SweDia 2000: A Swedish Dialect Database

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1. Introduction

The database to be described here is the result of a joint research effort by the departments of linguistics in Umeå, Stockholm and Lund which is financed by The Bank of Sweden Tercentenary Fund for the six year period 1998–2003 (Grant # 1997-5066:01/02). The aim of project, whose full title is *Phonetics and phonology of the Swedish dialects around the year 2000*, is to document, analyze and describe the dialectal variation in Sweden and the Swedish speaking parts of Finland. Studies carried out within the project focus on phonological and phonetic descriptions, but the database will be made available for research in other areas as well. A more detailed description of the database will be given below.

2. Data collection

Most of the recordings were made during three hectic summer months in 1999. Field work was done by students at the linguistics departments in Umeå, Stockholm and Lund. Recording teams worked in pairs, one managing the recording equipment and one carrying out the interview. They had received extensive training for the task both in terms of recording techniques and interviewing.

2.1 Recording locations

The overall goal in the selection of recording locations was that they should constitute a representative sample of the dialects spoken in Sweden and the Swedish speaking areas in Finland. At an early stage Estonia was also included in the discussions, but since Swedish is almost completely extinct in Estonia the idea was abandoned.

Locations were chosen in close co-operation with the main Swedish dialect archive, SOFI, in Uppsala. Gunnar Nyström, Head of Research at the archive was our main advisor in the selection process. For the Finland Swedish dialects, Ann-Marie Ivars, professor of Nordic languages at the Department of Nordic languages in Helsinki, Finland, served as our consultant.

The following selection criteria were applied:

1. The locations should be reasonably evenly distributed with respect to geographical distance and population density.
2. Only rural areas were considered (no major towns or cities).
3. Locations for which earlier recordings or other types of material existed were to be preferred.

The number of dialects to be recorded was a compromise between two important considerations. On the one hand it was desirable to sample the dialectal variation in as many locations as possible; on the other hand we had to ensure that a sufficient number of informants per location were recorded to keep inter-informant variation in a given location under statistical control. Test recordings and subsequent analyses performed during the summer before the main recording operations suggested that a minimum of 12 informants per location was sufficient. This meant that the total number of locations that could be managed would be around 100. In the final planning, 107 dialect locations were chosen. In each location equal numbers of the four chosen informant categories, older men, older women, younger men and younger women, were recorded. The responsibility for the recordings was divided approximately evenly between the three responsible institutions. The department of linguistic in Umeå was responsible for recordings in Norrland (North Sweden) and in Ostrobothnia (Finland), The Stockholm department

