

“Pitch accent” and prosodic structure in Scottish Gaelic: reassessing the role of contact

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I Introduction

Several varieties of Scottish Gaelic have attracted interest in both descriptive and theoretical literature due to an interesting feature of their prosody, which involves contrasting laryngeal activity (pitch and glottalization) in segmentally identical forms. As an example, consider the difference between [ˈtuan] ‘hook’ (written *dubhan*) and [ˈtuan] ‘song’ (*duan*). As documented by Ladefoged et al.¹ the first of these is realized in the dialect of Bernera (off the coast of Lewis in the Outer Hebrides) with a rising–falling contour, while the second one has a rising contour: an alternative way of describing the difference is analysing [ˈtuan] ‘hook’ as having an early pitch peak and [ˈtuan] ‘song’ as having a late one.

An essentially identical contrast is found between words with and without a certain type of epenthetic vowel, traditionally called the svarabhakti vowel (underlined for clarity in the remainder for this paper). For instance, in the dialect of Bernera, the word [ˈpalvək] ‘skull’ (*ballag*) has a high tone on the first vowel, comparable to the early peak of [ˈtuan] ‘hook’, while [ˈpalvək] ‘belly’ (*balg*) has a rising pattern throughout both vowels, similar to the late peak in [ˈtuan] ‘song’.

Descriptively, this contrast is extremely similar to “pitch accent” contrasts found in the North Germanic varieties of Sweden and Norway² and in the West Germanic varieties of Limburg and

¹Peter Ladefoged et al. “Phonetic structures of Scottish Gaelic”. In: *Journal of the International Phonetic Association* 28.1 (1998), pp. 1–41.

²E.g. Gösta Bruce. *Swedish word accent in sentence perspective*. Travaux de l’Institut de linguistique de Lund 12. Lund: Gleerup, 1977; Tomas Riad. “Structures in Germanic prosody”. PhD thesis. Stockholm: Stockholm University, 1992; Tomas Riad. “The origin of Scandinavian tone accent”. In: *Diachronica* 15.1 (1998), pp. 63–98; Ove Lorentz. “Stress and tone in an accent language”. In: *Nordic Prosody III*. ed. by Claes-Christian Elert, Irène Johansson, and Eva Strangert. Umeå, Stockholm: Almqvist & Wiksell, 1984, pp. 165–178; Gjert Kristoffersen. *The phonology of Norwegian*. Oxford: Oxford University Press, 2000; Aditi Lahiri, Allison Wetterlin, and Elisabeth Jönsson-Steiner. “Lexical specification of tone in North Germanic”. In: *Nordic Journal of Linguistics* 28.1 (2005), pp. 61–96.

the Franconian area.³ It has occasionally been treated in the literature as such, for instance by MacAulay⁴ and Ternes.⁵ In the remainder of this paper, I will indicate early-peak words using the symbol ¹, and late-peak words using the symbol ², recalling the tradition of “accent 1” and “accent 2” found in studies of the Germanic languages.⁶

Historically, the contrast is reconstructed as one of monosyllabic vs. disyllabic forms: [²ˈtuan] ‘hook’ corresponds to Old Irish *dubán*, while [¹ˈtuan] ‘song’ goes back to monosyllabic *duan* with a diphthong. Similarly, in pairs such as [¹ˈpalʲak] ‘skull’ and [²ˈpalʲak] ‘belly’ the late-peak words are descended from monosyllables, with the second vowel being epenthetic (Old Irish *bolg* ‘sack’).⁷ For ease of reference, such epenthetic vowels are underlined in the remainder of this paper.

The parallel is strengthened further by the existence of varieties where the same contrast is reflected in glottalization rather than pitch contours. In North Germanic, the prime example of this is Danish *stød*, while in southern dialects of Scottish⁸ we find pairs such as [ˈpoʔɔ] ‘underwater rock’ (from Norse *boði*) vs. [ˈpo:] ‘cow’ (Old Irish *bó*), which correspond to Lewis [¹ˈpo:] and [²ˈpo:] respectively.

³Carlos Gussenhoven and Peter van der Vliet. “The phonology of tone and intonation in the Dutch dialect of Venlo”. In: *Journal of Linguistics* 35 (1999), pp. 99–135; Anatoly Liberman. “*Schärfung*/stoottoon and *Trägheit*-*sakzent*/sleeptoon in the Rhein–Limburg area and their Scandinavian analogues”. In: *Language change and typological variation: in honor of Wilfred P. Lehmann on the occasion of his 83rd birthday*, 1–2. Volume 2: *Grammatical universals and typology*. Ed. by Carol F. Justus and Edgar C. Polomé. Journal of Indo-European Studies Monograph 31. Washington, D. C.: Institute for the Study of Man, 2000, pp. 275–298; Carlos Gussenhoven. “On the origin and development of the Central Franconian tone contrast”. In: *Analogy, leveling, markedness*. Ed. by Aditi Lahiri. Berlin, New York: Mouton de Gruyter, 2000, pp. 213–260; Carlos Gussenhoven and Jörg Peters. “A tonal analysis of Cologne *Schärfung*”. In: *Phonology* 21.2 (2004), pp. 251–285; Jörg Peters. “Tone and intonation in the dialect of Hasselt”. In: *Linguistics* 46.5 (2008), pp. 983–1018; Björn Köhnlén. “Rule reversal revisited: synchrony and diachrony of tone and prosodic structure in the Franconian dialect of Arzbach”. PhD thesis. Leiden: Leiden University, 2011.

⁴Donald MacAulay. “The Scottish Gaelic language”. In: *The Celtic languages*. Ed. by Donald Macaulay. Cambridge Language Surveys. Cambridge: Cambridge University Press, 1993, pp. 137–248.

⁵Elmar Ternes. “Scottish Gaelic phonemics viewed in a typological perspective”. In: *Lingua* 52.1–2 (1980), pp. 73–88; Elmar Ternes. *The phonemic analysis of Scottish Gaelic, based on the dialect of Applecross, Ross-shire*. 3rd revised. Dublin: Dublin Institute for Advanced Studies, 2006.

⁶See also Ternes, *Phonemic analysis*, for this convention.

⁷The literature on this epenthesis is extensive; some examples are Dónall P. Ó Baoill. “Preaspiration, epenthesis and vowel lengthening: interrelated and of similar origin?”. In: *Celtica* 13 (1980), pp. 79–108; G. Nick Clements. “Syllabification and epenthesis in the Barra dialect of Gaelic”. In: *The phonological representation of suprasegmentals*. Ed. by John Massie Stuart et al. Berlin: Walter de Gruyter, 1986, pp. 317–336; Andrew Carnie. “Whence sonority? Evidence from epenthesis in Modern Irish”. In: *MIT working papers in linguistics 21: Papers on phonology and morphology*. Ed. by Andrew Carnie, Heidi Harley, and Tony Bures. Cambridge, MA: MITWPL, 1994; Máire Ní Chiosáin. “Topics in the phonology of Irish”. PhD thesis. Amherst: University of Massachusetts, Amherst, 1991; Máire Ní Chiosáin. “Syllables and phonotactics in Irish. Views and facts”. In: *The syllable. Views and facts*. Ed. by Harry van der Hulst and Nancy Ritter. Studies in Generative Grammar 45. Berlin: Mouton de Gruyter, 1999, pp. 551–575; Kevin Hind. “The structure of epenthesis in Gaelic”. In: *Journal of Celtic Linguistics* 5 (1996), pp. 91–119; Anna R. K. Bosch and Kenneth de Jong. “The prosody of Barra Gaelic epenthetic vowels”. In: *Studies in the Linguistic Sciences* 27 (1997), pp. 1–15; Norval Smith. “A preliminary account of some aspects of Leurbost Gaelic syllable structure. Views and facts”. In: *The syllable. Views and facts*. Ed. by Harry van der Hulst and Nancy Ritter. Studies in Generative Grammar 45. Berlin: Mouton de Gruyter, 1999, pp. 577–630.

⁸Nils M. Holmer. *Studies on Argyllshire Gaelic*. Skrifter utgivna av Kungliga Humanistiska Vetenskapssamfundet i Uppsala 31. Uppsala: Almqvist & Wiksell, 1938; Ternes, “Gaelic phonemics”.

From a historical perspective, some authors, notably Borgstrøm,⁹ have suggested that the development of the “pitch accent” system in Scottish Gaelic, along with other phonetic and lexical features of the language¹⁰, is a contact phenomenon due to language shift from Norse to Gaelic that was assumed to occur as the Norse-occupied areas of the Highlands and the Isles became part of the kingdom of Scotland. Others, such as Ternes¹¹ and Eliasson,¹² have taken a more cautious line, preferring to see the commonalities in vaguer “areal” terms, with occasional references to the possibility of a common substrate.¹³

In this paper I explore the possibility of analysing the “pitch accent” as an independently occurring phenomenon. I review the phonological evidence that supports analysing the contrast as one of the number of syllables¹⁴ and argue that the “pitch accent” found in Scottish Gaelic requires the confluence of two factors: contrastive prosodic (including syllabic) structure in the surface phonology and a phonological computation that may associate tones and laryngeal features with boundaries and heads of certain prosodic constituents (including syllables and morae). I show that both of these can arise without significant external influence, focusing in particular on an example from a Breton dialect, where a “pitch accent” system appears to have arisen through the lexicalization of prosodic structure and associated tones, in a development parallel to that hypothesized by Riad¹⁵ for North Germanic but not clearly connected to language contact. I conclude by reflecting on the consequences of this approach for the bigger picture of Norse–Gaelic contact in early medieval Scotland.

