Phonetic and Phonological Aspects of Pre-aspiration in Aberystwyth English

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Introduction

Analyses of Aberystwyth English (AE) show that pre-aspiration has both gradient and categorical aspects. I argue that the categorical aspects must be represented discretely in the phonology.

In Icelandic, pre-aspiration is a phonological phenomenon and its obligatory, categorical presence in specific environments is not questioned [1]. Other languages have more variable (non-optional), e.g. [2-5] pre-aspiration. However, optional presence of a phenomenon can still be phonological (e.g. [6] for variation in phonology).

My findings concerning the interplay of categorical and gradient effects in AE pre-aspiration raise questions about the phonological representation of laryngeal contrasts in general, and pre-aspiration in particular.

Methodology

RESPONDENTS

- Women born and raised in Aberystwyth
- Most with parents also from mid-Wales
- 21 Welsh speakers, proficient in English
- Three age groups
  - 24-28 yrs
  - 48-54 yrs
  - 72 yrs

DEFINING PRE-ASPIRATION

Narrow sense of the term used here: a period of voiceless friction following a vowel and preceding a voiceless plosive.

Figure 1: Segregated vowel showing the voiceless pre-aspiration and the voiced biphonic transition.

Breathy transition was excluded as the duration of breathy periods before plosives was found to be conditioned by different factors than the duration of voiceless pre-aspiration.

DATA

- All short vowels and two long vowels in stressed syllables
- Combined with a following /l/, /r/, /N/
- Monosyllabic and disyllabic items: bab, bat, back; lap, laper, lacquer
- 550-615 tokens per speaker in isolation and a carrier sentence

- 1 speaker (28yrs) glottalises optionally in monosyllables (monosyllables excluded)
- For 1 speaker (24yrs) glottalised items included as they were pre-aspirated as well
- Otherwise glottalised items or items with ambiguous glottal activity were excluded

Vowel height

Is pre-aspiration dependent on phonological height or phonetic (acoustic) height?

- intra-phonemic correlations between F1 and pre-aspiration duration were examined
- In general, no correlations were found (Figure 3), direction sometimes inconsistent
- /U/, /A/, and /Ja/ were contrasted (Figure 2)
- The higher the vowel category, the shorter the pre-aspiration (2 speakers for /i/ and /I/)
- No difference between /a/ and /a/, or /u and /u/, for some respondents

Figure 2: vowel height plotted phonologically shown for (short) vowel stimuli: p < 0.0001 - 0.015

Vowel length

Is pre-aspiration dependent on phonological length or phonetic duration?

- /l/ - /a/, and /Ja/ - /a/ contrasted in monosyllables
- Both short and long /V/ followed by pre-aspiration
- Pre-aspiration is shorter following long vowel:
  - * distribution for 1 speaker (28yrs)
  - * only /a/ - /a/ different for 1 speaker (28yrs)
  - /u/ - /u/ different only in a carrier sentence (72yrs)

Figure 3: correlations between pitch and pre-aspiration measured on AEBE1/2/3 (28yrs, man: x = 0.27, y = 0.54, p < 0.0001; -0.30, 0.54, p = 0.0001; -0.56, 0.54, y = 0.0001 - 0.015, 0.25, p = 0.0001)

Place of articulation of the plosive

- Pre-aspiration is conditioned by place of articulation
- Shortest before /t/; longest variable with /t/ or /N/ observed in [2, 7]

Optional application

- Distributions show a categorical distinction between presence and absence
- This is because impossible environments have been included
- Only 2 speakers show some impossible environments in the first place
- * pre and /l/ for 98yrs
- * pre in disyllables for 54yrs
- contexts for obligatory presence vary across the speakers
- Each speaker shows contexts where pre-aspiration is optional
- The youngest speaker (24yrs) has almost reached obligatory presence

Pre- and post-aspiration

Does post-aspiration correlate with pre-aspiration, which is a cue to fortis-lenis contrast in plosives in AE

- Post- and pre-aspiration durations correlate positively
- Speakers however vary in the strength of the correlation

Discussion

- Clearly bimodal distribution = optional application, represented in the output of the phonology
- Youngest respondent = nearly obligatory application; still in the output of the phonology because
- Phonologically conditioned by
  - Vowel height
  - Has a phonological representation
  - Vowel length (for some speakers)
- Has a phonological representation
- Pre-aspiration should be specified in AE phonology

Questions:

- Do 1 or 2 features cover both pre- and post-aspiration in pre-aspirating languages?
- If pre- and post-aspiration correlate, are both represented by [+spread glottis]?
- How strong should the correlation be to suggest this is the case?
- Which of the numerous phonetic cues to [fortis-lenis] contrast are in the output of the phonology?
- Would it suggest which the most important cue is, and would this mean there is just one cue in the output of the phonology?

References