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ON THE ACOUSTICS OF SHORT MONOPHTHONGS IN VASTSELIINA (SOUTH ESTONIAN)*

Introduction

The present article gives an overview of the quality of short vowels in the Vastseliina subdialect of the Võru dialect. The Võru dialect is normally considered to be the most representative of South Estonia. It is also regarded as the area with the most archaic language. Particularly few foreign influences are evident in the Eastern Võru dialect area which is at the same time the centre of several linguistic characteristics. The Vastseliina subdialect, which belongs to the Eastern Võru dialect group, has preserved its linguistic characteristics well, and is thus suitable for characterising both the Eastern Võru dialect group as well as, more generally, the whole Võru dialect.

The aim of this instrumental phonetic study was to describe the short vowels of Vastseliina in different syllables and compare the results with those from Standard Estonian. The assumption was that although in general terms the sound structure of Standard Estonian, which is based on northern Estonian dialects, and that of Southern Estonian, are similar, the similarities (at least as regards the Võru dialect) are not as great as normally thought, including the vowels. In addition to the known raising of long vowels in different quantity degrees in the Võru dialect there are distinguishing features even in the system of short monophthongs. One of the main differences between the Võru dialect and Standard Estonian is that the Võru vowel system includes two unrounded central vowels *ɘ* and *ɨ*. It is important to note that neither of these monophthongs is the same in quality as the Standard Estonian back vowel *ɤ*. It has also been relatively problematic to establish the acoustic nature of the vowels *ɘ̆* and *ɨ̆* in the non-initial syllable of a word. Traditionally, these vowels have been regarded as back counterparts of *ɘ* and *ɨ*; in reality the relationships between vowels turn out to be much more complicated and the relatedness of these vowels remains largely questionable. When analysing the quality of *ɘ̆* it is important to account for additional information obtained from the comparisons of the vowel pairs *ɘ̆* — *ɘ* and *ɘ̆* — *e*. The main char-

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acteristics of *i̯* are due to its wide acoustic variation. A notable finding of the study is that the epenthetic high *i̯* ignores the normal rules of velar vowel harmony. The origin of *i̯*, too, remains to be investigated. The idea that *i̯* has resulted from Slavic influence is based only on hypotheses and is thus questionable. Some special features can also be observed in the acoustics of other dialectal vowels. In the present article I will concentrate principally on a more precise analysis of the quality of the above mentioned dialectal vowels.

I have previously dealt with problems of the Võru vowel system in the article "About the Phonetic Peculiarities of Short Vowels in the Võru Dialect" (Parve 1998a : 241—246) where I presented the preliminary results of the study and drew attention to the questions needing further investigation. I have dealt with separate questions regarding the same topic in a couple of other articles (see Parve 1998b : 38—46; 1999 : 179—188). A summary of the study whose materials and contents are constantly expanding can be found in a booklet published by Tartu University Press "Võru Vowels I" (Pajusalu, Parve, Teras, Iva 2000). The present article presents briefly the most important part of the results of the study so far.

Materials, informants, methodology

The measurements are based on the recordings of the Vastseliina subdialect of the Võru dialect made in 1991 and 1997. The recordings consist of a free conversation by a native of Sute village, RT (male, born in 1924). In addition, read frame sentences were used to control for some vowel qualities. Frame sentences where the vowels were repeated in different syllables of the read words were also recorded by an additional informant, LT (female, born in 1929) who is also a native of Sute village. For both recordings, the former carried out outdoors and the latter indoors, a Maranz tape recorder was used, and the quality of the recordings is good.

To some extent speech data from a third informant, MT (female, born in 1925) from the village of Tabina, recorded in 1994, was used. In the following I will, however, concentrate on the analysis of the pronunciation of the male informant. The figures and tables are largely based on the speech data of RT.

The materials consist of two to five syllable words that contain all possible vowels of Võru dialect in their characteristic surroundings. The words were chosen so that the vowel under investigation was next to a consonant and not a vowel.

The measurements were made using a Kay Elemetrics CSL 4300 B speech analysis workstation. Speech samples were digitised at 10 KHz and a wide-band filter with a bandwidth of 293 Hz was used for making spectrograms (for MT a bandwidth of 145 Hz was used).

General characterisation of Võru vowels

As to short monophthongs the sound structure of the Võru dialect is on the whole similar in the entire dialect area. The rule of velar as well as palatal vowel harmony is valid in the whole area. There are however smaller differences between the subdialects. For instance, the high vowel *i̯* is absent from the western areas of the Võru dialect, and occurs only in the eastern

parts of the dialect: in Vastseliina, Setu and the neighbouring areas. The usage of *u* and *o* in non-initial syllables is also different: the second syllable *o* has been preserved above all in the Eastern and Northern subdialects of Võru; in other places, *u* has mostly replaced *o* (see Saareste 1941, Map 60). Starting from the third syllable, *o* has been replaced by *u* in more or less the whole dialect area, although sometimes also *o*-coloured pronunciation can be heard (Saareste 1941, Map 29). A subdialect that stands out by a number of *o*-sounds is the Räpina subdialect belonging to the Northern group of the Võru dialect. There, the second syllable *u* in the strong degree has turned into *o* even in such words where originally there was no *o* (Keem 1997 : 11). As a special trait depending on the speaker, a partial raising of *ä* in the first syllable could be mentioned; *ɐ* can also be somewhat lowered depending on the speaker.

Characteristic features of the Võru dialect have receded from the Western group of the dialect (the Karula and Urvaste subdialects) where the influences of Standard Estonian and the Western dialect are the strongest. On the other hand, the Eastern Võru language area including the Vastseliina subdialect has remained relatively untouched by foreign influences and in the course of history might have been the centre of radical language change (Rätsep 1989 : 1503—1524). The Vastseliina vowel system also includes the two previously mentioned unrounded central vowels *ɐ* and *i̱*, of which *i̱* can seldom be found in the long quantity, and *ɐ* in the long quantity degree is in most cases raised in the third quantity words (*ɐ̄* : *î̱*). Neither of these vowels appears in native words after the initial syllable. The similarity of the subdialect and the standard is in this case limited to phonotactic general features only, as the Standard Estonian back vowel *ɐ* does not appear in non-initial syllables either. On the other hand, the dialectal *ɐ̯* that is absent from Standard Estonian is possible only in non-initial syllables and *i̯* appears only in the second syllable of certain type of words.

In sum, both the Vastseliina and more generally the Võru vowel system comprises 12 short monophthongs (if we count not only phonemes but also the sounds *ɐ̯* and *i̯* functioning on the allophonic level and representing a certain quality category).

Thus, a schematic figure containing all the Võru short monophthongs looks as follows:

i *ü* *i̯* *i̱* *u*

e *ö* *ɐ̯* *ɐ* *o*

ä *a*

Vowels in the initial syllable

On the basis of the productions of the Vastseliina informant RT the vowel system of Võru first syllables could be depicted with the help of the following diagram (see Figure 1). The same formant values are presented numerically in the following table (see Table 1).

