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A unified account of the behaviour of high vowels in Bothoa Breton

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7vet Koñferañs Yezhoniezh Keltiek
23 a viz mezheven 2012
Skol-veur Roazhon

Caveat emptor

- There are no spectacularly interesting data in this talk
- And the data are second-hand
- I want to show that close analysis of rather minute details of alternations is potentially interesting
- So bear with me

Roadmap

- Bothoa Breton glides and high vowels: a relatively boring story
- Tools deployed
  - Substance-free phonology, language-specific phonological representation
  - Stratal OT derivation
- Making sense of the pattern...
- ...and of the exceptions
- Support for the stratal model

Gliding of high vowels

- It is well-known in phonological theory (e.g. Levi 2011) that high vowels [i u] and glides [w j] (also [y] and [ɥ] etc.) can stand in (almost) complementary distribution
- Normally optimization is for syllable structure

(1) Latin: avoid complex onsets, then avoid hiatus
  a. Glides: #_V, V_V
     (i) /ekur/ \[.je.kur.\] ‘liver’
     (ii) /ouis/ \[.o.wis.\] ‘sheep’
  b. Vowels: C_
     (i) /mulier/ \[.mu.li.er.\] ‘woman’
     (ii) /mutuus/ \[.mu.tu.us.\] ‘mutual’
Analysis and exceptions

- Simplest analysis: there is no phonological (“phonemic”) distinction between /u/ and /w/, /i/ and /j/.
- Not in featural structure anyway.
- Distinction can be in prosodic structure (e.g. moraic vs. non-moraic), interpreted phonetically as a vowel vs. glide distinction.
- Levi (2004, 2011) and others: in some languages, there must be an underlying distinction.

(2) Italian (Krämer 2009)

a. (i) ['pja:no] piano ‘flat’
   (ii) ['pawza] pausa ‘break’
   (iii) ['kwı:] qui ‘here’

b. (i) [pi:'a:no] piano ‘of Pius’
   (ii) [ba'*u:le] baule ‘trunk’
   (iii) ['ku:i] cut ‘of which’

(3) a. (i) ['sfø:l] skeul ‘ladder’
   (ii) ['kwavd] kavout ‘find’

b. (i) ['fve:lβ̃] kefeleg ‘woodcock’
   (ii) [kaz'kνan̩] kazekenneg ‘mares’

b. (i) ['fahd̃] kerzhbet ‘to walk’
   (ii) ['kalβ̃] kalet ‘hard’

(4) a. ['fε:ri:w] kevrioù ‘strings’
   b. ['fε:rijøw] kertoù ‘villages’

- Humphreys (1995, p. 166): « [L]a paire unique … est loin de constituer une preuve d’opposition, car les deux mots n’ont pas le même nombre de syllabes »
- Although syllabification should be predictable, so it’s not a real solution.

Bothoa Breton

- Eastern Cornouaille dialect, with a noticeable Vannetais slant.
- Segmental phonology is fairly unremarkable for Breton.
- Caveat: the segments [tʃ dʒ] are clearly phonemic.

- The prosodic system is quite different.
  - Unpredictable distribution of vowel length.
  - Stress system: weight-to-stress, default-to-opposite, numerous cyclic effects.
  - Quantity system lost: [ˈVːT] and [ˈV̆D] are OK.
- Context for all this: a holistic approach to the system, full-language analysis (for reasons I will return to below).
- Coming soon to a repository near you.

Gliding in Bothoa Breton

- Eastern Cornouaille dialect with a noticeable Vannetais slant.
- Segmental phonology is fairly unremarkable for Breton.
- Caveat: the segments [tʃ dʒ] are clearly phonemic.

- So what about gliding?
- It’s almost well-behaved.
- Phonemic opposition is difficult to show.
  - No minimal pairs for [u] ~ [w] and [y] ~ [ɥ].
  - One pair for [i] ~ [j].

- Context for all this: a holistic approach to the system, full-language analysis (for reasons I will return to below).
- Coming soon to a repository near you.

