

Cue switching in the perception of approximants: evidence from two English dialects

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A surprising dissimilarity is found in the perception of approximant sounds by speakers of American English (AE) and Standard Southern British English (SSBE) dialects. Eighteen subjects (6 AE and 12 SSBE speakers) performed an identification task in which they judged whether stimuli were more like /r/ or /w/. The stimuli comprised five sounds copy-synthesised from a source /r/, where formant values (F1-F3) were manually adjusted as follows:

A:	F1=355	F2=1201	F3=1682	(/r/-like formants)
B:	F1=355	F2= 963	F3=1682	(F2 at midpoint of /r/ and /w/; F3 /r/-like)
C:	F1=355	F2= 1201	F3=2541	(F2 /r/-like; F3 raised to /w/-like height)
D:	F1=355	F2= 725	F3=1682	(F2 lowered to /w/-like height; F3 /r/-like)
E:	F1=355	F2= 725	F3=2541	(/w/-like formants)

The only significant difference ($t=2.031$, $p<.05$) between the two dialect groups' performance occurred with Stimulus D in which F3 was typical for /r/ and F2 was typical for /w/. AE speakers identified this stimulus as /r/ 90% of the time and SSBE speakers only 59% of the time. Such a disparity is unexpected given that alveolar approximant /r/ in both dialects is generally characterised acoustically by a low F3 (Delattre & Freeman 1968; Nolan 1983; Alwan et al. 1997; Stevens 1998; Espy-Wilson et al. 2000). Why then the significantly different results between the two groups when Stimulus D involves the canonical /r/ cue of a lowered F3?

A possible solution to this problem lies in the well-documented existence of a non-standard realisation of /r/ in Southeast England which is increasingly common in adult speech as a sociolinguistic variable – ‘labiodental’ /r/ (Foulkes & Docherty 2001; Trudgill 1988). This variant does not have a low F3 (Docherty & Foulkes 2001).

The performance of the SSBE subjects here may be due to greater exposure to the labiodental /r/ variant in their community. SSBE speakers must tolerate a wider diversity of /r/-types, including /r/s without a canonically low F3. As a consequence, the /r/ category in SSBE may be becoming increasingly defined by F2, rather than by F3. If this were the case, SSBE speakers would weight F2 more than F3 in their perceptual categorisation, and the F2 boundary between /w/ and /r/ would become sharper in SSBE relative to AE. AE speakers, who likely encounter ‘labiodental’ /r/ less frequently, continue to attend more to F3 than F2. For them, the /r/-like low F3 in Stimulus D leads them to a definite /r/ categorisation. For the SSBE speakers, the /w/-like F2 cue interferes with the low F3 cue to cause greater perceptual uncertainty.

The implications of this apparent shift in perceptual weighting may be a further increase in production variability, even involving SSBE speakers who do not use ‘labiodental’ /r/. As the cue for /r/ in SSBE shifts to F2, speakers may attend less to producing adequately low frequencies of F3 and therefore a gradual erosion of low F3 instances of /r/ can be predicted across SSBE.