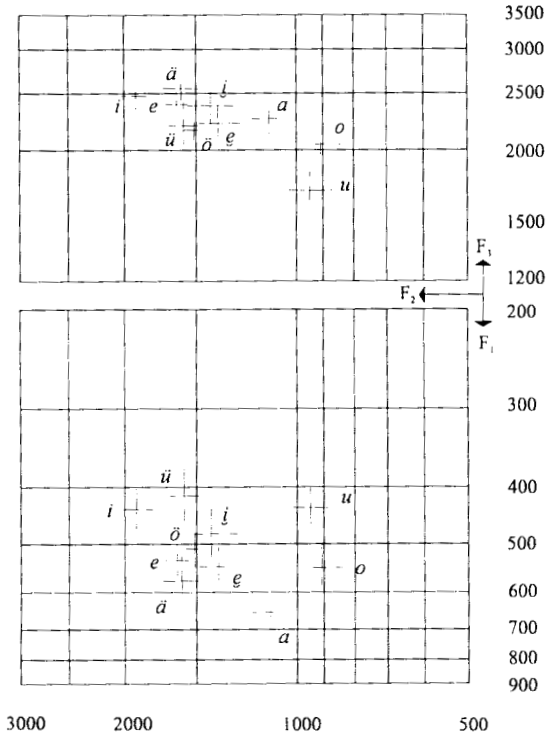

Figure 1. **The placement of initial syllable short monophthongs of the Vastseliina subdialect in the formant space. Informant RT.**

Table 1

Mean formant values and standard deviations of initial syllable short monophthongs of the Vastseliina subdialect (in Hz). The number of measured allophones is shown in brackets. Informant RT

	F_1	SD	F_2	SD	F_3	SD	F_4	SD
i (21)	441	36	1925	125	2477	161	3530	162
e (19)	539	38	1634	91	2400	126	3437	134
ä (15)	576	58	1593	136	2551	153	3598	114
ü (28)	417	49	1575	96	2217	200	3354	154
ö (28)	512	37	1508	79	2172	96	3410	124
ɨ (28)	480	49	1413	146	2384	164	3649	195
ɐ (26)	545	41	1378	115	2244	180	3521	222
a (32)	651	32	1165	80	2287	130	3526	167
o (16)	546	49	911	76	2053	132	2706	200
u (20)	438	33	955	99	1657	153	2610	163

As mentioned, one characteristic of the Võru dialect is the presence of two unrounded central vowels *ɐ* and *ɨ*. As the abundance of vowels in Võru is quite exceptional in the context of Estonian dialects, some linguists have for the sake of simplicity even here used the nine-vowel-system and have not distinguished between the above mentioned vowels (see e.g. Kask 1972; Wiik 1988). As *ɨ* appears only in the initial syllable and extremely seldom in the long quantity (Kasak 1997 : 98—99) one might doubt its phonemic status but dialect speakers themselves perceive *ɨ* as a qualitatively different vowel from its neighbouring phonemes. It appeared in the course of collecting the present speech data that if *ɐ* and *ɨ* are interchanged the word meaning is lost.

A similar conclusion was drawn by Tiit-Rein Viitso when studying the Setu subdialect in the neighbourhood of Vastseliina (Viitso 1990 : 161—172). T.-R. Viitso, too, stresses the phonemic status of the vowels *i̯* and *e̯*, and emphasises the difference of *e̯* and *e̯*. Thus, *i̯* and *e̯* are undoubtedly two separate phonemes and the distinguishing feature turns out to be the fact that *i̯* is higher (or *e̯* lower). If the height of *i̯* is reduced: [+high] > [–high] the contrastiveness of *i̯* is lost as well. For instance the words that created confusion in the informants when reading the text were those which they mistakenly pronounced with a mid-high vowel under the influence of the orthography: *ne̯nà* (instead of *ni̯nà*) 'nose'; *ke̯cè̯* (instead of *ki̯cè̯*) 'most'; *e̯nè̯* (instead of *i̯nè̯*) 'only', etc.

The same conclusion was reached by measuring the quality of *i̯* and *e̯* in the clearly pronounced words of the frame sentences. In the pronunciation of the two informants (RT and LT) who read the frame sentences, *i̯* and *e̯* are clearly distinguishable in respect of their formant values:

		F_1	F_2	F_3	F_4
RT	*i̯*	452	1411	2267	3486
	e̯	531	1348	2169	3516
LT	*i̯*	414	1747	2733	3897
	e̯	610	1739	2538	3383

The distance of *i̯* and *e̯* on the F_1 dimension is 79 Hz in the pronunciation of RT and all of 196 Hz in the pronunciation of LT. The increase of the F_1 distance of *i̯* and *e̯* in comparison to normal height is due to clearer pronunciation caused by careful reading of the frame sentences. In the case of the female voice the even larger difference between high and mid-high vowels is natural.

The data from the frame sentences as well as normal speech reinforce the measurements taken by P. Teras of the acoustic parameters of vowels pronounced in isolation (see Pajusalu, Parve, Teras, Iva 2000 : 52—61). These show the same relation: according to P. Teras the F_1 distance of isolated vowels is 121 Hz or 1.19 barks.

On the basis of the data presented, *i̯* can be considered a high vowel and *e̯* a mid-high vowel. The Standard Estonian back vowel *e̯* can be pronounced with either a high or a mid-high tongue position (Eek, Meister 1994 : 410—411) but taking into account the F_2 values neither of the above mentioned dialectal vowels could be considered the same as the *e̯* of Standard Estonian. Transferring the formant values of Võru *i̯* and *e̯* into barks it appears that acoustically both dialectal vowels are clearly distinguishable from the standard language back vowel *e̯*. The position of dialectal *i̯* and *e̯* is relatively close to front vowels, although with the help of a vertical line it is easy to distinguish them from both front and back vowels (see Figure 2 and Table 2).

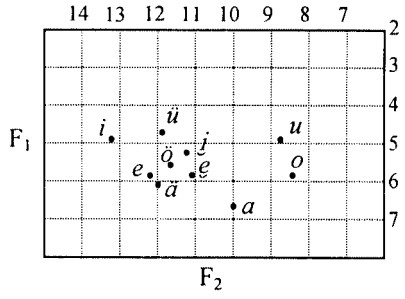

Figure 2. **The position of initial syllable short monophthongs of the Vastseliina subdialect in the bark chart. Informant RT.**

Table 2

Mean formant values of initial syllable short monophthongs of the Vastseliina subdialect in barks. Informant RT

	i	*e*	*ä*	*ü*	*ö*	*ị*	*ẹ*	*a*	*o*	*u*
F_1	4.92	5.78	6.09	4.7	5.55	5.27	5.83	6.68	5.84	4.9
F_2	13.28	12.19	12.02	11.94	11.66	11.23	11.07	9.99	8.51	8.78
F_3	14.97	14.76	15.16	14.23	14.09	14.71	14.31	14.44	13.71	12.28
F_4	17.24	17.07	17.36	16.92	17.02	17.44	17.22	17.23	15.55	15.31

When we compare these results with the data from Standard Estonian (see Eek, Meister 1994 : 409), it appears that the dialectal *ẹ* is differentiated from its standard language counterpart by frontness but also by its lower position (in the case of *ị* it is the frontness and higher position). In contrast to Standard Estonian, phonetic raising of *ẹ* has not taken place in the Võru dialect which results in a somewhat lower Võru *ẹ* and a somewhat higher *ị* than the Standard Estonian *ẹ*. (Because, in the case of Standard Estonian, isolated vowels have been measured, we can only make a general comparison.) However, all measurement results seem to suggest that neither *ị* nor *ẹ* are back vowels but, rather, they should be treated as mid-vowels. The same conclusion was reached by P. Teras on the basis of isolated vowel measurements (Pajusalu, Parve, Teras, Iva 2000 : 52).

