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## An acoustic study of the Estonian Swedish lateral [ɭ]

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### Abstract

This pilot study investigates the Estonian Swedish (ES) voiceless lateral [ɭ], which is rare among the Scandinavian dialects and is a development mainly of historic /sl/ clusters. Six elderly ES speakers were recorded, and the phonological and phonetic (duration, relative intensity) properties of [ɭ] studied and compared to other ES consonants and [ɭ] in Icelandic. The results suggest that ES [ɭ] is a single consonant rather than a consonant cluster. It behaves much like initial [s] in duration, although a tendency to anticipatory voicing in its latter part may point to its ‘approximant’ status. Furthermore, ES [ɭ] is similar in intensity to the Icelandic [ɭ]. It has a phonemic status and it can be both short and long. Laterals as well as other phonetic aspects of ES are in urgent need of further research.

### Introduction

Until the Soviet Russian occupation at the end of WWII there was a substantial Swedish speaking population in Estonia which had settled there in medieval times from the 13th century onwards. Swedish was concentrated mainly on islands off the west coast of Estonia and on the north-west corner of the Estonian mainland. Nowadays, Estonian Swedish (ES) survives only in a small community of elderly emigrants to Sweden and a tiny handful of equally elderly speakers in Estonia.

The sound system of ES has so far mainly been studied in the descriptive framework of dialect research (e.g. E. Lagman, 1979). The only two existing acoustic phonetic studies are an investigation of ES close vowels by Asu,

Schötz and Kügler (2009), and a study of the prosody of compounds by Schötz and Asu (2013). Yet, the ES sound system offers plenty of interesting and unique material for acoustic phonetic study. One of such is the lateral system that will be tackled here.

According to H. Lagman (1971: 175–188), ES has a fairly large number of laterals consisting of the following:

- (1) [l]: a voiced dental or alveolar common to all Scandinavian languages, in most contexts, e.g. *lag* (team) and *vall* (ley, mound),
- (2) [ɭ]: a voiced supradental (post alveolar) in the context /t/ + /l/, like many Swedish and Norwegian dialects (except most with [ɣ]; and Finland Swedish), e.g. *farligheter* [fa:ɭhaitə(t)] (hazards),
- (3) [ɽ]: a voiced retroflex flap in some contexts, as in some Swedish and Norwegian dialects, e.g. *blå* [brɔ:] (blue) and *nagel* [na:ɽ] (nail),
- (4) [ɭ]: a voiceless alveolar fricative, used sometimes in the (historic) contexts /sl-/ and /tl-/, which is more rare among the Scandinavian dialects, e.g. *slag* [ʃo:] (stroke, blow) and *vassle* [vaɭ:] (whey).

The latter two constitute major developments in the lateral system, one common to many dialects of Swedish and Norwegian, and the other idiosyncratic, or at least very rare. The retroflex flap [ɽ], often referred to as ‘cacuminal’ or ‘thick’ /l/, is found in initial clusters (e.g. *flytta* [fɽtɛtɛ] or [fɽrtɛ:] ‘to move’, and *blöt* [brɔt] ‘wet’), medially in some words (e.g. *mala* [mɔɽɐ] ‘to grind’), and finally after certain consonants (e.g. *fågel* [fɔ:ɽ] ‘bird’, and *körhjul* [ke:rjɔ:ɽ] ‘bicycle’). Swedish

and Norwegian [ɾ] is thought to have first arisen as a realisation of [rð] sequences in Old Norse in words such as *garðr* ‘court(yard)’ and *borð* ‘board’, and to have spread to /l/ in certain contexts. Tiberg (1962), though, claims that [ɾ] in Estonian Swedish did not originate from [rð] sequences.

The second development, the lateral voiceless fricative [ɬ] from historic sequences of /s/+l/, occurs in words such as *slipp* [ɬɪp:] ‘cloth/rag’ and *vassle* [vɑ:ɬ] ‘whey’. This sound is used consistently across our speakers, though with realisational variation. It is very rare in Swedish varieties, being (to our knowledge) found elsewhere only in the Älvdalska and Orsamål dialects of Dalarna in the west of Sweden. It may also have been present in the Gammalsvenskby dialect found in Ukraine before coming under pressure from more standard forms.

