

Vowel Reduction in Russian Dialects: *Akan'e* vs. *Okan'e*
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Introduction

Russian is an Indo-European language descended from Proto-Slavic. It can be broken up into three main dialect groups: Northern, Southern, and Central Russian. The Standard Russian language that most people refer to when speaking of it is actually the Moscow dialect which is apart of the Central Russian dialect group. There are a few differences that exist between these three dialect groups, some features being remnants of the earlier Proto-Slavic. However, for the sake of this paper, the most important difference has to do with vowel reduction. That is, in Central Russian and Southern Russian dialects instances of an unstressed /o/ are expressed as either an [a] or a [ə], a phenomenon known as *akan'e*. In Northern Russian dialects this vowel reduction does not occur, instead all instances of an unstressed /o/ are expressed the same way as when they are stressed, as [o], this phenomenon is known as *okan'e*. Both *akan'e* and *okan'e* are related to a phonological process known as vowel reduction, that first appeared in an earlier language that Russian evolved from. *Akan'e* and *okan'e* differ in how they approach vowel reduction. This differentiation can be accounted for using optimality theory, as it arises due to a differing ranking in constraints.

Evolution from Proto-Slavic to Russian

Russian is a member of the East Slavic group of languages that descended from a common ancestral language, Proto-Slavic. The first emergence of what is referred to as Proto-Slavic was around 2000-1500 BC (Cubberley 19). It survived for hundreds of years before it eventually began to break apart in the fifth century with the expansion of the Eastern Slavs. However, two of the main phonological features of Proto-Slavic survive today as key components of the modern Russian language, the stressed vowel and palatalized consonants (25).

Because the Slavs were not a particularly unified people, except when faced with danger from an external threat, there was a great deal of differentiation in the Slavic dialects. In fact, the language differed a great deal depending on the region a person occupied. By the tenth century, the Slavs had broken up into the three distinct sub-groups that still exist today in modern Slavic studies: the East Slavic, the West Slavic, and South Slavic (20). For the purposes of this paper, we will only discuss East Slavic as it pertains to the evolution of Proto-Slavic to the modern Russian language. In 988 AD, Prince Vladimir introduced Orthodox Christianity to the Eastern Slavs, and until the sacking of Kiev by the Tatars in 1240, Eastern Slavic remained relatively cohesive and without any great differentiation in dialect (80). It was only when Rus' captured by the Tatars and thrown into chaos that Eastern Slavic began to experience a divide into distinct Russian, Ukrainian, and Belarusian languages.

However, Russian still struggled to become distinct from the dominant language of Russian Orthodox Christianity, Church Slavonic which emerged after the Christianization of Kievan Rus' by Prince Vladimir. When Kiev fell to the Tatars, Russia's center of power shifted to Novgorod for a while before settling in Moscow. Eventually, in the eighteenth century, the dialect that had emerged and gained prominence there began to be established as what we now refer to as Standard Russian (81). Russian also began to be influenced by Western languages in the fifteenth century when Peter the Great sought to modernize Russia. He was the one that truly pushed forth the emergence of Russian from Church Slavonic. Now, Russian, much like Proto-Slavic before it, has three distinct dialect groups each with their own phonological features that differ from Standard Russian. Before discussing Russian dialects and their differences, it is important to understand one of the key features of the Russian language that plays a role in this differentiation.

Stress

One of the most important components of the Russian language is stress. It's the difference between torture and a fly, that is the Russian words for torture and fly are *múka* and *moka*, respectively. They are spelled exactly the same way in Russian, so the only way to distinguish one from the other is their pronunciation that shows how stress is placed. Now, many languages have set systems for assigning stress according to syllable structure, some are trochaic and some are iambic. Russian, however, does not follow such a well defined system for assigning stress placement. In fact, stress in Russian is quite unpredictable, as seen in the above example of torture and the fly. It follows no set system and is liable to change with the addition of case endings or conjugation. The only thing that is certain is that Russian is a language with no secondary stress assignment. As with most languages, how a word is spelled in Russian is not always how it is pronounced. In fact, that is rarely the case as stress in Russian goes hand in hand with another pivotal feature of the Russian language, vowel reduction.

