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Length and tenseness across Welsh dialects

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Outline

- Length and tenseness: the phonemic status debate
- Phonologization of tenseness: South-West Welsh
- Vowels and protraction: another instance?

I Finding phonemic contrasts

I.1 The standard picture

Vowel quality and length

- In all varieties of Welsh words such as *ton* ‘wave’ and *tôn* ‘tune’ are a *minimal pair*
- The only difference is the pronunciation of the vowel
- In most cases, the difference is realized as one of length and quality *simultaneously* (e. g. G. E. Jones 1984)
 - Long vowels are ‘tense’: [i: u: e: o:]
 - Short vowels are ‘lax’: [ɪ ʊ ɛ ɔ]
 - The vowel [ə] can only be short
 - Some of the literature (e. g. C. H. Thomas 1993) also describes a qualitative difference between [a] and [ɑ:]
- A recent study by Mayr & Davies (2011) confirms this picture

☞ We ignore some complications

- The (short) vowel [ɒ] found in English borrowings
- The ‘*a fain*’, i. e. [æ]
- For many dialects, especially in the north, there is not much more to say, e. g. Dyffryn Alyn, Flint. (A. R. Thomas 1966)

(1)	a.	[ˈhe:n]	<i>ben</i>	‘old’
	b.	[ˈtʰo:n]	<i>tôn</i>	‘tune’
(2)	a.	[ˈpʰɛn]	<i>pen</i>	‘head’
	b.	[ˈtʰɔn]	<i>ton</i>	‘wave’

- (The pattern might be leakier than that in some varieties, see e. g. Rees 2013)

Phonemic contrast?

- This sort of mutually predictable distribution is problematic in the classical phonemic framework
- If one of the features is distinctive, the other becomes predictable and therefore redundant
- But how do we choose?
 - G. E. Jones (1984), C. H. Thomas (1993): quality /pɛn/, /hen/
 - Awbery (1986): length /pen/, /he:n/
- A question lurking in the background: what is the specification for *unstressed* vowels?
- Always short, but quality varies, apparently depending on position with regard to stress and presence of following consonant in the same syllable

1.2 A theoretical perspective

Phonemic status or phonologization

- In many strands of current phonological theory, the thing that matters is not so much phonemic status (i. e. whether something is predictable from looking at the surface distribution) but rather involvement in phonological processes
- The process of becoming phonologically relevant is usually known as *phonologization* (Hyman 1976, Kiparsky 1995, Barnes 2006, Bermúdez-Otero 2007)
- If a particular property of segments is required for the description of phonological processes, it has become phonologized

Clues for phonologization in Welsh

- This perspective could be helpful with Welsh
- The relevant phonological process concerns the largely predictable distribution of the length/tenseness feature in stressed syllables (e. g. Awbery 1984)
 - Long before [b d g v ð]
 - Short before [p t k m ŋ]
 - Some dialect and positional variation with [f θ χ s ʃ t]
 - Can be either before [n l r]
 - Predictable before consonant clusters
- This is difficult (although not quite impossible) to formalize if the interacting feature is vowel quality
- An analysis in terms of vowel quantity is available
- The strongest evidence comes from [n l r], where vowel length is contrastive and lexically distributed: easy to derive if [n l r] come in two varieties ('short' and 'long'), and the 'long' blocks vowel lengthening
- ☞ See the precise details in Iosad (2012)
- Also fits nicely with the absence of long vowels before clusters non-finally (= in closed syllables)
- ☞ Interim conclusion: if we insist on picking only one contrast as 'phonological', quantity is the better candidate

2 Phonologization of tenseness

2.1 South-West Welsh

Imperfect distributions

- In south-western dialects, the perfect isomorphism between length and tenseness breaks down

Awbery (1986, p. 9)

'The long mid vowels in penultimate syllables each have two clearly distinguishable allophones, one half open and the other half close. [They] are in complementary distribution, the choice between them being determined by the vowel of the final syllable. If this contains a high vowel then we find the half open allophone in the penultimate [...] If however the final syllable contains a mid or low vowel then we find the half close allophone in the penultimate.'

