ПРОБЛЕМЫ ФОНЕТИКИ

VI

ISSUES IN PHONETICS

АСТ-ПРЕСС
ИЗДАТЕЛЬСКИЙ ДОМ

2014

УДК 801.4
ББК 81.2РУС-1
П78

Проблемы фонетики. VI / Отв. ред.: М. Л. Каленчук, Д. М. Савинов; Ин-т рус. яз. им. В. В. Виноградова РАН. — М.:АСТ-ПРЕСС КНИГА, 2014. — 416 с.:ил. [Серия основана в 1993 г.]

П78

ISBN 978-5-462-0715-5

В центре внимания авторов сборника — широкий спектр вопросов фонетики и фонологии. Основной корпус составляют статьи российских ученых, главным образом из Москвы и Санкт-Петербурга. Несколько работ представлено зарубежными коллегами из Великобритании, Нидерландов, Норвегии, Польши, США, Франции. Широта тематики, разнообразие позиций, исследовательских подходов и методов фонетического анализа остаются основными принципами нашего издания.

Для фонетистов, широкого круга лингвистов, преподавателей и студентов филологических вузов.

УДК 801.4
ББК 81.2РУС-1

Статьи печатаются в авторской редакции

ISBN 978-5-462-0715-5

СОДЕРЖАНИЕ

ЯЗЫКОВЫЕ ПОДСИСТЕМЫ

Наш друг, учитель и коллега – Леонид Леонидович Касаткин

Этот сборник статей посвящен двум датам — 85-летию Леонида Леонидовича Касаткина и 65-летию его научной деятельности. Обе эти даты кажутся нереальными любому, знающему юбиляра, поэтому забудем об этих цифрах и поговорим о человеке.

Леонид Леонидович — выдающийся российский лингвист, принадлежащий к поколению ученых, которых отличала способность не замыкаться в границах узкой темы или конкретного направления. Трудно сказать, в какой области лингвистики он сделал больше — фонетика, фонология, русская диалектология, история русского языка. При этом работы Леонида Леонидовича отличает редкое сочетание абсолютной творческой свободы и постоянно ощущаемой связи с классическими корнями — он не боится формулировать самые неожиданные теории, менять свое собственное мнение, опровергать то, что еще вчера казалось в науке незыблемым. Никакой косности при полной строгости исследовательской процедуры. Его не смущают ситуации, когда предложенные им идеи не находят единодушной поддержки коллег, и надо сказать, профессиональная интуиция почти никогда его не подводит. Проходит время, и оказывается, что он опять был прав. Леонид Леонидович — ученый-труженик, отдающий всего себя служению нашему общему делу и делающий это радостно и бескорыстно.

Леонид Леонидович не только блестящий ученый, но и талантливый преподаватель, что не так часто совмещается в одном человеке. Любой, кто слышал лекции Л. Л. Касаткина, конечно, помнит удивительное сочетание глубочайшего научного содержания и простоты изложения, передающуюся слушателям влюбленность в свое дело и особую, интеллигентную, неброскую и скромную манеру общения с аудиторией. Учиться у Леонида Леонидовича всегда было нелегко, но как же интересно! Он автор целого ряда учебников и пособий по фонетике русского языка и диалектологии, на которых выросло уже не одно поколение молодых лингвистов.

Леонид Леонидович — разносторонний человек, никогда не замыкающийся в рамках профессиональной деятельности. Ему все интересно — культура и политика, новые открытия и книги. А более всего ему интересны люди, окружающие его. Для многих из нас он является мерилом честности и принципиальности, умения оставаться самим собой в любых жизненных ситуациях.

Нам, его друзьям, ученикам и коллегам, повезло работать рядом с этим удивительным человеком, дружить с ним, учиться у него.

Дорогой Леонид Леонидович, поздравляем Вас!

От редакторов

Vowel shift and the rise of neutralization:
a study of an Arkhangelsk dialect

Alexander Krasovitsky (Oxford)

1. Introduction

A characteristic feature of North Russian and of some Central Russian dialects is *okan'je* (o-vowelling), a discrimination of the phonemes /a/ and /o/ in unstressed syllables following hard consonants. Recent studies (Vaahtera 2009, *inter alia*) point to a gradual decay of *okan'je*, in North Russian in favour of neutralization of /a/ and /o/ in unstressed positions. Due to the rapid nature of this process, we find a number of regional dialects in which archaic idiolects with consistent *okan'je*, such as that in (1a), co-exist with innovative individual systems where neutralization is possible or even obligatory in unstressed positions, as for example in (1b).