- Although syllabification should be predictable, so it’s not a real solution.
More problems

- It would appear there is generally gliding to avoid hiatus, even at the expense of complex onsets

(5) a. [ˈbjan] biban 'small'
   b. [ˈpjɒh] peoc’h 'peace'
   c. [ˈlwarn] louarn 'fox'

- Although sometimes it fails

(6) a. [pasiˈãnto] 'wait'
   b. [ˈbɔrdiəw] bordioù 'tables'
   c. [ˈbiːniəd̥] benniged 'blessed'
   d. [ˈkɔːniamp] kaniamp 'we will sing'

The proposal

- So, is Bothoa Breton one of those languages with underlying glides?
- I will argue the answer is no
- The difference between [i u] and [j w] is prosodic affiliation
- This is not so for [y] vs. [ɥ], but no time for that today
- The surface exceptions are all explainable via stratal computation
- Most of the exceptionality is principled, with a very few cases of lexically determined eccentricities in computation
- Now fasten your seat belts, ladies and gentlemen

Substance-free phonology

- Morén (2006, 2007); Blaho (2008); Youssef (2010); Iosad (2012, forthcoming)
- Phonology is an autonomous module of grammar
- No universal phonology-phonetics mapping
- No universal feature set (a bit like Mielke 2007)
- No functional considerations in computation
- Phonological representations are determined based on the patterns in each language at hand

Stratal OT

- Computation proceeds in three steps
  - Stem-level (at least root-to-stem, stem-to-stem derivation)
  - Word-level (stem-to-word)
  - Postlexical (word concatenation)
- Potential reranking across the strata
- “Bracket erasure”: only the output of the previous stratum is visible to each computation
High vowels

- See the extra sheet for the full representational system in consonants

```
C-place  C-place  C-place
V-place  V-place  V-place
[coronal] [labial] [labial] [coronal]
[i]       [u]      [y]
```

Dorsals and postalveolars

- Note that [ʧ] is, structurally, the union of [k] and [i]

```
C-man  C-lar  C-pl
|      |      |
[cl]   [vcl]  V-pl
[coronal]
[k]    [ʧ]
```

Some important coronals

- Note that [s] ∪ [i] is [ʃ]
- Note also that [t] ∪ [i] \ C-manner[closed] = [ʃ]

No hiatus, complex onsets allowed

- At the stem level, hiatus is avoided, but complex onsets are allowed
- High vowels before other vowels are parsed into onsets: gliding

```
(7) a. (i) ['bwiːd̥]  boued  'food'
    (ii) ['dwar]  douar  'land'
b. (i) ['bjɔh]  buoc'h  'cow'
    (ii) ['hyn:j]  heol  'sun'
```

- But that's not the whole story

```
(8) a. [komprə'nasjən]  'understanding'
b. [pasɪˈanto]  'wait'
```
Where have all the coronals gone?

- Actually, if you discount the above examples (and a few other ones, all French borrowings), there are no tautomorphemic sequences of coronals plus [j]
- What happened?
- I suggest that for the most part they undergo coalescence, e.g. /sj/ ⇒ [ʃ]
- As we shall see at the word level
- But why do we have the French borrowings then?
- We are at the stem level, where we are allowed to have lexically exceptional prosody (“nonanalytic listing”): see Bermúdez-Otero (forthcoming) for a detailed account.

The word level: coalescence

I will stop talking about [w] now, because there is nothing interesting to say.

At the word level, we get coalescence of coronals with a following [j]

1. [d] → [ʒ]
   a. [ˈpraːd̥] prad ‘prayer’
   b. [ˈpraːʒəw] pradoù ‘prayers’

2. [t] → [ʃ]
   a. [ˈpond̥] pont ‘bridge’
   b. [ˈpõːʃəw] pontioù ‘bridges’

3. /z/ → [ʒ]
   a. [ˈmiːz̥] miz ‘month’
   b. [ˈmiːʒəw] mizioù ‘months’

4. [s] → [ʃ]
   a. [ˈplaz̥] plas ‘place’
   b. [ˈplafʒəw] plasoù ‘places’

5. [st] → [ʃf]
   a. [ˈlɒst] lost tail
   b. [ˈlɒsʧəw] lostioù ‘tails’

6. [n] → [ɲ]
   a. [ˈʧærn] korn ‘horn’
   b. [ˈʧærɲəw] kornioù ‘horns’

7. [l] → [j]
   a. [ˈpaːl] pal ‘shovel’
   b. [ˈpaːjəw] palioù ‘shovels’
Analysis of coalescence

