The pure vowels (monophthongs) of Latgalian – spectral characteristics

1. Existing descriptions

To date, no acoustic description of Latgalian vowels has been published. One point of reference may be provided by descriptions of the Latvian system which is quite similar. (According to the official language policy in Latvia, Latgalian is recognized as a dialect of Latvian; cf. Nau 2011: 4.)

According to Nau (2011: 9–11), Latgalian has eleven pure vowels (monophthongs) and two vowel glides (diphthongs), with contrastive length (i.e. the physical length of a vowel has the power of distinguishing between words). The short pure vowels are /i ɨ ɛ æ a ɔ u/, while the long ones are /iː æː aː uː/. Within the long vowel subsystem, /iɛ uɔ/ are the counterparts of the short /ɛ ɔ/. The Latgalian system is thus similar to the Latvian system, with the exception of these two diphthongs – cognate Latvian words use long monophthongs. (It is worth noting that diphthongization of mid long vowels is also seen in other languages, less closely related to Latgalian, such as English.)

Fig. 1 shows traditional vowel quadrilaterals for Latgalian (proposed on the basis of Nau's [2011] transcription) and (for comparison) Polish.

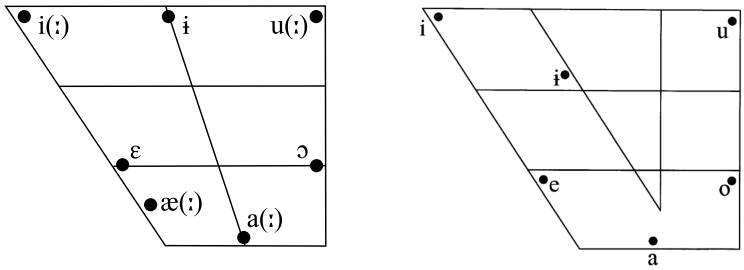

Fig. 1. Vowel quadrilaterals for Latgalian (proposed, left) and Polish (right, Jassem 2003: 105).

2. General characteristics

The quadrilateral shown in Fig. 1 takes as a point of departure the transcription proposed by Nau (2011), with the (somewhat simplistic) assumption that the qualities of the vowels correspond to the qualities traditionally recognized for the so-called "cardinal vowels" of the International Phonetic Association (IPA). One must realize that this is a simplification, and that IPA phonetic symbols are used in phonemic transcriptions of individual languages according to language-specific conventions which are not necessarily in line with the IPA's cardinal vowel system. Hence e.g. the difference in the positioning of the vowels marked /i/ for Latgalian and Polish in Fig. 1; in a strict interpretation of the IPA alphabet, [ɨ] is a high central vowel, and this quality is used in the Latgalian chart above. In turn, the positions of Latgalian /a/ and /aː/ is taken from descriptions of the Latvian system; strictly speaking, IPA [a] denotes a front vowel, not a central one. (Here, the convention is similar in the descriptions of Polish and many other languages.) Acoustic research makes it possible to determine more objectively whether the symbols used are appropriate. You can find out more about this from a separate document titled "Acoustic description of vowels" available from the project's website.

The question of contrastive use of vowel length is worth noting. Nau (2011) does comment on this in more detail, saying simply that Latgalian has long and short vowels. Standard descriptions of Latvian vowels (Grigorjevs 2012; Bond 1994) claim that the phonemic contrasts in pairs such as /i/–/iː/ etc. are mainly based on length and not on quality. This is different from Polish where vowel length is not distinctive (is not used to distinguish between words). It is also different from e.g. German or English where vowel contrasts are based both on quality and length; one could even say that quality is in fact more important than physical length (even though usually one talks informally about short and long vowels). An acoustic study may help decide this question.

3. Methods

Recordings from two Lagalian speakers (one female and one male) were selected from among the materials gathered for the present project. The recordings contained read speech for both speakers. Based on an orthographic transcript, all analysable pure vowels in stressed syllables located no closer than two syllables from the end of the intonational phrase were marked in Praat. Next, measurements of the first two formants were taken at the midpoint of each vowel. The resulting measurements, expressed in Hz (without normalization) are plotted below on standard charts showing the relationship between the first and second formant (F1 and F2). The charts are oriented so as to match the standard vowel quadrilateral (system origin at upper right, F1 on the Y axis). Thus, the charts can be interpreted (with some reservations) to show close vowels at the top and open vowels at the bottom; and front vowels on the left with back vowels on the right. You can find an introduction to acoustic description of vowels in a separate file available from the project's website.