	Phoneme		Allophones in unstressed syllables	
(a)	/o/	→	[o], [ʊ]	mol[o]kó mol[ʊ]kó ‘milk’
	/a/	→	[ɐ], [ə]	st[ɐ]rík, st[ə]rík ‘old man’
(b)	/o/ /a/	>	[ɐ], [ə]	mol[ɐ]kó mol[ə]kó ‘milk’; st[ɐ]rík, st[ə]rík ‘old man’

Figure 1. Discrimination vs. neutralization of the phonemes /a/ and /o/ in a hypothetical North Russian dialect

This paper considers the transition from consistent phonemic distinction to consistent neutralization of /a/ and /o/ in unstressed syllables following hard consonants, as found in one Arkhangelsk dialect. The dialect in question presents three types of individual systems: (i) one where the phonemes /a/ and /o/ are consistently discriminated, (ii) one where these phonemes are consistently neutralized and (iii) a transitional type which presents a competition between models (i) and (ii). Our study shows that a shift of articulatory zones of the phonemes /a/ and /o/ is a key factor contributing to the loss of *okan'je*. The articulatory shift leads to overlapping of the respective articulatory zones, thus reducing the acoustic and perceptual contrast between the phonemes in question. This, in combination with a considerable quantitative reduction, drives the development of neutralization in unstressed syllables. At the same time, our analysis of the most archaic vowel system of the three types specified above rules out quantitative reduction as the sole factor at play, as consistent *okan'je* can be shown to occur in a system with a strong quantitative reduction of unstressed syllables.

2. North Russian *okan'je* in the *Dialectological Atlas of the Russian Language* (DARL)

Mid-twentieth century data, as found in the *Dialectological Atlas of the Russian Language* (Avanesov & Bromlej 1986), display significant variation across the allophone sets representing the phonemes /a/ and /o/ in unstressed syllables: along with dialects which show no overlap of the relevant allophonic sets (patterns (2a) and (2b)), we find those which permit at least irregular neutralization of these phonemes, as shown in patterns (2c) – (2g).

(a)

Phoneme	Allophones in unstressed syllables
/o/	[o]
/a/	[a]

(b)

Phoneme	Allophones in unstressed syllables
/o/	[o], [u][1]
/a/	[a]

(c)

Phoneme	Allophones in unstressed syllables
/o/	[o], [u]
/a/	[a], [o],

(d)

Phoneme	Allophones in unstressed syllables
/o/	[o], [ə], [o^{a}]
/a/	[a], [ə], [o^{a}]

(e)

Phoneme	Allophones in unstressed syllables
/o/	[o], [a]
/a/	[a]

(f)

Phoneme	Allophones in unstressed syllables
/o/	[o], [ə], [a]
/a/	[a]

(g)

Phoneme	Allophones in unstressed syllables
/o/	[o], [u], [a]
/a/	[a]

Figure 2. Patterns of allophonic variation according to the *Dialectological Atlas of the Russian Language*. Phonemes /a/ and /o/ following non-palatalazed consonants

DARL data thus suggest that, in unstressed syllables following non-palatalized consonants,

[1] As pointed out by the editors in the comments to the map "The vowel [u] in the place of *o* in the second pretonic syllable" (Avanesov & Bromlej 1986: Map 10), [u] is used to denote a number of different sounds, including [o^{u}], [u^{o}] and [ô] (Avanesov & Bromlej 1986: 83). In many cases, this is likely to to involve a mid-high vowel [ʊ]. Kasatkin (2008) has shown that this sound corresponds to two distinct phonemes: /o/ and /ʊ/.

alongside phonemic distinction of /a/ and /o/ (as in patterns (2a) and (2b)), different patterns of neutralization (albeit irregular) of the two phonemes, as illustrated by patterns (2c) – (2g).

3. Data and methodology

The above data provide evidence that systems of allophonic variation based on neutralization of /a/ and /o/ (though not necessarily consistently) are clearly present in the majority of North Russian dialects alongside *okan'je*. This variation, in turn, indicates an ongoing restructuring of the North Russian phonological system, enabling us to study diachronic change on the basis of synchronic data. Labov's (1994, 2001, 2007) and Labov's et al. (2006) discussions of English show that phonetic change can occur at such pace that different stages of a diachronic process can be observed in the speech of different generations of speakers of one variety. The diachronic approach to synchronic variation is developed in the literature on pronunciation norms in Standard Russian (Avanesov 1950, Panov 1990, *inter alia*) which links realisational variants to speakers' sociolinguistic background on the one hand, and to developmental stages of a given sound system on the other. This approach, however, is novel to Russian dialectology (Vaahtera 2009)[2]. Meanwhile, ongoing radical changes in regional phonological systems, as reflected in the speech of different age groups, provide rich data for such research.

The goal of the present study is to analyse the decay of *okan'je* in one North Russian dialect, to describe its stages, as reflected in the speech of different age groups and to establish the linguistic factors at play. The study is based on data collected in the villages of Safonovo and Elkino on the upper Pëza river (Mezen District, Arkhangelsk Region) in 2006[3]. A total of 25 speakers between the ages of 11–88 (born 1918–1995) were recorded. The data discussed here stem from informal interviews and a series of elicitation tasks aimed at detecting shifts in the vowel system of the dialect. Eight participants were asked, in pairs, to read and repeat individual words and phrases from a list based on the DARL Programme (Avanesov 1947) containing 470 instances of vowel phonemes in stressed and unstressed positions in a variety of consonantal environments. Our subjects fall naturally into three age groups: (i) five participants born between 1934– 1941, (ii) one born in 1968 and (iii) two born in 1992 and 1995 respectively[4]. Of the 470 vowel phoneme realisations, 187 are allophonic variants of /a/ and /o/ in unstressed syllables following a non-palatalized consonant. This paper considers realisations of /a/ and /o/ in the 1st and 2nd pretonic syllables (on average 160 realisations per participant)[5].