2 The syllabic analysis in Scottish Gaelic

In the remainder of this paper I adopt the hypothesis that the contrast in “pitch accents” in at least some varieties of Scottish Gaelic is a function of their surface prosodic structure. In this section I review the evidence for this analysis. A minor point of terminology is in order: in the remainder of this paper I will refer to rising-pitch words such as [2'palvək] ‘belly’ (*balg*) as “monosyllabic”, and to early-peak words such as [1'palvək] ‘skull’ as “disyllabic”.

⁹Carl Hjalmar Borgstrøm. “On the influence of Norse on Scottish Gaelic”. In: *Lochlann* 6 (1974), pp. 91–107.

¹⁰E. g. Carl Marstrand. “Okklusiver og substrater”. In: *Norsk tidsskrift for sprogvidenskap* 5 (1932), pp. 258–304; Gunnar Ólafur Hansson. “Remains of a submerged continent: preaspiration in the languages of Northwest Europe”. In: *Historical Linguistics 1999*. Ed. by Laurel J. Brinton. Current Issues in Linguistic Theory 215. Amsterdam: John Benjamins, 2001, pp. 157–173; Jr Stewart Thomas W. “Lexical imposition. Old Norse vocabulary in Scottish Gaelic”. In: *Diachronica* 21.2 (2004), pp. 393–420.

¹¹Ternes, “Gaelic phonemics”; Ternes, *Phonemic analysis*.

¹²Stig Eliasson. “Typologiska och arealingvistiska aspekter på de nordeuropeiska språkens fonologi”. In: *Språkkontakt: innverknaden frå nedertysk på andre nordeuropeiske språk*. Ed. by Ernst Håkon Jahr. Nord 2000: 19. København: Nordisk ministerråd, 2000, pp. 21–70.

¹³Heinrich Wagner. “Nordeuropäische Lautgeographie”. In: *Zeitschrift für celtische Philologie* 29.1 (1964), pp. 225–298.

¹⁴Magne Oftedal. *The Gaelic of Leurbost, Isle of Lewis*. A linguistic survey of the Gaelic dialects of Scotland 3. Oslo: W. Aschehoug & Co., 1956; Peter Ladefoged. “Commentary: some thoughts on syllables — an old-fashioned interlude”. In: *Papers in laboratory phonology VI*. ed. by John Local, Richard Ogden, and Rosalind A. M. Temple. Cambridge: Cambridge University Press, 2003, pp. 269–276.

¹⁵Riad, “Origin”.

Pitch contours

One type of evidence involves the pitch contours themselves, at least in certain dialects such as the Hebridean varieties studied by Oftedal¹⁶ and Ladefoged et al.¹⁷ As noted above, monosyllabic words receive a rising pitch, while disyllabic ones have an early pitch peak followed by a long fall. A very plausible analysis for these facts is suggested by Ladefoged,¹⁸ who proposes that stress in Scottish Gaelic is by default associated with a disyllabic LH L contour. In monosyllabic words, including both straightforwardly monosyllabic ones such as [2'po:] 'cow' and more complex cases with epenthetic vowels of the type [2'palvək] 'belly', the second L tone has no syllable to associate with, and is therefore absent from the surface representation. This results in the rising pitch contour. Conversely, in disyllabic words — both those that are straightforwardly so, such as [2'palvək] 'skull', and cases such as [2'po:] 'underwater rock' that require some device to distinguish them from monosyllabic items with identical segmental content — the entire LH L contour surfaces as expected.

Rhyme palatalization and the analysis of epenthesis

An important piece of evidence concerns a palatalization process which is used as the exponent of certain grammatical categories, such as the genitive singular in some declension classes. It involves the palatalization of a final consonant or consonant cluster and fronting and/or raising of the preceding (short) vowel; however, normally it does not affect consonants preceding the vowel involved. This can be seen in the following examples from the Lewis dialect¹⁹; here and elsewhere in this paper I write the affected segments in bold face:

- (1) a. Long vowel unaffected:
- | | | | |
|------|--------|-----|-------------------|
| (i) | [ɔ:r] | òr | 'gold' |
| (ii) | [ɔ:ðj] | òir | 'gold (gen. sg.)' |
- b. Palatalization stops at short vowels:
- | | | | |
|-------|------------------------|------|------------------|
| (i) | [slv ^h k] | sloc | 'pit' |
| (ii) | [slv ^u kj] | | 'pit (gen. sg.)' |
| (iii) | *[flu ^h kj] | | |

Crucial examples, as pointed out by Smith,²⁰ among others, involve the contrast between true disyllabic words and monosyllabic words with epenthesis. The following examples, also from the dialect of Leurbost, demonstrate this clearly.

- (2) a. Disyllabic words
- | | | | |
|------|------------|---------|------------------|
| (i) | [1'palvəx] | balach | 'boy' |
| (ii) | [1'palviç] | balaich | 'boy (gen. sg.)' |

¹⁶Oftedal, *Gaelic of Leurbost*.

¹⁷Ladefoged et al., "Phonetic structures of Scottish Gaelic".

¹⁸Ladefoged, "Thoughts on syllables".

¹⁹Oftedal, *Gaelic of Leurbost*.

²⁰Norval Smith. "A preliminary account of some aspects of Leurbost Gaelic syllable structure. Views and facts". In: *The syllable. Views and facts*. Ed. by Harry van der Hulst and Nancy Ritter. Studies in Generative Grammar 45. Berlin: Mouton de Gruyter, 1999, pp. 577–630.

- (iii) *^{[1'}pal̥iç]
- b. Monosyllabic words with epenthesis
- (i) ^{[2'}pal̥ak] balg ‘bellows’
- (ii) ^{[2'}pul̥uk̥i] builg ‘bellows (gen. sg.)’
- (iii) *^{[2'}pal̥uk̥i]

The treatment of these facts in the literature has often been connected with the contention by Borgstrøm²¹ that speakers report a difference in syllabification between mono- and disyllabic words of the type *balg/ballag*. According to Borgstrøm,²² speakers show the expected V.CV syllabification in disyllabic words such as ^{[1'}pal̥ak] ‘skull’ (*ballag*) but the unexpected VC.V boundary in words like ^{[2'}pal̥ak] ‘bellows’ (*balg*). However, there are good reasons to believe that the placement of the syllable boundary is not the relevant phonological difference.

A cautionary tale in this respect is provided by Ní Chiosáin, Welby, and Espesser,²³ who show that Irish speakers report VC.V syllabifications in contexts where such a placement of syllable boundaries does not correspond to clear differences in “core” phonological properties such as alternation-related behaviour. This suggests (if more evidence were needed) that speaker judgments do not necessarily correspond to meaningful phonological distinctions.

More pertinently, Hind and Hall²⁴ have argued that the “epenthesis” process which appears to result in the insertion of a vowel between a sonorant and a following segment is different in kind from epenthesis understood as the insertion of a root node; see also work by Levin.²⁵ They argue that the epenthesis (at least in those dialects where it is described as involving a full copy of the pre-sonorant vowel) represents an obligatory realignment of the vocalic gesture extending beyond the sonorant (for another recent discussion of the theoretical importance of dissociating vocalic and consonantal gestures, see the work by Operstein²⁶). Crucially, this account does not require the insertion of a second root node by the phonological computation.²⁷

From a phonological perspective, the most parsimonious analysis of these facts involves viewing monosyllabic words such as ^{[1'}pal̥ak] ‘belly’ as containing a single vowel in the surface repres-

²¹Carl Hjalmar Borgstrøm. *The dialects of the Outer Hebrides*. A linguistic survey of the Gaelic dialects of Scotland 1. Norsk Tidsskrift for Sprogvidenskap, suppl. bind I. Oslo: Norwegian Universities Press, 1940.

²²Ibid.

²³Máire Ní Chiosáin, Pauline Welby, and Robert Espesser. “Is the syllabification of Irish a typological exception? An experimental study”. In: *Speech Communication* 54.1 (2012), pp. 68–91.

²⁴Kevin Hind. “The structure of epenthesis in Gaelic”. In: *Journal of Celtic Linguistics* 5 (1996), pp. 91–119; Nancy Hall. “Cross-linguistic patterns of vowel intrusion”. In: *Phonology* 23.3 (2006), pp. 387–429.

²⁵Juliette Levin. “Between epenthetic and excrescent vowels”. In: *WCCFL* 6 (1987), pp. 187–201.

²⁶Natalie Operstein. *Consonant structure and prevocalization*. Current Issues in Linguistic Theory 312. Amsterdam: John Benjamins, 2010.

²⁷An anonymous reviewer reminds that this proposal is hardly unprecedented: many languages with complex consonant clusters break these up using schwa-like vocalic segments which do not behave like phonological vowels; examples are Imdlawn Tashlhiyt Berber (François Dell and Mohamed Elmedlaoui. “Syllabic consonants and syllabification in Imdlawn Tashlhiyt Berber”. In: *Journal of African Languages and Linguistics* 7 [1985], pp. 105–130; Rachid Ridouane. “Syllables without vowels: phonetic and phonological evidence from Tashlhiyt Berber”. In: *Phonology* 25.3 [2008], pp. 321–359) and (for some speakers) Syrian Arabic (Maria Gouskova and Nancy Hall. “Acoustics of epenthetic vowels in Lebanese Arabic”. In: *Phonological argumentation: essays on evidence and motivation*. Ed. by Steve Parker. Advances in Optimality Theory 5. London: Equinox, 2009, pp. 203–226; Nancy Hall. “Acoustic differences between lexical and epenthetic vowels in Lebanese Arabic”. In: *Journal of Phonetics* 41.2 [2013], pp. 133–143).

entation: in other words, for the purposes of phonological computation the difference between the words for ‘belly’ and ‘skull’ is represented as the difference between [ˈpalʲk] and [ˈpalʲak]. This analysis immediately provides an elegant way of unifying the behaviour of disyllables and monosyllables for the purposes of rhyme palatalization.