- This is sometimes treated as a morphologized alternation
- But when the segment is not a coronal (or dorsal), we get a [j]

(16) a. (i) [ˈbroː] bro ‘country’
   (ii) [ˈbrojəw] broioù ‘countries’

b. (i) [ˈlevər] levr ‘book’
   (ii) [ˈlevərjəw] levrioù ‘books’

c. (i) [ˈeskob̥] eskob ‘bishop’
   (ii) [ɛsˈkɔbjən] eskibien ‘bishops’

Autosegmental analysis

- Coalescence allows us to avoid both hiatus and complex onsets
- When coalescence is disallowed, we can live with a complex onset
- Under our representational assumptions, coalescence is easy to achieve
- Stops: merge all the features, lose C-man[cl] because of feature co-occurrence
  
  \[
  /d/ \rightarrow /j/ \Rightarrow [ʒ]\n  \]

  C-manner C-place C-place C-place
  [closed] [coronal] V-place V-place [coronal]

  Fricatives: [s] ⇒ [ʃ]. Coalescence gives the right result without further stipulation.
- Sonorants: [lj] ⇒ [j], [nj] ⇒ [ɲ], [rj] ⇒ [ʁ]
  
  - Feature co-occurrence (specifically *(C-man[op], V-pl[cor])) blocks non-destructive coalescence, with different outcomes (ask me)
  - Labials: co-occurrence blocks coalescence, faithfulness blocks deletion of C-pl[lab], so we have to live with a complex onset
- What about dorsals?

Exception: /st/ ⇒ [stʃ]: here, the predicted outcome *[ʃ] is independently blocked by the phonotactics, so we lose C-pl[cor] instead

\[
\begin{align*}
/s/ & \rightarrow [s] \\
/t/ & \rightarrow [ʃ]
\end{align*}
\]

C-pl C-lar C-man C-pl C-pl C-lar C-pl C-lar C-man C-pl
[cor] [vcl] [cl] [cor] [cor] [cor] [vcl] [cl] [cor] [cor]
Dorsals at the word level I

- In general, *ɡj* sequences give *j* or *ʒ* or remain (Jackson 1967; Schrijver 2011)
  - Middle Breton *b(a)elec* ‘priest’, plural *baeleyen, beleien* or *belegyen*; *marchec* ‘horse rider’, plural *marreien; benheuc* ‘tool’, plural *binhyou*
  - Modern Breton examples from Favereau (2001): *krog* ‘fang’, plural *kregier* or *krejer*; *stag* ‘string’, plural *stegier, steier, stejer*
- Of course *kj* is very rare

Dorsals at the word level II

- Bothoa does have [ˈbɛːləɡ̊] ‘priest’, pl. [ˈbɛːliən]
- This is a problem because under the representational assumptions here and the ranking needed to derive the previous facts, we predict coalescence, i.e. [kj ɡj] ⇒ [ʧ dʒ]
- Coalescence is also found!

(17) a. [ˌlasˈtikən] ‘rubber band’
   b. [ˈlastiʧəw] ‘rubber bands’
- Since it’s obviously a recent loan, coalescence is productive (or at least was productive much later than the *beleien* pattern)
- More evidence to be discussed below

Exceptions to hiatus avoidance I

- There are several types of exceptions to hiatus avoidance, and almost all of them can be described in stratal terms
- Faithfulness

(18) a. (i) [ˈbaːdi-o] badeziñ ‘baptize’
   (ii) *[baːʒo]
   b. (i) [ˈbiːni-əd̥] benniget ‘blessed’
   (ii) *[biːɲəd̥]

Exceptions to hiatus avoidance II

- In exceptions of this type, there is always a morpheme boundary between the vowels
- The [i] receives a mora at the stem level, and the word level cannot remove that

\[
\sqrt{ba\ddi} \Downarrow
\begin{array}{c}
[ba\ddi]_V \\
[ba\ddi]_Wd
\end{array}
\]
Exceptions to hiatus avoidance III

- A related case: [e] in hiatus raises to [i], no coalescence because of mora preservation

(19) a. ['klɒːɡə] kloge ‘ladle’
b. ['klɒːɡəd̥] klogad ‘ladleful’
c. *[['klɒːɡəd̥̂]]

