

Latent consonant harmony in Russian: Experimental evidence for Agreement by Correspondence

Alexei Kochetov
al.kochetov@utoronto.ca
University of Toronto

It has been recently proposed that phonological constraints enforcing consonant harmony (long-distance consonant assimilation, as in (1)) are grounded in functional exigencies of speech production. Specifically, the *Agreement by Correspondence* approach (Rose & Walker 2004; Hansson 2001, 2007) hypothesizes that patterns of consonant harmony originate in difficulties at the level of phonological planning and phonetic implementation of featurally similar consonants. One interesting prediction of this approach is that harmony-like patterns may arise spontaneously, under certain conditions, even in languages that do not exhibit consonant harmony as a phonological process.

In this study we test this prediction experimentally, by examining patterns of errors involving Russian sibilant fricatives. The language is known to exhibit a 4-way place contrast, /s/ vs. /s^j/ vs. /ʃ/ vs. /ʃ^j/ (2a), and no apparent restrictions on combinations of these consonants within a word (2b). In the experiment, four native speakers of Russian were presented with nonsense words of the type C₁ap C₂ap, where C₁ and C₂ differed in primary (anterior/posterior) and secondary places (plain/palatalized), e.g. sap ʃap, sap ʃ^jap, s^jap sap, ʃap ʃ^jap, etc. It was hypothesized that speakers would produce partial or complete errors similar to those found in patterns of consonant harmony – specifically, assimilations of anterior / plain consonants to posterior / palatalized consonants (i.e. the ‘palatal bias’ observed in sibilant harmony: Hansson 2001).

Acoustic analysis of the recorded data involved measurements of centre of gravity of fricative noise (COG, in Hz; primary place: /s s^j/ vs. /ʃ ʃ^j/) and F2 at the onset of the following vowel (Hz; secondary place: /s^j ʃ^j/ vs. /s ʃ/). All tokens were categorized as errorful or non-errorful using a metric referring to the two measures. The analysis revealed that there were in total 66 errors (complete or partial), almost evenly split between the two acoustic parameters. As expected, most of the errors were assimilatory (about 70%), as opposed to dissimilatory or exchange errors. An overwhelming number of assimilatory errors in primary place involved changes from anterior to posterior (s/s^j → ʃ/ʃ^j). Among assimilatory errors in secondary articulation, changes from plain to palatalized (s/ʃ → s^j/ʃ^j) were more common than changes from palatalized to plain (s^j/ʃ^j → s/ʃ). Interestingly, while most primary place errors were anticipatory (regressive), most secondary articulation errors were perseveratory (progressive).

The patterns of errors that emerged in the experiment are consistent with previous work on errors (cf. assimilatory errors and palatal bias in Stemberger 1991, Pouplier & Goldstein 2005). Most importantly, these patterns are similar to those observed in languages with phonological consonant harmony, supporting the hypothesized link between consonant harmony and speech production (cf. Walker 2007 on experimental evidence for nasal consonant harmony). This suggests that while consonant harmony in languages like Russian is not manifested phonologically, it may become active under certain conditions, triggered by difficulties in planning and implementing similar consonants. Further evidence for the ‘latent status’ of consonant harmony in Russian comes from sporadic harmonization found in Russian sound changes, loanword adaptation, and dialect formations (3).

(1) Examples of consonant harmony (Hansson 2001; Rose & Walker 2004)

- a. Aari (Afro-Asiatic) /tʃʰaːq-sis/ [tʃʰaːqʃiʃ] ‘cause to curse’
b. Malto (Dravidian) /tuːd/ ‘tiger’, /ɖuːɖu/ ‘mother’
c. Tepehua (Totonacan) /ʔuks-laqtʃ-in/ [ʔoqsɻaqtʃin] ‘look at Y across surface’

(2) Russian sibilant fricatives: place contrasts (a) and the lack of co-occurrence restrictions (b)

a.	/s/	sol’	‘salt’	sbroʂ	‘dump’	
	/sʲ/	sël	‘villages, gen.’	broʂ	‘throw, imp.’	
	/ʃ/ [s]	šëlk	‘silk’	broš	‘broach’	
	/ʃʲ/ [ʃʲ:]	ščëlk	‘click’	boršč	‘borsht’	
b.	ʃ...s	šustryj	‘quick’	s...ʃ	suša	‘land’
	s...ʃʲ	suščnost’	‘being’	ʃʲ...sʲ	sčast’je	‘happiness’

(3) Sporadic harmony in Russian: sound changes, loanwords, dialect forms (Vasmer 1986-87)

- a. s...ʃ → ʃ...ʃ šeršen’ ‘hornet’ (< Old Russian sьršęnъ; cf. Slovak sršeň)
šubaš ‘head of police’ (< Turkish subaşı; cf. Romanian subașă)
šaška ‘sword’ (< Circassian/Kabardian sešxo)
- b. ʃ...s → ʃ...ʃ šaša dial. ‘highway’ (< French *chaussée*; cf. Standard Russian šosse)
- c. s...tʃ → ʃ...tʃ šmorčëk dial. ‘shorty’ (< smorčëk, cf. Standard Russian smorčëk)
šljača dial. ‘slush’ (< sljača, cf. Standard Russian sljakot’)
- d. s...zʲ → sʲ...zʲ sjuzjëm dial. ‘thicket’ (< suzjëm)

References

- Hansson, G. 2001. Theoretical and typological issues in consonant harmony. Doctoral dissertation, University of California, Berkeley.
- Hansson, G. 2007. On the evolution of consonant harmony: The case of secondary articulation agreement. *Phonology* 24(1): 77–120.
- Pouplier, M. & L. Goldstein. 2005. Asymmetries in the perception of speech production errors. *Journal of Phonetics* 33. 47–75.
- Rose, S. & R. Walker. 2004. A typology of consonant agreement as correspondence. *Language*. 475–531.
- Stemberger, J. P. 1991. Apparent anti-frequency effects in language production: The addition bias and phonological underspecification. *Journal of Memory and Language* 30. 161–185.
- Vasmer, M. 1986-1987. *Ètimologičeskii slovar’ russkogo iazyka*. Ed., transl. O. N. Trubachev. 2nd ed. Moscow.
- Walker, R. 2007. Nasal and oral consonant similarity: Exploring parallels with long-distance nasal agreement. *Language and Cognitive Processes* 22.7, 1–41.