

National Research University Higher School of Economics

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George Moroz

SOME QUESTIONS OF CIRCASSIAN SEGMENTAL
AND SUPRASEGMENTAL PHONOLOGY AND
PHONETICS

Dissertation Summary
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Academic supervisor:
Yury Lander
Candidate of Sciences in Philology

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General characteristics of the study

The present research is dedicated to various aspects of the phonology and phonetics of Circassian languages. Although there are a lot of studies on this topic, no attempt has been made to describe the phonology of Circassian languages in a uniform way. Researchers often consider either specific problems of particular Circassian idioms, or limit themselves to the standard varieties. The aim of this study is to provide a uniform description of the phonological systems of different Circassian idioms spoken in the Russian Federation.

Circassian idioms we call the languages used by the Circassians — an ethnic group inhabiting settlements in the Krasnodar Krai, the autonomous republics of Adygea, Karachay-Cherkessia, and Kabardino-Balkaria, and the Stavropol Krai (see Figure 1), and also in regions of Turkey, Syria, Israel and other countries. (Naturally, Circassian idioms do not include the major languages of the regions where the Circassians reside, e.g. Russian, Turkic, Arabic or Hebrew.)

After the end of the Caucasian War in 1864, the Russian government deported a significant number of Circassians, Abazins, Abkhazians and Ubykh from their native territory. As a result, part of the population formed a diaspora across the territory of

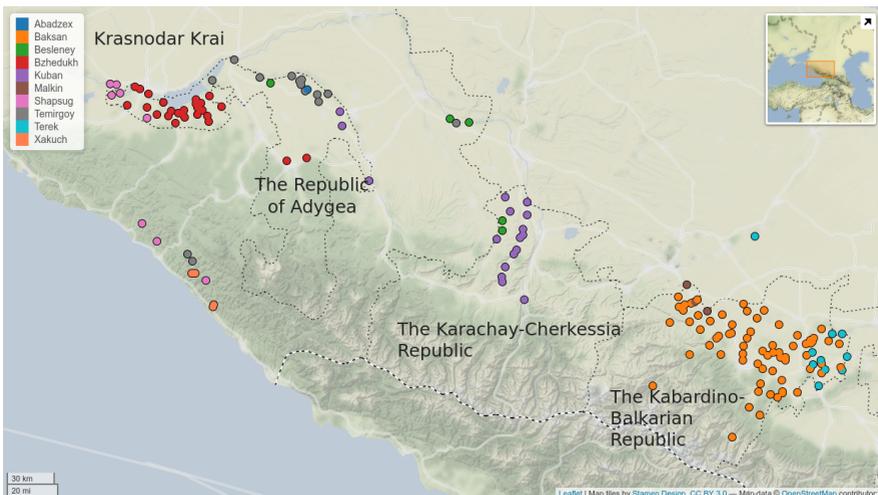


Figure 1: Circassian settlements in the Russian Federation

the former Ottoman Empire,¹ while another part of the population, whose forefathers agreed to the conditions of the Russian Empire to relocate to the plains, stayed on the territories which are now part of the Russian Federation. Despite the broad dispersion of Circassians on the territory of the Russian Federation, contact between speakers of various idioms has persisted, while the contact with Turkish Circassians was very limited. Only recently there have been some changes in this regard.

In the course of the 20th century, work on the description of Circassian idioms was carried out in a traditional format, by which the researcher studies one or several idioms considered to belong to a single dialect. The obtained information is subsequently simplified. As a result, it becomes unclear what kind of linguistic material is behind the statements of the researcher. The development of corpus linguistics and data science in our time allows us to change the approach towards these kinds of studies, and to equally take into account generalizations of researchers and the data on which their conclusions are based. The present study applies this approach in two different areas. First, we compared the available literature on Circassian idioms as well as data collected in separate Circassian villages and carried out a quantitative evaluation of the traditional dialectal division of Circassian idioms. This approach allows us to show how far removed idioms are from each other in terms of specific parameters. Second, we took a data-driven approach to the analysis of syllable structure, the research of which traditionally had a rather informal character. We wrote a script to automatically extract the syllable structure of all the words in the Circassian-Russian dictionary [Tharkaho 1991], which contains more than ten thousand words (though we excluded Russian borrowings from our analysis).

The subject of this dissertation are the segmental and suprasegmental units of Circassian idioms. **The object** of the research are the lexicon and phonetics of Circassian idioms spoken in the Russian Federation. The data for the study consist of lexical data, and audio recordings collected during fieldwork in 24 Circassian villages, as well as literature on Circassian phonology.

The aim of the research is to provide a uniform description of the phonology of Circassian languages and to add to the existing data for separate idioms. In addition, our goal is to develop and apply a quantitative method of analysis to measure the phonolog-

¹After the relocation the Circassians ended up in different parts of the Ottoman Empire, and after its collapse — on the territories of different countries. Currently there are Circassian diasporas in Syria, Jordan, Israel, Libya and other countries.

ical distance between idioms, based on their phonological inventory and regular sound correspondences.

