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**DURATION VARIABILITY IN ERZYA:
STRESSED AND UNSTRESSED SYLLABLE NUCLEI
IN IDIOLECTS**

Abstract. Recordings of spontaneous speech and scripted reading were analyzed to test the hypothesis that there is stress-related duration variability among the dialects of Erzya. This article reports the results of measurements on the durational relations between stressed and unstressed syllable nuclei in disyllabic words produced by 40 speakers. The data allowed distinguishing four groups of idiolects with regard to the durational characteristics of the adjacent syllable nuclei. In the group of idiolects characterized by the use of full vowels within a word, the duration of the syllable nuclei tended to be equal. The analysis of variance showed that differences between the duration of stressed and unstressed syllable nuclei were statistically not significant. In three groups of idiolects that are characterized by the occurrence of reduction in unstressed syllables, vowels under stress were found to be longer than in unstressed syllables; variance in the duration of the syllable nuclei for these groups was significant. Hence, in the types of idiolects that have reduction, duration is likely to be used as a correlate of stress. Cross-idiolect data exhibited a complexity of interrelationship between some of the varieties referred to different groups. Differences in the duration ratios between the syllable nuclei for separate idiolects were not statistically significant, which implies that there are borderline cases among the groups. The measurements of spontaneous speech and script reading produced analogous results. In the course of analysis, some of the segmental effects upon the durational relations between the syllable nuclei in the varieties were noted.

Key-words: Erzya, stress, duration, syllable nuclei, idiolect, variability.

1. Introduction

Spoken varieties of Erzya have been primarily classified according to the patterns of vowel distribution in initial and non-initial syllables. Distinction has been made between groups of dialects characterised by the use of full vowels within a word and groups of dialects in which reduction of vowels in non-initial unstressed syllables occurs (Itkonen 1971; Цыганкин 1977 : 19–30; Rédei 1984; Ермушкин 1984; Keresztes 1990 : 16–17; Feoktistow 1990). In view of this difference, it would be relevant to suggest that there is also stress-related duration variability in Erzya. Vowel reduction implies that duration is an important correlate of stress (Lindblom

1963; Dauer 1983; Aguilar, Balari, Castellví, Marín, Vallverdú 2003 : 2771—2772). A study of alternations in the assignment of stress in Erzya spontaneous speech (Aasmäe, Ross 2005) has revealed a relationship between the frequency of initial and non-initial stress and occurrence of full and reduced vowels. Namely, alternations of initial and non-initial stress were found to be more frequent in idiolects that use vowels of full formation while the tendency towards initial stress was dominant in idiolects characterised by reduction. The authors have suggested that reduction can have developed due to the diminishing mobility of alternating stress. Four groups of idiolects were differentiated in accordance with the occurrences of stress on the initial and non-initial syllables. On the acoustic level, attempts to establish factors determining the correlates of stress in Erzya have not yielded definitive results. It can be inferred from the data reported hitherto (Байчуря 1961 : 257—258; Baitchoura 1982 : 57—58; Lehiste, Aasmäe, Meister, Pajusalu, Teras, Viitso 2003; Estill 2004) that the durational characteristics of syllable nuclei in dialects vary. Comparable results have been obtained from measurements on similar idiolects while the use of different sources of material has given rise to controversial conclusions. For example, duration has been regarded as the main correlate of Erzya stress in a comparative study of Turkic and Finno-Ugric languages by Baitchoura (Байчуря 1961 : 257—258; Baitchoura 1982). Measurements were made on the productions of a speaker born in Guzyncy (Mordva). The values of average duration in stressed and unstressed, open/closed, syllables for the vowel *a*, for instance, were 191/178—157/144(ms) (Baitchoura 1982 : 57—58). In the results on duration measurements reported by I. Lehiste, N. Aasmäe, E. Meister, K. Pajusalu, P. Teras, T.-R. Viitso (2003 : 96—98), at least two groups of data can be distinguished. Vowels under stress were found to be longer in the productions of the speakers from Kočkurovo, Papulevo (Mordva) and Napolnoje (Chuvash). Averaged values of the duration of stressed and unstressed syllable nuclei for speaker NA (Kočkurovo), for instance, were 141—125(ms) in a phrase-final position and 134—108(ms) in a sentence-final position. Part of the data, the productions of the speakers from Luńga and Žabino (Mordva) as well as Bestuževka and Kivatsk (Orenburg), showed that the duration of vowels in non-initial unstressed syllables was either equal to that of vowels under stress or exceeded it, e.g.: 126—136(ms) in open syllables and 126—128 (ms) in an open and closed syllable for a sentence-final position (speaker NK, Luńga). The varieties spoken in Guzyncy and Kočkurovo differ but they are both referred to dialects characterized by reduction; the varieties spoken in the area including Luńga and Žabino use full vowels within a word (Цыганкин 1977 : 19—30). Taking into consideration the overall results on duration obtained in the study, the authors have concluded that duration does not serve as a reliable stress cue (Lehiste, Aasmäe, Meister, Pajusalu, Teras, Viitso 2003 : 61, 85). A manual of the phonetics of Erzya and Moksha (Бондарко, Поляков 1993 : 136) maintains that the duration of unstressed syllable nuclei in Erzya, unlike in Moksha, does not generally differ from the duration of stressed syllable nuclei. The authors, however, did not give any information concerning the origin of the speaker(s). Acoustic data reported by D. Estill (2004) in a study dealing with the issue of diachronic change in the placement of Erzya stress also refer to an idiolect from Ža-

