

## Pre-closure laryngeal properties as cues to the fortis-lenis plosive contrast in British English

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In this paper, we argue that pre-aspiration and pre-glottalisation can function as acoustic correlates to the fortis-lenis contrast in British English plosives. We provide evidence from production and perceptual studies showing that (a) pre-aspiration is a consistent and categorical correlate of the contrast in both Aberystwyth and Manchester English, (b) pre-aspiration and pre-glottalisation exhibit obligatory allophony in Manchester English, and (c) listeners of a variety of dialects of British English use pre-aspiration as a cue to the contrast, exhibiting clear categorical perception effects.

In a study of 10 speakers of Aberystwyth English (AE), pre-aspiration was found to be a robust correlate of the fortis/lenis contrast in both word-medial (e.g. **batter/badder**) and word-final (e.g. **cap/cab**) position, occurring in 80-91% of tokens for fortis plosives, but not for lenis plosives. Furthermore, the duration of the pre-aspirated interval within the fortis series in 12 speakers of AE shows a clear bimodal distribution between absent and present tokens (confirmed by Hartigan's Dip Test for Unimodality), suggesting that the phenomenon is conditioned phonologically.

In a study of 5 speakers of Manchester English, pre-aspiration and pre-glottalisation were found to be in complementary distribution in fortis plosives – pre-aspiration was found in 92% of tokens word-medially (but not word-finally), while pre-glottalisation was found in 98% of tokens word-finally (but infrequently word-medially). This complementarity suggests that pre-aspiration and pre-glottalisation are phonologically conditioned.

Finally, a perceptual study with 24 native speakers of British English (primarily from the North) showed clear categorical perception effects for pre-aspiration. Listeners were presented with stimuli from a Klatt-synthesised pre-aspiration continuum (20ms increments, with post-aspiration and other potential cues held constant), in both an identification task and an AX discrimination task. There was a clear peak in discrimination for items which straddled the 50% identification crossover point. (Results of a parallel study testing perception of pre-glottalisation are pending.)

We conclude that VOT alone cannot fully capture the phonetic implementation of the fortis-lenis contrast in these varieties of British English. This is further corroborated by the fact that pre-aspiration is a correlate of the contrast in *fricatives* in Scottish English (Gordeeva & Scobbie 2013). Instead, the fortis series of British English obstruents in general seem to be better captured via [+tense] or [+lax] laryngeal specifications, and an adequate analysis must take into account a range of acoustic features. Our studies also present further evidence that pre-closure laryngeal features do function as correlates/cues to phonological contrasts (see e.g. Clayton 2009; Kingston 1990; Silverman 1995).