(Un)Accentedness is not enough: The typology of lexical accent competition

Ekaterina Medvedeva, Prithivi Pattanayak, Razieh Shojaei, Eva
Zimmermann

Universität Leipzig

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(1)   Colville (Salishan; Mattina, 1973)

(ul. accent surfaces= V , ul. accent not realized= V , surface accent= V)

a.   ʕaʼc-n-t-iʔ   → No ul. accent: Initial default
     [ʕ **á** ʼcəntiʔ] 'Look at it!' (pl.) (M:72)

b.   x̣as-t-w **í** lx   → One ul. accent: surfaces
     [x̣stw **í** lx] 'He gets better' (M:28)

c.   xʷ **ú** k-n-t- **í** xʷ   → Multiple ul. accents: LMost/root 'wins'
     [xʷ **ú** kəntxʷ] 'You pull it out' (M:27)

d.   xʷ **ú** k-n **ú** -n-t- **í** xʷ   → Same root 'loses' against different affix
     [xʷkn **ú** ntxʷ] 'You managed to pull it out' (M:27)

🍃 morphemes can be **dominant** and override the expected winner of an
    accentual competition

(2)   Greek stress: Masculine nouns (Revithiadou, 1999, 93+94)

    a.   anθrop-os   �; Antepenult default

        á nθropos 'man'-nom.sg

    b.   anθrop- **'** u   ➙ one pre-accenting morpheme

        anθr **ó** pu 'man'-gen.sg

    c.   kl **í** van- **'** u   ➙ stem accent wins

        kl **í** vanu 'kiln'-gen.sg

    d.   uran **'** - **'** u   ➙ post-accenting stem wins

        uran **ú** 'sky'-gen.sg

- 🖋 'accentual' morphemes in (2): accented (2-c), pre-accenting (2-b-d), and post-accenting (2-d)

- 🖋 the type of accentual behaviour required by a morpheme is orthogonal to the **lexical accent competition**

Main Claim

🌿 Lexical accent competition is best analysed with **gradient phonological representations** that allow different degrees of accentual dominance/recessiveness and avoid specific undergeneration problems alternative accounts face.

🌿 This claim is based on an **representative empirical survey** of lexical accent systems in the languages of the world that transcends existing empirical evidence

  ꙅ across languages

  ꙅ within one language (=a full picture including 'exceptions').

(extending the studies in, for example, Revithiadou (1999); Alderete (2001); Vaxman (2016); Yates (2017), or Bogomolets (2020))

Plan

1. A Typology of Lexical Accent

2. Empirical picture and existing alternatives?

3. Theoretical Proposal: Gradient Representations
3.1 Case study: Japanese
3.2 Case study: Ukrainian

4. Conclusion

A Typology of Lexical Accent

A database of lexical accent competition (in progress)

- includes languages with **competition of underlying prominence** = abstracting away from whether this is stress/tone/'pitch accent'

- baseline assumption: binary distinction into **non-accentual** morpheme and **accentual** morpheme

- a single parameter **LMost/RMost** (or 'Outermost') decides the competition in case multiple accentual morphemes are present: Dec.W.Mc

- a (potentially different!) parameter decides the **default** accent placement (in case no lexical accent is present)

- if this is insufficient: a hierarchy of **accentual morpheme classes** is assumed

The methodology: Finding morpheme classes in a toy example: Hypothesis A

(=Underlying accentedness already determined from combination with accent-less roots/suffixes)

(3)   a.   kul-s ú – [kuls **ú**]   ➜ Hypothesis: **RMost**
      b.   kul-p á -s ú – [kulp **á** su]   ➜ **DomAfx**: pá > sú
      c.   kul-t ó -p á – [kult **ó** pa]   ➜ **ExtraDomAfx**: tó > pá

