Quarterly Progress and Status Report

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journal: Proceedings of Fonetik, TMH-QPSR
volume: 44
number: 1
year: 2002
pages: 049-052

http://www.speech.kth.se/qpsr
Long and short /a/ in Northern Swedish dialects

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Abstract

Quality and quantity characteristics of short and long /a/ were investigated in 19 Northern Swedish dialects. The main focus lay on differences in the tense-lax distinction, both within and across the long and short /a/ classes. Potential relations of quality and quantity were examined as well. The results show considerable dialectal variation with regard to tenseness, both within and across the two classes. Quality differences and durational differences might affect each other, but further influencing factors have to be taken into account as well.

Introduction

In Standard Swedish vowels, phonological quantity distinctions are combined with quality differences. Most long vowels are described as “tense”, while short vowels are “lax”.

Not much is known about the Swedish dialects in this respect. It is evident that the dialects show great differences in vowel qualities, see for example Pamp (1978). One can thus expect that also the characteristics of the tense-lax resp. long-short distinction vary. Experimental data of Johansson (1982) from six towns in Northern Sweden shows substantial differences in F1 and F2 values for several vowels.

This study examined the characteristics of long and short /a/ from 19 different locations in Northern Sweden. The study was performed within the project “SWEDIA 2000” (for a description of the project, see Bruce et al. (1999)). It is part of a sub-projekt within SWEDIA 2000 that aims to establish a typological description of phonological quantity in Swedish dialects.

Aims of the Study

As mentioned, Swedish long vowels are normally said to be “tense”, while short vowels are said to be “lax”. The Standard Swedish /a/ has also been classified in this way.

It has often been claimed that tense sounds are longer than lax sounds, but it is rather unclear how this intrinsic effect influences quantity distinctions. As a matter of fact, many languages show tense long vowels and lax short vowels, but typological investigations of vowel inventories (cf. e.g. Crothers(1978)) suggest that the long-tense, short-lax relationship is not universal.

Our aim in this study was to explore certain relationships between tenseness and quantity in Northern Swedish dialects. The height of F2 was used as an indicator of “tenseness”. According to the model of Wood (1975), a low F2 should indicate rather tense /a/ qualities, higher F2 values should indicate more lax /a/ qualities. Wood related these acoustic effects to changes in the low pharyngeal constriction of the vocal tract: moving the tongue forward increases the low pharyngeal constriction and raises F2. F1 shouldn’t be much affected by these changes, but it is known that rounding (or not spreading) the lips lowers F1. This is often found in Swedish long /a/ qualities, which normally have a lower F1 and F2 than their short counterparts (see Fant (1959), Johansson (1982)).

The study was first of all explorative. It was our aim to look for basic patterns in the data, providing guidelines for further research. Our main focus was on differences in vowel quality between the dialects, within and across the categories “long /a/” and “short /a/”. These differences were also studied in connection to durational values to find out whether quality differences had any relationship to quantity differences.

Method

The 19 studied dialects cover a considerable part of Northern Sweden. The locations are given in table 1, sorted by provinces (Swedish “landskap”). The provinces are roughly listed from north to south.
Table 1: locations of recordings, sorted by provinces (“landskap”). The short forms in brackets are used for figure 1 and 2.

<table>
<thead>
<tr>
<th>“Landskap”</th>
<th>Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lappland</td>
<td>Arjeplog, Vilhelmina</td>
</tr>
<tr>
<td>Norrbotten</td>
<td>Nederkalix (Ne), Piteå</td>
</tr>
<tr>
<td>Västerbotten</td>
<td>Nysättra (Ny), Burträsk (Bu)</td>
</tr>
<tr>
<td>Österbotten</td>
<td>Närpes (Nä), Vörå (Vö)</td>
</tr>
<tr>
<td>Jämtland</td>
<td>Are, Åspås, Ragunda</td>
</tr>
<tr>
<td>Angermanland</td>
<td>Anundsjö, Bjurholm</td>
</tr>
<tr>
<td>Härjedalen</td>
<td>Vemdalen (Ve)</td>
</tr>
<tr>
<td>Medelpad</td>
<td>Indal, Torp</td>
</tr>
<tr>
<td>Hälsingland</td>
<td>Skog</td>
</tr>
<tr>
<td>Gästrikland</td>
<td>Ockelbo, Årsunda</td>
</tr>
</tbody>
</table>

