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SOURCES OF VARIABILITY IN THE DURATION  
OF STRESSED AND UNSTRESSED SYLLABLE NUCLEI IN ERZYA:  
INTER-IDIOLECT DATA OF SPONTANEOUS SPEECH

**Abstract.** Analysis reported in this paper aimed at eliciting the effects of stress, vowel segment duration, openness/closedness of the syllable and number of syllables constituting the word upon the temporal relationship between the nuclei of adjoining stressed and unstressed syllables. Observations were made on spontaneously produced one-word utterances. Main spoken varieties of Erzya were represented in the materials by a group of idiolects characterised by the use of full vowels and three groups of idiolects exhibiting different types and degrees of vowel reduction. The results confirm the validity of indications obtained previously on the effects of word structure upon vowel duration in controlled speech. Analyses focused on the occurrences of comparable sets of vowels across the idiolect groups. The overall results revealed idiolect-specific sources of vowel duration variability. In the idiolects lacking reduction, stress and vowel duration were found to be independent. Vowels in the adjoining stressed and unstressed syllables tended to have equal duration. In the idiolects having reduction, the duration of the syllable nuclei showed dependence on stress. Stressed syllable nuclei were consistently longer than unstressed counterparts. The effect of the openness/closedness of the syllable was not explicitly manifested either in the reading or spontaneous speech data. Vowel duration variations in words with open/open and open/closed syllables were found to be statistically significant in some of the idiolects with reduction. Trisyllabic words compared to disyllabic ones in both types of idiolects had shorter syllable nuclei but higher duration ratios within the duple foot. Differences in the values of duration between stressed and unstressed syllable nuclei were not significant in the idiolects lacking reduction. The tendency towards equal duration of the vowels observed in disyllabic words persisted in trisyllabic words, as well. In the idiolects with reduction, statistically significant differences were found between vowel durations in the stressed and unstressed syllables both in di- and trisyllabic words, as well as between the duration ratios for the duple foot of trisyllabic and disyllabic words. Data obtained in the study provide evidence of differences in the rhythmic patterning of the two idiolect types.

Keywords: Erzya, stress, duration, idiolect.

## 1. Introduction

It has been argued that tendencies of stress assignment and the temporal relationship between the adjoining stressed and unstressed syllable nuclei in the major varieties of Erzya are not uniform (Aasmäe, Ross 2005a; Aas-

mäe 2005a). Analysis of inter-idiolect data showed a comparatively high mobility of stress and a tendency towards equal vowel duration in stressed and unstressed syllables in idiolects using full vowels. Data for the idiolects characterised by the occurrence of vowel reduction revealed a tendency towards initial stress and a higher duration of vowels in the stressed syllable. The study has been continued to define main word-related factors contributing to the variability of vowel duration in the groups of idiolects. An attempt has been made to elicit the effects of stress, vowel segment duration, openness/closedness of the syllable and number of syllables upon the temporal relationship between the nuclei of words pronounced with initial stress. Analyses were made by using, first, reading materials. They comprised disyllabic and trisyllabic words read by seven speakers (Aasmäe 2005b; Aasmäe, Ross 2005b).

This paper reports results obtained from the analysis of spontaneous speech data. The findings confirm the validity of results obtained for reading. The two parts of analysis allow distinguishing differences in the rhythmic patterning of the spoken varieties of Erzya. The type of stress, the absence or presence of vowel reduction and the degree of reduction, syllable type, the durational relationship between adjacent syllables or syllable nuclei are features that are relevant to the description of rhythm classes across languages and language varieties (Dauer 1983; 1987; Nespor 1990; Ramus, Nespor, Mehler, 1999; Low, Grabe, Nolan 2000; Grabe, Low 2002; Gut 2003; Asu, Nolan 2005). On the basis of overall results obtained in the study it is assumed that the two varieties of Erzya exhibit diverging rhythmic tendencies, traditionally termed as syllable- and stress-timing (the tendency to maintain equal duration of syllables or feet in an utterance).

Herein follows an overview of the findings that emerged from the analysis of data on reading. The main principles of analysis are also explained.