bino; the author claims that the leading correlate of stress in Erzya is duration (Estill 2004 : 200–211). The nuclei of initial stressed syllables in the majority of test words listed by D. Estill (2004 : 223–226) were longer compared to the nuclei of non-initial unstressed syllables, e.g.: 144–112(ms) in *tarad* 'branch'. In some cases, unstressed syllable nuclei were longer than stressed syllable nuclei or the length of the two vowels was nearly equal, e.g.: 112–150(ms) in *targi* 'pull, draw' and 106–103(ms) in *śorma* 'pattern, letter'. Diverging results on a same idiolect in the two studies might have been caused by a number of factors. Among the sources of temporal variability, such factors as changes in speech tempo, the length and phonetic environments of the utterances, prosodic contours, as well as speaking style have been suggested by different authors (e. g., Peterson, Lehiste 1960; Allen 1968; Torstensson 2004). Durational difference conditioned by syllable structure in Erzya has been noticed in Baitchoura 1982, as mentioned above. I. Lehiste, N. Aasmäe, E. Meister, K. Pajusalu, P. Teras, T.-R. Viitso (2003 : 53, 58, 84) have observed "a certain amount of conditioned variation" in closed and open syllables. Concerning the role of duration in manifesting primary stress, the authors write that this is an unsolved question. It emerges from the comparison of previous findings that research using more speakers is warranted to evaluate the temporal relations between stressed and unstressed syllable nuclei in Erzya.

This article evaluates the results of an empirical study of the duration of stressed and unstressed syllable nuclei in disyllabic words produced by forty speakers originating from twenty-nine locations in the Mordvin Republic and diaspora. The test materials included spontaneous speech and script reading. The phonetic research of the characteristics of conversational speech and reading has been of growing interest of late (Bolotova 2003; Bondarko, Volskaya, Tananaiko, Vasilieva 2003; Engstrand, Krull 2003; Strangert 2004). In this study, the use of the two sources served the purpose of obtaining sufficient material. It was essential to make observations on spontaneous speech since Erzyan communities actually use the spoken varieties. The results of auditory analysis (Aasmäe, Ross 2005) showed, for example, that it was possible to gain an insight into the tendencies of stress assignment using spontaneous speech. To obtain a larger amount of comparable productions of different speakers, script reading was used. The limitation of this type of material in the case of Erzya is that speakers are susceptible to mixing the idiolect and norm while reading. In such cases, for example, reduced vowels occurring in a part of dialects can be occasionally replaced by full vowels. During the analysis, the data were checked for possible effects of the script written in the literary language upon the productions of the speakers.

2. Data analysis

2.1. Experimental design

The material under discussion included disyllabic words which in the auditory analysis of the material were assigned initial stress. The location of stress was established through repeated listening to the material by the author who is a native speaker of Erzya. Spontaneously produced utter-

ances were one-word responses of the speakers recorded in an informal dialogue, as illustrated by the following example:

Question: *ul'it'-arast' jalgat?* 'do you have friends?'

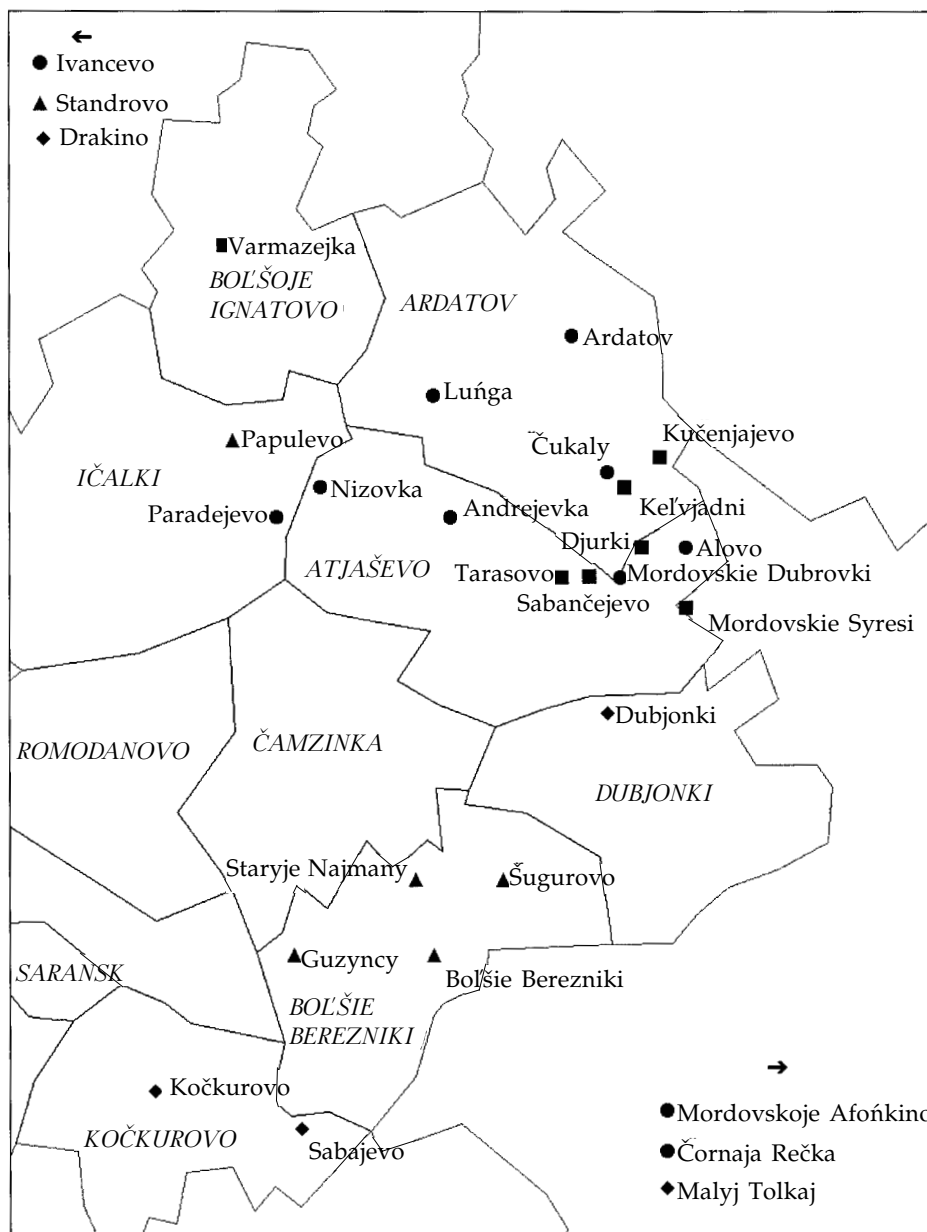
Response: *ul'it'* 'yes, I do'.

