

# THE PHONETICS-PHONOLOGY INTERFACE OF ERZYA STRESS: MORPHOLOGICAL CONDITIONING OF VOWEL REDUCTION

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## ABSTRACT

Analyses provided in this paper test the possibility of morphological conditioning for vowel durations in Erzya. The duration of stressed first-syllable and unstressed second-syllable vowels in disyllabic ‘root’ and ‘inflectional form’ tokens is compared. Material consisted of one-word utterances produced in spontaneous speech by speakers of different dialects. Vowel durations in the inter-dialect data tended to equalize within the root. At the boundary of the root and a suffix (or in the suffix), vowels were shorter than in the stressed first syllable. Manifestations of the tendency varied across four idiolect groups representing the main language varieties. The results suggest that there is causal relationship between unstressed vowel reduction and the domain of morphology. Dialects revealing variability in the manifestation of the general tendency towards vowel duration asymmetry in the root and inflectional forms also display differences in the mobility of stress, as suggested in previous research.

**Keywords:** stress, vowel, duration, reduction.

## 1. INTRODUCTION

The issue of mobile stress in Erzya, a Finno-Ugric language spoken by dispersed dialect groups in Russia and the neighboring territories, has been recently treated in several studies. It has been claimed that the mobility of Erzya stress (e.g.: *'kudo, ku'do* ‘a house, home’) over the last two centuries has diminished – the general tendency towards right-headed stress has been replaced by the dominance of left-headed stress. Measurements of the correlates of stress in read speech have been reported to show that duration is an important stress cue in Erzya [10]. Our study ([1], [2], [3], [4], [5]) has shown that the dialects of Erzya are not prosodically uniform. Analyses of the assignment of stress and of the relationship

between stress and duration observed in spontaneous and read speech revealed dialect differences. The mobility of stress, characteristic of all the language varieties, has been reported to be higher in the idiolects lacking vowel reduction (the basis for the standards of literary Erzya) than in the idiolects exhibiting the occurrence of reduced vowels. In the former, no dependence of vowel duration on stress was observed while in the latter, stressed first-syllable vowels were longer than unstressed second-syllable vowels. It has been suggested that unstressed vowel reduction is associated with the lower mobility of stress. Earlier measurements of vowel duration in stressed and unstressed syllables, [15], in which data from eight speakers were used, have also revealed inter-speaker differences. In the productions of several informants vowel durations in disyllabic words tended to be equal, while in the results of the other speakers stressed syllable nuclei were longer than unstressed ones.

Duration-dependent ‘undershoot’ has been assigned a causal role in the formation of patterns of phonological vowel reduction (for example, in: [6], [7], [8], [9], [12], [16]). In the treatment of the issue of vowel reduction not only the effect of stress, but also that of environment and morphological dependence have been accounted for. The case of Erzya in this context presents interest from the point of view of the complex interaction between vocalism and stress, which is movable, as well as environment and, allegedly, morphology. Emphasizing the dialect variability in the relationship between stress and vowel durations the authors argue that the diminishing of the stress mobility and unstressed vowel reduction are morphologically conditioned. The manifestations of the temporal relationship between stressed first-syllable and unstressed second-syllable vowels in disyllabic ‘root’ and ‘inflectional form’ tokens are compared by using data of idiolects that display

differences in the mobility of stress and patterns of vocalism. Some of the effects of environment are commented upon.

## 2. KEY NOTES ON STRESS AND VOWEL INVENTORY

The idiolects under consideration are labeled here as Groups 1 to 4, in which stress alternations have been previously found to be the most frequent in Group 1, fairly frequent in Group 2 and less frequent in Group 3. In Group 4 stress is dominantly assigned to the first syllable. Concerning the vowel inventory in the dialects, it has been established ([11], [13], [14], [17]) that initial syllable vocalism differs little across the varieties of Erzya. There are 5 phonologically distinct vowel qualities (*i*, *e*, *u*, *o*, *a*). In some sub-dialects, open *æ* occurs. The actual variability is manifested in non-initial syllables. In the dialects lacking reduction (Group 1), the vowel inventory in non-initial syllables – *a*, *o*, *e* (in suffixes also *i*) – is governed by vowel harmony. Either front or back vowels surface in non-first syllables, e.g.: *moro* ‘a song’, *tfemen<sup>j</sup>* ‘rust’, if not interrupted by palatalized consonants, e.g. *mol<sup>i</sup>* ‘goes’. In the dialects with vowel reduction, the systems of vocalism in non-initial syllables are complex and unstable. In addition to vowel harmony, also present in these dialects, vowels are affected by stress. A formant analysis of the stressed and unstressed vowels in Erzya provided in [15] (which did not aim at the analysis of inter-dialect differences) has shown centralization of vowels in unstressed syllables. The mid vowels *e* and *o* tended to centralize more than the other vowels; *a* appeared to be the most resistant to centralization.

