

Russian Consonant Cvlusters

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Preamble

This paper began with an observation that I had drawn from my limited exposure to Russian: some prepositions that normally surface as single consonants (e.g., *s*, “with”) appear at certain times with a vowel following them (e.g., *so mnoj*, “with me”). My thought was that this epenthetic vowel was inserted to break up illegal consonant clusters, and as such it should tell us something about Russian phonotactics.

It turned out to be much more complicated than that, but hopefully it still tells us something about Russian phonotactics. First off, my understanding is that these vowels are hypothesized in much previous writing to be underlying, not epenthetic. The underlying vowel is referred to as a *yer*, and is a high lax vowel. It surfaces only after lowering to *o* or *e*, and it lowers only when preceding another *yer* in the next syllable. All unlowered *yers* are deleted post-cyclically. The existence of the *yers* is supported by alternations of the kind I just discussed, as well as historical evidence that such vowels were actually present in old Slavonic.

So it appeared that my squib topic was pretty much shot. The epenthetic vowel in the example above is actually underlying, and it surfaces only because there’s another one in between the /m/ and the /n/ in /mnoj/. Because all Russian words beginning with /mn/ clusters have underlying *yers*, it looks on the surface like a vowel is being inserted to break up these clusters, but that’s not really what’s happening. Even if you could show that Russian speakers continue to insert vowels before loan words (e.g., *so mnemosajn* “with mnemosyne”) or nonce words (e.g., *so mnovyj*), one could just argue that the

speakers are positing an underlying *yer* in these words because of the statistical generalizations about /mn/ sequences that they've acquired.

But again, it turns out to be more complicated than that. As pointed out in Matushansky (2002)¹, the *yer* story is not enough to explain all of the cases where the prepositions /s/, /v/, and /k/ surface instead as /so/, /vo/, and /ko/. There are at least two kinds of cases where the latter forms surface despite there being no possibility (for reasons not discussed here) of an underlying *yer* in the next syllable. I'll examine each in turn.

One note: I prepared for the paper by spending long hours with a Russian dictionary, and shorter hours with a Russian informant. All generalizations about cluster distribution are mine unless I say otherwise. Because the generalizations are mine, there is a chance that some of them are wrong. Wherever possible, I'll try to indicate the basis for my generalizations.

The Geminate Prohibition²

1.	v + vytebsk	v:ytebske	“in Vytebsk”
	v + vtoryj	vo vtorom	“in the second (one)”
	s + svet	so svetom	“with light”
	v + svet	v svete	“in the light”
	k + krovat'	k:rovati	“towards the bed”

¹ This paper will figure prominently throughout this squib.

² Here and throughout this paper, I will abstract away from voicing assimilation, which is pervasive in Russian clusters, unless it is relevant to the phenomena under discussion.

As seen in (1), a sequence consisting of a geminate fricative followed by another consonant is broken up by epenthesis. Geminates, incidentally, form whenever two consonants with the same manner and place of articulation are adjacent, regardless of voicing differences. That the phonotactic constraint here holds of geminate fricatives, rather than fricative sequences or geminates in general, is shown by the last two data in (1): a /vsv/ sequence is kept intact, and a /kkr/ sequence surfaces as /k:r/.

The data from (1) are relatively easy to account for (at least in comparison to the next problem I'll discuss). Cross-linguistically, we can argue that geminate fricatives and complex onsets are both marked. It is unsurprising, then, that having a geminate fricative as part of a complex onset is also marked. The constraint that bans such sequences could be a high-ranked conjunction of the two relevant markedness constraints (call them *Gem(Fric) and *ComplexOnset (*CO) or an entirely separate constraint that assigns a violation to every cluster with a geminate fricative inside.

This (conjoined) constraint needs to be ranked above Dep(V) to allow vowel epenthesis. All other relevant faithfulness constraints (abbreviated here as Faith) need to be ranked above Dep(V), to preclude the possibility of other repairs. The simplex constraints against geminates and complex onsets must be ranked below faithfulness constraints, to capture the fact that both structures appear elsewhere in the language. I will simply assume gemination in the candidates here; pretend there's an undominated constraint disallowing sequences of the same consonant.

s + svet	*Gem(Fric) & *CO	Faith	Dep-V	*Gem(fric)	*CO
s:vetom	*!			*	*
☞ sosvetom			*		
s:ovetom			*	*!	
svetom		*!			*

So far, I've assumed that there is no underlying *yer* in the prepositions under discussion. My limited understanding is that these underlying vowels are necessary for the analysis of several other phenomena in Russian and Slavic in general, but for the purposes of this paper, I will essentially pretend that they don't exist.

