A metrical analysis of Scottish Gaelic tonal accent

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1   Introduction

1.1   The background

- Most Gaelic varieties distinguish between:

    - Historical disyllables and svarabhakti words: *balach* ≠ *balg*
    - Historical long vowels/diphthongs and hiatus sequences: *fitheach* ≠ *fiach*

- The contrast has long been recognized as akin to 'tonal' accent contrasts in North and West Germanic (Borgstrøm 1937, 1974, Macaulay 1993, Ternes 1980, 2006)
- More recently, Smith (1999) and Iosad (2015) have analysed svarabhakti vowels as phonologically inert
- This analysis has problems

1.2   The analysis: foot structure

- Here, I argue that Gaelic 'tonal' contrasts are best analysed by appeal to *foot structure*
- Largely in agreement with the recent analysis by Morrison (2018), I analyse svarabhakti words / old monosyllables as *monosyllabic feet* and old disyllables / hiatus words as *disyllabic feet*
- I suggest that Morrison (2018) may overstate the synchronic productivity of svarabhakti, which he analyses as a synchronic word-level rule
- Both analyses bring Gaelic in line with recent analyses of 'tonal' accents in Germanic (Morén-Duolljá 2013, Köhnlein 2016, 2018, Iosad 2016), and offer general support for the metrical approach due to the extensive non-tonal evidence in Gaelic

2 Background

2.1 Basic facts

- 'Tone 1' words:

  - Historical disyllables: *ballag* < Old Gaelic *ballóc*, *balach* < *bachlach*
  - Words with hiatus sequences
    * Historical hiatus: *fitheach* < *fïach*, *latha* < *laa*, *adha* < *áe*
    * Hiatus from fricative deletion: *dubhan* < *dubán*, *bodha* < Old Norse *boði*

- 'Tone 2' words:

  - Svarabhakti words: *balg* < *bolg*, *dearg* < *derg*
  - Old long vowels and diphthongs: *bò* < *bó*, *duan* < *dúan*

2.2 Realizations: the traditional descriptions

- Lewis (Oftedal 1956, Ladefoged et al. 1998):

  - Accent 1 = rise-fall
  - Accent 2 = rise

- Applecross (Ternes 2006)

  - Accent 1 = rise-fall, normal length in unstressed vowel
  - Accent 2 = 'wavy contour' (fall-rise-fall), overlength in unstressed vowel

- Skye (Hammond et al. 2014): svarabhakti words have later peak placement
- Barra (Bosch & de Jong 1997): svarabhakti words have longer unstressed vowels
- Argyll (Holmer 1938, Jones 2006, Scouller 2017)

  - Accent 1: glottalization
  - Accent 2: no glottalization

2.3 Previous analyses

- Borgstrøm (1937), Oftedal (1956): syllabification

  - *aran* [a.ran] vs. *arm* [ar.am]
  - Hiatus ('glottal catch [or] break in the tension of the muscles'): *rathad* [Ra-ad]

- Ternes (1973): 'tone 2' words have overlong vowels / long diphthongs

  - *aran* [aran] vs. *arm* [ara·m]
  - *bodha* [poːˑ] vs. *bò* [poː]

- Macaulay (1993): tonal distinction (of unclear nature)
- Bosch & de Jong (1997): svarabhakti vowels are stressed

  - *aran* ['ɑRɑn] vs. *aram* [ɑ'Rɑm]

– Endorsed by Brown (2009)

- Smith (1999): 'accent 2' words build recursive syllables

3   Reconsidering inertness

3.1   The inertness of svarabhakti vowels

- Both Smith (1999) and Iosad (2015) focus on patterns where svarabhakti vowels are *immune* to phonological processes

    – (Relatively) inert in syllabification intuitions (Borgstrøm 1937, Hammond et al. 2014)
    – Inert in poetic metre
    – Not visible in slenderization: [pʊlʲʊkʲ] *builg* from [paLak], not *[paLɪkʲ]
    – Apparently immune to syncope: [vaLaxu] *(a) bhalachaibh*, not *[valxu]
    – Do not undergo vowel reduction

