

Exploring factors influencing early neural processing of vowel variation

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Vowel categorisation is notorious for being highly flexible and subject to influence from a range of factors (Shaw et al., 2018). EEG experiments offer a unique chance to explore how these factors influence stages of neural speech processing which begin milliseconds after vowel onset. The N100 response is known to track the brain's early response to acoustic information in the speech signal, but results are inconclusive regarding whether it is affected by top-down information such as lexical context (e.g. Noe & Fischer-Baum, 2020). Understanding the N100 is crucial for differentiating between interactionist and feed-forward theories of speech perception (Norris & McQueen, 2025). Additionally, evidence from the mismatch negativity (MMN) shows that listeners hearing a variety they do not speak natively (V2) may affect neural processing of V2 contrasts which are allophonic in the listeners' native variety. Even if listeners neurally discriminate these contrasts, processing may be delayed and use more cognitive load than native contrasts (e.g. Lanwermeyer et al., 2016). It is also currently unknown how contrasts in a listener's V2 are neurally processed when presented on a continuum, especially when lexical bias favours one end of the continuum.

The present study aims to investigate the effects of lexical context and variety experience on the N100 and the MMN. It is the first to investigate how lexical effects are processed in V2 contrasts, and will provide insights into V2 contrast perception and the possible role of top-down feedback on early stages of speech processing.

25 Standard Southern British English (SSBE) and 25 New Zealand English (NZE) speaking participants living in the south of England completed two EEG experiments. SSBE DRESS and TRAP were chosen as vowels of interest as they are allophones of NZE TRAP (Bauer et al., 2007). The first was a forced choice task in which participants classified points of SSBE DRESS-TRAP continua varying in lexicality: *bed-bad*, *ped-pad* and *peg-pag*. The second was an oddball task in which participants passively listened to SSBE DRESS, TRAP and FLEECE vowels.

Analyses of results from this study are ongoing. Initial results from participants in the oddball task suggest that both groups neurally distinguished FLEECE, DRESS and TRAP, possibly due to the NZE group's experience with the SSBE variety. However, both groups also showed weaker distinction (a smaller MMN) between DRESS and TRAP, possibly due to the DRESS/TRAP height distinction being less clear than the FLEECE/DRESS height distinction. Further analysis is required to confirm these results, and comparison with results from the forced choice task will also inform the overall interpretation of the study and its relevance for theories of speech processing and V2 perception.

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