

Rhotics, jers and schwa in the history of Bulgarian

(paper presented at the 13th ICPHS, Stockholm, 13-19 August 1995)

Abstract

Three phonological contexts of early Slavic involving rhotics and jers, which gave different outcomes in the various Slavic languages, are explored. The modern Bulgarian reflexes of these contexts are explained by a change in the way the listener corrected the acoustic signal: the tendency to over-correct it (which had given rise to syllabic rhotics) reversed into a tendency to under-correct it (which resulted in a later insertion of anaptyctic schwas next to rhotics).

1. Description of three Early Slavic contexts

In the period of dialectal disintegration of Proto-Slavic, the two-level vowel system that characterized Early Slavic 2 (ES2, fig.1) was restructured in Early Slavic 3 (ES3, fig.2) into a four-level system through a shift from quantitative to qualitative contrasts [1, 2]. The latter is the system used as the starting-point in the historical phonology of the individual Slavic languages. The mid vowels in it (L2 and L3) shared the feature [+lax].

i	i:	ɨ:	u	u:
	æ	æ:	ɑ	ɑ:

Fig.1 Vowel system of Early Slavic 2

L1	i	ɨ	u
L2	ɪ		ʊ
L3	e		o
L4	æ	ɑ	

Fig.2 Vowel system of Early Slavic 3

The high lax vowels (ɪ and ʊ), traditionally called *jers*, evolved differently in different phonological contexts. In the so-called *weak* position (before a syllable with a 'full' vowel, i.e. a vowel that is not a jer, and word-finally) they demonstrated a tendency to reduction. In the so-called *strong* position (before a syllable with another jer) they were generally retained.

Later, in Early Slavic 4 (ES4), weak jers were lost whereas strong jers were subjected to lowering: they merged with L3 vowels.

1.1. Context A

(Proto-Indo-European, PIE) *CrC > (ES1) *CirC, *CurC

In ES1 the syllabic rhotics of PIE developed leftward anaptyctic vowels (short *i* or *u*), thus becoming codas in rhymes with decreasing sonority: *r > ir, ur [3:95]. Being in contradiction with the tendency only to admit rhymes with increasing sonority (the 'law of the open syllables'), the sequences of 'high vowel + rhotic' were most probably restructured once more in ES2. In Old Church Slavonic we find the spellings "r + front jer" (rɪ), "r + back jer" (rʊ) as reflexes of ES1 *ir, *ur.

1.2. Context B

(PIE-ES2) *CriC > (ES3) CriC
(PIE-ES2) *CruC > (ES3) CruC

1.2.1. Context B1

(ES3) CriC, CruC in *weak* position, i.e. __# ; __C₁V(≠jer)

1.2.2. Context B2

(ES3) CriC, CruC in *strong* position, i.e. __C₁jer.

2. Presentation of data for contexts A, B1 And B2

<i>Early Slavic 1 & 2</i> (reconstructed forms in IPA transcription):	<i>Polish</i>
A: */gurɖla/ "throat", */virhu/ "top"	A: gardło, wierzch
B1: */druva:/ "wood", */kristiti:/ "christen"	B1: drwa, chrzcić
B2: */kruvi/ "blood", */kristu/ "cross"	B2: krew, chrzest
	<i>Czech</i>
<i>Old Church Slavonic</i> (attested written forms in IPA transliteration):	A: hrdlo, vrch
A: gɾolo /gɾlo/, vɾihu /vɾʲhu/	B1: drva, křtiti
B1: drova, kristiti	B2: krev, krest
B2: kruvi & krovī, kristu & krestu	<i>Serbo-Croatian</i>
	A: grlo, vrh
<i>Russian</i> (in Roman transliteration)	B1: drva, krstiti
A: gorlo, verh	B2: krv, krst
B1: drova, krestit'	<i>Bulgarian</i> (in Roman transliteration)
B2: krov', krest	A: gărlo, vrăh
	B1: dărva, krăstja
	B2: krăv, krăst

Only Polish kept the three contexts distinct (see Table 1 where "V" stands for "vowel"). Russian maintained the distinction between context A and context B, B1 and B2 being confused within B. Czech developed syllabic /r/'s in contexts A and B1, but kept B2 distinct. Serbo-Croatian merged all contexts in a single reflex: syllabic rhotics.

In Bulgarian we find two different reflexes: *ăr*, *ră*. Moreover, there is a large set of Bulgarian words, historically related to contexts A, B1 and B2, which all exhibit morphophonemic alternations with 'metathesis' of schwa (written *ă*) and *r* [4:166-200]. Some examples:

grăk "Greek" vs. gărkat "the Greek", gărci "Greeks"
vrăv "twine" vs. vărvi "twines", vrăvta "the twine"
krăv "blood" vs. kărvav "bloody", okărvaven "bloodstained"

Since 1899 Bulgarian orthography has been based on the following principle : *ră* is written (i) before 2 (or more) consonants; (ii) in monosyllables. In all other cases, i.e. before one consonant in polysyllables, *ăr* is written.