My hope is that the surface facts about the particular vowel/null alternations discussed here can be explained solely in terms of phonotactically-driven epenthesis. Richness of the base, however, would dictate that I consider URs with *yers* in them. Clearly, this poses no problems for the form above, where the vowel surfaces. However, it would be extremely tricky to account for the vast majority of cases, where the vowel does not surface. I'll sketch a solution here, but this issue won't be of central interest in this paper. The solution would involve an underlying high schwa, an undominated markedness constraint against such vowels appearing on the surface, and complicated interactions and conjunctions between Ident(high), Max(V), and several phonotactic constraints. The resultant ranking could be paraphrased as "get rid of the *yer* vowels unless lowering them and leaving them in place will alleviate a phonotactic violation." The particulars would probably be messy, and I won't get into them here³.

The Sonority Prohibition

2.	v + vtornik	vo vtornik	"on Tuesday
	s + vtornik	so vtornika	"since Tuesday"

³ One note, however: if we eventually do want to posit underlying *yers*, it doesn't mean we need to give up on a phonotactic account of their alternations. For instance, with the sonority prohibition discussed below, it will be possible to analyze the emergence of the normally-deleted *yer* as alleviating a sonority violation. I'll sketch an approach to the much simpler epenthetic analysis in this paper.

k + vtornik	ko vtorniku	“for Tuesday”
s + vladimir	s vladimirom	“with Vladimir”
s/k/v + rtut’	so/ko/vo rtut[case]	“with/to/in quicksilver”

As seen in (2), a vowel is inserted to break up sequences of the form consonant-/v/-obstruent. This contrasts with licit sequences of the form consonant-/v/-sonorant, as seen in the penultimate datum. A vowel is also inserted to break up consonant-sonorant-obstruent sequences, as seen with the last datum.

The data from (2) are both stranger and more difficult to account for than those from (1). The strange thing is that they look like the result of constraints on the complexity of onsets or the sonority properties thereof (e.g., */srt/ in an onset), but Russian actually allows many structures that are marked along these lines. In fact, Russian is extraordinary in how few restrictions it imposes on cluster phonotactics. It features onsets of up to four consonants (/vzbresti/ ‘into one’s head;’ /vskrichat’/ ‘exclaim’). Sonority reversals are the exception, but are certainly present (/mgnovenije/ ‘moment;’ /l’stets/ ‘flatterer;’ /mzda/ ‘bribe;’ /rvat’/ ‘vomit’).

What seem to be banned are specifically the onset clusters (C /v/ [-son]) and (C [+son] [-son]). Both sequences are decomposable, in the sense of Greenberg; all two-segment substrings are attested as onsets elsewhere in the language. The question is this: if Russian allows long strings of consonants and allows violations of the sonority sequency principle (SSP), why does it disallow these specific long strings with sonority reversals?

Matushansky conceives of these effects as sonority-driven schwa epenthesis⁴. She stipulates that /v/ is underlyingly /w/ (based on historical change) and states the relevant epenthesis rule in terms of the structural description C _ [+son] [-son]. There are several problems with this rule, each of which I'll address in turn.

Underlying /w/?

One problem is the idea of /v/ as an underlying glide. Although it does pattern differently than other fricatives with regard to phonotactics, it does *not* pattern like a glide. The only true glide in the language is /j/. It occurs rather infrequently in consonant clusters, but when it does, it is never cluster initial (e.g., /sjel/ 'ate;' /djavol/ 'devil'). There are no geminate glides, and there are no sonority reversals involving glides in Russian. /v/, on the other hand, appears freely both before and after segments in consonant clusters, regardless of their sonority. It geminates freely, except as discussed above.

/v/ doesn't pattern with liquids either, as we might expect if underlying /w/ is of a lower sonority than /j/ in Russian. Liquids do not co-occur in onset clusters in Russian. There are no words beginning with /rl/ or /lr/ sequences, yet we find /rvat'/ 'vomit', /vrem'a/ 'time', /l'v'onok/ 'little lion' and /vlast'/ 'power'. If anything, /v/ seems to be closest in distribution to the nasals, which trigger the epenthesis discussed above and

⁴ Note that this solution renders these effects entirely unrelated to the v/vo alternations found with succeeding *yers*. A sequence like /so m noj/, for instance, results from *yer* lowering in the preposition, triggered by the *yer* that is underlyingly present between /m/ and /n/ (indicated by underscore). A sequence like /vo rtute/, on the other hand, is sonority driven epenthesis. The *yer* present in the UR of the preposition is deleted as usual, then a schwa is epenthesized according to the mis-named Sonority Schwa Epenthesis rule. This analysis seems, at best, to miss a commonality between these two cases.

occur in plateaux and sonority reversals. I think that calling /v/ a nasal should probably be a last resort, though.

