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## An Acoustic Analysis of Vowel Pronunciation in Swedish Dialects

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# Chapter 4

## Data

In this chapter the data set analyzed in this thesis is described. General information about the SweDia database where the data comes from is given in § 4.1. The specific data set and the vowels that were chosen for the analyses are described in § 4.2, and in § 4.3 the speakers are described in more detail.

### 4.1 The SweDia Corpus

SweDia 2000 (Eriksson, 2004a,b) was a project carried out as a joint effort between the Swedish universities of Lund, Stockholm and Umeå. The aim was to document, analyze and describe the dialectal variation in the Swedish language area, with a special focus on phonetic and phonological descriptions. The project was financed by The Bank of Sweden Tercentenary Foundation and was carried out between 1998 and 2003. Dialect data were recorded at 107 sites in Sweden and the Swedish-language parts of Finland. At each site recordings were made with approximately twelve speakers representing two generations. The older speakers were in the approximate age range of 55–75 years and the younger speakers of 20–35 years. An equal number of male and female speakers were recorded in each age group. Hence, each recording site was represented by three older women, three older men, three younger women and three younger men, with a few exceptions (see § 4.3).

The sites for the recordings were chosen to represent the rural dialects, so that no speakers from cities or larger towns were included in the database. The motivation for this was that traditional rural dialects tend to disappear in large parts of the Swedish language area and needed to be recorded before being completely lost (Eriksson, 2004b, see also § 2.1.2). Moreover, the language varieties in the cities have developed under different premises and have to be studied with different methods from those used for rural dialects. The language varieties in the cities have been influenced by large-scale immigration from the countryside and in the cities there is significantly more social and linguistic stratification than in rural areas (Nordberg,

2005). The locations for the database were chosen to represent the dialectal situation in the Swedish language area by being balanced geographically and with respect to population density. To enable diachronic comparison, locations that had been subject to previous studies were favored when the geographic distribution allowed a choice between nearby locations.

The database consists of two types of data: *a*) spontaneous speech, and *b*) a controlled part for which specific phonetic and linguistic features were elicited. The spontaneous speech comprises free interviews with dialect speakers or dialogs between two dialect speakers. The controlled data focused on three specific areas of the dialects: 1) the sound system, 2) intonation and tone accents, and 3) the quantity system.

The recordings were made with a lapel microphone and a portable DAT-recorder. The recordings were done at 48 kHz sample rate and 16-bit amplitude resolution. Before analysis the data were downsampled to 16 kHz/16 bit.

The recordings were made in the speakers' homes or other familiar places in order to make the participants feel comfortable and to make the use of the local vernacular feel natural. A quiet room without much reverberation was chosen to ensure good quality recording. Living rooms with many soft surfaces were preferred over kitchens, which contain many hard surfaces that produce reverb. Two interviewers were generally present at the recording sessions, one of whom carried out the actual interview and the other one being responsible for the technical equipment. In many cases the interviewers were not speakers of the local vernacular, but spoke a regional dialect or the regional standard language representing the larger geographical region of the recording site.

The fact that the interviewers are not speakers of the local vernacular might be a problem when recording dialect data. Especially in the Swedish language situation where most speakers use code-mixing when varying between local, informal speech and more formal speech it is difficult to say to what extent the speech of the interviewers has influenced the speakers. In a study of the local vernacular of Burträsk in the province of Västerbotten in the north of Sweden, Thelander (1979) recorded subjects in different speech situations and measured the use of dialectal versus standard forms of a number of morphological and morpho-phonological features. First, the local subjects participated in a free discussion with four locals. After one hour a "stranger" entered the discussion. He or she originated from the north of Sweden but not from Burträsk County and was introduced as a member of the research staff. There was no evidence of a complete code-switch, but the use of standard variants of the variables increased significantly among the local speakers after the "stranger" had entered the discussion. However, the increase of standard forms was strongest in sentences following immediately after the "stranger" had been talking. A number of the speakers who participated in the group discussions were also interviewed in Thelander's study. In the interview situation the use of standard forms was considerably higher than in the group discussions, and the difference between the discussion and the interview situation was larger than between group discussion with or without "stranger". When the speakers were explicitly told that

the purpose was to record the local colloquial language there was less difference in speech style in the different situations.