Vowels fail to reduce in certain consonant environments ([17]); for instance, *o* preserves its quality before *v* and *m*, e.g.: *todov* ‘a pillow’ (in separate idiolects a change like in *todov* > *todu* occurs); *e* resists in certain word forms, e.g.: *t<sup>l</sup>el<sup>n</sup>* ‘of the winter’, *mel<sup>n</sup>* ‘of last year’. As a result, in the dialects with different patterns of reduction all the 5 vowels – *i*, *e*, *a*, *o*, *u*, (also *æ* in some sub-dialects) can be generally found in non-initial syllables. In addition, a schwa vowel (*ə*) appears. Since the mobility of stress has not been cancelled in the varieties with unstressed vowel reduction, a syllable with a schwa-vowel can become stressed, e.g. <sup>1</sup>*sazər*, *sa<sup>1</sup>zər* ‘a sister’; the schwa-vowel in this

case develops into a full vowel. The vocalism of first and second syllables in the dialects lacking reduction (a) and those with reduction (b) is generalizable as follows:

(a) *i e a o u / e a o (i)*;

(b) *i e a o u / (e) a (o) i u ə*

Herein, some cross-dialect correspondences are exemplified.

Group 1: *ava* ‘a woman’, *kudo* ‘a house, home’, *vel<sup>e</sup>* ‘a village’, *ofos<sup>j</sup>* ‘the city’, *mastor* ‘earth’, *pitn<sup>i</sup>ej* ‘expensive’.

Group 2: *ava*, *kudǎ/kudu*, *vel<sup>ě</sup>*, *ofos<sup>j</sup>/ofǎs<sup>j</sup>*, *mastǎr*, *pitn<sup>ě</sup>j*. Unstressed second-syllable vowels *e* and *o* are weakened or change into *i*, *u*, respectively; (in a limited number of word forms a schwa appears, e.g.: *kudǎsǎ* ‘at home’, which is pronounced as a full vowel once the syllable with *ə* receives stress).

Group 3: *ava*, *kudǎ/kudu*, *vǎl<sup>ǎ</sup>*, *ofos<sup>j</sup>*, *mastər*, *pitn<sup>i</sup>j*. Characteristic is the use of *ǎ* both in initial and non-initial syllables; schwa occurs in non-initial syllables in certain environment (for example, before *r*).

Group 4: *avǎ*, *kudǎ/kudǎ*, *vǎl<sup>ǎ</sup>/ǎ*, *ofǎs<sup>j</sup>/ofǎs<sup>j</sup>*, *mastər*, *pitn<sup>i</sup>j*. The dialects are characterized by extensive reduction; *e* and *o* in non-initial syllables are restricted. Open *ǎ* in unstressed syllables can appear in slow articulation. The occurrence of *ə* in the initial syllable (before *r* or *k*, e.g.: *pǎr<sup>1</sup>dams<sup>1</sup>/pǎrdams* ‘to turn’) is a specific feature of this dialect group.

Though there is a fairly high instability in the alternation of reduced and unreduced vowels in a same dialect, vowel reduction can not be considered a feature of “speaking style” in Erzya, as it might be suggested. In same word forms there is regular occurrence of either the schwa-vowel or a full vowel, e.g.: *sazər* ‘a sister’, *sazərǎm* ‘my sister’, but: *morǎ/ǎ*, *morom* ‘a song, my song’.

Non-initial vocalism in Group 1, where full vowels *a*, *o*, *e* (*i*) surface in unstressed syllables, appears to be distant from that in Group 4, where mid vowels are restricted and the system tends to be reduced to the vowels *a* and *ə* (with *i*, *u* as variation). The dialect group, however, has not been hitherto reported to have a phonologically significant schwa-vowel. In the other two groups the occurrence of schwa is constrained.

### 3. MATERIAL AND METHOD

The test words used in this analysis are spontaneous one-word responses of 33 speakers (aged 19–25) to a set of questions asked by the first author (native Erzya). In the idiolects, four main varieties spoken in the Republic of Mordoviya and diaspora are represented. Test tokens were selected to contain both (C)V.CV and (C)V.CVC syllable structure; thus second-syllable vowels occurred in both syllable templates. Only words with initial stress were included. The quality of the first- and second-syllable vowels was comparable across the dialect forms – no clear cases of a schwa-vowel occurred in the speakers' productions (with the exception of some tokens from Group 4). Consonantal environment in the words differed. Interaction of the sentence level prosody is not treated in the analysis of the inter-idiolect data since a same utterance type occurred across the material. The 'root' and 'inflectional form' tokens were: *vel'e* 'a village', *aras<sup>j</sup>* 'no, not', *apak* 'no, not', *kudo/ǎ* 'a house, home'; *vel'es<sup>j</sup>* 'the village', *ofos<sup>j</sup>* 'the town', *ul'i* '(there) is', *ul'it<sup>j</sup>* '(there) are'. Measurements of vowel duration were made by using the software program PRAAT.

### 4. VOWEL DURATION DATA

Analysis of measurement results was made, first, for overall data; successively, vowel durations for the 'root' and 'inflectional form' tokens were evaluated. Table 1 shows the mean duration ratios *V1/V2* in overall data. The results varied across the idiolect groups. In the productions of group 1 the duration of vowels in the stressed first and unstressed second syllables tended to equalize.