- Iosad (2015) argues this means svarabhakti vowels are phonologically invisible

3.2   The problem with inertness

- This account is not tenable synchronically for modern varieties
- If svarabhakti vowels are not phonological, they must belong to a different component of the grammar, presumably phonetics
- Under strong theories of the phonology-phonetics interface, the prediction is that svarabhakti is entirely *transparent* on the basis of surface phonology
- Svarabhakti should be triggered *if and only if* the conditions are met

    – The conditions are 'between a sonorant and a non-homorganic consonant, except when the consonant is a fortis stop /p t k/, or the preceding vowel is long'

- This is incorrect

3.3   Overapplication of svarabhakti

- Data here from Wentworth (2005)
- Before fortis stops: [kʰ˞aLa˞ʰpə] *calpa*, [m˞ūluʰ˞kʲiNʲ] 'sleeve' for *muinchill*, [kʰ˞aRa˞ʰkɔx] *cairrceach*, [p˞ɪrʲɪ˞ʰkək] *birceadh*

    – Quite regular with *-te* forms: [m˞ɔ́Lɔ˞ʰtʃə] *mallaichte*, [kʰ˞ɤrʲɤ˞ʰptʃə] *coirbte* 'awkward', [kʰ˞ūmu˞ʰtʃə] *cuimte* 'well-shaped' &c.
    – Often supported by alternations: [m˞aRa˞ʰtʃɔx] *marbhteach*, cf. [m˞aRa˞v] *marbh* with transparent svarabhakti

- Homorganic consonants: [tʰ˞ɔRɔ˞ʃkʲin] *toirsgian*, [tʰ˞aRa˞Nʲəs] *tairrneas*, [tʃ˞aLa˞rək] *dealradh*
- Before a deleted consonant: [f˞ɔLɔ˞] *falbh*, [f˞ɔLɔ˞u mi] *falbhaidh mi*; [˞orʲi˞] *oirbh*

- – Can be supported by alternations: [k̟ɑRɑ̩v] *garbh*, [k̟ɑrʲi̩] *gairbh*, [k̟ɑrʲɑ̩i] *(nas) gairbhe*
  - – Or at least recoverable: [f̟urʲu̩i mi] *fuirichidh mi*, cf. [furʲixʲ] *fuirich*
- After obstruents: [h̟ɑpɑ̩tʃixʲəs] *shabaidicheas*

- In glottalizing dialects, we get exceptional lack of glottalization in similar contexts:
  - – [mɑRixʲ] *marbhaidh*, corresponding to tonal dialects' [m̟ɑrɑ̩i]

3.4 Underapplication of svarabhakti

- In dialects where Old Gaelic *cc* is realized as [xk], svarabhakti can fail: [ɔlxk] *olc* (*[̩ɔLɔ̩xk]), e.g. Borgstrøm (1937)

3.5 Why is this problematic?

- In the analysis by Iosad (2015), the presence and quality of svarabhakti vowels should derive solely from the properties of *surface* phonological forms
  - – No account for overapplication: why not *[fɑLi] for *falbhaidh*?
  - – No account for underapplication: why not *[̩ɔLɔ̩xk] for *olc*?
  - – No account for non-echo vowels: why [k̟ɑrʲi̩] for *(nas) gairbhe*?

4 The derivation of svarabhakti

4.1 Historical explanation

- The background here is clear: e.g., svarabhakti precedes consonant deletion, but follows slenderization
- So *garbi* > *gairb* > *gair*[i]*b* > [k̟ɑrʲi̩]

4.2 Derivation: a way out?

- A synchronic analysis can recapitulate the history with rule ordering
- Cf. Ó Siadhail & Wigger (1975) for Irish, Clements (1986); Morrison (2018) for Gaelic
- Morrison (2018) analyses the facts in Stratal OT
  - – Slenderization and weight-by-position for sonorants at the stem level
  - – *balg* is [p[ɑ]$_\mu$[lk]$_\mu$], *builg* is [p[u]$_\mu$[lʲkʲ]$_\mu$]
  - – Svarabhakti occurs at the word level, preserving the bimoraic syllable
  - – *balg* is now [p[ɑl]$_\mu$[ak]$_\mu$], *builg* is [p[ulʲ]$_\mu$[ukʲ]$_\mu$]
- With extra assumptions, this analysis extends to at least some exceptional cases
  - – /fɔlv-i/ *falbhaidh* > stem-level [f[ɔ]$_\mu$[lv]$_\mu$]+i > word-level [f[ɔl]$_\mu$[ɔ]$_\mu$vi] > postlexical deletion [f[ɔl]$_\mu$[ɔ]$_\mu$i]