The Bulgarian data suggest the following scenario: merger of A, B1 and B2 in a single reflex (like in Serbo-Croatian) and further differentiation in two different outcomes: *ăr/ră*.

Table 1. Reflexes of contexts A, B1 and B2 in the modern Slavic languages

	Context A *CurC, *CirC	Context B1 CruC, CriC (weak jers)	Context B2 CruC, CriC (strong jers)
Russian	V left to /r/	V right to /r/	
Polish	V left to /r/	no V	V right to /r/
Czech	no V		V right to /r/
Serbo-Croatian	no V		
Bulgarian	V either left or right to /r/		

3. Acoustic characteristics of rhotics in some Slavic languages

3.1. Bulgarian pre- and post-consonantal rhotics

Modern Bulgarian rhotics are apical taps and are typically realized as "an (almost) empty space on a spectrogram without any formants" [5:165-6], but only in intervocalic position. When they are preceded or followed by another consonant, a schwa-like vocoid element appears necessarily on oscillograms and spectrograms. In Bulgarian these svarabhakti vocoids (the term has been introduced by [6:298] in his description of Spanish rhotics) possess a formant structure very similar to that of a reduced vowel (schwa). The average duration of svarabhakti elements is about 30 ms.

Phonetically Bulgarian pre-consonantal rhotics represent a sequence of a tap and a svarabhakti vocoid (fig.3) whereas post-consonantal rhotics are a combination of a svarabhakti vocoid followed by a tap (fig.4). Compared to preceding (fig.3) or following schwa (fig.4), svarabhakti vocoids are shorter and of lower intensity.

3.2. Czech syllabic rhotics

The acoustic image of inter-consonantal rhotics in Czech is very similar to the sequences 'schwa + tap + svarabhakti vocoid' and 'svarabhakti vocoid + tap + schwa' in Bulgarian. Czech syllabic rhotics represent a tap both preceded and followed by a svarabhakti vocoid (fig.5). The two svarabhakti vocoids are roughly of equal duration and intensity. Thus the acoustic image of Czech syllabic rhotics is symmetrical unlike that of the Bulgarian sequences 'schwa + rhotic + consonant' or 'consonant + rhotic + schwa', characterized by asymmetry.

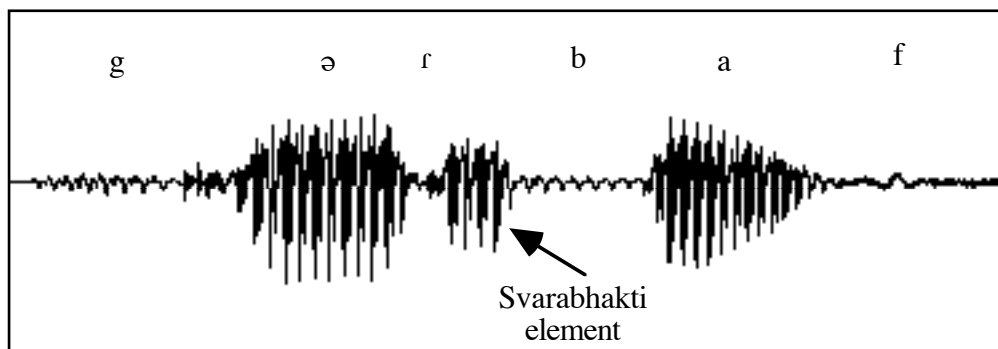


Figure 3. Oscillogram of Bulgarian pre-consonantal rhotic in gärbav, "hunchbacked"

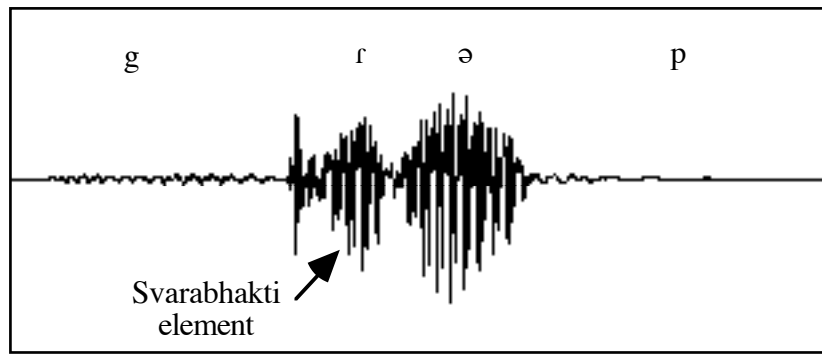


Figure 4. Oscillogram of Bulgarian pre-consonantal rhotic in grăb, "back"