- This is precisely the difference between [ʧɛːɾjəw] ‘villages’ from [ʧɛːɾ] and [['ʧɛːɾiəw] ‘strings’ from [ʧɛːɾi]

An aside: against OO-correspondence

- There is an important advantage to the stratal account in the case of verbal forms such as [ˈbiːnio] and [ˈbaːdio]
- The lack of coalescence here is a clear case of opacity
- OO-correspondence (Benua 1997) and paradigm uniformity (McCarthy 2004) have been proposed for this type of opacity: coalescence underapplies because it must preserve the moraic status of the [i] which is found in related forms
- This does not work in Bothoa Breton, because no verbal form is a bare stem: *['biːni]

- In some dialects 2sg imperatives are bare stems, but in Bothoa the 2sg present is used as an imperative form
- In a stratal theory, the existence of the stem-level cycle is a consequence of first principles
- For similar arguments, see Bailyn & Nevins (2008); Bermúdez-Otero (forthcoming)

Further exceptions to gliding

- Coalescence of [əliV] and [ɛliV] gives [iV]

(20) a. (i) ['mɔrzo] morzol ‘hammer’
   (ii) ['mɔrzio] morzolioù ‘hammers’
b. (i) [rʌʃ,te] rastell ‘rake’
   (ii) [rʌʃtiə] rastelloù ‘rakes’

- The future suffixes –iamp and –iant

(21) a. ['lɛniəm] leniamp ‘we will read’
b. ['lɛni:am] c. *[['lɛniəm]‘

- Wait until the postlexical level

A final set of exceptions

(With thanks to Ricardo Bermúdez-Otero p. c.)

- There is a very small residue that has no good explanation so far

(22) a. [ˈbɔrdiəw] bordioù ‘tables’
b. [avɔˈkadiən] avokadien ‘lawyers’

- Not phonotactics: *['bɔɾʒəw], *[avɔˈkaʒən] are perfectly fine
- Not faithfulness: this is the word level, where nonanalytic listing is unavailable — no exceptional storage of prosodic structure
- Solution: these constructs are exceptional in that the plural is built in the stem-level cycle, giving access to stored prosodic structure
- See Bermúdez-Otero (forthcoming) for details: English exceptional you[ŋg]est, lo[ŋg]est against regular du[m]est, nu[m]est, winni[ŋg]est
Mopping up

- Cases such as [ˈmɔrziəw]: we would expect [ˈmɔrzəjəw] as the outcome of the word level
- Postlexical rule [əi] ⇒ [i]
- Needed anyway because of phonotactics ("[əi] not a possible sequence)
- Cases such as [ˈleniam] coexist with [ˈleˈniːam]
- Long vowel is bimoraic by definition, output by the word level
- Optional postlexical shortening cannot completely remove the mora

Prosodic evidence for strata

- The argument for strata would be less circular if we had more evidence than the gliding
- There is some!
- Prosodic system: only the stem level allows stress on subminimal feet
- If a monosyllabic affix is lexically stressed, it can surface with stress:
  - On the stem level: [ˈdɔrn] ‘hand’, [ˈdɔrˌnad̥] ‘handful’

Mutation evidence for strata

- The spirantization mutation turns [k] and [ʧ] into [h]

(23) a. (i) [ˈkaːz̥] kazh ‘cat’
   (ii) [mɔ ˈhaːz̥] va cˈbazh ‘my cat’
  b. (i) [ˈʧiː] ki ‘dog’
   (ii) [mɔ ˈhiː] va cˈbi ‘my dog’

- Except when the [ʧ] is followed by anything other than [i y]

(24) a. [ˈʧɛzəɡ̊] kazegennoù ‘horses’
b. [mɔ ˈhɛzəɡ̊] va cˈhazegennoù ‘my horses’
c. * [mɔ ˈhezəɡ̊]
Conclusion

► At first blush, the relationship between high vowels and glides in Bothoa Breton is not very interesting.
► A holistic investigation taking into account all the patterns reveals systematic exceptions.
► A complete analysis is achieved using substance-free representations and a stratal model of computation.
► A sufficiently sophisticated—but not overly elaborate—computation allows us to explain both the patterns of alternations between high vowels and glides and cases of seemingly unpredictable overlapping distribution.
► High vowels and glides are not featurally distinct in Bothoa Breton, and there are no underlying glides in this language.

References