Laryngeal phonology in Plougrescant Breton:
sandhi, mutation, and contrast

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Talk outline

1. Laryngeal phonology in a Breton dialect
2. Final devoicing is loss of contrast, not loss of feature
3. Sandhi voicing is phonetic implementation (mostly)
4. Devoicing sandhi do not need [−voice]
5. Privative laryngeal features will do
6. Implications

Background

▶ Breton: a Celtic language, closely related to Cornish and Welsh
▶ Mostly described by Celtologists, dialectologists, and historical linguists
▶ Breton phonology remains seriously understudied (as opposed to syntax)
▶ Few proper phonetic studies, mostly aural transcriptions
▶ What can we do?

Previous work

Krämer (2000)
▶ Île de Groix Breton (Ternes, 1970)
▶ Argued to exhibit a ternary contrast between [+voice], [−voice], and [0voice] segments
▶ Evidence for binary features
▶ Final devoicing is loss of features

Hall (2008)
▶ Same dialect, same source
▶ Privative features with feature geometry
▶ Feature disalignment
▶ Final devoicing is loss of features and loss of contrast
The present approach

- Work in progress, (almost) nothing is final
- Features are privative with feature geometry
- "Final devoicing" is loss of contrast
- Devoicing sandhi is
  - Either lexical phonology
  - Or failed mutation due to geminate inalterability
- Argument for substance-free phonology
- Tested on Plougrescant Breton (Jackson, 1960)

Breton dialects

- Traditionally divided into four groups
  - Cornouaillais, Trégorrois, Léonais (KLT): relatively homogeneous, basis for standard language
  - Vannetais (south-east): very divergent, sometime even served by own literary tradition (Guillevic & Le Go, 1902)
- Île de Groix is a Vannetais dialect
- Source rather messy ("phonemic" approach, not very systematic)
- Here: attempt to look at a less messy data point
- Plougrescant is a Trégorrois dialect; description by Jackson (1960) more systematic
- Further outlook: extend approach to Île de Groix if possible

Consonant inventory

<table>
<thead>
<tr>
<th>Manner</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>Labial</td>
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<tr>
<td>Fricative</td>
<td>f</td>
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<tr>
<td>Nasal</td>
<td>m</td>
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<tr>
<td>Lateral</td>
<td>l</td>
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<tr>
<td>Rhotic</td>
<td>r</td>
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<tr>
<td>Glide</td>
<td>w</td>
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</tbody>
</table>

- Length contrast for all consonants except voiced obstruents

Vowel inventory

- Length is only licensed by (main) stress
Restrictions on laryngeal features

- Voiced and voiceless obstruents contrast word-initially; short allophones
  (1) a. [pesk] 'fish'
  b. [bœːrɛ] 'morning'
  c. [loɡɔt] 'mice'

- Voiced and voiceless obstruents contrast immediately following unstressed vowels; short allophones:
  (2) a. [bo'toː] 'shoes'
  b. [ja'denːɔt] 'chained (participle)'
  c. [ky'ryːno] 'peals of thunder'

- Following long stressed vowels, consonants can only be short; voiceless obstruents do not occur:
  (3) a. [ɔber] 'to do; to make; to work'
  b. [liːzɔr] 'letter'
  c. [meːlɔn] 'yellow'

- Following short stressed vowels, consonants are long; voiced obstruents cannot be long, so they are excluded:
  (4) a. [tapːut] 'to take'
  b. [jaΧɔɔ] 'more healthy'
  c. [skv deːlo] 'basins'

Restrictions on laryngeal features

- Word-finally following a stressed vowel, voiced obstruents are not permitted. Consonants are short following long stressed vowels and long following short stressed vowels.
  (5) a. [toːk] 'hat'
  b. [meːl] 'honey'

  (6) a. [grwɛkː] 'woman, wife'
  b. [mɛl] 'ball'

Summary

- Leaving final devoicing aside for a moment, laryngeal features are mostly predictable:
  - Laryngeal contrasts are allowed in the onset of the first syllable and of the stressed syllable
  - Otherwise they are predictable:
    - Voiced following unstressed (always short) vowels
    - Voiced when single and following long stressed vowels
    - Voiceless (and long) when single and following short stressed vowels
  - What is contrastive? What is marked?
Final devoicing

▶ At first blush final devoicing looks normal

(7) a. [bygalejo] ‘children’
    b. [by'ga:lə] ‘child’

▶ But what about vowel length?
▶ This is a good question

Final devoicing in monosyllables

▶ The really interesting part is when a stressed vowel precedes
▶ Stress is normally penultimate in KLT (but not in Vannetais!), so this is mostly monosyllables and a few words with final stress
▶ If it is vowel length that is distinctive, we expect V:C#

