# Laryngeal realism revisited: voicelessness in Breton

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20th Manchester Phonology Meeting
26th May, 2012
University of Manchester



## Plan

- Setting the scene, Part I: laryngeal realism, Element Theory, and the status of H
- Setting the scene, Part II: pre-sonorant voicing and its interpretation
- Bothoa Breton is a "H language" phonologically despite its Romance-like obstruent system
- Added bonus: there is a ternary contrast on the surface, and it is better implemented in feature-geometrical terms





## Laryngeal realism

- Classic position: [±voice] is all there is, most recently Wetzels & Mascaró (2001)
- "Laryngeal realism" (Iverson & Salmons 1995, 1999, 2003a,b, 2007; Avery 1996; Honeybone 2001, 2005, 2008, forthcoming; Jessen & Ringen 2002, *inter alia*)
  - "L languages" (Romance, Slavic, Dutch?, Yiddish?): short-lag VOT vs. consistent prevoicing in stops — ∅ vs. [voice];
  - "H languages" (English, German, Welsh, Turkish): long-lag VOT vs. variably voiced stops — [spread glottis] vs. ∅.
- Similar approaches in GP/DP/Element Theory (e. g. Harris 1994, 2009; Harris & Lindsey 1995; Backley 2011)





## Phonetic essentialism: some issues

- Issue 1: H often associated with [spread glottis] — undue focus on stops and VOT
  - Fricatives can show [spread glottis] phonological activity irrespective of VOT (Rice 1994; Vaux 1998; Iverson & Salmons 2003b; van Oostendorp 2003)
  - Logically, glottal spreading does not necessarily entail positive VOT, it can just inhibit voicing
  - Inconsistent with surface behaviour (e. g. English coda glottaling)
- Issue 2: phonetic bias
  - H languages often tend to have variable voicing in stops: assumed to be "passive", reflecting its lack of specification (e. g. Jessen & Ringen 2002; Jansen 2004; Honeybone 2005)
  - Corollary: categorical presence of laryngeal activity implies *phonological* specification (Ringen & Helgason 2004; Petrova et al. 2006; Helgason & Ringen 2008; Beckman et al. 2009, 2011)

## Phonetic and phonological patterning

- What if we only look at phonological patterns when dealing with phonological representations?
- Phonetics should not determine phonology (cf. Rice 1994, *passim*)
- It should be logically possible to have a "H language" with "L-type" phonetics
- E. g. with H stops realized with short-lag VOT
- Rather obvious proposal
  - GP/DP circles: Cyran (2010, 2011);
  - Also Blaho (2008).
- Problem: evidence sometimes hinges on pre-sonorant voicing
- Cyran (2011) on Kraków/Poznań Polish: PSV is the mirror image of final devoicing, i. e. H deletion






## Phonological problems with PSV

- Especially acute in a contrast-based framework
- If PSV is treated as a phonological spreading process...
  - ...where do the vowels and sonorants get redundant voicing specifications?
    - They are voiced because there is full specification
    - They receive redundant [+voice] postlexically
  - ...why does PSV sometimes do strange things?
    - In some Breton dialects (e. g. Jackson 1960), PSV in stops parallels [x]∼[h]
    - In some Dutch dialects PSV creates [g], which is otherwise marginal at best






## Representational solution

- The representational solution is to assume that PSV derives from the same surface underspecification process that gives variable voicing of lenis stops in H languages
- Jansen (2004) for West Flemish
- Colina (2009) for Ecuadorian Spanish
- Cyran (2011) for Kraków/Poznań Polish
- Solves the phonological problems very nicely
- But is PSV phonological?



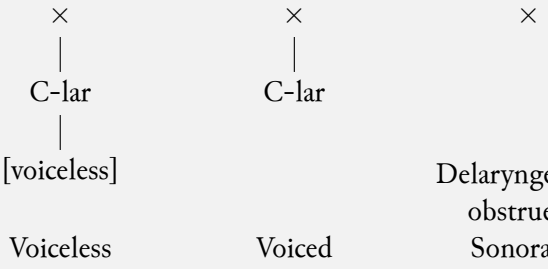



## Phonetic problems with PSV

- Strycharczuk (2010): Poznań Polish PSV not neutralizing → no evidence for the H/L question
- Strycharczuk & Simon (forthcoming): West Flemish PSV not assimilatory, involves categoricity (optional choice between categorical variants), inconsistent with the surface-underspecification analysis
- Are we entitled to use PSV evidence for phonological representations?
- Not unless there is other robust phonological evidence
- Which is why I'm here today