(4)   Resulting hierarchy of MClasses

1		2		3		4 (unacc)
tó	>	pá	>	sú	>	kul
A1	>	A2	>	A3	>	R1

(5)   Database parameters

N°.Acc.M.Classes:	4
N°.M.Classes	1 root, 3 affix
Dec.within.M.class	RMost

The methodology: Finding morpheme classes in a toy example: Hypothesis B

(6)   a.   kul-s ú – [kuls **ú**]   �ý Hypothesis: **LMost**

       b.   kul-p á -s ú – [kulp **á** su]   �ý LMost

       c.   kul-t ó -p á – [kult **ó** pa]   ➝ LMost

(7)   Resulting hierarchy of MClasses

1		2 (unacc)
tó, pá, sú	>	kul
A1	>	R1

(8)   Database parameters

N°.Acc.M.Classes:	2
N°.M.Classes	1 root, 1 affix
Dec.within.M.class	LMost

The methodology: Finding morpheme classes

- we always went for the hypothesis with the **fewest morpheme classes** (i.e. Hypothesis B in our toy example)

- the result of applying this algorithm of MClasses is often in **contrast to the surface** generalization

  (e.g. Spokane (Bates and Carlsen, 1989; Carlsen, 1989) is usually described as having a hierarchy of 5 (=3 suffix and 2 root) morpheme classes but ended up having only 2 in our database)

Our (preliminary) database in numbers

- 27 languages with lexical accent competition and **at least three accentual morpheme classes** (i.e. a binary distinction into accented/unaccented+directional decision is not sufficient)

- languages from 10 language families and 3 isolates; distributed across 5 macro-areas (mainly Eurasia and North America)

- 10x conflicting directionality

- 12x decision within MClass resolved by LMost (=BAP)

(Preliminary) results: 8 languages with 2 accentual classes

🍂 showing that directionality is sufficient: no dominance

				N°	DecMClass	Default
1.	Spokane	spo	Salishan	2	RMost	RMost
2.	Thompson River Salish	thp	Salishan	2	RMost	LMost
3.	Abkhaz	abk	Abkhaz-Adyge	2	LMost*	RMost
4.	Afar	aar	Afro-Asiatic	2	RMost	Penult
5.	Bikol		Austronesian	2	RMost	n.d.
6.	Pashto	pbt	Indo-European	2	RMost	RMost
7.	Cupeno Y	cup	Uto-Aztecan	2	LMost	LMost
8.	Goizueta Basque	eus	-	2	RMost	n.d.

(Preliminary) results: 19 languages with more than 2 accentual classes

🍂 some mechanism of (degrees of) dominance is necessary

				N°	Dec	Def	
1.	Bulgarian	bul	Indo-European	3	LMost	Penult	Dominance
2.	Hittite	hit	Indo-European	3	LMost	LMost	
3.	M. Greek	ell	Indo-European	3	LMost	Antepenult	
4.	Nez Perce	nez	Sahaptian	3	LMost	Penult	
5.	Sahaptin	yak	Sahaptian	3	RMost	n.d.	
6.	Colville	oka	Salishan	3	LMost	LMost	
7.	Shuswap	shs	Salishan	3	LMost	n.d.	
8.	Parabel Selkup	sel	Uralic	3	LMost	n.d.	
9.	Choguita Rarámuri	tar	Uto-Aztecan	3	LMost	Postin	
10.	A'ingae	con	-	3	LMost	Penult	
11.	Russian (N, infl)	rus	Indo-European	4	LMost	LMost	Degrees of D.
12.	Vedic Sanskrit	san	Indo-European	4	LMost	LMost	
13.	Arapaho	arp	Algic	4	RMost	Penult	
14.	Japanese	jpn	Japonic	4	OMost	Antepenult	
15.	Cupeño A	cup	Uto-Aztecan	4	RMost	LMost	
16.	Coastal Bizkaian Basque	eus	-	4	LMost	RMost	
17.	Moses Columbian Salish	thp	Salishan	5	RMost	RMost	
18.	Lithuanian	lit	Indo-European	5	LMost	LMost	
19.	Ukrainian (N, infl)	ukr	Indo-European	8	LMost	LMost	

(Preliminary) results: Accentual behaviour

🍃 13 languages show accentual morphemes that are not accented themselves

		preaccenting	postaccenting	subtractive	other
1.	Japanese	✓	✓	✓	attractive
2.	Bulgarian	✓	✓		
3.	M. Greek	✓	✓		
4.	Cupeño A	✓			
5.	Cupeño Y	✓			
6.	A'ingae	✓		✓	
7.	Vedic Sanskrit	✓		✓	
8.	Arapaho	✓		✓(L+NL)	
9.	Coastal Bizkaian Basque	✓		✓	
10.	Choguita Rarámuri				unstressable
11.	Moses Columbian Salish				local win
12.	Bikol				shift by 1
13.	Lithuanian				local attractive

Empirical picture and existing alternatives?

