**Can bistable auditory stimuli be decoded from EEG?**

Differences in the perception of two similar auditory stimuli can be found by decoding fMRI and EEG data (Beach et al., 2021), a process of using brain data (e.g. EEG or fMRI) to reconstruct the sensory inputs. Previous research has shown that musical pieces attended to can be decoded from EEG data (Bellier et al., 2023; Daly, 2023). Here we will use stimulus reconstruction with a bistable auditory stimulus—i.e., once that can be perceived in two different ways—to determine whether we can decode which of the two possible percepts a person perceived. We will use a popular bistable auditory stimulus that can be perceived as either “green needle” or “brainstorm”. To date, it has not been shown that the two percepts of a bistable stimulus can be decoded from EEG data. We will use semantic priming to encourage participants to hear the stimulus one way or another with our main question being does semantic priming lead to measurable differences in EEG for a bistable percept? First EEG data will be collected from listeners who will be presented with clear speech of both “green needle” and “brainstorm”. If decoding is successful, the process will be repeated with the bistable stimulus. Specifically, participants will be primed to hear either “green needle” or “brainstorm” when presented with the bistable percept. Decoding will be done with a machine learning classifier built with the Multivariate Temporal Response Function (mTRF) toolbox in MATLAB. A model will be built and trained from the EEG collected with the stable percepts to confirm successful decoding of a stable percept. Another model will be trained and tested with the bistable data. This will help further our understanding in decoding auditory signals in the brain, which will help guide development for generative speech and music from EEG data.

References

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