---

[2] Vaahtera (2009) describes the evolution of the sound system in a North Russian dialect spoken in the villages of the Grjazovets District (Vologda Region) by performing a contrastive analysis of three strands of data: the most archaic strand is reconstructed on the basis of the data elicited from DARL, data representing the newest strand was recorded from schoolchildren while sound systems found in current older speakers occupy the intermediate position between the two.

[3] I was unable to find any differences in the speech of the two villages, located 10 km apart. This is hardly surprising given the close family links between them and the widespread migration from Elkino to Safonovo, particularly in recent years. I shall henceforth use "Safonovo" to refer to the dialect of both villages.

[4] The data discussed was processed as part of the project *Sound change in progress: Case of a North Russian dialect* supported by the Alexander von Humboldt Foundation and carried out at the Linguistic Laboratory of the Ruhr University Bochum, Germany in July–September 2009.

[5] The data collected form part of the *Russian Regional Corpus,* which is currently being developed by a group of linguists (including the author) and computer scientists (Deutsche Forschungsgenmeinschaft grant no SA 278/16-1, Principal Investigator Professor Christian Sappok, Ruhr University Bochum). The entire corpus will be available online upon completion (the coding for the recordings from Safonovo and Elkino is MEZ1).

4. Speaker types with respect to /a/ and /o/ representation

According to patterns of allophonic variation, the individual phonological systems of the Safonovo dialect fall into three distinct groups (Types A, B and C in Figure 3)[6]:

	Type A. Discrimination of /a/ and /o/ in unstressed syllables	Type B. Inconsistent discrimination/neutralization of /a/ and /o/ in unstressed syllables	Type C Obligatory neutralization of /a/ and /o/ in unstressed syllables
Phoneme /o/	**/o/ > o, ʊ** rare: [ə], [ɜ], [ɨ]	**/o/ > o, ʊ, ɐ, ə** rare: [ɜ], [ɨ]	**/o/ > ɐ, ə** редко: [o], [ɨ]
Phoneme /a/	**/a/ > ɐ, ə** rare: [ɜ], [o]	**/a/ > ɐ, ə** rare: [ɜ], [o]	**/a/ > ɐ, ə** rare: [o], [ɨ]

Figure 3. Allophonic variation of phonemes /a/ and /o/ in the dialect of Safonovo

The examples below illustrate the realisational variation of /a/ and /o/ in pretonic syllables in the three speaker types. The first and second pretonic syllables display identical patterns of allophonic variation. The elicited data show no significant correlation between a speaker's choice of allophone and that allophone's position in relation to stress (likely due to the relatively small number of occurrences in some of the positions; see Appendix 1).

Type A	**Type B**	**Type C**	
domá	domá	dɐmá	‘house’ PL.NOM
stolɨ́	stolɨ́	stəlɨ́	‘table’ PL.NOM
prʲixodʲí	prʲixədʲí	prʲixədʲí	come SG.IMP
xorójʃɨj	xɐrójʃɨj	xɐrójʃɨj	’good’ M.SG.NOM
bʊlʲjʃój	bʊlʲjʃój	bɐlʲjʃój	‘large’ M.SG.NOM
nɨgʲé	nɨgʲé	nəgʲé	‘foot’ SG.LOC
vʊdój	vodój	vɐdój	‘water’ SG.INS
dʊmám	dɐmám	dɐmám	‘house’ SG.DAT

Figure 4. Phoneme /o/ in the 1st pretonic

Type A	**Type B**	**Type C**	
stərʲík	stərʲík	stərʲík	‘old man’ SG.NOM
nɐvʲérʲx	nɐvʲérʲx	nɐvʲérx	‘upward’
trəvá	trɐvá	trəvá	‘grass’ SG.NOM
stɜkán	stɐkán	stɜkán	‘glass’ SG.NOM
zɜbóta	zabota	zabota	‘care’ SG.NOM
skɐʒɨ́	skəʒɨ́	skəʒɨ́	‘say’ SG.IMP

Figure 5. Phoneme /a/ in the 1st pretonic

Type A	**Type B**	**Type C**	

[6] See Appendix 1 for quantitative data.

gʊvʊrʲít	govərʲítʲ	gəvərʲítʲ	‘speak’ 3.SG
golová	golová	gɐləvá	‘head’ SG.NOM
poskorʲéj	poskɐrʲéj	pəskərʲéj	‘sooner’
molokó	moləkó	mɐləkó	‘milk’ SG.NOM
pɨnʲisʲóm	pɨnʲisʲóm	pənʲisʲóm	‘carry’ 1.PL.FUT
pʊlʲubʲítʲ	polʲubʲítʲ	pɐlʲubʲítʲ	‘like’ INF

