

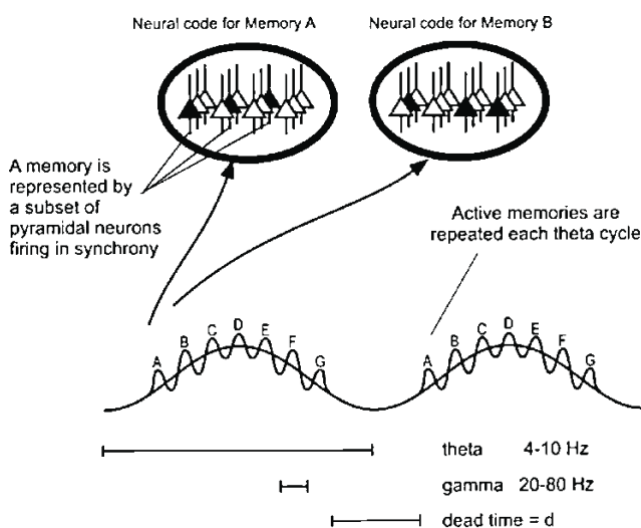


Phase-dependent semantic representation and binding in working memory

We are offering an exciting internship for individuals interested in exploring how neural oscillations contribute to the temporal coding mechanisms in human working memory.

Project Overview

Information in the brain is represented by the distributed activity of neural ensembles. The strength of this information representation may be linked to the phase of theta and alpha oscillations. Studies suggest that **information is most strongly represented at specific phases where excitability levels are high**. In this project, we aim to test if higher cognitive content, such as the semantic representation of words, can be encoded in a **phase-dependent** manner. Additionally, we will explore whether the **binding** of multiple semantic representations affects the phase coding of individual items.



Methodology

Our approach combines electrophysiology (EEG), source reconstruction, and multivariate pattern analysis (decoding) to study phase-dependent working memory representations.

Key Objectives

- Help with selecting the experiment stimulus and implementing the experiment.
- Conduct EEG measurements and register individual electrode position and head shape.
- Conduct data analysis including EEG preprocessing, source reconstruction using LCMV beamforming and MVPA.

Requirements

- German as the native language.
- Background in cognitive neuroscience, psychology, engineering, computer science or related fields.
- Proficiency in programming languages such as MATLAB, R and Python.
- Basic understanding of /experience with EEG, neural oscillations, source reconstruction, MVPA is desirable.

Benefits

- Gain hands-on experience in cutting-edge neuroscience research and advanced neural signal processing.
- Collaborate with researchers at the Max Planck Institute for Human Cognitive and Brain Sciences, Maastricht University and Donders Institute for Brain, Cognition, and Behaviour.
- Possibility of co-authoring scientific publications based on project outcomes.

Application process

To apply, please send your CV, academic transcripts (English or German) and a brief cover letter explaining your interest in the internship to the following contact person.

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