

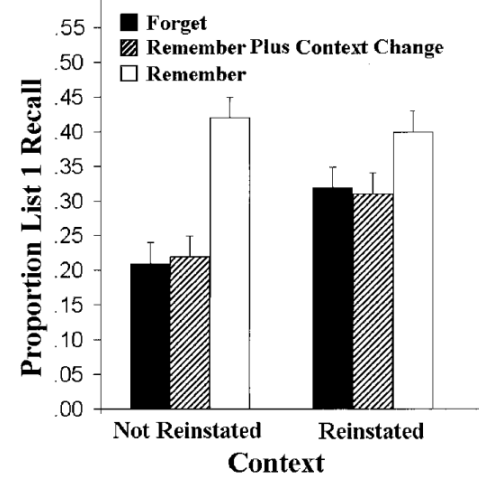


ERP and Oscillatory Dynamics Differentiate Forget and Thought Substitution Cues in Intentional Forgetting

Ryan J. Hubbard, Lydia Jiang & Lili Sahakyan
University of Illinois, Urbana-Champaign

Introduction

- Directed forgetting leads to impaired memory, but the mechanism remains unclear
- Shifting context leads to similar forgetting in list-method forgetting (Sahakyan & Kelley, 2002)
- Inhibition may also be a mechanism (Anderson & Hanslmayr, 2014)
- No study has directly compared these in an item-method paradigm



The Present Study

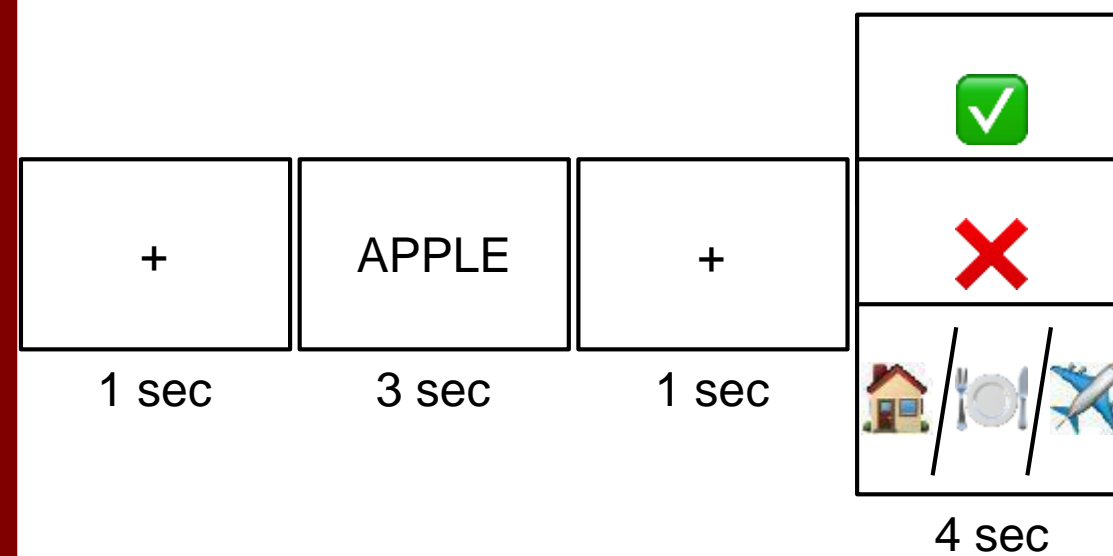
Do the neural mechanisms underlying intentional forgetting differ from the mechanisms of thought substitution?

Here, we address this question by comparing electrophysiological responses during Forget and Imagine cues in an item-method study.