The relevance of the research is determined by the absence of a full, uniform description that covers a large amount of Circassian idioms. Studies claiming such completeness do not take into account the peculiarities of a number of Circassian idioms, and many descriptions of specific idioms are largely outdated. In the present study we provide a description of the contemporary situation in certain idioms, which often differs from the descriptions presented in previous studies.

Research tasks

- provide a uniform description of various aspects of Circassian phonology, including:
 - inventory of vowels
 - inventory of consonants
 - stress systems
 - syllable structure
- the development of a method of comparison for Circassian idioms based on phonological structure and regular sound correspondences.
- study prosodic peculiarities of Circassian idioms, such as speech rate

The scientific novelty of this study consists of an attempt at a uniform description of Circassian phonology based on a large number of idioms, which entails the solution of a number of theoretical problems such, and the introduction of new data on phonetic and phonological aspects of Circassian idioms. In addition, the study of speech rate and the data-driven analysis of Circassian syllable structure were carried out for the first time. The research also brought to light a consonant that had not been described before in studies on Circassian languages or theoretical phonetics. In addition, methods were developed for the quantitative analysis of syllable structure and the comparison of idioms based on phonological inventories and regular sound correspondences. These methods were applied to Circassian data for the first time, and can be applied to other languages.

The theoretical relevance of the study lies in the fact that it adds to the understanding of Circassian phonology and as such provides new material for phonological typology. The results of the study also provides material for research in the area of com-

parative historical linguistics.

The practical relevance of the study is due to the possible application of the results in education. The formulated differences between Circassian idioms can be used to elaborate school and university curricula for learning Circassian languages, which will be especially valuable for speakers of idioms without an official status.

The material for the research consists of lexical data and sound recordings of phonetic surveys collected by the author in 2011-2016, as well as dictionaries and literature on Circassian languages.

The results of the research were presented in talks at the Scientific students' conference «Field research by students of the RSUH» (2011 r.), 12th Scientific Lectures in honour of G.A. Tkachenko (2012 r.), Scientific students' conference «Field research by students of the RSUH» (2012 r.), and at the conferences «Folk linguistics: speakers' view of languages» (2012 r.), The fourth conference-school «Language problems: the point of view of young scientists» (2015 r.), «14th conference on typology and grammar for young researchers» (2017 r.), and in the course of the annual preparation of students for summer field work, organized by the Institute of Linguistics of the RSUH and the School of Linguistics of the National Research University Higher School of Economics.

Theses put forth during the defense:

- Our description of the phonological system of the Besleney and Kuban dialects of the Kabardian language are significantly different from previous descriptions, which might be due to contacts with neighboring West-Circassian and Kabardian idioms, or to differences in methodology for the collection of data and their interpretation.
- The secondary vowels (i, e, o, u), which are formed from the basic vowels (a, v, ə) behave differently in specific Circassian languages: in the West-Circassian idioms secondary vowels can be interpreted as a combination of a glide and a core vowel (a, v, ə), while they can be analyzed as a core vowel and a glide or a combination of a glide - vowel - glide in Kabardian idioms.
- The clusterization of idioms based on their phonological inventory and regular sound correspondences can be used to measure the phonological distance between the investigated idioms. The results of the clusterization almost completely coincide with the traditional classification of Circassian languages.

- Circassian idioms have different stress systems. Stress in Kabardian languages can be described with two rules, operating on the morphonological concept of the stem (stress falls on the last syllable of the stem, except when the last syllable of the stem is an open syllable with the vowel v), and several exceptions. Stress in West-Circassian varies and possibly is not obligatory for all lexical units.
- The syllable structure of West-Circassian which we automatically extracted using the algorithm, looks as follows:

$$(1) \quad (\text{O})(\text{O}) \begin{pmatrix} \text{S} \\ \text{O} \end{pmatrix} \text{V} \begin{pmatrix} \text{S} \\ \text{O} \end{pmatrix} (\text{O})(\text{O}),$$

where V — vowel, S — sonorant, O — obstruents.

- The average speech rate in the Kuban dialect of Kabardian was 4.33 syllables per second, with a 95% confidence interval ± 0.18 , which is less than the values obtained in studies on other languages.
- The correlation between speech rate and the length of the phrase, which was significant in studies on other languages, was small in our data (0.13).