The segmental and morphological structure of the words varied: *vel'e* 'a village', *vel'es* 'the village', *vel'ent'* '(of) the village', *ošso* 'in a city', *ošsoś* 'the city', *aras'* 'no, not', *apak* 'not', *ul'i* 'is', *ul'it'* 'are', *ul'niń* 'I was', *kudo* 'a house'. The total number of tokens obtained was 315. Recordings were made by 33 speakers of the same age group (19–21 years); at the time of recording the speakers lived in rural areas where they mainly used Erzya. The script reading material included test words that were read within the carrier sentence *Valoś ... erźań* 'The word ... is Erzyan'. The words differed by the types of segmental structure. Morphological variation was constrained; the word list included nouns in the nominative case, singular, e.g.: *pize* 'nest', *jarmak* 'money' and verbs in the form of the infinitive with the ending *-ms*, e.g.: *kozoms* 'to cough', *pečkems* 'to cut'. The total number of tokens obtained was 350. The material was read by 7 speakers (aged 25–37) who actively used spoken Erzya, were norm-aware and were also exposed to Russian and other languages during their studies or professional involvement. The speakers were asked to read the sentences at their pace.

The recordings of the dialogues were performed by an experienced technician in the studio of the phonetics laboratory of the Mordvin Pedagogical Institute. Script reading material was recorded in the studio of the Radio and Television Broadcasting Station of the Mordvin Republic. Professional equipment used for recording in both cases consisted of a microphone MD-16, a recorder MƏ3-28 (recording at 38.1 cm/sec.) and a panel RKS-02. The recordings were subsequently digitalized and transferred to 16 bit/48kHz wav-files using a computer equipped with a Creative Labs SoundBlaster Extigy soundcard and Adobe Audition 1.0 software. For the playback of the tapes, a ReVex B77 MK II Stereo tape-recorder was used. Measurements were made of the values of duration of vowel segments using the software program PRAAT. The procedures and analysis were carried out in the Phonetics room of the Department of Estonian and Finno-Ugric Linguistics of the University of Tartu.

2.2. Idiolect groups

The target groups were initially defined through an auditory analysis. As a point of departure, the aforementioned grouping of Erzya dialects was considered. Further, the place of stress in the test materials was established. The occurrences of initial and non-initial stress in the idiolects were found to be associated with types of vowel distribution. Initial stress dominated in the idiolects characterized by the reduction of vowels in non-initial unstressed syllables. Alternations of stress were more frequent in the idiolects that use full vowels within the word. As a result, four groups of idiolects were defined (Aasmäe, Ross 2005). The values of relative duration between stressed and unstressed syllable nuclei in the speakers' productions were subsequently used to tally the idiolect groups.



Concerning the vowel segments in Erzya (*i, e, u, o, a*), I. Lehiste, N. Aasmäe, E. Meister, K. Pajusalu, P. Teras, T.-R. Viitso (2003 : 62–67, 85) have established that in unstressed syllables, they exhibited the expected centralization which was realized somewhat differently in the five vowels. In the material observed by the authors, vowel reduction did not constitute substitution of a stressed vowel by a reduced vowel, but it was a continuum, a process by which vowels were gradually more or less reduced. The studies of dialects referred to above have established a regular representation of reduced vowels in certain positions; the quality of the reduced vowels varies in different dialects. As acoustic data pertaining to reduced vowels have been missing, in this work, a general symbol (*ə*) is used to mark reduc-

tion. The symbols *ě*, *ǒ*, *ǎ* correspond to weakened *e*, *o*, *a*; the symbol *ǎ* also refers to a reduced *o* in a word-final position, as in *kudo/kudǎ*.