(8) a. [tɔɡo] ‘hats’
    b. [tɔk] ‘hat’

▶ And cf. minimal pairs like

(9) a. [kasː] ‘send!’ ([s] never voiced, French borrowing)
    b. [kə:s] ‘cat’ (cf. orthographic kaz)

Final devoicing in monosyllables

▶ This isn’t really devoicing in view of what we know about quantity and voicing
▶ This is incomplete neutralization
▶ Confer real devoicing:

(10) a. [lɔ'go:dən] ‘mouse’
    b. [lɔ'ɡotə] ‘to hunt mice’

▶ Side note: it isn’t always about voicing per se:

(11) a. [rɔ'this] ‘people of ar Roc’h’
    b. [rɔrɔ] ‘ar Roc’h (placename)’

▶ Not really surprising if you know (some) [h] is historically *ɣ, but must be accounted for

Final devoicing in monosyllables

▶ Does real final devoicing happen? Well, yes
▶ There is variation described by Jackson (1960) as “free”, and especially with coronals
▶ Context probably unknowable; the ambition here is at best to find which representations are involved

(12) [tyːt]∼[tjyt] ‘people’ (orthographic tud)

▶ More examples to come immediately below, as they involve sandhi to which we now turn
▶ What about lexically voiceless finals? These are relatively few, French borrowings of various antiquity, and behave as expected, cf. (9-a)
The traditional view (Stephens, 1993; Favereau, 2001) is essentially that all consonants are voiced in sandhi before [+voice] segments:

(13) a. [pweːloz̪ ɐ.ə] ‘if you saw me’
    b. [mab ˈneːwe] ‘new son’
    c. [po'b̥ ˈbi.ən] ‘little youth’

And voiceless before voiceless consonants:

(14) a. [mæp ˈhi:r] ‘tall son’
    b. [ɔnˌdyt ˈkapzəp] ‘the able people’

Plus there is the devoicing sandhi that is the focus of Krämer (2000) and Hall (2008):

For Île de Groix Ternes (1970) describes it as a lexical distribution: some words, and only these words, devoice initial obstruents following an obstruent:

(15) a. [læ:t tɨ] ‘said to me’, cf. [dɨ] ‘to me’
    b. [kankuf] ‘100 times’, cf. [ˈtɛrɡuʃ] ‘thrice’

In the narrative texts given by Jackson (1960), the sandhi rules are often violated:

(16) a. [mæp ˈdyː] ‘black son’
    b. [mɛɭʃ ˈvaːt] ‘good girl’
    c. [ˈdwaːn təes ˈdiːwɪ] ‘the fear that you have of me’

Jackson (1960) explains the texts were dictated at a slow pace.

However, some (in fact most) of the examples, such as (16-a) and (16-b), are transcribed with a secondary–main stress rhythm; these are possibly genuine connected phrases.

Thus failure of sandhi is not necessarily an artefact of dictation.

Note that vowels outside main-stressed syllables are shortened, so the preservation of length contrasts under devoicing does not work in the same way when stress is secondary.

Outline of analysis:

- Outline feature analysis
- Argue that final devoicing without length permutations is a phonetic process
- Argue that sandhi voicing is the flip side of final devoicing
- Unify some devoicing sandhi with "failure of mutation"
- Tentatively propose that other devoicing sandhi are an artifact of univerbation
Feature analysis

Before we even discuss final devoicing, we should solve the [voice]/[spread glottis] problem
Phonetics rather poorly understood
Voiceless stops are described as aspirated (at least initially) at Le Bourg Blanc (Falc’hun, 1951) and Saint-Pol-de-Léon (Sommerfelt, 1978), but these are both Léonais
No mention of aspiration is made for Plougrescant by Jackson (1960, 1967)
In all cases the voiced stops are described or assumed to be voiced
One possible point: at Plougrescant fricatives underwent a context-free voicing (“new lenition”), cf. Southern English Fricative Voicing, which Honeybone (2005a) takes as evidence for [spread glottis]:∅
But Honeybone (2005a) himself admits the analysis of fricatives should not be spread to stops uncritically

Final devoicing

I propose that final devoicing is in fact loss of the laryngeal node, i.e. it is the exclusion of the very possibility of contrasting for laryngeal features
Devoiced stops are a third phonological category: they behave differently from true voiceless stops in that they do not obey length-related restrictions
True voiceless stops cannot follow long vowels; devoiced stops can
In particular, what is the difference between final devoicing as in [ty:t] and final devoicing with gemination as in [tYt:]?
No tableaux in analysis (but hopefully it is pretty theory-independent)

