Pretonic prominence and vowel neutralization: evidence from Aŭciuki Belarusian

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Roadmap

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The phenomenon

Stress in Belarusian: phonology

Standard Belarusian and its dialects have lexically determined stress: there are no restrictions on the type or position of a stressed syllable.

Stress is phonologically active (Hyman 2012): there are numerous minimal pairs based on stress, including in accentual paradigms, and consistent patterns of vowel neutralization in unstressed syllables.

There are no lexical tonal distinctions in Belarusian.

Vowel length is not phonemic.

Stress in Belarusian: phonetics

According to grammars, stress in standard Belarusian is primarily signaled by higher intensity and duration of the stressed vowel as compared to neighboring vowels (Sussex & Cubberly, 2006:179; cf. Jones & Ward 1969:206 for Russian), as well as lack of neutralization.

The phonetic reality of this is unclear; no contemporary instrumental investigations of stress in standard Belarusian.

Depending on the type of the intonational pitch accent used (H* or L*), the stressed syllable can carry higher or lower pitch than vowels in the neighboring syllables.

Pretonic prominence

In Aŭciuki Belarusian - a variety of Belarusian spoken in the villages of Malyja Aŭciuki and Vialikija Aŭciuki (Kalinkaviču region, Homel province, Belarus) - typologically unusual acoustic prominence is found on a low pretonic vowel in the context of a high stressed vowel.

Pretonic prominence manifests itself as increased duration and (to a certain extent) intensity, but is not associated with a pitch target.

For ease of reference, I will be calling this phenomenon pretonic prominence (PP), and refer to the vowels in question as V_1 and V_2.

Pretonic prominence

Pretonic prominence is found in the environments where:

- the stressed vowel (V_2) is mid-high/high:
  (i/ɨ, u, e, o)
- the pretonic vowel (V_1) is mid-low/low:
  (ɛ, ɔ, a)

i	ɨ	u
e		o
ɛ		ɔ
	a	

Pretonic prominence: examples

(1) **sɛ:strú**   'sister.ACC'

  sɛstrá   'sister.NOM'

(2) **dvɔ:rú**   'courtyard.DAT'

  nazád   'backwards'

(3) **za:vód**   'plant, factory'

  krušɨna   'buckthorn'

Pretonic prominence: fully productive

Recent borrowings into the dialect are subject to pretonic prominence:

(4)   **scʲenaka:rdzíja**   'stenocardia'

          manɔ:čɨ́nkve   'Monocinque' (med. brand)

          izasa:rbíd   'isosorbide'

Typological context

Similar phenomena

The Aŭciuki pretonic prominence is typologically rare.

Outside of Slavic, pretonic lengthening is reported for:

- Tiberian Hebrew (McCarthy 1981)

- Canadian French (Walker 1984)

- Córdoba Argentinian Spanish (Lang-Rigal 2014).

Similar phenomena

Within (East) Slavic, a number of similar cases have been reported:

- Mosalsk Russian (Broch 1916)

- Pereslavl-Zalesskij Russian (Avanesov 1927)

- Upper Snov Ukrainian dialects, adjacent to the Aŭciuki dialectal area (Žylko, 1953; Bila 1970)

- Gnilovka Russian (Nikolaev 2009).

In these, lengthening and high pitch on the pretonic vowel are reported, based on impressionistic observations. Instrumental data available only for Nikolaev (2009)

No conditioning environment for pretonic lengthening reported for Mosalsk and Pereslavl-Zalesskij Russian.

Current data

New Aŭciuki data

- Collected in 2015 in the villages of Malyja Aŭciuki and Vialikija Aŭciuki;

- 3 speakers (females in their 70s);

- Narratives recorded in a quiet setting in the speakers' homes;

- Pretonic prominence is robust only in older speakers (over 70 y.o.); in the speech of the next generation (ca.45-50 y.o.), pretonic prominece is sporadic; in speakers younger than 40 y.o. PP is virtually non-existent.

New Aŭciuki data

- 50 tokens with pretonic prominence (V_1 = mid-low/low, V_2 = mid-high/high)

- 50 tokens with no pretonic prominence (V_1, V_2 = mid-low/low)

- 15 tokens with no pretonic prominence (V_1, V_2 = mid-high/high)

C(C)V syllable shape, C = [+voice]

Extracted from (the non-final parts of) declarative clauses with all-new intonation and analyzed using Praat.