Analyses were made by using duration data for target series of tokens containing comparable vowel representations. As differences in segmental duration constitute part of the temporal structure of the whole word (Ross, Lehiste 2001 : 38), comparison of vowel durations in adjacent syllables was based on both same and different vowel segments. The latter were represented by a high vowel in the stressed syllable and a low (or mid) vowel in the unstressed syllable — a high vowel is known to be shorter than a low vowel, "other factors being equal" (Lehiste 1976 : 227). Given this, the effect of duration-based stress was likely to be manifested by higher values of vowel duration for the stressed syllable nuclei in words with a same vowel in both syllables. In words with a high vowel in the stressed syllable and a low (or mid) vowel in the unstressed syllable, vowel durations in the adjoining syllables were likely to be equalized. Stress is a relative property and it is defined over syllables (Clark, Yallop 1995 : 57), hence, both lengthening of high vowels and shortening of low vowels could occur. The effect of consonants upon vowel duration was not taken into account. To avoid measurement bias, tokens had been selected to contain different types of consonants.

The analysis was constrained by the requirement of comparable representation of vowels across the idiolect types. There are considerable differences among the dialects of Erzya, as far as the use of mid and high

vowels in initial and non-initial syllables is concerned (Цыганкин 1979 : 33—59). Firstly, the occurrence of unreduced *o*, *e* in non-initial syllables is restricted in idiolects with reduction. In the words selected for comparison mid *o* and *e* preserved their quality (e. g.: *čemeń* 'rust', *lowoms* 'to count'). Secondly, the occurrence of the high vowels *u* and *i* in both initial and non-initial syllables (e. g.: *putums* 'to put', *šimims* 'to drink') is characteristic of some of the idiolects with reduction. Due to these circumstances, vowel segment durations were compared in a series of words containing *a*, *o*, or *e* in both syllables and in a series of words with high *u* or *i* in the stressed syllable and low *a*, *ä* or mid *o*, *e* in the unstressed syllable, e. g.: *nula* 'a rag', *pize/ä* 'a nest'.

Stress and the duration of syllable nuclei were found to be independent in the idiolects lacking reduction. High vowels (*u*, *i*) in the stressed syllable were shorter than low and mid vowels (*a*, *o*, *e*) in the unstressed syllable; differences between the vowel durations were statistically significant. In words with a same vowel in both syllables, vowel durations tended to be equal. In the idiolects having reduction, the duration of stressed and unstressed syllable nuclei was affected by stress. In words with a same vowel in both syllables, stressed syllable nuclei displayed higher vowel duration than unstressed syllable nuclei. The duration of high and low (or mid) vowels in the adjoining syllables tended to be equalized.

The influence of open/closed syllables upon vowel durations within the word was checked by comparing the mean durations and duration ratios for words of the CVCV, CVCCV, CVCVC, CVCVCC structure. The duration ratios had a tendency to grow from the CVCV through the CVCVCC series in all the idiolects. However, in the idiolects using full vowels, the values of duration for the adjoining stressed and unstressed syllable nuclei did not significantly differ in any of the word types, with the exception of the results on the CVCVC and CVCVCC series for one of the three speakers. Vowels in the stressed CV syllable were significantly longer than in the unstressed CVC(C) syllable(s). In the idiolects with reduction, statistically significant differences between the duration of the syllable nuclei were found in the CVCVCC series for all the four speakers, while in the CVCVC series, the results among the speakers differed. Thus, higher duration ratios in the CVCVCC series, compared to the CVCVC series, could be due to the occurrence of a consonant cluster in the coda of the closed second syllable. Data on the CVCV type, largely representing disyllabic stems, in which vowel harmony is preserved (Деваев, Цыганкин 1970 : 73; Keresztes 1990 : 30—31), showed word-final lengthening of vowels in the idiolects lacking reduction. In the other idiolect type, the duration of the vowels tended to be equal; the effect of stress may have counter-balanced vowel lengthening likely to occur in the word-final position. Analysis of data on the CVCCV type (e.g.: *pakša* 'a field', *jalga* 'a friend') posited the question of syllable boundary in words with an internal consonant cluster. According to the traditional point of view, syllable boundary in words with an internal consonant cluster (with the exception of *ng* and *mb* which start a new syllable) is between the consonants (Деваев, Цыганкин 1970 : 75). Comparison of data for the CVCV and CVCCV showed that duration ratios between the syllable nuclei in the latter were higher than in the former for all the idiolects. In the CVCCV series, no

