The realisation of sj- and tj-sounds in Estonian Swedish: some preliminary results

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Abstract

The aim of the present study is to cast some light on the realisation of sj- and tj-sounds (/ɧ/ and /ɕ/) in Estonian Swedish. These sounds are said not to occur in this variety of Swedish, or to have a different realisation as compared to Standard Swedish (Lagman, 1979). Our analysis, based on repetitions of elicited words produced by five elderly speakers of Estonian Swedish, shows that sj- and tj-sounds are mainly pronounced the way they are spelt (e.g. tjock [tjɔk:] (thick, fat) or stjärna [stja:ɳ] (star)). There appears, however, some variation in the realisation of the sj-sound, which depending on the word and position in the word can also be pronounced as a retroflex fricative [ʂ] or a palatal fricative [ç]or [ɕ].

Introduction

This study presents a small-scale investigation of sj- and tj-sounds in Estonian Swedish – a highly endangered variety of Swedish that until WWII was spoken on the islands and North-Western coastal areas of Estonia, but is currently surviving only in the speech of a community of elderly emigrants to Sweden, and a handful of speakers in Estonia.

The acoustic characteristics of the Estonian Swedish sound system are still very little studied (except for a study of close vowels by Asu et al. (2009), and two studies of the lateral fricative: Schötz et al. (2014) and Asu et al. (2015)). The descriptions found in the older accounts of dialectal research are often rather general or even hard to interpret. According to Lagman (1979) tj- and Standard Swedish sj-sound do not occur in Estonian Swedish; thus, the word *tjäna* (to earn, to serve) would be pronounced with a /t/ followed by what he describes as an apico-alveolar fricative *sj* (*spetsigt sj-ljud*), and the word *sjö* (lake) would be pronounced with the apico-alveolar fricative (Lagman, 1979:11). This description is intriguing, as on the one hand it claims that the tj-sound is absent from the phonological inventory, whereas on the other hand it suggests that the Estonian Swedish realisation of this sound is an affricate (which is a common realisation e.g. in Finland Swedish (Garlén, 1988)). Lagman's description also suggests that the Estonian Swedish sj-sound is realised differently from Standard Swedish.

For the Swedish sj-sound, which has over 30 different spellings (Garlén, 1988), two main variants are distinguished: [ɧ] (or [ʃʰ]) and [ʂ] (or [ʃ]) which are respectively referred to as 'dark' (the dorsal velar variant, commonly used in the Southern Standard Swedish), and 'light' (the predorsal apical variant, used mainly in the northern varieties) (Elert, 2000; Malmberg, 1971). Next to these variants also [ɕ] occurs mainly in Finland Swedish (Leinonen, 2004: 60). There are, however, many more allophones along the continuum between the two main variants depending on the regional, cultural and social aspects, as well as the age and sex of the speakers (Lindblad, 1980). The so called 'light' variant [ʂ] is sometimes considered to have higher prestige, occurring more often in the speech of women and higher social classes (Bruce, 2010: 166) and also read speech (Lindblad, 1980: 10); [ʂ] is more common among older generations and [ɧ] among younger ones.

Likewise, the orthography, phonetic realisation and transcription of the tj-sound varies, although not as widely as for the sj-sound. The most common spellings are *tj, k* and *kj*. The prevailing realisation, typical of the Central Swedish standard variety, is an alveolo-palatal fricative [ɕ], which in the older literature has also been transcribed with the IPA symbol for the dorso-(pre)palatal sibilant [ç] (e.g. Elert,

2000). In some areas of Sweden (South-Eastern and Northern Sweden) the tj-sound can be realised as a prepalatal affricate [cɕ], which occurs more frequently in the speech of elderly speakers (Elert, 2000). An affricate [t͡ɕ] or [t͡ʃ] is also a common realisation in Finland Swedish (Garlén, 1988: 71).

The Swedish sj- and tj-sounds, and fricatives on the whole, are notoriously difficult to perceive and describe acoustically (e.g. Lindblad, 1980). In addition to huge dialectal differences this is due to the large interspeaker variation in the realisation of these sounds, which has been explained by the varying shapes and sizes of the speakers' oral cavity and front tongue (e.g. an EPG analysis by Lindblad and Lundqvist (1995)).