# The proposal I

- Bothoa Breton (Humphreys 1995) contrasts three types of consonants on the surface




- In other words, voiced obstruents are less structurally marked than voiceless obstruents (Causley 1999; Rice 2003)





# The proposal II

- Explicit formulation of an old insight:
  - Carlyle (1988): “elsewhere” redundancy rule assigns [+voice] to obstruents;
  - Krämer (2000): Onset Voicing
  - Hall (2009): Default Voicing
- Key criteria
  - Phonological activity of [voiceless];
  - No phonological activity of [voice] separate from [voiceless];
  - Word-final delaryngealization: evidence from interaction with floating features supports the surface-underspecification treatment of pre-sonorant voicing





# Inventory

- The segment [h] is isolated, but is it [voiced] or [voiceless]?
- Obstruent system Romance-like with prevoicing (Bothorel 1982; Humphreys 1995)

| Manner | Labial | Coronal | Postalveolar | Palatal-labial | Palatal | Dorsal | Glottal |
|---|---|---|---|---|---|---|---|
| Stops | p b | t d | | | | k g | |
| Affricates | | | ʧ ʤ | | | | |
| Fricatives | f v | s z | ʃ ʒ | | | | h |
| Nasals | m | n | | | ɲ̃ | | |
| Laterals | | l | | | | | |
| Rhotics | | r | | | | | |
| Approximants | w | | | ɥ | j | | |

- Actually, can be either, depending on context:
  - [h] or [ɦ] word-initially, before a (voiceless) consonant, word-medially after [l r]
  - [x] utterance-finally or word-finally
  - [ɦ̃] or [ɣ̃] in voiced contexts
- Phonologically, it is clearly voiceless





# Word-level phonology

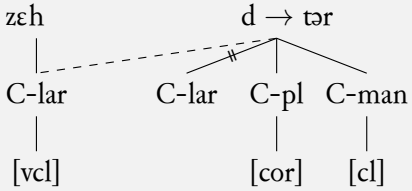
- I give suffixed forms to avoid final devoicing
- Assimilation:

| | | | | |
|---|---|---|---|---|
| (1) | a. | (i) | [ɛsˈkɔbjən] | ‘bishops’ |
| | | (ii) | [ɛsˈkɔpti] | ‘diocese’ |
| | b. | (i) | [ˈtom] | ‘warm’ |
| | | (ii) | [ˈtomdər] | ‘heat’ |
| | | (iii) | [ˈzɛːho] | ‘to dry’ |
| | | (iv) | [ˈzɛhtər] | ‘drought’ |

- Preservation of the marked (Causley 1999; de Lacy 2006): assimilatory neutralization preserves the bigger structure

## Assimilation: the geometry

- Assume something compels two adjacent obstruents to share a laryngeal specification...
- ...and don't think too much about delinking vs. coalescence of C-lar nodes...








## Complications

- In fact, obstruent clusters are mostly voiceless in Bothoa Breton

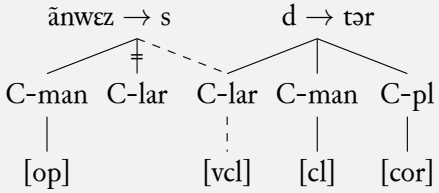
| | | | | |
|---|---|---|---|---|
| (2) | a. | (i) | [ãnˈwɛːzo] | 'to offend' |
| | | (ii) | [ãnˈwɛstər] | 'humiliation' |
| | b. | (i) | [ˈkaːzəg̊] | 'cat' |
| | | (ii) | [ˈbjan] | 'small' |
| | | (iii) | [ˌkasˈpjan] | 'kitten' |

- Some sort of licensing requirement forcing the addition of [voiceless] to multiply linked C-lar (cf. van Oostendorp 2003)





## The geometry




- Why is this important?
- Because postlexically the situation is quite different