Contents of the study

The first chapter starts with a section dedicated to the history of how Circassian idioms are classified. Studies of the 19th century mention a single Circassian (or *адыгейский* language, comprising a “pure” variety — Besleney or Kabardian, and a “lower” variety, spoken by all other Circassians, see [Bronevskij 1823] (via [Gishev 2009: 53]), [Han-Girej 1830: 93-94] (published in 1978), [Blaramberg 1832], U. Kh. Bersey (via [Gishev 2009: 106]), [Loewe 1854: 5], [Nogmov 1861: 42]. We assume that the authors mentioned worked with speakers of different Circassian idioms, so the idea of the “pure” Kabardian and Besleney varieties seems to have been wide-spread among Circassian tribes at the time, and is not a result of the fact that the authors only worked with Kabardian and Besleney idioms. The work of N. F. Jakovlev [Yakovlev 1924, 1928, 1938; Yakovlev, Ashhamaf 1941; Yakovlev 1948] formed the basis for the classification of Circassian idioms used in the work of [Ashhamaf 1939] and [Kumahov 1969] (see . Fig. 2), which is now common ground in Circassian studies (see. [Balkarov 1970, 1979; Kuipers 1975; Kumahov 1981; Colarusso 1988; Hewitt 2005] and others).

The next section of the **first chapter** is dedicated to the distribution of Circassian

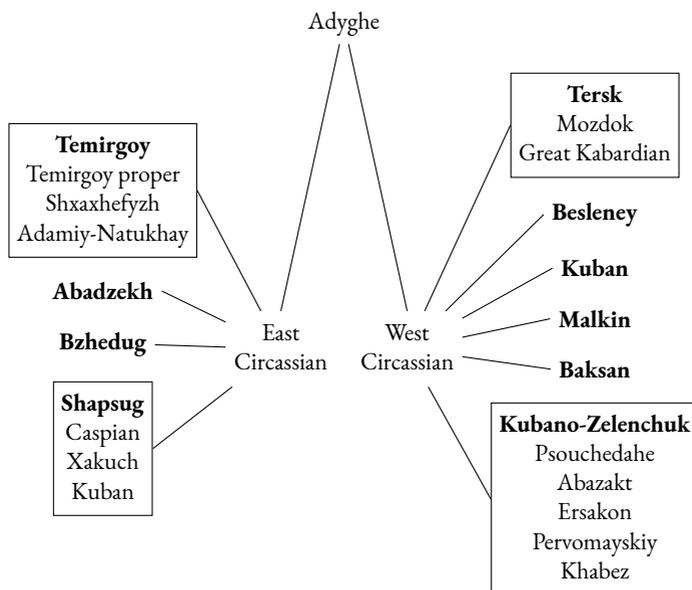


Figure 2: Classification of all Circassian idioms

idioms in the Russian Federation, illustrated with maps and lists of villages.

The last section of the **First chapter** deals with sociolinguistic aspects of Circassian languages in the USSR, the Russian Federation and countries that were formed after the collapse of the Ottoman Empire. The sociolinguistic situation in the Russian Federation can be characterized as follows:

- villages with a Circassian population where a language is taught, which is close to the idiom of the population (106 villages, 67%). This is the case in ten Temirgoy villages and in one Abadzex village in Adyghea, in one Temirgoy village in the Krasnodar Krai, 14 Kuban-Zelenchuk villages in Karachay-Cherkessia and in 80 villages in Kabardino-Balkaria (Malkin, Baksan and Terek).
- villages with a Circassian population where a language is taught, which is far removed from the local idiom (48 villages, 30%). This is the case in 28 Bzhedug villages, five Shapsug villages, one Besleney village and three Kuban villages in Adyghea, in 8 Shapsug villages and one Besleney village in the Krasnodar Krai and in two Besleney villages in Karachay-Cherkessia.

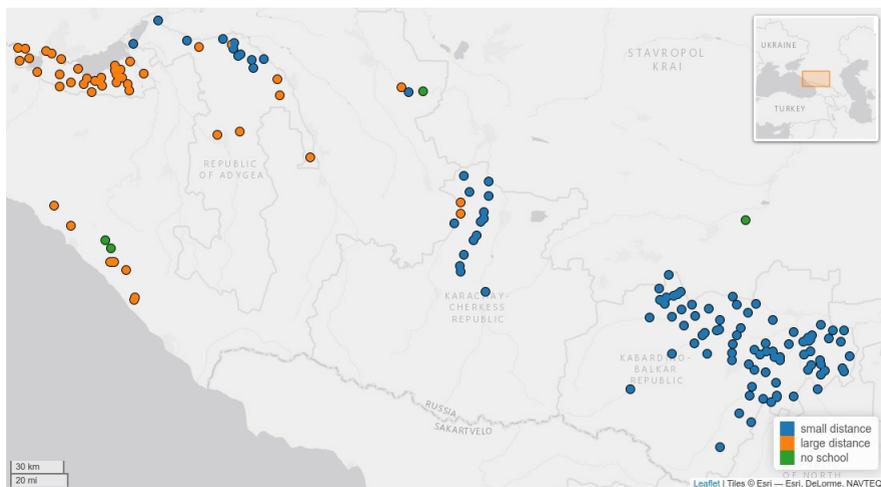


Figure 3: Map of the relationship between native idioms and language education in school

- villages with a Circassian population where no Circassian language is taught in school (4 villages, 2%). This is the case in two Shapsug villages and one Beslenny village in the Krasnodar Krai and, apparently, in settlements with a Circassian population in the Stavropol Krai, although we do not have exact data.