Figure 6. Phoneme /o/ in the 2nd pretonic

Type A	**Type B**	**Type C**	
zɐdəvʲítʲ	zɐdəvʲítʲ	zədəvʲítʲ	‘suppress’ INF
trəvʲenój	trəvʲinój	trəvʲinój	‘herbaceous’ M.SG.NOM
nɜ prʲæmúu (dorogu)	nɐ prʲæmúu (dorogu)	nɜ prʲemúu (dorogu)	‘on the staright (road) SG.F.ACC
nɜrʲedʲílsʲə	nərʲedʲílsʲə	nɐrʲɛdʲílsʲə	‘dress up’ SG.M.PST
rɐskɐʒɨ´	rɐskɐʒɨ´	rɐskəʒɨ´	‘tell’ SG.IMP
stɜrʲikʊ´f	stərʲekóf	stərʲikʊ´f	‘old man’ PL.GEN

Figure 7. Phoneme /a/ in the 2nd pretonic

Idiolects A and B permit two labialized vowels – [o] (mid) and [ʊ] (mid-high) – in unstressed positions. Kasatkin (2008) in his discussion of another North Russian dialect takes this to be evidence of a phonemic distinction between /o/ (historically /o/ with a falling tone) and /ʊ/ (historically /o/ with a rising tone). In the Safonovo dialect a distinction is drawn between these phonemes in stressed positions, not only in the archaic individual systems, but also in the innovative ones. However, due to the small number of occurrences of [ʊ] in unstressed syllables (see Appendix 1), we are unable to establish whether this sound in the unstressed position is a variant of /ʊ/ or /o/. The latter is possible in a range of contexts, for instance next to labials, velars and [l] (Kasatkin 2008: 57–58). The realisation of /ʊ/ in unstressed syllables is therefore not addressed here.

Assuming that the Safonovo system started out with consistent *okan'je*, as is the case with other North Russian dialects (Zakharova & Orlova 1970: 74), we can assert that type A is the most archaic of the three types, displaying the most consistent distinction between low and mid phonemes in unstressed syllables (although even here we do find isolated instances of neutralization; see Figure 3 and Appendix 1). Such systems are characteristic of some of the older speakers (in our data, this type is represented by one speaker). Type C, by contrast, displays consistent neutralization of /a/ and /o/ (though several occurrences of [o] are found in place both phonemes, likely resulting from contextual assimilation; see Tables 3.1 and 3.2 in Appendix 1). This type is found in speakers belonging to the two lower age groups. Type B, typical for most of the older speakers (both those taking part in the elicitation tasks and those interviewed informally) is a kind of transitional system from Type A to Type C, displaying competition between neutralization and phonemic distinction of low and mid vowels. On average, 50% of unstressed /o/ realisations following non-palatalized consonants in such systems are represented by allophones which are not part of the allophonic set of /a/.

5. Development of neutralization of /a/ and /o/

One school of thought posits that the opposition between /o/ and /a/ in unstressed syllables is lost in the first instance in systems where the sound [o] is only minimally different from [a] in both unstressed and stressed contexts. Vysotsky (1967: 66–81) and Kasatkin (2010: 10) have shown such systems to exist both in the North and South Russian dialects (see also Avanesov

& Bromlej 1986: Map 42). It is therefore natural to suppose that the contrast between these minimally distinct sounds is likely to disappear in unstressed syllables, giving rise to neutralization of /o/ and /a/.

It is well-known that phonological features (e.g. backness or height) correlate with specific areas of the articulatory space, the so-called articulatory zones (Martine 1960: 70, Stevens 2005, Clements 2009). Each articulatory zone is characterised by fixed acoustic properties, which translate into stable formant values of the sounds produced within these areas. Moderate fluctuations within each area, caused by consonantal context or individual manner of pronunciation, have no effect on the phonological level. At the same time, even minor boundary shifts of these areas can significantly affect speakers' perception of phonological contrasts, thus giving rise to phonological change (Clements & Ridouane 2006). The Safonovo dialect is an instance of such change. Our data from Safonovo display a clear correlation between the rise of neutralization of /a/ and /o/ in unstressed syllables and a general overlapping of these phonemes' articulatory zones, in both stressed and unstressed contexts.

Figures 8–10 depict articulatory zones of the phonemes /a/ and /o/ in stressed syllables within the vowel quadrilateral for three speakers of different type: Type A (consistent distinction of /a/ and /o/ in unstressed syllables), Type B (inconsistent neutralization of /a/ and /o/ in unstressed syllables) and Type C (compulsory neutralization of /a/ and /o/ in unstressed positions).

The diagrams plot F1 on the vertical axis against F2 on the horizontal, representing height and backness respectively (cf. Johnson 2003: 113). Formant value were measured for stressed vowels in non-palatalized contexts. The values for each of the three speakers were from the same set of stimuli.