Vowel Reduction

Vowel reduction occurs in unstressed vowels. In Russian, vowel reduction occurs when tone interacts with vowel quality and stress (Molczanow 109). There are two hierarchies that are important to the implementation of vowel reduction. The first is the vowel sonority hierarchy, which gives us this ranking: high central vowels {i} > mid central vowels {ə} > high peripheral vowels {i, u} > mid-high peripheral vowels {e, o} > mid-low peripheral vowels {ɛ, ɔ} > low peripheral vowels {a} (110). The second hierarchy is the tonal prominence hierarchy that indicates that high tone is more prominent than low tone: H > M > L (110). Now, when we cross

this sonority hierarchy with the tonal prominence hierarchy, a few markedness constraints arise.

According to Molczanow, these markedness constraints are:

*H/i: a violation occurs for every high central vowel associated with a High tone,

*H/i; ə: a violation occurs for every high or mid central vowel associated with a High tone,

*H/i; ə; i, u: a violation occurs for every central or high peripheral vowel associated with a High tone,

*H/i; ə; i, u; e, o: a violation occurs for every central, high, or mid-high peripheral vowel associated with a High tone,

*H/i; ə; i, u; o; ε, ɔ: a violation occurs for every central or non-low peripheral vowel associated with a High tone,

*H/i; ə; i, u; o; ε, ɔ; a: a violation occurs for every vowel associated with a High tone.

It appears that low vowels seem to favor High tone.

Now, the Russian language has quite a few instances of vowel reduction, but perhaps the most interesting are the instances of phenomenon such as *akan'e* and *okan'e*. Both have to do with the phonological changes that occur when presented with an /o/ in an unstressed position in a word. When, /o/ is stressed it is expressed as [o]. However, how it is expressed in its unstressed position differs according to whether one follows *akan'e* or *okan'e*.

Akan'e could, in English, refer to “saying a.” That is, when /o/ is unstressed it is often pronounced similarly to an “a”. Of course, the phenomenon is actually much more complicated than this basic explanation. *Akan'e* also deals with the vowel reductions that unstressed /a/ undergoes, but that is outside the scope of this paper and will not be addressed. The pronunciation of an unstressed /o/ differs in *akan'e* depending on the /o/s relation to the stressed

vowel. In immediately pre-tonic positions, that is the vowel directly before the stressed syllable, unstressed /o/ is neutralized to [a], this is referred to as a moderate vowel reduction (113).

Extreme vowel reduction occurs in post-tonic, that is any vowel after the stressed syllable, and not immediately pre-tonic positions. In the case of *akan'e*, this means that an unstressed /o/ in post-tonic or not immediately pre-tonic positions is centralized to [ə]. *Okan'e* differs from *akan'e* in that no vowel reduction actually occurs, unstressed /o/ is expressed as [o] just like stressed /o/s.

Consonants in Russian can be divided between two categories: hard and soft, or palatalized, consonants. Often it is hard to distinguish whether a given consonant is hard or soft just by looking at a word; however, there are a few easy ways to determine this. By far the easiest to remember is that if a consonant is followed by the soft sign, *ь*, then it is soft and if it is followed by the hard sign, *ъ*, then the consonant is hard. Another way to determine the type of a consonant is to look at the vowel that follows it. However, as this paper is centered around the topic of vowel reduction in the context of the unstressed /o/, this form of identification only matters in the sense that if a consonant is followed by an /o/, then that consonant is hard. Now, this information might seem out of place given what has been discussed so far. But it is actually quite important with regard to *akan'e*.

There is in fact another reduction that occurs within *akan'e* that differentiates between hard and soft consonants. *Akan'e* always occurs as described above when an unstressed /o/ follows a hard consonant. However, when an unstressed /o/ follows a palatalized consonant, a different phonological change occurs. Here, no matter the location of the unstressed /o/ in relation to the stressed syllable, the /o/ is expressed as [i] (Crosswhite 112). This is due to the fact that [o], [a], and [ə] can only follow hard consonants in Russian. All three of these

phonological changes occur within the same language and refer to the same phoneme. So, how is it possible to tell which one is used. It all depends on location.

Russian Dialects

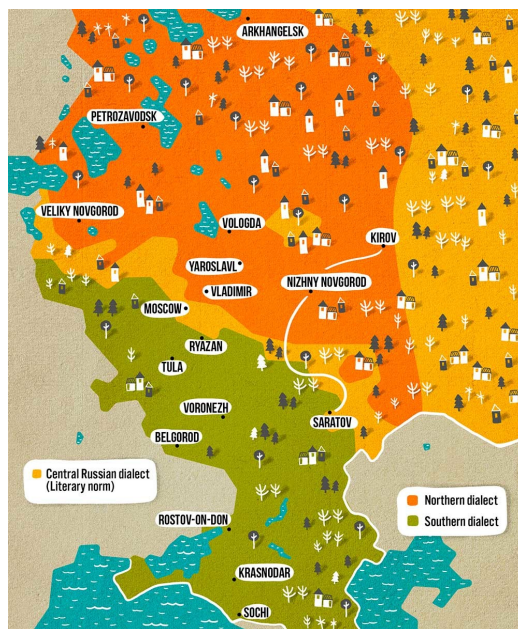


Figure 1: Map of Russian Dialects (Nosova)