Fig. (3) shows a map generalizing the different types of sociolinguistic situations in terms of education in the native language. Only in two thirds of the villages education is provided in a language that is close to the idiom spoken in the village, while in all other cases a distant idiom is taught as “native language”, or no Circassian language is taught at all.

The **second chapter** discusses the segmental aspects of Circassian. The first section introduces different symbols used to transcribe the material, and proposes a practical transcription for all Circassian languages based on Cyrillics. We also propose a measure of isomorphism for the available writing systems, which allows the comparison of different writing systems. Subsequently, we counted the values for the literary West-Circassian and Kabardian languages in Russia and the new alphabets based on Latin script, which are used to teach Circassian languages in Turkey (see. [Doğ et al. 2014]).

The next section of the **second chapter** is dedicated to the description of vowel sys-

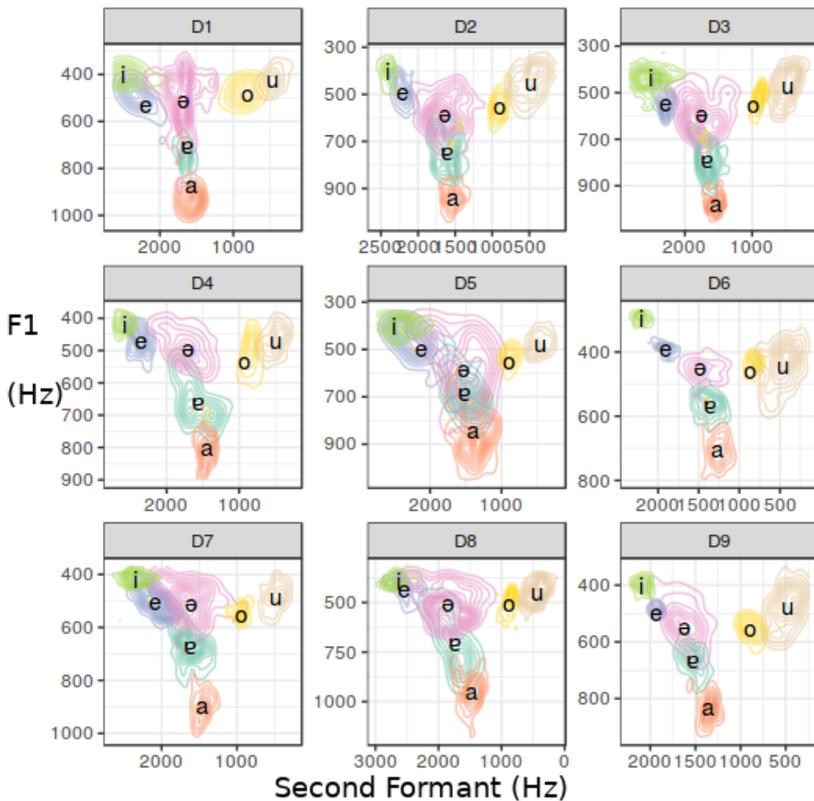


Figure 4: Kernel density estimation vowel of Kuban: values of first and second formants speakers D1–D9 (D6, D9 — males).

tems in Circassian languages. First, we discuss various previous descriptions, and introduce and discuss the concept of core and secondary vowels distinguished in studies on Circassian phonology. In the following section we discuss the results of an acoustic study on Kabardian vowels (based on data from the Kuban dialect). We did not aim to create a model that predicts the type of vowel based on its formant structure, so we used we used the Kernel Density Estimation (KDE) of Parzen–Rosenblatt ([Rosenblatt et al. 1956], [Parzen 1962]) for the correct display of data and the levelling of errors in the algorithm for automatically determining formants. As shown in Fig. 4, the “cloud” of vowels is

situated in a standard triangle, which is typical of vocalic systems in many languages, although due to the predictability of the appearance of certain vowels, the vowel system of Circassian languages is traditionally described as consisting of three basic vowels (or even one [Kuipers 1960]).

This section also discusses the effect of movement away from palatalization, discovered in those idioms, which distinguish alveolar and palato-alveolar fricatives and affricates, as in Bzhedug, Temirgoy, Abadzex, Besleney and Abazaktsk idioms. This phenomenon is the result of the fact that some segments can combine with upper and central-upper front vowels, i.e. *i* and *e*. One of the means of avoiding a combination of non-palatalized and non-palatal segments with a vowel with a high second formant (such as *i*, *e* or *æ*) is the change of the vowel. Another means represented in the idioms mentioned above, is the following: during the pronunciation of the vowel, a coarticulatory movement of the formant takes place. As a result, the vowel starts to look like a diphthong: *æi*. Further in this section, the phonological status of different groups of secondary vowels is discussed and their deep forms are revealed. As the result of the analysis we concluded, that the secondary vowels (*i*, *e*, *o*, *u*) formed from the core vowels (*a*, *ɐ*, *ə*) behave differently in Circassian languages: secondary vowels in West-Circassian can be interpreted as a combination of a glide and a core vowel (*a*, *ɐ*, *ə*), while in Kabardian they can be interpreted as the combination of a core vowel and a glide or the combination of a glide, a vowel and a glide.