was to organize the recordings in Svealand (Central Sweden), Åland and Nyland (Finland) with the Lund department taking care of Götaland, the southern parts of Sweden. The map in Figure 1 shows the geographical distribution of the locations.
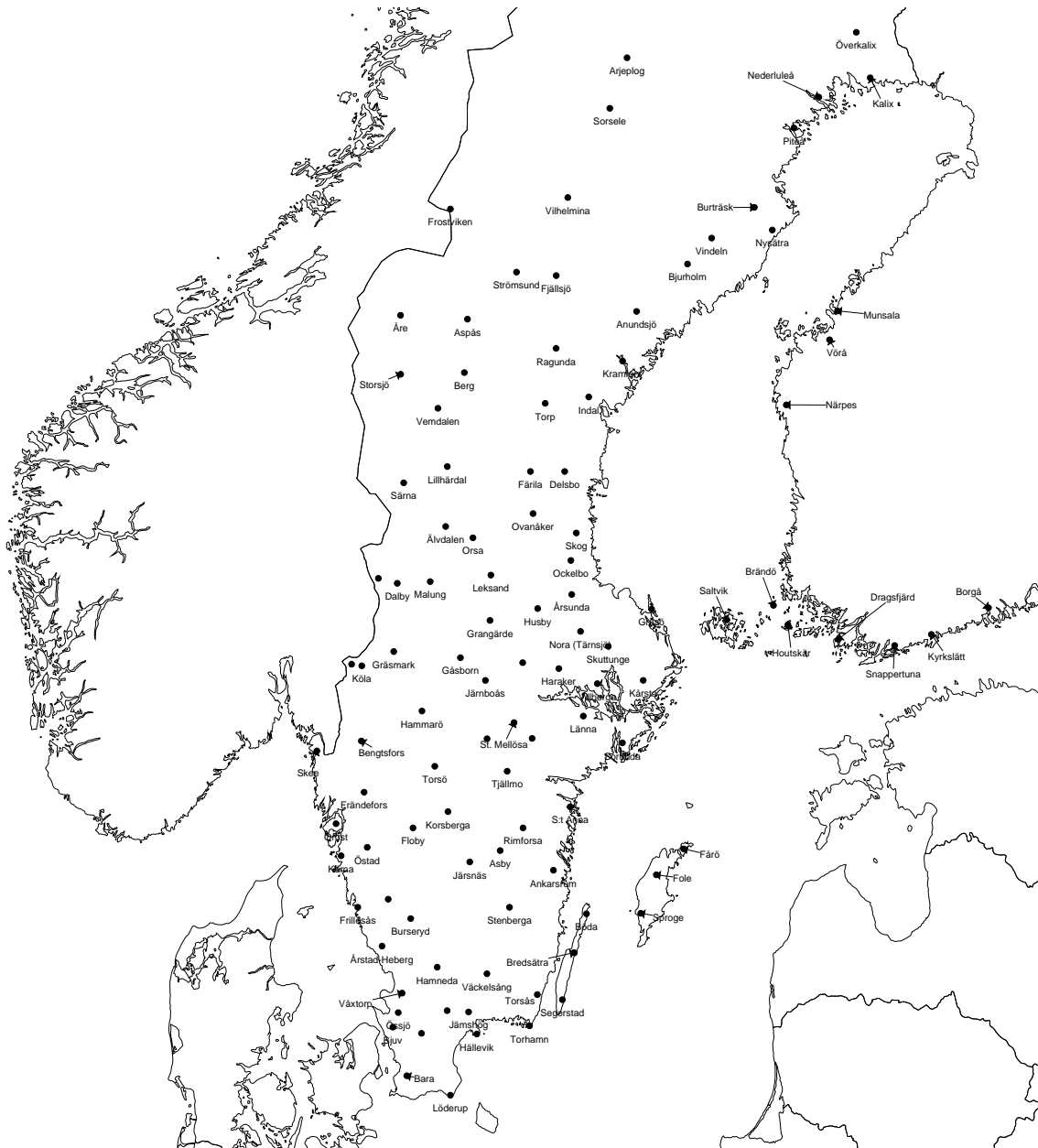
Figure 1. Geographical distribution of the recording locations.

2.2 Selection of informants

Informants were selected from two age groups intended to represent two generations of speakers, an older generation defined as 55–65 years of age and a younger generation defined as 25–35 years of age. An equal number of men and women were to be represented in each age group. The informants should be active participants in the social life of their communities either through work or other activities. The informants must have been born in the dialect area and lived there for the greater part of their lives. For the younger informants it was a requirement that their parents should be native speakers of the dialect. This was not a requirement for the older informants but in most cases they too had parents from the same region. The inclusion of two generations was meant to make it possible to detect ongoing changes in the dialect assuming that the younger generation would provide information about the direction of change in the dialect. It is a commonly held belief that men are more conservative in their speech behaviour than women. It is therefore possible, although not always the case, that there could be differences with respect to the sex of the speaker which would then also then be an indicator of dialectal change. It was therefore necessary to include an equal number of informants of both sexes in both age groups.

2.3 Recording procedures

Informants were in most cases recorded in their own homes using portable recording equipment – DAT recorder and lapel microphones. Normal homes are, of course, not ideal for making high quality recordings but it was nevertheless considered the best available option considering the fact that most informants had never been in a recording situation before and would probably have been quite uncomfortable in a more unfamiliar setting. So recording quality was sacrificed to some extent in favour of minimizing stress on the part of the informants. Care was taken, however, to find the best suitable room for the recording, usually the living room. Kitchens were avoided although for social reasons they are often the most relaxed environments. Test recordings made prior to the field recordings had shown,

however, that echoes from hard surfaces such as cupboard doors could seriously affect the technical quality of the recording although this was not always immediately obvious when monitoring the recordings via headphones.

