

**SCTCMG 2018**  
**International Scientific Conference “Social and Cultural  
Transformations in the Context of Modern Globalism”**

**RELEVANT PROBLEMS OF PHONETIC RESEARCH IN  
OSSETIC LANGUAGE**

Veronica T. Dzakhova (a)\*

\*Corresponding author

(a) North Ossetian State University, Vatutin str., 44-46, Vladikavkaz, Russia,

*Abstract*

The analysis of the current state of the orthoepic level of the Ossetic language revealed the absence of the necessary dictionaries and textbooks for its codification, which is connected, according to the opinion of the author of the article, with the lack of appropriate scientific prerequisites. Scientific prerequisites are understood as the development of articulation phonetics as the basis for the most accurate description of the phonological base of a language and the creation of a phonetic transcription based on it. Ultimately, all these aspects should lead to a higher stage of codification of the language – the creation of orthoepic dictionaries. The article touches upon the issue of the controversial questions of the phonetic and phonological descriptions of the Ossetic language and suggests ways to solve them using modern computerized speech analysis tools. Primarily it concerns, the clarification of the vowel articulation of "ы" sound, the phonetic markers of word stress and the nature of the Ossetic intonation. The analysis of oscillograms and spectrograms obtained with the help of modern computer programs for speech analysis SOUND FORGE 6 and Speech Analysis allowed obtaining the objective phonetic characteristics of the analyzed phenomena and clarification of their phonological status. Thus, the data on the formant characteristics and duration of vowels were obtained for the first time, indicating that the vowel "ы" is the vowel of the middle row of the average rise, not the top one, which explains its significant acoustic difference from the Russian vowel "ы".

© 2019 Published by Future Academy [www.FutureAcademy.org.UK](http://www.FutureAcademy.org.UK)

**Keywords:** Ossetic language, phonetics, phonology, codification, orthoepy



## 1. Introduction

The creation of an orthoepic dictionary of the Ossetic language and the textbook on the theoretical and practical phonetics of the Ossetic language is one of the most pressing tasks of modern Ossetic linguistics, since it represents the highest stage in the codification of the orthoepic level of the language.

## 2. Problem Statement

The analysis of works on the phonetics and phonology of the Ossetic language made it possible to formulate a number of controversial problems whose solution is relevant for modern Ossetic studies. In particular, such problems are presented by the question of the phonological status of vowels *æ* and *ɪ*; the question of phonetic markers of word stress; the question of the alternation of voiced and deaf stop; the question of the nature of the Ossetic intonation.

## 3. Research Questions

A vowel *ɪ* is described by all Ossetic scholars as a vowel that differs significantly from Russian *ɪ* while listening, but it is placed in the vowel triangle in the same position as Russian *ɪ*, i.e. interpreted as a vowel of the middle row of the upper lift. In this case both vowels would sound in the same manner.

Vowels *æ* and *ɪ* are called weak in scientific literature, what indicates their lower intensity in comparison to other vowels. Meanwhile, the observations of real speech have not shown that vowels *æ* and *ɪ* are quieter than other vowels (as it is known, the intensity of a vowel is related to its volume).

Ossetic word stress is traditionally considered to be an expiratory one, although there is no study confirming this fact.

The intonation of the Ossetic language has not been studied at all. Meanwhile, this is one of the most difficult phonetic tasks, taking into account the number of factors involved in the design of the melodic outline of a sentence.

## 4. Purpose of the Study

The purpose of the article is to analyze the current state of phonetic and phonological descriptions of modern Ossetic (Iron) language and to identify the problems that require urgent solution for the codification of orthoepic level of Ossetic language. The result of the study is presented for each of the research questions.

## 5. Research Methods

In order to solve the tasks successfully it is necessary to use such methods as: a method of critical analysis of existing linguistic descriptions; speech analysis method; statistical method of data processing; perceptual analysis method.