The initial syllable vowels in normal speech were additionally analysed in another informant's pronunciation (female informant MT). The vowel *ö* did not occur in the speech material. Despite smaller individual differences the results lead to similar conclusions.

Table 3

Mean formant values and standard deviations of initial syllable short monophthongs of the Vastseliina subdialect (in Hz). Informant MT

	F_1	SD	F_2	SD	F_3	SD	F_4	SD
i (8)	408	24	2352	152	2884	242	3865	117
e (6)	515	44	2071	68	2860	66	3938	99
ä (6)	659	75	1927	82	2852	157	3765	245
ü (6)	429	52	1956	86	2653	90	3541	163
ị (20)	462	40	1844	203	2860	106	3843	151
ẹ (16)	589	50	1551	132	2830	123	3817	197
a (12)	656	53	1430	132	2785	126	3613	116
o (7)	528	45	911	147	2703	101	3723	76
u (10)	440	42	993	155	2836	208	3612	220

In the productions of MT, the difference between *ị* and *ẹ* in the F_1 dimension is even greater than in the pronunciation of RT: *ị* has approached other high vowels and *ẹ* has been considerably lowered (the distance between *ị* and *ẹ* for MT is 127 Hz, and for RT 65 Hz). In the F_2 values these vowels are closer to front vowels than to back vowels in the pronunciation of both informants. In the productions of MT another pronunciation tendency which is characteristic of the Vastseliina subdialect becomes evident — the acoustic proximity of *u* and *o*. In the speech of RT the distance between *u* and *o* was 108 Hz whereas in the speech of MT it has decreased by 20 Hz. Re-calculated into barks, these distances are slightly less than one bark in both cases. In the case of normal speech, this is probably sufficient for distinguishing *u* and *o*, but on the basis of the speech data of RT it can be maintained that

in the second syllable this distance is considerably shortened (see Figure 4 and Table 5). The backest vowel in the pronunciation of both informants is *o*; *u* is pronounced with a slightly more front tongue position.

There appeared to be no noticeable characteristics in the quality of the rest of the initial syllable vowels. The relatively high *ä* of RT seems to be an individual characteristic appearing in spontaneous speech. The *ä* of MT is in its F_1 values similar to *a*, or even slightly lower. The measurements of the frame sentences showed, too, that in the case of slower and more concentrated pronunciation *ä* could be considerably lower. (formant values of *ä* in RT's frame sentences: F_1 645, F_2 1549, F_3 2269, F_4 2416; formant values of *ä* in LT's frame sentences: F_1 818, F_2 1959, F_3 2638, F_4 3335).

Second syllable vowels

In the Võru dialect, the vowels *į* and *ę* do not occur after the first syllable. *ę* can occur in a non-initial syllable only in the Setu subdialect which can only conditionally be considered a part of the Võru dialect. On the other hand, second syllable vowels are diversified by *ę̡* whose quality is relatively close to *ę*, and a schwa *į̡*. The vowel *ö* appears only in the first syllable in the recordings.

The values of second syllable vowels in the Vastseliina subdialect are presented in the following diagram (see Figure 3) and the table (see Table 4).

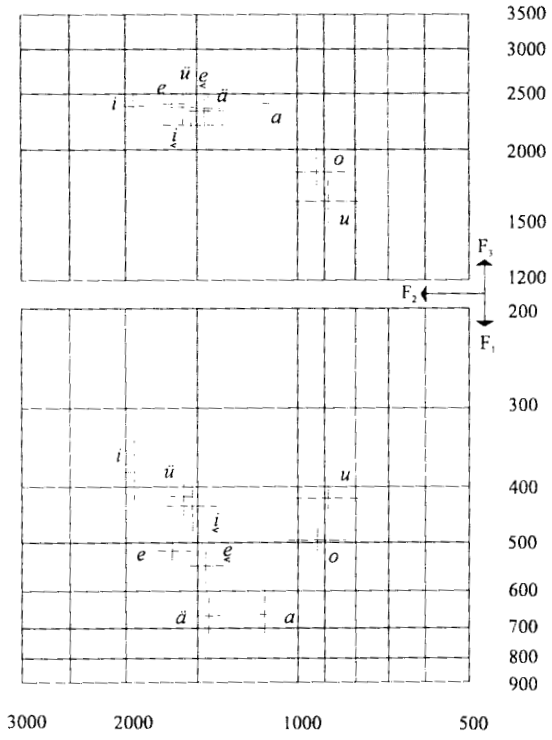

Figure 3. **The placement of second syllable short monophthongs of the Vastseliina subdialect in the formant space. Informant RT.**

Table 4

Mean formant values and standard deviations of second syllable short monophthongs of the Vastseliina subdialect (in Hz). Informant RT

	F_1	SD	F_2	SD	F_3	SD	F_4	SD
i (38)	382	56	1928	87	2391	122	3382	157
i̯ (34)	431	52	1537	204	2204	154	3675	221
e (26)	519	25	1662	126	2415	173	3528	192
e̯ (34)	548	35	1451	101	2361	144	3510	153
ä (19)	670	63	1439	71	2350	150	3572	117
ü (26)	418	47	1591	88	2381	192	3346	129
a (22)	666	74	1192	70	1404	174	3501	147
o (19)	498	27	936	125	1856	195	2623	171
u (17)	425	42	889	123	1613	161	2568	152

e̯ — a variant of *ɐ̯* or *e*?

As compared to initial syllable vowels, clarifying the nature of the non-initial syllable vowels *e̯* and *i̯* has raised even more problems. The analysis of the data reveals that the quality of the *e̯* occurring in non-initial syllables differs from that of *ɐ̯* above all because *e̯* is a more front vowel, closer to *e*.

Of initial syllable vowels, the closest vowel to *e̯* is the vowel *ɐ̯*, but the historical development of *e̯* forces us to find acoustic parallels even with *e*. As the origin of *e̯* is connected to velarisation of the *e* of non-initial syllables under the influence of a back vowel in the first syllable, it is possible that a certain type of psycho-acoustic connection that applied between *e* and *e̯* in the past has been retained up to the present, and that in the case of *e̯* we have to do with a variant of *e* (not *ɐ̯*). When drawing phoneme boundaries we have first to answer the question whether the prevailing characteristic is the acoustic proximity of the vowels (*e̯* and *ɐ̯*) or their phonological relatedness (*e̯* and *e*).

