

DeSMRRest (#68915)

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1) Have any data been collected for this study already?

No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?

We predict, that there is evidence for sequential replay of previously learned sequences of objects in a post-task resting state, while there is no evidence for sequential replay in the pre-task resting state. Research Question: Can post-task replay be discovered in the post-task resting state?

3) Describe the key dependent variable(s) specifying how they will be measured.

Brain states of the two resting states will be divided into ten distinct states corresponding to the representations of the ten object stimuli. Evidence for sequenceness of these states with regard to the learned sequence will be measured using the TLDM algorithm.

4) How many and which conditions will participants be assigned to?

Two conditions: A 8-minute closed-eye resting state before stimulus exposure and after learning of a sequence of ten objects.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

A localizer will be run in which the participants will see each of the 10 stimuli 54 times, divided in 2 blocks of 27. The order of stimuli is counterbalanced by a debruijn-sequence. The word of the stimulus (e.g. "car") will be played before the visual appearance. Each stimulus appears as a distractor 6 times, in which an incongruent word will be played, to which the participants must react. To create a localizer, the MEG recordings will be epoched starting from the visual display of the stimuli to 300ms after stimulus onset. A machine learning classifier will be created on the data to create a decoder that is able to distinguish between the different stimuli. The two resting state segments from before and after the main experiment are taken and normalized in the same way as the epoched localizer data. Then, the segments are divided into blocks of 30 seconds. Blocks are divided into the training and test set in an interleaved manner, where from the first 15 participants, the even numbered 30-second segments are taken for training, and from the last 15 participants the uneven numbered segments are taken for training (starting the count at 0). Half of the blocks (8x30s=4 minutes total) are used for an explorative analysis to validate different machine learning classifiers and training paradigms. The other half (8x30s=4 minutes total) will be used once a final configuration has been set, and will only be used after the explorative phase has been finished.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

Localizer trials with button presses (both false alarm and correct recognitions of incongruent distractor trials) will be discarded, and for balancing reasons, the same number of trials will be discarded for each stimulus category, beginning from trial index 0. Participants with more than 25% missed distractor trials will be excluded.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

30 participants will be recruited from the age 18-35, gender balanced.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)