It might be better, then, to state the rule as applying to anything with the sonority of at least a fricative, rather than at least a nasal: C _ [+cont] [-son] instead of C _ [+son] [-son]. This is where we run into some of the cases of other fricatives patterning differently: /vzdor/ and /sxvatka/ are fine.

So we've come full circle: /v/ is not a glide, not a liquid, and not (behaviorally) a fricative. Its frequency at the beginning of clusters suggests that it is an obstruent (there are relatively few words with sonorant-initial onset clusters in Russian, but hundreds and hundreds with /v/-initial clusters). Its patterning with respect to vowel epenthesis suggests that it is a sonorant. For the current paper, I will treat /v/ as belonging to its own idiosyncratic category. It is a fricative, but has higher sonority than other fricatives. Thus, it may be subject to sonority generalizations that do not affect other fricatives.

Sonority-Driven Coincidences

A second problem with the Sonority Schwa Epenthesis rule is that it's not sonority-driven at all; it's simply a description of a (rather complex) featural environment with instructions to insert a segment. If it has the effect of alleviating an SSP violation, it can't be considered anything but a coincidence.

What would be a more explanatory way to analyze the epenthesis? Let's restate the question I asked earlier: if Russian allows long strings of consonants and allows violations of the SSP, why does it disallow these specific long strings with sonority reversals?

When the question is stated this way, constraint conjunction seems like an attractive solution. But this won't work; sonority reversals and long strings of consonants often coincide in Russian (e.g., /mstitel'/ 'avenger'). We must account for the fact that /mzda/ is a perfectly good syllable in Russian while /zmda/ is illegal. It may be useful to decompose such clusters, and figure out all the things that may be wrong with them.

If we take the SSP to be a universal constraint of the form "each syllable contains one and only one sonority peak," where a sonority peak is any segment with higher sonority than its syllable-internal neighbors, we need to posit this constraint as low-ranked in Russian. The SSP is still present, though, and the epenthesis at issue could feasibly be a case of low-ranked SSP as a tie-breaker. But there's really no way that candidates /srta/ and /sorta/ could be in a tie in the first place. If the underlying string is /srta/, as in the cases we're interested in, faithfulness will always favor the "wrong" candidate.

The only other possibility I can think of invokes the idea of an appendix. This is an extra-syllabic position at the beginning or end of a word. We could reanalyze Russian words as having an extra-syllabic appendix position initially; under this analysis, many violations of the SSP vanish. /rtut'/, for instance, could be analyzed as r(tut'), where an extrasyllabic liquid is appended onto a well-formed syllable, and the SSP is not violated. Putting the preposition /s/ onto the word would force /r/ into the syllable, violating the SSP: *s(rtut').

This proposal would explain why the features of the first C are not important in stating the environment for epenthesis: anything that fills the appendix slot will force a

succeeding sonorant into the onset, violating the SSP. In this conception, the SSP is not low-ranked as we originally thought. It is just easily-bypassed.

Appeal to an appendix position can also explain the asymmetry of /mgla/ vs. */lmga/. In a sequence of three onset consonants, sonority falls are permitted across the first two because they are not part of the same syllable. Falls are prohibited across the second two consonants because they are necessarily part of the same syllable: m(gla) vs. *l(mga).

For the analysis to work correctly, we must posit the following sonority hierarchy for Russian: Vowel >> (glide), liquid >> nasal, /v/ >> obstruent. The liquid/nasal distinction may not be strictly necessary, but preliminary generalizations seem to support it (e.g., /nr/, /mn/ words exist but /rn/, /rl/ words do not). Grouping all obstruents together reflects the interchangeability of plosives and fricatives in clusters (/vzdor/, /vdvoje/, /skver/) and the fact that fricative-plosive sequences don't violate the SSP (/m(stit')/, /v(zdor)/).

The appendix analysis predicts that SSP violations should be impossible word-internally, unless a syllabic parsing is available that will avoid the violation. That is, we predict that sequences like /ar.ga/ should be possible, but not sequences like */as.rga/. This generalization holds as far as I can see, although my data is far from exhaustive. Note that if we had posited a low-ranked SSP as originally intended, this asymmetry would not be explainable.