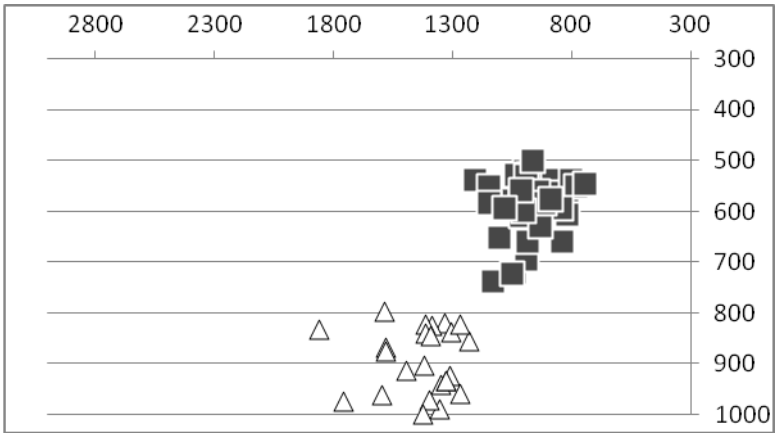

Figure 8. Articulatory zones of /a/ △ and /o/ ■ in stressed syllables.
Speaker type A

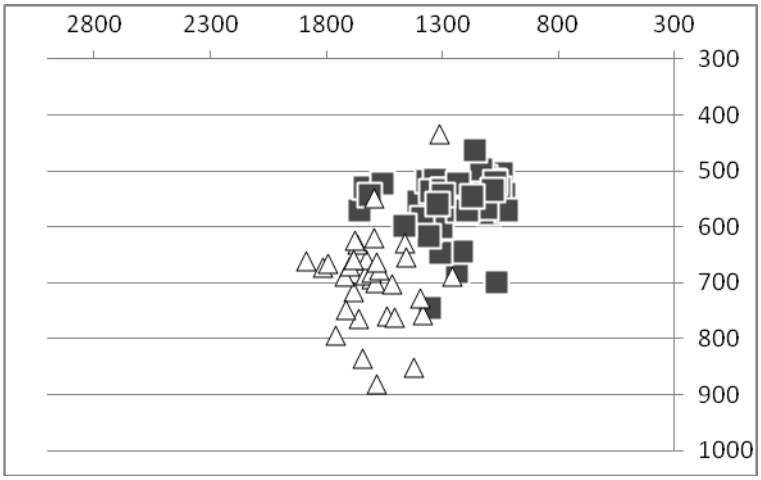

Figure 9. Articulatory zones of /a/ △ and /o/ ■ in stressed syllables. Speaker type B

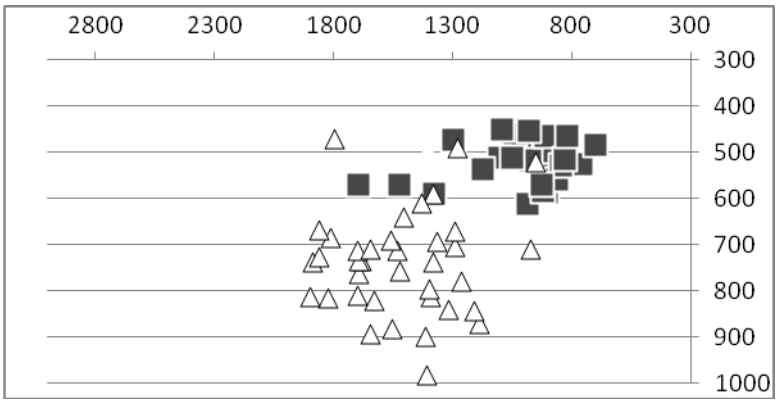

Figure 10. Articulatory zones of /a/ △ and /o/ ■ in stressed syllables. Speaker type C

It is evident from Figures 8–10 that in the most archaic idiolect (Type A) the articulatory zones of /a/ and /o/ are clearly separated, which ensures that the phonological contrast between the two phonemes is preserved by ruling out the possibility of a gradual transition from one articulatory zone to the other. Acoustically, this translates into a significant difference in each vowel's respective formant values and thus an obvious perceptual contrast. Idiolects which permit /a/ and /o/ neutralization in unstressed syllables are, by contrast, characterised by overlapping of the stressed allophones' articulatory zones. This is largely due to expansion of /a/ zone and the shifting of its upper boundary towards the centre of the quadrilateral, resulting in a gradual transition between the articulatory zones of the stressed allophones of /o/ and /a/. In unstressed syllables, which in the dialect of Safonovo are approximately 50% shorter in duration than stressed ones (see Appendix 2), the likelihood of diffusion of these zones is increased due to undershoot (Flemming 2005: 3). This results in a further upward shift of the /a/ boundary. We suggest that the configuration of the stressed vowel articulatory space, specifically the lack of a safety zone between the stressed allophones of /a/ and /o/, contributes to the loss of *okan'je* and the rise of neutralization in unstressed positions.

Given the weakening of height contrast, labialization remains a deciding factor in preserving the opposition between /a/ and /o/ in unstressed syllables, by preventing the unstressed /o/ allophones from spreading across a larger area. Labialization and backness are the most

stable phonological features, loss of which typically occurs only when other contrasts, such as height, have been eliminated (Flemming 2005: 3–5). Typologically there is a strong correlation between labialization and backness: in world' languages, labialized vowels make up 93.5% of back vowels (Maddieson 1984).