Methods

Study Design

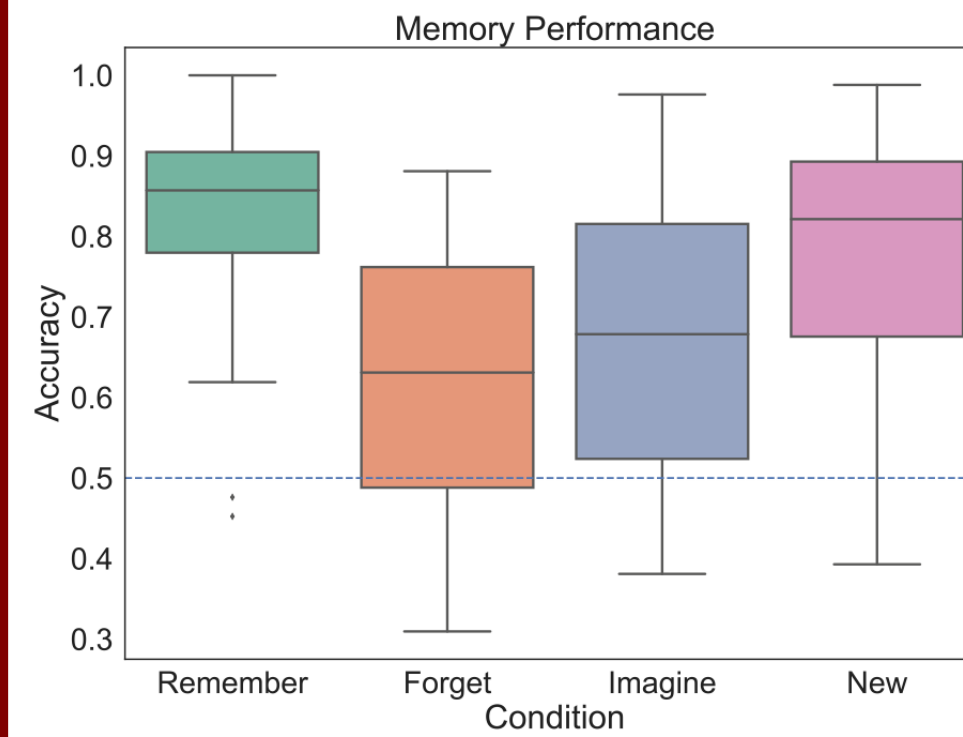
- 36 participants
- Item-method DF: Remember, Forget, and Imagine cues
 - 3 Imagine cues: childhood home, high school cafeteria, vacation
- Familiarization period prior to encoding
- Recognition test with Old and New items



EEG Setup

- 26 scalp channels, mastoids reference
- Bandpass filtered, 0.1-30 Hz
- Ocular artifacts corrected with ICA
- Z-score baseline procedure (Ciuparu & Muresan, 2016)
- ERPs time-locked to onset of R/F/I cue
- Time-frequency analysis with Morlet wavelets