Most of the study of Russian linguistics has been centered in European Russia, that is everything West of the Ural Mountains. Extensive study of the language and its different dialects was done between the 1960s to the late 1980s during the time of the Soviet Union. Russian can be divided into three dialect groups that have been named according to their geographical location: North, Central, and South. Central Russian dialects are probably the most well known form of the Russian language as they include Standard Russian. They are located in a horizontal strip in the center of European Russia, including important cities such as the capital of Russia, Moscow, and Saratov. Central Russian dialects are known for their use of *akan'e*. However, they are not the only dialect of Russia that uses it. Southern Russian dialects are spoken in the south of European Russia, including cities such as Krasnodar and Sochi. *Akan'e* is also prevalent in

Southern Russian dialects. Now, not all dialects of Russian have *akan'e*. In fact one of the most prominent phonological characteristics of the Northern Russian dialects is their lack of it. Instead, *okan'e* is prevalent. Northern Russian dialects are spoken in the North of European Russia, including cities like Veliky Novgorod and Nizhny Novgorod. Now that the differences between *okan'e* and *akan'e* have been established and their places of use have been described, it is now possible to determine why they occur using optimality theory.

Akan'e

In addition to the six markedness constraints that we laid out above, there are other constraints that are needed in order to determine why *akan'e* occurs. One of the most important is that High tone (H) is assigned to stressed syllables. This can be described using a correspondence constraint that says:

HEAD=H: Head syllables should be H (Molczanow 119).

It should be noted that Head refers to stressed syllables. So, stressed syllables should have High tone. As stressed syllables have High tone, it is important to note that unstressed syllables must have Low tone (L) and if they do not, they have it forced upon them. This can be described with a constraint that states:

NON-HEAD=L: Non-head syllables should be L (119).

According to Molczanow, not only do stressed syllables have High tone, but this High tone spreads to the left to affect the preceding syllable. This occurs due to the combination of three constraints:

ALIGN-L(H, PW): Every High tone should be aligned with the left edge of the prosodic word,

LOCAL: Spread only to the adjacent element,

DEP-T: No insertion of tones (119).

The ranking of these constraints is HEAD=H > LOCAL > NON-HEAD=L > ALIGN-L (H, PW) > DEP-T.

The location of tone in Russian is assigned according to the location of stress. The spreading of High tone leftward, that is the association of H with the immediately pre-tonic syllable, is due to the fact that every high tone should be aligned with the left edge of the prosodic word. Now that we have defined a few important constraints. It is possible to show them in action. For example, take the Russian word for window, in cyrillic this word is *окно*. The underlying representation of this word is /ok 'no/. Using optimality theory, we find that the correct surface form of this word is /ak 'no/:

/ok 'no/	ALIGN-L	*H/≤ə	*H/≤e, o	*H/≤a
L H / /ək 'no/		*!	**	
L H / /ok 'no/		*!	**	
L H / ⇐ /ak 'no/				**
L H /ok 'no/	*!		*	

Because /ak 'no/ lowers the immediately pre-tonic mid-vowel, it avoids violating the markedness constraint *H/i; ə; i, u; e, o that states a violation occurs for every central, high, or mid-high peripheral vowel associated with a High tone. For brevity in the chart this constraint has been

given the short-hand name $*H/\leq e, o$. Therefore, /ak ‘no/ wins over the faithful candidate /ok ‘no/. Vowels in stressed syllables do not lower regardless of the pressure of tone, which we know from HEAD=H.

Now, why does an extreme vowel reduction occur, reducing an unstressed /o/ to [ə]? First, we need to introduce another constraint. In Russian, only low sonority vowels are allowed in atonic positions. The inability of unstressed vowels in Russian to be sonorous is defined by the constraint:

“ $*-\Delta\omega \geq \{i, u\}$: incur a violation for every non-head of a prosodic word that contains a segment with sonority higher than or equal to $\{i, u\}$ ” (116).