New Aŭciuki data

A highest value for intensity, pitch, and duration was extracted for vowels in the following conditioning environments:

1. V_1, unmarked 1 (low/mid-low)
2. V_2, unmarked 1 (low/mid-low)

3. V_1, unmarked 2 (high/mid-high)
4. V_2, unmarked 2 (high/mid-high)

5. V_1, pretonic prominence
6. V_2, pretonic prominence

New Aŭciuki data

	V$_1$	V$_2$
unmarked 1	mid-low/low	mid-low/low
PP	mid-low/low	mid-high/high
unmarked 2	mid-high/high	mid-high/high

Mean duration
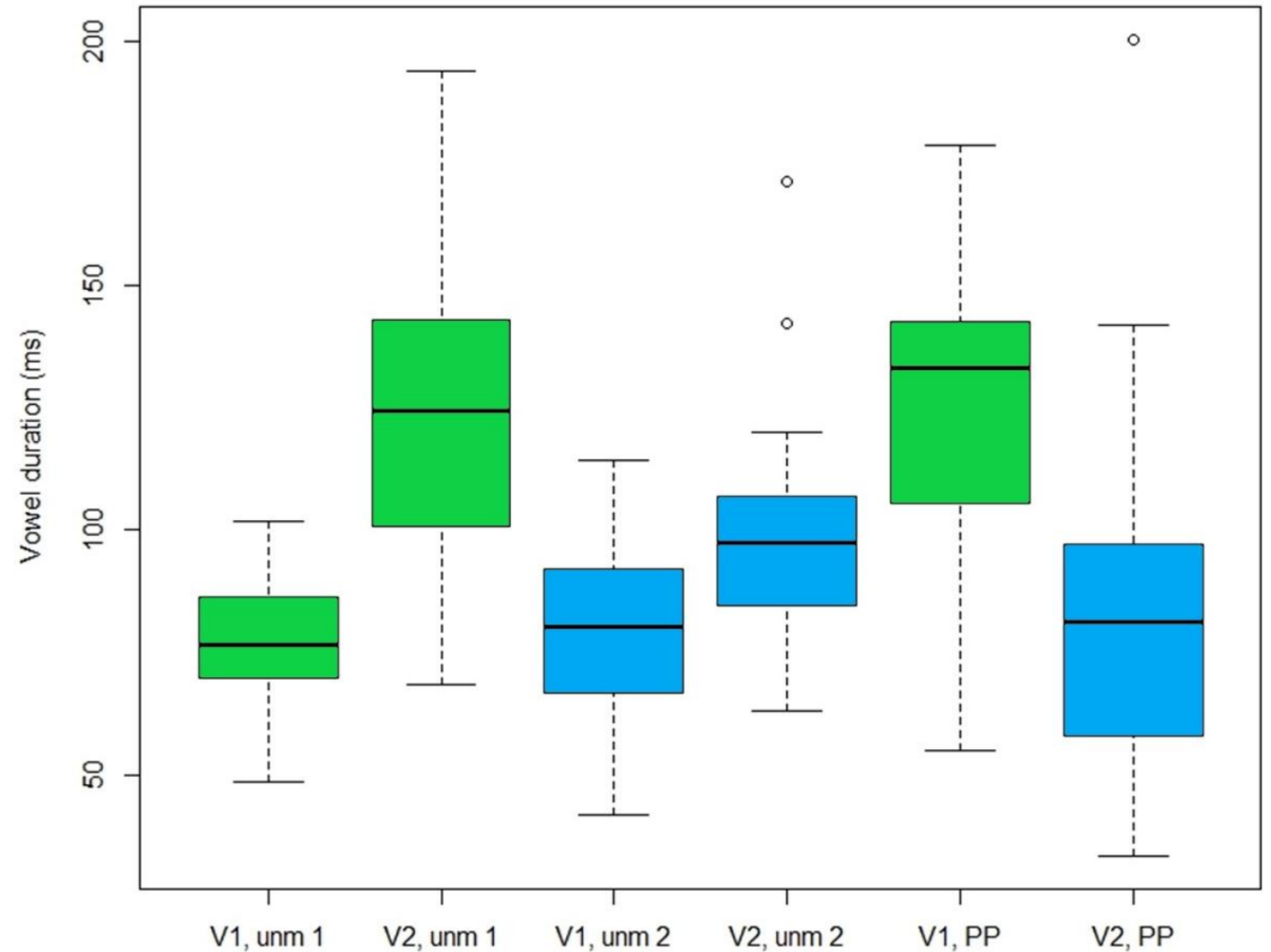
V_1 PP vs V_1 unmarked 1:
t-test, unpaired: $p < 0.01$

