Interface constraints and frequency in Russian compound stress

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Introduction. Frequent words and informal speech styles are often unmarked compared to rare words and formal registers: they are characterized by lenition, truncation, and relatively unmarked segmental inventory and syllable structure (Zipf 1949, van Oostendorp 1997, Coetzee and Pater to appear). Most Optimality-Theoric accounts rank faithfulness higher than markedness for formal registers and infrequent words but reverse the ranking for frequent/informal contexts. Here, we present a different type of frequency/register effect. We examine the various morphological and phonological factors that determine the presence and position of secondary stress in Russian compounds. We argue that in the stress patterns of Russian compounds, what matters is not faithfulness but morphology-prosody interface constraints.

Stress in compounds. Russian has a famously complex lexical accent system, in which the position of primary word stress depends on the lexical properties of individual morphemes (Halle 1973, Alderete 1999). Additonal complexities emerge in compounds. Russian subordinating compounds consist of at least two stems plus a theme vowel (cf. Greek, Nespor and Ralli 1996). In the resulting compound, primary stress always falls on the last constituent, and its position is determined by the accentual properties of the root and affixes, if any. Secondary stress surfaces only in compounds, and it surfaces variably, under complex phonological and morphological/lexical conditions. Phonologically, secondary stress is licensed if it is separated by at least two unstressed syllables from the following primary stress (see (1)). This is an emergent pattern of ternary rhythm, which we attribute to *LAPSE ('an unstressed syllable is adjacent to a stressed syllable'; Elenbaas and Kager (1999)). Interestingly, however, the basic pattern has exceptions in both directions: sometimes, secondary stress doesn't surface in the expected environment, and other times it surfaces unexpectedly.

(1) Prototypical patterns of secondary stress in Russian compounds

a.	σσ́	les-o-párk	'forest park'	cf. lés 'forest, párk 'park'
	σσ́σ	ver-o-lómstvo	'treachery'	cf. vér-a 'faith', lomátʲ 'to break'
b.	ὸσσ́σ	lès-o-kulʲtúra	'forest cultivation'	cf. lés 'forest', kulʲtúra 'cultivation'
	ὸσσσσ́σσ	vèr-o-ispovedánije	'denomination'	cf. vér-a 'faith', ispovedanije 'creed'

Our data come from three native speakers of Russian, who recorded a list of about 150 compounds of varying length and frequency. We found that even if secondary stress is phonologically conditioned, it may fail to appear if the stem is underlyingly unaccented. On the other hand, secondary stress may appear even when *LAPSE is not violated—i.e., with only one syllable separating the stresses—in infrequent words (see (2a, b)). Crucially, in many low-frequency words, secondary stress surfaces in a position that does not correspond to an underlying accent. Moreover, there is one phonological context where secondary stress may surface even in a syllable adjacent to primary stress, in violation of *CLASH: for yer stems, which have no surface vowel and consist of particularly marked consonant clusters, secondary stress surfaces on the theme vowel, which then heads the syllable of the marked cluster (see (2c)). Thus, the effect of frequency is that low-frequency words are more likely to surface with secondary stress even when it isn't conditioned phonologically or present underlyingly.

(2) Exceptions to the pattern

a. unaccented stem	golov-o-kruʒénije	'vertigo'	cf. golov-á 'head'
b. low frequency	jestèstv-o-védenije	'natural science'	cf. jestestv-ó 'nature'
c. marked cluster/yer stem:	lʲd-ò-búr	'ice breaker'	cf. lʲód 'ice'
	lʲn-ò-zavód	'linen factory'	cf. lʲón 'linen'

Analysis. Our analysis is summarized in (3). The key difference between low-frequency words and others is the ranking of the interface constraint ROOT→PRWD, which requires that each root correspond to a phonological word (cf. Nespor and Vogel 1986). Normally RT→PWD can be satisfied only when *LAPSE is satisfied. *LAPSE dominates NONRECURSIVITY(PRWD), which in turn dominates RT→PWD. In shorter words, the default is to not have secondary stress, but in longer words, lapse violations are avoided by realizing underlying accents as secondary stresses. For low-frequency words, however, RT→PWD is variably ranked or weighed higher than faithfulness (DEP-ACCENT), and so there will be secondary stress even if the stem has no underlying accent. Faithfulness is also dominated by the constraint we call "LICENSE-CLUSTER," which requires marked consonant clusters to be licensed by strong prosodic positions. In both contexts of exceptional secondary stress, it is crucially not faithfulness to underlying accent that compels recursive prosodification but either markedness or morphology-phonology interface constraints. We hypothesize that for low-frequency words, such prosodification aids in lexical access (Cutler 1997 and others) similarly to hyperarticulation at the segmental level (Baayen 2007). This suggests an extension to theoretical approaches to the effects of frequency in phonology. In addition to faithfulness constraints, frequency can be indexed to interface constraints, since both mediate between levels of structure relevant to lexical retrieval.

(3) Analysis of the basic pattern, in brief

/golov-, -o-, kruʒ-, énije/	LIC-CLUSTER	DEP(ACC)	*LAPSE	NONREC	RT→PWD
a. ☞ {golov-o-kruʒénije}			**		*
b. {{golóv-o}{kruʒénije}}		*!		*	

/rabót-, o-, sposób-, nostʲ/					
c. ☞ {{rabòt-o}{sposóbnostʲ}}				*	
d. {rabot-o-sposóbnostʲ}			*!*		*

/ln-, o-, zavód/					
e. ☞ {{lnò}-{zavód}}		*		*	
f. {ln-o-zavód}	*!				*

Low frequency:

/jestestv-, o-, véd, -énije/	RT→PWD	LIC-CLUSTER	DEP(ACC)	*LAPSE	NONREC
g. ☞ {{jestèstv-o}{védenije}}			*		*
h. {jestestv-o-védenije}	*!			*	