If the frontness of *e̯* is not accidental but intentional the second explanation is preferred: according to which, when velar harmony occurs, a speaker aims at a more back vowel similar to *e*, rather than a variant of *ɐ̯*. This in its turn is connected to the rare status of *e̯*-harmony: *e̯*-harmony differs in principle from palatal harmony (it is a case of alternating adjacent vowels or even phoneme variants). When describing vowel harmony in Votic, Petri Lauerma has also referred to the non-initial syllable *e̯* as a vowel which is close to *e*, stressing the more front position of *e̯* as compared to *ɐ̯* (Lauerma 1993 : 258). The acoustic similarity of *e* and *e̯* has been noticed by several other dialectologists whose materials can be found in the dialect collection of Mihkel Toomse. In this corpus, in a large number of words containing a back vowel, the non-initial syllable *e̯* has been transcribed with the front vowel *e*. Confirmation of this is found in a comment by M. Toomse who says that the back variant of *e* has often simply been replaced by *e* (Toomse 1976—1984 : 46). The acoustic similarity with the initial syllable *ɐ̯* is thus more like an accidental coincidence which is a result of the restricted possibilities of the articulatory space, and of perception. Thus, when concentrating on the differences between Võru velar harmony and palatal harmony — phonetically very similar sounds are alter-

nating — then we can treat ę as a more back variant of the *e*-phoneme. This version finds support even in the historical development of ę and in the assimilation of ę and *e* starting from the third syllable. However, when relying on the acoustic proximity of ę and ę (which is greater in the case of second syllable ę than between ę and *e*), then we can treat ę as a variant of the ę-phoneme; these vowels lack a reliably perceived difference (see Figure 4 and Table 5).

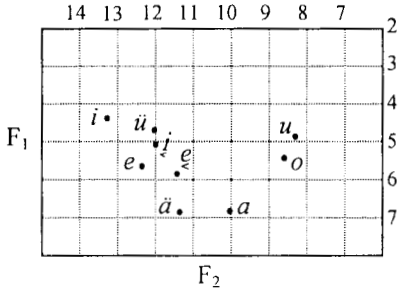

Figure 4. **The position of second syllable short monophthongs of the Vastseliina subdialect in the bark chart. Informant RT.**

Table 5

Mean formant values of second syllable short monophthongs of the Vastseliina subdialect in barks. Informant RT

	i	*į*	*e*	*ę*	*ä*	*ü*	*a*	*o*	*u*
F_1	4.37	5.04	5.61	5.86	6.83	4.71	6.8	5.43	4.78
F_2	13.29	11.96	12.3	11.4	11.35	12.01	10.14	8.66	8.36
F_3	14.73	14.24	14.8	14.65	14.62	14.7	14.77	13.04	12.1
F_4	16.97	17.57	17.23	17.2	17.31	16.9	17.18	15.34	15.2

The closest second syllable vowel to ę is indeed *e* and the distance between these vowels (F_2 0.9 barks) remains less than one bark. As these are not isolated vowels but from normal speech, this distance may be sufficient for perceiving the difference between the vowels, although not always, as also confirmed by M. Toomse's materials. When comparing the bark charts of first and second syllable it appears that of the initial syllable vowels, the formant values of ę are even closer to ę (the difference of F_2 values is 0.33 barks). The difference in the quality of ę and ę should thus not be perceivable; the stability of both vowels is preserved only because they cannot appear in the same syllables.

Mean formant values (in Hz) measured on the basis of frame sentences are as follows for each informant:

		F_1	**F_2**	**F_3**	**F_4**
RT	į	439	1483	2116	3659
	ę	537	1426	2283	3541
LT	į	602	1778	2484	3207
	ę	634	1717	2566	3465

Also, when pronounced in frame sentences, both ę and į are relatively front vowels. When comparing the frame sentence ę and į to the frame sentence initial syllable vowels (ę and j), it appears that in the pronunciation of RT, the F_2 value of both second syllable vowels has increased: the distance between į and j is 72 Hz and between ę and ę 78 Hz. In the pro-

nunciation of LT, however, *ę* and *ę̣* are practically overlapping and there appears to be no high *į* in the speech of LT. On the basis of the quality of *ę* it is possible to conclude that in spite of a slightly more front position, *ę* and *ę̣* can be treated as one phoneme on a purely phonetic basis. At the same time this conclusion is not supported by the historic connection between *ę* and *e*; this contradiction is reinforced also by the data from the third and fourth syllables.

The vowel *ę* was measured in the pronunciation of MT (19 times); for *į* there was not, however, sufficient data. The formant values for MT's *ę* were: F_1 — 549 Hz, F_2 — 1740 Hz, F_3 — 1985 Hz, F_4 — 3862 Hz. The results coincide largely with those from RT. The F_2 difference between *ę* and *ę̣* for MT is 189 Hz, and between *ę* and *e*, 331 Hz. Thus, on the basis of F_2 values, the *ę* of MT is qualitatively the closest vowel to *ę̣*, but on the F_1-dimension the proximity of *ę* to *e* is greatest: the distance between *ę* and *e* is 34 Hz, between *ę* and *ę̣* 40 Hz. Thus, on the basis of the speech data of MT, *ę* is a vowel that is qualitatively between *e* and *ę̣*, being higher and more front than *ę̣* but lower and more back than *e*.

Summarising the material presented, *ę* could be phonetically treated as a front variant of the *ę̣*-phoneme, although phonologically (e.g. under vowel harmony) it functions as a back equivalent of *e* or the so called back *e*.

Taking into account the phonetic characteristics of *ę* and *į*, second syllable *į* and *ę* could still be classified as front vowels, whereas for the purposes of initial syllable *ị* and *ę̣* it is reasonable to create a separate class of mid-vowels. In Figure 2, *ị* and *ę̣* are slightly closer to the centre of the vowel space than *į* and *ę* in Figure 4. *ę̣* is separated from *e* by 1.12 barks, whereas the difference between *e* and *ę* is less than one bark (0.9 barks). In the case of high vowels, the difference between *ị* and *i* is 2.05 barks as compared to 1.33 barks in the case of *į* and *i*.

However, what proves to be crucial is the placement of the rest of the vowels. In Figure 4, it is not possible to separate *į* and *ę* from other front vowels with the help of a vertical line and the F_2 values of both vowels are larger than the F_2 of *ä*. At the same time the F_2 values of *ị* and *ę̣* are between those of front and back vowels, and *ę̣* lies at an equal distance from *ä* and from *a*.

At the same time *ę* differs from other front vowels in that, under vowel harmony, it behaves like a back vowel. Although, on the one hand, *ę* and *ę̣* are phonetically almost the same, the quality and distribution of *ę* have an immediate connection to *e*, and *ę* should be treated as a back equivalent of the front vowel *e* because within the word it is capable of co-occurring with other back vowels, but not with front vowels.

The classification of *į* as a front vowel is also relative and relies solely on phonetic data. More detailed analysis of the quality of *į* will clarify the point.

The quality of *į*

The quality of *į* has been the subject only of speculation. This vowel did not appear until this millennium or at any rate until after the apocope (loss of endings) that took place between the 13th and 15th century (Rätsep 1989 : 1511). After apocope had occurred, the eastern subdialects of Võru started to use an epenthetic vowel *į* to facilitate the pronunciation

of **sepra*-type words. According to the dialect maps by Andrus Saareste, *i̯* can be found persistently only in Vastseliina and Setu, but even there it does not appear regularly; individually words can be pronounced with a mid-high epenthetic vowel even in those areas (Saareste 1938, Map 10; 1941, Map 31; 1955 : 57, 73).

A prerequisite for the development of *i̯* has been considered to be the presence in the language of a sound with a similar quality: initial syllable *i̯* of Slavic origin. Traditionally, the above mentioned vowels have been treated as one phoneme. The measurements of its quality implied, however, a relatively large difference between *i̯* and *i̯* (the F_1 difference was 0.23 barks, and for F_2 0.73 barks, in the case of normal speech rather than isolated vowels). Thus it is questionable to rely on the articulatory and acoustic model of *e̯* for the schwa, and other possible models could be considered such as *i* and *e̯*.