lengthening of word-final vowel occurred in the idiolects lacking reduction, while in the idiolects having reduction, vowels tended to be longer in the first syllable. The result seems to indicate that the initial syllable in the CVCCV type can have been open. In a closed syllable a vowel tends to be shortened (Redford 2003 : 2261); hence, the duration ratio for the CVCCV series could be expected to be lower than for the CVCV series. The occurrence of a consonant cluster, thus, affected the duration ratios between the syllable nuclei in the CVCCV type of words, as well. It can not be excluded that the consonant cluster started the second syllable and, thus, the words consisted of two open syllables. Results of duration measurements available in other works showed that the dependence of vowel duration on the openness/closedness of the syllable was manifested only in unstressed second syllables, where vowels in open syllables were longer than in closed syllables (Baichura 1982 : 57–59; Lehiste, Aasmäe, Meister, Pajusalu, Teras, Viitso 2003 : 53). The implication might be that syllable boundary in words with an internal consonant cluster (which constituted part of the tokens used in these works) was between the open head syllable and a consonant cluster in the onset of the second syllable. To gain insight into the question of syllable boundary, a detailed empirical study is warranted.

The effect of the number of syllables constituting a word upon the duration of syllable nuclei was checked by comparing vowel durations in the duple foot of disyllabic and trisyllabic words. It has been noted by several authors in pre-experimental research that trisyllabic and other polysyllabic words have additional stress (Шахматов 1910; Марков 1961; Биушкин 1967). In later studies (Аасмяэ 1982; Lehiste, Aasmäe, Meister, Pajusalu, Teras, Viitso 2003) it has been suggested that stress in Erzya manifests itself primarily over disyllabic prosodic feet and it is assigned to either odd-numbered or even-numbered syllables constituting a word, e.g. *ku-doso-nzo/kudo-sonzo* 'in his/her house'. Previous duration measurements on trisyllabic words (Baitchoura 1958; 1982; Lehiste, Aasmäe, Meister, Pajusalu, Teras, Viitso 2003; Estill 2004) have shown that in words with initial stress, vowels in third syllables tended to be longer than in first syllables. Ilse Lehiste and the co-authors have found that the duration of vowels in trisyllabic words was lower than in disyllabic words. Results obtained on reading materials in the current study showed that in trisyllabic words, compared to disyllabic ones, vowel durations were lower, while duration ratios between the stressed and unstressed syllable nuclei were higher in all the idiolect groups. Vowel duration in the third syllable was comparable to that in the first syllable. The differences between the duration of the syllable nuclei in the duple foot were not statistically significant in the idiolects lacking reduction. The tendency towards equal vowel duration in the stressed and unstressed syllables observed in disyllabic words persisted in trisyllabic words, too. In the idiolects with reduction, unstressed second syllable nuclei were shorter than stressed first syllable nuclei; differences between the values of vowel duration in the duple foot were statistically significant in both di- and trisyllabic words. Furthermore, statistically significant differences were observed between the duration ratios for the duple foot within trisyllabic and disyllabic words. In the duple foot of trisyllabic words, unstressed second syllable nuclei

were compressed more than in disyllabic words. Duration measures showed dependence on the number of syllables constituting a word primarily in the idiolects with reduction.

The analysis of spontaneous speech data proceeded in the same order; the materials used in the two parts of analysis differed.

## 2. Experimental design

### 2.1. Materials and speakers

Spontaneous speech data comprised averaged measures of vowel duration across speaker groups, while the data on reading were averages for individual speakers obtained on larger word series. The material of spontaneous speech consisted of one-word utterances produced by 33 native speakers in an informal dialogue with the author. The conversation had been planned to obtain recurrences of the same target tokens in the responses of the speakers. The responses were predominantly uttered with a falling tone; initial and non-initial stress in the utterances alternated, e. g.: *a·raś*, *ara·ś* 'no, not'. For the current analysis only tokens with initial stress were selected; the number of observations per a speaker-group, as a consequence, differed. The total number of tokens used in the current analysis was 475. In the list of target tokens below, variants for idiolects lacking/having vowel reduction have been provided.

Disyllabic words: *araś* 'no, not', *apak* 'no, not'; *ošos* 'the city', *ošo/-a*, *-ā*, 'in a city'; *vele/välä*, 'a village', *veleś/väl'is* 'the village', *veleñt'/väl'int'* '(of) the village', *kudo/-a*, *-ā* 'a house, home', *ul'i/-ä* 'is, there is', *ul'it'* 'are, there are', *ul'niñ* 'I have been'.

Trisyllabic words: *arašel'/arašil'* 'was not', *kudoso/kudusa/kudəsə* 'at home, in a house', *kudosot/kodusut/kudəsət* '(they) are at home', *velese/väl'isä/väl'isä* 'in a village', *veleset'/väl'isit'* 'they are in a village', *ul'nekšniñ/ul'nikšniñ* 'I have been'.