Each dialect was represented by three older male speakers. The long /a/ sounds were uttered in the word “tak” (“roof”), the short ones in the word “tack” (“thank you”). Each word was uttered five times in a row by each speaker. Thus there were normally fifteen versions of the short and fifteen versions of the long vowel for each dialect. The segmentation followed principles described in Schaeffler et al. (2002). The durational values were extracted from the segmentation. Formant extraction was done with the programme “PRAAT”.

Results

The qualities of long and short /a/

Figure 1 displays the mean values in an F1-F2 chart for short and long /a/ for each dialect.

It had been decided to focus on overall tendencies and extreme cases instead of attaching too much importance to each individual mean value, as there were not always 15 tokens for each category and dialect available. Besides, the standard deviation was rather high in some cases.

Dialects showing notable patterns have been labelled. Figure 1 reveals that most dialects show a quality difference for the long and short segments. The F2 values - and in many cases also the F1 values – are considerably lower for the long versions, thus showing a similar relationship as Standard Swedish does.

This relationship is not exceptionless, though. For the dialect of Vemdalen, the long and short qualities lie very closely together, and both qualities resemble the tense quality described for Standard Swedish.

There is a considerable variation within the two categories. Furthermore, both categories suggest a positive correlation between F1 and F2.

One group of dialects (cf. Vörå, Nysättra and Närpes) tends towards a rather high F2 for long vowels, resembling short vowels in other dialects.

Quality differences and durational differences

For each dialect, the linear distance between the short and long vowel means on the F1/F2 plane (the so-called “euclidean distance”) was chosen as an estimate of the difference in quality. For the durational differences, the V:/V ratio of the mean durations was calculated.

Figure 2 shows the euclidean distance for each dialect (y-axis), related to the V:/V-ratio on the x-axis. As the durational values varied to a certain extent, not too much importance should be attached to minor differences.

There is a large group of dialects which seems to vary between approximately 200 and 400 on the distance scale. One dialect, Burträsk, shows a much greater distance, while others

1 The province “Österbotten” is a Swedish-speaking province in North-West-Finland.

2 For example Fant (1959, p. 64) reports 582 Hz (F1) and 940 Hz (F2) for Standard Swedish long /a/ (male speakers).

3 It seems to be more common to calculate the V/V ratio in this context. But as the V:/V ratio increases when the numerator (V:) increases or the denominator (V) decreases, we judged this calculation to be more suitable for the current purpose.
(Närpes, Vörå and especially Vemdalen) seem to have considerably smaller distances.

Concerning the possibility of a trading relationship between the quality and the durational ratios, our data do not permit a general interpretation. The most extreme cases, Burträsk with a strong quality difference and Vemdalen with a weak – if even existing – quality difference, seem to differ in a direction one might expect: a stronger quality difference goes along with a minor durational difference and vice versa. The patterns of Närpes and Vörå, possibly also Nederkalix, could point in this direction as well. But the less extreme values do not yet provide much evidence for such a connection.

There are two dialects with exceptionally high durational ratios: Nederkalix and Vörå. In other studies (cf. Schaeffler et al. (2002), Strangert and Wretling (1999)) we could show that Vörå has a V:C: quantity pattern besides the two usual Swedish V:C and VC: patterns. The exceptionally high V:/V ratio (see figure 2) is presumably a reflection of this. It is interesting to note that Nederkalix shows a similarly high V:/V ratio without a very low quality distinction.

Närpes, on the other hand, resembles Vörå in having a rather low quality distinction but its V:/V ratio seems to be within the range of the other dialects.