## 6. Findings

Since uncodified speech presents "a certain usual way of sound design of oral speech, which spontaneously develops in the professional speech of educated people – speakers of a given language as

the most appropriate pronunciation for the speech, the lexical units and grammatical means of pronunciation used in it" (Raevsky, 1997), one should rely primarily on the pronunciation of teachers, radio and television announcers, theater and film actors. According to the pronunciation of these people, it is possible to determine not only the correct pronunciation of certain sounds, but also to learn how to put stress in words. The rules of the accentuation of Ossetic words are quite well described in literature (Abaev, 1959; Bagaev, 1965; Akhvlediani, 1969; Isaev, 1959). However, as it is shown by the results of the experiment, there are a number of words in which normative announcers put stress differently. Consequently, it is also necessary to pay due attention to the issue of the place of stress in Ossetic words. The next problem, the solution of which was performed in a special study, is the question of the nature of word stress in the Ossetic language. Traditionally, following V. I. Abaev (Abaev, 1959) the authors of modern textbooks and teaching aids describe it as an expiratory, which means that the selection of the stressed vowel is reasoned by its greater intensity. However, the data obtained during the course of the oscillographic study of Ossetic speech, allow us concluding that the frequency of fundamental tone of a vowel is subject to the changes associated with stress. In particular, if a stress falls on the first syllable, then the frequency of pitch of an unstressed vowel is 0.83 times less than the frequency of pitch of a stressed vowel. When a stress falls on the second syllable, pitch frequency of a stressed vowel is 1.02 times longer than pitch frequency of an unstressed vowel.

The study of changes of the intensity of vowels revealed that Ossetic vowels are not subject to qualitative reduction and are pronounced equally intensively, regardless of whether they are in stressed or unstressed position. The comparison of the durations of stressed and unstressed vowels revealed that the increase in duration is not connected with stress, but with a position in a word: a vowel located near the end of a word is always longer than a vowel standing in initial position. Thus, the Ossetic word stress can be interpreted as melodic. The study of oscillograms and spectrograms of Ossetic vowels gave the correct characteristics of Ossetic vowels *æ* and *ɪ*, traditionally considered as weak vowels. The analysis of the duration and intensity of the vowels shows that it is more correct to consider them not weak, but short. In terms of intensity, the weakest vowel of Ossetic language is the vowel *y* with an average intensity of 118 dB, followed by the vowel *o* (123 dB), vowel *u* (124 dB), vowel *ɪ* (125 dB), vowel *e* (128 dB), vowel *æ* (129 dB) and the vowel *a* (130 dB). The analysis of the formant structure of vowels for the first time gave an objective characteristic of the Ossetic vowel *ɪ* as the vowel of a mixed series of medium rise, and then it explains its noticeable acoustic difference from the Russian vowel, denoted by the same letter.

In particular, this applies to the devoicing of sonant occlusive at the end of words. The adaptation of abutting consonant with regard to voice participation is a phenomenon that is widespread in different languages. Devoicing or voicing consonants can be full or partial. As it is known, this interaction mainly involves noise consonants. The phenomenon of devoicing of voiced occlusive, intrinsic for many languages (for example, for German and Russian), is not unexpected for Ossetic language. On the one hand, in Ossetic language, there is the devoicing of voiced occlusive in positions of reduplication and after deaf fricatives *c*, *ɸ*, *x*, which is the result of the action of progressive assimilation of deafness. On the other hand, it is well known that the Ossetic voiced are weak, incomplete. Considering that a language is a system in which the law of analogy operates, it can be stated that the system created a precedent for devoicing of voiced in specified positions, and in the final position a voiced began to be devoiced by analogy.

Thus, in order to know how to transcribe a word in a dictionary, it is necessary to investigate the allophone variation and the alternation of all the phonemes of Ossetic language. It should be noted that the work on the orthoepic dictionary of Ossetic language has already begun. The first steps in the establishment of Ossetic transcriptional system have been made. The choice of signs for the phonemes of Ossetic language was carried out by comparing the data obtained by the method of oscillographic and spectral analysis of Ossetic speech, and the signs of International Phonetic Alphabet provided for all the possible phonemes. The use of transcription will help to see the difference in pronunciation between separate sub-dialects and dialects of Ossetic language using a single alphabet.

As it is known, the main difference between the sub-dialects and dialects of the Ossetic language is in pronunciation of consonants, denoted by the letters *у, дз, ц, з*. Therefore, for these consonants, the main variants of their pronunciation are presented in separate sub-dialects and dialects.