V_2 PP vs V_2 unmarked:
t-test, unpaired: $p = 0.03$

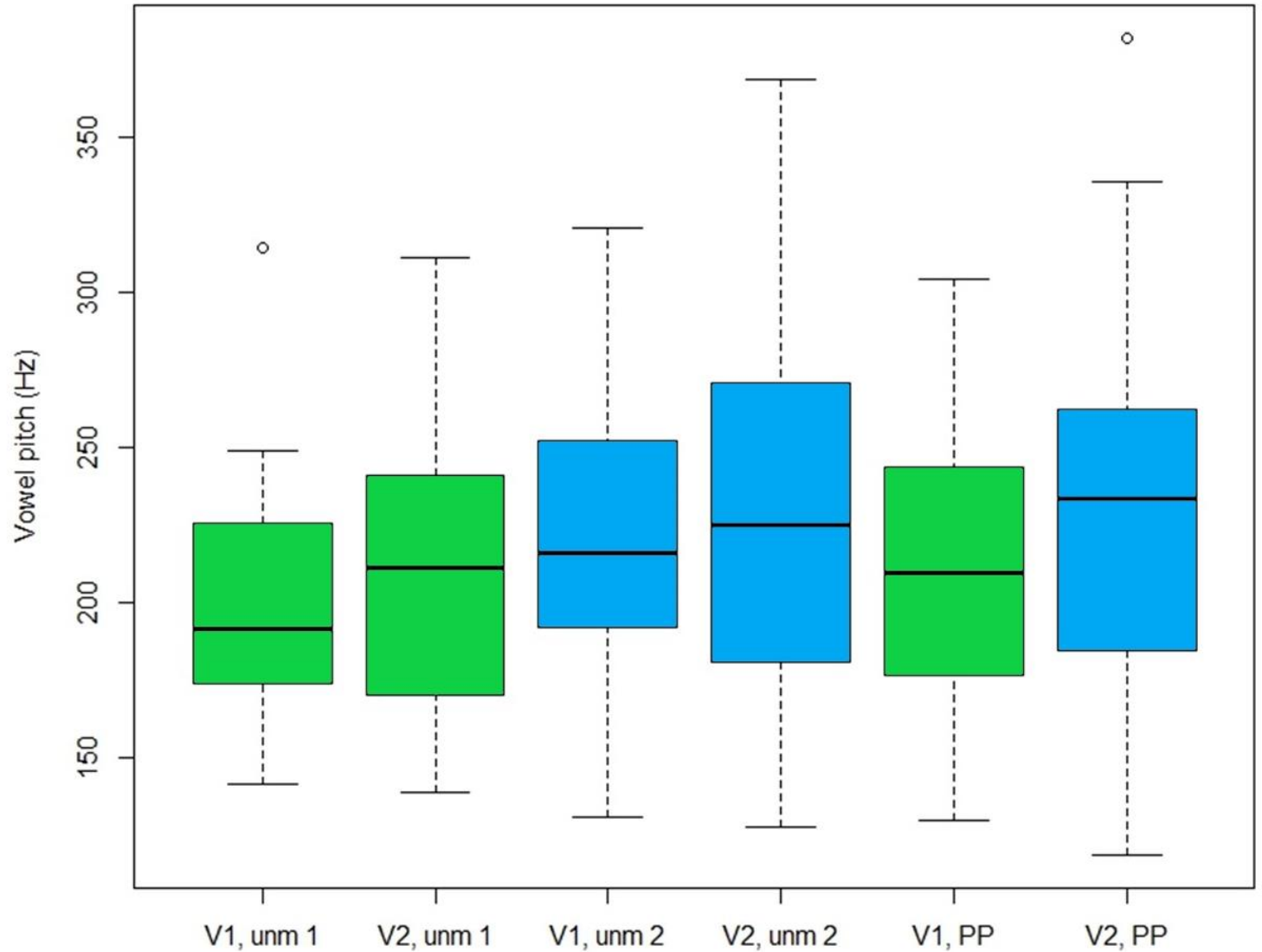V_1 PP vs. V_2 PP:
t-test, paired: $p < 0.01$