Specifically, we can analyse rhyme palatalization as involving the nucleus of the final syllable and any following consonants. This is very clear in the case of disyllabic [ˈpalʲɪç] from [ˈpalʲəx] ‘boy’. The behaviour of monosyllabic [ˈpulʲukʲ] ‘bellows (gen. sg.)’ is explainable if we treat it as phonological [ˈpulʲikʲ], from non-palatalized [ˈpalʲk].

Syncope

Another piece of evidence offered by Smith²⁸ concerns the behaviour of epenthetic vowels in syncope. According to Smith,²⁹ syncope affects medial syllables in order to optimize prosodic structure in terms of lapses, resulting in alternations such as the following:

- (3) a. [ˈobəðj] *obair* ‘work’
 b. [ˈobrəx] *oibreach* ‘work (gen. sg.)’
 c. *[ˈobəðjəx]

However, this syncope does not apply to vowels resulting from epenthesis:

- (4) a. [ˈpalʲəx] *balach* ‘boy’
 b. [ˈvalʲaxu] *a bhalachaibh* ‘boy (voc. pl.)’
 c. *[ˈvalʲxu]

In the analysis offered by Smith,³⁰ epenthetic vowels in words such as [ˈvalʲaxu] are root nodes inserted by the phonological component. These root nodes exhibit special behaviour, in that they remain invisible to top-down prosodic rules regulating syncope. Smith³¹ suggests that they remain affiliated to the initial syllable by proposing an elaborate syllable-internal structure, whereby the svarabhakti vowel is seen as projecting a non-maximal syllable contained inside the initial one ([va[l̩a]_σ][xu]_σ).

Under the assumptions outlined in section 2, this elaborate structure is not needed, because the svarabhakti vowel is simply not manipulated by the phonology: the surface representation of example (4-b) is [valxu]. This allows us to express the generalization that the vowels are invisible to the prosodic phonology, since they are simply absent from the surface-phonological representation.³²

²⁸Smith, “Leurbost Gaelic syllable structure”.

²⁹Ibid.

³⁰Ibid.

³¹Ibid.

³²Note, however, this particular analysis is only applicable to dialects such as that of Leurbost, where the svarabhakti vowels are complete copies of preceding nuclei or are simply exponents of the same vocalic gesture (Hind, “The structure of epenthesis in Gaelic”; Nancy Hall. “Cross-linguistic patterns of vowel intrusion”. In: *Phonology* 23.3 [2006], pp. 387–429). Other varieties, such as Barra Gaelic (Carl Hjalmar Borgström. “The dialect of Barra in the Outer Hebrides”. In: *Norsk tidsskrift for sprogvidenskap* 8 [1937], pp. 71–242; Clements, “Syllabification and epenthesis”; Andrew Nevins. *Locality in vowel harmony*. Linguistic Inquiry Monograph 55. Cambridge, MA: MIT

Glottal stop insertion

The data discussed in ?? 2–(2) do not provide conclusive evidence for a contrast in syllable affiliation, but rather only in syllable count³³: the crucial differences are between mono- and polysyllabic words, not between V.CV and VC.V syllabifications. In this section I leverage data from southern varieties of Scottish Gaelic to argue that the interaction of glottal stop insertion with other processes active in Scottish Gaelic phonology provides the best evidence for viewing the contrast as one of syllable structure.³⁴

As noted above, southern varieties of Scottish Gaelic, such as the dialects of Islay³⁵ and Tiree³⁶ show the insertion of a postvocalic glottal stop where Hebridean varieties have “accent ɪ”, which I have argued to reflect disyllabicity. Smith,³⁷ building on proposals by Clements,³⁸ suggests that insertion of [ʔ] is used in Islay Gaelic to achieve bimoraicity of stressed syllables when no consonant is available to serve as a (moraic) coda. This is seen in the following examples (numbers refer to pages in Nils M. Holmer. *Studies on Argyllshire Gaelic*. Skrifter utgivna av Kungliga Humanistiska Vetenskapssamfundet i Uppsala 31. Uppsala: Almqvist & Wiksell, 1938):

- (5) a. No glottal stop insertion in heavy syllables
- (i) [tʰrɑ_μi_μ] *tràigh* ‘shore’ (227)
 - (ii) [kʰliu_μ] *cliù* ‘fame’ (46)
 - (iii) [pjɔ_μ] *beò* ‘alive’ (127)
- b. Glottal stop insertion in subminimal monosyllables
- (i) [tʰe_μʔ_μ] *teth* ‘hot’ (221)
 - (ii) [mɛ_μʔ_μ] *math* ‘good’ (188)
 - (iii) [kru_μʔ_μ] *gruth* ‘curds’ (177)
- c. Glottal stop insertion in polysyllables
- (i) [pɑ_μʔ_μlax] *balach* ‘boy’ (125)
 - (ii) *[pɑ_μlax]
 - (iii) [ko_μʔ_μur] *gobhar* ‘goat’ (176)

Crucially, glottal stop insertion is not found before sonorants when these are followed by svarabhakti vowels:

- (6) a. [marəv] *marbh* ‘dead’ (189)
- b. *[maʔrəv]

Press, 2010) are described as exhibiting a mismatch in quality between the underlying and the svarabhakti vowel whenever the sonorant is palatalized: the genitive singular of [2¹palvək] ‘bellows’ is said to be [2¹pu¹ik] (Borgstrøm, “Dialect of Barra”, §263). If this vowel is indeed identical to lexical [i], it is not impossible that something like the analysis offered by Smith, “Leurbost Gaelic syllable structure” is required for these varieties.

³³Cf. Bert Vaux. “Syllabification in Armenian, Universal Grammar and the lexicon”. In: *Linguistic Inquiry* 34.1 (2003), pp. 91–125.

³⁴Thanks to an anonymous reviewer for raising many of the concerns discussed in this section.

³⁵Holmer, *Argyllshire Gaelic*.

³⁶Ternes, “Gaelic phonemics”.

³⁷Smith, “Leurbost Gaelic syllable structure”.

³⁸G. Nick Clements. “Syllabification and epenthesis in the Barra dialect of Gaelic”. In: *The phonological representation of suprasegmentals*. Ed. by John Massie Stuart et al. Berlin: Walter de Gruyter, 1986, pp. 317–336.

This is explained if the correct surface representation in (6) is [ˈma_μr_μv], with a moraic coda consonant obviating the need for glottal stop insertion. Thus, glottal stop insertion can be viewed as a device to provide a light stressed syllable with a mora.³⁹ If this account is correct, the minimal pair [ˈpoʔɔ] ‘underwater rock’ vs. [ˈpo:] ‘cow’, given by Ternes⁴⁰ for Tìreè Gaelic, can be explained if we assume the former to be stored as lexically disyllabic (/ (po)_σ(o)_σ/), the same solution that is applicable to Hebridean [ˈpo:] ‘underwater rock’ vs. [ˈpo:] ‘cow’.

Alternative analyses of these data are possible. In particular, the distribution of the glottal stop in examples (5-c-i) to (5-c-iii) could be static (i. e. lexically determined), while in example (5-c-iii) the insertion of the glottal stop could be viewed as breaking the hiatus and thus as involving an onset [ʔ]. However, it can be demonstrated that the glottal stop is both derived in the phonology and affiliated to the preceding syllable.

Glottal stop insertion is phonological

To demonstrate that glottal stop insertion is phonological, we turn to alternations involving closed and open syllables: we expect that contexts in which the stressed syllable is closed do not involve glottal stop insertion, since the coda consonant can project the second mora, while an open syllable should be associated with the epenthetic glottal stop. The literature provides three sources for such alternations: inflection, syncope, and resyllabification.

In stems of the form CVC, the first syllable is closed when no suffix follows⁴¹ but open when followed by a vowel-initial suffix. It appears that glottal stop insertion operates in line with expectations in this case in Islay Gaelic (the pronouns appear to be clitics which do not influence syllabification; see below for more discussion of these). The examples are from Holmer⁴²

- (7) a. Open syllables, glottal stop inserted
 (i) [ˈkʰu_μʔ_μ.rɪç mi] *cuiridh mi* ‘I will put’
 (ii) [ˈxu_μʔ_μ.rə tu] *chuireadh thu* ‘you would put’
 b. Closed syllables, no glottal stop
 (i) [ˈxu_μr_μ mi] *chuir mi* ‘I put (past)’
 (ii) [ˈxu_μr_μ u] *chuir thu* ‘you put (past)’

Another process creating these alternations is the syncope referred to above in example (2), as seen in the following example (Holmer, *Argyllshire Gaelic*, p. 156):⁴³

- (8) a. (i) [ˈtɔ_μʔ_μ.rəs] *dorus* ‘door’
 (ii) [ˈtɔ_μr_μ.ʃən] *doirsean* ‘doors’

³⁹Smith, “Leurbost Gaelic syllable structure”.

⁴⁰Ternes, “Gaelic phonemics”.

⁴¹A relatively frequent occurrence, see e. g. David Adger. “Gaelic morphology”. In: *The Edinburgh companion to the Gaelic language*. Ed. by Moray Watson and Michelle Macleod. Edinburgh: Edinburgh University Press, 2010, pp. 283–303.

⁴²Holmer, *Argyllshire Gaelic*, §95.