4.3   Additional data to consider

- This is a very elegant analysis, but sometimes it stretches the boundaries of the evidence available to the learner
- Notably, it relies on svarabhakti deriving from underlying clusters, raising some problems

  - Svarabhakti unsupported by alternation evidence: *toirsgian, oirbh*
  - Phonologically irregular svarabhakti: *shabaidicheas, chunnacas*

- It has nothing to say about the tonal or segmental realization of the contrast
- It would be strengthened with non-tonal evidence for metrical structure

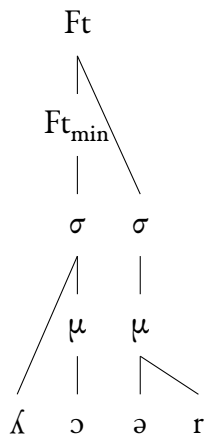# 5   A metrical analysis

5.1   Foot structure: accent 1

- Accent 1 is a monosyllabic foot
- Disyllables with accent 1 show foot adjunction

(1)   *ballag* with recursive footing
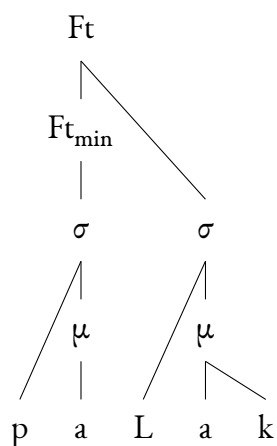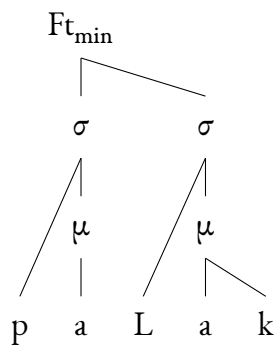

- Same structure for hiatus words

(2) *leabhar* with recursive footing

```
              Ft
              ╱╲
         Ftₘᵢₙ  ╲
            │    ╲
            σ    σ
           ╱│    │
          ╱ μ    μ
         ╱  │    ╱╲
        ʎ   ɔ   ə  r
```
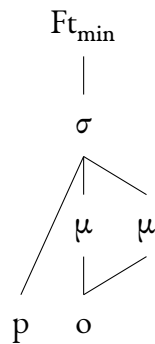
5.2   Foot structure: accent 2

- Accent 2 is a regular bimoraic (LL) trochee
- Without foot recursion, this foot is also *minimal*

(3) *balg* in a bimoraic foot

```
          Ftₘᵢₙ
          ╱‾‾╲
         σ    σ
        ╱│   ╱│
       ╱ μ  ╱ μ
      ╱  │ ╱  ╱╲
     p   a L  a  k
```

- Long vowels are regular (H) moraic trochees

(4) *bò* in a bimoraic foot

```
          Ftₘᵢₙ
            │
            σ
           ╱╲
          ╱ μ μ
         ╱  ╲╱
        p    o
```

6

5.3   Which is the marked structure?

- For the *bodha/bò* contrast, it is easier to assume accent 1 is marked

    – Unusual foot structure follows from the storage of syllable structure

- For the *ballag/balg* contrast, this has the admittedly strange consequence that the marked structure is much more common/productive

5.4   Restrictions on svarabhakti

- Svarabhakti is not found after a heavy syllable because it would require a (non-recursive) uneven trochee $(HL)_{Ft}$
- There are *no* (synchronic) restrictions on vowel quality in svarabhakti:

    – Any consonant can be found foot-medially
    – More combinations of vowels than predicted by existing accounts

5.5   Tonal placement

- Brown (2009) is the most detailed study of Gaelic intonation
- Ness Gaelic intonation: L* pitch accent, H* focus tone and L% boundary tone
- In her analysis, L* goes on the stressed vowel (svarabhakti vowel) and focus H goes on the following unstressed syllable

    – Basically, 'accent 1' has a steeper fall and a shallower rise than 'accent 2': low tone timed earlier