Mean pitch

V_1 PP vs V_1 unmarked 1:
t-test, unpaired: p = 0.2

V_2 PP vs V_2 unmarked:
t-test, unpaired: p = 0.8

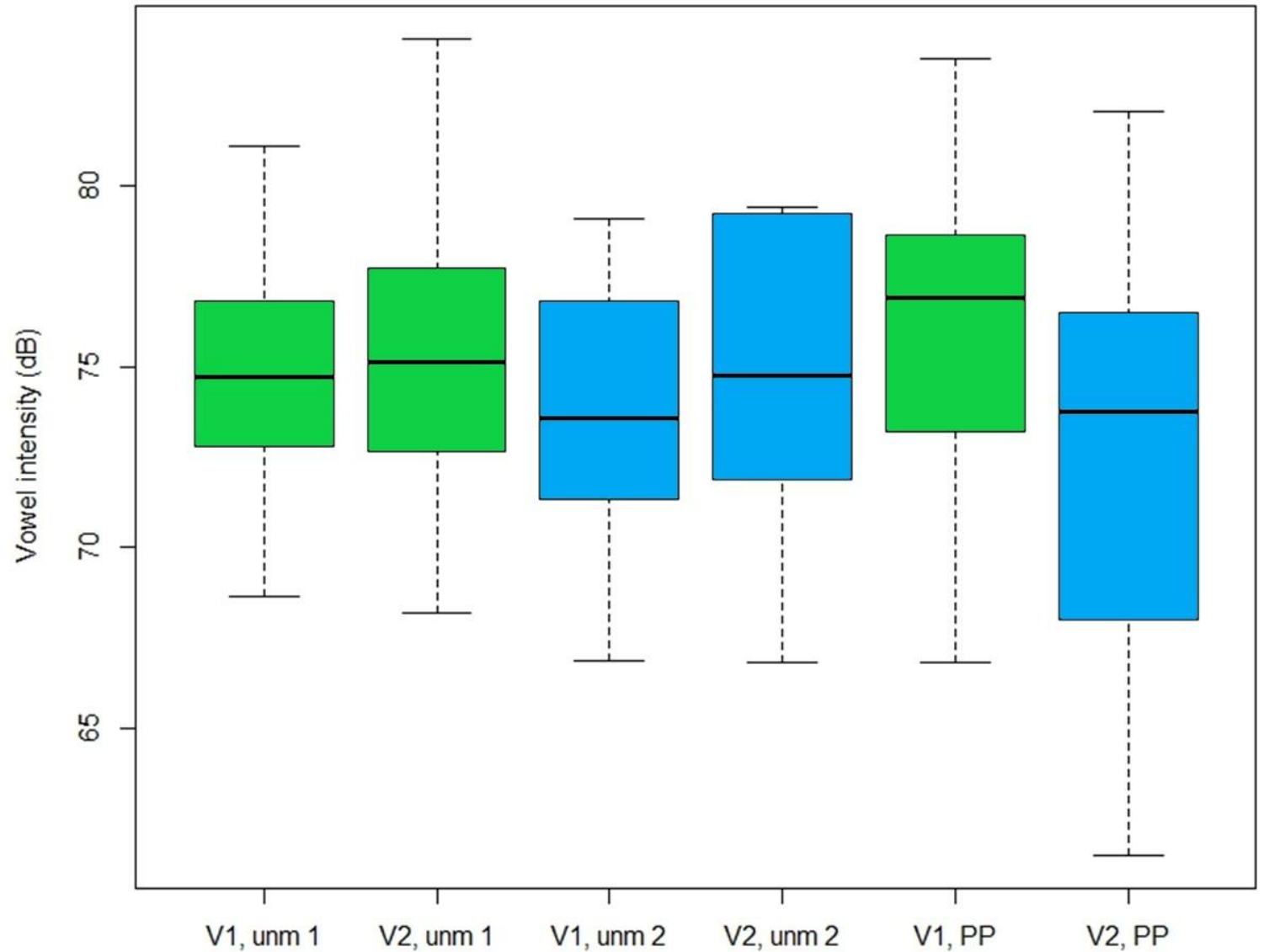V_1 PP vs. V_2 PP:
t-test, paired: p = 0.01