(3)	a.	[ˈtɛːbɪg]	<i>tebyg</i>	‘similar’
	b.	[ˈgɔːvɪn]	<i>gofyn</i>	‘to ask’
(4)	a.	[ˈeːde]	<i>edau</i>	‘thread’
	b.	[ˈoːgov]	<i>ogof</i>	‘cave’

- Also C. Jones & Thorne (1992, p. 20): ‘Nodwedd fwy cyffredinol ar batrymu llafarog tafodieithoedd gorllewin Dyfed yw’r defnydd o lafariad hanner agored yn y goben acennog [...] Clywir y nodwedd mewn geiriau megis *mochyn, cochi, gofyn, tlodi, priodi, meddwl, enw, wedi, beddi*.’

The source of the pattern

- The pattern looks a bit like dissimilation: /e o/ become *lower* [ɛ ɔ] before a *high* vowel, and vice versa
- Similar cases
 - Patterns of vowel reduction in some East Slavic dialects (e. g. Crosswhite 2000)
 - Vowel distributions in Irish: Munster (Ó Sé 2000), historically Connacht (Ó Sé 1984)
- Reasonable explanation: trade-off in inherent length
- Lower vowels are generally longer than higher ones, so a lower (longer) post-tonic vowel gives a shorter (higher) tonic vowel (and vice versa)

Questions

- What are the actual data? Is the pattern limited to mid vowels?
- Is there a length tradeoff?
- Is the process (still) a gradient length trade-off, or has it morphed into a categorical symbolic operation (cf. Myers 2000, Bermúdez-Otero & Trousdale 2012)?

The study

- Word list controlled for stressed vowel quality and length, post-tonic vowel height, post-tonic consonant place
- Words in carrier sentence, 3 repetitions per word
- 8 speakers, 6 from Carmarthenshire or Pembrokeshire
- Here: 2 analysed

The outlines of the data

- Measures: F₁ and F₂, duration for both stressed and post-tonic vowels
- F₁ and F₂ are Lobanov-normalized (converted to z-scores) to deal with speaker-specific effects
- We build a conditional inference tree (Hothorn, Hornik & Zeileis 2006; for linguistic applications cf. Strycharczuk et al. 2014) for long vowels ($N = 280$) with `v1.f1.normalized` as dependent variable and predictors `v1`, `v2`, `v2.duration`, `v1.duration`, `v2.f1.normalized`

Interpretation

- Even this initial look confirms the descriptions:
 - Stressed mid vowels are not like stressed high vowels
 - For stressed mid vowels, there is an effect of the following vowel: [i] (high) is different from [a e o] (non-high)
 - Once these are accounted for, there is no effect of post-tonic vowel length on the quality of the stressed vowel
- We know that there is an effect, but what kind of effect?

Vowel quality: mid vowels

- It looks like the height of the post-tonic vowel does give a relatively neat division
- Statistics confirms this: Wilcoxon rank sum test (to allow for non-normal distributions)
 - For /e/: $W = 1502, p = 1.1834 \times 10^{-11}$
 - For /o/: $W = 1591, p = 5.1388 \times 10^{-18}$

- A closer look at the outliers reveals that out of 7 tokens of [ɛ:] before a non-high vowel, 6 belong to the word *ffenstr* ‘window’

- All tokens of *ffenstr* belong to that region: [ˈfɛ:nɛst]

☞ It appears to be a lexical exception: the distribution may not be perfect

- Note that Awbery (1986) does cite it, but as [ˈfe:nɛst]