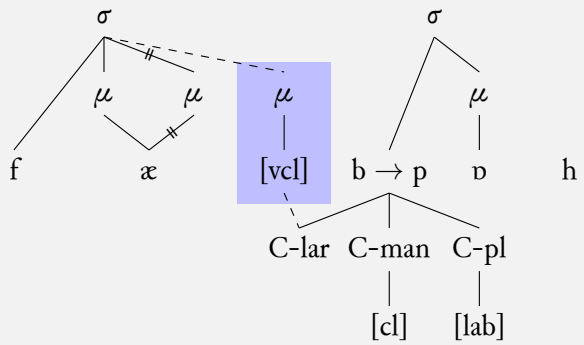
## Further evidence for [voiceless]

- "Provection": associated with certain suffixes
  - Voiced obstruents devoice
  - Vowels in closed syllables shorten
  - Voiceless obstruents and sonorants unaffected

| | | | | |
|---|---|---|---|---|
| (3) | a. | (i) | [fæbˈliːʒən] | 'weakness' |
| | | (ii) | [ˈfæːb̥] | 'weak' |
| | | (iii) | [ˈfæpɒh] | 'weaker' |
| | b. | (i) | [ˈkaːzəg̊] | 'cat' |
| | | (ii) | [ˈkasad̥] | 'to be on heat (of cats)' |

## Analysis

- I suggest the facts are best analysed with a floating mora associated with a C-lar[vcl] feature




- Evidence for the activity of [voiceless]
- Some forms still retain the [h]: ['skɑ̃ː] 'light', ['skɑ̃ː(h)ɒh] 'lighter'





## Word-level phonology: summary

- Apart from final devoicing (to which we return), there is little evidence for the marked status of voiced obstruents
- In particular, they are not triggers of assimilation
- Voiceless obstruents and [h] demonstrate phonological activity:
  - Preservation in assimilation
  - Triggers in additive processes
- Important generalization: at the word level, obstruent clusters neutralize to voiceless
- ☞ Robust evidence for the phonological activity of [voiceless]





## Further evidence for [voiceless]: the provective mutation

- Triggered by certain proclitics
- Voiceless obstruents unaffected; voiced ones devoice

| | | | | |
|---|---|---|---|---|
| (4) | a. | (i) | ['kaːz̥] | 'cat' |
| | | (ii) | [o 'kaːz̥] | 'your (pl.) cat' |
| | b. | (i) | ['brøːr] | 'brother' |
| | | (ii) | [o 'prøːr] | 'your (pl.) brother' |

- Vowel and sonorants are prefixed with [h]:

| | | | | |
|---|---|---|---|---|
| (5) | a. | (i) | ['alve] | 'key' |
| | | (ii) | [o 'halve] | 'your (pl.) key' |
| | b. | (i) | ['lɛvər] | 'book' |
| | | (ii) | [o 'hlɛvər] | 'your (pl.) book' |

- Best analysis: [h] coalescing with obstruents
- Corollary: [h] is [voiceless]





## Pre-sonorant voicing

- Bothoa Breton seems to have it

| | | | | |
|---|---|---|---|---|
| (6) | a. | (i) | ['kɔgəw] | 'roosters' |
| | | (ii) | [kɔg iz'maj] | 'Yves-Marie's rooster' |
| | b. | (i) | ['tɔkəw] | 'hats' |
| | | (ii) | [on ˌtɔg 'al] | 'another hat' |

- Although it doesn't sound very phonological
- « Il faut se rappeler [...] que l'alternance sourde/sonore, qui représente la catégorie plus importante de ces modifications, n'est pas, sur le plan phonétique, un simple choix binaire : on rencontre assez souvent, non seulement des sourdes douces, mais aussi des consonnes à sonorité décroissante. Plus le débit rapide et l'articulation relâchée, plus les assimilations sont poussées. » (Humphreys 1995)

## Pre-sonorant voicing

- Phonetic data not available
- Still, I analyse this (and final devoicing) as word-final delaryngealization à la Jansen (2004); Colina (2009)
- Crucially, there is more evidence for the lack of specification
- One piece of evidence is that word-final obstruents become *voiced* before voiced obstruents

(7) a. ['lɒst] 'tail'
b. [ˌlɒzd 'bɛːr] 'short tail'

- Which is precisely the opposite of what happens at the word level
- But couldn't this just be a reranking at different strata? Well, yes



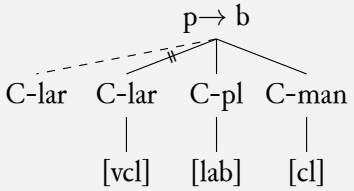


## Devoicing sandhi, part I: lenition

- The lenition mutation involves voicing of stops

(8) a. ['pəwr] 'poor'
b. [o ˌvroː 'bəwr] 'a poor country'