According to the sonority hierarchy, there are only two vowels that are less sonorous than $\{i, u\}$, and only one of them has any bearing on the topic of *akan* ‘e, $\{ə\}$. Take, for example, the Russian word for space, *космос*. It’s underlying representation is /’kos mos/. Using optimality theory, we find that the correct surface form of the word is /’kos məs/:

/’kos mos/	ALIGN-L	$*H/\leq ə$	$*H/\leq e, o$	$*H/\leq a$	$-\Delta\omega \geq \{i, u\}$
<div style="text-align: center;"> H L /’kos mos/ </div>			*	*	*!
<div style="text-align: center;"> H L /’kos mas/ </div>			*	*	*!
<div style="text-align: center;"> H L /’kos məs/ ⇐ </div>			*	*	

Because /’kos məs/ contains [ə] it does not incur a violation with regard to the $-\Delta\omega \geq \{i, u\}$ constraint as [ə] is the only vowel of the three possible outcomes that is less sonorous than $\{i, u\}$. Therefore, /’kos məs/ wins out over the faithful candidate /’kos mos/.

It is entirely possible for both phonological changes that are described in *akan'e* to occur in the same word. For example, the Russian word for professor is *профессор*. The underlying representation of this word is /pro 'fɛs sor/. Using optimality theory, we find that the correct surface form of the word is /pra 'fɛs sər/:

/pro 'fɛs sor/	ALIGN-L	*H/≤ə	*H/≤e, o	*H/≤a	-Δω≥{i, u}
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & / & & & \text{↗} \\ \text{/pra 'fɛs sər/} \end{array}$			*	**	*
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & & & & \\ \text{/prə 'fɛs sər/} \end{array}$	*!		*	*	
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & & & & \\ \text{/pro 'fɛs sor/} \end{array}$	*!		*	*	**
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & / & & & \\ \text{/pro 'fɛs sər/} \end{array}$			**!	**	*
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & / & & & \\ \text{/prə 'fɛs sar/} \end{array}$		*!	**	**	*
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & / & & & \\ \text{/pra 'fɛs sor/} \end{array}$			*	**	**!
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & & & & \\ \text{/prə 'fɛs sor/} \end{array}$	*!		*	*	*
$\begin{array}{ccccc} \text{L} & & \text{H} & & \text{L} \\ & & & & \\ \text{/pro 'fɛs sər/} \end{array}$	*!		*	*	*

Because /pra 'fɛs sər/ spreads the High tone of the stressed vowel to the left, it avoids violating the ALIGN-L constraint as the High tone is aligned with the left edge of the prosodic word.

Therefore, /pra 'fɛs sər/ wins over the faithful candidate /pro 'fɛs sər/.

Thus, it has been shown how *akan'e* works in the Central Russian and Southern Russian dialect groups when the preceding consonant of an unstressed /o/ is hard. Now, how does *akan'e* account for the reduction of an unstressed /o/ to [i] when the /o/ is preceded by a soft consonant? According to Crosswhite, this phenomenon can be described using a positional markedness constraint that states:

Ci/[+front]: a [+front] vowel must follow a palatalized consonant in unstressed syllables
(121).

Front vowels in Russian are {i}, {e}, and {ɛ}. Because of the $-\Delta\omega \geq \{i, u\}$ constraint defined earlier, it is impossible for {e} or {ɛ} to be the front vowel that follows palatalized consonants in unstressed syllables as they are not less sonorous than {i, u}. Therefore, the previous constraint can be redefined to state:

Ci/[i]: a [+front] vowel, [i] must follow a palatalized consonant in unstressed syllables
(121).

However, in Russian /o/ only usually appears after a palatalized consonant when it is stressed. So, this aspect of *akan'e* mainly refers to the reductions of /a/ which are not the focus of this paper. As stated earlier *akan'e* only occurs in Central and Southern Russian dialects. Northern Russian dialects discard *akan'e* and instead implement *okan'e* in pronunciation.

Okan'e

Obviously *okan'e* is much less complicated than its counterpart *akan'e* as it involves no vowel reduction. But, for most Russian speakers this phenomenon is actually quite strange as vowel reduction is seen as an integral part of the Russian language. Using the ideas presented by Molczanow, it seems that *okan'e* occurs due to high ranking correspondence constraints that make vowel reduction from /o/ to any other vowel impossible. The feature specifications for Russian vowels are:

	i	u	ɨ	e	o	a
high	+	+	+	-	-	-
low	-	-	-	-	-	+
back	-	+	+	-	+	+
round	-	+	-	-	+	-

Therefore, the correspondence constraint needed for *okan'e* are:

IDENT-V[+back]: If a vowel is [+back] in the input, it must be [+back] in the output,

IDENT-V[+round]: If a vowel is [+round] in the input, it must be [+round] in the output.

