SVM neural decoding of EEG for words and non-words across speakers, dialects, and genders

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Abstract

Decades of behavioural research have shown that word recognition is an incremental process involving competition among multiple lexical candidates (Huettig et al. 2011). Recent work by McMurray et al. (2022) demonstrated that SVM-based machine learning can decode the neural spatiotemporal encoding of phonetically similar words and non-words from EEG signals, and that decoding response patterns closely mirror prototypical lexical competition effects. Here we describe two studies that (i) replicate McMurray et al. (2022) and (ii) extend this paradigm one step further, by decoding EEG responses to words and non-words across different speakers, dialects, and sexes. Additionally, we assess the decoder's sensitivity to individual differences by correlating its performance with behavioral task data. We conclude that this algorithmically simple decoder can be a powerful tool for uncovering neural psycholinguistic dynamics, but that it requires an amount of data that currently limits applications to developmental or clinical populations.

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