Mean intensity

V_1 PP vs V_1 unmarked 1:

t-test, unpaired: $p = 0.14$

V_2 PP vs V_2 unmarked:

t-test, unpaired: $p = 0.16$

V_1 PP vs. V_2 PP:

t-test, paired: $p < 0.01$

Summary

Duration:

V_1 in PP contexts is significantly longer than V_1 in unmarked 1 contexts.

V_2 in PP contexts is significantly shorter than V_2 in unmarked 2 contexts.

Pitch:

V_1 in PP contexts is not significantly different from V_1 in unmarked 1 contexts.

V_2 in PP contexts is not significantly different from V_2 in unmarked 2 contexts.

Intensity:

V_1 in PP contexts is not significantly different from V_1 in unmarked 1 contexts.

V_2 in PP contexts is not significantly different from V_2 in unmarked 2 contexts.
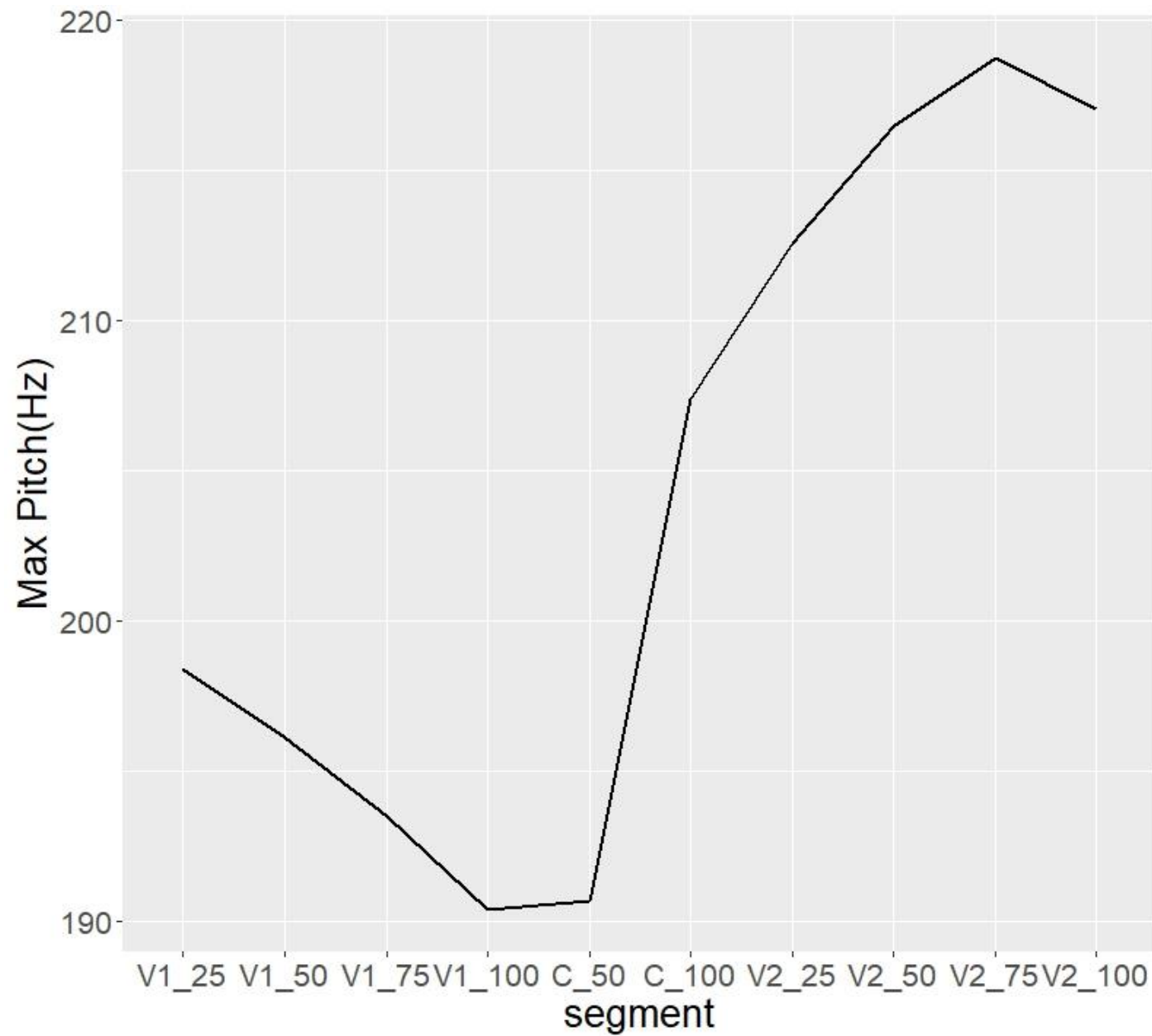
Pitch contour in pretonic prominence