The speakers were applicants to university who came from different rural areas in the Mordvin Republic and diaspora. The age range among the speakers was 19–21. Taking into account the grouping of Erzya dialects and the results of auditory evaluation of the materials, four idiolect groups were distinguished (relevant literature on the taxonomy of dialects and the description of the idiolect groups have been provided in: Aasmäe, Ross 2005a). Idiolects exhibiting no vowel reduction were referred to group 1 (13 speakers); idiolects characterized by different types and degrees of reduction were referred to group 2 (9 speakers), group 3 (6 speakers) and group 4 (5 speakers).

Origin of the speakers (in the list of place names, the abbreviation MR stands for the Mordvin Republic):

Idiolect group 1 — Ardatov, Čukaly, Luńga (Ardatov, MR); Alovo, Andrejevka, Mordovskie Dubrovki, Nizovka (Atjaševo, MR); Paradejevo (Ičalki, MR); Čornaya Rečka (Isakly, Samara), Ivancevo (Lukojanov, Nižnij-Novgorod), Mordovskoje Afońkino (Čeremšan, Tatarstan).

Idiolect group 2 — Djurki, Keļvedne, Kučenjajevo, Mordovskie Sire-si, Sabančejevo, Tarasovo (Atjaševo, MR); Varmazejka (Bolšoje Ignatovo, MR).

Idiolect group 3 — Berezniki, Guzyncy, Staryje Najmany, Šugurovo (Bolšie Berezniki, MR); Papulevo (Ičalki, MR); Standrovo (Tenguševo, MR).

Idiolect group 4 — Dubjonki (MR); Koškurovo, Sabajevo (Kočkurovo, MR); Drakino (Torbejevo, MR); Malyj Tolkaĵ (Pohvistnevo, Samara).

## 2.2. Recording

The recordings of the material were performed by an experienced technician in the studio of the phonetics laboratory of the Mordvin Pedagogical Institute. Professional equipment used for recording consisted of a microphone MD-16, a recorder MЭ3-28 (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 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.

## 3. Results

### 3.1. The temporal relationship between stressed and unstressed syllable nuclei in disyllabic words

In this part of analysis, the effect of stress upon vowel durations was checked. Duration data on words with a same vowel in both syllables (*araš*, *apak* 'no, not', *ošoš* 'the city', *ošso/-* 'in the city', *vel'e/väl'ä* 'a village', *vel'eš/-* 'the village', *vel'eit'/-* 'of the village') and different vowels (*kudo/-a* 'a house', *ul'i/-ä* 'is, there is') were compared. The measures shown in Table 1 include data for the two series of words and all the disyllabic tokens used in the analysis. The tokens containing a same vowel, compared to the whole set, displayed higher mean duration ratios across the idiolect types. In the idiolects without reduction (group 1), the differences between the values of duration for stressed and unstressed syllable nuclei were statistically not significant. In the groups of idiolects with reduction (groups 2, 3, 4), stressed syllable nuclei were significantly longer than unstressed syllable nuclei. The mean duration ratio was the highest in the idiolects of group 4, in which reduction is the most extensive.

In the series of tokens with different vowels, the mean duration ratios were lower than in the overall data. It can be seen that in the stressed syllable, the values of duration for the high vowel *u* in all the idiolects were lower than for the low and mid vowels *a*, *o*, *e/ä*. In the idiolects lacking reduction, *u* in the stressed syllable was shorter than *o* and *i* in the unstressed syllable; differences between the duration of the syllable nuclei were statistically significant. It implies that the duration of *u* in the stressed syllable and of mid *o* (also high *i*) in the unstressed syllable did not depend on stress. In the occurrences of *u — o*, duration ratios primarily reflected a relationship between the segmental duration of the vowels. As far as the occurrences of *u — i* are concerned, the higher duration of the

high vowel *i* can have been mainly due to word-final lengthening. In the idiolects with reduction, the duration of high *u* in the stressed syllable and of low *a*, *ä* in the unstressed syllable did not significantly differ, to all appearances, due to the effect of stress. The syllable nuclei tended to be equal due to the lengthening of *u* and shortening of *a*, *ä*, as suggested in the Introduction.