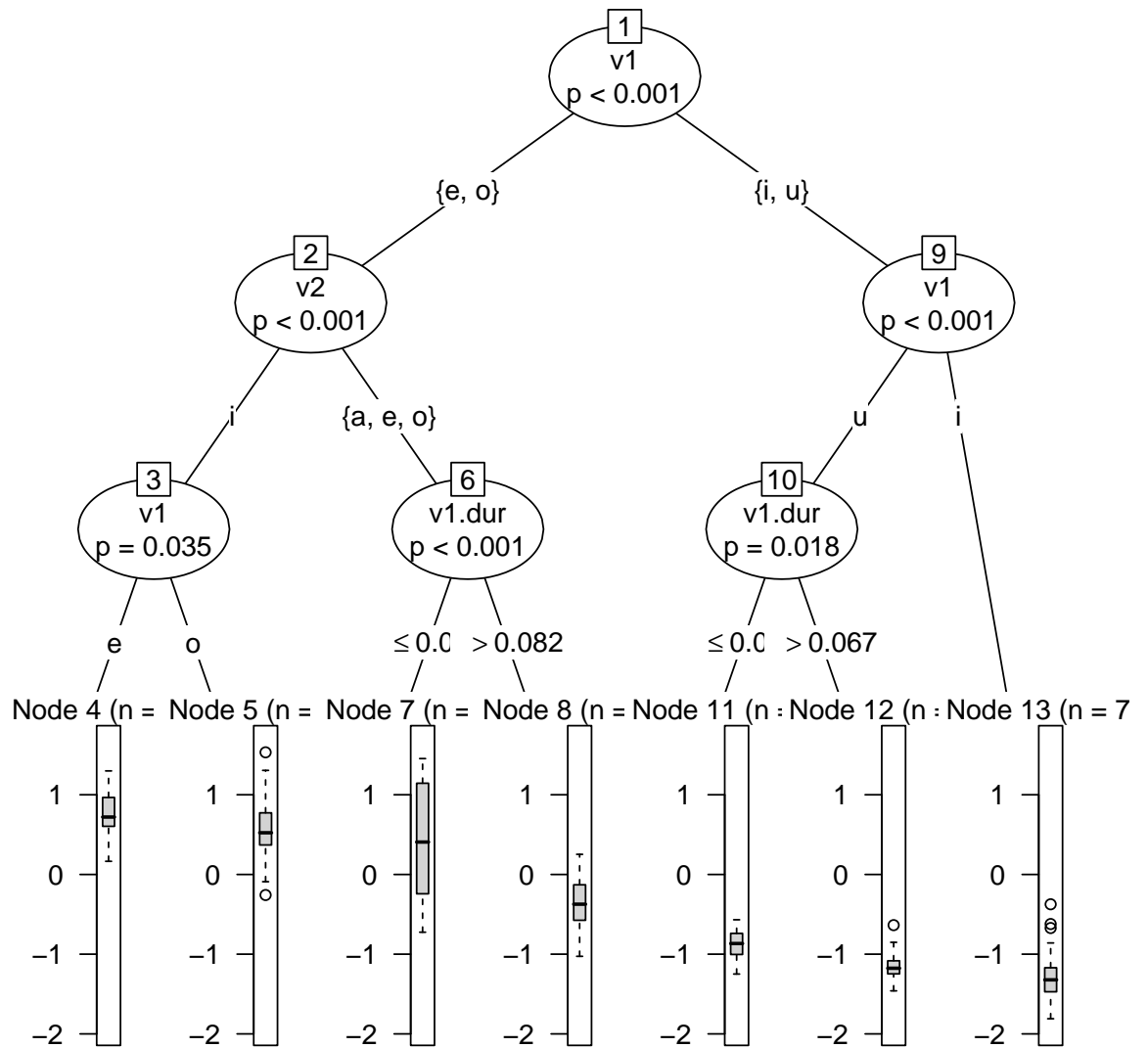


Figure 1: Conditional inference tree for stressed vowel height

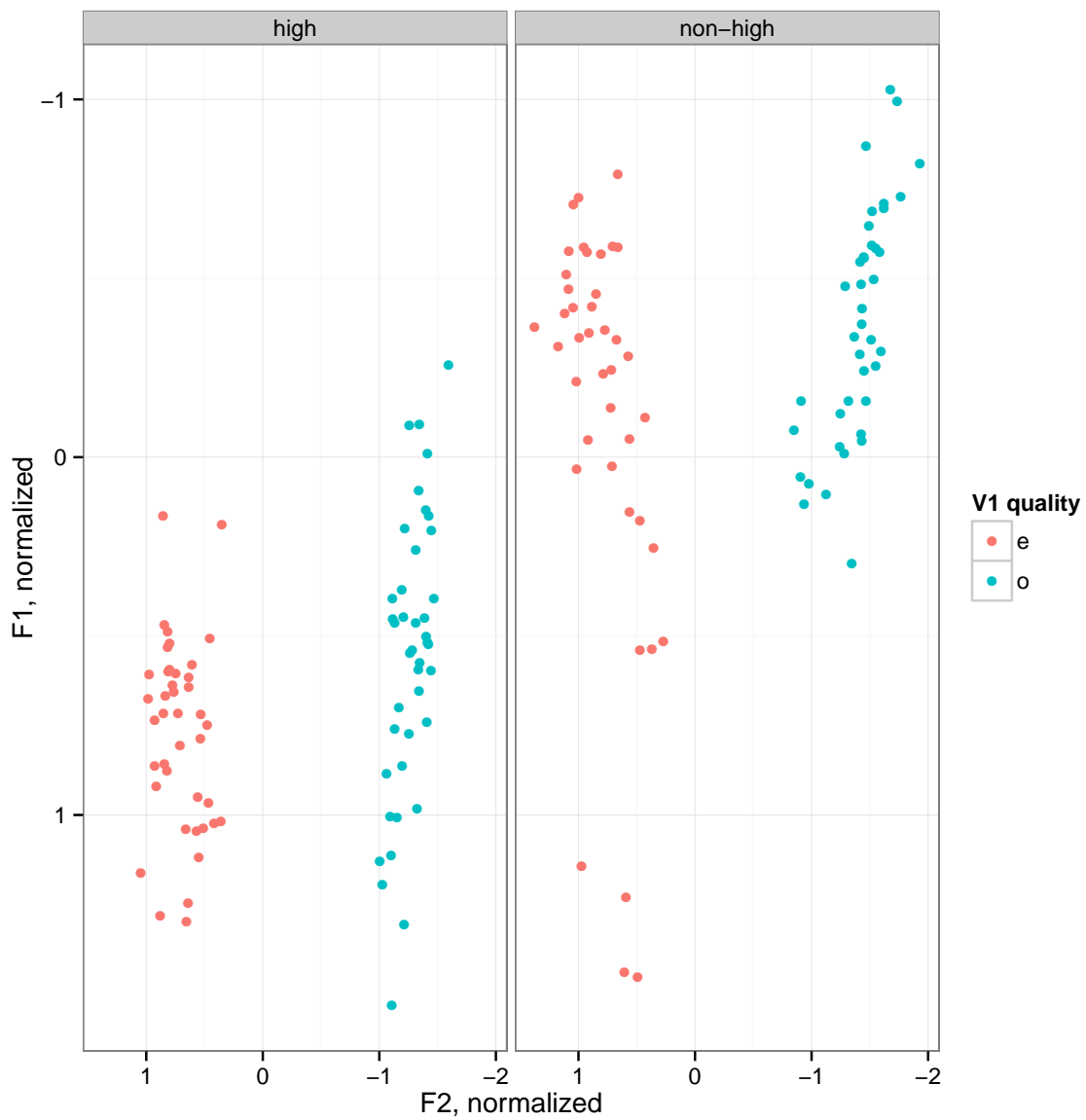


Figure 2: Normalized F1 height by V2 category: mid vowels