When we compare the articulatory zones of the stressed /o/ allophones, a considerable difference becomes apparent between speaker type A on the one hand and speaker types B and C on the other. While in type A this area is rather compact and located predominantly towards the back of the vowel quadrilateral, in types B and C it expands horizontally towards the centre. In other words, type B and C present a number of stressed [o] sounds with relatively high F2 values. The F2 values here range between 742–1204 Hz (mean: 971 Hz) for type A (Figure 8), 1023–1659 Hz (mean: 1253 Hz) for type B (Figure 9) and 699–1693 Hz (mean 1019 Hz) for type C (Figure 10). A wide range of F2 values can be attributed to articulatory differences: higher F2 values are observed in front vowels, while the lower values are found in back vowels; labialized vowels yield lower F2 values than non-labialized (Kodzasov & Krivnova 2001: 160, Ladefoged & Maddieson 2002: 358, Grawunder, Simpson & Khalilov 2010: 234). Our acoustic measurements therefore suggest that speaker types B and C may be characterised, at least in some cases, by weakened labialization of the stressed [o].

In unstressed syllables, a further expansion of the articulatory zone of /o/ towards the centre points to further weakening of labialization, as show in Figures 11 and 12, depicting speaker types A and B (i.e. those which preserve the opposition between /a/ and /o/ in unstressed syllables): F2 values of the unstressed [o] range between 933–1981 Hz (mean: 1268 Hz) in type A and between 1027–2026 Hz (mean: 1478 Hz) in type B. This increases the likelihood of delabialization of some of the unstressed allophones of /o/. Thus, in type A, non-labialized vowels make up a sixth of all /o/ realizations, while in type B this increases to between a half and two thirds, depending on speaker (see Appendix 1).

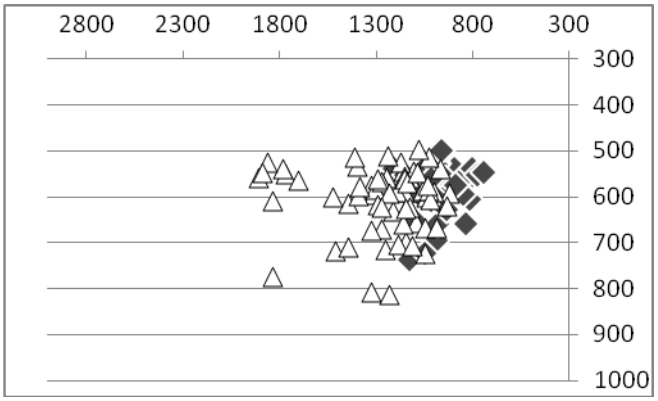

Figure 11. Articulatory zones of the phoneme /o/ in stressed ◆ and in 1st pretonic syllables △. Speaker type A

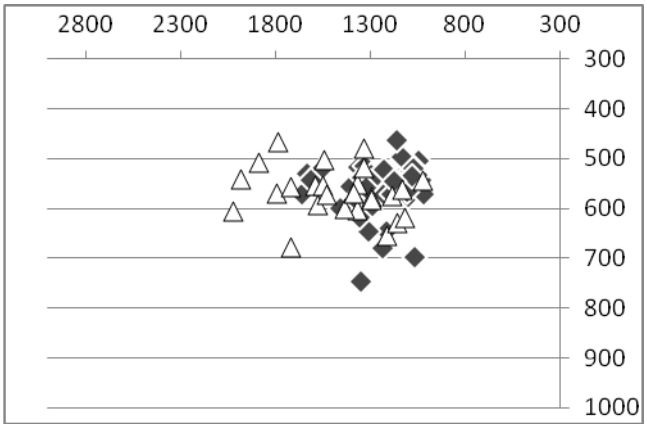

Figure 12. Articulatory zones of the phoneme /o/ in stressed ◆ and in 1st pretonic syllables △. Speaker type B

6. Conclusion

The rise of vowel neutralization in the dialect of Safonovo can be traced by contrasting individual sound systems which clearly reflect different stages of the diachronic process. Acoustic analysis reveals the key factors which account for the transition from consistent discrimination of low and mid vowels to their obligatory neutralization in unstressed syllables. It has been established that the converging and overlapping of articulatory zones observed for stressed realisations of /o/ and /a/ translate into even more drastic change in unstressed syllables, leading to partial merge (Crowley & Bowern 2010: 71).

Further work will proceed along two avenues: firstly, our corpus will be expanded with data from informal interviews; secondly, recordings made in the Mezen area in the 1960s will be analysed with the view of gaining a time point outside the time period covered by this study, enabling natural ageing to be ruled out as a factor at play.

Translated from Russian by Georgy Krasovitsky

Перевод Г. А. Красовицкого

REFERENCES

Avanesov R. I. & S. V. Bromlej (eds). Dialektologičeskij atlas russkogo jazyka: Centr Evropejskoj časti SSSR. Vol. 1: Fonetika. Moscow, 1986.