Most probably the quality of *i̯* has developed through a certain type of analogy with the non-initial syllable vowel *e̯*. It is possible that, parallel to the previously mentioned psycho-acoustic pair *e* — *e̯*, the developing new vowel became related with *i* in the same way as *e̯* with *e*. The parallel vowel relationship that developed was based on a purely phonological analogy. There was no change on the phonological level (e.g. in relation to the rules of vowel harmony). A fact suggesting some correspondence between *i̯* and *e̯* is that some dialect speakers pronounce the *sõber*-type words persistently with a mid-high *e̯* and not with a *i̯* or *e̯*. As *i̯* does not arise from velarisation of the vowel *i* in the same position, *i̯* might not have a direct relationship with *i* (comparable to the one between *e̯* and *e*). But as the vowel *e̯* is deliberately pronounced relatively close to *e* it is still possible that a similar tendency appears also in the case of *i̯*: the relationship of *e* and *e̯* has been transferred to the vowels *i* — *i̯*. At this stage this is a hypothesis which can only be supported by a large standard deviation of *i̯*, which is why it can be very close to *i* in quality. Also worth mentioning is a certain parallelism of the relationships between *e* and *e̯* on the one hand, and *i* and *i̯* on the other hand (see Figure 3).

The closest vowel to *i̯* in terms of first and second formant values is *ü*. Because of the large standard deviation, *i̯* could be articulated even fronter than *ü*, although this proximity is not decisive because these vowels differ by the lip-rounding of *ü*.

i̯ and vowel harmony

When characterising the quality of *i̯* we have to pay attention to one aspect of its phonological behaviour. Traditionally, dialect researchers have been of the view that *i̯*, like *e̯*, participates in harmony alternations. If this is the case the analogy with the relationship between *e* and *e̯* would be particularly apparent. The results of this investigation seem to point to *i̯* as a neutral vowel from the point of view of vowel harmony; it appears both in front-vowel and back-vowel words. In this case the primary factor in the emergence of the schwa-vowel could have been a general striving for balance and not analogy of relationships. There are also dialect examples that support the neutrality of *i̯*. There are not many front vowel words with *i̯* in the Võru dialect but the following examples were found in the collection of South Estonian dialects by M. Toomse: SeVa *mü̯cer*, SeL *müg̀r*,

SeVi *mügɨr*, SeR *mʲüg̬ɨr* (Toomse 1976—1984 : 3988a). On the other hand the proximity of *ɨ̯* to *i* can at times be so great that *i* is perceived even in back vowel words where according to all expectations *ɨ̯* should occur. Thus, for instance, A. Saareste in his "Small Dialect Atlas of Estonian" has marked the second syllable vowel that occurs in Vastseliina, Setu, in the northern part of Rõuge and the southern part of Põlva in the word *pɛ̨ɒɨ̯r* with a non-initial syllable vowel *i* (Saareste 1955 : 73). However, *ɨ̯* appears specifically in these areas. In the dialect database by M. Toomse the words *naɢɨ̯lʹ*, *nɛ̨ɢɨ̯lʹ* and *vɪɢɨ̯lʹ* appear transcribed both with *i* and *ɨ̯* (Toomse 1976—1984 : 3983—3984). In any case, M. Toomse connects the vowel *ɨ̯* with *i* and presents it as a back variant of *i* rather than a front variant of *ɨ̯*.

When measuring the quality of all the *ɨ̯* vowels that occurred in the speech material used for the purposes of this work, other pronunciation characteristics could be observed in addition to the neutrality of *ɨ̯* (see Figure 5).

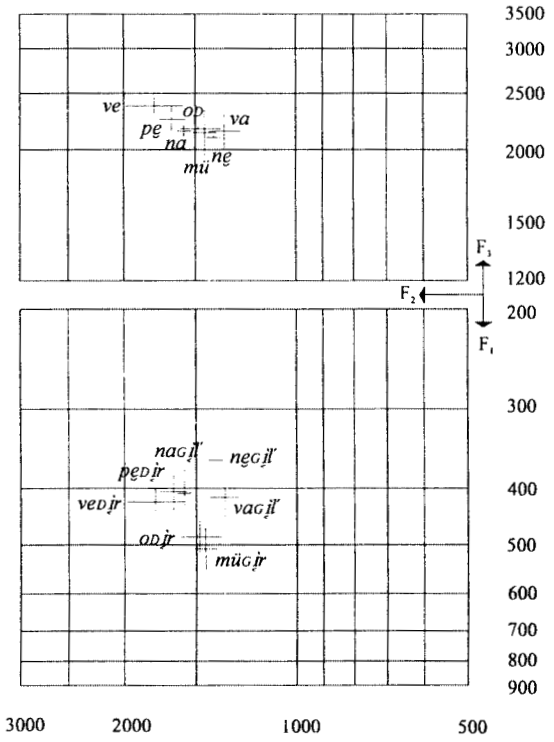

Figure 5. **The quality of *ɨ̯* in different words of the Vastseliina sub-dialect on the basis of F_1—F_2 values. Informant RT.**

Figure 5 presents separately the mean formant values together with standard deviations in all the *ɨ̯*-vowels of the dialect words that appeared in the speech data. As additional material I also measured the Standard Estonian word *ɒɒɛ̀r* which appeared in the text and which the informant pronounced dialectally as *ɒɒɨ̯r*. The number of measured allophones word by word is as follows: *pɛ̨ɒɨ̯r* (7), *müɢɨ̯r* (6), *veɒɨ̯r* (6), *ɒɒɨ̯r* (3), *vaɢɨ̯lʹ* (9), *naɢɨ̯lʹ* (4), *nɛ̨ɢɨ̯lʹ* (2).

Among the words presented, two have a front vowel in the first syllable and five a back vowel. It is surprising that the words with a front vowel in the first syllable do not form a group of their own. The grouping is entirely random and, contrary to expectations, the word in the lowest position is a word with a front vowel in the first syllable (*müɢɨ̯r*). On the other hand the position of another word with a front vowel in the first syllable (*veɒɨ̯r*) implies the possibility of vowel harmony, although the distance from other vowels is too small for the possibility to be confirmed. The quality of *ɨ̯* probably does not depend on the rules of vowel harmony but rather on the customary pronunciation tradition of different words.

Variation of *i̯*

As another important characteristic, the large standard deviation of *i̯* should be mentioned (see Figure 3). The size of standard deviation indicates the varying pronunciation of a vowel and in the case of *i̯* this variation is particularly large. As the similarity of *i* and *i̯*, which is based on the analogy of vowel relation between *e* and *e̯*, is only partial, it must be concluded that the quality of *i̯* developed according to the analogy of this relationship, or only on the basis of *e̯*, is not absolutely determined but varies within the range of pronunciation models. Sometimes *i̯* is lowered to a mid-high vowel *e̯* whereas other times it becomes particularly high and front. Thus, the quality of *i̯* varies to quite a considerable extent: from a sound close to *i* to a mid-high *e̯* (see Figure 6).

