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Categorical and non-categorical perception of speech: Behavioural and neural evidence

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What effects do within- and between-category variations have on the perception of speech? Using audio-morphing and the "Straight" channel vocoder (Kawahara, 2004), we produced 320 high-quality phonetic continua varying in place, manner and voicing including word/word (blade/glade), word/pseudo (blouse/glouse), pseudo/word (bown/gown) and pseudo/pseudo (blem/glem) pairs. A 2AFC task confirmed the category boundary shift for word/pseudo and pseudo/word pairs (Ganong, 1980), equivalent for onset (bench/gench) and offset (flad/flag) pairs. This suggests that lexical influences on categorical perception are not produced on-line but rather occur post-perceptually, consistent with top-down effects. Sensitivity to within- and between-category phonological variation was investigated using sparse fMRI in a paired auditory repetition priming paradigm. Minimal pairs (48 across the 4 stimulus groups) were presented to participants who listened in the context of a semantic monitoring task. Between-category pairs with a phonological change produced a greater neural response compared to within-category same pairs with the same magnitude of acoustic difference. This response to phonologically different pairs provides a neural correlate of categorical perception in left middle temporal, inferior frontal and pre-central regions. These responses in inferior frontal regions may contribute towards top-down influences on categorical perception of speech (cf Ganong Effect).