⁴³Some of these examples are also discussed by Smith, “Leurbost Gaelic syllable structure”, who also adduces cases such as [ˈtʰuʔrəm] ‘dry’ (*tioram*), [nəs-ˈtʰuʔrəma] ‘drier’ (*nios tiorma*), which are consistent with the approach that sees glottal stop insertion as driven by minimality, but the argument hinges on the analysis of svarabhakti here, so I do not discuss it further to avoid circularity.

- b. (i) [ˈpɑ̃ʔ̃.ɫə] *baile* ‘place’
 (ii) [ˈpɑ̃ʔ̃.ʈən] *bailtean* ‘places’

Finally, relevant data from another southern dialect (that of Jura) are provided by Jones.⁴⁴ In that variety, we find glottal stops in open syllables, as in [ˈpɑʔlɪɑx] ‘boy’, [rɑʔtan] ‘rat’, [ˈtʰɑʔpɑtʃ] ‘quarrel’. However, we also find that a glottal stop can be inserted in what is lexically a VC-final stem in a phrasal context:

- (9) a. [ʏɛʔn a] *dh’fhan e* ‘he stayed’
 b. [staʔt əŋ kʰɑ:r] *stad an càr* ‘stop the car’
 c. [koʔp əŋ ɛ:n] *gob an eun* ‘the bird’s beak’

When these words appear in a non-prevocalic context, the glottal stop is not obligatory:

- (10) a. [fən ləm] *fan leam* ‘stay with me’

This suggests that glottal stop insertion in contexts such as those in example (9) is driven by the postlexical resyllabification of the word-final consonant as an onset before the following vowel, which leaves the stressed syllable light. This further confirms that the glottal stop insertion is a phonological process driven by the stress-to-weight principle.^{45,46}

The glottal stop is a coda

Having established that glottal stop insertion in Scottish Gaelic is a phonological process, we are in a position to reconsider its relevance for the issue of contrastive syllabification. As discussed above, this analysis of glottal stop insertion allows us to account for minimal pairs such as Tìre [ˈpɔʔ] ‘underwater rock’ vs. [ˈpɔ:] ‘cow’ (and therefore possibly Hebridean [ˈpɔ:] vs. [ˈpɔ:]) in terms of stored prosodic structure, i. e. as underlying / $(po)_\sigma(o)_\sigma$ / vs. / poo /.

All of the arguments adduced in example (6) concern glottal stop insertion in preconsonantal position. Crucial cases such as those in [ˈpɔʔ] vs. [ˈpɔ:] (and parallel examples) all involve prevocalic glottal stops. These could, in principle, be analysed as hiatus-breaking devices with an onset glottal stop. Although this would involve two different accounts for what appear to be parallel

⁴⁴George Jones. “Beagan mu’n stad ghlotasach ann an Gàidhlig Ceann a Deas Earraghaidheil”. In: *Scottish Gaelic Studies* 20 (2000), pp. 201–211.

⁴⁵E. g. Alan S. Prince. “Quantitative consequences of rhythmic organization”. In: *CLS* 25.2 (1992), pp. 355–398; Laura W. McGarrity. “Constraints on patterns of primary and secondary stress”. PhD thesis. Indiana University, 2003; Patrik Bye and Paul de Lacy. “Metrical influences on fortition and lenition”. In: *Lenition and fortition*. Ed. by Joaquim Brandão de Carvalho, Tobias Scheer, and Philippe Ségéral. Studies in Generative Grammar 99. Berlin: Mouton de Gruyter, 2008, pp. 173–2006.

⁴⁶George Jones. “Beagan mu’n stad ghlotasach ann an Gàidhlig Ceann a Deas Earraghaidheil”. In: *Scottish Gaelic Studies* 20 (2000), pp. 201–211 states that this rule is not “fully regular” (*gu léir cunbhalach*) and that glottal stop insertion appears possible in preconsonantal contexts as well: [ˈʏɛʔn mi] ‘I stayed’ (*dh’fhan mi*). It seems plausible, however, that the variable application of the rule in preconsonantal contexts could be seen as a further development of the system sketched here. It is noteworthy that the overapplication is said to happen before the sonorants [n l r], i. e. precisely those segments that enter a “fortis/lenis” contrast in Scottish Gaelic (and Irish), which is often treated in moraic terms. This glottal stop insertion could then be seen as a process parallel to the lengthening and/or diphthongization of vowels before fortis sonorants, analysed as a compensatory process due to the delinking of the mora from the sonorant (see e. g. Ní Chiosáin, “Topics”, §4).

processes, such an analysis might allow us to dispense with contrastive syllabic structure. In this case, ‘underwater rock’ would involve a mapping /poo/ → [.po.ʔo.] and ‘cow’ would be stored with a long vowel. This scenario involves only storing moraic structure, which is uncontroversial.⁴⁷

However, if it could be shown that the default response to hiatus is not glottal stop insertion, then forms such as [poʔɔ] cannot be accounted for in this way. As observed by Smith,⁴⁸ some evidence is available that at least for some vowel combinations the response is contraction rather than consonant epenthesis. This evidence comes from the interaction of syncope and glottal stop insertion. As discussed above, some suffixes trigger a deletion of the second syllable in polysyllabic stems, cf. example (8-b) above. Crucially, this deletion also affects what I hypothesize to be stored syllabic nodes. Consider the following examples from Holmer;⁴⁹ I rewrite his <ou> to <ow> to make it clear that it is a diphthong

- | | | | | | |
|------|----|------|-------------|----------------------|----------------|
| (11) | a. | (i) | [ˈjoʔur] | <i>leabhar</i> | ‘book’ (183) |
| | | (ii) | [ˈjowriçən] | <i>leabhraichean</i> | ‘books’ (183) |
| | b. | (i) | [ˈuʔul] | <i>ubhal</i> | ‘apple’ (231) |
| | | (ii) | [ˈu:lən] | <i>ubhlan</i> | ‘apples’ (231) |

Assume ‘book’ is stored as / $(jo)_\sigma(ur)_\sigma$ /. There can be no contraction of the two adjacent vowels, presumably prevented by faithfulness to underlying prosodic structure, since it would force a single output syllable to correspond to two input ones. In a suffixed form which creates a context for syncope, the second syllabic node has to be deleted under pressure from whatever factor drives the syncope, and in this case the vowel /u/ can be subject to the general rules of syllabification active in the language, which force it to be parsed as part of a diphthong. An alternative account assuming that glottal stop insertion is unrelated to the number of syllables in the form has no explanation for why syncope triggers the contraction rule rather than epenthesis of the glottal stop in suffixed forms. Thus, I conclude that the glottal stop in [ˈjoʔur] and [ˈuʔul] (and by extension [ˈpoʔɔ]) cannot be a hiatus breaker, but must rather belong to the coda of a preceding syllable.

Although in principle we cannot uncritically extend the analysis of glottal stop insertion in southern varieties to Hebridean “pitch accents”, the fact that dialects such as those of Leurbost show entirely parallel examples of the interaction of pitch accents and syncope suggests that we are justified in viewing the pitch accents as deriving from syllabification (numbers show pages in Oftedal⁵⁰):

- | | | | | | |
|------|----|------|---------------------------|----------------------|---------------|
| (12) | a. | (i) | [¹ ˈɫɔ:r] | <i>leabhar</i> | ‘book’ (70) |
| | | (ii) | [² ˈɫɔ:riçən] | <i>leabhraichean</i> | ‘books’ (175) |
| | b. | (i) | [¹ ˈuəlʲ] | <i>ubhal</i> | ‘apple’ (76) |
| | | (ii) | [² ˈu:lʲən] | <i>ubhlan</i> | ‘apples’ (75) |

⁴⁷E. g. Bruce Morén. *Distinctiveness, coercion, and sonority: a unified theory of weight*. London, New York: Routledge, 2001.

⁴⁸Smith, “Leurbost Gaelic syllable structure”.

⁴⁹Holmer, *Argyllshire Gaelic*.

⁵⁰Oftedal, *Gaelic of Leurbost*.

Interim conclusion

If the analysis given above is correct, then a language can acquire the Scottish Gaelic type of “pitch accent” via a confluence of two factors. First, contrastive prosodic structure must be present in surface representations. In the particular case of Scottish Gaelic, it appears that the relevant node in the prosodic hierarchy is, unusually, the syllable. Although it is often claimed that contrastive syllabic structure (in underived forms) should be impossible, I would suggest that the review of the evidence above allows us to make a sufficiently robust claim to that effect.⁵¹

Second, once the prosodic structures are in place, even fairly general mechanisms of aligning suprasegmental features such as tones with prosodic pivots (heads and edges) are sufficient to derive pitch accent contrasts. This is the essence of the proposal by Ladefoged⁵² that the dialect of Lewis uses the LH L contour for both “accent 1” and “accent 2” words, with the distinction being derived only by the difference in prosodic structure rather than by a lexical difference in tonal melodies.

In the next section I will show that both components of the Scottish Gaelic recipe — lexically specified prosodic structure and the realization of what are phonologically prosodic contrasts by pitch differences — are independently found in the Celtic languages. I focus on Irish for exceptional prosodic structure and on a Breton dialect for the relationship between pitch and prosodic constituency.

3 Exceptional prosodic structure in Irish

As shown in section 2, nontrivial prosodic structure is reflected in Scottish Gaelic in a number of ways apart from the pitch accent contrast. Here I consider data from related varieties which demonstrate a very similar pattern of rhyme palatalization, despite not having the other robust cues to surface prosodic structure.