4. Results

Speaker ML is a middle-aged female. The recording used for the measurements contained a fragment of a written story – i.e. read speech which was nonetheless quite expressive. The F1–F2 chart for individual measurements (Fig. 2, left) shows that the contrasts /i/–/iː/ and /a/–/aː/ are most probably indeed ones of length alone. The measurements in these two pairs form almost completely overlapping clusters, which indicates similar qualities, even though the long vowels are slightly more peripheral. (This may also apply to the pair /æ æː/, but here the number of words analysed was very small.) Less clear is the relationship between the vowels /u/ and /uː/; short /u/ is considerably centralized, suggesting /ʊ/ as an alternative transcription. The vowel /ɨ/ (which is shown as <y> on the chart) is generally central but tends towards front centralized – its F2 values are similar to those of /ɛ/ (marked as <e> on the chart); this, the symbol /ɪ/ would be equally appropriate. The vowels /æ æː/ are very open; due to the small number of measurements, no firm conclusions may be formulated, but the symbol /a/ would probably be more appropriate. The question of contrast between /æ æː/ and /a aː/ is also unclear. The evident distinction visible for Latvian (see below) is absent.

Speaker ID is a middle-aged male. His recording also contained read speech (epigrams), but it was somewhat less expressive than for ML. In general, the chart is similar: contrasts between the short and long vowels, with the exception of /u/ and /uː/, are most probably based mainly on length. The vowels /æ æː/ are again very low. Also relatively low are /u/ and /uː/, as well as /ɔ/. Short /u/ is significantly centralized. The vowel /ɨ/ is front centralized, like for ML; it could be written /ɪ/. The question of the contrast between /æ æː/ and /a aː/ cannot be settled on the basis of these data.

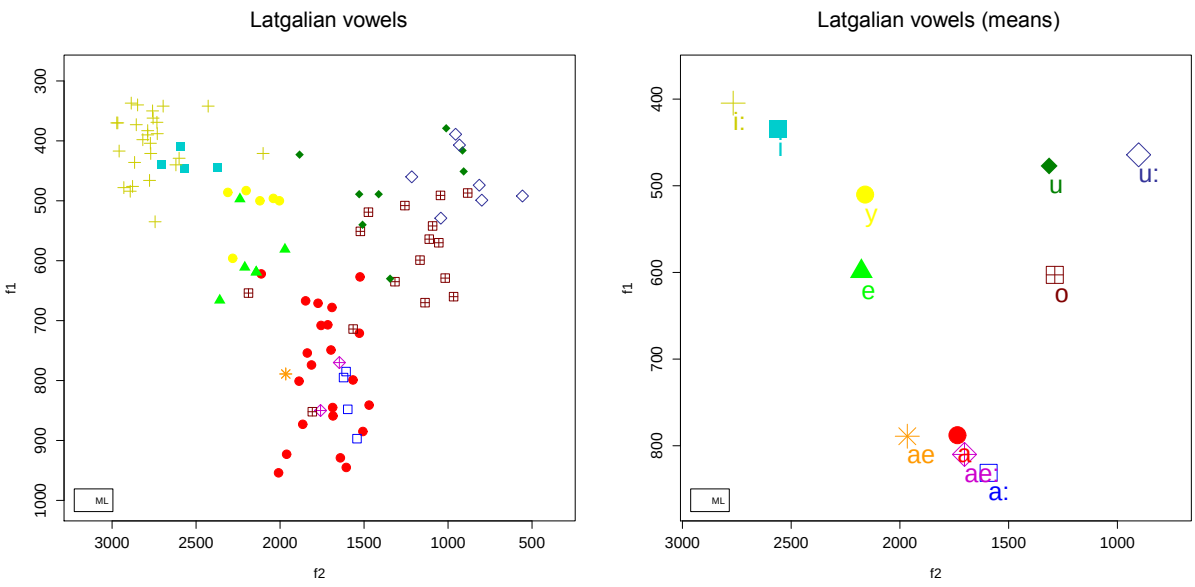

Fig. 2. Speaker ML's Latgalian vowels. Left: individual measurements, right – means for each vowel.
Transcription conventions: /ɨ/ = y; /ɛ/ = e; /ɔ/ = o; /æ/ = ae.

