A metrical approach to ternarity in Northern European accentual contrasts

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The empirical domain

Accentual systems in Northern Europe

> Ebenso bilden die Sprachen des Baltikums einen Sprachbund, den die *Polytonie* kennzeichnet; hierher gehören: das Schwedische, das Norwegische […], die meisten dänischen Dialekte, einige norddeutsche Mundarten, das Nordkaschubische, das Litauische und Lettische, das Livische und Estnische. In den meisten Sprachen und Mundarten dieses Bundes ist die *Tonverlaufkorrelation* und in den übrigen *ihre Abänderung, die Tonbruchkorrelation*, vorhanden.[1]

- To this we must add Franconian (West Germanic) and Scottish Gaelic[2]

[1] Roman Jakobson. 'Über die phonologischen Sprachbünde'. In: *Réunion phonologique internationale tenue à Prague (18–21/XII 1930)*. Travaux du Cercle Linguistique de Prague 4. Prague: Jednota československých matematiků a fysiků, 1931, pp. 164–183. *Selected writings*. Vol. 1: *Phonological studies*. 's Gravenhage: Mouton, 1962.

[2] Elmar Ternes. 'Scottish Gaelic phonemics viewed in a typological perspective'. In: *Lingua* 52.1–2 (1980), pp. 73–88.

North Germanic

- 'Accent 1' vs. 'accent 2': Norwegian *¹badet* 'bath-DEF' ≠ *²bade* 'bathe'
- Neutralized to accent 1 in monosyllables:[3] *¹bad* 'bath'
- Usually, but not necessarily, accent 2 in non-final syllables
- Massive structured variation in the specific pitch correlates

[3] Or, rather, final stressed syllables

West Germanic: Franconian

- Contrast in final and non-final syllables:
  - Mayen *¹šāl* 'scarf' ≠ *²šāl* 'stale'
  - Mayen *¹šal* 'cover' ≠ *²šal* 'sound'
  - Maastricht *¹spøːlə* 'rinse' ≠ *²spøːlə* 'play'
- Usually no contrast in CV([obstruent]) stressed syllables
  - Mayen *ˈzat* 'sated, full' vs. *¹šāt* 'pity' vs. *²štāt* 'stand.PRS.3SG'
- Some variation in the exact correlates ('Rule A' vs 'Rule B')

For an overview covering both North and West Germanic, see Björn Köhnlein. 'Tone accent in North and West Germanic'. In: *The Cambridge handbook of Germanic linguistics*. Ed. by Richard B. Page and Michael T. Putnam. Cambridge: Cambridge University Press, 2019, pp. 143–166

West Germanic: Low German

- Usually final syllables, MLG long vowels
  - *¹vīt* 'wide' ≠ *²vīd̥*/*²vīt* 'willow'
  - But no contrast in *vɪt* 'white'
- Realizations/correlates unclear/various
  - Tone/prosody ('accent')?
  - Length vs. overlength?
  - Vowel quality [vɪt] 'white' vs. [viː(ː)t] 'wide'/'willow'

Maike Prehn. 'Vowel quantity and the fortis-lenis distinction in North Low Saxon'. PhD thesis. Amsterdam: University of Amsterdam, 2012; Steffen Höder. 'Tonalität im nördlichen Niederdeutschen und in Skandinavien. Eine areale Perspektive'. In: *Niederdeutsches Jahrbuch* 143 (2020), pp. 49–67

Gaelic

Donald Alasdair Morrison. 'Metrical structure in Scottish Gaelic. Tonal accent, glottalisation and overlength'. In: *Phonology* 36.3 (2019), pp. 391–432

- Generally final/penultimate syllables
  - Historical long vowels/diphtongs vs. disyllables with hiatus: *¹bogha* 'bow' ≠ *²bò* 'cow'
  - Historical monosyllables with excrescent vowel vs. disyllables: *ballag* 'skull' [¹pałak] ≠ *balg* 'belly' [²pałak]
- No contrast in light monosyllables: *math* 'good'
- Various correlates
  - Tone/pitch: Lewis accent 1 'low + rise' vs. accent 2 'high + fall'
  - Glottalization (South Argyll)
  - Length vs. overlength? (Applecross)
  - Probably some combination of all three

Baltic

- Lithuanian: 'acute' vs. 'circumflex'
  - *šáukite* 'shoot-IMP.2PL' vs. *šaũkite* 'call-IMP.2PL'
- Usually interpreted as pitch: falling on acute, rising on circumflex
  - But also other cues, e.g. duration, vowel quality
  - Žemaitian acute: rising-falling pitch with glottalization
- Latvian: three[4] accents in main-stressed syllables
  - *mī̃t* 'exchange.INF' ≠ *mìt* 'live.PRS.3SG' ≠ *mît* 'tread.INF'
- Usually pitch + glottalization, but in various combinations depending on dialect
- Accent contrasts only in CVV or CV[sonorant] syllables
- Lithuanian *lùpa* 'peel.PRS.3SG' ('stress') vs. *lű́pa* 'lip' ('acute accent') vs. *lū̃žis* 'break' ('circumflex accent')

[4] Some dialects merge two of these, some have more than just these.