Below is a brief description of the resultant groups. In the list of place names, the abbreviation (MR) stands for the Mordvin Republic.

1. Origin of the speakers: Ardatov, Čukaly, Luńga (Ardatov, MR); Alovo, Andrejevka, Mordovskije Dubrovki, Nizovka (Atjaševo, MR); Paradejevo (Ičalki, MR); Čornaja Rečka (Isakly, Samara), Ivancevo (Lukojanov, Nižnij-Novgorod), Mordovskoje Afońkino (Čeremšan, Tatarstan). The idiolects are characterized by the occurrence of the full-formation vowels *e*, *i*, *o*, *u*, *a* both in initial and non-initial syllables (with the exception of *u* which is not used in unstressed syllables), e. g.: *kudo* 'home', *vel'e* 'village', *ošso* 'in the city', *ošós* 'the city'. The distribution of vowels is common to that in the literary language. Alternations of initial and non-initial stress in the dialects are the most frequent of the four groups.

2. Origin of the speakers: Djurki, Keļvjadni, Kučenjajevo, Mordovskije Sireši, Sabančejevo, Tarasovo (Atjaševo, MR); Varmazejka (Bolšoje Ignatovo, MR). The idiolects are close to those of group 1; however, sporadic reduction was observed in the utterances of the speakers, e.g.: *kudǒ/ǎ*, *kudu*, *vel'ě*, *oššǒ/ǎ*, *ošós/ošǒs*. Alternations of initial and non-initial stress are less frequent than in group 1.

3. Origin of the speakers: Berezniki, Guzyncy, Staryje Najmany, Šugurovo (Bolšije Berezniki, MR); Papulevo (Ičalki, MR); Standrovo (Tenguševo, MR). The common feature of the idiolects is moderate reduction; characteristic is the use of the vowel *ǎ*, e.g.: *kudǎ*, *kudu*, *vǎl'ǎ*, *oššǎ*, *ošós*. Initial stress is less dominant than in group 4.

4. Origin of the speakers: Dubjonki (MR); Kočkurovo, Sabajevo (Kočkurovo, MR); Drakino (Torbejevo, MR); Malyj Tolčaj (Pohvistnevo, Samara). The idiolects are characterized by extensive reduction. The use of the vowel *ǎ* is also a feature of the idiolects, cf.: *kudǎ*, *kudǎ*, *vǎl'ǎ/ǎ*, *oššǎ/ǎ*, *ošǎs*. Stress is dominantly on the first syllable.

3. Results

3.1 Data of spontaneous speech

The results of measurements on spontaneous speech are presented in Table 1 as inter-group data. They include the values of average duration for vowels in stressed and unstressed syllables (V1, V2) and the value of average relative duration (V1/V2) across the original measurements for each group, with the values of standard deviation. Mean duration and standard deviation were lower for groups 1 and 2. However, the duration ratios differentiate between the data for group 1 and groups 2, 3, 4. The nuclei of stressed and unstressed syllables tended to have equal duration in the idiolects of group 1 while in the idiolects of the other three groups, the nuclei of stressed syllables were longer than those of unstressed syllables. The values of absolute and relative duration were also the smallest for group 1. This is consistent with the use of vowels in initial and non-initial syllables, mentioned in 2.2. There was less variation in the types of vowels occurring in the idiolects of this group. The auditory analysis of the material showed that full vowels (*e*, *o*, *i*, *u*, *a*) occurred both in the

first and second syllable (with the exception of *u*). In the data of group 2, the duration ratio and standard deviation were higher than those for group 1. The use of vowels in stressed syllables in the idiolects of this group was the same as in group 1. However, in unstressed syllables, in addition to *e, o, a*, weakened *ě, ő, ǎ* occurred; *o* was occasionally replaced by *u* (*kudo/u*). In some idiolects, reduced *ə* appeared (*kudə*). In groups 2 and 3, the duration ratios were nearly the same but there were higher values of standard deviation both for absolute and relative duration for group 3. The dispersion of the values was especially high for V2. In the idiolects of this group, 6 full vowels (*e, o, i, u, a, ä*) occurred in the first syllable; in non-initial syllables, except the full vowels (*i, u, o, a, ä*), there were allophones of reduced *ə* and *ǎ*. Higher values of absolute duration and standard deviation observed in the data of group 3 may be due to the occurrence of low front *ä* both in the first and second syllable (*välä, väl'ís, väl'ínt', ulä*) in nearly all the idiolects of this group. In the idiolects of group 4, *ä* mainly occurred in the first syllable (*välä/ə, väl'ís, väl'ínt', ulä/ə*). Due to a regular reduction in the unstressed syllable, mean duration and standard deviation for V2 were not high but the duration ratio was the highest among the groups. The vowel *ä* is represented by *e, i* in the idiolects of group 1 (*vel'e, vel'eś, vel'eńt', ul'i*) and *e, ě/i* in those of group 2 (*vel'ě, vel'eś, vel'eńt', ul'ě/i*). The analysis of mean values of duration in the inter-group data established the following types of relation between the syllable nuclei. Average duration ratios for the groups were within the range 1.0–1.2; the value of relative duration increased from group 1 through group 4. The values of standard deviation for absolute and relative duration were higher for groups 3 and 4, compared to groups 1 and 2. Thus, the data exhibited a higher level of duration variability in groups of idiolects characterized by reduction. In group 2, reduction was less salient. In literature, higher values of standard deviation in languages having vowel reduction have been reported by E. Grabe, B. Post, and I. Watson (1999). The authors related this finding to vowel quality. English has full as well as spectrally reduced and shortened vowels. The consequence is a high level of variability in vowel durations. French does not have vowel reduction and the level of vocalic variability is significantly lower.