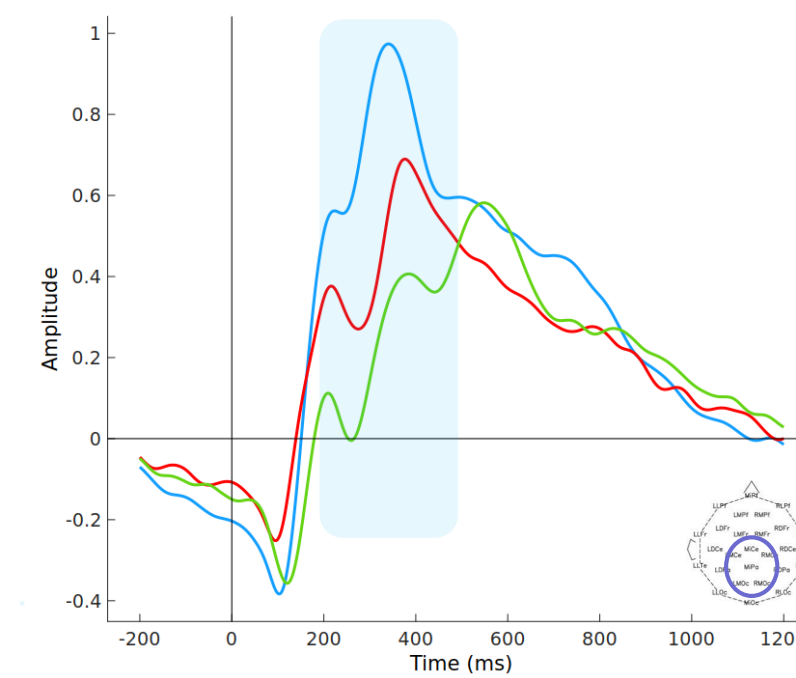
Behavioral Results



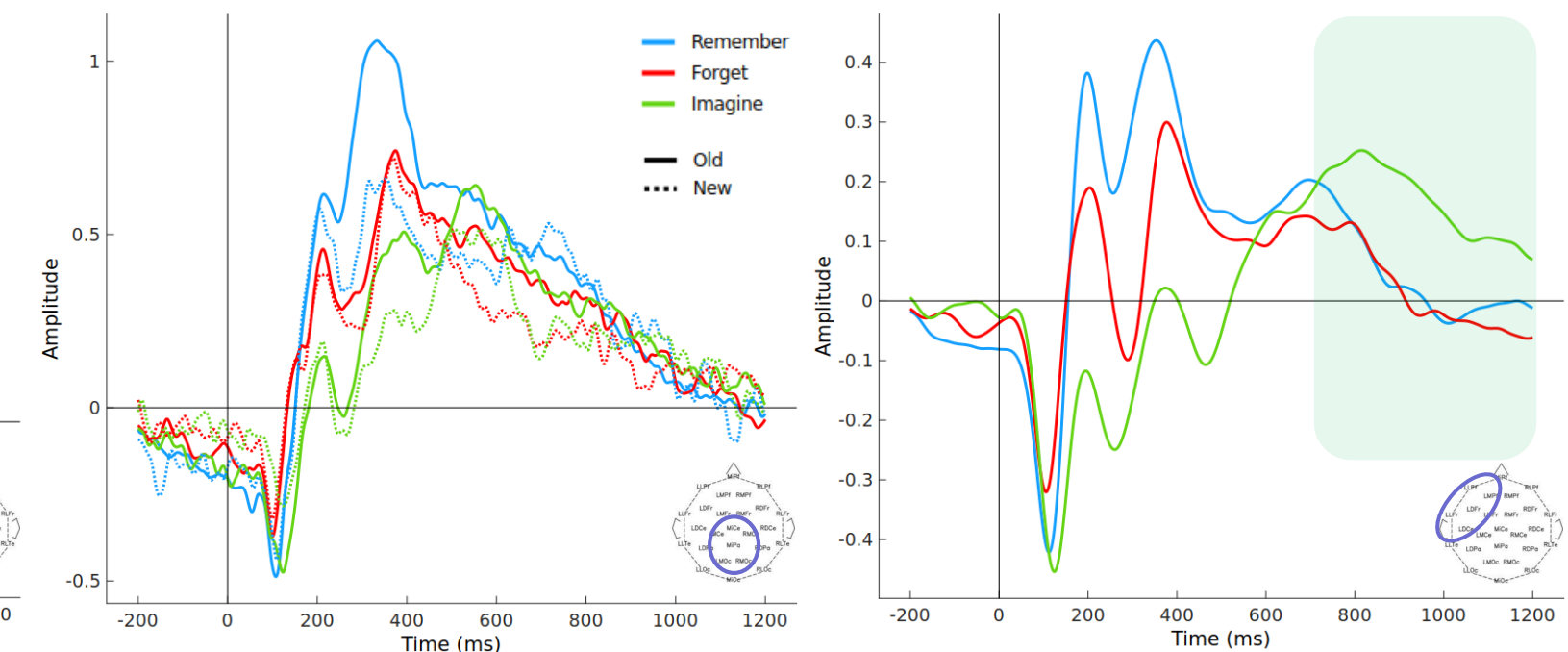
Impaired memory for Forget and Imagine conditions compared to Remember

