426–1429. https://doi.org/10.1126/science.1138581