The [ATR]/laryngeal connection and emergent features

Pavel Iosad
The University of Edinburgh
pavel.iosad@ed.ac.uk

Outline

- 'Provection': A puzzling process in South-East Welsh

- Phonologizaton of redundant features in Welsh and Kiparsky's bias

- Emergent connections between vowel quality and laryngeal features

1 Provection in Welsh

1.1 The data

Provection in South-East Wales

- The term 'provection' (Welsh *calediad*, 'hardening') refers to a process whereby 'voiced' stops become 'voiceless' following a stressed vowel in a non-final syllable

- Traditionally found across most of SE Wales (the Valleys and Vale of Glamorgan, extending north to Breconshire and west to E Carmarthenshire), see C. H. Thomas (1975)

- Examples here are from Nantgarw (C. H. Thomas 1993), the fullest description of a provecting dialect available

(1) a. [keˈɡina]   *ceginau*   'kitchens'
     b. [ˈkekɪn]   *cegin*   'kitchen'

(2) a. [ˈɡovɪd]   *gofid*   'regret'
     b. [ɡoˈvɪtjo]   *gofidio*   'to regret'

More facts about provection

- Does not affect voiced fricatives:

(3) a. [ˈkɛlʊð]   *celwydd*   'untruth'
     b. [ˈkluða]   *celwyddau*   'untruths'
     c. *[ˈkluθa]

- Generally moribund, but lexically specific and socially constrained where still described (S. E. Thomas 1983)

- Some generalizations beyond purely lexical variation:

    – Affects singleton intervocalic stops more regularly than stops in clusters

    – Not triggered by [i] from historical **ei*: [nido] 'jump' for *neidio*

    – Generally not triggered before an epenthetic vowel: [kubʊl] 'whole' (*cwbl*)

1.2 Possible solutions and issues

Gemination

- Without offering a full analysis, Hannahs (2013, p. 151) suggests that the 'devoicing' may be due to the fact that voiceless consonants after a penultimate stressed vowel are geminated

(4) a. [ˈatˑɛb]   *ateb*   'answer'
     b. [ˈgɔsˑɔd]   *gosod*   'to set'

    – However, this gemination is characteristic of consonants after a *short* stressed vowel (e. g. Awbery 1986)

    – There is a phonotactic restriction in (Southern) Welsh whereby vowels are normally short before voiceless stops and long before voiced ones (Awbery 1984)

(5) a. [ˈpapˑir]   *papur*   'paper'
     b. [ˈpaˑbɪð]   *pabydd*   'Catholic'

- C. H. Thomas (1993, p. 70) explicitly says that vowels before provected stops are long and the stops themselves are short: 'Provection does not change the length relationship between these stops and preceding vowels within the syllable'[1]

(6) a. [ˈpoːpi]   *pobi*   'to cook'
     b. [ˈkaːtu]   *cadw*   'to keep'

- Gemination doesn't seem to be the answer here

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[1]Nid yw Caledu felly yn newid dim ar y berthynas hir/byr rhwng y ffrwydrolion hyn a'r llafariaid o'u blaen yn y sillaf.

High tone

- (I owe this suggestion to Andrew Nevins (p. c.))

- Could the devoicing be a result of a high tone being associated to the stressed syllable?

- Attractive solution, but:

    - Although we are far from a comprehensive understanding of Welsh intonation, it seems that stressed syllables are not generally associated with high tones

    - In fact, we frequently get rises on the post-tonic syllable

    - Non-involvement of fricatives unexplained

Incomplete neutralization

- Are the [p t k] provection outcomes the same as lexical [p t k]?

- The length facts discussed by C. H. Thomas (1993) show that the *lexical* contrast is *not* neutralized

- S. E. Thomas (1983) explicitly says that provected [p t k] are *not* identical with lexical [p t k]: they are *fortis* (i. e. voiceless) but *unaspirated*

- How do we account for all these facts?