Assumptions of analysis

Vowel length distinctive in main-stressed syllables: faithfulness ≫ markedness in this context
*[voiceless] above MAX[vcl]
Except for positional faithfulness: MAX[vcl]/Initial and MAX[vcl]/σ above *[vcl]
Final devoicing driven by a constraint *Lar/∅d militating against any segments with a laryngeal node at the end of a (morphological?) Word
Medial obstruents: /Vt/

- Obstruents are long and voiceless following short stressed vowels

\[ \dot{\sigma} \quad \sigma \]

\[ t \quad a \quad p \quad u \quad t \]

- The voiceless obstruent piggybacks on MAIN-TO-WEIGHT to be parsed into the stressed syllable and thus keep [vcl]
- This is assuming (as I do) that faithfulness to vowel length is undominated

Medial obstruents: /Vd/

- Assuming richness of the base, what happens with voiced obstruents after short vowels?

\[ \dot{\sigma} \quad \sigma \]

\[ t \quad a \quad b \quad u \quad t \]

- Assume a constraint *Lar/µ: geminates without laryngeal specifications exist in the language (geminate sonorants)
- This is of course outranked by positional faithfulness to [vcl] to derive the previous case

Medial obstruents: /V:t/

- This is a simple case

\[ \dot{\sigma} \quad \sigma \]

\[ 1 \quad o \quad b \quad \sigma \quad t \]

- The obstruent loses its laryngeal specification in order to become moraic for the benefit of MAIN-TO-WEIGHT
- Laryngeally unspecified obstruent geminates are realized as voiceless for obvious phonetic reasons
- Maybe these are excluded by Lexicon Optimization since the learner never really has to posit /b:/?

Medial obstruents: /V:/:f/

- No superheavy syllables, so [vcl] cannot be saved
Final devoicing: voiced stops

- No Lar node word-finally
- Final consonant is extrametrical (so maybe no Lar node not licensed by prosodic structure?)
- Stress: ultimate if V: in final syllable, else penultimate. Moraic trochee, but then final VC must be L

![Diagram](image)

Final voiceless stops

- The [vcl] obstruent becomes moraic to satisfy MAIN-TO-WEIGHT, so the restrictions on vocalic quantity hold

![Diagram](image)

Final devoicing: voiced stops

- Laryngeally unspecified obstruents in pause are realized as voiceless, phonetic reasons are well-known
- What if our [vcl] is really [spread glottis] in this dialect?
- It is apparently unproblematic to have aspiration as the phonetically natural realization of phonological underspecification (Vaux & Samuels, 2005)
- What about cases such as [tyːt]∼[tʏt:]
- I propose this is real final devoicing, i.e. the imposition of the [vcl] feature at word (phrase?) edges (Iverson & Salmons, 2007)
- First let’s look at underlying voiceless obstruents

![Diagram](image)

True final devoicing

- In this scenario, forms such as [tʏt:] for /tyːd/ imply that the constraint driving final devoicing is ranked over faithfulness for vowel length.

![Diagram](image)
I have argued that what looks like normal final devoicing is in fact the deletion of a Lar node, or absence of contrast.

Further evidence: final /v/ does not always neutralize with /f/ phonetically: Jackson (1960) writes [v].

We know [v] is aerodynamically complicated (Padgett, to appear).

So this would be consistent with a phonologically underspecified /v/?

Final devoicing as final fortition (Iverson & Salmons, 2007) is distinct from this process and also attested.

Grazing other dialects: final devoicing is optional at Saint-Pol-de-Léon (Sommerfelt, 1978) (?)

In this system, voicing sandhi arise from two sources.

Before sonorants: laryngeally unmarked stops are voiced in the phonetics.

Sonorants do not contrast for laryngeal features, so they do not have a [Lar] to spread.

Explains variability (pause-sensitivity?).

No need to have (contrastive) laryngeal features for sonorants (Krämer, 2000; Blaho, 2008; Hall, 2008).

[mab 'ne:we] = /mab ne:we/

Before obstruents, we are faced with two options.

Same as above.

Explains possible devoicing even before voiced obstruents.

Possibly predicts that under certain phonetic circumstances final consonants may be voiced before voiceless consonants?

Spread of Lar, with [vel] if need be.

Variation must have a phonological explanation (stochastic ranking?).

Devoicing sandhi crucial piece of evidence in favour.