2.4 Types of speech recorded

The recorded material consists of two main components – a standardized part identical for all recordings and an informal part consisting of spontaneous speech in the form of everyday conversations or informal interviews. The standardized section has three subsections. The first subsection is a wordlist containing carefully chosen test words meant to enable a reconstruction of the phoneme system of the dialect in question and also to track sound changes back to earlier stages of the Swedish language. The words were elicited from the speaker by giving them crossword-puzzle-like cues. A second subsection of the standardized component was designed to elicit information about the word accent and sentence accent system. In this case it was necessary to chose words which would be pronounced the same way at the segmental level in all dialects. The test words that were used in this case were three currency names 'kronor', 'dollar' and 'D-Mark'. The third and final subsection of the standardized part contains minimal word-pairs chosen for the purpose of analyzing the Swedish quantity distinction. Old Swedish had a quantity system where vowel and consonant length were both distinctive in stressed syllables. All the four logically possible combinations of vowel and consonant length, long-short, short-long, short-short and long-long, were used distinctively. Today only the first two remain in Standard Swedish and most dialects. There are, however, a few dialects that still retain one or the other of the last two in addition to the first two.

The durations of the standardized parts of the recordings range between 10 and 20 minutes and the spontaneous conversations between 25 and 40 minutes. That means that close to an hour of speech per speaker has been recorded.

3. Databases

The recorded material is meant to be used for two purposes – scientific research on the one hand and education and information to the general public on the other. To this end the material is organized in two separate databases – a research database and an Internet based database which we call "The Public Database". Both these databases will be described in more detail below.

4. The research database

The research database consists of the entire recorded material. It is intended for research purposes only. So far it has been used almost exclusively by researchers working within the Swedia project, but the intention is to make it available for any researcher in any field who needs access to dialect material. To accomplish this might, however, require considerable administrative and technical resources. How this problem should best be tackled is at present not clear, however. Some form of additional funding is most likely necessary

4.1 Preparation of the recorded material

All DAT-recordings, originally sampled at 48 kHz, have been re-sampled at 16 kHz, a sampling rate better suited for the subsequent acoustic analysis work, and stored on hard disks. The recordings are stored on UNIX machines and the acoustic analysis environment used for all work so far has been the well known *esps/WAVES* system. The sound file format used in the database is the native esps format .sd. There are several advantages with using this format when working in the esps/waves environment, but no other analysis program (as far as we are aware) uses this format which means that anyone who intends to use the recorded data must either work within the same environment or convert the file format. Later versions of esps can, however, also read the much more common wav-format. Some of the advantages that come with a very useful header structure in the sd-format is lost, but we still feel that the advantages of using a more common file format outweighs the disadvantages. The sound file format will therefore be changed to the wav-

format in the next version of the database which will be issued during the first half of 2004. This way researchers working in other analysis environments (most notably *Praat*, which is the most widely used program today at least in Europe) may use copies of the files. The label-files cannot be used as is, however, in any program outside esps/WAVES except the *WaveSurfer* program developed by the technical university, KTH, in Stockholm.

4.2 Organization of the database

To facilitate work when the database was built its file structure maps the organization used when recording the data (Region – province – location – speech type (wordlist, prosody etc) – speaker. With the search tools developed in the course of this work, the underlying file structure is no longer particularly important.

4.3 Labeling the speech files

A typical user will want to search the sound files for words or segments illustrating some aspect of dialect phonology. In order for this to be possible there must be information available about where in a given sound file a certain feature is to be found for all relevant words and segments. This has been accomplished by labeling the sound files using the esps/WAVES labeling tool. All wordlist recordings have been labeled at word level and segment level. Most of the prosodic wordlists and quantity wordlists have also been labeled. The recordings of spontaneous speech have so far only been labeled to a limited extent

4.3.1 Labeling of the wordlist material

As was mentioned above this part of the database is intended to be used for typological studies of the sound systems of Swedish dialects. The data consists of a series of test words. Each word, repeated 3-4 times, contains a target sound. Words and target sounds have been labeled on two separate tiers. Labeling on the word tier uses standard orthography to make it possible to

search for a target word irrespective of its particular pronunciation in a given dialect. But it must also be possible to search for a particular pronunciation of given target sound. On the segment tier, where the target sounds are transcribed, we have therefore used a simplified form of phonetic transcription. Now, it is very important, if this transcription is to be reliable, that there is a high degree of consistency in the choice of symbols irrespective of who the transcriber is. To accomplish this goal a reference tool was

developed. The tool consists of a set of recorded reference sounds for all the used vowel symbols. The sounds can be played back by clicking on one of the buttons of a key pad. The reference sounds exist in two versions, one with a male voice and one with a female voice. Informal experiments have demonstrated that a high degree (albeit not perfect) of inter-labeler agreement can be obtained this way. A picture of the key pad is shown in Figure 2.

Figure 2. The key pad for the reference vowel sounds used when transcribing the word list material.

