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Decodable anticipation from prestimulus activity

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Decoding anticipation from prestimulus activity

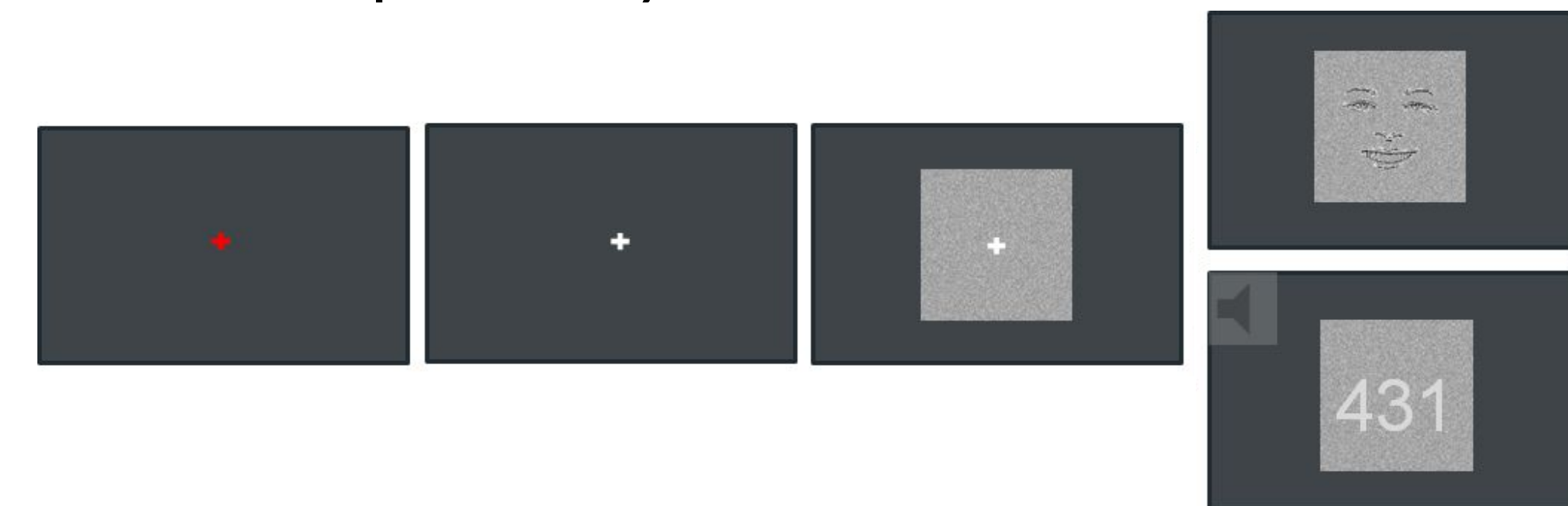


PRESENTER:
Isabelle Hoxha

BACKGROUND: Correctly anticipating stimuli allows for faster responses. While common, perceptual anticipation is difficult to observe in the laboratory as its processes are mainly unconscious (Barik et al., 2019). In particular, asking participants to report anticipation implies the elucidation of unconscious processes, which is a form of decision-making and thus changes brain activity (Koch and Preuschoff, 2007). However, reaction times are helpful to infer the class of anticipation (Petro et al., 2019). While previous EEG studies have shown the impact of prestimulus alpha power (8-13Hz) on performance (Lou et al., 2014), its predictive power has to be assessed for further brain-computer interface applications.