Unlike Scottish Gaelic, in varieties of Irish the epenthetic vowel that is inserted following sonorants that precede certain consonants “counts” for the purposes of prosodic structure, in particular for the projection of feet. First, as demonstrated by Ní Chiosáin,⁵³ Irish prefers words to contain a binary non-final foot, and svarabhakti in Irish is only allowed when it contributes

⁵¹In previous literature, the facts have been analysed by postulating an empty onset consonant (Clements, “Syllabification and epenthesis”; Smith, “Leurbost Gaelic syllable structure”), which acts as a proxy for syllable count and ensures that sonorants in svarabhakti words such as [ʔpalʲak] ‘belly’ and glottal stops in cases such as [ʔoʔɔ] ‘underwater rock’ are parsed as codas (so [.palʲ_ak.], [.poʔ_ɔ.]). However, for this solution to work the qualification that the empty segment should be an onset appears quite crucial: if syllabification is entirely deterministic and driven in large measure by sonority (e. g. Draga Zec. “Sonority constraints on prosodic structure”. PhD thesis. Stanford: Stanford University, 1988; Bruce Morén. *Distinctiveness, coercion, and sonority: a unified theory of weight*. London, New York: Routledge, 2001; Maria Gouskova. “Relational hierarchies in Optimality Theory: the case of syllable contact”. In: *Phonology* 21.2 [2004], pp. 201–250), then it is not at all clear why the empty unprosodified segment is parsed as an onset and does not undergo some other process (such as deletion or coalescence). Designating a segment as an onset is tantamount to storing at least a syllabic treelet if not a full syllable: it adds a poorly motivated element to the surface representation without resolving the conundrum of stored syllable structure.

⁵²Ladefoged, “Thoughts on syllables”.

⁵³Máire Ní Chiosáin. “Syllables and phonotactics in Irish. Views and facts”. In: *The syllable. Views and facts*. Ed. by Harry van der Hulst and Nancy Ritter. Studies in Generative Grammar 45. Berlin: Mouton de Gruyter, 1999, pp. 551–575.

to improving foot structure. Conversely, it is blocked when the word has sufficient segmental material to build the needed structure without the insertion of an extra root node. Second, as discussed by Green,⁵⁴ in some dialects of Irish stress falls within a three-syllable window at the left edge of the word. Barring some irrelevant complications, long vowels attract stress; in the absence of long vowels in the three-syllable window, stress falls on the initial syllable. Crucially, epenthetic vowels “count” for the purposes of establishing the number of syllables, because they are able to push a long vowel outside the three-syllable window: in a word of the form LLLH stress is initial even if one of the vowels in the light syllables is epenthetic.

Thus, learners of Irish lack some important cues to surface prosodic structure that are available to learners of Scottish Gaelic, such as the phonological invisibility of epenthetic vowels, pitch accents, and glottalization. Nevertheless, Irish dialects preserve at least one phenomenon associated with exceptional prosodic structure, namely rhyme palatalization. For concreteness, I consider here the dialect of Corca Dhuibhne (Dingle), a Munster variety spoken in the south-west of Ireland and described in detail by Ó Sé.⁵⁵

Given that the epenthetic vowel in Irish is always [ə] or [ɪ], it would be relatively difficult for speakers to recover the unusual surface prosodic structure found in cases of svarabhakti: there does not appear to be a phonetic factor that would allow the speakers to identify whether a given instance of [ə] is derived via svarabhakti or comes from some other source. Nevertheless, the dialect retains traces of at least one cue for this prosodic structure.

In monosyllables, we find the expected pattern whereby palatalization and fronting/raising affects only the rhyme of the syllable, as in the following examples:

- | | | | | | |
|------|----|------|----------|---------------|-------------------|
| (13) | a. | (i) | ['brov] | <i>brobh</i> | ‘rush’ |
| | | (ii) | ['brivʲ] | <i>broibh</i> | ‘rush (gen. sg.)’ |
| | b. | (i) | ['knuk] | <i>cnoc</i> | ‘hill’ |
| | | (ii) | ['knikʲ] | <i>cnoic</i> | ‘hill (gen. sg.)’ |

If Munster Irish reproduced the historical pattern faithfully, we would expect disyllables, such as ['soləs] ‘light’ (*solas*), to exhibit the raising effects only in the second syllable (cf. Old Irish genitive singular *soluis* rather than **suilis*); conversely, in monosyllables such as ['boləg] ‘belly’ (*bolg*) we would expect irregular fronting and/or raising of both vowels.

Historical monosyllables often exhibit the expected behaviour:

- | | | | | | |
|------|----|------|-------------|---------------|--------------------|
| (14) | a. | (i) | ['boləg] | <i>bolg</i> | ‘belly’ |
| | | (ii) | ['bilʲiɡʲ] | <i>builg</i> | ‘belly (gen. sg.)’ |
| | b. | (i) | ['lʲanəv] | <i>leanbh</i> | ‘child’ |
| | | (ii) | ['lʲinʲivʲ] | <i>linbh</i> | ‘child (gen. sg.)’ |

However, the raising of both vowels and palatalization of the medial sonorant can also affect historical disyllables, where this alternation may vary with the historically correct pattern.

- | | | | | | |
|------|----|-----|----------|--------------|---------|
| (15) | a. | (i) | ['soləs] | <i>solas</i> | ‘light’ |
|------|----|-----|----------|--------------|---------|

⁵⁴Anthony Dubach Green. “The prosodic structure of Irish, Scots Gaelic, and Manx”. PhD thesis. Cornell University, 1997.

⁵⁵Diarmuid Ó Sé. *Gaeilge Chorca Dhuibhne*. Baile Átha Cliath: Institiúid Teangeolaíochta Éireann, 2000.

	(ii)	[ˈsolɪf]	<i>solais</i>	‘light (gen. sg.)’
	(iii)	[ˈsɪlɪf]		
b.	(i)	[ˈdorəs]	<i>doras</i>	‘door’
	(ii)	[ˈdɪrɪf]	<i>dorais</i>	‘door (gen. sg.)’

Clearly, the Munster Irish forms do not merely descend from Old Irish unepenthesized ones, because we find examples such as those in (15), where the historical pattern associated with monosyllables is extended to disyllables. This suggests that the generalizations associated with the unusual prosodic structure of svarabhakti words may have survived the obliteration of the other cues. Thus, surface prosodic structure can be a robust enough element of the system, and therefore it may exist in the absence of a pitch accent. Crucially, the existence of this surface structure is not at all contingent on language contact: from a historical perspective, it simply represents the reflex of the Old Irish syllable count.⁵⁶

In the next section I consider some cases that have been analysed as contrasts in surface prosodic structure realized as contrasts in pitch.

4 Prosodic structure contrasts and pitch

A crucial distinction between Munster Irish and Scottish Gaelic under the present proposal is that the latter does not just retain surface prosodic structure but also reflects this contrast using in the assignment of pitch accents. In this section I consider data from another Celtic variety — the Breton dialect of Bothoa — where a “pitch accent” contrast also appears amenable to an analysis in terms of surface prosodic structure. Before I present the Breton analysis, I briefly discuss the relationship between prosodic structure and pitch accent contrasts in Germanic languages.

North and West Germanic

In the preceding sections I have treated Germanic (especially North Germanic) as a “prototypical” pitch accent system, following much of the literature in the field. However, the analysis of Germanic varieties as exhibiting lexical tones, although quite widespread⁵⁷ is not entirely uncon-

⁵⁶This is not to say Corca Dhuibhne Irish today exhibits the same sort of surface structure as that posited for Hebridean dialects. The phonological irregularity and the lexical specificity of the alternation suggest that it is quite advanced in terms of the life cycle of phonological processes (e. g. Ricardo Bermúdez-Otero. “Diachronic phonology”. In: *The Cambridge Handbook of Phonology*. Ed. by Paul de Lacy. Cambridge: Cambridge University Press, 2007, pp. 497–518). Since synchronic analysis of the Irish patterns is not the focus of this paper, I leave the question aside here.

⁵⁷See, for instance, Gösta Bruce. *Swedish word accent in sentence perspective*. Travaux de l’Institut de linguistique de Lund 12. Lund: Gleerup, 1977; Ove Lorentz. “Stress and tone in an accent language”. In: *Nordic Prosody III*. ed. by Claes-Christian Elert, Irène Johansson, and Eva Strangert. Umeå, Stockholm: Almqvist & Wiksell, 1984, pp. 165–178; Tomas Riad. “Structures in Germanic prosody”. PhD thesis. Stockholm: Stockholm University, 1992; Allison Wetterlin. *Tonal accents in Norwegian. Phonology, morphology and lexical specification*. Linguistische Arbeiten 535. Berlin: De Gruyter, 2010 for North Germanic and Carlos Gussenhoven. “On the origin and development of the Central Franconian tone contrast”. In: *Analogy, leveling, markedness*. Ed. by Aditi Lahiri. Berlin, New York: Mouton de Gruyter, 2000, pp. 213–260; Carlos Gussenhoven. *The phonology of tone and intonation*. Cambridge: Cambridge

troversial. In particular, Morén⁵⁸ treats both the Swedish and Norwegian tonal accents and the Danish *stød* as involving the top-down association of laryngeal activity with surface prosodic structure (see also Bruce Morén-Duolljá. “The prosody of Swedish underived nouns: no lexical tones required”. In: *Nordlyd* 40.1 (2013): *X Years of CASTL Phonology and L Years of Curtness*. Ed. by Sylvia Blaho, Martin Krämer, and Bruce Morén-Duolljá), while Köhnlein⁵⁹ offers an analysis of a West Germanic system along these lines.

