Redistribution of stress-related prominence in a Belarusian dialect

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mfm 24 · **Manchester, UK** · May 26-28, 2016

In a nutshell

The dialect of Belarusian spoken in the villages of Malyja Aŭciuki and Vialikija Aŭciuki in south-east Belarus has an unusual **prominence** in the immediately pretonic syllable (Kryvicky 1959, Vajtovič 1972, Belaja 1974; overview by Bethin 2006a,b). It has been described as lengthening, a peak of energy on the pretonic syllable, special 'musical' intonation, or a high tone. It has also been considered a stress retraction (Kurylo 1924, Kryvicky 1959, Belaja 1974).

This paper shows that the phenomenon in question, which I am calling **pretonic prominence (PP)**, is related to the fact that the Aŭciuki dialect is developing **vowel neutralization**, as also hypothesized in earlier literature. Specifically, I propose that PP is sonority-based, and is compensatory in nature.

Belarusian vocalism

Standard Belarusian, as well as its dialects, has stress and no tonal distinctions. Stress is free and mobile, and is acoustically signalled by **increased duration** of the stressed vowel and **lack of reduction**. Intensity is secondary in signalling stress in Belarusian (cf. also Jones & Ward 1969, Zlatoustova 1962 for Russian), and so is pitch (cf. Sussex & Cubberly, 2006). There is no phonemic vowel length in the language.

Pretonic prominence (PP)

The immediately pretonic syllable is characterized by increased duration and intensity of the vowel, if:

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

PP applies to native lexical items (1) and recent borrowings (2). It also applies across word boundaries (3):

(1) sestru 'sister.ACC [sʲɛ:ˈstru] (2) scienakardzija 'stenocardia' [scʲenaka:ˈrdzija]
sestra 'sister.NOM' [sʲɛˈstra] izasarbid 'isosorbide' [izasa:ˈrbit]

(3) na vulitsy 'in the street' [na: vulicɨ]

Vowel neutralization

Various types of vowel neutralization in unstressed syllables are prominent in East Slavic, especially Russian and Belarusian. Depending on the dialect, a low or mid-low V_1 (/ɛ, ɔ, a/) can preserve its quality, be realized as [a], or exhibit a 'dissimilative pattern' - be realized as [a] unless V_2 is /a/, in which case V_1 is realized as [ə].

The Aŭciuki dialect, sitting on the boundary between dialects with and without neutralization exhibits a mixed pattern different from all of the above (Vajtovič 1972). Note that in PP contexts (top row), there is no neutralization.

V_1		V_2
etymological /ɔ/	**etymological /a/**	
[ɔ:]	[a:]	/i, ɨ, u, o, e/
[ɔ] or [a]	[a], rarely [ɔ]	/ɔ, ɛ/
[a], rarely [ɔ]	[a]	/a/

Further pretonic, as well as post-tonic syllables in the Aŭciuki dialect receive strong neutralization – to /ə/ or even complete loss of the vowel.

Data

Acoustic data (narratives recorded in a quiet setting in the speakers' homes) was collected in 2015 in the villages of Malyja Aŭciuki and Vialikija Aŭciuki using a Zoom H4n voice recorder. Data from three informants (female, age 65-81) is used in this paper. Tokens in which PP applies (n=100) and tokens with no PP (n=100) were extracted from declarative clauses with all-new intonation and analyzed using Praat (Boersma & Weenink 2016).

The highest value for intensity, pitch, and duration was extracted for vowels in four conditioning environments:

(i) V_1, unmarked, [+low]; ⟷ (iii) V_1, PP, [+low];
(ii) V_2, unmarked, [+low]; (iv) V_2, PP, [-low];

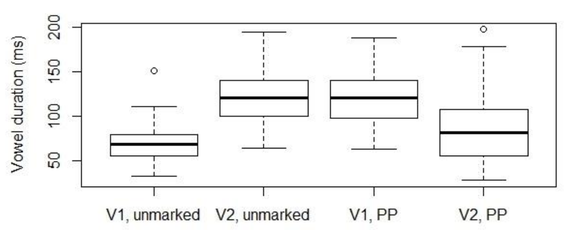
The values for each acoustic characteristic of (iii) V_1, PP contexts were compared with those of (iv) V_2, PP, and (i) V_1, unmarked. The second comapison was carried out in order to ensure that intrinsic phonetic difference between V_1, PP, [+low] and V_2, PP, [-low] are not the only source of any differences observed.