Average pitch measurements might not capture the dynamics of a pitch contour, especially if the pitch target is delayed/early, and is realized predominantly on the preceding/following consonant.

In order to exclude the possibility that the pitch peak associated with V_1 is delayed until the following consonant, in 37 PP tokens the sequence $V_1C(C)V_2$ was divided into 10 segments:

- V_1:   25%, 50%, 75%, 100%
- C(C):   50%, 100%
- V_2:   25%, 50%, 75%, 100%

Maximum pitch per segment was measured.

Pitch contour in pretonic prominence

Previous accounts

Sonority-driven pitch peak/stress retraction?

The Aŭciuki pretonic prominence has been known to linguists since mid-20th century (Kryvicki 1959, Vajtovič 1972, Belaja 1974).

It has also been described as a retraction of the H portion of the HL pitch contour associated with stress (Bethin 2006a,b).

In the older literature, it has been tentatively described as a sonority-driven stress retraction.

Pitch peak retraction analysis (Bethin 2006a,b)

Main insight: a mid-high/high vowel is too short to accommodate the HL contour tone associated with stress, and the tonal peak H is forced to shift to the preceding syllable.

C=consonant, a=for a mid-low/low vowel, i=mid-high/high vowel:

L	HL		L	HL	
Ca	Ca		Ci	Ca	

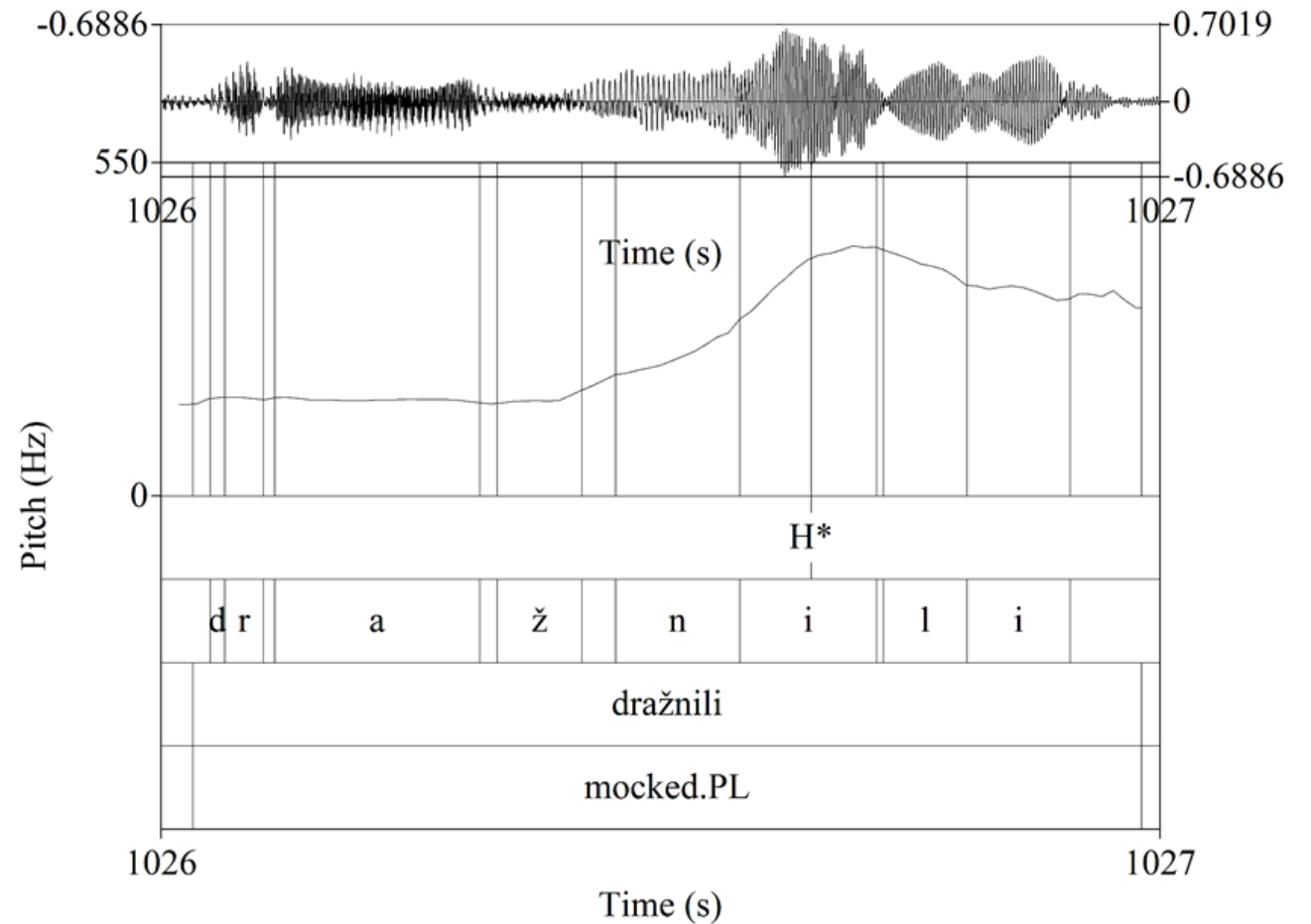|					
L	HL		LH	L	
Ca	Ci	→	Ca:	Ci	

Pitch peak retraction analysis (Bethin 2006a,b)

But, as we have seen, in examples where pretonic prominence applies, the pitch peak is still associated with V_2, the etymologically stressed syllable.

In fact, it easy to show that especially in emphatic speech, H* intonational pitch accent targets V_2.

Pitch peak retraction analysis (Bethin 2006a,b)

(5) dra:žníli 'mocked.PL'

Sonority-driven stress retraction?