To avoid influencing the speaking style of the participants in the SweDia project the interviewers tried to talk as little as possible and to give feedback with facial expressions and body language rather than using verbal feedback (Aasa et al., 2000). The participants were also told explicitly that the purpose of the interview was to record the local dialect. For some speakers it was more difficult than for others to keep talking the local dialect when the interviewers spoke another variety. When eliciting the controlled data, the participants sometimes had to be reminded to give the local forms (Sw. *bondska*) instead of using standard variants.

## 4.2 Vowel data

The vowel data for this thesis come from the controlled part of SweDia database focusing on the sound system. The purpose of this part of the database was to make phonetic and phonological analyses of the vowel systems of the dialects possible. As described in § 2.3.3 the Swedish dialects vary a lot with respect to the vowel systems, and the phoneme systems of many present day dialects are unknown. Therefore, the word list for eliciting vowels was put together so that it would not only cover the Standard Swedish vowel system, but also reflect some Proto-Nordic features that are known to be preserved in some dialects.

A list of approximately 30 different words was put together for eliciting the vowel data. The list was, however, not constant across all sites but varied to some extent. For some of the most divergent dialects the word list turned out to be unsuitable, because many of the words in the list were not used in the local vernacular. This was the case for the sites Munsala, Orsa and Älvdalen, for which separate word lists were created. For the same reason, a few words in the original list had to be replaced for all or some of the speakers at some other sites. In order to keep the phonetic context of the vowels as stable as possible, words were chosen where the target vowels are surrounded by coronal consonants. Only words with an /r/ following the vowel were an exception from this rule, since some varieties of Swedish have a dorsal /r/ and not an apical /r/ like Standard Swedish. Including vowels in pre-/r/ context was still important because some of the Swedish vowels have allophonic variants that occur only before /r/.

The interviewers had prepared short questions<sup>1</sup> that would make the dialect speakers come up with a certain word. Once a speaker had guessed the right word, the word was repeated 3–5 times in isolation.

The word list data were manually segmented and transcribed within the SweDia project and partly in the follow-up project SweDat. The segmentation and transcription was mainly done by student assistants working within the project. For each word, only the target phoneme was segmented and transcribed. The transcription is

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<sup>1</sup>For example, “*Vad använder fiskaren för att fånga fisk?*” ‘What does the fisherman use for catching fish?’, answer: “*nät*” ‘net’.

a rough phonetic transcription. The aim of the SweDia project was to gather data and provide researchers with the data for experimental and quantitative research purposes. The transcriptions were mainly intended to offer an overview of the data as well as to serve as a search tool. By not transcribing the data in fine phonetic detail variation due to different transcribers was reduced. One example of the roughness of the transcriptions is that diphthongs are usually not transcribed, but indicated with the symbol of the most nearby monophthong and an additional label “dift”. For the present thesis, vowel segments were analyzed acoustically. The transcriptions in the database were only used for identifying point vowels (see § 5.1.3).

### 4.2.1 Selected vowels

For this thesis a selection of the vowels in the SweDia word lists was made. Table 4.1 displays the 19 vowels selected: twelve long vowels and seven short vowels. Only words that were used for eliciting vowel phonemes at most of the locations in the database were chosen. Moreover, it turned out that some of the words in the original word lists were problematic for eliciting dialect data. The selected words include all the Standard Swedish long vowel phonemes and the allophones of /ɛ:/ and /ø:/. Of the Swedish short vowel phonemes four are missing: /ɛ/, /ø/, /ʊ/ and /ɔ/. However, the pre-/r/ allophones of /ɛ/ and /ø/ (that is, [æ] and [œ]) are represented.

For some reason, the /o:/ vowel was elicited with the word *låt* in the southern parts of the language area (administrated by the university of Lund) and with *lås* in the central and northern parts (administrated by the universities of Stockholm and Umeå). Even though, as a rule, only vowels elicited with the same word all over the language area were used for this study, an exception was made for /o:/, so that the complete set of Swedish long vowels would be represented.

Standard Swedish /ø:/ is represented by two different words, *lös* and *söt*, in the selected data set. The reason for this is that the vowel in *lös* represents the Proto-Nordic diphthong /au/, while the vowel in *söt* was originally a monophthong. Some dialects have preserved two different phonemes in these two words.

### 4.2.2 Missing vowels

The reason that some of the Swedish short vowels are missing in the selected data set is that they had not been consistently elicited at all sites for the database. Sometimes different words were used at different sites for eliciting the vowels. However, two words that have the same vowel phoneme in Standard Swedish do not always have the same phoneme in all dialects. For this reason a decision was made to only use vowels elicited with the same word for comparison across dialects. The only exception to this rule was Standard Swedish /o:/, elicited with *lås* and *låt* (see previous section).