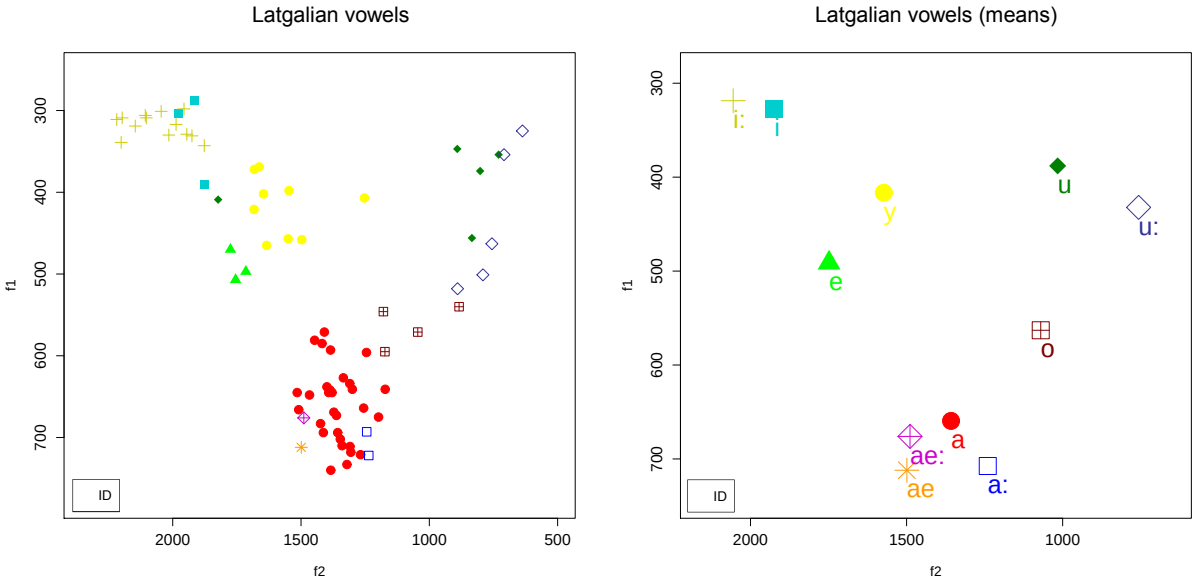

Fig. 3. Speaker ID's Latgalian vowels. Left: individual measurements, right – means for each vowel.
Transcription conventions: /ɨ/ = y; /ɛ/ = e; /ɔ/ = o; /æ/ = ae.

Based on these acoustic data, one can venture a traditional vowel quadrilateral that would correspond to acoustic facts better than the one proposed in Fig. 1 based exclusively on transcription. Fig. 4 shows the improved chart. Of course, this is still only a proposal that would have to be corroborated in further research.

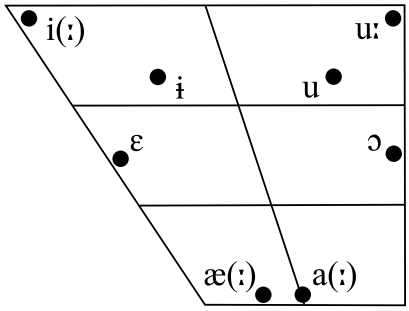

Fig. 4. An improved proposal for a Latgalian vowel quadrilateral.

In contrast to the other languages studied within the present project, Latgalian has a speech community that is sufficiently large to make further research not only appropriate but also feasible. The following questions will be worth investigating should any such research be undertaken:

(1) It should be determined whether there is a well-defined contrast between /a aː/ and /æ æː/. BAsed on the data presented above, no firm conclusions can be drawn due to the small number of measurements for /æ æː/. This question is interesting for two reasons. Firstly, the contrast is well visible in acoustic descriptions of Latvian vowels, and it is based on a difference in tongue position (front–back) rather than mouth opening: the Latvian counterpart of /a(ː)/ is more back than in Latgalian (Bond 1994 even uses – rightly – the symbol /ɑ/). This can be clearly seen in Fig. 5. (It should be noted that since both Latgalian and Latvian /æ(ː)/ are very low, the symbol /a(ː)/ could be very well used, and the situation would be similar to the contrast between /æ/ and /ɑː/ in modern British English, where the phoneme /æ/ has the phonetic quality of [a].) Secondly, any loss of contrast may be related to the bi- and multilingualism of Latgalian speakers. The main second language in this area is Russian which lacks a similar contrast – there is only one low vowel, /a/. This hypothesis has some validity for Latvian (cf. Bond et al. 2006).