Table 1

Mean values of absolute and relative duration
for stressed and unstressed syllable nuclei in spontaneous speech data
(M — mean, SD — standard deviation)

Idiolects	Number of speakers	Number of tokens	Value	V1 (ms)	V2 (ms)	V1/V2
Group 1	13	112	M	110	108	1.03
			SD	17	16.2	0.19
Group 2	9	93	M	108	97	1.13
			SD	18.9	16.7	0.22
Group 3	6	54	M	122	111	1.15
			SD	21.1	27.4	0.28
Group 4	5	56	M	112	95	1.21
			SD	22.5	17	0.28
Total	33	315				

The durational data were evaluated by using the analysis of variance. First, the values of absolute duration for V1 and V2 across all the measurements within each group were compared. The analysis showed that the duration variance between the vowels in group 1 was statistically not significant ($p = 0.6$). In the data of groups 2 and 4, the variance in the duration of V1 and V2 was significant at $p < 0.0001$, in both cases; in the data of group 3, it was significant at $p = 0.01$. Further, the values of V1/V2 across all the measurements in each group were compared in pairs of groups. As it has been mentioned, the idiolects of group 2 revealed uniformity with group 1: the mean values of duration were closer to those for group 1. It had also been found that the mobility of stress in both groups was higher than in groups 3 and 4, reduction in group 2 was not as salient as in groups 3 and 4. However, the analysis of variance showed that differences in the duration ratios between groups 1 and 2 were highly significant ($p = 0.0005$). The variance in the duration ratios between the syllable nuclei was also highly significant for groups 1 and 3 ($p = 0.0009$) and groups 1 and 4 ($p = 0.0001$). The pairwise comparison of the duration ratios for the groups of idiolects characterized by reduction, groups 2/3, 3/4, 2/4, showed that the difference between them was not significant: the values of p were 0.6, 0.3, and 0.06, respectively. The analysis of variance in the absolute duration between the syllable nuclei thus confirmed the finding that in group 1, the duration of stressed and unstressed syllable nuclei did not differ while in the case of groups 2, 3, 4, the differences in the duration of the vowels were significant. Analysis based on the comparison of duration ratios between the syllable nuclei differentiated between group 1 and each of the other three groups but differences between groups 2, 3, and 4 were statistically not significant. Fluctuations in the rate of speech and, hence, in the degrees of reduction across speakers and across tokens in spontaneous speech can be one of the reasons why variance in V1/V2 between the groups of idiolects characterized by reduction was not significant.

3.2 Data of script reading

In spontaneous speech, productions of a large number of speakers were compared on a small number of tokens; in reading, more tokens were obtained from each of the 7 speakers. The results of measurements on reading were assessed as inter-speaker and inter-group data. Group 1 was represented by three speakers; group 4 by two speakers; groups 2 and 3 each by one speaker. Data in Table 2, similarly to Table 1, contain the values of absolute duration for stressed and unstressed syllable nuclei (V1, V2), and the values of average relative duration (V1/V2), with values of standard deviation for each speaker. In the data for group 1, the length of the syllable nuclei tended to be equal. In groups 2, 3, 4, vowels under stress were longer than in unstressed syllables. Average duration was higher in the data of speakers NA and RV compared to the other speakers. Average duration ratios in the inter-speaker data were within the range 1.0–1.2 and, thus, overlapped with the inter-group results obtained on the spontaneous speech material. The average value of V1/V2 for speaker VR was higher than that for idiolect group 2 in spontaneous speech but it was

within the range of values for the group; the values of standard deviation for absolute and relative duration were similar to those observed in the spontaneous speech material. Standard deviation was the lowest for speakers VD, PA and NP; the auditory analysis showed that the speakers maintained an even rate of speech over the readings. In the case of NP, similarly to the data of spontaneous speech for group 3, standard deviation was higher for the vowels in the second syllable, due to a complex use of full and reduced vowels. Certain particularities were observed in the values of standard deviation in the inter-speaker data. A higher value of standard deviation for the unstressed syllable nuclei, compared to the stressed syllable nuclei, was also observed in the data for VL and NA. In the readings by NA, according to the auditory analysis, switching from idiolect to norm and, hence, substitution of reduced vowels by full ones occasionally occurred. The idiolect forms *pirä/i*, *pizä/i*, *šivä/i*, *šimims*, *päl'ims* were replaced by the corresponding literary forms *pir'e*, *pize*, *šive*, *šimems*, *pell'ems*. The high value of standard deviation for V2 in the result can reflect a complex use of vowels in the unstressed syllable by this speaker. In spontaneous speech data, standard deviation for V2 in group 4 was considerably smaller than for V1. In the case of VL, opposite to NA, sporadic weakening occurred in unstressed syllables, which was also reflected in a higher value of standard deviation for V2. Thus in the data for VL, NP, NA, which were merged in different groups, the dispersion of the values for V2 was higher than for V1.