The next large section of the **second chapter** presents an analysis of consonant systems in Circassian idioms and we discuss data collected in Circassian villages. The section concludes with the results of a hierarchical clusterization, which was carried out based on:

- phonological inventory
- regular sound correspondences

For each set of data we calculated the Manhattan distance (see [Riesz 1910]) and applied hierarchical clustering using an agglomerative method with full coupling [Everitt et al. 2011].

The results of the clusterization based on the phonological inventory coincides with the traditional classification of Circassian idioms (cf. Fig. 2: a small distance was found between closely related dialects, while the main clusters distinguish West-Circassian and

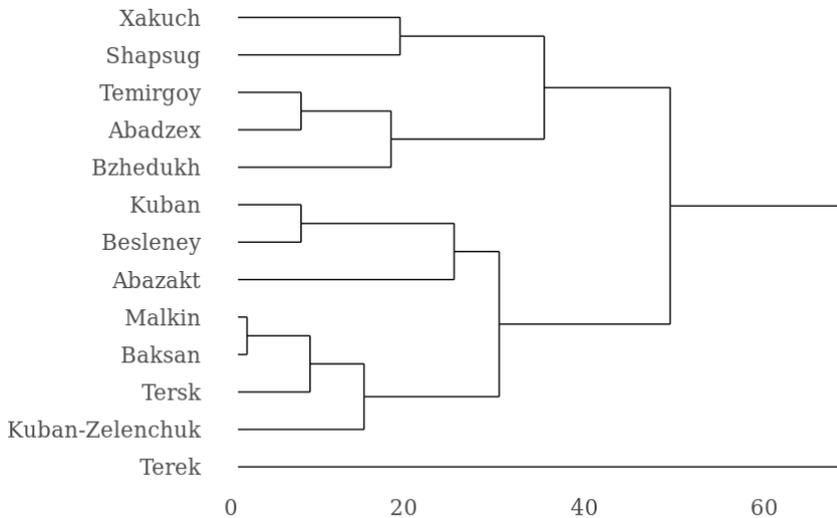


Figure 5: Clusterization of Circassian idioms based on their phonological inventory (using Manhattan distance and hierarchical clusterization with full coupling)

Kabardian idioms. In the literature we can find impressionistic observations that the Abadzex and Temirgoy idioms are closer to one another, than to Shapsug and Bzhedug. Clusterization allows us to confirm this observation and receive a measure of closeness for each pair of idioms. For example, according to the clusterization the Shapsug and Xakuchin idioms are further removed from other Circassian idioms. In addition, the clusterization also correlates with the geographical distribution of Circassian settlements.

The second clusterization was based on data from «The Circassian Consonants Correspondences Database» [Moroz 2019], which contains regular correspondences in Circassian idioms based on lexical data collected during field trips to 21 Circassian villages in the Republic of Adygea, the Krasnodar Krai and Karachay-Cherkessia, and data from the work of [Kumahova 1972; Kerasheva 1957; Bagov 1969; Balkarov 1959; Sitimova 2004; Vodozhdokova 1960; Tharkaho 1991, 2012; Apazhev, Kokov 2008]. The results of the clusterization almost completely coincide with the traditional classification of Circassian idioms (see Fig. 6): the top part of the graph represents the Shapsug idioms (B. Pseushkho, B. Kichmai, Khadzhiko, Pseituk, Khakuchin, Psebe, Agui-Shapsug, Shap-

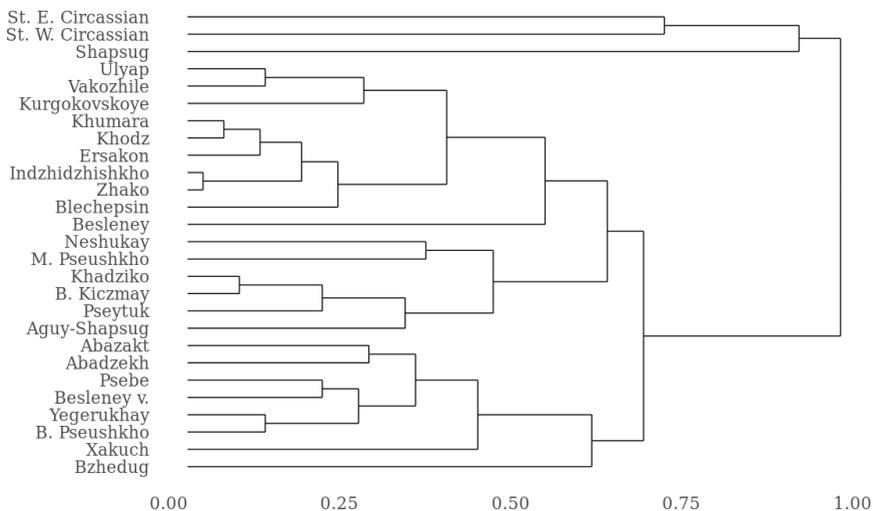


Figure 6: Clusterization of Circassian idioms based on regular correspondences (using Manhattan distance and hierarchical clusterization with full coupling)