2   Phonologization of vowel tenseness

2.1   Contrastive and redundant tenseness

Provection and vowel tenseness

- I capitalize on the description of provected stops as 'fortis unaspirated'

- Another context for such stops in the language is in tautosyllabic clusters with fricatives (e. g. Ball & Williams 2001): *pysgodyn* 'fish', *gwallt* 'wild'

- Following proposals for such clusters in Germanic (Magnus Pétursson 1978, Kingston 1990, Iverson & Salmons 1995), I suggest that provected stops share a feature analogous to [spread glottis] with a preceding vowel

(7)   k e k ɪn

         [spread glottis]
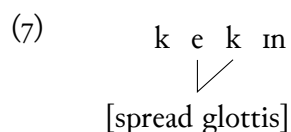
Length and tenseness

- The core of the proposal lies in the association of provection with the historical context *CV:D*V

- Historically, vowels in this context are both *long* (because of the phonotactic restriction) and *tense* (on which more below)

- The fact that this association led to stops becoming *'voiceless'* in a tense-vowel context is surprising, given that tenseness/[+ATR] is generally associated with *voicing* (Trigo 1991, Vaux 1996, 2009)

- However, given that [spread glottis] (or some equivalent) is active in Welsh phonology (e. g. Cyran 2010, Iosad 2012) we do not expect to see any activity of [voice] under privative/contrastivist assumptions

Redundant tenseness

- A distinction between 'tense' and 'lax' versions of most vowels is generally associated with a contrast in vowel length: short vowels are 'lax' [ɛ ɔ ɪ ʊ], long vowels are 'tense' [i u e o] (G. E. Jones 1984)

- This is the 'standard' picture and is found, for instance, in many North Welsh dialects, and in South Welsh monosyllables

  (8) Dyffryn Alyn, Flintshire, North Wales (A. R. Thomas 1966)

a.	(i)	[ˈheːn]	*hen*	'old'
	(ii)	[ˈtʰoːn]	*tôn*	'tune'
b.	(i)	[ˈpʰɛn]	*pen*	'head'
	(ii)	[ˈtʰɔn]	*ton*	'wave'

- See Mayr & Davies (2011) for a cross-dialectal acoustic study (monosyllables only)

☞ There is more variation in unstressed syllables, but it is poorly understood

- Crucially, there is little if any evidence of the involvement of this distinction in the phonology (e. g. contrast or alternations)

☞ The only study of such dialects (that I know of) which is detailed enough to say if there is a marginal contrast is Fynes-Clinton (1913), and the work has not been done

Phonologization of tenseness: South-West Welsh

- The tight fit breaks down in SW Welsh dialects (W Carmarthenshire, N Pembrokeshire, SW Ceredigion)

- Long mid vowels in penults are tense before non-high vowels, lax before high vowels (Awbery 1984, 2009, C. Jones & Thorne 1992)

(9) a. (i)   [ˈkʰɔ·di]   *codi*   'to rise'
         (ii) [ˈkʰo·dɔð]   *cododd*   '((s)he) rose'
     b. (i)   [ˈgwɛ·dʊχ]   *dywedwch* 'say!'
         (ii) [ˈgwe·dɔð]   *dywedodd* '((s)he) said'

- This would appear to be *phonologized*, since the alternation is described as *categorical* and *sensitive to phonological structure*

- Data analysis ongoing

- Here: 1 speaker from Goodwick (N Pembrokeshire)

SW Wales: categorical

- No statistical data ready yet, but these examples are representative: F1 higher before a high vowel
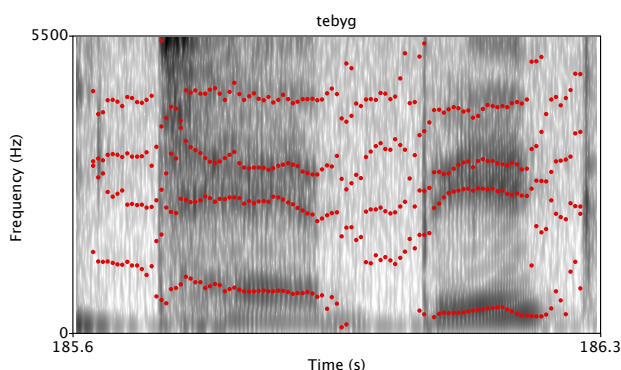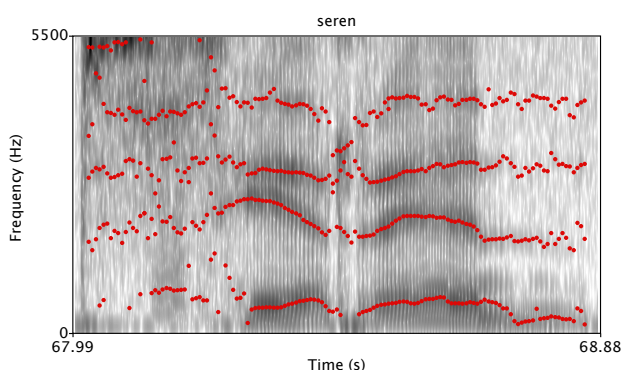