4.3.2 Labeling of the prosody material

The test words in this section of the database were chosen so as to minimize pronunciation differences between different dialects. Phonetic transcription is therefore not necessary. Instead standard orthography is used at both word and segment levels.

4.3.3 Labeling of the quantity material

Two factors are known to be involved in signaling quantity in Swedish, duration and vowel quality. Both these aspects must therefore be reflected in the transcription. At the word tier normal orthography is used, but for the

segment tier the same phonetic vowel symbols as those used for the word list material has been used. The target segments in the target words consist of a vowel followed by a voiceless consonant. Now, when a vowel is followed by a voiceless consonant it is very common for the vowel to be terminated by a voiceless phase with frication noise (aspiration). In languages where this fricative phase is phonologically distinctive the phenomenon is called *preaspiration*. This was not believed to be the case for Swedish, but during the transcription of the material it was nevertheless observed that the amount of what might be preaspiration varied considerably and apparently rather consistently between dialects. It was therefore decided to label the aspiration noise and the silent phase (occlusion) of the voiceless consonant separately and leave the phonological analysis for later consideration.

4.3.4 Labeling of the spontaneous speech material

This part of the database has been transcribed to a very limited extent. To do it manually would require an enormous amount of work for which the financial resources were simply not available. Preliminary tests using automatic alignment based on orthographic transcriptions at the word level have, however, shown some promise. Work on two North Swedish dialects in connection with a study of the use of relativisers (see below or more details!) have shown that the spontaneous speech recordings may be transcribed orthographically in a little more than a week by someone who is thoroughly familiar with the dialect. Transcribing the entire database this way would hence require approximately three man-years of work. Automatic alignment at the word level based on these transcriptions should be possible with a reasonable degree of accuracy, but would require manual correction. Another man-year would probably be sufficient to accomplish automatic transcription and alignment at the segment level. We are at present trying to find the financial resources necessary to accomplish this goal.

4.4 Searching the research database

The speech files in the database are not edited. That means, for example, that the part of the recording that contains the wordlist material for a given speaker is stored as a single speech file including the interviewer's questions, introductions etc. It is important that this context information is preserved, but it is in most cases not what the researcher is after. The basic use of the database is to access only the target words and segments. To meet this requirement several search tools that facilitate search and exploration of the database have been developed. The interface of one such tool, developed for exploring the wordlist files, is shown in Figure 3. Using the menu, the researcher may specify the search with respect to dialect location, speaker category and target word. There are two output options for the search, the
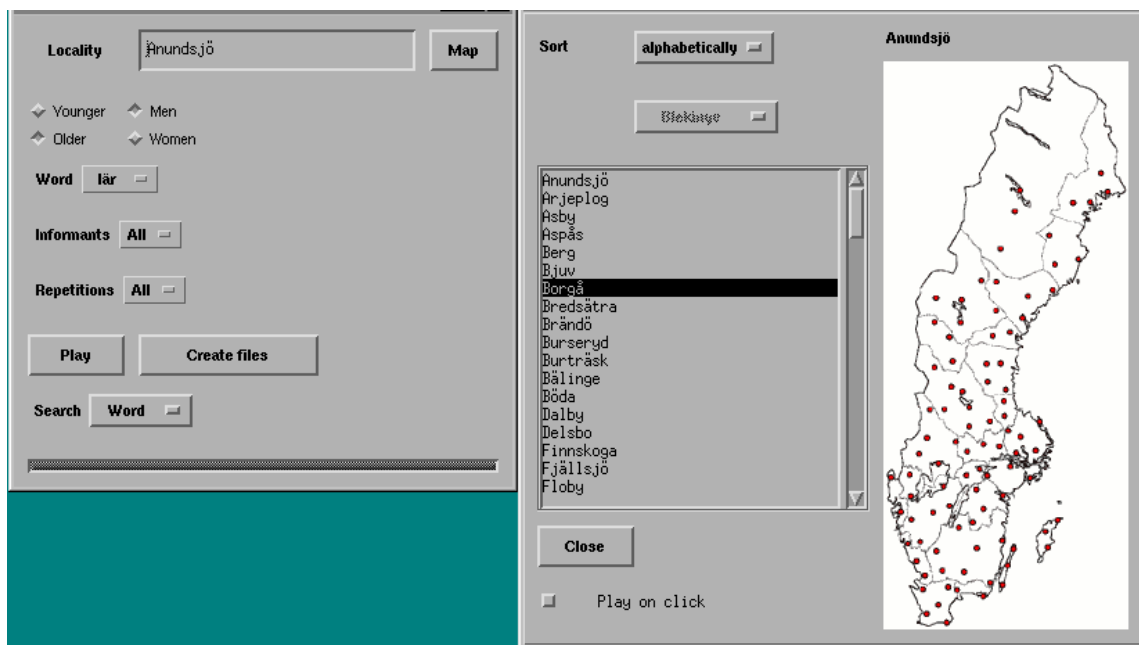
Figure 3. Menus for the search tool used for word and segment search in the wordlist section of the database.