- Under the present assumptions, it must be the docking of a floating C-lar node








## Devoicing sandhi, part II: the sandhi

- Some words beginning with voiced stops in isolation undergo devoicing when following an obstruent (Krämer 2000; Hall 2009)

(9) a. ['gãntæ] 'with them'
b. [də 'gas kãntæ] 'to carry with them'
c. *[də 'gaz gãntæ]

- Crucially, the same unexpected voiceless cluster is found in lenition contexts (although it is usually described as a "failure of lenition")

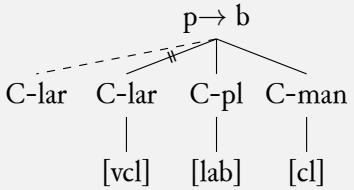
(10) a. ['koːg̥] 'old'
b. [o ˌgaːdər 'goːg̥] 'an old chair'
c. [on ˌiːlis 'koːg̥] 'an old church'
d. *[on ˌiːliz 'goːg̥]





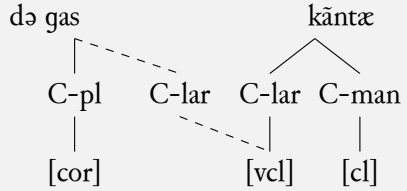
## Analysis

- I suggest that both types of phenomena can be unified in terms of a C-lar floating node
- It is better to dock to an unspecified obstruent than to a specified one
- If there is no suitable site to the left (sonorants and vowels cannot be laryngeally specified), dock to the right → lenition.




## Analysis

- If there is a suitable site to the left, dock there
- (Stratal alert!) Word-final obstruents come delaryngealized from the word level
- Docking to the left creates a domain for the spreading of [voiceless]








## How is that evidence for underspecification?

- Normally, C-lar[vcl] does not spread across a word boundary
- Sequences of a nasal and a (delaryngealized) stop undergo variable progressive assimilation of nasality in pre-sonorant position

(11) a. ['dãnː] 'tooth'
b. ['dãnd al] 'another tooth'

- In this respect, they differ from sequences of a nasal and a stop that has acquired a floating C-lar[vcl] feature (again!)

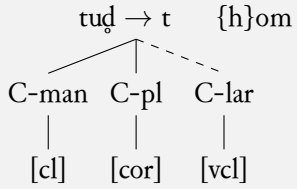
(12) a. Floating C-lar[vcl]
(i) [om] 'our'
(ii) [ˌtut om 'amzər] 'all our time'
(iii) *[ˌtud om 'amzər]
b. After nasals
(i) [gãnt i 'hwɛːr] 'with his sister'
(ii) *[gãnː i 'hwɛːr]





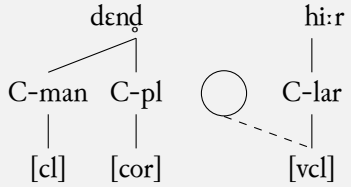
## No [vcl] spreading across a word boundary

- Familiar analysis...




- But the C-lar[vcl] from an actual segment does not do this:

(13) a. [ˌdɛnː 'hiːr] 'long teeth'
b. *[ˌdɛnt 'hiːr]








## Conclusion

- (There is a similar story to be told about prefixes)
- Both at the lexical and the postlexical level, there is ample evidence for the marked nature (phonological activity) of the feature [voiceless]
- The evidence for the phonological activity of [voice] is weak, despite the phonetics
- Crucially, a distinction must be made between contrastive non-specification (bare C-lar) and underspecification (no C-lar)
- Laryngeal underspecification of word-final obstruents makes sense even if we do not view pre-sonorant voicing as an argument
- But it surely is a nice result for the surface-undespecification theory of PSV

## Problems with phonetic essentialism I

- There are two types of empirical problems with laryngeal realism
- ☞ Unexpected categoricity
  - An "H language" like German is predicted to have variable/"passive" voicing of lenis stops
  - Apparently borne out in German, English, Welsh, Turkish, Irish...
  - Counterexamples:
    - Overspecified, fully voiced lenis stops: Swedish (Ringen & Helgason 2004; Helgason & Ringen 2008; Beckman et al. 2011), possibly Île de Groix Breton (Ternes 1970)
    - Lenis stops with categorical short-lag VOT and no passive voicing: Icelandic, Scottish Gaelic
    - Confer also categorical voicing in German fricatives (Beckman et al. 2009)
  - On the other hand, these overspecified categories tend to be relatively inert phonologically (cf. Ringen & Helgason 2004)