The empirical results of our typology

Degrees of dominance

A theoretical account needs to allow for different degrees of dominance for accentual morphemes.

Different accentual behaviour

A theoretical account needs to predict different accentual morphemes (at least: accented, pre-/post-accenting, attractive, subtractive, unaccentable)

Zooming into the results: Some predictions of classical theories

		Lexical Phonology (e.g. Halle and Mohanan, 1985)	Head Dominance (Revithiadou, 1999)	Anti-faithfulness (Alderete, 2001)
A. **Af≤3**	Affixes can be ± accentual or 'dominant' accentual.	Restr.A	Restr.A	Restr.A
B. **Rt≤2**	Roots can be ± accentual.	Restr.B		Restr.B
C. **HdWin**	The accentual property of the morphological head always wins over accentual patterns of non-heads.		Restr.C	

Evaluating some theoretical predictions (19 lgs)

	Af≤3	Rt≤2	HdWin
Bulgarian	✓	✓	✓
Colville	✓	✓	✓
Greek (Modern)	✓	✓	✓
Hittite	✓	✓	✓
Shuswap	✓	✓	✓
A'ingae	✓	✓	☹
Choguita Rarámuri (Tarahumara)	✓	✓	☹
Nez Perce	✓	✓	☹
Parabel Selkup	✓	✓	☹
Vedic Sanskrit	✓	☹	☹
Lithuanian	☹	✓	☹
Arapaho	☹	✓	☹
Russian (N,infl)	☹	✓	☹
Sahaptin (Northwest) Yakima	☹	✓	☹
Coastal Bizkaian Basque	☹	✓	✓
Cupeno A	☹	✓	✓
Moses Columbian Salish	☹	☹	✓
Ukrainian (N, infl)	☹	☹	☹
Japanese	☹	☹	✓
Problematic	10	15	9

"Degrees of dominance"

- 🍃 various proposals allow (in principle) gradient degrees of accented-ness (e.g. Halle and Vergnaud (1987); Idsardi (1991); Inkelas (2015) or Vaxman (2016))

- ➡ we argue for an OT-implementation
    - ➡ that is fully parallel and hence allows **roots to have different degrees of dominance**
    - ➡ where **all phonological elements** can have gradient presence to predict all accentual behaviours
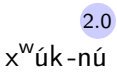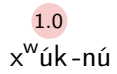
Theoretical Proposal: Gradient Representations

GSR: Background assumption

- phonological elements can have different underlying **activities** that result in **gradient constraint violations**
  (Smolensky and Goldrick, 2016; Rosen, 2016)

→ differences between 'accentual morpheme classes' correspond to **activity differences** in underlying representations (of tones, feet, moras,...)

→ one simple mechanism: the **most active one wins**

- harmony evaluation based on Harmonic Grammar where constraints with weighted constraints to predict threshold effects
  (Legendre et al., 1990; Potts et al., 2010)

Accent competition in GSR

🍃 deletion of the more active element is more costly: **Max** $>>$ **LMost**

(9)

	Max	LMost	
1.0 2.0 xʷúk-nú	2	1	
☞ a. 2.0 xʷúk-nú	-1	-1	-3
b. 1.0 xʷúk-nú	-2		-4

Two case studies:
Different lexical accent competition patterns and their GSR accounts

(10)

	Japanese	Ukrainian
N°.Acc.M.Classes:	4	8
Accentual classes:	accented attractive pre-accenting subtractive	accented
Representations in a GSR account:	3: $H_{1.5} > H_1 > H_{0.5}$ 2: $\mu_2 > \mu_1$	8: $H_{0.8} > \ldots > H_{0.1}$

Accentual affixes in Japanese (Kawahara, 2015, 468+472)