Now, all the constraints needed to examine *okan'e* using optimality theory have been defined.

Given the new constraints defined above and the knowledge of how *okan'e* differs from *akan'e*, it is possible to reexamine the examples used earlier for their pronunciation in Northern Russian dialects. In the cases of *okan'e* it is obvious that IDENT-V[+back], IDENT-V[+round] rank higher than the constraints used in the section describing *akan'e*. For example, the Russian word for window is expressed as /ok 'no/ in its underlying representation. In *okan'e*, the surface form of this word is /ok 'no/:

/ok 'no/	IDENT-V [+back]	IDENT-V [+round]	ALIGN-L	*H/≤ə	*H/≤e, o	*H/≤a
L H / /ək 'no/	*!	*		*	**	**
L H / ⇐ /ok 'no/					**	**
L H / /ak 'no/		*!			*	**
L H /ok 'no/			*!		*	*

Because the second candidate does not violate the higher ranking ALIGN-L (H, PW) constraint it wins over candidate four. Under *okan'e* the optimality theory analysis of the Russian word for space also differs because of the higher ranking faithfulness constraints. The underlying representation of space is /'kos mos/. For Northern Russian dialect groups, the surface form of this word is /'kos mos/:

/'kos mos/	IDENT-V [+back]	IDENT-V [+front]	ALIGN-L	*H/≤ə	*H/≤e, o	*H/≤a	-Δω≥{i,u}
H L ⇐ /'kos mos/					*	*	*
H L /'kos mas/		*!			*	*	*
H L /'kos mäs/	*!	*			*	*	

So, because /'kos mos/ does not violate any IDENT-V constraints it wins over the candidates with vowel reduction. The Russian word for professor in Russian has an underlying representation of /pro 'fɛs sor/. In *akan'e*, the surface form of this word is /pra 'fɛs sər/. However, under *okan'e*, the surface form is different due to the higher ranking IDENT-V constraints:

/pro 'fɛs sor/	IDENT-V [+back]	IDENT-V [+front]	ALIGN-L	*H/≤ə	*H/≤e, o	*H/≤a	-Δω≥{i, u}
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & / & & \\ \text{/pra 'fɛs sər/} \end{array}$	*!	**			*	**	*
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & & \\ \text{/prə 'fɛs sər/} \end{array}$	**!	**	*		*	*	
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & & \rightarrow \\ \text{/pro 'fɛs sor/} \end{array}$			*		*	*	**
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & / & & \\ \text{/pro 'fɛs sər/} \end{array}$	*!	*			**	**	*
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & / & & \\ \text{/prə 'fɛs sar/} \end{array}$	*!	**		*	**	**	*
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & / & & \\ \text{/pra 'fɛs sor/} \end{array}$		*!			*	**	**
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & & \\ \text{/prə 'fɛs sor/} \end{array}$	*!	*	*		*	*	*
$\begin{array}{ccc} \text{L} & \text{H} & \text{L} \\ & & \\ \text{/pro 'fɛs sər/} \end{array}$	*!	*	*		*	*	*

Because the faithful candidate /pro 'fes sor/ does not violate any IDENT-V constraints, it wins out over the other possible candidates.

Conclusion

Okan'e and *akan'e* differ greatly from one another both in their definitions and their respective dialects. However, it is interesting to note that this large difference, ultimately is due to two small constraints and how they rank in relation to the many others of the Russian language. Since the fall of the Russian Empire in 1917 and the subsequent rise of the Soviet Union, Russian dialects have been in decline. When the Soviet Union was created, the average person living within Russia was illiterate; therefore, one of the USSR's first main directives was a push towards literacy. As the center of power was in Moscow, it was the Moscow dialect that was used as the language model. Therefore, cementing that dialect as the Standard Russian known today. Because of this, most children were taught the Central Russian dialect instead of the dialect that dominated the region they lived in. However, while *akan'e* is certainly more prominent than *okan'e*, it does not mean that the latter has disappeared. In fact, it is still in use today in the north of European Russia. This creates an interesting conundrum in the field of computational linguistics, specifically with natural language processing. Voice input software has become something the average person encounters everyday, whether they are speaking to Siri or telling Alexa to play that one song stuck in their head. So, pronunciation is everything. As *akan'e* is the more prominent of the two phonological phenomena and a key feature of Standard Russian, it is the obvious choice for NLP programmers, leaving Northern Russian dialect speakers out of luck.

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