## Problems with phonetic essentialism II

- ☞ Passive voicing isn't
  - Westbury (1983); Westbury & Keating (1986): English speakers do expand the supraglottal cavity for lenis stops, it just happens to be insufficient to sustain voicing
  - Kingston & Diehl (1994, 1995); Kingston et al. (2008): "lenis/voiced obstruents" are a category that English speakers cue, even if there is no consistent closure voicing






## Substance-free to the rescue

- The present approach resolves both issues
- "Lenis" obstruents in H languages are contrastively specified for C-lar, not underspecified because of lack of contrast
- Overspecification is expected
- ☞ Substance-free: the realization is language-specific
  - Prevoicing as in Swedish
  - Devoicing as in Icelandic
  - Multiple cues as in English (German? Welsh?)
- Also explains why English voicing is not entirely passive
- Still compatible with English being a H language, *pace* Kingston et al. (2009)






## Conclusions: Breton

- Bothoa Breton is best treated as a language where voiceless obstruents are more marked than voiced ones
- Despite its Romance-like phonetics
- There is a ternary contrast *on the surface*, with delaryngealized obstruents in weak (neutralization-inducing) positions
- Privative features and feature geometry reflect markedness relationships better than binary features

## Conclusions: laryngeal realism

- Substance-free laryngeal realism (“laryngeal relativism”; Cyran 2011)
- Languages can be H or L irrespective of their phonetics
- Surface underspecification is less widespread than often suggested
- Surface underspecification expected only in contrast-neutralization conditions, rarely across the board
- Does not invalidate the main insight

Trugarez!





## Things to ask

### Is there real data?

- Sorry, not yet. Treat this as a falsifiable prediction.

### Ask me about...

- Prefixes (see bonus slides)
- Richness of the Base: what happens to delaryngealized obstruents in the input
- Surface underspecification and pre-sonorant voicing: a rôle for categorical distributions





## Bonus: prefixes I

- Two productive prefixes: /had/ ‘re-’ and /diz/ ‘not’
- Behave like pwords in many respects
  - Consistently stressed
  - Final consonants behave like word-final ones
- /had/ is easy

(14) a. ['desko] ‘learn’
b. [ˌha'd·esko] ‘relearn’

- Secondary stress on light syllable (otherwise rare)
- No devoicing (*contra* Hemon 1940; Press 1986)

☞ It’s just a pword





## Bonus: prefixes II

- /diz/ is harder

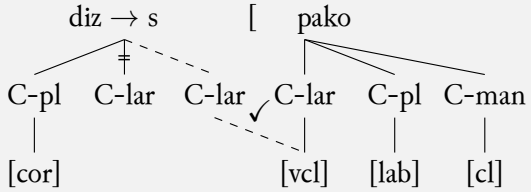
(15)

| | | | | |
|---|---|---|---|---|
| a. | (i) | ['alve] | ‘key’ |
| | (ii) | [ˌdi'zalve] | ‘opening’ |
| b. | (i) | ['pako] | ‘pack’ |
| | (ii) | [ˌdis'pako] | ‘unpack’ |
| c. | (i) | ['ba:dio] | ‘baptize’ |
| | (ii) | [ˌdiz'va:dio] | ‘rename’ |

- Seems to be /diz/
- Causes lenition (/b/ → [v])
- This means we could have expected *[dizbako], but obstruent clusters are expected to be voiceless...
- Why not *[ˌdis'fa:dio] then?

## Bonus: prefixes III

- I suggest it is /diz + {C-lar}/
- In [ˌdi'zalve], C-lar docking is vacuous
- In [ˌdis'pako], devoicing is entirely parallel to devoicing sandhi (recall prefixes are also pword-like domains)

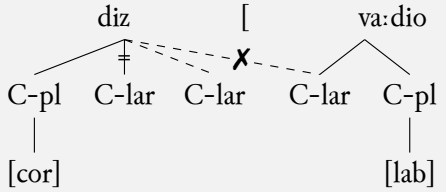







## Bonus: prefixes IV

- There are two explananda with [ˌdiz'va:dio]
- Lack of cluster devoicing: spread of C-lar blocked across a word boundary, no incentive to epenthesize [vcl]
- Lack of coda delaryngealization: floating C-lar provides the feature








## References I

Avery, Peter. 1996. *The representation of voicing contrasts*. Toronto: University of Toronto dissertation.