The aim of the current study is to analyse the phonetic realisation and variation in the pronunciation of sj- and tj-sounds in Estonian Swedish using a set of elicited isolated words. Following Lagman (1979) we would expect words with these sounds to be pronounced according to their orthography; the tj-sound could also be realised as an affricate.

Materials and method

Speakers and speech data

The data was recorded in 2009 in Stockholm from four elderly speakers of Estonian Swedish (2 women and 2 men), and in 2012 in Nuckö (Noarootsi), Estonia, from one elderly female. All speakers represent the Nuckö-Rickul variety – the largest dialectal area of Estonian Swedish. The speakers recorded in Stockholm had arrived in Sweden in the mid 1940s as youngsters and were between 80 and 86 years old at the time of the recording. They were recorded in a quiet setting in Stockholm using a Sony portable DAT recorder TCD-D8 and Sony tie-pin type condenser microphones ECM-T140. The speaker recorded in Estonia was 77 years old at the time of the recording. The recording was conducted at her home using a Roland R-09HR WAVE/MP3 recorder with a Sony tie-pin type condenser microphone ECM-T140.

As materials, a word list adapted from the word list of the SweDia 2000 database was used (slightly different word lists were used in the two recording sessions). The words were not read but elicited, and the subjects were asked to repeat each word at least three times. The data recorded in Stockholm consists of seven words where /ɧ/ or /ɕ/ appear word-initially in other varieties of Swedish (four words with /ɧ/ and three with /ɕ/: *chaufför* (chauffeur), *sjö* (lake), *stjärna* (star), *skjorta* (shirt), *körhjul* (bicycle), *kälke* (sleigh), *tjock* (thick, fat)), and the data from Nuckö comprises six such words including five with /ɧ/ and one with /ɕ/ (*ske/r* (happen/s), *sjunga* (sing), *sjö* (lake), *stjärna* (star), *skjorta* (shirt), *tjuv* (thief)). Additionally, the dataset recorded in Stockholm included three words where variants of /ɧ/ would appear word-finally or medially in Estonian Swedish: *lös* (loose) pronounced with a diphthong [au], *Pauls (gård)* (Paul's (farm)) pronounced as a disyllabic word, and *nors* (European smelt, a species of fish), an example of supradental assimilation.

For a comparison with Central Swedish the word list data from the SweDia 2000 database (Bruce et al., 1999) was used. The data comprised three repetitions of two words containing /ɧ/ and /ɕ/: *själen* (the soul) and *käke* (jaw), recorded in a quiet home setting with a Sony portable DAT recorder TCD-D8 and Sony tie-pin type condenser microphones ECM-T140. Three elderly women and three elderly men from the location Kårsta near Stockholm were selected from the SweDia 2000 database. The speakers were between 64 and 74 years old (mean age 67).

Analysis

The data was manually labelled, segmented, normalised for intensity, and analysed using Praat (Boersma & Weenink, 2015). All realisations of /ɧ/ and /ɕ/ were first classified based on auditory analysis and visual examination of spectrograms.

Three measures were taken of all the sibilant sounds: duration, mean relative intensity and the centre of gravity (COG) of the DFT spectrum (the so-called 'spectral centroid'). Duration and mean relative intensity were obtained using a Praat script. In order to measure the centre of gravity, the steady state part of the sibilants was first manually segmented, which usually meant that about 10-15 ms were excluded from the beginning as well as from the end of the sound to minimise the influence of coarticulation. Then a Praat script was run. Mean values were calculated for all the measures for the different sibilant realisations in different words.

Results and discussion

Phonetic realisation of sj- and tj-sounds

Table 1 presents the different realisations of sj- and tj-sounds in the test-words. It appears (as expected) that the tj-sound is always realised the way it is spelt. Thus, in the words *tjuv* and *tjock* it is pronounced with [tj], and in the words *körhjul* and *kälke* it is realised without velar softening as [k] for all speakers. Contrary to our expectations there were no affricate realisations in the data.

Table 1. The phonetic realisation of sj- and tj-sounds in the Estonian Swedish data. The total number of tokens for each word is shown in the brackets.

