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‘Greem benches’ – can speech errors eliciting the Ganong effect be used as evidence for auditory simulations in the brain during speech production?

Abstract:

Studies on deliberate speech errors at the phonetic feature level by Gaskell et al. (1996; 1998; 2002) helped to demonstrate that the extent of phonetic mismatch between a target word in the mental lexicon and acoustic input determine the strength of lexical activation. A listener will accept an unclearly-articulated incorrect phoneme as a different phoneme if it matches the lexical context. If this phenomenon – known as the ‘Ganong effect’ – is also reflected in real speech errors, then this may suggest some level of simulation of an acoustic signal in the brain before speech production, as well as during the processing of speech.

The aim of this piece of work is to firstly determine whether or not speech errors such as the ‘greem benches’ error in the study by Gaskell et al. (1996; 1998; 2002) occur naturally, through the use of speech error databases. (It may also be advisable to attempt to replicate the aforementioned study by Gaskell et al., on a side note). Specifically, incidents wherein the incorrect phoneme has a similar offset to the target phoneme – thus minimally mismatching with the intended phonological context – will be sought.

If speech errors that elicit the Ganong effect are found, then further work must immediately be planned. Specifically, fMRI and NIRS could be used to further test the idea of auditory simulations, by possibly showing activity at the auditory cortices during speech production that is comparable to the activity at the auditory cortices as when a listener is receiving an acoustic signal. This may imply more similarity to the word processing process. It must be emphasised, however, that this is only a possibility, and may not be what is observed through brain imaging.

If no such speech errors are found, however, it may be indicative of some manner of phonetic ‘quality control' process unique to speech production at the level of finer phonetic details – which have been identified as highly important in comprehension - as opposed to speech processing, wherein allowances are made for somehow distorted speech, in that the lexical context influences the ultimate message processed from the acoustic signal.

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