sug), followed by the Temirgoy idioms (literary Circassian, Yegerukhai, M. Pseushkho,² followed by Bzhedug (Neshukai and Bzhedug). All of the above are part of a single cluster of West-Circassian idioms. The algorithm united the Kabardian idioms in a single cluster, which is divided into Kabardian proper (Indzhidzhishkho, Zhako, Ersakon, Khumara, Khodz', Blechepsin, and literary Kabardian) and Besleney, which forms a separate cluster (Vakozhile, Besleney, Ulyap). The last cluster is surprising, since it contains data from one Besleney village (Kurgokovskoe), one Kuban-Zelenchuk village (Abazakt), the description of Besleney by B. Kh. Balkarov, and the description of Abadzekh by Z. Ju. Kumakhovoi. The fact that the description of B. Kh. Balkarov does not cluster with the Besleney idioms is expected: as we mentioned earlier, the Besleney villages are diverse in terms of phonetics, and they are quite different from the description of B. Kh. Balkarov. The relationship of Abadzex with this cluster can be explained by the small amount of data from this idiom.

²It should be pointed out that the classification of M. Pseushkho as a Temirgoy village is not a proven fact but our conjecture based on data from phonetics and the lexicon.

The collected material shows that the phonological diversion of Circassian languages shows a strong link with phylogenetic divergence. If we exclude the descriptions of Besleney by B. Kh. Balkarov, and the description of Abadzekh by Z. Ju. Kumakhovoi, the distance between field data and the description in the literature is small. The results of clusterization should not be used to reconstruct the history of Circassian idioms, and should be used with caution. They can, however, be interpreted as a confirmation of the existing classifications, and the distance between idioms can be used for further research and to check hypotheses on the similarity and differences of Circassian idioms on other levels — syntactic, morphological and lexical.

The **third chapter** discusses the investigation of suprasegmental units in Circassian idioms. The first section of this chapter is dedicated to the description of stress in Kabardian idioms. The following rules are formulated:

- stress falls on the last syllable of the stem.³
- if the last syllable of the stem is an open syllable with the vowel *v*, stress falls on the penultimate syllable (if present).
 - exception 1: in jussive forms from non-verbal roots in *Cv*, stress falls on the stem.
 - exception 2: Russian borrowings retain the stress on the original syllable.

Stress in Circassian idioms has not been studied fully, and existing studies on this topic contradict each other ([Rogava, Kerasheva 1966: 25–28], [Yakovlev, Ashhamaf 1941: 418–424], [Kuznecova 2006]). We can only claim with certainty that Circassian stress shows considerable variation and is poorly described. It should be pointed out, that not all Circassian idioms are arranged in the same way in this regard: in the Khackuchin dialect (of the village Bolshoi Kichmai) according to our observations, stress always falls on the final syllable (at least in nominal stems).

The next section of the **third chapter** presents the results of our study of syllable structure in West-Circassian. It varies from simple (V) to complex (CCCvCC or CVCCC) with large consonant clusters. In the course of a preliminary experiment we found significant variation in speakers' division into syllables. We analyzed the syllable structure of the West-Circassian language based on the West-Circassian-Russian dictionary by Ju. A. Tkharakho from 1991. In this chapter we applied the algorithm we

³Endings include case affixes (-r, -m, -tē'v, -w), plural markers (-xv), the coordinative (-rv, -ri, -jə), and some others.