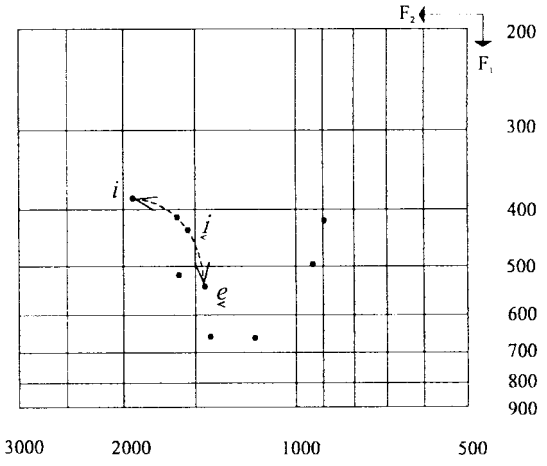

Figure 6. **The variation of *i̯* in the Vastseliina sub-dialect (in Hz). Informant RT.**

What the quality of *i̯* turns out to be in a concrete speech situation depends to some extent on the word itself and on the customary pronunciation of the word (see Figure 5). If a dialect speaker is used to pronouncing all the *sõber*-type words with the lowest variant, the mid-high *e̯*, it could be said that in his/her speech there occurs no *i̯*. On the other hand, in Setu and Vastseliina, pronunciation variants with a pure *i* occur (Saareste 1955 : 73; Toomse 1976—1984 : 3983b—3983).

It could be concluded that *i̯* is a schwa-vowel with a very ill-defined quality, its pronunciation varying and the rules of vowel harmony not applying to it. The main reasons for both of these characteristics is the late emergence of *i̯* which is why the influences of sound models appear in its quality to greater or lesser extent, and the rules of vowel harmony have not applied. Another reason is the schwa-character of the vowel. As an epenthetic vowel it has a slightly different role in the vowel system which is more important than a stable quality. For the same reason even in other subdialects of the Võru dialect, one can encounter vowels of different quality in the same position: Setu *i*, *i̯*; Rõuge *i*, *i̯*, *e*, *e̯*; Urvaste, Karula *e*, *e̯*. (The reasons for the development of *u* in Kanepi are different (Keem 1997 : 13).)

Despite the partial acoustic proximity, *i̯* cannot be regarded as belonging to the same phoneme as any other vowel, including *i,* as the pronunciation of *i̯* is too varied. Sometimes its quality can turn out to be quite similar to some vowels but this does not always happen and not always to a certain vowel. Evaluating *i̯* on the basis of mean formant values can lead to doubtful results. A reliable overview of the quality of *i̯* can only be arrived at by analysing words separately. On the whole *i̯* can be regarded

as a back *i* as well as a variant of *e̯*, but the best term still is a high schwa-vowel with variable quality.

One of the most important pronunciation features of the second syllable is the close position of *u* and *o*. As compared to the situation in the initial syllable these vowels have approached each other considerably. The difference in barks between *u* and *o* on the F_1 scale is 0.65 barks, which in the case of spontaneous speech can in some cases be sufficient for distinguishing vowels but not always. The proximity of the rounded back vowels is not accidental but is a pronunciation feature generally typical of the Võru dialect. Starting from the third syllable, the merger of *o* and *u* is even more complete: in almost the whole of the dialect area (apart from a few exceptions) *o* has been replaced by *u*, which is mostly articulated with a relatively low tongue position and is thus in-between *u* and *o*.

In summary, in the case of second-syllable vowels as compared to initial syllable ones, we can observe more precise articulation: vowels are more distinct from each other, which results in a more even vowel quadrilateral (one with a more distinct shape). A more precise pronunciation is in its turn connected to the duration of the second syllable vowel which in Vastseliina (as in Standard Estonian) exceeds the duration of the initial syllable vowel in first quantity words (see Table 6).

Table 6

Average vowel durations (in relation to the initial syllable vowel) in non-initial syllables in the Vastseliina subdialect. The number of measured vowels is in brackets. Informant RT

	2nd syllable	3rd syllable	4th syllable
1 Quantity (1 Q)	1.18 (159)	0.67 (45)	0.70 (40)
2 Q	0.90 (45)	0.64 (16)	0.69 (17)
3 Q	0.71 (11)	0.62 (3)	0.44 (2)
Mean	0.93 (215)	0.66 (64)	0.69 (59)

Vowel durations are regularly shortest in third quantity words and longest in first quantity words. Much depends on speech rate. In the case of clearer articulation, the differences in duration can be larger and vowels either longer or shorter depending on the quantity. In the case of fast spontaneous speech, these duration differences decrease noticeably. In the speech of RT the differences in vowel durations in different quantities are modest.

Comparing the intrinsic durations of vowels it appeared that the vowels with the longest duration are the second syllable low vowels *a* and *ä* (with a ratio to the initial syllable vowel of 1.51 and 1.43 respectively). The duration of the schwa-vowel *i̯* as compared to other close second syllable vowels was also above average (1.05). All this excludes the possibility of the variation of the quality of *i̯* being caused by the short duration of the vowel.

Third syllable vowels

The vowel system in the third syllable in the Võru dialect differs slightly as compared to the second syllable. The third syllable lacks *i̯* (which can appear even in the second syllable only under certain condition). Also, *o* does not appear evenly in the whole dialect area but can be absent in some regions. In such cases *o* has been replaced by *u* as in the speech of RT.

The vowel diagram in Figure 7 gives an overview of the position of the third syllable vowels in the formant space; numerical values are presented in the form of a table (see Table 7).

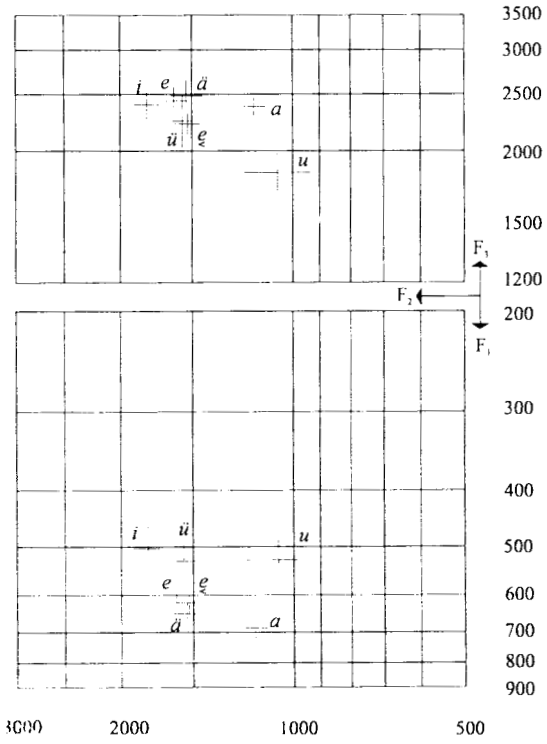

Figure 7. **The placement of third syllable short monophthongs of the Vastseliina subdialect in the formant space. Informant RT.**

Table 7

Mean formant values and standard deviations of third syllable short monophthongs of the Vastseliina subdialect (in Hz). Informant RT

	F_1	SD	F_2	SD	F_3	SD	F_4	SD
i (21)	404	44	1783	116	2419	196	3499	250
e (18)	500	45	1637	114	2446	171	3445	200
ę (23)	520	40	1537	96	2250	109	3462	256
ä (19)	554	50	1532	105	2485	191	3473	189
ü (16)	432	38	1559	66	2257	240	3252	206
a (18)	592	54	1209	81	2370	102	3445	145
u (23)	423	46	1105	169	1840	147	2664	166