- 🍃 different affix-induced accent patterns follow from:
  - ⅰ **gradiently active** H-tone and TBU (=μ)
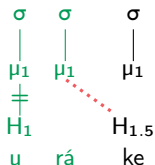 - ⅱ **associated or floating** H/μ

(11)   Suffix classes in Japanese: representational assumption

Recessive		Dominant	Recessive Preaccenting
σ | **μ₁**	σ σ | | μ₁ μ₁ | **H₀.₅**	σ /\ μ₁ μ₁ **H₁**	σ | μ₁ **H₀.₅**
ga	ta ra	ppo i	si
Usurper	**Subtractive**	**Attractive**	**Dominant Preaccenting**
σ | **μ₂**	σ σ | | **μ₂** μ₁ μ₁	σ σ | | **μ₂** μ₁ μ₁ **H₁**	σ | μ₁ **H₁.₅**
te	te ki	mo no	ke

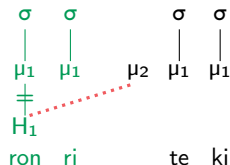## Accentual affixes in Japanese

🌿 **root** and suffix accent competition:
the strongest H/μ are associated

❶ Preaccentuation

$$\begin{array}{ccc} \sigma & \sigma & \sigma \\ | & | & | \\ \mu_1 & \mu_1 & \mu_1 \\ & & \\ H_1 & & H_{1.5} \\ u & rá & ke \end{array}$$

❷ Subtraction

$$\begin{array}{ccccc} \sigma & \sigma & & \sigma & \sigma \\ | & | & & | & | \\ \mu_1 & \mu_1 & \mu_2 & \mu_1 & \mu_1 \\ & & & & \\ H_1 & & & & \\ ron & ri & & te & ki \end{array}$$

❸ Attraction: Subtraction+Preaccentuation

$$\begin{array}{ccccc} \sigma & \sigma & & \sigma & \sigma \\ | & | & & | & | \\ \mu_1 & \mu_1 & \mu_2 & \mu_1 & \mu_1 \\ & & & & \\ H_1 & & H_1 & & \\ ka & kí & & mo & no \end{array}$$
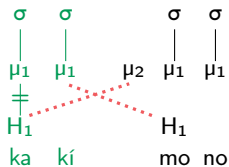
The paradigm: Feminine, 1st Declension class (Butska, 2002)

		$\sqrt{article}$	$\sqrt{height}$	$\sqrt{foot}$	$\sqrt{head}$	$\sqrt{base}$
sg	nom	statt^j- á	vysot- á	noɦ- á	ɦolov- á	osnóv -a
	gen	statt^j- í	vysot- ý	noɦ- ý	ɦolov- ý	osnóv -y
	dat	statt^j- í	vysot^j- í	noz^j- í	ɦolov^j- í	osnóv^j -i
	acc	statt^j- ú	vysot- ú	nóɦ -u	ɦólov -u	osnóv -u
	inst	statt^j- éju	vysot- óju	noɦ- óju	ɦolov- óju	osnóv -oju
	loc	statt^j- í	vysot^j- í	noz^j- í	ɦolov^j- í	osnóv^j -i
	voc	—	vysót -o	nóɦ -o	ɦólov -o	osnóv -o
pl	nom	statt^j- í	vysót -y	nóɦ -y	ɦólov -y	osnóv -y
	gen	statt^j- éj	vysót-ø	n^{j}íɦ -ø	ɦol^{j}ív -ø	osnóv -ø
	dat	statt^j- ám	vysót -am	noɦ- ám	ɦólov -am	osnóv -am
	acc	statt^j- í	vysót -y	nóɦ -y	ɦólov -y	osnóv -y
	inst	statt^j- ámi	vysót -amy	noɦ- ámy	ɦólov -amy	osnóv -amy
	loc	statt^j- áx	vysót -ax	noɦ- áx	ɦólov -ax	osnóv -ax
	voc	—	vysót -y	nóɦ -y	ɦólov -y	osnóv -y