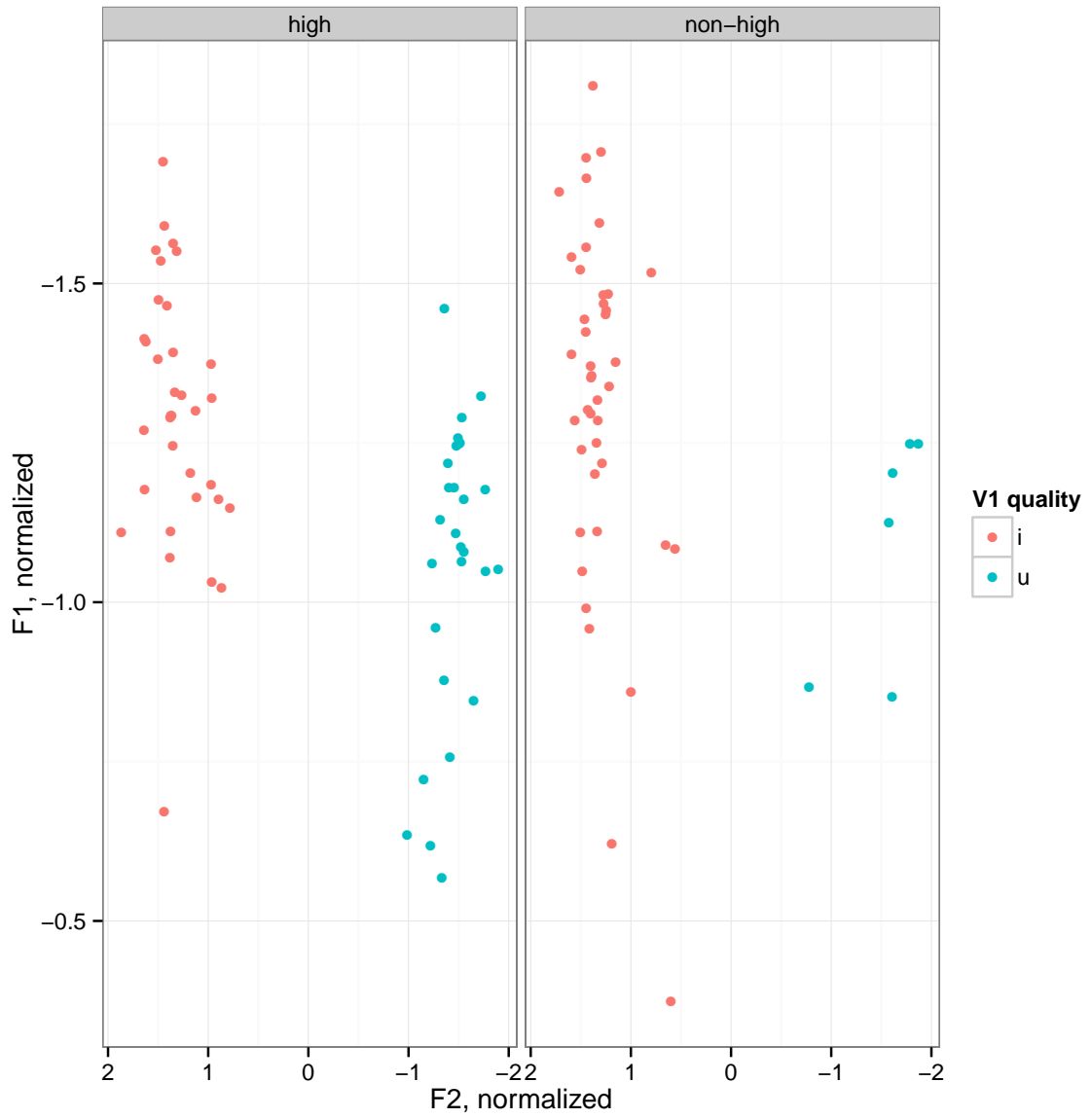


Figure 3: Normalized F1 height by V2 category: high vowels

Vowel quality: high vowels

- The categories seem much more similar
- One-tailed t-tests:
 - For /i/: $t(72.9925) = 0.34, p = 0.3689$
 - For /u/: $t(8.6772) = 0.38, p = 0.3563$
- The behaviour of high vowels is very different from the behaviour of low ones