In itself, the proposition that some of the tonal picture in Germanic derives from some sort of default assignment of tone associated with a relevant intonational structure is not entirely new: it is a staple of approaches that view the contrast between the two types of accents as privative⁶⁰. However, this top-down assignment of intonational tones at the higher levels of the prosodic hierarchy such as the Intonational Phrase is usually assumed to coexist with a lexical contrast in tonal melodies; disentangling the two is an important area of enquiry.⁶¹

By contrast, approaches such as those of Morén-Duolljá⁶² and Köhnlein⁶³ imply that also the lexically specific contours derive not from tonal contrasts but rather via general algorithms regulating the assignment of tones at lower levels of the hierarchy such as the foot or even the mora. For example, Köhnlein⁶⁴ treats the contrast between “accent 1” and “accent 2” in the Arzbach dialect as one between monosyllabic binary feet, consisting of a single bimoraic syllable (H), and disyllabic uneven trochees (HL). He argues that the difference in tonal curves (in declarative contexts) derives from the fact that low tones are dispreferred on head morae. Given the foot structure he proposes for that dialect, either one or both of the morae in a stressed (bimoraic) syllable are treated as “head morae”, and this derives the pitch distinction. No storage of tone in the lexicon is required under this analysis, but foot structure must be specified (either as part of the underlying representation or through morphological processes).

This analysis allows Köhnlein⁶⁵ to combine completely general mechanisms for associating tone with prosodic structure and independently specified constituency, just as proposed by Ladefoged⁶⁶ for Scottish Gaelic. However, the case might still not be watertight, in that, as far as the data are described by Köhnlein,⁶⁷ there does not appear to be any non-tonal evidence corroborating the prosodic structure he proposes. In the next section I consider the data from the Breton dialect of Bothoa, where such evidence is available.

University Press, 2004; Jörg Peters. “Tone and intonation in the dialect of Hasselt”. In: *Linguistics* 46.5 (2008), pp. 983–1018 for West Germanic.

⁵⁸Bruce Morén. *Danish stød and Eastern Norwegian pitch accent. The myth of lexical tones*. Presentation at the 13th Manchester Phonology Meeting. 2003; Bruce Morén. “Using the prosodic hierarchy to account for North Germanic tones”. Presentation at the Workshop on the Prosodic Hierarchy, CASTL, University of Tromsø. 2008.

⁵⁹Köhnlein, “Rule reversal”.

⁶⁰See e. g. Lahiri, Wetterlin, and Jönsson-Steiner, “Lexical specification”, for an overview.

⁶¹E. g. Bruce, *Swedish word accent*; Gussenhoven and van der Vliet, “Tone and intonation in Venlo”.

⁶²Bruce Morén-Duolljá. “The prosody of Swedish underived nouns: no lexical tones required”. In: *Nordlyd* 40.1 (2013): *X Years of CASTL Phonology and L Years of Curtness*. Ed. by Sylvia Blaho, Martin Krämer, and Bruce Morén-Duolljá.

⁶³Köhnlein, “Rule reversal”.

⁶⁴Ibid.

⁶⁵Ibid.

⁶⁶Ladefoged, “Thoughts on syllables”.

⁶⁷Köhnlein, “Rule reversal”.

Celtic

In this section I sketch some relevant aspects of the prosodic system of the Breton dialect of Bothoa as described by Humphreys.⁶⁸ Specifically, I argue that the contrast between the two “accents” identified by Humphreys⁶⁹ is best analysed as a contrast between monopodal structures and structures specified as having two feet. Crucially, the behaviour of words showing the accent which I hypothesize to reflect the presence of two feet is completely in line with the behaviour of other words containing multiple feet in the language. For reasons of space and focus, I omit some of the detailed argumentation here; see Iosad⁷⁰ for a fuller account.

Apart from Scottish Gaelic, the Celtic languages are not generally associated with having “pitch accents”. Pitch plays an important role in the phonetic expression of stress in Welsh,⁷¹ and at least one scholar has proposed an extensive phonological analysis involving “tonemes”.⁷² However, the distribution of pitch in Welsh is not driven by lexical factors.⁷³ and thus it is not a “pitch accent” system: in terms of stress typology, Welsh exhibits a relatively orthodox system enforcing penultimate stress by default. Closely related to this fact is the restriction on weight: long vowels in Welsh are restricted to stressed syllables.

Bothoa Breton: the data

Breton is closely related to Welsh, and the stress system of many dialects is all but identical to the Welsh one, with consistent penultimate stress. A notable exception is found in the dialects found in the south-east of the Breton-speaking area (commonly called *Vannetais*). Stress in Vannetais dialects falls on the final syllable, and further developments of the Vannetais pattern are described by Jackson, Falc’hun, and Plourin.⁷⁴

The hamlet of Bothoa lies in the far east of the Breton-speaking region, near the border of what is traditionally considered to be Vannetais territory. For our purposes, the most interesting aspect of this variety is its prosodic system, which, unusually for Brythonic languages in general, puts relatively few restrictions on the distribution of stress and weight within words. In particular, Bothoa Breton allows more than one long vowel per word. In addition, the placement of stress is entirely lexical, and it is not tied to word edges: adding more syllables to a word within a paradigm does not lead to stress shift. Similarly, whereas in Welsh and many Breton varieties

⁶⁸Humphrey Lloyd Humphreys. *Phonologie et morphosyntaxe du parler breton de Bothoa en Saint-Nicolas-du-Pélem*. Brest: Emgleo Breiz, 1995.

⁶⁹Ibid.

⁷⁰Pavel Iosad. “Representation and variation in substance-free phonology: a case study in Celtic”. PhD thesis. Tromsø: University of Tromsø, 2012, §7.3.

⁷¹E. g. Briony Williams. “Pitch and duration in Welsh stress perception. The implications for intonation”. In: *Journal of Phonetics* 13.4 (1985), pp. 381–406.

⁷²Herbert Pilch. “Advanced Welsh phonemics”. In: *Zeitschrift für celtische Philologie* 34 (1975), pp. 60–102.

⁷³Ceinwen H. Thomas. “Welsh intonation: a preliminary study”. In: *Studia Celtica* 2 (1967), pp. 8–28; Martin Rhys. “Intonation and the discourse”. In: *Welsh phonology: Selected readings*. Ed. by Martin J. Ball and Glyn E. Jones. Cardiff: University of Wales Press, 1984, pp. 125–155.

⁷⁴Kenneth Hurlstone Jackson. *A Historical Phonology of Breton*. Dublin: Dublin Institute for Advanced Studies, 1967; François Falc’hun. *Perspectives nouvelles sur l’histoire de la langue bretonne*. Paris: Union générale d’éditions, 1981; Jean-Yves Plourin. “L’accentuation en Haute-Cornouaille et en bas-vannetais”. In: *La Bretagne Linguistique* 1 (1985), pp. 103–115.

long vowels may only appear in stressed syllables, in Bothoa Breton vowel length is essentially lexical: if a long vowel is present in the underlying representation of a morpheme, it will surface as long irrespective of whether it bears main stress.

Another important aspect of Bothoa Breton prosodic structure that appears deviant from a Celtic perspective is the fact that it allows more than one stress per word, i. e. it has both main and secondary stress. In principle, both short and long vowels may bear both types of stress, as the following examples illustrate:

- (16)
- | | | | |
|----|---------------|-----------------|-----------------|
| a. | [,by:'e:əw] | <i>bubezioù</i> | ‘saints’ lives’ |
| b. | [,fjy:'badər] | <i>skubadur</i> | ‘swept rubbish’ |
| c. | [,dis'pako] | <i>dispakañ</i> | ‘to unpack’ |

Finally, and most importantly for our purposes, Humphreys⁷⁵ describes the existence of a contrast between two classes of words in terms of their pitch patterns. In the normal case, stress in all-light disyllables falls on the initial syllable; phonetically, the initial syllable is the locus of both a pitch accent and increased duration. In a minority of lexical items, however, the vowels are said to be of about equal duration, and the second syllable hosts a significant rise in pitch “strikingly reminiscent of Welsh accentuation” (« [qui] rappelle d’une façon assez frappante l’accentuation du gallois »). Humphreys⁷⁶ writes the latter words as containing two stresses, reflecting an analysis that I will show to be essentially correct.

- (17)
- | | | | |
|----|-------------------------|---------------|----------|
| a. | Default accentuation | | |
| | [,paruz] | <i>parrez</i> | ‘parish’ |
| b. | Additional pitch accent | | |
| | [,da,vad] | <i>dañvad</i> | ‘ewe’ |

From now on, I will refer to words such as those in (17-a) as “single-peaked” words and to words such as those in (17-b) as “double-peaked”. In the remainder of this section I will show that Humphreys⁷⁷ is correct in identifying the source of the pitch accent as lexically stored prosodic structure, and more specifically as *foot structure*.

Bothoa Breton: the analysis

In order to establish the correctness of this hypothesis, we turn to a consideration of the behaviour of words in which the existence of multiple feet should be uncontroversial, namely those containing multiple stresses. The majority of such words fall into two categories: words with multiple long vowels and words with “stressed suffixes”. In the former case, the generalization is quite simple: all long vowels in Bothoa Breton bear (at least secondary) stress:

- (18)
- | | | | |
|----|---------------|------------------|-------------|
| a. | [,hy:'a:l] | <i>bual</i> | ‘hindrance’ |
| b. | [,zi:ʃa'ty:r] | <i>sinatur</i> | ‘signature’ |
| c. | [,ʃb:'di:ʒən] | <i>teod-ejen</i> | ‘plantain’ |

⁷⁵Humphreys, *Parler breton de Bothoa*.

⁷⁶Ibid.

⁷⁷Ibid.

In the latter case, Humphreys⁷⁸ identifies a class of suffixes that receive stress despite having a short vowel, as in the examples in (19).