Table 2

Average values of the duration of syllable nuclei in script reading data (M — mean, SD — standard deviation; speakers: VD (Mordovskoje Afońkino), PA, VL (Čukaly), NP (Guzintsi), AB (Dubjonki), NA (Kočkurovo), VR (Ičalki))

Speaker	Idiolect group	Number of tokens	value	V1 (ms)	V2 (ms)	V1/V2
VD, male	1	50	M	105	106	0.99
			SD	9.80	8.38	0.11
PA, male	1	50	M	110	110	1.01
			SD	13.26	12.24	0.12
VL, female	1	49	M	124	119	1.06
			SD	17.78	19.32	0.17
NP, female	3	51	M	114	106	1.08
			SD	12.81	14.26	0.11
AB, male	4	50	M	121	108	1.13
			SD	16.90	16.55	0.15
NA, female	4	50	M	149	135	1.14
			SD	20.29	24.31	0.24
VR, female	2	50	M	144	121	1.21
			SD	15.5	14.01	0.16
Total: 7	4	350				

Analysis of variance in the values of absolute duration for stressed and unstressed syllable nuclei, V1 and V2, showed that in the idiolects of group 1 (VD, PA, VL), the variance was not statistically significant; the values

of p were 0.3, 0.9, 0.1, respectively. The data of the other idiolects revealed a significant difference between the values for V1 and V2: the values of p were 0.004 and 0.002 for NP and NA, respectively, and < 0.0001 for AB and VR. Subsequently, the duration ratios across the original measurements for each of the 7 speakers were compared to establish the relationship between the groups. A highly significant variance ($p < 0.001$) was found between two groups of results — those for speakers VD, PA, VL (group 1), and those for speakers VR, NP, AB, NA (groups 2, 3, 4). Script reading data also allowed differentiating between groups 2, 3, 4. Differences in the duration ratios between the groups were statistically significant at $p = 0.005$. In addition to these analyses, the values of V1/V2 for pairs of idiolects were compared using the analysis of variance to evaluate the relatedness of the duration ratios for idiolects merged in different groups. The results of comparison are presented in Table 3. Differences between the pairs VD/PA and PA/VL referred to group 1 were not statistically significant; the variance between the pair VD/VL was, however, statistically significant at $p = 0.008$. Differences in the duration ratios for the pair VL/NP and VL/NA were not significant ($p = 0.5$ and 0.08 , respectively) while the differences in the data for VL/AB were marginally significant ($p = 0.04$). As it has been noted, VL and NA had, for different reasons, a higher value of standard deviation for V2, similarly to NP. The results for VL can be regarded as borderline; they were interrelated with those for idiolects merged in different groups. In the case of NA, there was partial substitution of reduced vowels by full ones due to a mixed use of the idiolect and norm. The results of the pairwise comparison of the inter-idiolect data are schematically illustrated in Figure 1 which shows that differences in the duration ratios for the idiolects within the circles were statistically not significant. In this continuum of data, the four idiolects (VL, NP, AB, NA) in the central circle are interrelated: differences in the duration ratios for the four idiolects were not significant ($p = 0.1$). However, variance in the data for VL and AB, as mentioned above, was marginally significant ($p = 0.04$). The relatedness of the data exemplifies a complexity of boundary features that exist between language varieties (Hudson 1999 : 29). On the other hand, the data for three idiolects — VD, PA (Group 1) and VR (Group 2), revealed little congruence with the other part of the cross-idiolect data. Differences in the duration ratios between the pairs RV/NP and RV/AB that represent idiolects characterized by reduction were significant at $p < 0.0001$ and at $p = 0.01$, respectively. Thus, the analysis of script reading material yielded the following results. No difference between the values of absolute duration for V1 and V2 was found in the idiolects of group 1; in the idiolects of groups 2, 3, 4, variance between the duration of stressed and unstressed syllable nuclei was significant. Differences in the duration ratios between stressed and unstressed syllable nuclei differentiated between group 1 and groups 2, 3, 4 as well as between groups 2, 3, 4. Pairwise comparison of the duration ratios in cross-idiolect data revealed an interrelationship between idiolects merged in different groups.

Table 3

**Levels of the statistical significance of variance (*p*-value)
in inter-speaker V1/V2 data (pairwise comparison)**

Speaker, group	VD (1)	PA (1)	VL (1)	NP (3)	AB (4)	NA (4)	VR(2)
VD (1)							
PA (1)	0.4						
VL (1)	0.008	0.06					
NP (3)	< 0.0001	0.001	0.5				
AB (4)	< 0.0001	< 0.0001	0.04	0.09			
NA (4)	0.0002	0.001	0.08	0.16	0.8		
VR (2)	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.01	0.09	

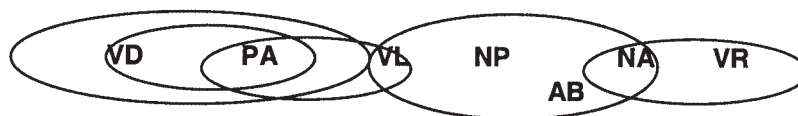


Figure 1. Relatedness within cross-idiolect data of duration ratios between stressed and unstressed syllable nuclei.