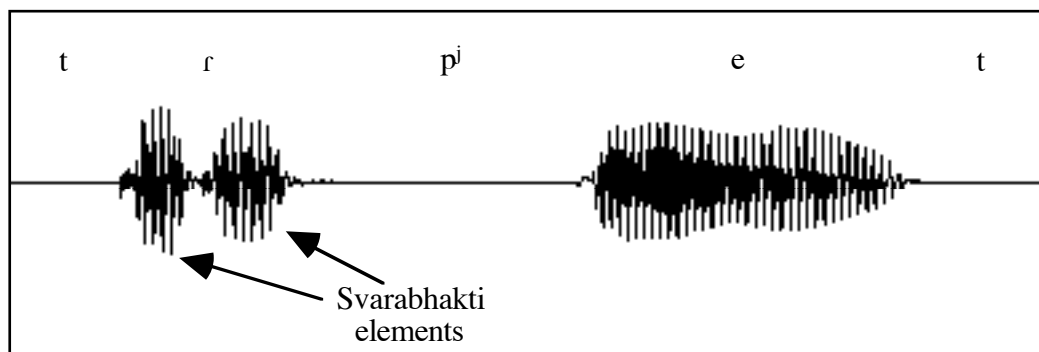


Figure 5. Oscillogram of Czech inter-consonantal syllabic rhotic in trpět, "endure"

4. Sound changes through under- and over-correction

As pointed out by Ohala [7:348] such 'automatic' vocoids may create a sound change. The intervocalic rhotic is an unambiguous context and as such doesn't require any correction. There exists perfect correspondence between the speech signal and its perceptual interpretation. As for pre-consonantal and post-consonantal rhotics, they are contexts with virtual ambiguity: they require correction of the speech signal by the listener (factoring out of the svarabhakti vocoid).

4.1. Under-correction of svarabhakti vocoids. Anaptyxis.

If the listener fails to attribute the svarabhakti vocoid to the adjacent rhotic, he will misperceive it as a phonemic (most probably reduced) vowel. He will under-correct the signal. The resulting sound change will be an *anaptyxis*.

4.2. Over-correction of reduced vowels. Vowel loss.

If the listener inappropriately corrects the signal, he can misperceive a reduced vowel as a svarabhakti vocoid, erroneously attributing it to the adjacent rhotic. He will over-correct the signal. The resulting sound change will be a *vowel loss*.

5. A possible scenario for Bulgarian

5.1. Merger of contexts A, B1 and B2

In context A, the orthographic jers in the Old Church Slavonic sequences *ru*, *ri* (ръ, рь) did not denote real jers. Even in strong position they were not subject to lowering. Words as *vrithu*, *privu*, *skrobī* never appear with *e*, *o* in the place of strong jers (i.e. in their first syllable): **vrehu*, **skrobi* [8:139-140].

By contrast, lowering of the jer in strong position does occur occasionally in the manuscripts where the sequences *ru*, *ri* are found in context B2: *krestu* for *kristu* 'cross', *krovi* for *krovi* 'blood'.

Hence Old Church Slavonic used the same spelling *ru*, *ri* for two different phonetic and phonological realities:

i. 'svarabhakti vocoid + rhotic + svarabhakti vocoid' (phonetically), 'syllabic rhotic' (phonologically) from ES1 *ir, *ur (**context A**);

ii. 'svarabhakti vocoid + rhotic + reduced vowel (jer)' (phonetically), 'non-syllabic rhotic + reduced vowel' (phonologically) from ES1 *CriC, *CruC (**context B**).

The merger between (i.) and (ii.) took place later: at the end of the Old Bulgarian period, i.e. at the end of the 11th century.

This merger resulted from the reanalysis of the jer in context B as a svarabhakti vocoid, i.e. as part of a syllabic rhotic. This was a process of dephonologization. The perceptual mechanism which produced the sound change was that of over-correction. Listeners erroneously analyzed the jer as part of a syllabic rhotic. Then speakers began producing /r/ with symmetrically distributed svarabhakti elements (the corresponding acoustic image was similar to that of fig.5) at the place of the earlier asymmetrical acoustic image corresponding to "rhotic + reduced vowel (jer)" (cf. fig.4). The resulting sound change was *jer loss*.

5.2. Schwa anaptyxis

In a later period, a new tendency towards undercorrection of the acoustic signal arose. The Bulgarians then started perceiving either the leftward or the rightward svarabhakti vocoid of syllabic rhotics as a reduced vowel (schwa). This resulted in *schwa anaptyxis*. One of the svarabhakti vocoids was thus phonologized. Acoustically, this meant a return to asymmetry. The direction of the anaptyxis (leftward or rightward) depended upon the syllable structure. Apparently a constraint against complex codas (sequences of a liquid and an obstruent in coda position like in the excluded forms *.vǎrh., *.kǎrst., *.kǎrs.tja. vs. the actual .vrǎh., .krǎst., .krǎs.tja.) was at work at that time. That is why *ǎr* is admitted before one consonant when a vowel follows (i.e. in polysyllables), but not in monosyllables where the following consonant is word-final and hence it cannot be resyllabified as the onset of another syllable.

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