Based on my observation of a fair amount of data, I believe that the appendix analysis is also justified on the basis of the maximum size for word-initial vs. word-medial syllable onsets. As noted above, clusters of up to four consonants are allowed at

the beginning of a word. But I couldn't find a single case of a four-segment onset word-medially. Although there exist word-medial clusters of four consonants (/jurodstvo/ 'holy idiocy'), they never unambiguously appear in the onset. In the case I've just mentioned, for instance, /ju.rodst.vo/ seems to be a more natural parse than /ju.ro.dstvo/.

A Preliminary Formalization⁵

The relevant constraints:

Sonority Sequency Constraint (SSC): each syllable has one and only one sonority peak.

Parse: every segment must be parsed into a syllable. Violated by appendix consonants.

Dep-V: don't add a vowel.

Faith: shorthand for the complex of faithfulness constraints that prohibit alternative repair strategies, e.g., deletion, metathesis.

***Complex Onset (*CO):** Assigns one violation to every complex onset.

NoCoda: Assigns one violation for every coda.

The SSC and Faith will be undominated, because sonority reversals and repairs other than epenthesis never surface. Dep-V will be ranked below the SSC, to make epenthesis available as a repair. Parse and *CO will be ranked below Dep(V), and will constrain the choice of a site for epenthesis. NoCoda figures here only because it is a "companion" to *CO; it is bottom-ranked in this analysis.

⁵ As I've done throughout this paper, here I will ignore: (1) voicing assimilation. (2) the distribution of /j/, which can't appear in the appendix. (3) richness of the base; my comments from the earlier analysis also apply here, but I won't get into the gritty details.

Here are tableaux for two forms with epenthesis and two forms without:

s + vtorom	SSC	Faith	Dep-V	Parse	*CO	NoCoda
(svto)rom	*!					
☞(sov)(to)rom			*			*
(svo)(to)rom			*		*!	
s(vo)(to)rom			*	*!		
(sto)rom		*!			*	

s + vladimir	SSC	Faith	Dep-V	Parse	*CO	NoCoda
☞(svla)dimirom					*	
(sov)(la)dimirom			*!			*
(svo)(la)dimirom			*!		*	
s(la)dimirom		*!				

mglā	SSC	Faith	Dep-V	Parse	*CO	NoCoda
(mglā)	*!				*	
☞m(glā)				*	*	
(mog)(lā)			*!			*
m(go)(lā)			*!	*		
(om)(glā)			*!		*	*

v + mglā	SSC	Faith	Dep-V	Parse	*CO	NoCoda
(vmglā)	*!				*	
v(mglā)	*!			*	*	
☞(vom)(glā)			*		*	*
(vmo)(glā)			*		**!	
v(glā)		*!		*	*	

Conclusions and Discussion

The principal finding is that the somewhat difficult data about phonotactic onset repairs in Russian can be characterized as an effect of the normal sonority sequence principle interacting with an extrasyllabic appendix slot. This allows us (in a constraint-based approach) to view Russian onset patterns as arising from the same principles that govern phonotactic phenomena in other languages. I also gave an analysis for the geminate fricative cluster prohibition, which involved constraint conjunction.

In the course of analyzing the sonority prohibition, I explored a few interesting side questions. I took exception to the characterization of /v/ as [+son]. In my analysis, the idiosyncratic behavior of /v/ is due to an idiosyncratic sonority hierarchy in Russian. Such language-specific variations in sonority ranking arose at least once during our class (for Lebanese Arabic), so it doesn't seem like such a crazy solution. It can still be viewed as a byproduct of /v/'s historical roots as /w/, if one so wishes. I supplied converging evidence for the appendix theory based on corpus work (well... dictionary work), showing that word-medial onset clusters differ from word-initial ones.

One interesting avenue for further research involves richness of the base. It seems likely that a proper analysis of other Russian phenomena will require us to posit underlying *yer* vowels. I sketched a way that this might be accomplished, but I leave a concrete solution for future research.

A second intriguing question arose while I was eliciting data from a native speaker. I had chosen several dozen words from a dictionary based on their extremely complex onsets and sonority reversals. My informant reported that almost half of the words were either archaic or "nobody would use that." That is, my completely non-scientific sample of words with marked onsets seemed to have an abnormally high proportion of words that are not in general use. This raises the intriguing possibility that words with marked clusters are disappearing from the language. Obviously, such a hypothesis would be premature. A potential confound also exists; I was using a rather old dictionary, and it's possible that it contained a large proportion of archaic words in general. Nonetheless, this is at least worth looking into in the future.