Danish

Hans Basbøll. *The phonology of Danish*. Oxford: Oxford University Press, 2005

- Stød, a laryngealization prosody
- Contrast in both final and non-final syllables:
  - *kol* 'coal' ≠ *kolˀd* 'cold', *team* 'team' ≠ *liˀm* 'glue'
  - *biˀbel* 'bible' ≠ *engel* 'angel'
- No stød possible in CV([obstruent]) syllables[5]

[5] In Standard Danish; on so-called 'short-vowel stød' in dialects, see Pavel Iosad. 'Prosodic structure and suprasegmental features. Short-vowel stød in Danish'. In: *Journal of Comparative Germanic Linguistics* 19.3 (2016), pp. 221–268

Livonian

Paul Kiparsky. 'Livonian stød'. In: *Segmental structure and tone*. Ed. by Wolfgang Kehrein et al. Berlin: Mouton, 2018

- Stød contrasts in CVV and CV[voice] syllables
  - *ūdõ* 'cook.INF' ≠ *ū'dõ* 'strain.INF'
  - *vannõ* 'swear.INF' ≠ *va'nnõ* 'old.PART.SG'
- No stød in light syllables: *va(*')dā* 'fishing net' but PART.SG *va'ddõ*

- Intensity, pitch, glottalization all involved (but all optional)

Ternarity in accentual systems

First primary claim

- Most two-way systems distinguish between not two but three types of stressed syllables:
  - Syllables that lack some property that supports the accentual contrast
  - Two kinds of syllables that do have the property
- I will refer to the accent-supporting property as *accent basis*
- I will further distinguish between 'unmarked' and 'marked' accent
  - 'Unmarked' = assigned by default
  - 'Marked' = assigned in well-defined circumstances

The term comes from the Danish tradition: a syllable is said to have 'stød basis' if it is stressed and has a heavy, high-sonority rhyme. For extensions of this notion to accentual contrasts in general, see Solomon Davidovich Katsnel'son. *Sravnitel'naya aktsentologiya germanskikh yazýkov*. Moscow: Nauka, 1966; Anatoly Liberman. *Germanic accentology*. Vol. 1. Minneapolis: University of Minnesota Press, 1984

Language	No basis	Accent 1	Accent 2
Rhine Franconian	ˈzatʰ	¹šal	²šal
Norwegian	¹bad	¹badet	²bade
Danish	kat	kol	kolˀd
Lithuanian	lùpa	lū́pa	lūžis
Low German	vɪt	¹vit	²vit
	vit	viːt	viːːt
Lewis Gaelic	(¹)math	¹bogha	²bò
Argyll Gaelic	math	boˀgha	bò
Livonian	vadā	ūdõ	ūˀdõ

Sonority-defined basis

- In many cases, basis is a 'heavy sonority' rhyme:
  - Long vowel
  - or sonorant/voiced coda
- Examples are
  - Danish stød
  - (Rhine) Franconian[6]
  - Baltic
  - Livonian (voiced coda)
  - Norwegian: Flekkefjord, Salten[7]

This is a well-known pattern, cf. Draga Zec. 'Sonority constraints on prosodic structure'. PhD thesis. Stanford: Stanford University, 1988.

Size-defined basis

- Contrast only within domains of a certain size
- Norwegian/Swedish: contrast in disyllabic domain, accent 1 when there is no following syllable[8]
- North Germanic 'circumflex accent': *å kâst* 'throw-INF'[9] vs. *et ¹kast* 'throw'
  - Circumflex monosyllables are superheavy[10] ⇒ trimoraic basis

[6] There exist Limburgian varieties with accent contrasts (or at least distinctions) in light syllables, cf. Wolfgang Kehrein. 'There's no tone in Cologne. Against tone-segment interactions in Franconian'. In: *Segmental structure and tone*. Ed. by Wolfgang Kehrein et al. Berlin: Mouton, 2018, pp. 147–194; Jan Goossens. 'De oorsprong van de Rijnlands-Limburgse tweetonigheid. Een analyse met bijzondere aandacht voor de korte klinkers voor obstruent'. In: *Handelingen van de Koninklijke Commissie voor Toponymie en Dialectologie* 89 (2017), pp. 129–185.