Avanesov R. I. Programma sobiranija svedenij dlja sostavlenija dialektologičeskogo atlasa russkogo jazyka. Moscow – Leningrad, 1947.

Avanesov R. I. Russkoe literaturnoe proiznošenie. Moscow, 1950; 5th ed.: Moscow, 1972.

Clements G. N. & Rachid Ridouane. "Quantal phonetics and distinctive features: a Review." In Antonis Botinis, ed., Proceedings of the ISCA Tutorial and Research Workshop on Experimental Linguistics, 28-30 August 2006, 17-24. Athens: University of Athens, 2009.

Clements G. N.. The role of features in speech sound inventories. In Eric Raimy & Charles Cairns, eds., Contemporary Views on Architecture and Representations in Phonological Theory. Cambridge, MA: MIT Press, 2006.

Crowley, Terry & Claire Bowern. An Introduction to Historical Linguistics. Oxford: Oxford University Press. 2010.

Flemming, Edward. A Phonetically-Based Model of Phonological Vowel Reduction.

2005. http://web.mit.edu/flemming/www/

Grawunder, Swen, Adrian Simpson and Madzhid Khalilov. Phonetic characteristics of ejectives – samples form Caucasian languages. // Fuhs, Susanne, Martine Tode and Marzena Żygis (eds). Turbulent sounds. An interdisciplinary guide. Berlin: Mouton de Gruyter, 2010.

Johnson, Keith. Acoustic and auditory phonetics. Oxford: Blackwell, 2003.

Kasatkin L. L. Fonemy /ɔ/, /ω/, /a/ v slobodskix govorax. Materialy i issledovanija po russkoj dialektologii. III (IX). Moscow: Nauka. 2008.

Kasatkin L. L. Iz istorii akan′ja – jakan′ja v russkom jazyke. Russkij jazyk v naučnom osveščenii, 2010, vol. 2.

Kodzasov S. V., Krivnova O. F. Obščaja fonetika.Moscow, 2001.

Labov, William, Sharon Ash and Charles Boberg. The Atlas of North American English:Phonetics, phonology and sound change. Berlin: Mouton de Gruyter, 2006.

Labov, William. Principles of Linguistic Change, Volume I: Internal factors. Oxford, Blackwell, 1994.

Labov, William. Principles of Linguistic change. Volume II: Social Factors. Oxford, Blackwell, 2001.

Labov, William. Transmission and diffusion. Language, 83:2, 2007.

Ladefoged, Peter & Ian Maddieson. The Sounds of World's Languages. Blackwell, 2002. l

Maddieson, Ian. Patterns of Sounds. Cambridge, Cambridge University Press, 1984.

Martinet, André. Économie des changements phonétiques, Berne, Francke, 1955. Cited from Russian edition: Princip èkonomii v fonetičeskix izmenenijax (Problemy diahroničeskoj fonologii). Moscow, 1960.

Panov M. V. Istorija russkogo literaturnogo proiznošenija XVIII—XX vv. Moscow, 1990.

Stevens, K.N. Features in Speech Perception and Lexical Access. In Pisoni, D.E. and Remez, R.E. (eds.), Handbook of Speech Perception, 125-155. Cambridge, MA, Blackwell, 2005.

Vaahtera, Jouni Mikael. 2009. Èvoljucija sistemy glasnyx fonem v nekotoryx govorax Vologodskoj oblasti. Slavica Helsingiensia 37. Helsinki.

Vysotskij S. S. Opredelenie sostava glasnyx fonem v svjazi s kačestvom zvukov v severnorusskix govorax // Očerki po fonetike severnorusskix govorov. Moscow, 1967.

Zaxarova K. F. & V. G Orlova. Dialektnoe členenie russkogo jazyka. Moscow, 1970.

Appendix 1

Segmental variation in the dialect of Safonovo with respect to speaker type.