- This translates as 'aligned to the right in the minimal foot'
- The generalization is lost in the analysis by Morrison (2018), where this site has no special status

5.6   No need for abstract segments

- Svarabhakti in *toirsgian, oirbh could* be analysed with an abstract underspecified segment [Clements (1986); Donald Morrison p.c.]
- The abstract segment cannot be *entirely* empty:

    – It needs to be visible in syllabification (Iosad 2015)
    – It needs to be non-homorganic to the preceding consonant to trigger svarabhakti
    – Admittedly the evidence for the homorganicity condition in Gaelic is very eroded due to vowel lengthening

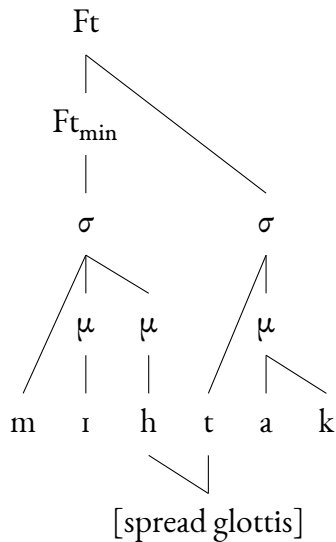- In the proposed analysis, the abstract segment is unnecessary

(5) *oirbh* with a disyllabic foot

```
                Ft
               /\
              /  \
            σ      σ
            |     /|
            μ    / μ
            |   /  |
            ɔ   rʲ  i
```
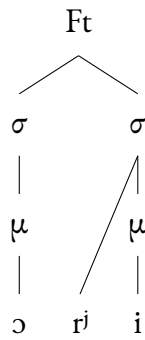
5.7   No evidence for disyllabic feet

- Morrison (2018) crucially relies on accent 1 words having disyllabic feet
- This follows from his definition of headedness, following Köhnlein (2016)
- Not clear what the evidence is *for* disyllabic feet in accent 1 words
- On the basis of the distribution of preaspiration, Iosad, Ramsammy & Honeybone (2015) suggest that in dialects other than Lewis 'accent 1' words like *miotag, bàta, lùdag* have monosyllabic bimoraic feet

(6) *miotag* with segmental preaspiration

```
                Ft
               /|
              / |
           Ft_min
              |   \
              σ     σ
             /|    /|
            / μ μ / μ
           /  | | /  |\
          m  ɪ h t a  k
              _____/
            [spread glottis]
```
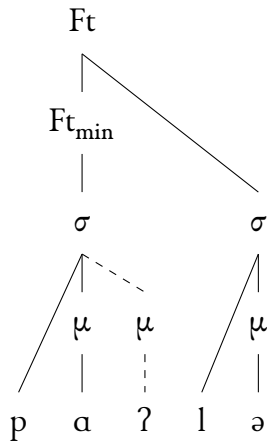
- In the current analysis, they are bimoraic *minimal* feet
- In the analysis by Morrison (2018), the foot is a syllabic trochee, which is not easily reconcilable with lenition evidence (Iosad, Ramsammy & Honeybone 2015)

8

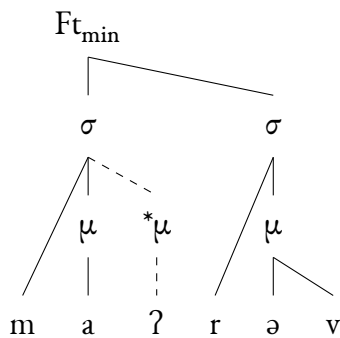## 5.8   More on disyllabic feet: Argyll glottalization

- Argyll glottalization further supports the recursive ((H)L) trochee in the postlexical phonology
- MAIN-TO-WEIGHT effect targeting the (main) stressed syllable (McGarrity 2003, Bye & de Lacy 2008, Iosad 2015)
- Accent 1 words can have an additional mora because they have space in the main stress foot

(7)   *baile* with glottalization

$$
\begin{array}{c}
\text{Ft} \\
\text{Ft}_{\text{min}} \\
\sigma \qquad \sigma \\
\mu \quad \mu \qquad \mu \\
\text{p} \quad \text{ɑ} \quad \text{ʔ} \quad \text{l} \quad \text{ə}
\end{array}
$$