Intonational pitch accent placement provides evidence against the stress retraction account.

More evidence against stress retraction comes from vowel neutralization.

In Aŭciuki Belarusian, posttonic mid-low/low vowels are subject to strong neutralization/reduction to schwa or even complete elision.

Vowel neutralization

V$_2$ in PP contexts does not neutralize/reduce:

(6)   **basɔnóžki, *basɔ́nəžki**   'open-toe sandals'   (Vajtovič, 1972a)

   ɣɔdóŭ, *ɣɔ́dəŭ   'years.GEN'

Absence of vowel neutralization on V$_2$ in PP contexts provides evidence against the stress retraction account.

Vowel neutralization and pretonic prominence

Vowel neutralization

Various types of vowel neutralization in unstressed syllables are found in East Slavic.

Notably, the vowel neutralization patterns that apply to the immediately pretonic syllable are weaker than those that apply to the posttonic and not immediately pretonic syllables.

Vowel neutralization

For example, standard Russian exhibits two degrees of vowel neutralization:

- a weaker degree applies to the immediately pretonic syllable;

- a stronger degree applies to all other unstressed syllables (further pretonic, and post-tonic):

(7)   moloko 'milk'   [məlaˈko]

            karandaš 'pencil'   [kəranˈdaʃ]

            slovo 'word'   [ˈslovə]

Vowel neutralization

The pattern of neutralization on the immediately pretonic syllable can also be conditioned by vowel height (=‘dissimilative’ neutralization):

V_1	V_2
[a]	¬ [a]
[ə]	[a]

(8)   trava ‘grass.NOM’ [trəˈva]   travy ‘grass.GEN’ [traˈvɨ]
        voda ‘water.NOM’ [vəˈda],   vody ‘water.GEN’ [vaˈdɨ]

Current OT account

Key insight

Vajtovič 1972: pretonic prominence is likely diachronically linked with the dissimilative pattern of vowel neutralization, since both are dependent on the height of stressed V_2.