Forget condition significantly lower than Imagine

Results

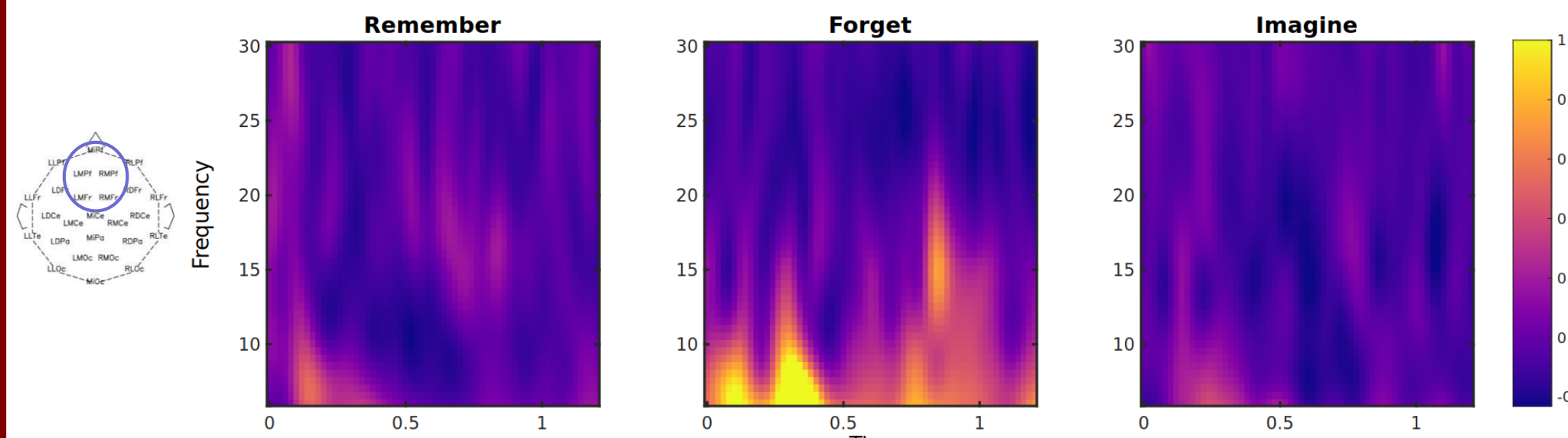


Cue-Locked ERPs

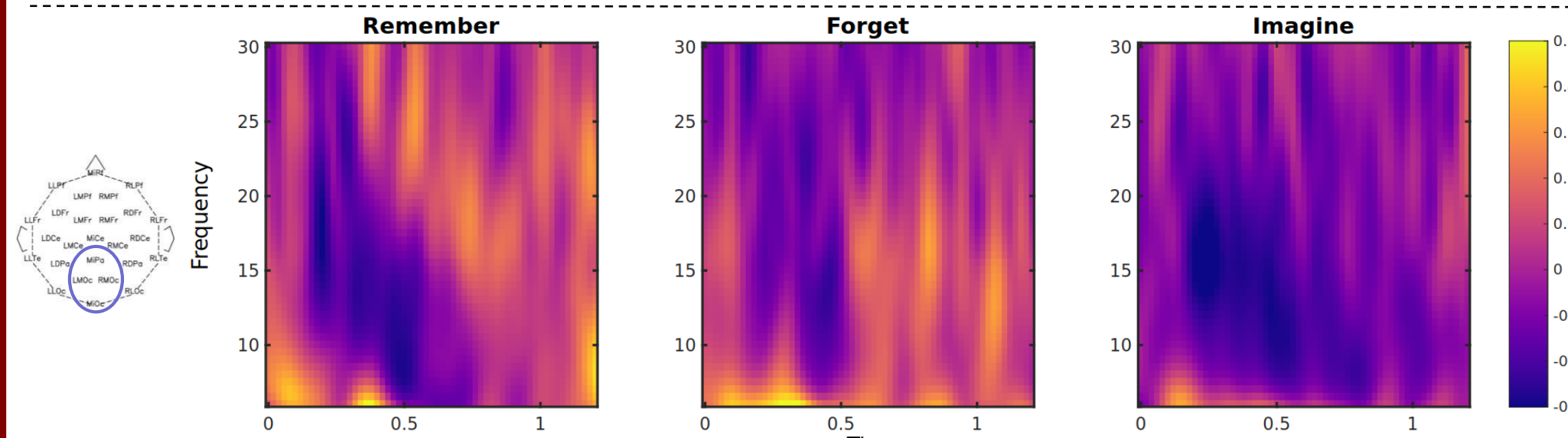


Early and late ERP components differentiate cue conditions and relate to memory success