Vowel quantity

- Gradient properties of the post-tonic vowel (duration and height) do not appear to influence the height of the stressed vowel
- ☞ Evidence that phonologization has occurred
- What about quantity?
- At first blush, there does not seem to be a trade-off in pure duration either
- This might be due to collinearity with some overall durational measure, however

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	0.0741	0.0081	9.14	0.0000
v2.dur	0.2408	0.0587	4.10	0.0001

Table 1: Linear model for duration

- However, the relationship between the durations of the two vowels is not straightforward: the duration of the post-tonic vowel grows faster than that of the stressed one
- In other words, increased duration of the post-tonic vowel makes the stressed one shorter in comparison
- The quantitative pattern that must have given rise to the featural process appears to be still present in the grammar as a gradient phenomenon
- This is an example of *rule scattering* (Bermúdez-Otero 2010, 2014, Ramsammy forthcoming, Strycharczuk et al. 2014): the pattern ascends a step in the life cycle of phonological processes, but the original pattern also remains

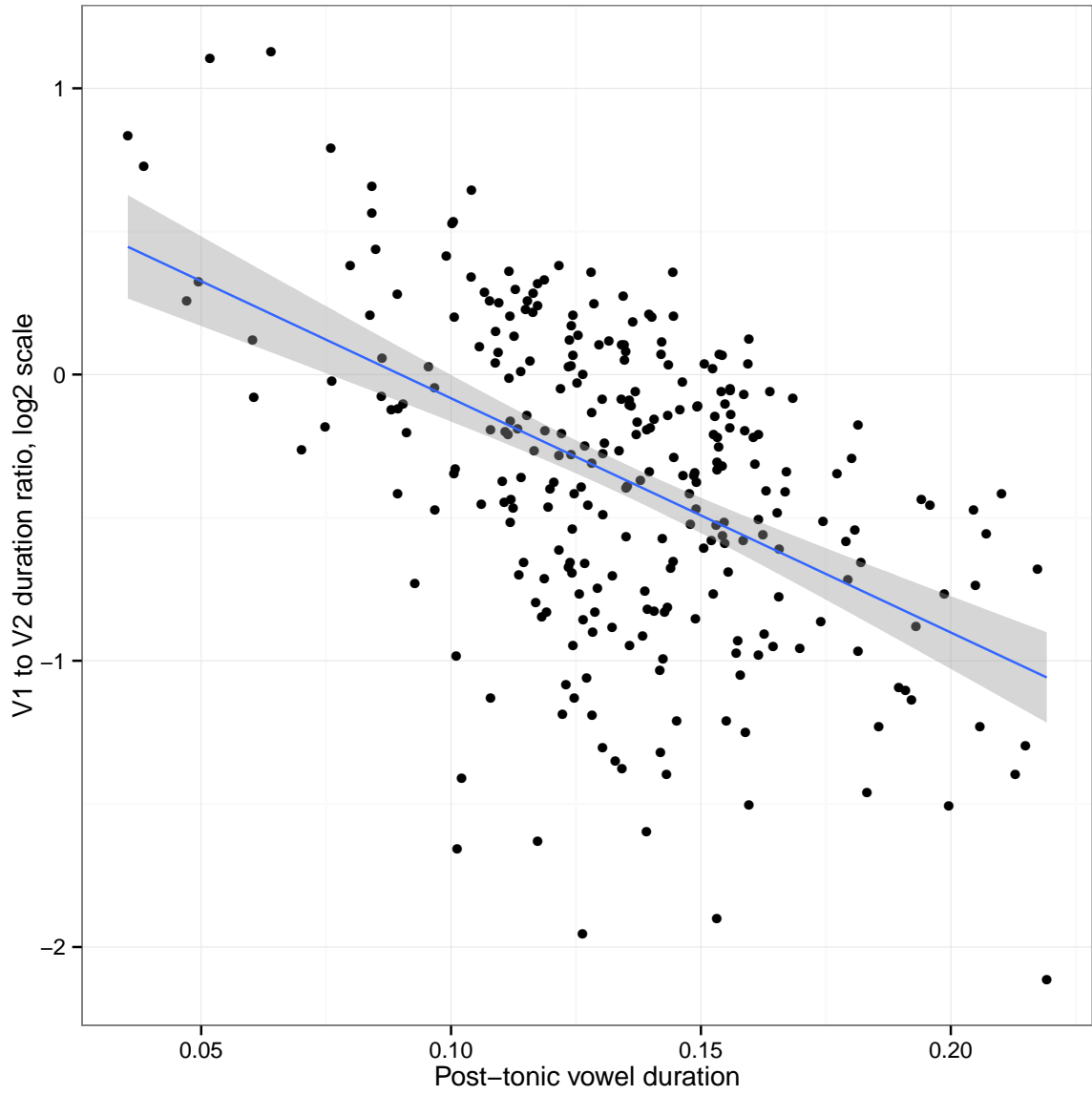


Figure 4: Post-tonic vowel duration and V_1/V_2 ratio

2.2 South-East Welsh

Provection and vowel features?

- Another potential candidate for the phonologization of vowel quality is seen in south-eastern dialects
- The process of ‘provection’ (*calediad*) involves a devoicing of stops following stressed vowels
- Examples from Nantgarw (C. H. Thomas 1993)

(5)	a.	[ke'gɪna]	<i>ceginau</i>	‘kitchens’
	b.	['kekɪn]	<i>cegin</i>	‘kitchen’
(6)	a.	['gɔvɪd]	<i>gofid</i>	‘regret’
	b.	[gɔ'vɪtʃɔ]	<i>gofidio</i>	‘to regret’

Why vowel features?

- The interaction between stressed vowels and devoicing is unusual
- One possible route is suggested by Hannahs (2013), who notes that consonants after (short) stressed vowels are long, and gemination promotes devoicing
- However, the ‘voiceless’ stops produced by provection are not identical to lexical voiceless stops (S. E. Thomas 1983)