- (19) Stressed affixes
- | | | | | |
|----|------|-----------------|--------------------|-----------------|
| a. | (i) | [ˈfj:b-aɔ̃] | <i>skubañ</i> | ‘to sweep’ |
| | (ii) | [ˌfj:ˈb-aɔ̃r] | <i>skubadur</i> | ‘swept rubbish’ |
| b. | (i) | [ˈdesk-o] | <i>deskiñ</i> | ‘study’ |
| | (ii) | [ˌdesˈk-aɔ̃ræz] | <i>deskadurezb</i> | ‘teaching’ |

If we follow the standard assumption that stress is the phonetic correlate of being the head of a foot, we can conclude that in Bothoa Breton multiple feet may have two sources: long vowels, where the rationale for foot-building is presumably phonological (the weight-to-stress principle), and lexical specification of suffixes for foot structure. For our purposes, the crucial fact is that whatever the sources of this foot structure are, main stress (i. e. the head foot of the word) is always the rightmost stress-attracting element, as can be confirmed by inspection of the relevant forms in Humphreys.⁷⁹

These data also show that the canonical foot type in Breton is the moraic trochee, i. e. either a (H) syllable (normally only long vowels count for weight) or a (LL) disyllabic sequence. Degenerate feet (i. e. those consisting of a single syllable with a short vowel) are also found in the language, albeit in strictly circumscribed conditions: they are never built by the phonological computation, but only preserved when they are part of the input to the phonological component, either because they are lexically specified (at the first cycle) or because they are output by a previous cycle.⁸⁰

With these findings in mind, we turn back to the contrast between single-peaked and double-peaked words. In describing double-peaked disyllables, Humphreys⁸¹ admits that the choice of writing them as [óð], with main stress preceding secondary stress, is essentially arbitrary, as the two syllables have similar levels of phonetic prominence (with pitch playing a prominent role in the expression of the contrast). However, he is consistent in writing the suffixed forms of double-peaked words with main stress on the second syllable:

- (20)
- | | | | | |
|----|------|-------------|-----------------|---------------|
| a. | (i) | [ˈdaˌvaɔ̃] | <i>dañvad</i> | ‘ewe’ |
| | (ii) | [ˌdaˈvaɔ̃w] | <i>deñved</i> | ‘sheep (pl.)’ |
| b. | (i) | [ˈlaˌgaɔ̃] | <i>lagad</i> | ‘eye’ |
| | (ii) | [ˌlaˈgaɔ̃n] | <i>lagadenn</i> | ‘bud’ |

This “flip” can be explained if we assume that the relevant lexical items are in fact stored with foot structure: thus, EWE is stored as / $(da)_{Ft}(vad)_{Ft}$ /. According to Humphreys,⁸² words pronounced in isolation tend to have a rising intonation, with an especially abrupt rise on the final syllable. This seems to indicate a H% or LH% boundary tone on some prosodic constituent (since no data are provided on phrase-level intonation, it is difficult to identify which level of the prosodic hierarchy introduces this tone). If we also assume that foot heads may be associated with some pitch accent,

⁷⁸Humphreys, *Parler breton de Bothoa*.

⁷⁹Ibid.

⁸⁰See Iosad, “Representation and variation”, §7.3.2 for detailed argumentation to this effect.

⁸¹Humphreys, *Parler breton de Bothoa*.

⁸²Ibid., p. 66.

we can expect that unsuffixed forms such as [ˈda,vaŋ] with two degenerate feet, when pronounced in isolation, will show extensive tonal specification. This will be particularly true of the final syllable in double-peaked words, which will host both the tone associated with foot heads and the boundary tone(s) of the higher-level constituents, explaining the “Welsh-like” abrupt rise.

In suffixed forms of the relevant words, there is enough segmental material to build a binary foot for the second stress, resulting in a pattern which is more readily recognizable as similar to main stress in other words with multiple stresses such as those in (19). Crucially, these suffixed forms show the same right alignment of main stress as that seen in the language otherwise. Moreover, the consistent right-headedness in such words finds a parallel in the behaviour of “stressed affixes”: almost all affixes identified by Humphreys⁸³ as consistently attracting main stress from a long vowel (as in (19)) are at least two morae long (i. e. they contain at least two syllables with short vowels or a long vowel).

This evidence allows us to conclude that the “pitch accents” identified in the Bothoa dialect of Breton by Humphreys⁸⁴ are highly likely to be artefacts of lexical specification of prosodic structure coupled with general mechanisms for the assignment of tone: essentially the same analysis as that proposed in section 2 for Scottish Gaelic. In the next section I briefly describe the possible origins of the Bothoa prosodic system.

Bothoa Breton: the history

The pattern in Bothoa Breton is interesting not just synchronically, but also with respect to its origins. Common to Scottish Gaelic, North Germanic, and West Germanic systems discussed above is the historical relationship between exceptional prosodic structure and (apparent) changes in syllable count. In Scottish Gaelic, the appearance of a “pitch accent” contrast is at least partially due to the rise of apparently disyllabic words through epenthesis. In North Germanic, the rise of pitch accents has been variously related to epenthesis in previously monosyllabic words⁸⁵ or to syncope.⁸⁶ In West Germanic the rise of the pitch accent is clearly related to apocope and the (partial) neutralization of a contrast between disyllabic and monosyllabic forms in the direction of the latter.⁸⁷ The origin of the Bothoa Breton pattern is also related to changes in syllable count, being to a scenario that is fairly similar to that proposed for North Germanic by Riad.^{88,89}

As briefly discussed above, Bothoa Breton shares many properties with the Vannetais dialects spoken in the south-east of the Breton-speaking area. Among the peculiar features of these dialects is final stress. However, this system has undergone a number of further developments.⁹⁰ Among these, of particular interest to us are stress retraction and syncope.

⁸³Humphreys, *Parler breton de Bothoa*.

⁸⁴Ibid.

⁸⁵E. g. Magne Oftedal. “On the origin of the Scandinavian tone distinction”. In: *Norsk tidsskrift for sprogvidenskap* 16 (1952), pp. 201–225.

⁸⁶Riad, “Origin”.

⁸⁷Gussenhoven, “Origin and development”; Carlos Gussenhoven. *The phonology of tone and intonation*. Cambridge: Cambridge University Press, 2004; Köhnlein, “Rule reversal”.

⁸⁸Riad, “Origin”.

⁸⁹Thanks to an anonymous reviewer for highlighting this similarity.

⁹⁰Falc’hun, *Perspectives*; Plourin, “L’accentuation”.

First, Falc’hun⁹¹ notes a number of examples of trisyllabic words with initial stress, as in *hwérezet* ‘sisters’ instead of the expected *hwerezét*. He interprets this in terms of a secondary stress appearing in order to repair the initial lapse (sequence of unstressed syllables) and then taking over as the main stress in the word: $\sigma\sigma\acute{\sigma} \rightarrow \acute{\sigma}\sigma\acute{\sigma} \rightarrow \acute{\sigma}\sigma\sigma$. A second development found in Vannetais dialects that are affected by this retraction is syncope, i. e. deletion of medial syllable: *hwérezet* or *hwárrzet* ‘sisters’.

Bothoa Breton appears to have partaken of at least some of these developments: as recorded by Humphreys,⁹² the plural of ‘sister’ in the dialect is [‘hwɛ:rzəð] (or [‘hwɛ:rəzəð]). Neither process is completely regular in this variety: as discussed above, stress in Bothoa Breton is relatively free (or at least not fixed on the initial syllable), whereas syncope appears to be a variable process that has not yet been completely phonologized.⁹³ Nevertheless, it appears plausible that the ultimate source of the “two degenerate feet” pattern is the historically intermediate representation $\acute{\sigma}\sigma\acute{\sigma}$ hypothesized by Falc’hun.⁹⁴ The structure can be derived if we assume that the correct foot structure in this case was $(\acute{\sigma}\sigma)(\acute{\sigma})$. Following syncope, which affected the weak branch of the initial foot, the foot structure itself could remain intact, giving $(\acute{\sigma})(\acute{\sigma})$. This development is similar to that hypothesized for Proto-Nordic by Riad,⁹⁵ who suggests syncope in $(\acute{H}L)(\acute{H})$ structures created a suboptimal $(\acute{H})(\acute{H})$ configuration with stress clash. The difference between Bothoa Breton and Proto-Nordic under this interpretation is that the former tolerates the clash and treats both syllables as metrically strong positions, as suggested above, while in Proto-Nordic the stress clash was removed by reinterpreting the second pitch peak as a lexical tone associated with the initial syllable (HL*+HL) rather than as a way to mark an ictus.

In the particular case of Bothoa Breton, it is clear that the words exhibiting the “double-peaked” pattern do not necessarily go back to historical trisyllables: in this class, we find both historical disyllables ([‘da,vəð] ‘ewe’, Welsh *dafad*) and what are obviously recent borrowings such as [‘las’tikən] ‘rubber band’ (French *élastique*). Nevertheless, I suggest that historically the double-peaked accent must represent a Breton-internal development, probably with a role for dialect contact. While I cannot speculate on the precise sequence of events in the specific case of the Bothoa dialect, it appears quite likely that the ultimate origin of the pattern with two degenerate feet still lies within the prosodic system of Breton itself rather than in contact with some other language. Thus, a system of tones marking (sometimes lexically determined) prosodic constituents can arise in Celtic without an external influence.

5 Reconsidering contact between Nordic and Gaelic

In this paper I have argued that the “pitch accent” system described for some Scottish Gaelic dialects is best viewed as the outcome of a combination of two distinct patterns, namely the existence of lexically specified prosodic structure and general rather than lexically specific mechanisms for the assignment of tone. I have also shown that both of these features are independently attested

⁹¹Falc’hun, *Perspectives*, pp. 271 *sqq.*

⁹²Humphreys, *Parler breton de Bothoa*.

