Multivariate Pattern Analysis of Fixation-Related EEG

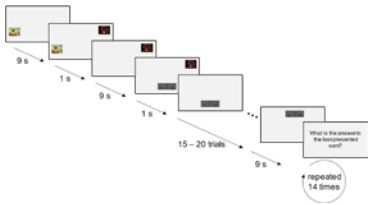
Identify the Temporal Evolution of Higher Cognitive Processes

1 BACKGROUND

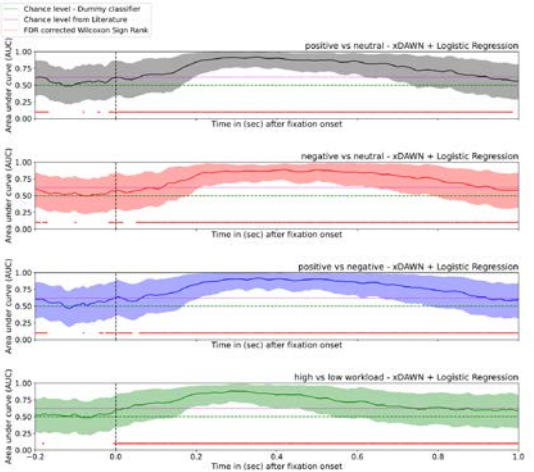
- In naturalistic environments, it is important to integrate contextual information.
- Identify mental states as a function of locus of attention
- Combining EEG with Eye Tracking [1,2] in a Multi-Variate Pattern Analysis (MVPA) [3,4]
- Investigate spatio-temporal dynamics of different emotional states and workload levels

2 METHODS

- EEG recordings from 16 participants (age of *M* = 22.2 ± 4.1, range: 19 and 34 years)
- Emotional pictures or pairs of three-digit numbers positioned on trial-by-trial alternating locations
- Low workload task: watch numbers
- High workload task: elementary calculation
- xDAWN algorithm to increase the signal-to-noise ratio [5]
- Pairwise binary classification using a logistic regression (LR)



Temporal Decoding of Emotion and Workload



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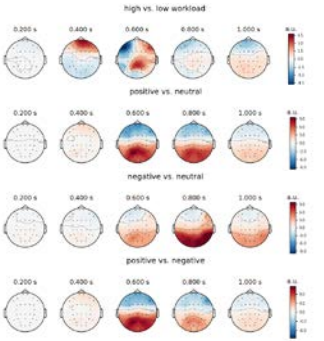
3 RESULTS

- Above-chance level emotion decoding from 200 to 700 ms
- Above-chance level workload decoding from 200 to 580 ms
- Parieto-occipital and frontal channels contributed to the decoding between positive and negative or neutral
- Fronto-central channels contributed to the decoding between workload levels

4 SPATIAL PATTERNS



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