In the data on spontaneous speech, analogous to the results on reading, lower duration ratios were observed for the occurrences of *a* than those for *o*, *e/ä*. In idiolect groups 1, 2, 3, the mean duration ratios for *a* were 0.85, 0.98, 1.12, respectively. In group 4, however, *a* in the unstressed syllable was significantly shorter than in the stressed syllable (the duration ratio was 1.28). The duration ratios for *o*, *e/ä* ranged between 1.1 (for group 1) and 1.18–1.28 (for groups 2, 3, 4). The low vowel *a*, unlike the mid vowels *o* and *e*, in the majority of idiolects displayed no significant shortening in the unstressed syllable.

Table 1

**Mean values of duration for stressed and unstressed syllable nuclei (v1, v2) and mean duration ratios (v1/v2) with values of standard deviation:**  
**a) across all the measurements on disyllabic words, b) in series of tokens with a same vowel (*a*, *o*, *e/ä*) in both syllables, c) in series of tokens with different vowel segments (*u—o/a*, *u—i/ä*). Significant differences between the values of duration for stressed and unstressed syllable nuclei (v1, v2) are starred: \*( $p < 0.05$ ), \*\*( $p < 0.005$ ), \*\*\*( $p < 0.0005$ ), \*\*\*\*( $p < 0.0001$ )**

Series: a)					b)				c)			
Idiolect group	N of tokens	v1 (ms)	v2 (ms)	v1/v2	N of tokens	v1 (ms)	v2 (ms)	v1/v2	N of tokens	v1 (ms)	v2 (ms)	v1/v2
1	107	108.67	109.31	1.01	76	112.00	106.95	1.05	31	101.23	115.10	***0.89
		15.86	15.60	0.16		16.00	14.79	0.15		12.90	16.27	0.14
2	93	107.86	97.37	***1.13	65	112.00	97.09	***1.17	28	98.25	98.00	1.03
		18.85	16.66	0.22		17.78	15.93	0.19		18.00	18.54	0.25
3	54	121.91	110.61	**1.15	38	123.55	104.97	**1.22	16	118.00	124.00	0.98
		21.08	27.44	0.28		20.56	25.38	0.26		22.48	28.28	0.23
4	56	111.55	94.73	***1.21	37	119.76	92.41	***1.32	19	96.00	99.26	0.98
		22.49	17.02	0.28		19.08	17.49	0.22		20.23	15.51	0.25
<b>Total:</b>	<b>310</b>				<b>216</b>				<b>94</b>			

### 3.2. The relationship between vowel durations and the openness/closedness of the syllables constituting the word

Types of word structure used for comparing vowel durations in open/open and open/closed syllables were: (C)VCV (*vel'e/väl'ä* 'a village', *kudo/-a* 'a house', *ul'i/-ä* 'is, there is'), VCVC (*araś*, *apak* 'no, not', *ošos* 'the city', *ul'it* 'are, there are') and VCCV (*ošso/-a* 'in a city'). The first series of words consisted of two open syllables; in the second series, an open syllable without an onset and coda was followed by a closed syllable. In the third series, containing a consonant cluster at the syllable boundary, types of syllables (open/closed) were left unidentified for the ambiguity of syllable division, which was mentioned in the Introduction. Duration data for the target series of tokens are displayed in Table 2.

Table 2

**Mean values of duration for stressed and unstressed syllable nuclei (v1, v2) and mean duration ratios (v1/v2) with values of standard deviation, in three series of tokens. Significant differences between the values of duration for stressed and unstressed syllable nuclei (v1, v2) are starred: \*( $p < 0.05$ ), \*\*( $p < 0.005$ ), \*\*\*( $p < 0.0005$ ), \*\*\*\*( $p < 0.0001$ )**

Series: CVCV					VCVC				VCCV			
Idiolect group	N of tokens	v1 (ms)	v2 (ms)	v1/v2	N of tokens	v1 (ms)	v2 (ms)	v1/v2	N of tokens	v1 (ms)	v2 (ms)	v1/v2
1	48	111.44	113.79	0.99	24	100.96	106.96	0.96	16	113.44	105.63	1.08
		15.65	16.43	0.17		18.00	17.82	0.21		13.61	12.37	0.8
2	33	105.48	99.58	1.08	17	105.88	99.44	1.09	18	115.28	95.56	**1.22
		17.84	17.37	0.22		23.53	20.46	0.25		19.87	15.42	0.16
3	21	123.90	116.76	1.10	18	116.17	108.61	1.13	7	125.29	112.14	1.12
		22.26	26.58	0.27		18.77	32.06	0.28		18.27	9.04	0.20
4	21	110.86	107.19	1.04	17	109.47	87.24	**1.28	6	112.00	89.83	**1.25
		26.74	13.32	0.26		20.03	15.96	0.24		9.84	8.08	0.10