Time-Frequency Analysis

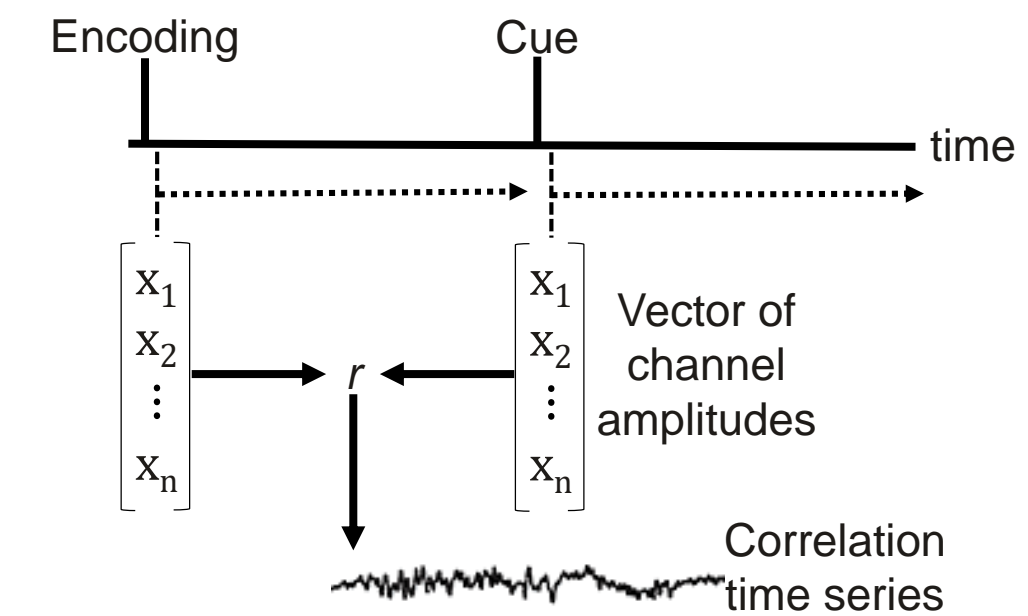


Greater frontal theta / alpha power for Forget cues

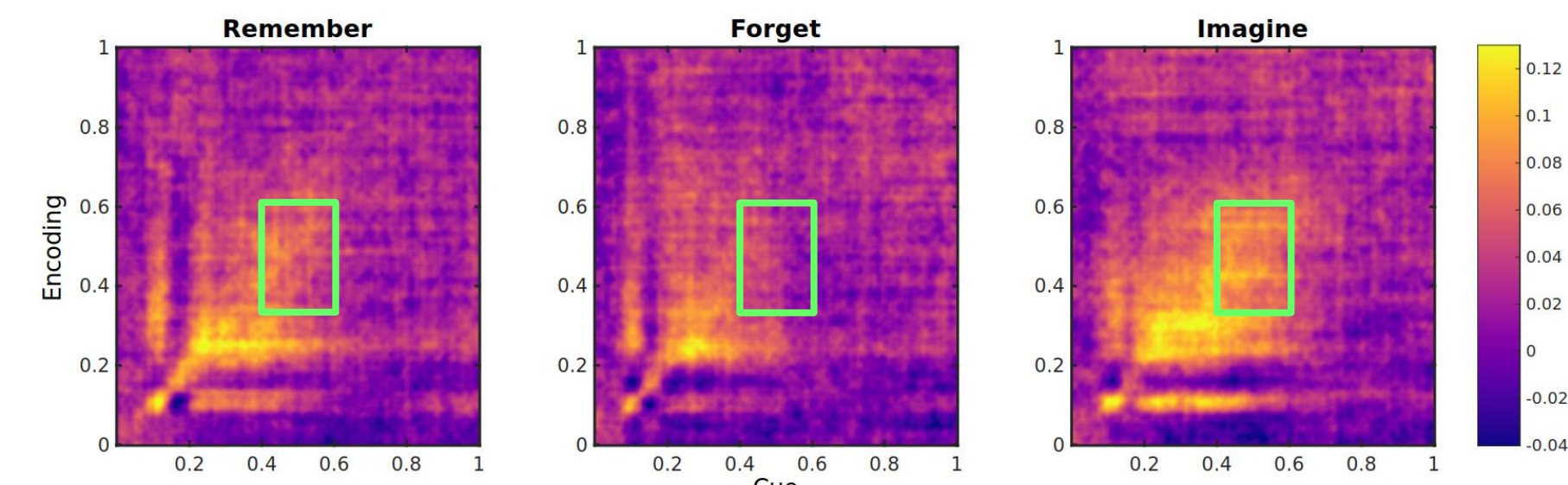


Reduced posterior alpha / beta for Imagine cues

Representational Similarity Analysis



Correlate each timepoint with every other timepoint to create a time x time matrix of similarity



Less cue-item similarity for Forget cues

Conclusions

- Forget and Imagine cues produce similar behavioral forgetting, though Forget cues produced the most forgetting
- ERPs during the Cue period differentiated Forget and Imagine cues, with Imagine cues eliciting a late frontal positivity
- Forget cues elicited greater low frequency power over frontal channels, as well as reduced cue-item neural similarity
- Forget cues may lead to a termination of encoding processes through inhibitory control, which differs from Imagine cues