Phonetic cues of the fortis-lenis contrast in Bethesda Welsh

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What do we know?

- aspiration/non-aspiration contrasts (Jones 1984: 41)
  - Provection in some traditional S.E. dialects (Thomas 1975; see also Thomas & Thomas 1989).
- not a voicing distinction (Ball 1984, Ball & Williams 2001)
  - Cyfeiliog Welsh (Ceredigion), lenis fully voiced between voiced elements, partly word-finally (Sommerfelt 1925: 17)
- vowel duration (Awbery 1984 & 1986, Hannahs 2013; Ball 1984: 10, 12)
- Closure duration (Ball 1984: 17)
- gemination of fortis consonants after stressed vowels (e.g. Hannahs 2013: 21 and references therein)
Issues

• not based on much data
• not many dialects described
• differences between males and females not described
• pre-aspiration also a possible cue? (Ball 1984: 18; Morris 2010)
• VOT measurements problematic (also Ní Chasaide 1985: 398-9)
  – some authors do not measure word-final post-aspiration because VOT cannot be measured there (e.g. Ball 1984: 17)
Today’s talk

• preliminary analysis of fortis and lenis tokens in 8 speakers from Bethesda
• inclusion of more features
• what are the phonetic differences between fortis and lenis stops in their Welsh?
• are there differences between male and female speakers?
Methodology

• 4 male, 4 female L1 Welsh speakers
• raised in Bethesda
• 16-18 years
• word list
• 60-64 words per respondent
• 44 fortis, 16 lenis: Word-medial and word-final
• preceding vowel not controlled for
• $n=483$
Procedure

• release duration
• voicing (presence & duration)
• pre-aspiration (presence & duration)
• vowel duration
• voiceless closure duration
• monosyllables/disyllables
Procedure
Release duration

- no significant difference for individual speakers
- female & male speakers show the same pattern
- monosyllables & disyllables show the same pattern
- lower mean dur.
- duration range
Not a voicing distinction?

• Little evidence of voicing \((n=17; \; 3.5\%)\)
• fortis-lenis distinction for females and males \((p<0.001)\)
Is there pre-aspiration?

- pre-aspiration in both fortis ($n=276, 79.5\%$) and lenis tokens ($n=64, 47.1\%$)
- sig. difference between males and females before both fortis ($p<0.001$) and lenis ($p=0.0012$)
- sig. difference between fortis/lenis for both males and females ($p<0.001$)
Duration of pre-aspiration

- duration of pre-aspiration is not a cue of the fortis-lenis contrast:
Closure duration: post-tonic coda plosives

- fortis plosives geminated (see Hannahs 2013: 21 and references therein) → moraic in codas (Hannahs 2013: 31)
- monosyllables: V:C (lenis plosives), VC: (fortis plosives) – all dialects (Awbery 1984: 66-8, 74)
- polysyllables: same in the south
  only V in the north
  V & V: in free variation in mid Wales
  (Awbery 1984: 68, 74, 77)

- Bow Street Welsh (Aberystwyth): fortis & lenis plosives lengthened (Pilch 1975: 89)

- closure duration = cross-linguistically the most prominent and common cue to gemination
- post-aspiration as a cue to gemination reported for Cypriot Greek (Arvaniti & Tserdanelis 2000: 560; Arvaniti 2001)
Closure duration

- duration of preceding vowel could influence the duration of the closure duration → not controlled for
- no conclusive results on correlations between the two in our data

- if lenis not geminated & not moraic and fortis geminated & moraic, then these should be two clearly separate categories → bimodal distribution
- no bimodal distribution
- for each gender
- for each speaker

- done on disyllables
- (2-3 lenis tokens in monosyllables)
Initial Statistical Analyses

• Overall, sig difference between voicing and presence of preaspiration for fortis and lenis (Chi-squared p<0.001).

• No sig effects for continuous data (Wilcoxon Mann Whitney).
Mixed Effects Models

• Mixed effects models with word and subject as random factors.
• Voicing removed due to lack of tokens.
• Preaspiration ($t=0.627$), and consonant duration ($t=0.061$) significant predictors for fortis consonants (Intercept $t=21.003$).
• Not reliable indications or general patterns (due to low t-values).
Conclusions

• release duration differs in duration as expected but also in terms of range (but not significant).
• some voicing present (and a cue) but very infrequent.
• presence of preaspiration is a cue (but not duration).
• closure duration could be a cue irrespective of the overall duration (=length) of the coda plosive
Further work

• Aim to provide a more comprehensive analysis of fortis/lenis plosives in the three main dialectological areas for Welsh
• More controlled data
• Consideration of pre- and post-aspiration
• Possible sociolinguistic effects, in particular gender, area, linguistic background.
Bibliography