- Awbery (1984), C. H. Thomas (1993) are quite explicit that provection does not lead to gemination: ‘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.’ (C. H. Thomas 1993, p. 90)
- Another option (Andrew Nevins p. c.): high tone on the stressed vowel prevents voicing (a parallel in Verner’s Law)
- Still problematic
 - We don’t know for sure that high tone is associated with stress in Welsh
 - Provection does not affect fricatives
 - Provection is not caused by [i] ← *ei ([‘nido] *neidio*)
 - Provection is less regular in clusters
- The ‘core’ context for provection is a singleton voiced stop: this is the context where vowels are *long* and therefore *tense*
- What if the tenseness has phonologized and become active in the phonology?

2.3 Discussion

Phonologization from below

- I have proposed that vowel quality becomes phonologized in Welsh because of its categorical association with vowel length
- This is consistent with the model of the life cycle of phonological processes where learners assume that a property categorically present in the output must be present in the input (Bermúdez-Otero & Hogg 2003, Bermúdez-Otero 2007, Bermúdez-Otero & Trousdale 2012, Bermúdez-Otero 2014, Roberts 2012, Ramsammy forthcoming)
- Crucially, the *presence* of this feature does not tell the learner much about its *nature*
 - In SW Welsh, it interacts with vowel height
 - In SE Welsh, if the proposal is on the right track, it interacts with the laryngeal feature distinguishing stops
- Support for a substance-free featural model

Dialectal diversity in Welsh

- Although these differences across the Welsh dialectal landscape look like relatively minor things, they are actually quite valuable
 - Hopefully for communities
 - Certainly for linguists
- Looking at cross-dialectal microvariation allows us to pinpoint interesting differences while keeping so many other factors constant
- It is important to both engage with existing work and conduct targeted empirical research

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