Some examples of devoicing sandhi:

(17) a. [læt tǐ] ‘said to me’
    b. [me ‘gaf tǐ] ‘I find, I consider’ (lit. ‘I get to me’)
    c. [dɔ ‘wen:ɔk ’tit] ‘your two sous’ (lit. ‘two sous to you’)

Prepositions are overrepresented.

Actually, this is also true of Île de Groix!

(18) [tra na'vaŋk temp] ‘we don’t miss anything’ (lit. ‘nothing is missing to us’)

What’s with the prepositions?
Detour 1: mutation

- Breton is (widely?) known for its initial consonant mutation
- Here we are only interested in lenition

<table>
<thead>
<tr>
<th>Underlying</th>
<th>p</th>
<th>t</th>
<th>k</th>
<th>b</th>
<th>d</th>
<th>g</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutated</td>
<td>b</td>
<td>d</td>
<td>g</td>
<td>v</td>
<td>z</td>
<td>h</td>
<td>v</td>
</tr>
</tbody>
</table>
- The interesting bit is the voicing of voiceless stops

Detour 2: prepositions

- Historically, prepositions in Brythonic have tended to undergo the effects of soft mutation/lenition in a context-free way
- Old Welsh and Old Breton *gurth* 'through', Modern Welsh *wrth*, Modern Breton *ouzh*
- Old Welsh *di* 'to', Modern Welsh *i* (via *[ði]*)
- Modern Welsh variation: *trwy* ~ *drwy* 'through'

Detour 2: prepositions

- Why is this important?
- At least in Welsh, there is evidence that the new initial consonant is not fully lexicalized
- In particular, *gan* 'with' is historically *kant*
- The conjunction *a* 'and' causes a mutation whereby voiceless stops are spirantized to *[f θ χ]* but voiced ones are unaffected
- We expect *a gan* for 'and with', but it is actually *a chan* (Morgan, 1952; Ball & Müller, 1992)
- The same is true of *dros* and *drwy* though there the variants with the voiceless stop survive in the modern language
- So maybe *gan* is really *L*can underlingly
- Where *L* is the autosegment (Wolf, 2007)

Back to Breton: devoicing sandhi

- I propose that (some) Breton devoicing sandhi reflect the same incomplete lexicalization of the voiced stops
- Consider *lavare*[t t][iñ*
t

```
[ ]

[L]

t

Lar

[vcl]
```

- Normally, [L] docks to the following /t/, e.g. due to MAXFLT (Wolf, 2007)
- But not when the Lar node spreads to a preceding root node
This can be for any number of reasons
- Some version of geminate inalterability
- Structure sharing inhibits weakening processes (Honeybone, 2005b)
- Under certain assumptions, the structure shown is not convex (Scobbie, 1997)

Further evidence for this approach comes from so-called “failure of mutation” (Jackson, 1967, §481)

- Lenition of voiceless stops is said to “fail” when an adjective (given the necessary morphosyntactic conditions) follows an obstruent-final noun
- But with sonorant-final nouns or voiced stops mutation happens
- Cf. kaer ‘beautiful’

(19) a. un dimezell gaer
    a maiden beautiful
  b. ur vaouez kaer
    a woman beautiful

Morphosyntax actually irrelevant, since other triggers of this mutation are sonorant-final

This is the same phenomenon: an autosegment normally leading to voicing is inhibited by spreading of the Lar node

Following sonorants the Lar node can’t spread since sonorants with a Lar node are never well-formed

But this time we have much better evidence for the autosegment being there

The same data are described by Ternes (1970) in an extremely convoluted way...

The generalization: if an obstruent is voiced by an autosegment, it can resist voicing by spreading Lar to a preceding obstruent

In previous work I have doubted that the autosegmental approach is suited to Brythonic Celtic mutations (cf. also Green, 2006)

- I think these data are actually pretty solid evidence for autosegments or at least for a phonological analysis
- Breton is less problematic than Welsh morphosyntactically
- Breton mutation seems to be genuinely sensitive to prosody (Pyatt, 2003)
- There is still the problem of doing mutation phonologically: Wolf (2007) covers only a small subset
- In particular, the autosegment should cause deletion of [vcl] in the current approach
- Problem! But see Bye & Svenonius (2009) for an approach...
More devoicing sandhi

- Other types of devoicing sandhi do not seem to fall under this rubric
- \( \text{san \ k\ö\'ne\:ri} \) ‘Saint Gonery’
- \( \text{[k\ö\'n\kju\]} \) ‘thrice’, cf. \( \text{[t\ë\r\kju\]} \) ‘thrice’

I propose that here devoicing is due to univerbation, i.e. the relevant words are now compounds