3.3. Compatibility of the data on spontaneous speech and reading

As spontaneous speech and script reading data were based on samples that are not identical, a direct comparison between them was not viable. In order to make a judgement concerning the degree of compatibility between the results on the two parts, sets of inter-group and inter-speaker data were considered. Both spontaneous speech and script reading data showed that in the idiolects of group 1, stressed and unstressed syllable nuclei tended to be equal while in the other groups of idiolects, vowels under stress were longer than in unstressed syllables. Comparison of the values of absolute duration for the syllable nuclei using analysis of variance produced analogous results in both parts of the material. Statistics brought out in Table 4 are inter-group results of the analysis of variance in the values of absolute duration between the stressed and unstressed syllable nuclei for spontaneous speech and script reading. The values of *p* show that differences in the duration of the syllable nuclei in group 1 were not significant while they were significant in groups 2, 3 and 4. The data in both parts of the test materials consistently differentiate between the idiolects of group 1, in which syllable nuclei tended to be equal in length, and groups 2, 3 and 4, in which stressed syllable nuclei were longer than unstressed syllable nuclei.

Variance in the inter-group duration ratios between stressed and unstressed syllable nuclei in the script reading data differentiated between group 1 and groups 2, 3, 4 as well as between groups 2, 3 and 4; the differences were significant at $p = < 0.0001$ in the first case and at $p = 0.005$ in the second case (see 3.2). Spontaneous speech data only revealed differences between group 1 and the other groups, which were significant at $p = < 0.0001$ (see 3.1), but they did not differentiate between groups 2, 3 and 4.

Table 4

**Levels of statistical significance of variance (*p*-value)
in the duration of V1 and V2 for spontaneous speech and script reading**

Idiolect group	Spontaneous speech			Script reading		
	Number of speakers	Number of tokens	<i>p</i> -value	Number of speakers	Number of tokens	<i>p</i> -value
Group 1	13	112	0.6	3	149	0.5
Group 2	9	93	< 0.0001	1	50	< 0.0001
Group 3	6	54	0.01	1	51	0.004
Group 4	5	56	< 0.0001	2	100	< 0.0001
Total	33	315		7	350	

As script reading data derive from a small number of speakers, they were juxtaposed to the spontaneous speech data for single speakers in order to define whether the results for single speakers are compatible. As suggested in 3.2., the results for one of the speakers reflected the effect of mixing the idiolect and norm. Mean values of duration for single speakers on the two types of material displayed in Table 5 were obtained from a) a same speaker (in bold), b) speakers originating from a same location, c) speakers from different locations representing a same idiolect type.

Differences in the duration ratios between stressed and unstressed syllable nuclei in the spontaneous speech and script reading data in all the cases, irrespective of the pairs of idiolects compared within each group, were statistically not significant. Hence, the results produced by counterpart speakers (or same speaker) in the two parts of material can be considered congruent. In group 1, the results of two speakers from M. Afońki-no, four speakers from Čukaly and a speaker from Paradejevo were compared. The mean values of duration for V1 and V2 tended to be equal in all the cases, unlike those in groups 2, 3, and 4, in which stressed syllable nuclei were longer than unstressed counterparts. In group 1, the productions of speaker VL in both parts showed a somewhat higher duration ratio and a higher value of standard deviation for V2 compared to V1 than the values for the other speakers. In group 2, data of three idiolects (Varmazejka, Sabančejevo and Ičalki) were confronted. The values of V1/V2 ranged between 1.12 and 1.21; standard deviation for V1 in all the three cases was higher than that for V2. With respect to the representation of vowels in unstressed syllables, group 2 was not uniform. In the productions of RV (Ičalki), full vowels were somewhat weakened, in those of LT (Varmazejka), full vowels sporadically alternated with ə, e.g., *kudo/ə*, while the productions of MN (and other speakers from Sabančejevo, as well as those of the speakers from Djurki and Mordovskije Siresi) were characterized by the use of ə which changed into a strong variant in the condition of stress shift in trisyllabic words, e.g.: *ku-dəsə/kudə-sə*. This type of reduction is common to group 4, in which processes of reduction are, though, far more extensive. The idiolects of group 3 shown in the table originate from Guzyncy and Staryje Naimany. The duration ratios ranged between 1.08 and 1.19; the dispersion of the values for V2 was higher than that for V1 or nearly the same for both vowels. In group 4, the duration ratios ranged between 1.11 and 1.24. The values of standard deviation were,

generally, higher than for the idiolects of group 2, with which it shares a feature of reduction mentioned above. A higher value for V2 was observed only in the results for NA. Thus, the results of single speakers brought out from the two parts of analysis were comparable within each group, with the exception of the data for two speakers. In the data for VL (group 1) and NA (group 4), there were higher values of standard deviation for V2 compared to V1, unlike the results for the other speakers in the groups. The sources of the atypical results for the groups have been considered in 3.2.