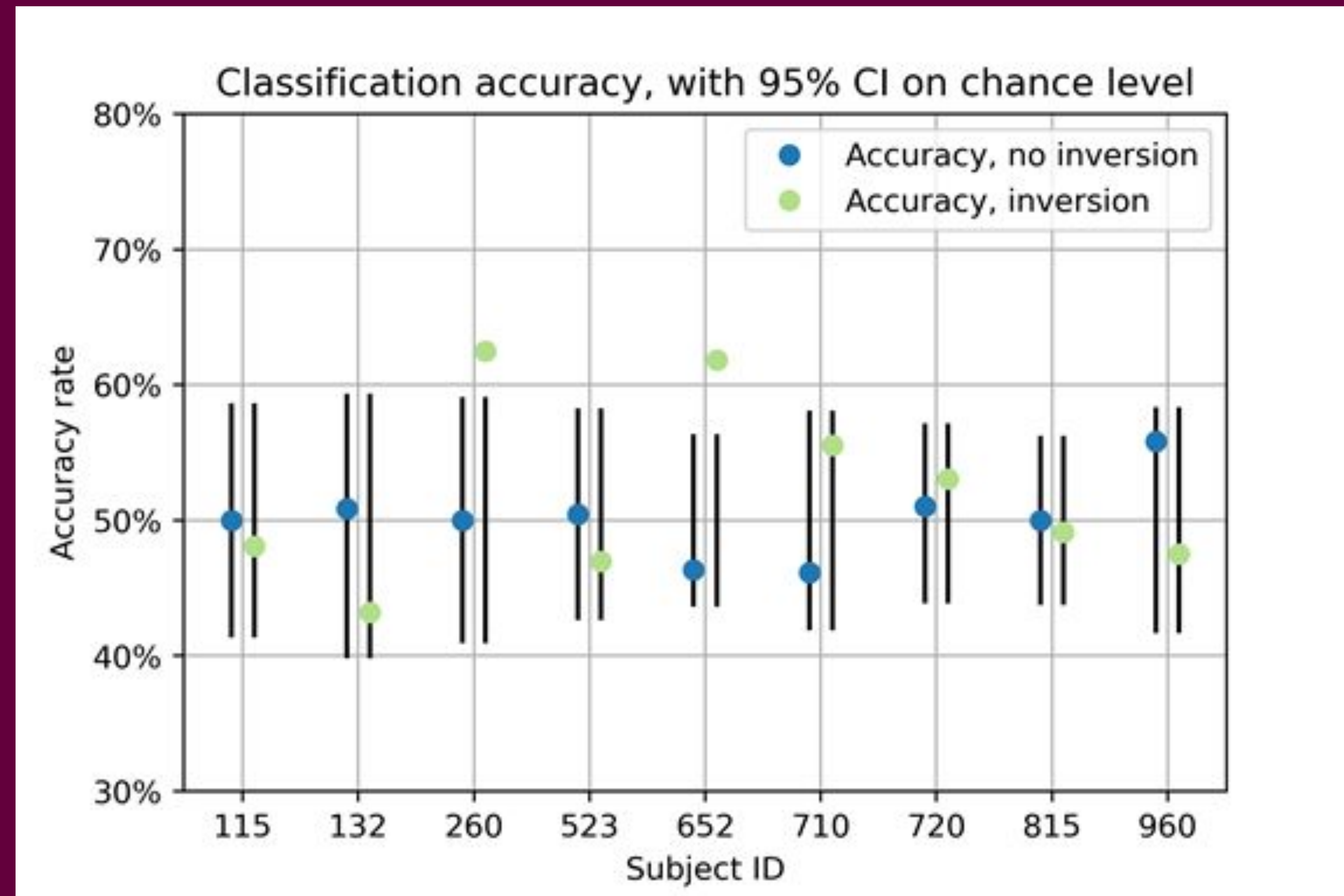
METHODS

- 9 healthy adult participants
- EEG: 32 electrodes, 1000Hz sampling
- Discrimination task: stimulus is either an image of a face or an image of a number accompanied by a sound



- Obtain class of anticipation: invert stimulus labels of the trials with response time on the top 25%
- Alpha power in prestimulus period (Multitaper)
- Competition between auditory and visual information: ratio of occipital and temporal power: two features (T7/Oz and T8/Oz)
- SVM classification, 5-fold cross-validation. Compare classification performance with the stimulus labels and with the inverted labels