Data for the idiolect groups with different patterns of vowel reduction show that stressed first-syllable vowels were significantly longer than unstressed second-syllable vowels, as it could be expected in the case of vowel reduction. Noteworthy is that the statistics for the three groups somewhat differ. For example, the value of *V1/V2* for group 2, where reduction is not salient, was lower than in the results for groups 3 and 4. Note: The absolute values of vowel duration for group 3 were somewhat higher than those for the other groups, due to the occurrences of *æ* (in *væ<sup>l</sup>æ*), the intrinsic duration of which should be higher compared to that of the other vowels).

**Table 1:** Mean durations (*ms*) with values of standard deviation for stressed first and unstressed second syllable vowels (*V1*, *V2*) and duration ratios (*V1/V2*) for all tokens. Significant differences between the values of duration for *V1* and *V2* are starred: \*( $p < 0.05$ ), \*\*( $p < 0.005$ ), \*\*\*( $p < 0.0005$ ), \*\*\*\*( $p < 0.0001$ ). Number of speakers: 13 (Group 1), 9 (Group 2), 6 (Group 3), 5 (Group 4).

Group	N of tokens	<i>V1</i>	<i>V2</i>	<i>V1/V2</i>
1	112	109.58	108.27	1.03
		16.98	16.23	0.19
2	93	107.86	97.37	****1.13
		18.85	16.66	0.22
3	54	121.91	110.61	**1.15
		21.08	27.44	0.28
4	56	111.55	94.73	****1.21
		22.49	17.02	0.28

**Table 2:** Mean durations (*ms*) with values of standard deviation for stressed first and unstressed second syllable vowels (*V1*, *V2*) and duration ratios (*V1/V2*) for the 'root' and 'inflectional form' tokens. Significant differences between the values of duration for *V1* and *V2* are starred: \*( $p < 0.05$ ), \*\*( $p < 0.005$ ), \*\*\*( $p < 0.0005$ ), \*\*\*\*( $p < 0.0001$ ). Number of speakers: 13 (Group 1), 9 (Group 2), 6 (Group 3), 5 (Group 4).

Root					Inflectional form				
	N of tokens	<i>V1</i>	<i>V2</i>	<i>V1/V2</i>	N of tokens	<i>V1</i>	<i>V2</i>	<i>V1/V2</i>	
Group1	60	107.62	112.31	0.97	52	111.85	103.60	*1.10	
		17.67	16.60	0.16		15.99	14.60	0.20	
Group2	40	106.05	100.18	1.08	53	109.23	95.25	****1.17	
		19.66	18.33	0.22		18.28	15.12	0.22	
Group3	30	121.26	111.00	1.14	20	124.85	105.75	**1.22	
		20.21	29.15	0.26		20.91	23.19	0.28	
Group4	29	112.17	98.66	*1.16	27	110.89	90.52	****1.25	
		25.24	18.78	0.28		19.56	14.03	0.28	

Data for the two categories of tokens, shown separately in Table 2, reveal differences in the temporal relationship between the vowels within the root and in the inflectional forms. There were no statistically significant differences in the vowel durations ( $V1$  and  $V2$ ) within the root for groups 1, 2, 3, the duration ratio  $V1/V2$  for groups 2 and 3 was, however, higher than for group 1. Differences in the vowel durations for group 4 were statistically significant. With the exception of data for Group 4, the results show a general tendency towards equal vowel durations within the root. In the inflectional forms a tendency towards vowel compression at the boundary of the root and a suffix (or in the suffix) was manifest in all the groups. The values of  $V1/V2$  for the inflectional forms were higher than those for the 'root' tokens across the data. Differences between the values of  $V1$  and  $V2$  for all the idiolects, including group 1, were statistically significant.

## 5. DISCUSSION AND CONCLUSIONS

The durational asymmetry observed in the production of vowels in inflectional forms across the idiolects is a manifestation of the dependence of vowel durations upon the relationship between the morphological constituents of a word. There is a general tendency to make the most important part of the word (the root) salient; in inflectional forms, duration-based stress gravitating to the head syllable and unstressed vowel reduction are conditioned. The data might imply that the morphologically conditioned vowel shortening is a factor that contributes to the development of the duration-based foot. It has been suggested in [1], [2], [5] that Erzya dialects with less mobile stress display compression of the unstressed vowel in the dual foot, while in the dialects with frequent stress alternation, vowel durations are not affected by stress.

Unstressed vowel reduction appears to be the product of changes within the language's structure. It is evolving in the language varieties unevenly. In the dialects with dominantly initial stress, vowel reduction occurs not only in the unstressed second syllable but in a certain environment it is also allowed in the head syllable. In a part of the dialects vowel reduction fails to apply radically. There is lack of stability in the neutralization of unstressed vowel contrasts – only certain vowel contrasts have been given up to neutralization by speakers.

Dialects exhibiting a pattern of vocalism that primarily depends on vowel harmony also displayed morphologically conditioned vowel reduction in inflectional forms. However, these dialects prove to be highly resistant to phonological vowel reduction.

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