- Glottalization in accent 2 words would create a trimoraic minimal foot

(8)   No glottalization in *marbh*

$$
\begin{array}{c}
\text{Ft}_{\text{min}} \\
\sigma \qquad \sigma \\
\mu \quad {}^{*}\mu \qquad \mu \\
\text{m} \quad \text{a} \quad \text{ʔ} \quad \text{r} \quad \text{ə} \quad \text{v}
\end{array}
$$

- [Addendum after the conference:] Donald Morrison (p. c.) points out that Argyll glottalization does not occur before |spread glottis| fricatives, so this analysis of glottalization as a straightforward MAIN-TO-WEIGHT effect is at least incomplete, and possibly incorrect

5.9 Non-echo vowels

- Forms such as [k̪ɑrʲiˌ] for *(nas) gairbhe* create additional difficulties in accounting for the quality of the vowel
- Lexical storage easily accommodates vowel mismatch

6 Further consequences of the analysis

6.1 Trade-offs

- The analysis of svarabhakti vowels as underlyingly present undermines two key arguments of Iosad (2015)

  – Invisibility in slenderization
  – Interaction with syncope

6.2 Svarabhakti and slenderization

- If the vowels in *balg* [p̪aLaˌk] and *builg* [p̪ulʲuˌkʲ] are stored rather than derived, they cannot be invisible
- Two alternatives:

  – Storage with an empty syllabic position (e.g. Köhnlein 2016): [p̪aL_ˌk]
  – Vowel slenderization is itself due to lexical storage

- Iosad (2015) analyses slenderization as affecting coda consonants in the first instance: *òr* but *òir*
- Are vowel changes an automatic consequence of consonant slenderization?
- This is a common analysis for Irish (e.g. Ó Siadhail & Wigger 1975, Ó Siadhail 1989, Ní Chiosáin 1991, Ó Maolalaigh 1997), and cf. McConville (2013) and Morrison (this conference) for Gaelic

  – The Gaelic slenderization patterns are highly irregular and could be morphological? Admittedly an *argumentum ad ignorantiam*
  – There is some evidence that the vowel patterns are stem-level in Irish (Iosad & Ní Chiosáin 2016)

- Either conclusion is compatible with stem-level storage of foot structure

6.3 Hiatus and syncope

- For Iosad (2015), hiatus words like *leabhar*, *bodha* must have stored syllable structure, because the default prosodic parse is a long vowel / diphthong
- Cf. alternations like *leabhar* [L̪ɔːˌr] with stored hiatus / accent 1 ∼ *leabhraichean* [L̪ɔːrɪxʲən] with default long vowel / accent 2
- Potentially awkward deletion of the stored second syllable node

- However, the best analysis of syncope *may* be stem-level allomorphy anyway (Donald Morrison p.c.)
- This makes sense because 'syncope' in *leabhraichean* &c is historically mostly reversed epenthesis, now unmotivated after the loss of the intervocalic consonant
- There is no synchronic across-the-board syncope in Gaelic: *rannsachadh*, **rannschadh*

7   Conclusion

7.1   Metrical approaches to Gaelic accent

- The analysis proposed here expresses fundamentally the same insight as Morrison (2018):
  - Accent 1 (non-svarabhakti disyllables / hiatus words) reflects a disyllabic constituent
  - Accent 2 (svarabhakti words / words with long vowels and diphthongs) reflects a monosyllabic constituent

- The historical rationale for this consilience is clear
- Important to verify that it works also synchronically
- Scottish Gaelic is not a 'tonal language' in the sense that we need no recourse to lexical tonal differences ('contrastive tone', following Ternes 2006) to derive the two accent classes

7.2   The theoretical importance of Gaelic accents

- Gaelic is typologically important because it provides arguments for the viability of a metrical approach to 'tonal accents'

  - The analysis should extend to varieties with different intonational systems (cf. Lewis vs. Applecross; Ternes (2006))
  - Gaelic provides a rich seam of material to develop a unified approach to 'tonal accents' and segmental phenomena, which is difficult with a purely tonal approach

- The approach offered here is less restrictive than that of Morrison (2018), but may have better empirical coverage outside Lewis
- Much work remains to be done

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