For eliciting the Standard Swedish phoneme /ø/ the word *blött* ‘wet’ was used. This turned out to be problematic, because some of the fieldworkers asked for the adjective *blött* (neuter form) while others asked for the verb form *blött* (supine),

**Table 4.1.** The words used for eliciting the vowels that comprise the data set for the current study.

Swedish word	Standard Swedish vowel	Proto-Nordic diphthong?	word class, form	English translation
<i>dis</i>	/i:/	no	noun sing.	haze
<i>disk</i>	/ɪ/	no	noun sing.	counter, dishes, disk
<i>typ</i>	/y:/	no	noun sing.	type, jerk
<i>flytta</i>	/ʏ/	no	verb inf.	move
<i>leta</i>	/e:/	yes	verb inf.	seek, look for
<i>lett</i>	/ɛ̃/	yes	verb sup.	lead
<i>lus</i>	/ʌ:/	no	noun sing.	louse
<i>nät</i>	/ɛ:/	no	noun sing.	net
<i>lära</i>	[æ:]	no	verb pres.	teach
<i>särk</i>	[æ]	no	noun sing.	nightgown
<i>söt</i>	/ø:/	no	adj. sing.	sweet
<i>lös</i>	/ø:/	yes	adj. sing.	loose
<i>dör</i>	[œ:]	yes	verb pres.	die
<i>dörr</i>	[œ]	no	noun sing.	door
<i>lat</i>	/ɑ:/	no	adj. sing.	lazy
<i>lass</i>	/a/	no	noun sing.	load
<i>lås/låt</i>	/o:/	no	noun sing.	lock/tune
<i>lott</i>	/ɔ/	no	noun sing.	lott, share
<i>sot</i>	/u:/	no	noun sing.	soot

which are homophones in Standard Swedish. The vowels in the adjective and the verb, however, do not have the same historical origin. The vowel in the adjective *blött* originates from the Proto-Nordic diphthong /au/, while the vowel in the verb form originates from Proto-Nordic /eu/. A number of Swedish dialects have preserved the Proto-Nordic diphthongs, and thus, also reflexions of /au/ and /eu/, as separate phonemes. In the database the words are not tagged for word class, but only the Standard Swedish orthographic form is given in addition to the phonetic transcription of the vowel segment. Comparing the reflexion of /au/ in one dialect with the reflexion of /eu/ in another dialect would show differences that do not have a linguistic basis. Therefore, *blött* was not included in the analysis, so that the phoneme /ø/ is only represented by its allophone [œ] in the word *dörr*.

For eliciting /ø/ the word *ludd* ‘fluff, fuzz’ was used in the SweDia project. This was an unlucky choice, since this word turned out to be unknown to many of the dialect speakers. In many dialects the words *lo* and *lugg* are used instead of *ludd*. In *lugg* the vowel phoneme is the same as in *ludd*, only the consonant context is different. The word *lo*, however, has a different phoneme (a long vowel). Therefore, the data concerning /ø/ is incomplete in the database. This is a shortcoming, since /ø/ is an important dialect marker: in the spoken language around Stockholm and Uppsala many speakers show a merger of /ø/ and /ø̃/, while, for example, in parts

of the Finland-Swedish dialect area /ø/ is lacking as a separate phoneme with the pronunciation being identical to /ʊ/.

For the phoneme /ɛ/ the word *lätt* ‘easy’ was used at some sites and *läsk* ‘soft drink’ at other sites. While *lätt* originates from Proto-Nordic, *läsk* is a relatively recent formation to the verb *läska* which is a Low German loanword in Swedish. The *ä* in the two words does not have the same origin and the two words might have different phonemes in some dialects. Therefore the vowel was not included in the analysis.

The phoneme /ʊ/ was not included in the word lists for all of the locations, and could therefore not be included in this study.

It is regrettable that a few important vowel phonemes have not been consistently elicited for the SweDia database. Still, the SweDia data is a unique collection of systematically elicited data of modern Swedish dialects from the whole Swedish language area. Even though a few vowel phonemes are missing in the analysis in the present thesis, the data should be able to give a good picture of how the Swedish dialects relate to each other with respect to vowel pronunciation. All Standard Swedish long vowel phonemes are included in the data set, and as mentioned in § 2.3 the geographic variation is more prominent in Swedish long vowels than in Swedish short vowels.