**Table 01.** The signs of transcription for Ossetic phonemes

Alphabet letter	Transcription sign of International Phonetic Alphabet
А	a
Æ	ɜ
Ы	ɐ
Е	e
И	i
О	o
У	u (for vowel) w (for consonant)
Б	b
В	v
Г	g
Гъ	ɣ
Д	d
ДЖ	dʒ
ДЗ	<u>dʒ</u> , z, ž, dʒ
З	z, ž
Й	j
К	k
Къ	kʔ
Л	l
М	m
Н	n
П	p
Пъ	pʔ
Р	r
С	s, š
Т	t
Тъ	tʔ
Ф	f
Х	χ
Хъ	q
Ц	s, ts, š, tʃ
Цъ	tsʔ, tʃʔ
Ч	tʃ
Чъ	tʃʔ

The next actual problem of phonetic studies of Ossetic language is the description of intonation. This problem is more difficult to study, since it refers to the suprasegmental level and is difficult to

determine it in pronunciation. Considering that this level of language is not described or studied, and also that it is closely related to syntax, descriptions of which cannot be considered perfect either, this problem can be defined as super complex.

The relevance of the study of intonation of Ossetic language is explained by several points. On the one hand, the studies of Ossetic intonation can complement the data of phonetic typology. It is associated with the uniqueness of Ossetic language, Indo-European in its origin, but existing for a long time surrounded by Caucasian languages. The phonetic systems of neighboring Caucasian languages in the field of intonation are unfortunately poorly described, so the comparison with them is not possible. However, the comparison with other Indo-European languages, the intonation of which is well described, can reveal that Ossetic intonation is originally Indo-European, and what was borrowed, perhaps, from Caucasian languages. In any case without objective data one cannot deny possible influence of Caucasian languages on Ossetic in the sphere of prosody. Against the background of the revealed significant coincidences, it is possible to reveal the originality and specificity of Ossetic language. On the other hand, the importance of the description of Ossetic prosody is connected with the need to codify the orthoepic level of Ossetic language, to make textbooks on phonetics, which will make it possible to increase the efficiency of teaching Ossetic language in the context of growing bilingualism.

The methodological basis for the study of Ossetic intonation is presented by the works of E. A. Bryzgunova (Bryzgunova, 1989), T. M. Nikolaeva (Nikolaeva, 1982), N. D. Svetozarova (Svetozarova, 1982), S. V. Kodzasova (Kodzasova, 1996) and O. F. Krivnova (Krivnova, 2016).

As an empirical material the sentences from the representatives of each class were selected, which were recorded by speakers of Ossetic language. At the next stage, the experimental material was subjected to instrumental analysis of several correlates: pitch frequency, vowel duration, their intensity and inter-syntax interval. All these prosodic correlates were measured both in absolute and relative values, which will allow deriving the average values and make generalizations. The use of modern computer aided tools of speech analysis makes the analysis results reliable.

It is necessary to note that the work in the field of intonation research continues. The first results can be found in the works of (Dzakhova, & Andieva 2016; Andieva, 2014). In particular, the narrative and interrogative sentences were analyzed in the delivery of two normative announcers of the North Ossetic state television, Zh. Zhukayeva and V. Dudiyeu. In order to identify significant difference at the acoustic level of a declarative sentence from an interrogative one, the sentences that coincide completely in lexical composition and syntactic design, differing only in the purpose of the utterance, were selected as experimental material. For example:

Зæронд мæнынрдæм æрбакаст. – The old man looked in my direction.

Зæронд мæнынрдæм æрбакаст? – Did the old man look in my direction?

Equal filling of sentences is necessary in order to eliminate a number of factors that predetermine the tone curve in advance. In particular, such factors, according to S.V. Kodzasov include, among others, segmental perturbations of tone: the decreasing effect of noise voiced vowels, the complex effect of noise deaf on vowels transitional areas, the vividness of vowels. The change in the frequency of fundamental tone and accentuated words in the phrase were investigated. The analysis was carried out using computer programs Sound Forge 6.0 and Praat.