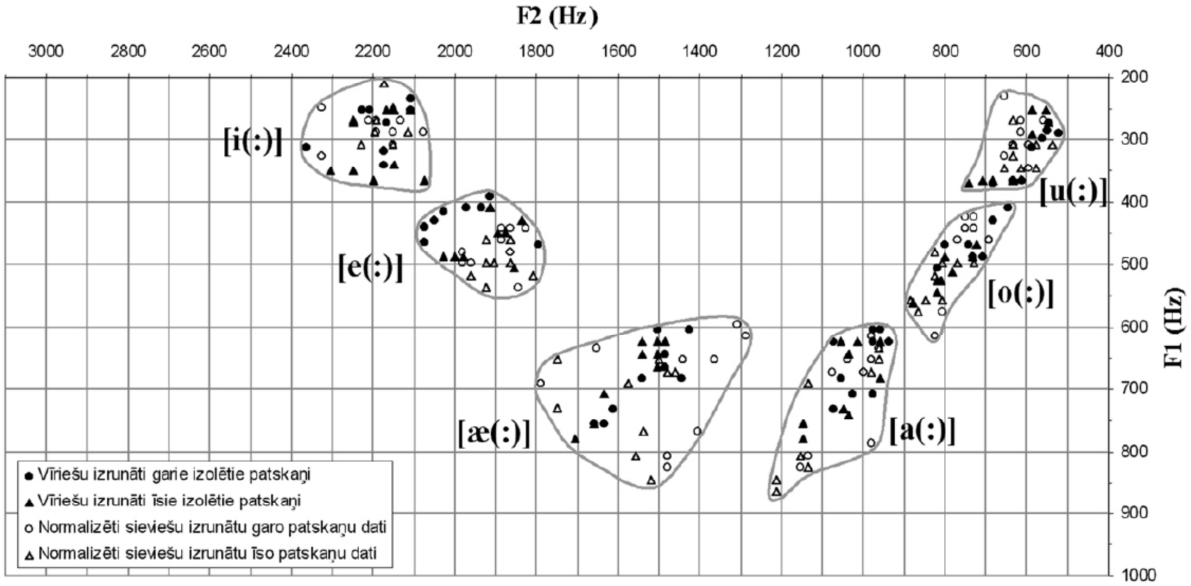

Fig. 5. Formant values of Latvian vowels (Grigorjevs 2012: 162).

(2) An attempt could be made to more definitely determine whether length is indeed the main carrier of contrast in pairs of „short" and „long" vowels. Everything seems to be pointing in that direction but perception experiments would be needed to decide the question.

(3) The relationship between short and long /u/ is interesting. This is the only pair for which quality (rather than length) can be suspected to contribute more to the contrast. It should be noted that recognizing a "separate" quality for short /u/ would result in a very symmetrical system (as can be seen in Fig. 4). Relatively symmetrical vowel systems are seen quite often cross-linguistically.

5. Examples

Sound	Spelling	Gloss	Audio
/i/	**i**zmat	'will throw away'	
/iː/	P**ī**terpilī	'in St. Petersburg'	
/ɨ/	z**y**na	'knows'	
/ɛ/	dz**e**du	'grandfather (acc.)'	
/æ/	z**e**mis	'earth (gen.)'	
/æː/	dz**ē**rvinis	'cranberry'	
/a/	b**a**zneicu	'church (acc.)'	
/aː/	s**ā**tu	'house'	
/ɔ/	p**o**šu	'alone' (acc.sg. or gen.pl.)	
/u/	Z**u**zanu	'Susan (acc.)'	
/uː/	k**ū**rpis	'shoes'	

6. Sources

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