Multiplicity of the acoustic correlates of the fortis-lenis contrast: plosives in Aberystwyth English

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What do we know... /p, t, k/ vs /b, d, g/

Welsh

- seen as being based on the presence of post-aspiration ([5] and [6])
- and the duration of the preceding vowel ([7] and [8, p. 13])

Welsh English

- suggestions that Welsh English is more strongly post-aspirating than other varieties of English [4]
- acoustic analyses have not been carried out to confirm these impressionistic descriptions
- not known whether preceding vowel duration plays any role, but to be expected [7] and [8]
What do we know... /p, t, k/ vs /b, d, g/

More recent observations

- pre-aspiration recently reported in Welsh English and other British English accents ([10], [11], and [12, pp. 36 and 48])

- suggestions that pre-aspiration innovates in the fortis series as a consequence of the loss of voicing in the lenis series or the other way round ([1] and [2])

- or as a step on a degemination trajectory [3]

- affrication in Welsh English and English English /t/ ([12, p. 270] and [17])
  - not certain whether it is post-aspiration or affrication that serves as a correlate of the contrast
Questions

- Is post-aspiration an acoustic correlate of the contrast in foot-initial (post-pausal and post-vocalic), foot-medial, and foot-final (pre-pausal and pre-sonorant) environments?

- Is vowel duration an acoustic correlate of the contrast foot-medially and foot-finally?

- Is /t/ affrication more important in distinguishing /t/ and /d/ than /t/ post-aspiration?
Questions

- What role do pre-aspiration and breathiness have in distinguishing the two series?

- Is presence of pre-aspiration in the fortis series concomitant with the absence of voicing in the lenis series?

- Does the increasing in the duration of pre-aspiration lead to the decreasing in the duration of closure?

- Do pre-aspiration and post-aspiration implement the contrast in an allophonic way?
Methodology

- 10 female speakers born & raised in Aberystwyth, Wales
- L1 Welsh speakers, proficient in English
- foot-initial \((bap vs pap)\)
- foot-medial \((cabbie vs capper)\)
- foot-final \((cab vs cap)\)
- once in isolation, once in a carrier sentence Say X once.

- Say \textit{tot} once. vs Say \textit{dot} once. vs \textit{tot} vs \textit{dot}
- Say \textit{cot} once. vs Say \textit{cod} once. vs \textit{cot} vs \textit{cod}

- 1,976 tokens in total
- Fit Bayesian & Linear Mixed Effects models
Release duration

- distinguishes the series in all positions
- difference bigger in the tokens in isolation
Release duration
Vowel duration

- preceding vowel duration distinguishes the series foot-medially and foot-finally
- but following vowel duration distinguishes the series in the foot-initial position as well
Voicing

- distinguishes the series in all positions
- more frequent foot-initially if preceded by a voiced segment rather than a pause
Voicing

MEDIAL LENIS PLOSIVES
- 88% of the lenis plosives foot-medially

FINAL LENIS PLOSIVES
- 91% foot-finally

INITIAL LENIS PLOSIVES
- 13% of cases preceded by a pause
- 80% where a voiced segment precedes
Pre-aspiration and local breathiness

- pre-aspiration = voiceless
- breathiness = voiced
Pre-aspiration and local breathiness

- pre-aspiration consistently associated with the fortis series
- 80-91% foot-medially and -finally
- 32% foot-initially when preceded by a voiced segment
- reflected by breathiness
- but less consistent
  - Also found in the lenis series

Diagrams showing the presence of pre-aspiration in word-initially, word-medially, and word-finally for fortis and lenis series.
Closure duration

- longer values associated with the fortis series foot-finally
- this is not so for one speaker, who relies on glottalisation instead

`codder`  `Pippy Longstockings`
tagger

/t/, /d/ affrication
Is presence of affrication a correlate of the contrast?

/t/ is affricated in all the prosodic conditions

/d/ is similarly realised with affrication fairly frequently and this is speaker-dependent

Post-aspiration occurrence is more reliable than affrication in this regard

Durational aspects of the release of /t/ and /d/ are more consistent than the presence or absence of affrication or post-aspiration
Voicing and pre-aspiration
Pre-aspiration and closure

- degemination scenario?
  - \([p:] > [^h]p > [p]\)

- predicts a negative correlation between the duration of pre-aspiration and that of closure duration within

- but the correlations are positive and very weak \((r = 0.11-0.13; p < 0.01;\) Spearman and Pearson correlation tests)
Conclusions

- Release duration distinguishes the series in all positions
  - durational properties are more consistent than presence of affrication and aspiration → [long VOT]? [33]

- Vowel duration distinguishes the series in all positions
  - affiliation of post-aspiration with respect to the plosive as opposed to the vowel is as ambiguous as the segmental affiliation of pre-aspiration

- Pre-aspiration and local breathiness distinguish the series foot-medially and foot-finally
  - firstly reported for English
Conclusions

- degemination scenario not confirmed
  - but the change may be finalised
  - or style-dependent issues → lengthening produced only in informal speech?

- not the case that those who pre-aspirate more would voice less

FIRST NEXT STEPS

- more systematic analyses of affrication
- natural speech
Thank you!


References


References


References