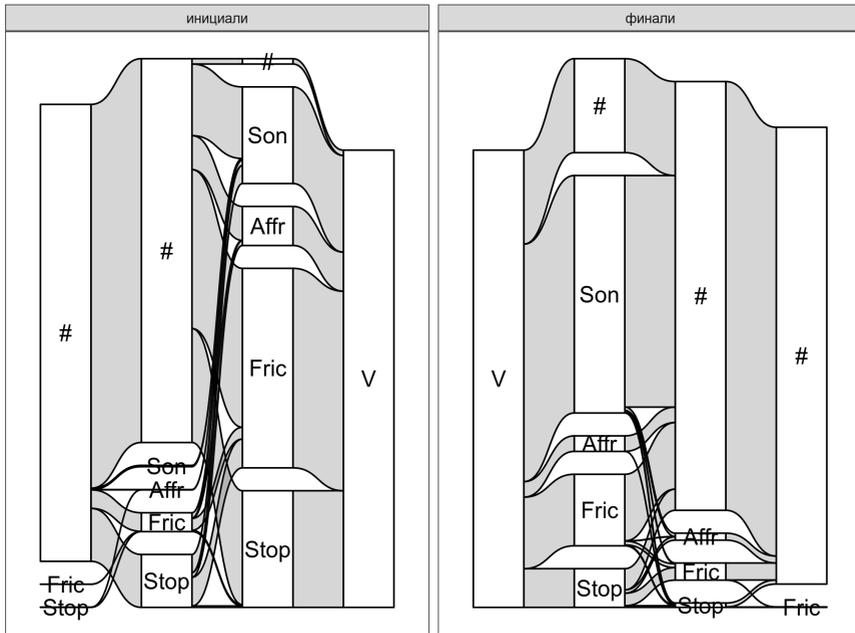


Figure 7: Result of our model survey: onsets of first syllables and codas of last syllables based on dictionary [Tkharakho 1991]: vowels (V), stops (Stop), fricatives (Fric), affricates (Affr), sonorants (Son). The # symbol stands for the absence of segment.

developed. This algorithm consists of several stages:

1. Derive syllable nucleus units based on monosyllabic words.
2. Derive all possible onsets based on first syllables of all lexical material we have.
3. Derive all possible codas based on last syllables of all lexical material we have.
4. Analyse all combinations of possible onsets and codeas presented in monosyllabic words.
5. Create a syllable model based on gathered data.
6. Test the obtained model against all lexical material and change it if necessary
7. (Optional step) Check the distribution of different syllable types across the word testing for the tendencies to appear in different parts of the word.

As a result we obtained several models: with all segments, with place of articulation features, with manner of articulation features. We selected the model presented in Fig. 7.

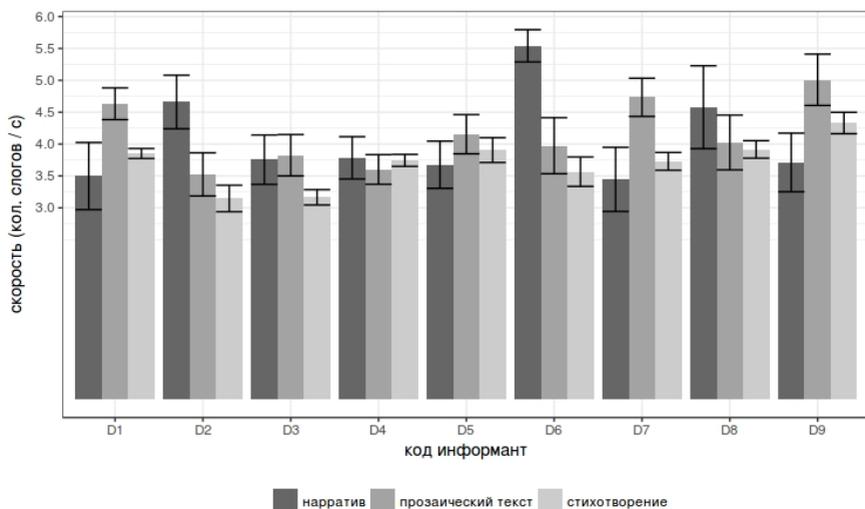


Figure 8: Result of speech rate research of speakers D1–D9 (D6, D9 — males). Points represent mean value and 95% confidence interval.

After the model evaluation we made the final conclusions regarding syllable structure:

$$\begin{pmatrix} \hat{s}/\text{шгь} \\ p/\text{п} \\ b/\text{б} \end{pmatrix} (C)(C)V(C)(\text{Obs}) \begin{pmatrix} \chi/\text{хь} \\ \text{h}/\text{хь} \\ f/\text{ф} \end{pmatrix}$$

The final section of the **third chapter** is dedicated to the study of speech rate in the Kuban dialect of Kabardian. In the course of field work we carried out an experiment in which nine speakers of the dialect participated. The experiment consisted of several parts. In the first part, consultants were asked to tell a story based on pictures. The pictures were shown to the speaker, and after they had some time to look at them, the pictures were taken away, and the speaker had to tell a story based on the pictures to another speaker. In the second part of the experiment, speakers were asked to read two texts (prose and poetic), written in the Kuban dialect of Kabardian. We discovered that the average speech rate differs depending on the type of discourse: narratives were told with an average speed of 4.33 syllables per second, with a 95% confidence interval ± 0.18 . The poem was read

