On the interaction of vowel reduction and stress clash in Russian nominal compounds

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This paper presents a study of the interaction of lexical stress and vowel reduction in nominal compounds in Modern Standard Russian (the variety spoken in Moscow). Vowel reduction in Russian comes in two flavours, 'radical' and 'moderate' (Crosswhite 2000), depending on the position of the targeted vowel within the prosodic word: generally, moderate reduction applies in the pretonic syllable, and other syllables are covered by radical reduction. In radical contexts, basically all vowels neutralise to schwa (although /u/ retains its labialisation), whereas in moderate contexts schwa does not occur, instead /o/ and /a/ neutralise to [ɐ] (or [ɨ̞] after /ʂ/, /ʐ/, /ʦ/), /u/ is centralised to [ʊ̟], /i/ and /e/ neutralise to [ɨ̞] (or onsetless [ɪ]) after non-palatalised consonants, or else /i/, /e/, /a/, and /o/ neutralise to [ɪ] and /u/ is centralised to [ʊ̟] after palatalised consonants.

The proposed paper addresses the behaviour of compounds formed from two monosyllabic stems without a linker vowel, e.g. *stop-kran* 'emergency brake', *xèštèg* 'hashtag', with respect to reduction. It has been shown previously that Russian compounds do or do not have a secondary stress depending on a number of factors (see Gouskova & Roon 2013 for an overview and analysis). When compounds like *stop-kran* exhibit a secondary stress on the first stem (which mostly happens when the compound in question is accented), they surface with the vowels [o] and [e] as expected. Yet in cases when there is only one stress in the whole compound *stop-*ˈ*kran* (mostly weak phrasal contexts), they do not demonstrate the expected typical pattern of moderate reduction requiring that mid-vowels /o/ and /e/ after non-palatalised consonants should be reduced to [ɐ] and [ɨ̞] respectively, e.g. *polk* [polk] 'regiment' — *polka* [pɐlˈka] 'regiment.GEN'. Instead, the vowel of the first stem surfaces as [ə] and crucially not as [ɐ] or [ɨ̞]—a behaviour observed in proclitic function words with the underlying /o/ (*vot* 'here', *no* 'but', *čto* 'that', etc.) elsewhere in the system.

The data were collected from 25 speakers of Modern Standard Russian aged between 17 and 50. A reading task was given to each speaker, consisting of 7 sentences that included the compounds of the type *stop-*ˈ*kran* described above and the control group of simplex words in both stressed and unstressed phrasal positions. Since vowel duration is the main cue of lexical stress in Russian on a par with spectral qualities of vowels (see Yanushevskaya & Bunčić 2015 and references therein), the durations of vowels in the analysed compounds were measured. The results demonstrate that the first vowel in such compounds is significantly shorter than in simplex words (ANOVA: $F(2, 42) = 116.05$, $p < 0.0001$) in unaccented

positions, with a duration range of 17 to 33.6 ms, showing also the spectral qualities characteristic of radically reduced vowels.

As pretonic vowels within a single phonological word are never radically reduced, we take this observation to corroborate the existence of two phonological words in compounds (cf. Lavitskaya 2015: ch. 10). Although the first syllable in such compounds is underlyingly stressed, it surfaces as schwa in weak phrasal positions. This phenomenon supports the separation of, roughly, 'phonological' vs. 'phonetic' reduction in Russian proposed by Barnes (2006) and Iosad (2012). First, phonological reduction operates at the word level, yielding /o/ > [ɐ] in the pretonic syllable (cf. /stoˈptatʲ/ > [stɐˈptatʲ] 'tread down'), but it is clearly not applicable to compounds like *stop-kran*, which never surface like [stɐpˈkran]. Second, the first of the two adjacent stresses in compounds is deleted at the phrase level, hence its exponents such as vowel duration are lost, see Horne (1990) for a similar approach to English. Finally, phonetic reduction mechanisms apply (Iosad 2012, Grammatchikova & Knyazev 2014), primarily affecting vowel duration and thus turning unstressed /o/ and /e/ into [ə], which produces the derivation /ˈstopˈkran/ → [stəpˈkran].

References

Barnes, Jonathan. 2006. *Strength and weakness at the interface: Positional neutralization in phonetics and phonology*. Berlin; NewYork: Mouton de Gruyter.

Crosswhite, Katherine M. 2000. Vowel reduction in Russian: A unified account of standard, dialectal and 'dissimilative patterns'. In: Crosswhite, Katherine M. & Joyce McDonough (eds.). *University of Rochester Working Papers in the Language Sciences*, Spring 2000, 1.

Gouskova, Maria & Kevin Roon. 2014. Gradient clash, faithfulness, and sonority sequencing effects in Russian compound stress. *Laboratory Phonology* 4.2: 383–434.

Grammatchikova, Elena V. & Sergey V. Knyazev. 2014. Русские заударные гласные в предударной позиции внутри синтагмы [Russian posttonic vowels in pretonic position within a prosodic phrase]. *Вестник МГУ. Серия 9: Филология* 5: 122–134.

Horne, Merle. 1990. Empirical evidence for a deletion formulation of the rhythm rule in English. *Linguistics* 28: 959–981.

Iosad, Pavel. 2012. Vowel reduction in Russian: No phonetics in phonology. *Journal of Linguistics* 48.3: 521–571.

Lavitskaya, Yulia. 2015. *Prosodic structure of Russian: A psycholinguistic investigation of the metrical structure of Russian nouns*. PhD thesis. Konstanz: Universität Konstanz.

Yanushevskaya, Irena & Daniel Bunčić. 2015. Russian. *Journal of the International Phonetic Association* 45.2: 221–228.