Selected references: **Belaja, A. S**. 1974. K xarakteristike kvantitativno-prosodičeskix različij v Nadsnovskix govorax na Černigovščine. In: R. I. Avanesov et al. (eds.). *Obščeslavjanskij lingvističeskij atlas: materialy i issledovanija*, 1971. Moscow: Nauka. 22-31. **Bethin, Christina Y**. 2006a. Stress and Tone in East Slavic Dialects. *Phonology*, 23, 2, 125-156. **Bethin Christina Y**. 2006b. From Pitch Accent to Stress: Peak Retraction in the Nadsnovs'ki Dialects of Ukraine and Belarus. *Harvard Ukrainian Studies* 28, 1/4, 69-79. **Crosswhite, K.** 2000. Vowel Reduction in Russian: A Unified Account of Standard, Dialectal, and "Dissimilative" Patterns *University of Rochester working papers in the language sciences* 1 (1), 107-172. **Crosswhite, K.** 2001. *Vowel reduction in optimality theory*. Psychology Press. **Hayes, B. 1989.** Compensatory Lengthening in Moraic Phonology. *Linguistic Inquiry* 20 (2), 253-306. **Kryvicky, A. A**. 1959. Fanetyčnyja asablivasci adnoj z havorak poŭdnia Belarusi. *Pracy Instytuta movaznaŭstva AN BSSR*, 98-104. **Vojtovič, N. T.** 1972. K voprosu o putjax razvitija akan'ja v vostočnoslavjanskix jazykax. In: R. I. Avanesov et al. (eds.). *Obščeslavjanskij lingvističeskij atlas: materialy i issledovanija*, 1970. Moscow: Nauka. 17-39.

Acknowledgements: I would like to thank Kevin Ryan, Juliet Blevins, Patrick Jones, Christina Bethin, Draga Zec, Michael Flier, and Donca Steriade for their help and advice on this project, as well as the audiences at Polinsky Lab, Harvard LingedIn, FASL 24 and FDSL 11 for their most helpful comments and questions. I am very grateful to Veranika Kurcova for the many valuable discussions we had on the topic, and for her assistance with the fieldwork. Special thanks are due to my Aŭciuki informants – вялікі дзякуй!

Results

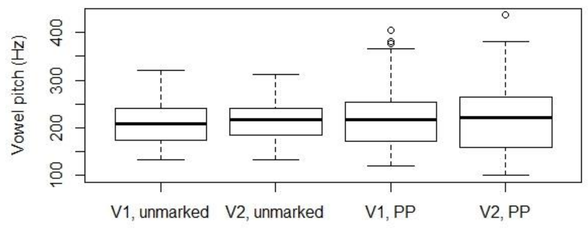
Duration:



n=100	V_1 Average	V_1 SD	V_2 Average	V_2 SD
Unmarked	69 ms	20	120 ms	29
PP	120 ms	30	85 ms	34

V_1 PP vs. V_2 PP: $p < 0.01$ (Wilcoxon paired test)
V_1 PP vs. V_1 unmarked: $p < 0.01$ (Wilcoxon test)

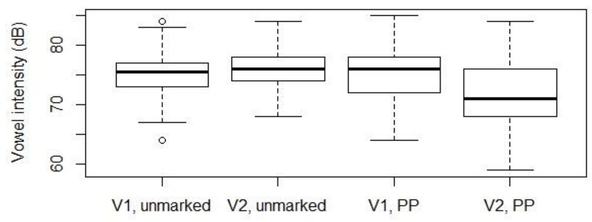
Pitch:



n=100	V_1 Average	V_1 SD	V_2 Average	V_2 SD
Unmarked	210 Hz	42	214 Hz	38
PP	220 Hz	59	221 Hz	67

V_1 PP vs. V_2 PP: $p = 0.8$ (Wilcoxon paired test)
V_1 PP vs. V_1 unmarked: $p = 0.34$ (Wilcoxon test)

Intensity:



n=100	V_1 Average	V_1 SD	V_2 Average	V_2 SD
Unmarked	74.9 dB	4	75.8 dB	3
PP	75.5 dB	5	71.9 dB	6

V_1 PP vs. V_2 PP: $p < 0.01$ (Wilcoxon paired test)
V_1 PP vs. V_1 unmarked: $p = 0.33$ (Wilcoxon test)

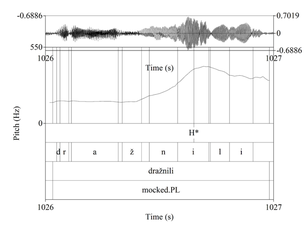
Why not stress retraction, or pitch peak retraction?