The purpose of the present paper is to quantify the phonetic properties of ES [ɬ]. Specifically, we wanted to answer the following questions: (a) Is [ɬ] still a complex onset, i.e. a nostalgic [sl-] consonant cluster? An initial auditory analysis revealed that many tokens, especially in Rickul ES, have [ɬ], and some tokens showed evidence of a voiceless vocalic portion before the lateral friction, i.e. [hɬ]. Does this suggest a *phonological* sequence, assimilated for manner but not voicing? (b) if [ɬ(l)] is not a cluster, has the original [sl-] become a lateralised [s], or has it become a devoiced [l]? and (c) Is it an approximant [ɬ] or a fricative [ɬ]? An additional aim was to hypothesise the historical origin of [ɬ].

### Material and method

Speakers for the present study represent the Nuckö-Rickul-Ormsö variety of Estonian Swedish which forms the largest dialect area of Estonian Swedish. As can be seen from Figure 1 Nuckö and Rickul lie in the north-west of the Estonian mainland and Ormsö is a small island close to Nuckö. Three elderly speakers of each of Rickul and

Ormsö ES were recorded in Stockholm in 2012. All speakers have been resident in Stockholm since the 1940s. The main speech material was compiled with the help of the members of the Estonian Swedish community *Svenska Odlingens Vänner* (SOV) in Stockholm and contained 90 words, most of which included liquid consonants in various positions. The words were read in the carrier sentence ‘jag sa \_\_\_ igen’ (I said \_\_\_ again). The speakers were asked to produce three repetitions of each sentence. In this study we focussed on five words with initial [ɬ(l)]: *slag*, *slita*, *slipp* (=‘rag’), *slå*, and *slak*, eleven words with initial [f]: *fågel*, *falla*, *fel*, *föl*, *föll*, *fall*, *fil*, *fall*, *fylla*, *fåll*, *fittla* (=‘tickle’), and six words with initial [ft]: *flytta*, *flaska*, *flat*, *fläta*, *flämta*, *flicka*.



Figure 1. The main dialect areas of Estonian Swedish in the 1930s (from E. Lagman 1979: 2).

As additional materials an elicited word list adapted from the word list used in the Swedish dialect project SweDia 2000 (Bruce et al., 1999) was used. These materials were recorded in Stockholm in 2009 with four Rickul speakers (of whom three were the same as the ones recorded in 2012). From this corpus, we selected the following words: [ɬ]: *läs*, *lus*, *lös*, *lat*, *lott*, *lass*, *ludd*, *lett*, and [s]: *särk*, *såll*, *saker*, *sur* ([sø:ɪ], used instead of *söt* for /ø:/).

The target words were manually segmented in Praat (Boersma & Weenink, 2014), and durations obtained of the initial singleton consonant or consonant cluster. In the case of [ɬ] we also measured the duration of its potential components: [(h)ɬ] ([ɬ]). Figure 2 shows an example of an [ɬ] by one Rickul speaker.

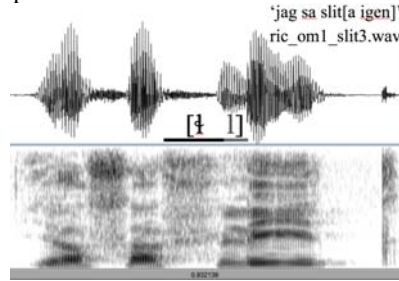


Figure 2. Waveform and spectrogram of [ɬ] for one Rickul speaker.

## Results

### Phonetic properties of [ɬ]

Mean durations of [(h)ɬ] ([ɬ]) for Rickul and Ormsö ES are shown in Figure 3.

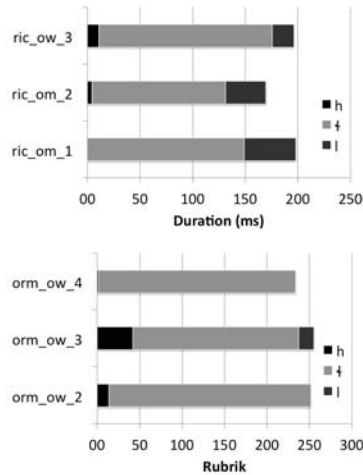


Figure 3. Mean duration of the components of [(h)ɬ] ([ɬ]) for three Rickul (top) and three Ormsö (bottom) speakers.