⁹³See Iosad, “Representation and variation”, for details.

⁹⁴Falc’hun, *Perspectives*.

⁹⁵Riad, “Origin”.

in various branches of Celtic. This claim undermines the otherwise plausible suggestion by scholars such as Borgström⁹⁶ that the “pitch accents” of Scottish Gaelic are, like other features of the Scottish Gaelic sound system,⁹⁷ the outcome of contact with North Germanic languages.

We can take as our starting points the criteria for the plausibility of a contact explanation identified by Thomason⁹⁸ as follows:

1. The existence of contact between the two languages;
2. Diverse shared features in the two languages, preferably from at least two different subsystems;
3. The existence of the shared feature(s) in the “source” language prior to contact;
4. The absence of the shared feature(s) in the “recipient” language prior to contact.

The first criterion is unproblematic, as contact between Goidelic and North Germanic speakers is amply documented by historical and literary sources⁹⁹ and supported by the existence of numerous North Germanic loanwords in Scottish Gaelic¹⁰⁰¹⁰¹ and by genetic studies.¹⁰² The existence of shared features appears uncontroversial, although, interestingly, they are largely concentrated in the sound system: North Germanic is not commonly assumed to have contributed to either the morphology or the syntax of the Goidelic languages in a meaningful way.¹⁰³

The existence of lexically specific pitch accents in North Germanic in the relevant period is more problematic. Although most continental North Germanic languages all have either “pitch accent” or pitch accent-like phenomena such as *stød*, it is notably absent in the insular languages Icelandic and Faroese (it is probably not knowable where it was found in Norn), which makes it uncertain whether the dialects spoken by the North Germanic inhabitants of the British Isles possessed the distinction. On the other hand, at least in the case of Icelandic, it appears possible that Old Norse syllable counts did survive for some time after epenthesis disrupted them, and it is possible that the distinction was expressed by pitch movements.¹⁰⁴ Moreover, it has been

⁹⁶Borgström, “Influence of Norse”.

⁹⁷Marstrander, “Okklusiver og substrater”; Gunnar Ólafur Hansson, “Remains of a submerged continent: preaspiration in the languages of Northwest Europe”.

⁹⁸Sarah G. Thomason. *Language contact: an introduction*. Edinburgh: Edinburgh University Press, 2001; Sarah G. Thomason. “Contact explanations in linguistics”. In: *The handbook of language contact*. Ed. by Raymond Hickey. Oxford: Blackwell, 2010, pp. 31–47.

⁹⁹E. g. Alex Woolf. *From Pictland to Alba. Scotland, 789–1079*. New Edinburgh History of Scotland 2. Edinburgh: Edinburgh University Press, 2007.

¹⁰⁰Lexical borrowing in the other direction appears more limited, with a concentration in personal names and (especially in the case of Iceland and the Faroe Islands) toponyms.

¹⁰¹E. g. Stewart, “Lexical imposition”.

¹⁰²E. g. Agnar Helgason et al. “Estimating Scandinavian and Gaelic Ancestry in the Male Settlers of Iceland”. In: *The American Journal of Human Genetics* 67.3 (2000), pp. 697–717.

¹⁰³cf. Joseph F. Eska. “Contact and the Celtic languages”. In: *The handbook of language contact*. Ed. by Raymond Hickey. Oxford: Blackwell, 2010, pp. 539–549.

¹⁰⁴E. g. Kjartan G. Ottósson. “Indicier på tonaccentdistinktion i äldre isländska”. In: *Íslenskt mál* 8 (1986), pp. 183–190; Klaus Johan Myrvoll and Trygve Skomedal. “Tonelagsskilnad i isländsk i Tredje grammatiske avhandling”. In: *Maal og Minne* 2010/1 (2010), pp. 68–97; Haukur Þorgeirsson. “Hljóðkerfi og bragkerfi í íslenskum kveðskap fyrr á öldum”. PhD thesis. University of Iceland, in preparation.

proposed¹⁰⁵ that the tonal specifications themselves, if not necessarily the pitch accent system as we know it, go back to Proto-Nordic, in which case the problem disappears.¹⁰⁶

However, this paper does cast doubt on whether the fourth criterion is in place for contact between Gaelic and North Germanic. If the analysis presented in section 2 is correct, Gaelic “pitch accents” must have arisen in connection with the appearance of epenthesis and the deletion of voiced fricatives which swelled the ranks of “hiatus words”.¹⁰⁷ In terms of dating, both of these processes would appear to be roughly contemporaneous with the rise of “lexical” pitch accents and *stød* in most of North Germanic (after about 1100). Essentially, the *precursors* for pitch accents as they appear in contemporary Scottish Gaelic (that is, the tones associated with the relevant prosodic constituents) were plausibly present at an early stage and do not need a contact explanation.

This does not mean that I necessarily advocate the internal explanation *over* the one based on contact. As emphasized by Thomason,¹⁰⁸ multiple causation of language change is an extremely frequent phenomenon. Given the close similarity and rough contemporaneity of the appearance of lexically specific “pitch accents” in Gaelic and North Germanic, it is not at all implausible that the developments were parallel in the two languages, and perhaps reinforced by this closeness.

Gauging the probability of each scenario requires a better understanding of the historical circumstances of the contact (which is unfortunately quite difficult¹⁰⁹) to reach a better understanding of the sociolinguistic setting.¹¹⁰ It has often been assumed that the contact-based features of Scottish Gaelic such as preaspiration and “pitch accent” are due to language shift from Norse to Gaelic; this is also the conclusion of the study of lexical borrowings by Stewart.¹¹¹ There are some weaknesses in this approach, however. First, the status of contact as the source of preaspiration has also been put into doubt, on the basis of both phonetic¹¹² and dialectological¹¹³

¹⁰⁵See especially Riad, “Origin”; Tomas Riad. “Diachrony of the Scandinavian accent typology”. In: *Development in prosodic systems*. Ed. by Paula Fikkert and Haike Jacobs. Studies in Generative Grammar 58. Berlin: Mouton de Gruyter, 2003, pp. 91–144.

¹⁰⁶Although see e.g. Patrik Bye. “Mapping innovations in North Germanic using GIS”. in: *Oslo Studies in Language* 3.2 (2011): *Language variation infrastructure*. Ed. by Janne Bondi Johannessen, pp. 5–29, for a different view.

¹⁰⁷Some of the “hiatus words” were in fact disyllabic in Old Irish, e.g. *fiach* ‘raven’ with hiatus vs. *fiach* ‘obligation’ with a diphthong. It appears impossible to determine whether this contrast was implemented (primarily) by pitch in Old Irish, although presumably pitch at least participated in its expression.

¹⁰⁸Thomason, *Language contact: an introduction*; Thomason, “Contact explanations in linguistics”.

¹⁰⁹Woolf, *Pictland to Alba*.

¹¹⁰See e.g. Peter Trudgill. “Contact and sociolinguistic typology”. In: *The handbook of language contact*. Ed. by Raymond Hickey. Oxford: Blackwell, 2010, pp. 299–319; Peter Trudgill. *Sociolinguistic typology. Social determinants of linguistic complexity*. Oxford: Oxford University Press, 2011, on its importance.

¹¹¹Stewart, “Lexical imposition”.

¹¹²Dónall P. Ó Baoill. “Preaspiration, epenthesis and vowel lengthening: interrelated and of similar origin?” In: *Celtica* 13 (1980), pp. 79–108; Ailbhe Ní Chasaide. “Preaspiration in phonological stop contrasts: an instrumental phonetic study”. PhD thesis. Bangor: University College of North Wales, 1986; Máirtín Ó Murchú. “Varia VIII. Devoicing and Pre-aspiration in Varieties of Scots Gaelic”. In: *Ériu* 36 (1985), pp. 195–198.

¹¹³Ruibéard Ó Maolalaigh. “The sound of silence. Some structural observations on preaspiration in Scottish Gaelic”. In: *Bile ós chrannaibh: a Festschrift for William Gillies*. Ed. by Wilson McLeod et al. Ceann Drochaid: Clann Tuirc, 2010, pp. 365–404.

evidence. Second, contrary to the conclusions of Stewart,¹¹⁴ Cox¹¹⁵ suggests that the pattern of Norse lexical borrowings in Gaelic indicates prolonged contact rather than abrupt language shift. Third, despite claims by earlier scholars such as Oftedal¹¹⁶ that Norse predominates in Hebridean toponymy, Cox¹¹⁷ argues that these numbers are significantly overestimated; this could also constitute evidence against the language-shift approach to contact between Norse and Gaelic.

Thus, it is clear that further study is required to determine the type and scenario of language contact between Norse and Gaelic in Scotland. In this paper, I have shown that despite some compelling synchronic and diachronic similarities between the “pitch accent” systems of North Germanic and Gaelic, the hypothesis that their ultimate cause lies in contact should not be taken for granted.

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¹¹⁴Stewart, “Lexical imposition”.

¹¹⁵Richard A. V. Cox. “Faclan-iasaid às an Lochlannais ann an Gàidhlig na h-Albann”. In: *Cànan & Cultar / Language & Culture: Rannsachadh na Gàidhlig* 4. Ed. by Gillian Munro and Richard A. V. Cox. Edinburgh: Dunedin Academic Press, 2010, pp. 1–6.

¹¹⁶Oftedal, *Gaelic of Leurbost*.

¹¹⁷Richard A. V. Cox. *The Gaelic place-names of Carloway, Isle of Lewis. Their structure and significance*. Dublin: Dublin Institute for Advanced Studies, 2002.

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