In the third syllable, all the dialect vowels have undergone noticeable reduction. A particularly great degree of reduction can be observed in the case of *ä*, and also *ę*. *ä* has become higher and approached mid-high vowels in its formant values; *ę* has shifted towards the front and become slightly higher, thus approaching *e*. The acoustic approximation of *e*, *ę* and *ä* is above all due to the shift of the mid-vowel *ę* towards front vowels, or, in other words, towards its front counterpart *e*. The distance between *e* and *ę* in the third syllable is acoustically too small to regard these sounds as separate phonemes. As in the second syllable, the phonemic identity of *e* and *ę* was above all

dependent on taking into account the peculiarity of the mutual relationship of these vowels; and on the fact that from the third syllable on these vowels also belong together acoustically. To some extent the lower and backer position of *ę* is still retained but on the basis of the data recalculated into barks it can be maintained that this difference is mostly not perceived. In barks the distances between vowels are very small so that in addition to mid-high front vowels *ä* too has assimilated to them, and it is mostly not possible to make a perceptual difference between *ä*, *e* and *ę* (see Figure 8 and Table 8).

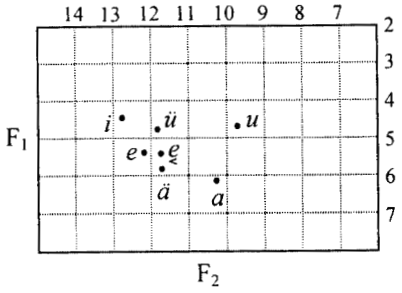

Figure 8. **The position of third syllable short monophthongs of the Vastseliina subdialect in the bark chart. Informant RT.**

Table 8

Mean formant values of third syllable short monophthongs of the Vastseliina subdialect in barks. Informant RT

	i	*e*	*ę*	*ä*	*ü*	*a*	*u*
F$_1$	4.58	5.45	5.62	5.91	4.84	6.22	4.76
F$_2$	12.77	12.2	11.78	11.76	11.88	10.23	9.66
F$_3$	14.81	14.88	14.33	14.99	14.35	14.67	12.98
F$_4$	17.18	17.09	17.12	17.14	16.73	17.09	15.44

The existence of *ä* as a separate phoneme is thus questionable. It can be suggested that although *ä* has undergone considerable reduction in the third syllable, the extent of its raising is not sufficient for it to be confused with mid-high vowels. In the frame sentences the pronunciation of *ę* and *ä* differed greatly between the informants. In the case of RT, the reduction of *ä* was not very noticeable; in the pronunciation of LT, however, *ę* and *ä* had moved so close to each other that they could be considered practically the same vowel.

Taking into account sound changes that have taken place in the neighbouring dialects, this kind of pronunciation variant is entirely acceptable. Similar vowel changes have to a slightly larger extent taken place for instance in the Mulgi dialect in the western part of South Estonia, where both *ä* and *a* have as a rule been reduced into *ə* or *e* starting from the third syllable (Pajusalu 1998 : 236—239). On the basis of the variable extent of raising of *ä* in the third syllable, it can be suggested that the vowel change, *a*, *ä* > *e* (*ə*), that has taken place in the Mulgi dialect does not yet apply to the same extent in the Vastseliina subdialect or in the entire Võru dialect area. But it is not impossible that together with the progression of the reduction this change will generalise in the longer term in all the South-East Estonian subdialects where the tendency for *ę* and *ä* to reduce is apparent.

Fourth syllable vowels

In the fourth syllable of the Võru dialect the same vowels occur as in the third syllable. The difference lies only in the absence of *o* in the whole dialect area. Table 9 and the vowel diagram (see Figure 9) give an overview of the formant values of the vowels in the fourth syllable.

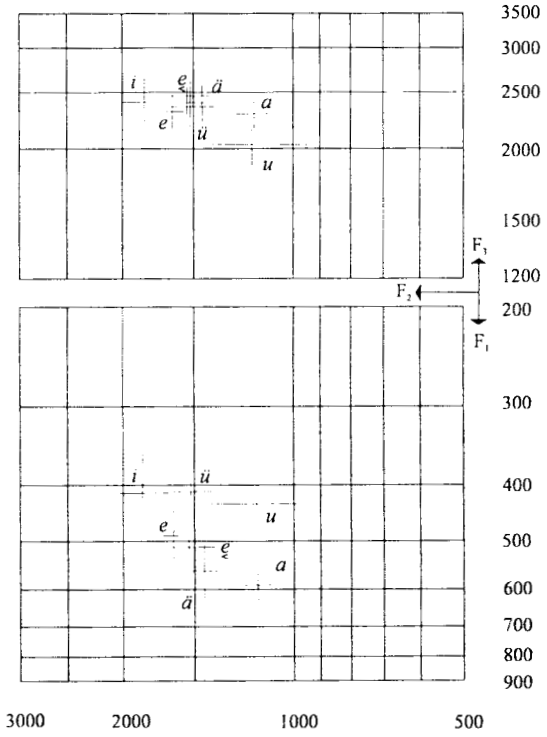

Figure 9. **The placement of fourth syllable short monophthongs of the Vastseliina subdialect in the formant space. Informant RT.**

Table 9

Mean formant values and standard deviations of fourth syllable short monophthongs of the Vastseliina subdialect (in Hz). Informant RT

	F_1	SD	F_2	SD	F_3	SD	F_4	SD
i (21)	416	59	1824	183	2437	241	3419	277
e (17)	490	52	1622	74	2336	164	3521	169
ę (17)	515	42	1516	122	2477	158	3634	221
ä (12)	567	95	1473	88	2431	167	3572	132
ü (4)	414	38	1516	126	2359	252	3375	262
a (21)	597	74	1206	76	2311	150	3500	126
u (9)	432	29	1200	266	2012	162	2794	268

In general terms the fourth syllable vowels are not more reduced than the third syllable vowels. The differences in formant values are very small in the case of most vowels. On the other hand, the standard deviations of all vowels are significantly increased, which shows that the quality of vowels can vary within a wide range. This tendency to vary is particularly noticeable in the case of *u*, the fluctuation in the pronunciation of which is apparent already in the third syllable.

As in the third syllable, ę and ä have undergone considerable reduction. One difference is that ä is slightly lower and further from mid-vowels whereas ę is even closer to *e*, but no other major differences are added in the fourth syllable (see also Figure 10 and Table 10).