The Rickul speakers on average produce a largely voiceless lateral, which is often voiced towards the end. Two of the Ormsö speakers produce completely

voiceless [ɬ], while one speaker has shorter, and less frequent voicing at the end of the lateral. There is some tendency towards an [h] onset to [ɬ] in both dialects, which may be interpreted as pre-aspiration or anticipatory devoicing of the vowel.

### Phonological and phonetic status of [ɬ]

#### Is [ɬ] a singleton or consonant cluster?

Several of the [ɬ] tokens are realised as [(h)ɬ], which is unlike [ɬ] in other languages, like e.g. Zulu and Welsh (Ladefoged & Maddieson 1996; Mark Jones, *pers. communication*). The duration is also rather long for a singleton (150-250 ms, see Figure 3). This would suggest that [ɬ] is phonologically a consonant cluster. However, two of the Ormsö speakers lack voicing, and only one Rickul speaker has no fully voiceless tokens, which would indicate that [ɬ] is phonologically a singleton. Figure 4 shows mean durations of the consonant cluster [fɾ], the two singleton consonants [s] and [f], and the possible consonant cluster [(h)ɬ].

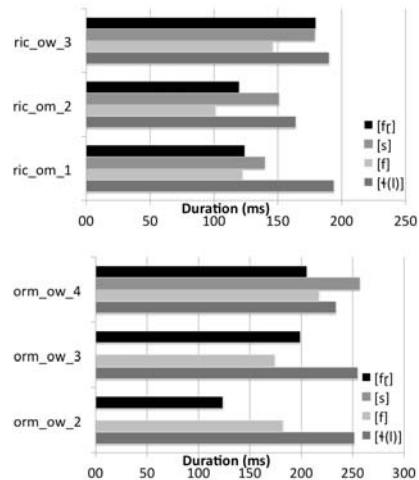


Figure 4. Mean duration of initial [(h)ɬ], [fɾ], [s] and [f] for three Rickul (top) and three Ormsö (bottom) speakers.

The results for [s] should, however, be seen as tentative since they are based on only three tokens of each speaker, and

as two of the Ormsö speakers did not produce any words with initial [s]. In both Rickul and Ormsö ES, [s] can be as long as [h(l)], suggesting that [h(l)] need not be a cluster. However, durational compensation means that clusters need not be longer than singletons, so the question is still open, although the evidence tends against the consonant cluster structure of /sl-/.

*Is [h(l)] as a lateral [s] or voiceless [ʃ]?*

If [h(l)] is not a nostalgic reflex of the [sl-] consonant cluster but a singleton, should we regard it as a lateral [s], or rather as a voiceless [ʃ]? We compared the duration of [h(l)] to that of [l], and [s] in initial positions of the words taken from the word list materials read by the same speakers of Rickul ES, taken from the word list material. The duration for four Rickul speakers are shown in Figure 5.

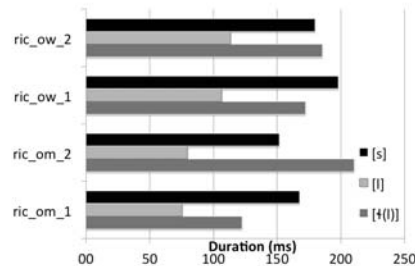


Figure 5. Mean duration of initial [h(l)], [l] and [s] for four Rickul speakers.

The duration of [h(l)] is clearly more similar to the duration of [s] than that of [l], indicating that durationally, [h(l)] may be some kind of lateralised [s].

*Is it a [h] or a [ʃ]?*

The difference between [h] and [ʃ] is arguably that devoicing an approximant (e.g. [ʃ]) needs only enough glottal opening to stop voicing, and gives minimal local friction, whereas a voiceless fricative (e.g. [h]) needs wide opening, and narrower oral constriction, to produce significant local friction. Ladefoged and Maddieson *SoWL* (1996: 199) imply that anticipatory

voicing is characteristic of [ʃ] (and some voiceless nasals) rather than [h].

On this basis the ES voiceless lateral shows signs of anticipatory voicing, i.e. of being an approximant, at least in Rickul ES. However, impressionistically the strength of the friction suggests ‘fricative’.

We compared intensity ratios between the lateral and the following vowel in ES and Icelandic, which has an approximant /l/, often realised as [h], as well as a fricative [s]. Figure 6 shows that the mean intensity of the following vowel relative to [h] is very similar in Ormsö ES and Icelandic, suggesting that [h] may have approximant status.