PP has been considered a stress retraction. Some evidence that this is not the case comes from speakers' intuitions, as well as vowel neutralization facts. The stress shift account predicts that V_2, no longer bearing stress, should neutralize in PP contexts. Relevant examples, with V_1 = /ɔ/ and V_2 = /o/ are somewhat rare, but they show no neutralization on either vowel (4):

(4) basonožki 'open-toe sandals' [basɔ:ˈnoški], *[baˈsɔ:nəški]
ɣodoŭ 'years.GEN' [ɣɔ:ˈdow], *[ˈɣɔ:dəw]

Evidence against viewing PP as stress retraction also comes from placement of intonational pitch accents, which align with stressed syllables (Ladd 2008). In tokens with PP, H* pitch accents align with V_2:

(5) dražnili 'mocked.PL' [dra: žˈnili]



Another existing analysis, by Bethin 2006 (a,b) accounts for Aŭciuki PP as a retraction of pitch peak, associated with stress, from V_2 to V_1. The acoustic data shows, however, that there is no pitch movement associated with PP.

Analysis

Drawing on Broch 1916, Belaja 1974, and Vajtovič 1972, I propose that **PP relies on a sonority effect**: because V_2, which is [-low], is low on sonority, V_1 receives compensatory lengthening and intensity.

Every word in the Aŭciuki dialect contains an iambic foot, which consists of V_1 and V_2; all other syllables are unfooted (cf. Crosswhite 2000 for Russian). Within the foot, [+low] vowels are bi-moraic, and [-low] vowels are mono-moraic (cf. Crosswhite 2001 on Carniolan Slovene). Unfooted vowels are non-moraic – this is reflected in vowel neutralization that applies to syllables outside of the foot. When V_1 equals V_2 in height, they contribute a mora each. In PP contexts, the sonority of the vowels is unequal, which results in V_2 losing a mora and V_1 acquiring one (cf. Hayes 1989). Acoustically, this is why in PP cases, V_1 is longer and higher in sonority than V_2.

Constraints:

MAX, DEP, IDENT:	undominated
MAXPROM (Alderete 1999):	stress in the input has an output correspondent – undominated
RHTYPE=IAMB:	a penalty if stress is not right-aligned in the foot – undominated
FT-BIN:	a foot is two syllables and two morae
*STRUC-μ (Crosswhite 2000):	morae do not appear in output forms
*[+low], -μ:	no low/mid-low vowel should be non-moraic
$*[+low]_{\mu\mu}$:	no low/mid-low vowels should be mono-moraic
$*[-low]_{\mu\mu}$:	no non- low/mid-low vowel should be bi-moraic

σ(CaCí)σ	FT-BIN	*Struc-μ	*[+low], -μ:	$*[+low]_{\mu}$	$*[-low]_{\mu\mu}$
$\sigma_{\mu}(Ca_{\mu}Cí_{\mu})\sigma_{\mu}$		***!*		*	
$\sigma(Ca_{\mu}Cí_{\mu})\sigma$		**		*!	
☞ $\sigma(Ca_{\mu\mu}Cí)\sigma$		**			
$\sigma(CaCí_{\mu\mu})\sigma$		**	*!		*
$\sigma(Ca_{\mu\mu}Cí_{\mu})\sigma$	*!	***			

σ(CaCá) σ	FT-BIN	*Struc-μ	*[+low], -μ:	$*[+low]_{\mu}$	$*[-son]_{\mu\mu}$
σ(CaCá)σ	*!		*		
☞ $\sigma(Ca_{\mu}Cá_{\mu})\sigma$		**		*	
$\sigma(Ca_{\mu\mu}Cá)\sigma$		**	*!		
$\sigma(Ca_{\mu\mu}Cá_{\mu})\sigma$	*!	***		*	