[7] Ove Lorentz. 'Tonelagsbasis i norsk'. In: *Maal og Minne* 2008.1 (2008), pp. 50–68.

[8] The same restriction holds for Zealand short-vowel stød.

[9] Historically, and in other dialects, *å ²kaste*

[10] Gjert Kristoffersen. 'Cirkumflekstonelaget i Oppdal'. In: *Norsk lingvistisk tidsskrift* 29.2 (2011), pp. 221–262.

- East Slesvig Danish,[11] with apparent contrast in CV syllables: *¹hy* 'high' ≠ *²hy* 'height'
  - In fact, accent 2 adds a mora,[12] so *²hy* is an accentual minimal pair with *¹tō* 'two' ⇒ bimoraic basis

[11] Marie Bjerrum. *Felstedmaalets tonale Accenter*. Århus: Universitetsforlaget, 1949.

[12] Yonatan Goldshtein. 'Scandinavian word accents in Felsted, Southern Jutland'. MS., Aarhus University. 2021.

Special case: Scottish Gaelic

- CV syllables do not support the accent contrast
  - Accent 1 (?) in 'tonal' dialects
  - Literature claims that /CV/ syllables surface as [CVˀ] due to stress-to-weight, but this is doubtful[13]
  - Rather: glottalization is *predictable* in monomoraic domains
- Sandhi glottalization: *gheobh* [jo] 'receive.FUT' but *gheobh i* [joˀ i] 'she will receive'
- The precise rule identified by Morrison[14] is that a light syllable is glottalized when there is a following syllable, subject to segmental conditioning: no glottalization across a [spread glottis] segment.
- Bimoraic basis

[13] Donald Alasdair Morrison. 'Metrical structure in Scottish Gaelic. Tonal accent, glottalisation and overlength'. In: *Phonology* 36.3 (2019), pp. 391–432.

[14] Morrison, 'Metrical structure in Scottish Gaelic'.

The fundamental generalization

- The basis for accentual contrasts is *size*
- Syllables lacking basis are, in some relevant sense, *too small*
- Ternarity arises because syllables lacking basis are incompatible with the marked accent

Ternary quantity: Estonian

- Minimal triplets
  - *lina* 'flax.GEN/PART' ≠ *linna* 'town.GEN' ≠ *`linna* 'town.PART'
  - *sagi* 'bustle.IMP.2SG' ≠ *saagi* 'yield.GEN' ≠ *`saagi* 'saw.PART'
- Well established generalizations:[15]
  - Light syllables are Q1
  - Heavy syllables are Q2 or Q3
    - ⋆ Q2 syllables must be followed by another syllable
    - ⋆ Q3 is lexically and morphologically conditioned

[15] See, among many others, Alan S. Prince. 'A Metrical Theory for Estonian Quantity'. In: *Linguistic Inquiry* 11.3 (1980), pp. 511–562; Martin Ehala. 'Estonian quantity. Implications for moratic theory'. In: *Generative approaches to Finnic and Saami linguistics*. Ed. by Diane Nelson and Satu Manninen. Stanford, CA: CSLI, 2003, pp. 51–80; Külli Prillop. 'Feet, Syllables, Moras and the Estonian Quantity System'. In: *Linguistica Uralica* 49.1 (2013), pp. 1–29

Relevant orthographic conventions: the symbol <`> signals that vowels or sonorants spelled double are overlong. Word-medially, <b d g> are singleton stops, <p t k> are short geminates after short vowels, long geminates after long vowels, <pp tt kk> are long geminates (after short vowels).

Morphophonology: for these nouns, GEN is in the 'weak' grade relative to PART. For singleton consonants, the weak grade is made distinct from the strong by segmental alternation or not at all; for geminates, weakening involves shortening. ILL requires Q3 even when the noun is ordinarily Q1.