Phonemes /a/ and /o/

1. Type A

1.1. Speaker MEZ1-23

/o/ in 1st pretonic

allophone	number of occurrences
ʊ	8
ɨ̞	2
ɜ	1
ə	12
ɐ	1
o	66
Total	90

/a/ in 1st pretonic

allophone	number of occurrences
ɜ	2
ə	5
ɐ	15
o	2
Total	24

/o/ in 2nd pretonic

allophone	number of occurrences
ʊ	4
ɨ̞	2
ə	2
ɐ	1
o	23
Total	32

/a/ in 2nd pretonic

allophone	number of occurrences
ɜ	5
ə	6
ɐ	10
o	2
Total	23

2. Type B

2.1. Speaker MEZ1-21-AA

/o/ in 1st pretonic

allophone	number of occurrences
ʊ	4
o	26
ɐ	17
ə	25
ɨ	4
ɜ	5
Total	81

/a/ in 1st pretonic

allophone	number of occurrences
ɐ	13
ə	9
ɜ	3
Total	25

/o/ in 2nd pretonic

allophone	number of occurrences
ʊ	
o	9
ɐ	16
ə	7
ɨ	2
Total	34

/a/ in 2nd pretonic

allophone	number of occurrences
ɐ	11
ə	3
ɜ	6
Total	20

2.2. Speaker MEZ1-15

/o/ in 1st pretonic

allophone	number of occurrences
ʊ	4
o	42
ɐ	13
ə	18
ɨ̞	1
ɜ	4
Total	82

/a/ in 1st pretonic

allophone	number of occurrences
ɐ	11
ə	10
ɜ	1
o	2
ɨ̞	2
Total	26

/o/ in 2nd pretonic

allophone	number of occurrences
ʊ	2
o	14
ɐ	8
ə	6
ɨ̞	2
Total	32

/a/ in 2nd pretonic

allophone	number of occurrences
ɐ	6
ə	12
ɜ	1
o	1
ɨ̞	1
Total	21

2.3. Speaker MEZ1-16

/o/ in 1st pretonic

allophone	number of occurrences
ʊ	9
o	28
ɐ	5
ə	30
ɨ̟	7
Total	79

/a/ in 1st pretonic

allophone	number of occurrences
ɐ	14
ə	8
ɜ	2
ɨ̟	2
Total	26

/o/ in 2nd pretonic

allophone	number of occurrences
ʊ	8
o	10
ɐ	2
ə	5
ɨ̟	5
Total	30

/a/ in 2nd pretonic

allophone	number of occurrences
ɐ	7
ə	6
ɜ	2
o	2
ɨ̟	1
Total	18

3. Type C

3.1. Speaker MEZ1-21-MA

/o/ in 1st pretonic

allophone	number of occurrences
ɨ	1
ɜ	19
ə	11
ɐ	54
a	3
Total	88

/a/ in 1st pretonic

allophone	number of occurrences
ɨ	2
ɜ	3
ə	9
ɐ	20
Total	34

/o/ in 2nd pretonic

allophone	number of occurrences
ɜ	8
ɐ	13
o	1
ə	5
Total	27

/a/ in 2nd pretonic

allophone	number of occurrences
ɜ	3
ɐ	9
ɨ	6
ə	2
a	2
Total	22

3.2. Speaker MEZ1-13

/o/ in 1st pretonic

allophone	number of occurrences
o	6
ɐ	24
ə	51
ɨ	1
Total	82

a/ in 1st pretonic

allophone	number of occurrences
ɐ	5
ə	18
o	2
Total	25

/o/ in 2nd pretonic

allophone	number of occurrences
ɐ	15
ə	13
ɨ	2
Total	30

/a/ in 2nd pretonic

allophone	number of occurrences
ɐ	8
ə	11
ɨ	2
Total	21

Appendix 2.

Duration of /a/ and /o/ allophones with respect to speaker type

1. Type A

Speaker MEZ1-23

/a/ stressed	Duration (ms)	/o/ stressed	Duration (ms)	/o/ 1st pretonic	Duration (ms)	/a/ 1st pretonic	Duration (ms)	/o/ 2nd pretonic	Duration (ms))	/a/, 2nd pretonic	Duration (ms)
a	0.163	o	0.145	o	0.08	o	0.071	o	0.078	o	0.079
				ə	0.07	ɐ	0.084	ə	0.075	ə	0.075
				ʊ	0.094	ɜ	0.074	ʊ	0.094	ɐ	0.081
						ə	0.091	ɜ	0.062	ɜ	0.068
mean	0.163	**mean**	**0.152**	**mean**	**0.079**	**mean**	**0.083**	**mean**	**0.077**	**mean**	**0.076**

2. Type B

Speaker MEZ1-21-AA

/a/ stressed	Duration (ms)	/o/ stressed	Duration (ms)	/o/ 1st pretonic	Duration (ms)	/a/ 1st pretonic	Duration (ms)	/o/ 2nd pretonic	Duration (ms))	/a/, 2nd pretonic	Duration (ms)
a	0.111	o	0.098	o	0.060	ə	0.058	ɐ	0.048	ə	0.048
				ə	0.075	ɐ	0.056	o	0.056	ɐ	0.061
				ʊ	0.053	ɜ	0.055	ɨ	0.031	ɜ	0.048
				ɐ	0.058			ə	0.048		
				ɨ	0.061						
				ɜ	0.071						
mean	**0.111**	**mean**	**0.098**	**mean**	**0.064**	**mean**	**0.056**	**mean**	**0.046**	**mean**	**0.052**

3. Type C

Speaker MEZ1-21-MA

/a/ stressed	Duration (ms)
a	0.121
mean	**0.121**

/o/ stressed	Duration (ms)
o	0.101
mean	**0.101**

/o/ 1st pretonic	Duration (ms)
ɐ	0.069
a	0.072
ə	0.063
ɜ	0.071
mean	**0.069**

/a/ 1st pretonic	Duration (ms)
ɐ	0.068
ɜ	0.072
ə	0.067
mean	**0.069**

/o/ 2nd pretonic	Duration (ms))
ɐ	0.052
ə	0.064
ɜ	0.053
ɨ	0.050
mean	**0.055**

/a/, 2nd pretonic	Duration (ms)
ɐ	0.069
ə	0.071
ɜ	0.059
ɨ	0.064
a	0.085
mean	**0.068**