Table 5

Mean values of duration (M — mean, SD — standard deviation) for stressed and unstressed syllable nuclei in spontaneous speech (12 tokens per speaker) and script reading (50 tokens per speaker)

		Spontaneous speech				Script reading				
	Speaker	Value	V1	V2	V1/V2	Speaker	Value	V1	V2	V1/V2
Group1	LS	M	120.2	131.2	0.92	VD	M	105	106	0.99
	MAf	SD	22.05	8.044	0.16	MAf	SD	9.8	8.4	0.11
	VL	M	103.9	99.38	1.06	VL	M	124	119	1.06
	Čuk	SD	7.882	12.35	0.13	Čuk	SD	17.8	19.3	0.17
	RL	M	109.4	118.7	0.93	PA	M	110	110	1.01
	Čuk	SD	16.16	16.82	0.07	Čuk	SD	13.3	12.2	0.12
	NA	M	104.9	112	0.95					
	Čuk	SD	15.28	12.64	0.18					
	NP	M	113.4	110	1.03					
	Pard	SD	10.95	4.751	0.10					
Group2	LT	M	99.57	83.36	1.2	RV	M	144	121	1.21
	Varmz	SD	16.67	8.62	0.20	Ič	SD	15.5	14.01	0.16
	MN	M	120.4	108.8	1.12					
	Sbč	SD	17.8	13.8	0.20					
Group3	VN	M	126.2	111	1.15	NP	M	114	106	1.08
	Guz	SD	12.84	11.9	0.15	Guz	SD	12.8	14.3	0.11
	MA	M	105	93.78	1.19					
	StNaim.	SD	17.2	21.28	0.38					
Group4	OK	M	93.85	84.46	1.17	AB	M	121	108	1.13
	Dub	SD	19.98	16.92	0.41	Dub	SD	16.9	16.6	0.15
	NB	M	120.2	109.1	1.11	NA	M	149	135	1.14
	Sab	SD	29.04	14.46	0.25	Koč	SD	20.3	24.3	0.24
	OK	M	122.9	100.6	1.24					
	MTol	SD	18.09	12.14	0.22					

Locations: MAf — Mordovskoje Afońkino, Čuk — Čukaly, Pard — Paradejevo; Varmz — Varmazejka, Sbč — Sabančejevo; Ič — Ičalki; Guz — Guzyncy, StNaim — Staryje Najmany, Dub — Dubjonki, Sab — Sabajevo, MTol — Malyj Tolčaj, Koč — Kočkurovo.

4. Conclusions

The analyses of temporal relations between stressed and unstressed syllable nuclei on the material of disyllabic words produced by a large group of speakers revealed inter-idiolect group differences. Four major groups of idiolects were distinguished with respect to the type of durational rela-

tionship between the syllable nuclei. In a group of idiolects characterized by the use of full vowels within a word, the duration of the syllable nuclei tended to be equal. The main features of these idiolects are common to the literary language. In three groups of idiolects, stressed syllable nuclei were found to be longer than unstressed syllable nuclei. The idiolects of these groups are characterized by the occurrence of reduction in unstressed syllables. The extent of reduction observed in the three idiolect groups varies. The data imply that in the spoken varieties of Erzya characterized by reduction, duration is likely to be used as a correlate of stress. Duration variability is manifest differently in the three groups of idiolects characterized by reduction. The durational characteristics of stressed and unstressed syllables in different types of idiolects exhibited a complexity of interrelationship, which shows that there are borderline cases among the four types of varieties. Overlapping results for some idiolects were associated with similar processes of reduction and types of the distribution of full and reduced vowels in unstressed syllables. The results of measurements that were reported previously pertaining to the idiolects from Guzyncy, Kočkurovo, Papulevo, and Luńga (see the review of data in the Introduction) do not contradict the results obtained on the same types of idiolects in this study.

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ИДИОЛЕКТНЫЕ РАЗЛИЧИЯ ПО ДЛИТЕЛЬНОСТИ ГЛАСНЫХ УДАРНЫХ И БЕЗУДАРНЫХ СЛОГОВ В ЭРЗЯНСКОМ ЯЗЫКЕ

В статье приводятся результаты анализа, целью которого было выявление различий по длительности гласных ударных и безударных слогов в идеолектах эрзянского языка. Длительность гласных измерялась в двусложных словах, произнесенных носителями разных диалектов в спонтанной речи и при чтении. В эксперименте участвовали 40 информантов. Данные позволили установить ряд различий между группами идиолектов. Гласные ударных и безударных слогов в идиолектах, которым не свойственна редукция, имели одинаковую длительность. Отклонения от средней длительности статистически не были значимы. В идиолектах, которые характеризуются наличием редукции в безударных слогах, гласные ударных слогов имели большую длительность, чем в безударных, разница статистически значима. Следовательно, длительность может быть коррелятом ударения в идиолектах, которым свойственна редукция. Данные анализа по таким идиолектам распределились на три группы. Средняя величина относительной длительности между гласными в ударных и безударных слогах в этих группах соответствовала степени редукции безударных гласных, установленной при прослушивании материала. Разница результатов по всем группам статистически значима. Наряду с основными группами выявлены переходные типы идиолектов. Анализ спонтанной речи и прочитанного материала дал одинаковые результаты. В качестве исходного материала использовались данные о вокализме непервых слогов в эрзянских диалектах.