The GSR representations

	∅	$H_{0.2}$	$H_{0.3}$	$H_{0.45}$	$H_{0.6}$	
	$\sqrt{article}$	$\sqrt{height}$	$\sqrt{foot}$	$\sqrt{head}$	$\sqrt{base}$	
sg.nom	statt^j- á	vysot- á	noɦ- á	ɦolov- á	osnóv -a	
sg.gen	statt^j- í	vysot- ý	noɦ- ý	ɦolov- ý	osnóv -y	
sg.dat	statt^j- í	vysot^j- í	noz^j- í	ɦolov^j- í	osnóv^j -i	$H_{0.8}$
sg.inst	statt^j- éju	vysot- óju	noɦ- óju	ɦolov- óju	osnóv -oju	
sg.loc	statt^j- í	vysot^j- í	noz^j- í	ɦolov^j- í	osnóv^j -i	
pl.dat	statt^j- ám	vysót -am	noɦ- ám	ɦólov -am	osnóv -am	
pl.inst	statt^j- ámi	vysót -amy	noɦ- ámy	ɦólov -amy	osnóv -amy	$H_{0.6}$
pl.loc	statt^j- áx	vysót -ax	noɦ- áx	ɦólov -ax	osnóv -ax	
sg.acc	statt^j- ú	vysot- ú	nóɦ -u	ɦólov -u	osnóv -u	$H_{0.5}$
sg.voc	—	vysót -o	nóɦ -o	ɦólov -o	osnóv -o	
pl.nom	statt^j- í	vysót -y	nóɦ -y	ɦólov -y	osnóv -y	
pl.acc	statt^j- í	vysót -y	nóɦ -y	ɦólov -y	osnóv -y	$H_{0.1}$
pl.voc	—	vysót -y	nóɦ -y	ɦólov -y	osnóv -y	
pl.gen	statt^j- éj	vysót-∅	n^{j}íɦ -∅	ɦol^{j}ív -∅	osnóv -∅	∅

The GSR analysis: Competition

	$\emptyset$ $\sqrt{article}$	$H_{0.2}$ $\sqrt{height}$	$H_{0.3}$ $\sqrt{foot}$	$H_{0.45}$ $\sqrt{head}$	$H_{0.6}$ $\sqrt{base}$	
sg.reg	stattʲ-á	vysot-á	noɦ-á	ɦolov-á	osnóv-a	$H_{0.8}$
pl.obl	stattʲ-ám		noɦ-ám	ɦólov-am	osnóv-am	$H_{0.6}$
pl.reg	stattʲ-í	vysót-y	nóɦ-y	ɦólov-y	osnóv-y	$H_{0.1}$

- 🍂 a single underlying accent: no competition ▇
- 🍂 stem's accent $\geq$ affix' accent: stem wins ▇
- 🍂 affix' accent has higher activity than stem's accent:

   - ᴄ affix wins if activity difference is ≥ 0.3 ▇

- 🍂 affix' accent has higher activity than stem's accent:

   - ᴄ affix wins if activity difference is ≥ 0.3 ▇

   - ᴄ but stem still wins if activity difference is < 0.3 ▇
     (=favored by higher-weighted MaxH_{st})

The GSR analysis: Coalescence

	$\emptyset$	$H_{0.2}$	$H_{0.3}$	$H_{0.45}$	$H_{0.6}$	
	$\sqrt{article}$	$\sqrt{height}$	$\sqrt{foot}$	$\sqrt{head}$	$\sqrt{base}$	
sg.reg	statťʲ-á	vysot-á	noɦ-á	ɦolov-á	osnóv-a	$H_{0.8}$
pl.obl	statťʲ-ám	vysót-am	noɦ-ám	ɦólov-am	osnóv-am	$H_{0.6}$
pl.reg	statťʲ-í	vysót-y	nóɦ-y	ɦólov-y	osnóv-y	$H_{0.1}$

- 🌿 the expectation if stem's accent $H_{0.2}$ and affix' accent $H_{0.6}$: affix wins
- 🌿 additional relevant mechanism: **a threshold effect that allows coalescence**:
- ➜ if the joined activity of stem&affix accent does not exceed 0.8, realization of both coalesced tones is possible on the preferred stem-position without MaxH violations

Conclusion

Summary and Discussion

- our (preliminary) database of lexical accent competition shows
    - that **different degrees of dominance** exist
    - there are **various attested accentual behaviours**

- these empirical facts are predicted in an account where all phonological elements can have different **degrees of activity**

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