Backley, Phillip. 2011. *An introduction to Element Theory*. Edinburgh: Edinburgh University Press.

Beckman, Jill, Pétur Helgason, Bob McMurray & Catherine Ringen. 2011. Rate effects on Swedish VOT: Evidence for phonological overspecification. *Journal of Phonetics* 39(1). 39–49.

Beckman, Jill, Michael Jessen & Catherine Ringen. 2009. German fricatives: coda devoicing or positional faithfulness? *Phonology* 26. 231–268.

Blaho, Sylvia. 2008. *The syntax of phonology: a radically substance-free approach*. Tromsø: University of Tromsø dissertation.

Bothorel, André. 1982. *Étude phonetique et phonologique du breton parlé à Argol (Finistère-Sud)*. Spezed: Diffusion Breizh.

Carlyle, Karen Ann. 1988. *A syllabic phonology of Breton*: University of Toronto dissertation.

Causley, Trisha. 1999. *Complexity and markedness in Optimality Theory*. Toronto: University of Toronto dissertation.

Colina, Sonia. 2009. Sibilant voicing in Ecuadorian Spanish. *Studies in Hispanic and Lusophone Linguistics* 2(1). 1–18.





## References II

Cyran, Eugeniusz. 2010. *Complexity scales and licensing in phonology* (Studies in Generative Grammar 105). Berlin: Mouton de Gruyter.

Cyran, Eugeniusz. 2011. Laryngeal realism and laryngeal relativism: Two voicing systems in Polish. *Studies in Polish Linguistics* 7.

Hall, Daniel Currie. 2009. Laryngeal neutralization in Breton: loss of voice and loss of contrast. In Frederic Mailhot (ed.), *Proceedings of the 2009 annual conference of the Canadian Linguistic Association*, .

Harris, John. 1994. *English sound structure*. Oxford: Blackwell.

Harris, John. 2009. Why final obstruent devoicing is weakening. In Kuniya Nasukawa & Phillip Backley (eds.), *Strength relations in phonology* (Studies in generative grammar 103), 9–46. Berlin: Mouton de Gruyter.

Harris, John & Geoff Lindsey. 1995. The elements of phonological representation. In Jacques Durand & Francis Katamba (eds.), *Frontiers of phonology: atoms, structures, derivations*, 34–79. Harlow, Essex: Longman.

Helgason, Pétur & Catherine Ringen. 2008. Voicing and aspiration in Swedish stops. *Journal of Phonetics* 36(4). 607–628.

Hemon, Roparz. 1940. *Grammaire bretonne*. Brest: Gwalarn.

# References III

Honeybone, Patrick. 2001. Lenition inhibition in Liverpool English. *English Language and Linguistics* 5(2). 213–249.

Honeybone, Patrick. 2005. Diachronic evidence in segmental phonology: the case of obstruent laryngeal specification. In Marc van Oostendorp & Jeroen van de Weijer (eds.), *The internal organization of phonological segments* (Studies in Generative Grammar 77), 319–354. Mouton de Gruyter.

Honeybone, Patrick. 2008. Lenition, weakening and consonantal strength: tracing concepts through the history of phonology. In Joaquim Brandão de Carvalho, Tobias Scheer & Philippe Ségéral (eds.), *Lenition and fortition* (Studies in Generative Grammar 99), 9–93. Berlin: Mouton de Gruyter.

Honeybone, Patrick. forthcoming. Lenition in English. In Terttu Nevalainen & Elizabeth Closs Traugott (eds.), *Handbook on the history of English: Rethinking approaches to the history of English*, Oxford: Oxford University Press.

Humphreys, Humphrey Lloyd. 1995. *Phonologie et morphosyntaxe du parler breton de Bothoa en Saint-Nicolas-du-Pélem*. Brest: Emgleo Breiz.

Iverson, Gregory K. & Joseph C. Salmons. 1995. Aspiration and laryngeal representation in Germanic. *Phonology* 12(3). 369–396.