- Word-internally voiceless obstruent clusters are (nearly) universal (also noted by Hall, 2008 for Île de Groix)

Summary and outlook: sandhi

- Voicing sandhi are mostly due to phonetic implementation of laryngeally unspecified obstruents in a phrasal context
- Some devoicing sandhi are due to inhibition of autosegmentally induced voicing
- Others might possibly be not phrasal sandhi at all
- Both of these phenomena seem to be cross-dialectal, so the account possibly extends to Île de Groix:
  - Prepositions
  - More examples: the “devoicing” word \( \text{[b\ö\'n\k] \} \) ‘any’ is Middle Breton \( \text{pennac} \) (Lewis & Piette, 1962, §45)
  - The “provection in common phrases” (univerbation) is described as pan-Breton. Examples of devoicing sandhi in Île de Groix include ‘grey peas’ and ‘little finger’—intuitively good candidates for univerbation

More devoicing sandhi

- Jackson (1967, §487): “provection in common phrases”
- Are these actually phrases or words?
  - Saint Gonéry is the patron saint of the local chapel
  - ‘Thrice’ might well be a single word, cf. Welsh \( \text{dwywaith} \) ‘twice’, and in fact \( \text{[\kju\] \} \) is the reduced form, cf. stressed \( \text{gwej} \) ‘time, occasion’
  - Etc.

Photo credit: Steffen Heilfort. Source.

Loss of feature or loss of contrast

- Here I have argued that Breton presents examples two types of final devoicing
  - Final devoicing as loss of contrast: cf. the arguments of Harris (2009) for FD as weakening
  - Final devoicing as edge alignment: final fortition (Iverson & Salmons, 2007)
- Take-home message here: there is no process of “final devoicing”, “final weakening” or “final fortition” that we can speak of in universal terms
- Argument for substance-free phonology
Final devoicing as phonetics

▶ Growing body of work on final devoicing (and generally laryngeal assimilation) as a “low-level phonetic process”
▶ The Paradestück here is of course Dutch (Ernestus & Baayen, 2006, 2007; Jansen, 2007)
▶ Possibly others (e.g. the disputed claim for Polish)
▶ Breton seems to show quite good evidence for incomplete neutralization
▶ Laryngeally unspecified segments interpreted by the phonetics as devoiced or aspirated rather than [−voice] or [spread glottis] specified
▶ Needs careful cross-linguistic study

Ternary contrasts

▶ Krämer (2000) argues that the presence of both voicing and devoicing necessitates binary features, i.e. a ternary contrast
▶ Related issue: Uffmann (2009) asks how to distinguish between categorically voiceless and laryngeally unspecified stops in a privative system
▶ The answer is of course feature geometry
▶ Objection of Uffmann (2009): but this is an overgenerating notational variant of binary features

Tiers or features?

▶ One answer: who says we never need bigger feature geometry trees? It is correct that arboreal representations can have many levels, but maybe this is empirically better?
▶ Related answer: binary features are no more God-given/less stipulative: [o voice], [1 voice] and [2 voice] are also a notational variant, but these are as overgenerating as trees
▶ Reason: three independent values of [F] cannot capture implication relations in the same way that feature geometry can
▶ Here I argue that the feature geometry/underspecification approach is empirically more adequate than one based on [±voice] spreading

▶ Here I use class nodes (as in e.g. Avery, 1996)
▶ Blaho (2008): no need for nodes if features can do the job, e.g. substitute Lar with [obst] since only obstruents are laryngeally specified
▶ Gives strange results for Breton, since final devoicing is driven by *[obst]: works formally but how insightful is it? Are the devoiced obstruents sonorants? (Well, why not)
▶ Here: nodes are necessary
Tiers or features?

- If features can only attach to nodes, the presence of a node (even with no features) is the formal correspondent of contrastive specification
- Sort of answers the concern of Uffmann (2009) on the difference between two types of feature absence
- Without nodes, how do we define tiers and all the autosegmental phenomena that come with them?
- Null hypothesis: all and only features dependent on a specific node are on the same autosegmental tier
- Field of empirical inquiry

Summary

- New interpretation of Breton data
- Possible cross-dialectal extension
- Privative features can do the job
- Feature/node geometry is preferable to binary features and (possibly) to node-less geometry.

Trugarez!


Bye, Patrik & Peter Svenonius. 2009. Extended exponence and non-concatenative morphology. MS., University of Tromsø.


Uffmann, Christian. 2009. To (bi) or not to (bi). Presentation at the Privative Project workshop, Old World Conference in Phonology 6, Edinburgh.