Estonian gradation

Nucleus	C	Q1	Q2	Q3
Short	N	*talu* [l] 'farm.GEN/PART'		*`tallu* [l:l] 'farm.ILL'
	NN		*kulli* [l:] 'hawk.GEN'	*`kulli* [l:l] 'hawk.PART/ILL'

Nucleus	C	Q1	Q2	Q3
	T	*saba* [p] 'tail.GEN/PART'		*sappa* [pːp] 'tail.ILL'
	TT		*lõpu* [pː] 'end.GEN'	*lõppu* [pːp] 'end.PART/ILL'
Long	N		*piima* [iː] 'milk.GEN'	*`piima* [iːi] 'milk.PART/ILL'
	T		*koodi* [oː] 'code.GEN'	*`koodi* [oːo] 'code.PART/ILL'
	TT		*riigi* [iːk] 'state.GEN'	*riiki* [iːkːk] 'state.PART/ILL'

- Light syllables have no basis
- Heavy syllables have basis
- Q3 is the marked accent
- Ternary quantity and 'tonal' or 'laryngeal' accentual contrasts have the same underlying structure

The metrical approach

Second principal claim

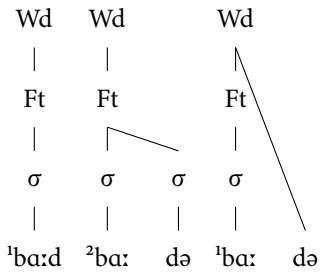
- Basis restrictions are ultimately interpretable in terms of structural size
- This follows if the marked accent is a particular kind of metrical structure
- Syllables lack basis when they lack the segmental substrate to build that kind of metrical structure

Corollary: the use of neutralization criteria

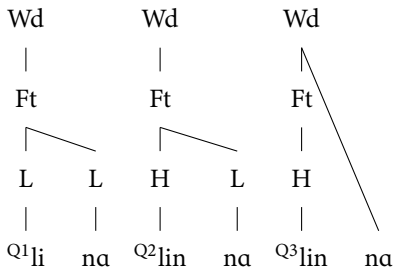
- 'Neutralization produces unmarked accent' is a poor criterion when neutralization occurs because of lack of basis
- In Norwegian/Swedish, accent 2 can be considered marked because monosyllables always have accent 1[16]
- Default assignment ≫ lack of basis
- Estonian:
  - Q1 = (LL), Q2 = (HL), default in disyllables, Q3 = (H)
  - It follows, correctly, that H monosyllables are automatically Q3: strong grade ^{Q1}*jõgi* 'river', weak grade ^{Q3}*jõe* 'river.GEN'

The basic approach has been often formalized with foot structure. For ternary quantity, cf. on Estonian Külli Prillop. 'Feet, Syllables, Moras and the Estonian Quantity System'. In: *Linguistica Uralica* 49.1 (2013), pp. 1–29, on Aanaar Sámi Patrik Bye, Ida Toivonen and Elin Sagulin. 'Phonetic Duration, Phonological Quantity and Prosodic Structure in Inari Saami'. In: *Phonetica* 66.4 (2009), pp. 199–221, and on Low German Carol Chapman. 'Überlänge in North Saxon Low German. Evidence for the Metrical Foot'. An Approach to Vowel Length Based on the Theory of Metrical Phonology. In: *Zeitschrift für Dialektologie und Linguistik* 60.2 (1993), pp. 129–157. For Germanic tonal accents, see the overview of the 'metrical' approach in Björn Köhnlein. 'Tone accent in North and West Germanic'. In: *The Cambridge handbook of Germanic linguistics*. Ed. by Richard B. Page and Michael T. Putnam. Cambridge: Cambridge University Press, 2019, pp. 143–166 with references. For laryngeal accents, see Yonatan Goldshtein and Pavel Iosad. *Metrical structure and Stratal Phonology provide a complete account of Danish stød*. Presentation at the 29th Manchester Phonology Meeting. 25th May 2022 on Danish and, *mūtātīs mūtandīs*, Paul Kiparsky. 'Livonian stød'. In: *Segmental structure and tone*. Ed. by Wolfgang Kehrein et al. Berlin: Mouton, 2018 on Livonian. Donald Alasdair Morrison. 'Metrical structure in Scottish Gaelic. Tonal accent, glottalisation and overlength'. In: *Phonology* 36.3 (2019), pp. 391–432 covers the full range of Scottish Gaelic data.

[16] Tomas Riad. 'The morphological status of accent 2 in North Germanic simplex forms'. In: *Nordic prosody. Proceedings of the 10th conference*. Ed. by Martti Vainio, Reijo Aulanko and Olli Aaltonen. Frankfurt am Main: Peter Lang, 2009, pp. 205–216.