- Also note the quite steady formant state

SW Wales: phonological

- Crucially, the allophony appears sensitive to the *phonological* specification of the next vowel as $[(\pm)\text{high}]$

- Historically, this type of 'height dissimilation' appears to be due to a trade-off in inherent duration: a vowel becomes lower (=longer) as the following becomes higher (=shorter)

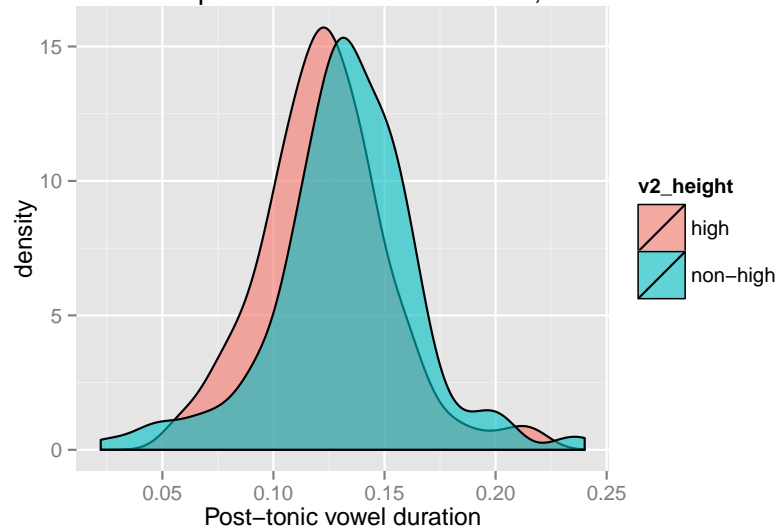☞ East Slavic (Kniazev 2000, Crosswhite 2000), Munster Irish (Ó Sé 1984)

- This is a plausible diachronic scenario, and it looks like this trade-off might exist in the dialect in some form

Phonetic length trade−off
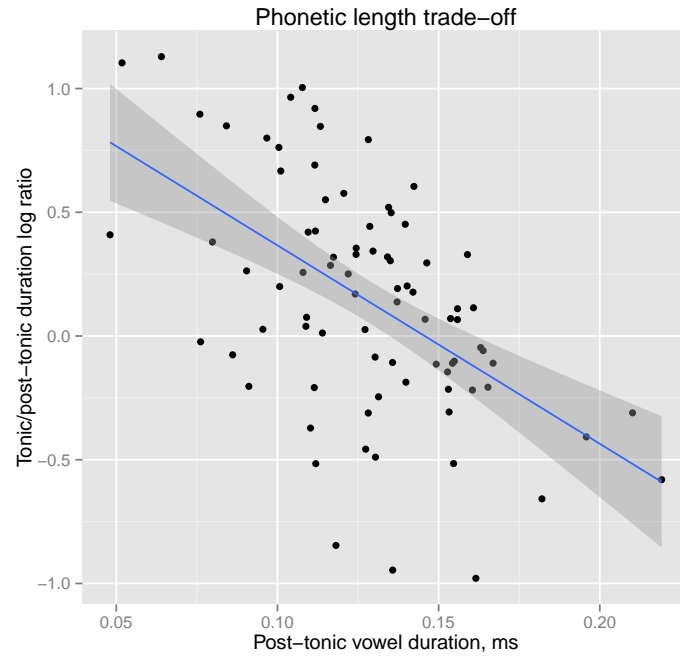
$$b = -8.0174, p < .001$$

- Inherent length seems to have some sort of role

Distribution of post−tonic vowel durations, all tokens

Wilcoxon rank-sum test (one-tailed): $W = 11507, p = .0001848$

- It remains to be seen whether the continuous duration trade-off maps onto a binary distinction in vowel quality