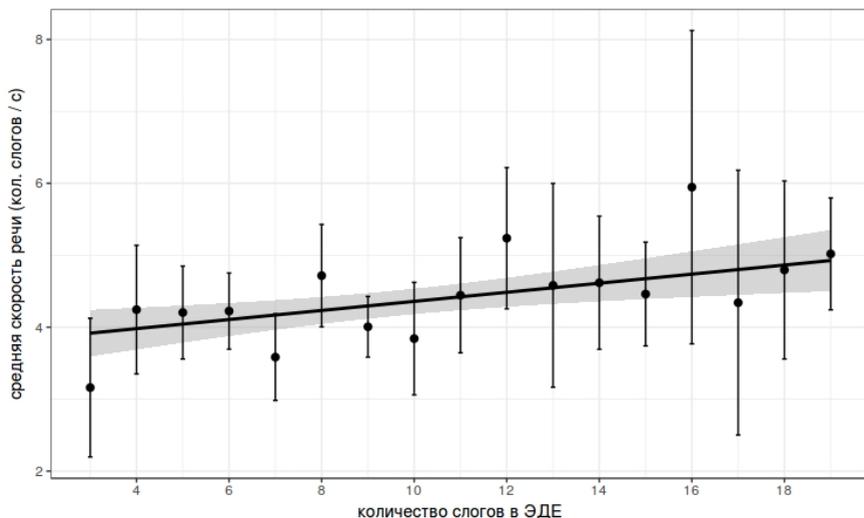


Figure 9: Mean value of the EDU with 95% confidence interval.

with an average speed of 3.72 syllables per second with a 95% confidence interval ± 0.06 , and the prosaic text was read with an average speed of 4.14 syllables per second with a 95% confidence interval ± 0.13 .

In the last section we checked the correlation discovered by [Fonagy, Magdics 1960; Stepanova 2011], who claim that when a phrase is longer, it tends to be pronounced faster. We analyzed EDU (elementary discourse units) [Kibrik, Podlesskaya 2014]) with a length of two to 19 syllables. Fig. 9 presents the average speed for the pronunciation of phrases with a different number of syllables, and also a 95% confidence interval for the average. The Pearson correlation coefficient between the number of syllables and speech rate is very small, but, as in the studies mentioned above, it is positive: 0.13. As a result, based on our data we can conclude that our experiment did not reveal tendencies similar to those mentioned in [Fonagy, Magdics 1960; Stepanova 2011]. Although it should be pointed out that speakers were not eager to retell stories, so we can presume that the result is in part due to the small amount of narratives collected. Possibly, we failed to prompt the speakers in the course of the experiment.

The content of the study is reflected in the following publications

In journals indexed in Scopus:

- Moroz G. A. Slogovaya struktura adygejskogo yazyka // Voprosy yazykoznanija. 2019. № 2. S. 82-95.

In journals from the list, recommended by the HSE University:

- Sieber I. A., Moroz G. A. Issledovanie akusticheskoy variativnosti s metodom glavnyh komponent // Vestnik Novosibirskogo gosudarstvennogo universiteta. Seriya: Lingvistika i mezhkul'turnaya kommunikaciya. 2019. № 1. S. 49-64.
- Moroz G. A. Skorosti rechi nositelej kubanskogo dialekta kabardino-cherkesskogo yazyka: ustnyj diskurs vs. chteniya teksta // Tomsnij zhurnal lingvisticheskikh i antropologicheskikh issledovanij. 2017. № 2. S. 9-17.

Other publications:

- Moroz G. A. Adygskie idiomy v Turcii: ot pervyh opisanij do sobstvennoj pis'mennosti // Vestnik RGGU. Seriya «Filologicheskie nauki. Yazykoznanie»/ Moskovskij lingvisticheskij zhurnal. 2015. S. 44-60.
- Moroz G., Martynova Aleksandra. Uvular consonants in Languages of the Caucasus, in: Historical Linguistics of the Caucasus: Book of abstracts. Paris, 12-14 April, 2017 / Istoricheskoe izuchenie yazykov Kavkaza. Tezisy dokladov Mezhdunarodnoj nauchnoj konferencii. Parizh, 12-14 aprelya 2017 g. / Sost.: T. A. Majsak. Mahachkala : IYaLI DNC RAN, 2017. P. 150-153.
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- Lander Yu. A., Arkad'ev P. M., Moroz G. A. Ob issledovanii bzhedugskogo dialekta adygejskogo yazyka // V kn.: Polevye issledovaniya studentov RGGU: Etnologiya, fol'kloristika, lingvistika. Vyp. X / Pod obš. red.: P. M. Arkad'ev, O. A. Kazakevich, V. L. Klyaus, N. A. Kozlova, Yu. A. Lander, E. V. Levkievskaya, A. B. Moroz, Yu. V. Filippov. M. : RGGU, 2015. S. 183-201.
- Moroz G. A. Adygsnij, adygejskij, besleneevskij, ulyapskij: predstavleniya nositelej ulyapskogo govora o svoem yazyke // V kn.: «Narodnaya lingvistika»: vzglyad nositelej yazyka na yazyk. Tezisy dokladov mezhdunarodnoj nauchnoj konferencii

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