Norwegian ¹*bad* 'bath', ²*bad-e* 'bathe-INF', ¹*bad-et* 'bath-DEF'



Estonian *lina* 'flax', *linna* 'town.GEN' [linːɑ], *`linna* 'town.PART' [linːnɑ]; cf. also Q3 *`linn* 'town.NOM'

Corollary: taking the tone out of tonal accents

- No commitment to *tone* as the mechanism implementing contrast
- Direct account of cue variability
  - Livonian stød
  - Dialect variation in cues (or rather cue weighting): Gaelic
- Diachronic permeability
  - Quantity > pitch (Estonian, Low German?)
  - Pitch > laryngealization (North Germanic, Gaelic, Livonian, Leivu Estonian)
  - Pitch > quantity (Gaelic?)
  - Laryngealization > pitch (Baltic?)

Corollary: ternarity is not a given

- In systems with quantitative criteria for basis, ternary structure is 'baked in'
  - If marked accent is absolutely required, segmental basis is coerced: Estonian *saba* 'tail' > *sappa* 'tail.ILL'
- Basis can be determined otherwise: Germanic lax/tense vowel quality
- Low German:[17]
  - Q1 / short V / no basis = lax [ʊɪt] 'white'
  - Q2 / long V / basis = tense short [ʊit] 'wide'
  - Q3 / overlong V / accent = tense long [ʊiːt] 'willow'

[17] Klaus J. Kohler. 'Überlänge im Niederdeutschen?' In: Vulpis adolatio. *Festschrift für Hubertus Menke zum 60. Geburtstag.* Ed. by Robert Peters, Horst P. Pütz and Ulrich Weber. Heidelberg: Carl Winter Universitätsverlag, 2001, pp. 385–402.

Shading indicates phonological patterning as heavy/long in patterns like word minimality, syllable structure, stress assignment.

	Lax		Tense	
Language	Short	Long	Short	Long
English, German	ɪ		i(ː)	
Dutch	ɪ		i	
Scots	ɪ		i	iː
North Low Saxon	ɪ		[1]i(ː)	[2]iː(ː)
West Frisian[18]	ɪ		i	iː
Icelandic	ɪ	ɪː	i	iː

- When basis is quantitative, adding quantity to the smallest syllable type makes it long and creates basis ⇒ ternarity
- With qualitative basis, adding quantity can fill the gap without creating accentual basis
- East Frisian Low German:[19]
  - Tense length: [ziː(ː)t] 'silk' < *ziːdə
  - Lax length: [ruːəp] 'seal' < *rʊbə

[18] Willem Visser. 'The closed vowels in West Frisian revisited. On the mismatch between phonetic duration and phonological length'. In: *From West to North Frisia. A journey along the North Sea coast*. Frisian studies in honours of Jarich Hoekstra. Ed. by Alastair Walker et al. NOWELE Supplement Series 33. Amsterdam and Philadelphia: John Benjamins, 2022, pp. 409–422.

[19] Wilko Lücht. 'Zur "Überlänge" im ostfriesischen Niederdeutsch'. In: *Zeitschrift für Dialektologie und Linguistik* 80.2 (2013), pp. 131–151.

Conclusions and prospects

Conclusions

- Most Northern European accent systems submit to the ternary analysis
- Fundamentally, basis is about *size*
  - Metrical approaches to accentual systems capture this directly
  - See also Pöchtrager[20] on vowel quality as size
- The metrical approach gives the right level of abstraction
  - Cue variability
  - If the analytical key is tone (or laryngealization), does the link with size follow?

[20] Markus Pöchtrager. 'Danish, Estonian, English. Variations on a theme'. In: *Glossa. A Journal of General Linguistics* 42.1 (2023), and passim.

Questions and prospects

- Empirical work on variation remains outstanding
- More-than-ternary systems: tone after all?
  - Standard Latvian[21]
  - Low Latvian, Lithuanian dialects
- Diachronic and areal links, including the life cycle
- Stretch target: a fully privative analysis of markedness[22]

[21] Martin Krämer. 'The interaction of tone, weight and stress in Latvian'. In: *Proceedings of NELS 52*. Forthcoming.

[22] See e.g. Martin Ehala. 'Estonian quantity. Implications for moratic theory'. In: *Generative approaches to Finnic and Saami linguistics*. Ed. by Diane Nelson and Satu Manninen. Stanford, CA: CSLI, 2003, pp. 51–80; Natalia Kuznetsova. 'What Danish and Estonian can show to a modern word-prosodic typology'. In: *The study of word stress and accent. Theories, methods and data*. Ed. by Rob Goedemans, Harry van der Hulst and Jeffrey Heinz. Cambridge: Cambridge University Press, 2018, pp. 102–143 on Estonian Q3 as a 'heavy accent' mark