- But to the best of current knowledge the distinction is both categorical and phonological, in that it involves the $[(\pm)\text{high}]$ specification

- Phonologization: from empirically categorical but phonologically inert distinction (North Welsh) to empirically categorical and phonologized distinction

- The distinction appears to be conceptualized as aperture

- New categories introduced through phonologization biased to use existing features (Kiparsky 1995)

☞ As Bermúdez-Otero (2014) points out, this follows from the low rank of relevant cue constraints in the bidirectional model of Boersma & Hamann (2008), Hamann (2009)

2.2 Tenseness and provection

Vowel quality and provection

- The core context for provection is C*V:D*V

- Historically, given the distribution of tenseness vis-à-vis length, this means that *provection was triggered by a preceding tense vowel*

☞ The SE system presumably comes from something like the Northern one: I have no evidence of height-dissimilation phenomena in the SE

- SE [k{ek}$_{[SG]}$ɪn] 'kitchen' ← *[k{eː}$_{[tns]}$gin] ← *[kɛːgin]

Another way to phonologize

- The SE system starts out as a type of the 'standard' one

- As in the SW, the categorical distribution of tenseness prompts a phonological interpretation by the learner

- The feature chosen here, however, is not aperture but the laryngeal feature active in the language

- Cf. Buchan Scots (Paster 2004, Youssef 2010)

- Kiparsky's bias at work again, although the cuing mechanism needs more work

- (But for this, we need to understand the phonetics of laryngeal contrast in Welsh better than we do now)

☞ Tellingly, the laryngeal feature active in Buchan Scots is [voice]: this is at odds with the 'laryngeal realism' analysis of English, but Scots is described as having (more) voiced lenis stops and it lacks the English evidence for phonological activity of [SG]

Why [spread glottis]?

- Accounts for the 'fortis unaspirated' realization of provected stops in parallel with post-fricative stops

- Accounts for the non-involvement of [v ð]

    – These 'voiced fricatives' do not enter a laryngeal contrast with [f θ]: phonologically they are more like sonorants than obstruents (Botma & van 't Veer 2013)

    – See Iosad (2012) for evidence to this effect in Welsh

Provection and the debris of phonological change

- Provection is clearly not a live process even in dialects where it is (was) most active, and those dialects are generally moribund

☞ Outright lexical conditioning (apparently)

☞ Opacity, or (more charitably) obscuring by later phonological change, as with *neidio* → ['nido]

☞ Provection after short vowels

    – Difficult to recognize confidently due to transcriptions not generally distinguishing underlyingly fortis and provected stops

    – C. H. Thomas (1993) does have examples where relexification seems to have occurred: [dɪkˑɔn] 'enough' instead of expected *[diːkɔn] (*digon*)

    – Provection in clusters: [ɛprɨɬ] 'April' (*Ebrill*), where the vowel was never tense (as far as we know); happy to answer questions

☞ Social conditioning (S. E. Thomas 1983)

Conclusion: phonologization, emergent features, and substance

- If this analysis is on the right track, Welsh provides an example of (micro)variation in the construction of emergent phonological representations

- Learners observe categorical distributions in surface forms and are biased to map them to phonological categories: features exist but are emergent (Mielke 2007)

- This process has input *both* from the bottom up (substantively coherent categories are presumably easier to learn) and from the top down (there is a mechanism which ensures that existing categorial distinctions are more likely to be repurposed); cf. Boersma this workshop

- This allows for both grounded and substantively arbitrary patterns

8

- In our case, there is a phonetic case for [+ATR] vowels to be associated with [(+)voice] in obstruents, as seen e. g. in Buchan Scots

- However, if the language does not provide a [(+)voice] phonological category, it is not available to interact with tenseness, so it can be conceptualized as a different type of feature (aperture, or perhaps a new category like [ATR]), or it can latch onto the laryngeal feature that the language does offer

- Under these assumptions, a theory of phonologization should allow for both 'natural' and 'substance-free' patterns

- This type of argument for non-trivial phonetic interpretation differs from the emphasis on 'unnatural classes' by Mielke (2007): phonetically unnatural interactions are uncovered in whole-language analysis of phonological computation, not by inspection of surface patterns (cf. Hall this workshop)

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