Test word	Phonetic realisation
chaufför (12)	ʂ
sjö (16)	sj, ç, ɕ
stjärna (13)	stj
skjorta (14)	skj
ske/r (3)	sk
sjunga (3)	sj
lös (21)	ʂ
nors (12)	ʂ
Pauls (15)	ʂ
tjock (12)	tj
tjuv (3)	tj
körhjul (9)	k
kälke (15)	k

For the sj-sound there was more variation in the productions. In most words with an initial sj-sound, the pronunciation matched the orthography: *stjärna* was pronounced with [stj] and *skjorta* with [skj] for all speakers. Also, the word *ske/r* was realised with [sk] and *sjunga* with [sj].

The sibilant in the word *chaufför* was in all cases produced as a retroflex fricative [ʂ]. The realisations of the word *sjö* varied somewhat: in addition to the most common [sj] (10 tokens), also a palatal fricative [ç] and an alveolo-palatal fricative [ɕ] appeared in the pronunciation of two speakers. The palatal fricative realisation might seem surprising at first glance, but becomes more logical if viewed as a variant of [ʂj] that has taken the place of articulation from the second element [j] and the voicing from the first element [s]. More speakers and comparable test words are needed to see if this indeed is the case rather than merely a speaker-specific variation, or if the alveolo-palatal fricative variant similar to the realisation of sj-sound in Finland Swedish (cf. Leinonen 2004) is more common also in Estonian Swedish.

In addition to word-initial sibilants the data of the four speakers included three words where the fricative appeared word-finally. In all these instances it was produced with an [ʂ]: *lös* [l͡auʃ], *Pauls* [poːʃa] and *nors* [nɔʂ]. The latter is an example of supradentalisation (retroflexion), i.e. the assimilation of /r/ and /s/ into [ʂ] found in most Swedish dialects (except in South and Finland Swedish). It is interesting that Estonian Swedish differs in this respect from Finland Swedish.

Acoustic measures

Table 2 presents the average measures of duration, mean intensity and COG for the different variants of fricative sounds found in the data. The figures should be interpreted with caution, as the total number of tokens is small. Nevertheless, some general observations can be made on the basis of these results. The best measure for differentiating between the various fricative sounds seems to be the centre of gravity. Likewise, in a comparison of [s] and [ʃ], Nittrouer et al. (1989) found that COG reliably distinguished between the spectral shapes of the two fricatives, yielding higher values for [s] than for [ʃ].

Table 2. Average measures of duration (ms), intensity (dB) and centre of gravity (COG) (Hz) for the different realisations of sj- and tj-sounds in the Estonian Swedish and Central Swedish data.

Sound	Duration	Intensity	COG
Estonian Swedish			
s	128	52	5007
ɕ	120	65	4732
ç	116	46	1692
ʂ (chaufför)	100	53	2979
ʂ (nors)	300	62	4804
ʂ (lös)	198	60	4832
ʂ (Pauls)	129	61	3837
Central Swedish			
ɧ	113	65	933
ɕ	119	62	3991

In our data COG was highest for [s] measured at the onset of consonant clusters *sj, stj, skj, sk* (average 5007 Hz), and lowest for [ç] (1692 Hz). The COG for [ʂ] was on average 2979 Hz in the word *chaufför*, but had a higher value word-finally: 4832 Hz in *lös* and 4804 Hz in *nors*, and 3837 Hz in *Pauls*. As a comparison, the sj-sound measured in the data of Central Swedish speakers' productions of the word *själen* had a very low COG (933 Hz), which is characteristic of velar sounds, while [ɕ] in the word *käke* had a much higher COG (3991 Hz).

Duration has been shown not to be differentiating for word-initial sibilants (Lindblad, 1980), and in our data all word-initial sibilants had an average duration of 100-128 ms. The word-final sibilants were, however, much longer with [ʂ] in *nors* being the longest (300 ms on average).

Conclusions

The present study analysed the realisation of sj- and tj-sounds in Estonian Swedish elicited words. The sj- and tj-sounds were mainly pronounced according to their orthography. There was variation in the pronunciation of *sj* in the word *sjö*, where in additioan to the prevailing realisation [sj] also the palatal fricative realisations [ç] and [ɕ] occurred.

As the present data set is rather limited the next obvious step is to collect more Estonian Swedish data that would enable us to carry out larger-scale acoustic measurements of these fricatives. We plan to compare sj- and tj-realisations with data from Finland Swedish.

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