

Coarticulation resistance quantification in several Scottish English phonemes

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Vowel-on-consonant (V-on-C) and consonant-on-vowel (C-on-V) coarticulation was analysed. Coarticulation resistance (CR) values were calculated for several English phonemes, using the approach suggested in Hewlett & Zharkova (in preparation).

Ultrasound and acoustic data were collected using the Queen Margaret University ultrasound system. The two subjects were adult female speakers of Scottish English. The data were /C1V1#C1V1/ sequences from real sentences (e.g., “My brother Keigh keeps his secrets”), with the consonants /p, f, t, s, k, l, r/ and the vowels /a, i/. Two curves corresponding to the tongue contour were captured, at mid-V and mid-C of the /V1#C1/ sequence (underlined). Tongue curve comparison was based on nearest neighbour calculations. Comparison of the curves for the consonant in the context of two vowels provided a measure of V-on-C effect. Comparison of the curves for the vowel in the context of each pair of consonants provided a measure of C-on-V effect.

There was a significant V-on-C effect for all the consonants in both subjects. The C-on-V effect was smaller, and it was not present in some consonant environments (especially those including labial consonants). The average CR value was 1.54 for consonants and 2.31 for vowels. Lingual consonants were more resistant than labials; /s/ and /k/ were most resistant. In both subjects, all consonant pairs including /k/ had a significant effect on the vowel /a/; all consonant pairs including /l/ had a significant effect on the vowel /i/. The results are discussed in relation to the theory of CR (e.g., Recasens et al. 1997).

References

- Hewlett, N. & Zharkova, N. (in preparation). An ultrasound study of coarticulation resistance of English /t/ and /a/.
- Recasens, D., Pallarès, M. D. & Fontdevila, J. (1997). A model of lingual coarticulation based on articulatory constraints. *Journal of the Acoustical Society of America*, 102, 544-561.