### 4.3 Speakers

The total number of dialect speakers analyzed in this thesis is 1,170, recorded at 98 different sites. The sites are displayed in Figure 4.1. In addition, twelve speakers of Standard Swedish were included. These speakers were recorded in the SweDia project, too, and had been perceived as good representatives of Standard Swedish pronunciation. The speakers of Standard Swedish grew up in the greater Stockholm area and were all either professional linguists working at a Swedish university or students of a linguistic subject at the time of the recording.

In the SweDia project the aim was to record twelve speakers at each site: three older women, three older men, three younger women and three younger men. However, at some sites more than twelve speakers were recorded and at some sites the fieldworkers did not manage to find three speakers of each speaker group for a recording. Therefore, the number of speakers varies somewhat across sites and across speaker groups. In addition, not all words in Table 4.1 were recorded by all speakers at all sites. A decision was made to include only speakers who had recorded at least 13 out of the 19 vowels. The average number of speakers per site is twelve, but the number varies between eight and fourteen. The number of speakers per site included in this thesis is shown in Appendix A.

For the various analyses in this thesis average values per vowel were computed for groups of speakers. Three different groupings were made:



**Figure 4.1.** The 98 sites in Sweden and Finland where the dialect data were recorded. The four biggest cities in the area are included as reference points in the map.



- one group per site
- two groups per site: older and younger speakers
- four groups per site: older women, older men, younger women, younger men

When the number of vowels recorded by a group was less than fifteen, the group was not included in any analyses. The total number of speakers in each group and the number of older and younger speakers and men and women in each group is listed in Appendix A.

Some of the analyses presented in Chapters 6 and 7 work with missing data in the data matrix, while others do not. Factor analysis (§ 6.3) is sensitive to missing data, so only objects with data for all 19 vowels were included. Multidimensional scaling (Chapter 7), on the other hand, is based on average vowel distances, which can be calculated for a smaller number of vowels without biasing the results. Therefore, a larger number of speakers are included in the multidimensional scaling than in the factor analysis. Groups without the full number of vowels are indicated by footnotes in Appendix A.

The average birth year for the older speakers is 1933 and for the younger speakers 1973. When the recordings were made, the average age of the older speakers was 66 and the average age of the younger speakers 26. As the histograms in Figure 4.2 show, the age range is larger for the older speakers than for the younger speakers. The older speakers were born between 1911 and 1957, while the younger speakers were born between 1959 and 1982.

By including speakers from two age categories in the SweDia database one purpose was to make studies of language change in apparent time possible. The age range of the younger speakers was deliberately chosen so that the group would not include teenagers, but somewhat older speakers. While the language of teenagers can include features that are dropped when the speakers get older, speakers in their 20s

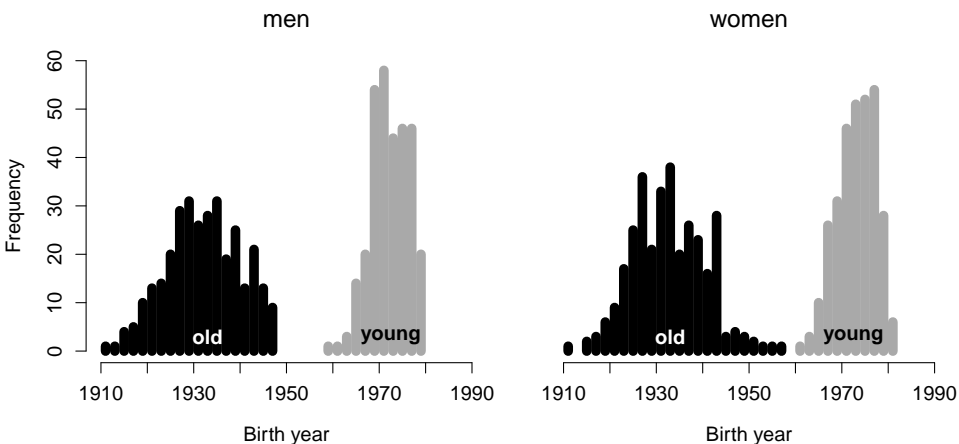


Figure 4.2. Histograms of the birth years of the speakers.

or early 30s who still lived in the municipality where they grew up were considered to be representative for the local dialect (Eriksson, 2004b).

The speakers were all born in the area where they were recorded and had lived there most of their lives. An additional requirement for the younger speakers was that their parents were speakers of the local vernacular. For the older speakers this was not a requirement, but the parents of most of the older speakers were at least from the same larger region.