**Discussion**

Taking the results provided by the absolute formant values together with the qualitative distances and the durational ratios, the following can be concluded: Many dialects in this sample have a relationship between long /a/ and short /a/ that resembles Standard Swedish. They show a lower F2, and sometimes also a lower F1 for the long vowels. There seems to be some variation in this pattern: a group of dialects shows remarkable “lax” long vowels. Two of these (Vörå and Närpes) have also a low quality difference.

The dialect of Vemdalen obviously breaks the rule of combining short with lax and long with tense (see above). An earlier investigation of this dialect (Wretling et al. (2002)) showed regularly preaspiration with short vowels (also in the word “tack”). The preaspiration could possibly be a complement for the quantity distinction in this case.

A further pattern is provided by Burträsk. Its qualitative difference is by far the greatest of all differences (see figure 2). The quantity distinction is rather low, but this should be verified with more data.

Dialectological descriptions of the dialects of Västerbotten may provide an explanation for the extraordinary quality difference in Burträsk: Pamp (1978, cf. p. 137) mentions that historical sound changes led to two different long /a/ qualities in certain dialects of Västerbotten. In Burträsk there could thus exist three different low vowels (two long ones and a short one) instead of two. This, in turn, might be the reason for extending the quality difference between the two vowels investigated in this study.

**Conclusion**

The tendencies described above should be verified with more data from the same dialects. Nevertheless, the tentative results so far point out the direction for our further research.

Several aspects of the observed patterns suggest interesting questions and hypotheses: The tenseness variations within the classes could provide valuable answers concerning the influence of tenseness on duration: Comparisons between the classes cannot clarify which part of the durational difference is due to “tenseness” and which is due to “quantity”, but comparisons between short /a/-qualities of different dialects could show whether – and to what extent – tenseness influences duration.

There is yet another aspect of the relationship between tenseness and duration. Hadding-Koch and Abramson (1964) have shown for Standard Swedish short-long vowel pairs that listeners rely more on durational cues for some vowel pairs and more on quality cues for at least one

![Figure 2: Euclidean distance (y-axis) and V:/V-ratio (x-axis) for the means of each dialect](image-url)
This vowel pair showed also quite low durational differences. Hadding-Koch and Abramson (1964, cf. p. 105) suggest that the cue might have shifted from quantity to quality for this vowel pair, resulting in a lessened requirement of maintaining a clear durational difference.

This fits well in the context of the “theory of adaptive dispersion”. Engstrand and Krull (1994) provide the following description of the theory: “...the speaker uses only the amount of articulatory precision necessary to guarantee the listener’s lexical access in any given situation...” (p. 80).

If this principle holds, we could expect similar relationships for the quantity distinction in the Swedish dialects: those with a greater quality difference between long and short vowels should show less stable quantity distinctions than those with minor quality differences.

Our own data points slightly towards this direction (see above), but there are certainly a number of factors which should be taken into account in this context:

Firstly, the absolute durational difference between classes might not be the only reflection of this effect. Thus one should also test the maintenance of durational differences under different circumstances, for example in spontaneous speech. Cross-language comparisons have already shown that languages differ in this respect (see Engstrand and Krull (1994)).

Secondly, the quality vs. quantity contrast has to be seen in the light of the vowel system of a dialect. As mentioned before, the extreme quality contrast found in the dialect of Burträsk might arise from a third vowel quality in the same part of the articulatory space. This adds further constraints to the system which must not be neglected. The same applies to the quantity contrasts: The high quantity contrast found in Vörä is presumably not (only) due to the low quality contrast, but is also a consequence of the V:C: quantity category found in this dialect.

Our findings suggest rather complex relationships between quantity and quality in the Swedish dialects. The integration of the mentioned different factors will be a prerequisite for a quantity typology of Swedish dialects.

Acknowledgements

This work was supported by a grant from The Bank of Sweden Tercentenary Foundation.

References


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4 see also Lindblom (1987)