# References IV

Iverson, Gregory K. & Joseph C. Salmons. 1999. Laryngeal bias in Germanic. *Linguistische Berichte* 178. 135–151.

Iverson, Gregory K. & Joseph C. Salmons. 2003a. Laryngeal enhancement in early Germanic. *Phonology* 20(1). 43–74.

Iverson, Gregory K. & Joseph C. Salmons. 2003b. Legacy specification in the laryngeal phonology of Dutch. *Journal of Germanic Linguistics* 15(1). 1–26.

Iverson, Gregory K. & Joseph C. Salmons. 2007. Domains and directionality in the evolution of German final fortition. *Phonology* 24(1). 121–145.

Jackson, Kenneth Hurlstone. 1960. The phonology of the Breton dialect of Plougrescant. *Études celtiques* 9. 327–404.

Jansen, Wouter. 2004. *Laryngeal contrast and phonetic voicing: a Laboratory Phonology approach to English, Hungarian and Dutch.* Groningen: University of Groningen dissertation.

Jessen, Michael & Catherine Ringen. 2002. Laryngeal features in German. *Phonology* 19. 189–218.

Kingston, John & Randy L. Diehl. 1994. Phonetic knowledge. *Language* 70(3). 419–454.

Kingston, John & Randy L. Diehl. 1995. Intermediate properties in the perception of distinctive feature values. In Amalia Arvaniti & Bruce Connell (eds.), *Papers in laboratory phonology* 4, 7–27. Cambridge: Cambridge University Press.





# References V

Kingston, John, Randy L. Diehl, Cecilia J. Kirk & Wendy A. Castleman. 2008. On the internal perceptual structure of distinctive features: the [voice] contrast. *Journal of Phonetics* 36(1). 28–54.

Kingston, John, Aditi Lahiri & Randy L. Diehl. 2009. Voice. Unpublished MS.

Krämer, Martin. 2000. Voicing alternations and underlying representations: the case of Breton. *Lingua* 110. 639–663.

de Lacy, Paul. 2006. *Markedness: reduction and preservation in phonology*. Cambridge: Cambridge University Press.

van Oostendorp, Marc. 2003. Ambisyllabicity and fricative voicing in West Germanic dialects. In Caroline Féry & Ruben van de Vijver (eds.), *The syllable in Optimality Theory*, 304–337. Cambridge: Cambridge University Press.

Petrova, Olga, Rosemary Plapp, Catherine Ringen & Szilard Szentgyörgyi. 2006. Voice and aspiration: evidence from Russian, Hungarian, German, Swedish and Turkish. *The Linguistic Review* 23. 1–35.

Press, Ian. 1986. *A grammar of Modern Breton*. Berlin: Mouton de Gruyter.

Rice, Keren. 1994. Laryngeal features in Athapaskan languages. *Phonology* 11(1). 107–147.





# References VI

Rice, Keren. 2003. Featural markedness in phonology: variation. In Lisa Cheng & Rint Sybesma (eds.), *The second* Glot International *state-of-the-article book: the latest in linguistics* (Studies in Generative Grammar 61), 389–430. Berlin: Mouton de Gruyter.

Ringen, Catherine & Pétur Helgason. 2004. Distinctive [voice] does not imply regressive assimilation: evidence from Swedish. *International Journal of English Studies* 4(2). 53–71.

Strycharczuk, Patrycja. 2010. What's in a word? Prosody in Polish voicing. Presentation at Manchester Phonology Meeting 18.

Strycharczuk, Patrycja & Ellen Simon. forthcoming. Obstruent voicing before sonorants: the case of West Flemish. *Natural Language & Linguistic Theory* .

Ternes, Elmar. 1970. *Grammaire structurale du breton de l'Île de Groix (dialecte occidental)*. Heidelberg: Carl Winter Universitätsverlag.

Vaux, Bert. 1998. The laryngeal specifications of fricatives. *Linguistic Inquiry* 29(3). 497–511.

Westbury, John R. 1983. Enlargement of the supraglottal cavity and its relation to stop consonant voicing. *Journal of the Acoustical Society of America* 73(4). 1322–1336.

Westbury, John R. & Patricia A. Keating. 1986. On the naturalness of stop consonant voicing. *Journal of Linguistics* 22(1). 145–166.

Wetzels, W. Leo & Joan Mascaró. 2001. The typology of voicing and devoicing. *Language* 207–244.