Authors:
Matthias J. Sjerps[1], Caicai Zhang[2], Gang Peng[2]
[1]Donders Institute for Brain, Cognition and Behaviour. Donders Centre for Cognitive Neuroimaging; Radboud University Nijmegen
[2]Department of Chinese and Bilingual Studies; the Hong Kong Polytechnic University

Title:
Unequal effects in the normalization of lexical tone and the normalization of vowel quality

Abstract:
Speech from different speakers varies on many dimensions. In tone languages such as Cantonese, variation in the acoustic realization of speech sounds can be caused by differences in speakers pitch ranges (affecting lexical-tone height) or by differences in their vocal tract shapes (affecting vowel quality). Listeners perceptually “normalize” (i.e., shift their category boundaries) to a speaker’s expected range of pitch or vowel quality to accommodate such differences (1-4). The current study tested 16 speakers of Cantonese to address the temporal scope over which tone and vowel quality are normalized. Participants heard a nonsense word on every trial (/f?patsi/) where, in half of our experiment, the first vowel (/?/) ranged between /o/-/u/ (an F1 distinction) in 5 steps, while the /patsi/ context was manipulated to have either a high F1 range or a low F1. In the other half of the experiment, the first vowel ranged from a low-level tone to a mid-level tone. Here the /patsi/ part was manipulated to have either a high or a low pitch. The results revealed that for normalization of vowel quality, only the F1 range of the context on the preceding trials influenced participants’ decisions. For normalization of tone, only the pitch range on the immediately following /patsi/ context influenced perception of tone. These results demonstrate that normalization of vowel quality and lexical tone operate over a different temporal scope. These patterns may reflect differences in the underlying mechanisms that cause normalization of tone and of vowel quality.

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