Anticipation can be decoded from pre-stimulus alpha power

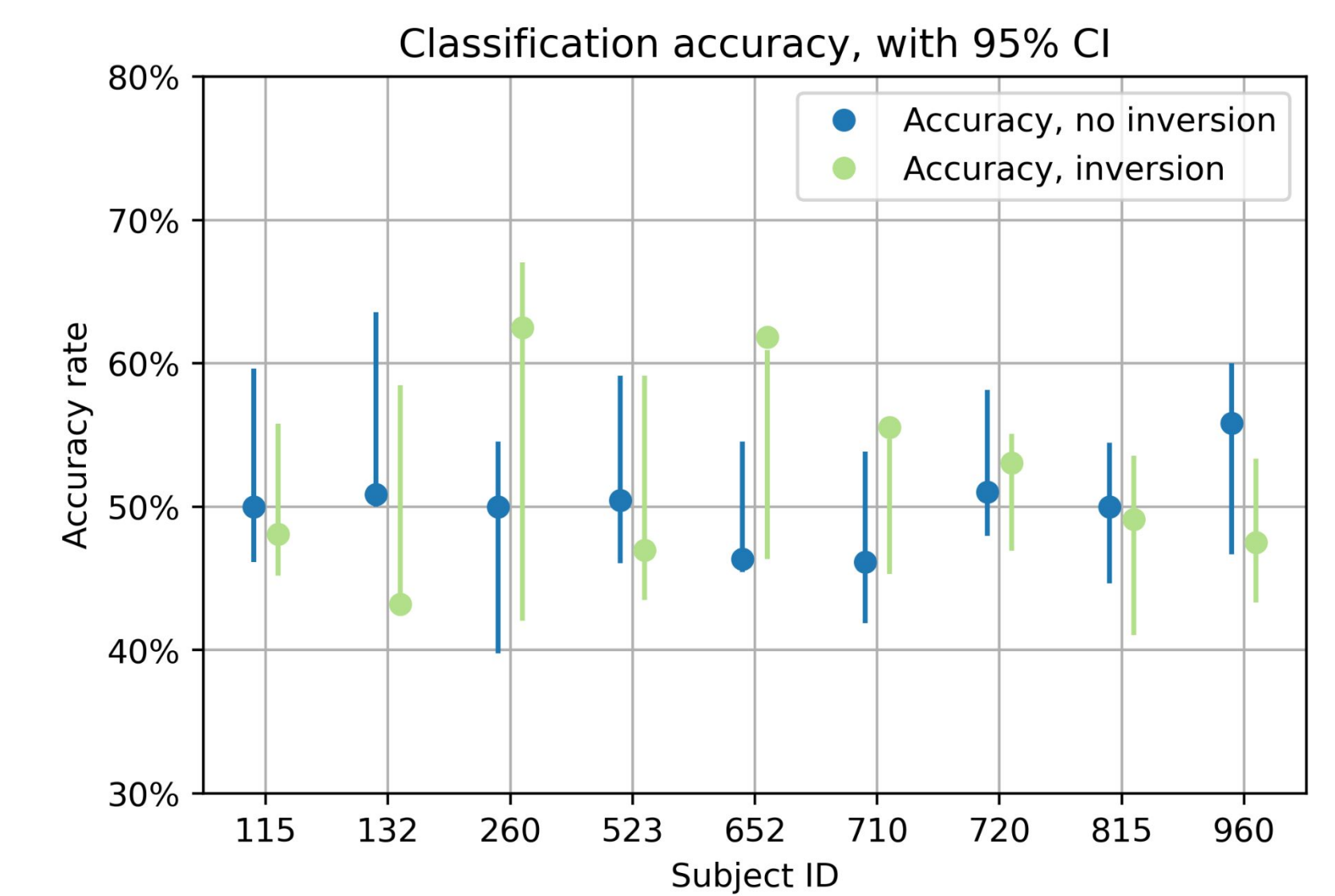


Permutation testing: shuffle labels on train set, recompute the hyperparameters, test performance on the same test set. 1000 iterations.

- Broad uncertainty on chance level: more iterations needed
- 2 participants show significant classification performance on inverted labels, none on stimulus labels

About the paradigm...

- Equiprobable stimuli at each trial
- 480 trials



References:

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