In the (C)VCV and VCVC series, differences between stressed and unstressed syllable nuclei across the idiolects were not statistically significant. The only exception was the result for idiolect type 4 on the VCVC series, in which the nucleus of the unstressed closed syllable was significantly shorter than the vowel in the stressed open syllable. Comparable duration ratios for the (C)VCV and VCVC series of words were observed in the other three groups of idiolects. There were higher duration ratios for groups 1 and 2 in the VCCV series compared to those in the (C)VCV and VCVC series. In the idiolects of group 2, the differences between the syllable nuclei in the VCCV series were statistically significant. Similar duration measures in the VCVC and VCCV series can be seen in the results for group 4. The data for the CVCV and VCCV series showed higher duration ratios in the latter type of structure, with the exception of those for idiolect group 3, where duration ratios did not vary. In idiolect group 1, word-final vowel lengthening occurred in the production of the CVCV series of words, but not in the VCCV word type. Hence, the first stressed syllable might have been open.

### 3.3. Vowel duration in disyllabic and trisyllabic words

Mean values of duration and duration ratios between the syllable nuclei of disyllabic words were compared to the same measures for the duple foot of trisyllabic words (listed in 2.1) to get indications as to the possible effect of the number of syllables upon the vowel durations. In trisyllabic words, first and third syllables carried stress (no distinction between the degrees of stress was made). Data in Table 3 show that in trisyllabic words, compared to disyllabic ones, vowel durations were lower, while the duration ratios between the stressed and unstressed syllable nuclei (v1/v2) were higher in all the idiolects. In the idiolects lacking reduction, there were comparable values of mean duration for the syllable nuclei in both disyllabic and trisyllabic words. In the idiolects with reduction, third syllable nuclei were somewhat shorter than first syllable nuclei and longer than second syllable nuclei. The differences between the values of duration

in the stressed first and unstressed second syllables were statistically significant in both series of words. The analysis also established differences between the duration ratios ( $v1/v2$ ) for the series of disyllabic and trisyllabic words, which were statistically significant. The values of  $p$  were 0.0007 for group 2, 0.02 for group 3, and  $< 0.0001$  for group 4. (In group 1, differences between the duration ratios in the two series of words were not significant; the value of  $p$  was 0.3).

Table 3

**Mean values of duration for the syllable nuclei ( $v1$ ,  $v2$ ,  $v3$ ) and mean duration ratios ( $v1/v2$ ) with standard deviations in di- and trisyllabic words.** Significant differences between the values of duration for stressed and unstressed syllable nuclei ( $v1$ ,  $v2$ ) are starred:  $*(p < 0.05)$ ,  $** (p < 0.005)$ ,  $*** (p < 0.0005)$ ,  $**** (p < 0.0001)$

Series:	disyllabic				trisyllabic					
	Idiolect group	N of tokens	$v1$ (ms)	$v2$ (ms)	$v1/v2$	N of tokens	$v1$ (ms)	$v2$ (ms)	$v3$ (ms)	$v1/v2$
1		107	108.67	109.31	1.01	57	89.79	86.53	90.88	1.06
			15.86	15.60	0.16		17.14	13.27	16.94	0.27
2		93	107.86	97.37	****1.13	38	97.45	76.82	83.11	****1.30
			18.85	16.66	0.22		21.82	12.70	22.98	0.34
3		54	121.91	110.61	**1.15	40	91.68	75.63	88.40	**1.26
			21.08	27.44	0.28		22.41	19.13	25.74	0.34
4		56	111.55	94.73	****1.21	30	93.74	70.33	82.33	****1.38
			22.49	17.02	0.28		20.69	13.72	23.14	0.37
<b>Total:</b>		<b>310</b>				<b>165</b>				

The maximum, minimum and mean duration ratios ( $v1/v2$ ) for the duple foot of disyllabic and trisyllabic words in the inter-idiolect data are depicted in Figure 1. Mean duration ratios (shown as dots) were higher for the series of trisyllabic words in all the four groups of idiolects. The smallest difference between the mean values of  $v1/v2$  for the two series of tokens was found in group 1.