Crosswhite 1999, 2000, on vowel neutralization in Russian: every word contains an iambic foot, which comprises V_1 and V_2. All other syllables within the word are unfooted.

Moraic content of the foot

We can view intrinsic sonority of vowels as reflected in their moraic content.

When the two vowels within the foot are of equal height, they contribute a mora each.

But: moraicity is only retained within the foot. Unfooted vowels are non-moraic – this is reflected in vowel neutralization, as well as common vowel loss in further pretonic and post-tonic syllables (Crosswhite 1999, 2000).

Moraic content of the foot

In pretonic prominence contexts, the sonority of the vowels is skewed. This is because V_2 loses a mora and V_1 acquires one.

Acoustically, this is reflected in the fact that in PP contexts, V_1 is longer and higher in intensity & sonority than V_2.

(cf. Crosswhite on Carniolan Slovenian, where mid-low/low vowels are bi-moraic, and mid-high/high vowels are mono-moraic).

OT analysis

In order to express this account in Optimality Theoretical terms, we need the following constraints:

Undominated:

NO-FLOP-PROM corresponding ensures that stress syllable.

'Corresponding prominences must have sponsors and links' (Alderete 1999); surfaces on the etymologically stressed

RHTYPE=IAMB right-

For every foot, assign a penalty if stress is not aligned in that foot (to ensure the foot is present).

OT analysis

Ranked:

Fᴛ-Bɪɴ   A foot is two syllables and two morae

*Sᴛʀᴜᴄ-µ   Morae do not appear in output forms (Crosswhite 1999, 2000)

[+low]µ: Mid-low/low vowel ≥ µ

[+low]µµ: Mid-low/low vowel = µµ

*[-low]µµ: Mid-high/high ≠ µµ (Crosswhite 1999, 2000)

Deriving unmarked 1

σ(CaCá) σ	Fт-Bιn	*Struc-μ	[+low]$_\mu$	[+low]$_{\mu\mu}$	*[-low]$_{\mu\mu}$
σ(CaCá)σ	*!		*	*	
☞ σ(Ca$_\mu$Cá$_\mu$)σ		**		*	
σ(Ca$_{\mu\mu}$Cá)σ		**	*!	*	
σ(Ca$_{\mu\mu}$Cá$_\mu$)σ	*!	***		*	

Deriving unmarked 2

σ(CiCí) σ	Fᴛ-Bɪɴ	*Struc-μ	$[+low]_\mu$	$[+low]_{\mu\mu}$	*$[-low]_{\mu\mu}$
σ(CiCî)σ	*!				
☞ σ($Ci_\mu$$Cí_\mu$)σ		**			
σ($Ci_{\mu\mu}$Cî)σ		**			*!
σ($Ci_{\mu\mu}$$Cí_\mu$)σ	*!	***			

Deriving pretonic prominence

σ(CaCí)σ	Fᴛ-Bɪɴ	*Struc-μ	[+low]$_μ$	[+low]$_{μμ}$	*[-low]$_{μμ}$
σ$_μ$(Ca$_μ$Cí$_μ$)σ$_μ$		***!*		*	
σ(Ca$_μ$Cí$_μ$)σ		**		*!	
☞ σ(Ca$_{μμ}$Cí)σ		**			
σ(CaCí$_{μμ}$)σ		**	*!	*	*
σ(Ca$_{μμ}$Cí$_μ$)σ	*!	***			

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Conclusions

1. Pretonic prominence (acoustic prominence on the immediately pretonic syllable found in Aŭciuki Belarusian) manifests itself as lengthening of the pretonic vowel, as compared to the unmarked contexts.

2. Pretonic prominence does not constitute a sonority-driven retraction of a pitch peak or stress.

3. The current account derives pretonic prominence from the same properties of the pretonic syllable that vowel neutralization accounts are built on, thus allowing the two diachronically related processes to be formalized in a similar way.

Acknowledgements

Thank
you!
Дзякуй!

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