## 7. Conclusion

For the first time, the acoustic distinction between the Ossetic vowel *ɨ* and Russian vowel, denoted by the same letter, found its objective justification. In the Ossetic language, according to the spectral analysis, this vowel should be attributed to the vowels of the average rise, and not the upper one, as in Russian. The closeness of the vowel *ɨ* to the vowel *æ*, found during the analysis, explains the acoustic similarity of these two vowels and the possibility of their interchange in some cases in colloquial speech.

The designation of vowels *æ* and *ɨ* as weak, unlike other vowels of Ossetic language, was not confirmed. These vowels are short in comparison to other vowels. In terms of intensity, the vowel *æ* refers to strong (along with *a*, *e*), and the vowel *ɨ* to medium intensity (along with *o*, *u*). The weakest vowel in all positions in a word in Ossetic language is the vowel *y*.

The frequency of vowel pitch directly depends on stress, in other words, a stressed vowel is always higher in pitch than an unstressed. The intensity of a vowel depends both on stress (a stressed vowel is on average more intense than an unstressed) and on the place in a word: a stressed vowel is always more intense than an unstressed, the intensity of a vowel decreases as the end of a word approaches. This fact makes it possible to consider Ossetic stress as expiratory-melodic, not purely expiratory.

In the area of consonants, it is possible to talk about devoicing of final voiced consonants, i.e. on withdrawal in final position of the opposition for voicing / deafness. At the place of orthographic voiced, paired deaf consonants are always pronounced, which does not contradict the phonological system of Ossetic language, in which voiced consonants are incompletely voiced.

It is too early to draw final conclusions about the nature of intonation, since the work is still ongoing. At this stage, it is possible to say that the curve of change of pitch frequency in the declarative sentences is single-vertex, with the maximum value recorded at the beginning of a sentence. In interrogative sentences, the tone curve looks different: it is two-vertex with peaks in initial and final syntagmas. It allows drawing preliminary conclusions about the fact that the beginning of a sentence is uninformative from the point of view of young people: in both narrative and interrogative sentences a peak of pitch frequency can be located at the beginning. But the presence of a peak at the end of a sentence may indicate a question tune. More precise conclusions can be made at the end of the study.

## References

- Akhvlediani, G. S. (1969). *Grammar of Ossetic language*. Ordzhonikidze: North Ossetian Book Publishing.
- Andieva, M. A. (2014). Intonation of Ossetic language: Data of instrumental research. *Modern problems of science and education*, 6, 1340.
- Abaev, V. I. (1959). *A grammatical essay on Ossetic language*. Ordzhonikidze: North Ossetian Book Publishing.
- Bagaev, N. K. (1965). *Modern Ossetic language. Part 1 Phonetics and morphology*. Ordzhonikidze: North Ossetian Book Publishing.
- Bryzgunova, E. A. (1989). *Intonation and syntax Modern Russian: A textbook for students of philological faculties of universities*. Moscow: High School.
- Dzakhova, V. T., Andieva, M. A. (2016). On the issue of perceptual relevance of the pitch frequency (based on the analysis of the results of perception of the narrative and interrogative sentences of Ossetic language). *Bulletin of VolSU. Series 2: Linguistics*, 15(3), 143-148.
- Isaev, M. I. (1959). *Essay on the phonetics of Ossetic literary language*. Ordzhonikidze: North Ossetian Book Publishing.

- Kodzasov, S. V., Kalenchuk, M. L., Kasatkina, R. F. (1996). Prosodic structure of the Russian language. Moscow: Publishing house of the Institute of the Russian language by V.V. Vinogradov.
- Krivnova, O. F., Knyazev, S. V., Moiseeva, E. V. (2016). Studies of prosodic articulation of sounding text on the material of Russian language. *Bulletin of Moscow University. Series 9: Philology*, 4, 7-33.
- Nikolaeva, T. M. (1982). *Accent allocation semantics*. Moscow: Publishing Science.
- Raevsky, M. V. (1997). *Phonetics of German language. Theoretical course*. Moscow: MSU Publishing House.
- Svetozarova, N. D. (1982). Intonation system of Russian language. Leningrad: St. Petersburg State University.