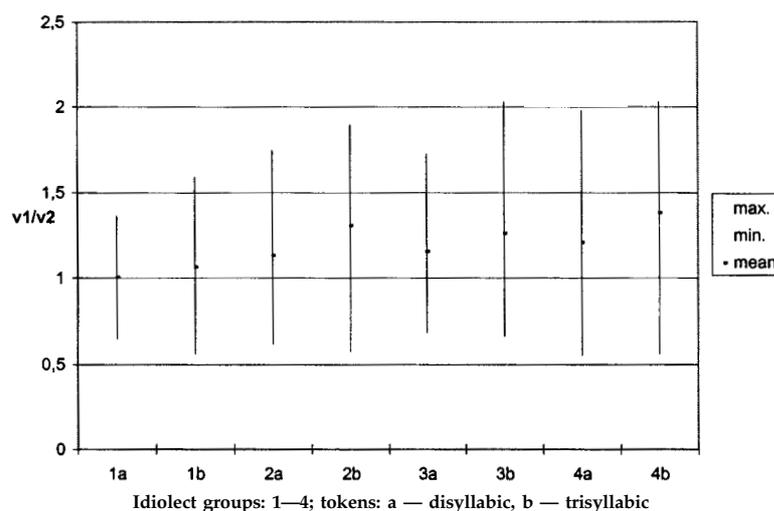


Figure 1. Mean duration ratios between the stressed and unstressed syllable nuclei ( $v1/v2$ ) in the duple foot of disyllabic and trisyllabic words.

#### 4. General discussion

The results of analyses allowed establishing several idiolect-specific factors that conditioned variation in the duration of syllable nuclei within di- and trisyllabic words. Data on reading and spontaneous speech yielded analogous results. It was established that stress and vowel duration were independent in the idiolects lacking reduction. The duration of a same vowel in a stressed and unstressed syllable tended to be equal. Statistically significant differences in the values of duration between the syllable nuclei could be observed only for the occurrences of vowels with different segmental duration. The values of duration for low or mid vowels in the unstressed syllable exceeded those for high vowels in the stressed syllable. In words with a high vowel in the stressed syllable and a low (or mid) vowel in the unstressed syllable, the prominence of the latter can be perceived as stress. The idea of the attraction of stress to a non-initial syllable containing low *a* and *ä* in words with high *i* and *u* in the initial syllable has long been influential in the historic studies of Erzya and Moksha (for a survey of literature on the subject see: Lehiste, Aasmäe, Meister, Pajusalu, Teras, Viitso 2003 : 31–42). Word-final lengthening of a vowel was another factor that contributed to the variation of the duration ratio between the syllable nuclei. The tendency towards equal duration of vowels in the adjoining stressed and unstressed syllables was observed both in disyllabic and trisyllabic words. Though the mean duration ratio between the syllable nuclei in trisyllabic words was higher than in disyllabic words, the differences between the values of vowel duration for the two series of words were statistically not significant. Variations in the measures of duration for series of words differing by syllable structure were not significant in the idiolects lacking reduction, either.

In the idiolects exhibiting different types and degrees of reduction, vowel duration measures revealed dependence on stress. A same vowel in a stressed syllable was found to be longer than in an unstressed syllable. In words with a high vowel in the stressed syllable and a low vowel in the unstressed syllable, the duration of the vowels was equalized or high vowels were longer than low vowels. Duration, thus, can be considered an important correlate of stress in the idiolects with reduction.

Data for some of the idiolects revealed dependence of vowel duration upon the openness/closedness of a syllable. Mean duration ratios tended to be higher in words with open/closed syllables compared to those with open/open syllables. However, only results on some of the idiolects (both in reading and spontaneous speech data) showed statistically significant differences between the vowel durations in words differing by syllable types. In contemporary research, syllables have been considered as units of the speech plan; along with this, it has been admitted that syllable-related segment duration patterns are not explicitly encoded (Redford 2003 : 2261).

Comparison of vowel durations in trisyllabic and disyllabic words showed that the increase of the number of syllables in the word was associated with the increase of the duration ratio between the stressed and unstressed syllable nuclei. In the duple foot, thus, the unstressed syllable nucleus was compressed more than in disyllabic words. It means that in

the idiolects with reduction, the relationship between the duration of the syllable nuclei in a foot is stress-based.

