

Multifaceted EEG Protocol for Comprehensive Assessment of Alzheimer's Disease Progression during Emotional Processing, Working Memory and Attention: The PREDICTOM Study

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Background

- Subtle changes in **EEG** could be used as potential **prognostic indicator** for Alzheimer's disease (AD) progression and its preclinical stages
- The PREDICTOM study aims to develop a comprehensive **EEG protocol for early detection** in primary care of AD

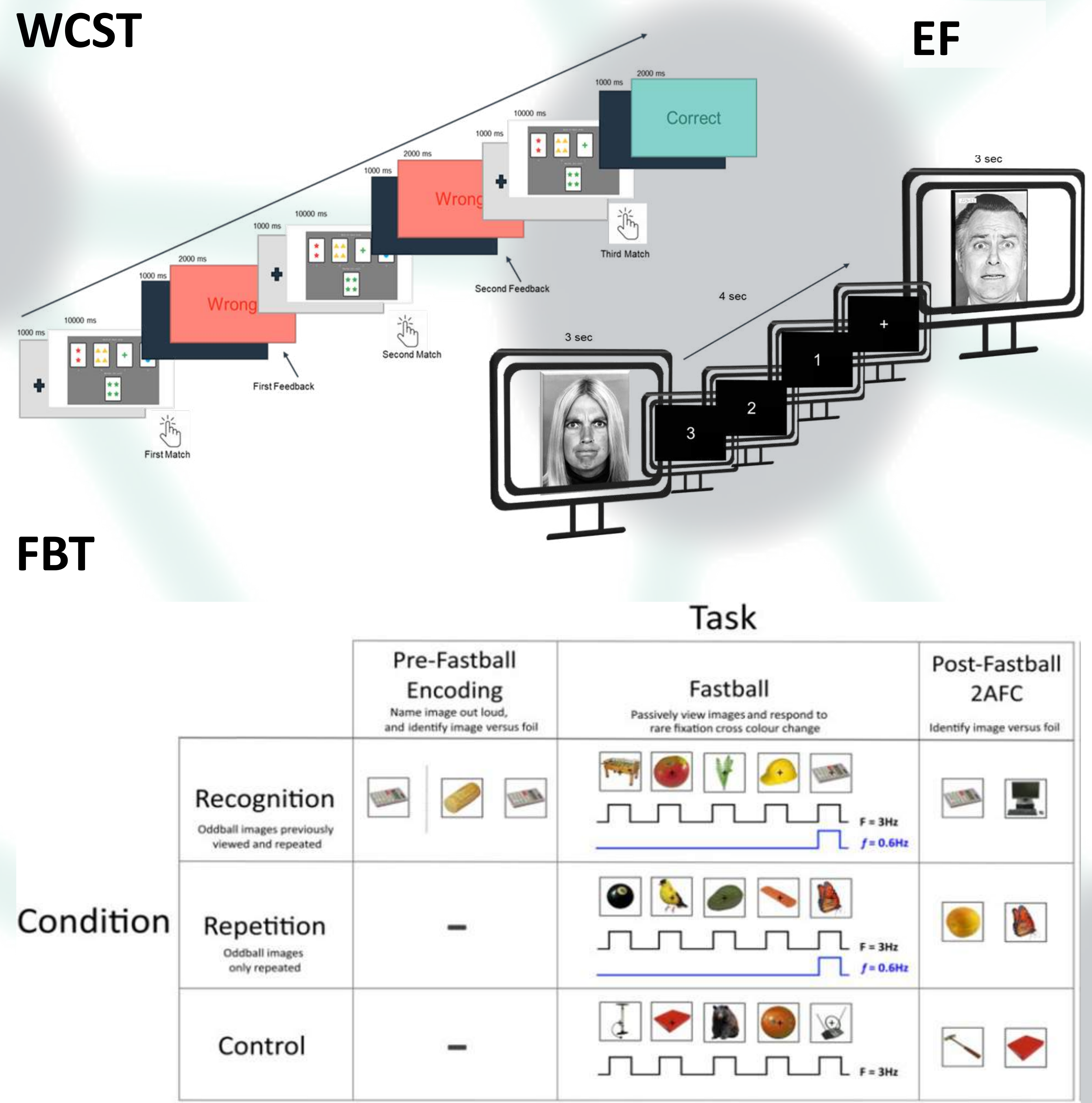
Methods

The protocol will involve **five tasks** administered using a portable EEG solution, lasting 1 hour:

- 1. Resting State (RS):** eyes-closed/eyes-opened resting EEG activity - *general cognitive function*
- 2. Wisconsin Card Sorting Test (WCST):** match the target card to one of the three reference cards based on a hidden rule - *working memory, abstract reasoning and executive functions*
- 3. Ekman faces task (EF):** facial stimuli displaying emotional expressions (anger & fear) - *emotional processing and perception*
- 4. Two-tone oddball task (TTOP):** auditory oddball paradigm - *attentional switching and working memory*
- 5. Fast-ball Task (FBT):** three conditions: recognition, repetition, and control of different images – *attention and long-term memory*

Equipment and Algorithms

- Neuroelectrics, Enobio EEG
- Filtering, Artifact Detection, Segmentation
- Power Spectral Density (PSD), Correlation Matrices (CM), Functional Connectivity (FC), Graph Theory Metrics



Expected results

- Classification of the groups at preclinical stages – statistical significant differences in particular connectivity – network metrics (degree centrality, path length, small-world etc)
- Effectiveness of EEG as a potential physiological biomarker of early detection in routine clinical practice