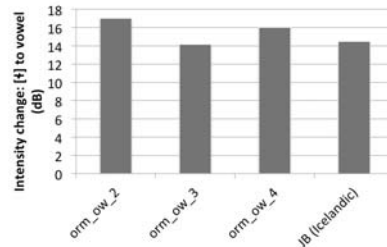


Figure 6. Mean intensity (dB) of the following vowel relative to [h] for three Ormsö speakers and one speaker of Icelandic.

*Is [h(l)] a phoneme?*

Figure 7 shows the waveform and spectrogram of an example minimal pair in ES: /val:/ – /va:l:/.

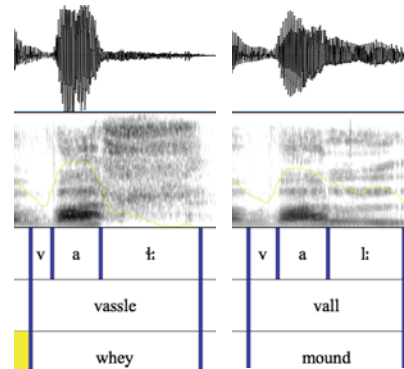


Figure 7. Waveform and spectrogram of the Estonian Swedish minimal pair /val:/ – /va:l:/.

The existence of minimal pairs in our material, e.g. /la:/ ‘lag’ (team) – /la:/ ‘slå’ (hit, blow) and /val:/ ‘vall’ (mound) – /val:/ ‘vassle’ (whey) suggests that [ɬ] has a phonemic status. Moreover, it can be short [ɬ] as in e.g. [la:] as well as long [l:] as in e.g. [val:].

### Historical origin of [ɬ]

ES has undoubtedly historically been influenced by its closest contact language Estonian (e.g. Danell, 1905: 34, ref. in H. Lagman, 1971: 13). As Estonian prefers simple onsets, it is tempting to hypothesize that somehow the emergence of [ɬ] for [sl-] might have to do with Estonian influence. On the other hand, the sound is not present in the Estonian phonemic inventory, and the hypothesis is less persuasive than it might be given that we are not aware of any other processes of cluster simplification in ES like those evident in borrowings into Estonian from Germanic languages.

Also for this solution to generalize, dialects like Älvsdalska, – one of the few other Swedish dialects with [ɬ] – would have had to be in contact with e.g. Sami, which is not self-evidently likely in the relevant timescale.

It is therefore more likely that the seeds of [ɬ] may be inherent in variation in [sl-] more generally. To test this, a search was made of the DyViS database (see Nolan et al., 2009). Perhaps surprisingly, in approximately 25 hours of interviews the interviewees provided only 16 examples of word-initial /sl-/. Of these, all had identifiable voiceless lateral events following the [s], and nearly half (7/16) lacked a subsequent identifiable voiced lateral episode. This suggests that a voiceless lateral is latent in any [sl-] sequence.

### Discussion and future work

The results of this pilot study suggest that [ɬ] is a phoneme in ES, which can be realised as [ɬ], [lɬ], or [hlɬ] in the Rickul and Ormsö sub-varieties. Moreover, the duration and intensity measurements suggest that [ɬ] is a singleton

consonant rather than a consonant cluster [sl-], which behaves like an [s] in duration, but like a [l] in intensity, suggesting that it has approximant status. However, three speakers of each sub-variety are too few for any broader generalisations. Remaining questions may be answered by including a larger number of speakers and other sub-varieties of ES. In the project Estonian Swedish Language Structure we intend to record additional speakers of different ES dialects and also use previously recorded materials to further investigate the phonetic and phonological properties of ES.

### Conclusions

Estonian Swedish has a rich and unusual set of liquids, as shown in Figure 8.



Figure 8. Estonian Swedish liquids.

The most unusual liquid among Scandinavian languages is the voiceless lateral [ɬ]. Although some questions remain, in ES [ɬ] appears to be

- a singleton consonant rather than a nostalgic reflex of a cluster,
- a voiceless fricative in duration, behaving much like initial [s], although the partial final voicing may point to ‘approximant’ status, similar to Icelandic voiceless laterals,
- optionally anticipatorily voiced,
- a phoneme, as it appears both short and long in minimal pairs like /la:/ – /la:/ and /val:/ – /val:/.

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