It was noticed, along with this, that in both idiolect types duration ratios for the tokens with *a* were lower than for those with *o* and *e*. Analysis of the formant structure of Erzya vowels has shown the least amount of centralization in the case of unstressed *a* (Lehiste, Aasmäe, Meister, Pajusalu, Teras, Viitso 2003: 64). Vowel reduction in Erzya can, apparently, be referred to a type (Crosswhite 2004), in which *a* has "a special durational status".

## 5. Conclusion

The overall results of this study bear implications for the evaluation of the rhythmic patterning of Erzya. The varieties distinguished by the absence/presence of vowel reduction have been found to differ with respect to the assignment of stress and the temporal relationship between the syllable nuclei.

Data for the idiolects lacking reduction displayed a relatively high mobility of stress and a tendency towards equalizing the duration of the syllable nuclei; the temporal relationship between stressed and unstressed syllables mainly depended on the segmental duration of vowels. It should be noted that in the idiolects lacking reduction, the effect of stressedness on the auditory level is less perceivable than in the idiolects having reduction. The idiolects exhibiting different types and degrees of reduction revealed the tendency to assign stress dominantly on the word-initial syllable. The temporal relationship between the syllable nuclei in the duple foot of disyllabic and, especially, trisyllabic words showed dependence on stress. Taking into account the durational data for syllable nuclei it can be suggested that the idiolects using full vowels gravitate to the syllable-timed structure, in which the tendency towards equal duration between syllables prevails, while the idiolects characterized by reduction gravitate to the stress-timed structure, with the prevailing tendency towards equal duration of feet. For the evaluation of the rhythm classes based on syllable duration, research on syllabification will be needed in future. Among the future research questions are also the relatedness of vowel duration to morphology and the patterning of vowel reduction: "Stress is a necessary but not sufficient condition for vowel reduction..." (Burzio 1996 : 112).

As the idiolect types have been preliminarily distinguished according to the distribution of vowel segments in initial and non-initial syllables (a criterion used for classifying Erzya dialects), the inter-idiolect data obtained from the analyses can be claimed to reflect characteristics of dialect-groups. Empirical data obtained in the study allow juxtaposing the language varieties on the basis of the parameter of timing.

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НИНА ААСМЯЭ (Тарту)

**ВЛИЯНИЕ СТРУКТУРЫ СЛОВА НА СООТНОШЕНИЕ  
ПО ДЛИТЕЛЬНОСТИ МЕЖДУ ГЛАСНЫМИ УДАРНЫХ  
И БЕЗУДАРНЫХ СЛОГОВ В ИДИОЛЕКТАХ ЭРЗЯНСКОГО ЯЗЫКА**

В статье приводятся результаты анализа, целью которого было выявление факторов, влияющих на различия в длительности гласных ударных и безударных слогов в идиолектах редуцирующего и нередуцирующего типа. Длительность гласных измерялась в двух- и трехсложных словах с начальным ударением, произнесенных дикторами (число дикторов — 33) в спонтанной речи. В идиолектах нередуцирующего типа проявилась зависимость величины соотношения по длительности в основном от сегментных характеристик гласных. Длительность одного и того же гласного в ударном и безударном слоге была одинаковой; длительность гласных нижнего и среднего подъема (*a*, *o*, *e*) в безударном слоге была больше, чем длительность гласных высокого подъема (*i*, *u*) в ударном слоге. В идиолектах редуцирующего типа основным фактором, влияющим на различия в длительности гласных ударных и безударных слогов, оказалось ударение. В двухсложных словах один и тот же гласный в ударном слоге имел большую длительность, чем в безударном слоге. Длительность гласных высокого подъема (*i*, *u*) в ударном слоге не отличалась от длительности гласных нижнего подъема (*a*, *ä*) в безударном слоге. Влияние открытости и закрытости слога на длительность гласных не было эксплицитным. Оно проявилось в отдельных идиолектах редуцирующего типа — гласные в открытом слоге имели большую длительность, чем в закрытом. В трехсложных словах, в сравнении с двухсложными, во всех идиолектах проявилась тенденция к сокращению длительности гласных наряду с возрастанием величины соотношения по длительности между гласными ударных и безударных слогов. В идиолектах редуцирующего типа была установлена статистически значимая разница между величинами соотношения по длительности ударных и безударных гласных в двух- и трехсложных словах. В идиолектах нередуцирующего типа эта разница была незначительная; как в двухсложных, так и в трехсложных словах наблюдалась тенденция к равной длительности гласных. Результаты анализа свидетельствуют о различии между ритмическими тенденциями, присущими идиолектам редуцирующего и нередуцирующего типа.