

Gestural Reduction as a Function of Phonological Contexts: a Study of Word-final t/d Deletion

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This study investigates phonetic implementation of and individual differences in t/d deletion in word-final consonant clusters in British English (e.g. *best*>*bes(t)*, *cold*>*col(d)*). Using the data extracted from the multichannel articulatory database, MOCHA-TIMIT (Wrench, 1999), the current study aims at (i) providing initial empirical data for the phonetic nature of t/d deletion, at (ii) capturing the production characteristics within and across speakers, and at (iii) examining the approach taken by the Articulatory Phonology framework.

The t/d deletion phenomenon has been investigated extensively in various accents of North American English. Guy (1991a,b) has shown that a t/d deletion rule applies with probabilities specific to words of different morphological classes. In contrast, Tagliamonte & Temple (2005) investigate English spoken in York and show that the preceding and following phonological contexts significantly influence the actuation of t/d deletion, while, in contrast to previous research on American varieties, the morphological class of the word is not significant in the British English data.

There have been few studies investigated from the viewpoint of articulatory organization. Browman & Goldstein (1990) have claimed that an explanation of the occurrence of t/d deletion could follow directly from an understanding of articulatory organization: casual speech alternations are consequences of two modifications to gestural structure, increase in overlap and decrease in magnitude. This gestural account has not been examined systematically.

In the current analysis, a dataset of 456 tokens was used (152 words with final C+/t/ and C+/d/×3 speakers). The Electromagnetic Articulograph (EMA) data (the tongue, lower lip and velum), the Laryngograph data, and the EPG contact patterns were analysed for the selected utterances spoken by three speakers of Southern British English (SE, SA, AP). The target stops were characterised by the EPG contact patterns in an alveolar zone (full-, groove-, residual-, and zero-alveolar) and acoustic features (weak explosion, frication, glottalised, and no trace). Gestural hiding was examined using the EMA data. Statistical tests using SPSS® (Chi-square test, multivariate analysis) were performed within and across the speakers.

The articulatory-acoustic analysis indicates a clear pattern of decreasing the tongue tip gesture in the deletion cases. Gestural hiding does not always occur even if the target stop is in the relevant phonological context. The logistic regression analysis (performed for a random sample of 50% of all cases) shows that the preceding and following phonological contexts are significant but the morphological class of the words is not. And the individual differences are found in the rate of t/d deletion [AP (44%, 70/152) > SA (31%, 50/152) > SE (26%, 41/152)]: for AP, the deletion occurs in the following vowel context as well as the following consonant context, while for SA and SE, it occurs in the following consonant context only. These results suggest that the articulation of t/d deletion reflects a gradient process of gestural reduction and that the phonetic contexts in which the segment occurs affect its realisation.

References

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