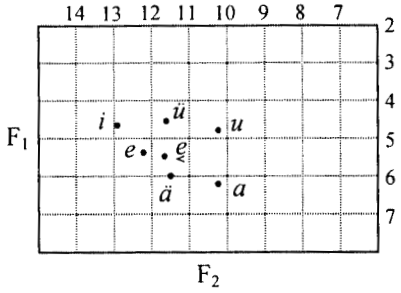

Figure 10. **The position of fourth syllable short monophthongs of the Vastseliina subdialect in the bark chart. Informant RT.**

Table 10

Mean formant values of fourth syllable short monophthongs of the Vastseliina subdialect in barks. Informant RT

	i	*e*	*ę*	*ä*	*ü*	*a*	*u*
F$_1$	4.69	5.36	5.58	6.01	4.67	6.26	4.84
F$_2$	12.92	12.14	11.69	11.50	11.69	10.21	10.18
F$_3$	14.86	14.58	14.97	14.84	14.64	14.50	13.58
F$_4$	17.04	17.22	17.41	17.31	16.96	17.18	15.75

Disregarding some smaller vowel shifts the general picture is similar to that of the third syllable: the separation of *e*, ę and ä is less than one bark. Taking into account the data presented in Figure 10 it can be maintained that although starting from the third syllable *e* and ę belong acoustically together, forming one phoneme, there still seems to be a certain difference in the pronunciation of ä. The size of standard deviation allows ä sometimes to be formed rather similarly to mid-high vowels, but sometimes (apparently in the case of longer duration) it is articulated as a low vowel. In the latter case the difference from *e* and back *e* (ę) is clearly perceivable.

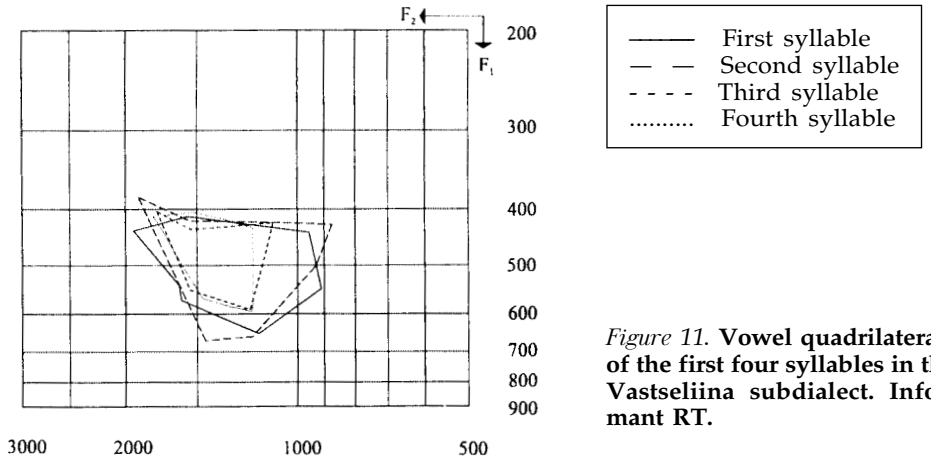

Figure 11. **Vowel quadrilaterals of the first four syllables in the Vastseliina subdialect. Informant RT.**

As there is a dependency relation between the quantity and quality of sounds, the data from both areas complement each other. The figure depicting the vowel quadrilaterals of the first four syllables thus contains data on both the quality and quantity of different syllables.

The quadrilaterals of the first and second syllable are more similar to each other, whereas the quadrilateral of the third and fourth syllable could be grouped together. The same relation applies to duration. Generally, second syllable vowels are acoustically more distinct, whereas the third and fourth syllables are reduced almost equally. The vowels of the second syllable are most distinct in quality. They also have greater average duration than initial syllable vowels.

Conclusion

The vowels of the Võru dialect differ from those of Standard Estonian by several characteristic features. Some features characteristic of the Võru dialect do not occur at all in the standard language.

The characterisation of the two unrounded mid-vowels (*ę* and *į*) and the non-initial syllable vowels (*ę̆* and *į̆*) have created several problems for the description of the Võru vowel system. The initial syllable vowels *ę* and *į* have mostly been considered to belong to the phonemes *ę* and *į̆* respectively. The acoustic analysis of the vowels, however, implies otherwise. On the basis of the second syllable data it is possible to consider the phonetic relatedness of *ę* and *ę̆*, but under vowel harmony, *ę* behaves like a back *e* or a back variant of the front vowel *e*. This behaviour can in its turn be explained by the special status of *ę̆*-harmony, which is based on the alternation of acoustically adjacent vowel variants. In the third and fourth syllable, *ę* approaches *e* even phonetically and thus the phonemic identity of *e* and *ę* cannot be excluded.

The quality of the schwa vowel *į̆* appearing mainly in the Setu and Vastseliina subdialects turned out to be highly variable. It cannot be regarded as an allophone of any other vowel. The quality of *į̆* varies within the range of its supposed pronunciation models from *ę* to *i* whereas the main reason for this variation is the customary pronunciation of a word. Similarly the results of the investigation do not confirm the participation of *į̆* in the harmony alternation. The above characteristics are caused by the late emergence of *į̆* (approximately in the middle of this millennium) which is why the rules of vowel harmony have not started to apply. Another reason is the functioning of *į̆* as a schwa. In general terms, *į̆* can be called a high front vowel although its actual characteristics are better conveyed if called a high schwa vowel with variable quality.

o and *u* are relatively proximate vowels in Vastseliina, particularly on the basis of the second syllable data. Beyond the second syllable, *o* is replaced by *u* or a sound in-between *o* and *u* in almost all the dialect area.

From the third syllable onwards, all the vowels of the Võru dialect have undergone considerable reduction. The degree of reduction is particularly noticeable in the case of *ę̆* and *ä*, which participate in vowel harmony. The change in the quality of *ę̆* is above all caused by the shift of the vowel towards its front vowel counterpart *e*. In addition to the acoustic relatedness of *ę̆* and *e* in the third and subsequent syllables, the existence of *ä* as a separate phoneme

in the case of the third syllable is also questionable. But in the fourth syllable the raising tendency of *ä* is no greater. Thus the degree of reduction of *ä* is not sufficient for it to be confused with mid-high vowels.

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МЕРИКЕ ПАРВЕ (Тарту)

АКУСТИКА КРАТКИХ МОНОФТОНГОВ В ЮЖНОЭСТОНСКОМ ВАСТСЕЛИЙНАСКОМ ГОВОРЕ

При описании системы гласных выруского диалекта, относящегося к южноэстонской группе, ряд затруднений вызывает характеристика двух негубных средних гласных (*e̯*, *i̯*) и гласных непервого слога (*e̯*, *i̯*). Акустический анализ гласных вастселийнаского говора показал, что по данным второго слога, *e̯* и *e̯* фонетически примерно одного качества, но данные третьего и четвертого слогов свидетельствуют об *e̯* как более заднем варианте *e*. В первом слоге *i̯* отличается от *e̯* прежде всего степенью высоты.

Качество встречающегося в основном в сетуском и вастселийнаском говорах *i̯* как шва-гласного оказалось в значительной мере варьирующим. Качество *i̯* колеблется в предполагаемых пределах — от *e̯* до *i*. При этом основной причиной колебаний является привычное произношение слова. Данные исследования подтверждают, что *i̯* не участвует в гармонии гласных. В общих чертах *i̯* можно определить как высокий передний гласный, однако на базе практических свойств предпочтительнее назвать его высоким шва-гласным варьирующего качества.

Вастселийнаские *u* и *o* — довольно близкие между собой звуки, и в первую очередь по данным второго слога. После второго слога почти по всей диалектной территории *o* заменяет *u* или промежуточный между ними звук.

Начиная с третьего слога все гласные выруского диалекта заметно редуцировались. Особенно велика степень редукции в случае *e̯* и *ä* при гармонии гласных. Можно предположить, что происшедшее в мульгиском диалекте звукоизменение *a*, *ä* > *e* (*ə*) в отдаленной перспективе распространится на ареал выруского диалекта.