target words may be played back or they may be extracted and appended to a new sound file with short silences between the words. The transcriptions from the label files will also be extracted, synchronized with the time scale of the new file and stored as a new label file. Figure 4 shows the result of a search

for the word "blöt" where the target segment is the vowel "ö". Similar search tools for exploring the prosody files have been developed.
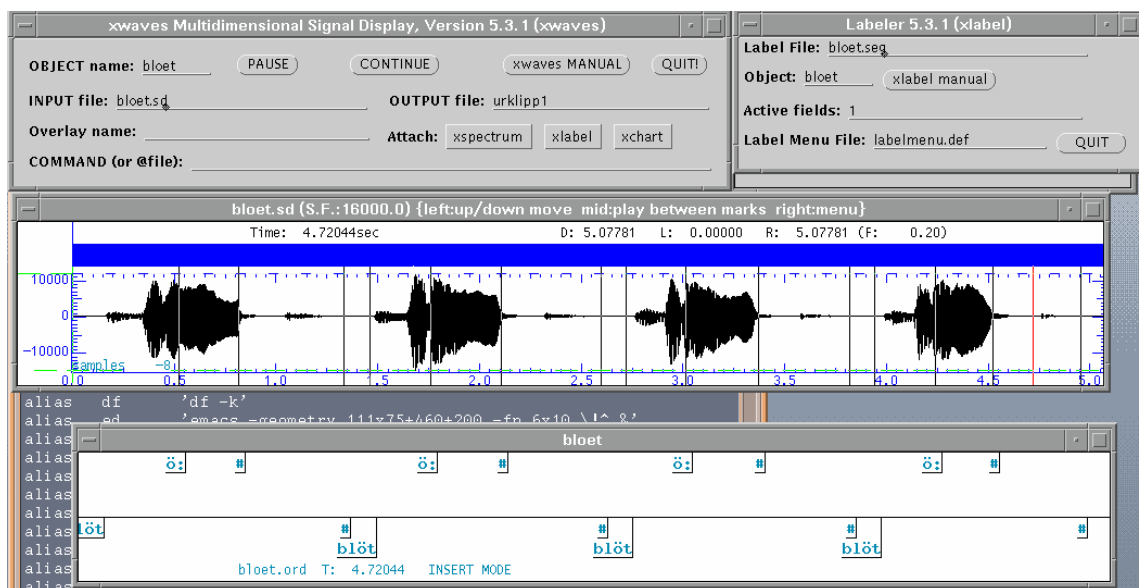
Figure 4. Output from a wordlist search. Target words have been extracted from the source file and appended to a new file together with the relevant transcriptions from the respective label files.

5. The Internet database (http://www.swedia.nu)

An important part of the Swedia project has been the launching of an Internet database accessible to the general public. It is intended to be used for education at various levels from secondary school level to university courses but also by anybody with an interest in Swedish dialects. The speech material in the database consist of short clips (between half a minute and one minute) taken from the spontaneous speech recordings. Each dialect is represented by four speakers, one from each of the four categories of speaker types. Altogether 100 dialects are represented in the database. The sound files exist in two formats – wav and mp3. Maps showing the geographical locations of the dialects are included in the database as well as some general information

about the different areas and accompanying photos. For each sound clip there is a page containing a simplified phonetic transcription using normal

Figure 5. Home page from the Internet database. The speaker is a younger woman speaking the dialect of Brändö, Åland. The text to the right is a simplified orthographic transcription and the text to the left a translation of the text to standard Swedish

orthographic symbols and a translation to standard Swedish. Unusual words and expressions are also explained. (Figure 5 shows one such page.)

6. Research based on the material in the database

The present paper is focused on the database as such and not primarily on research performed within the Swedia project. In this section, I will therefore only give an indication of the type of research that is presently carried out without going into too much detail.[1] The research performed at the participating institutions is quite naturally influenced by their current research

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[1] For a list of publications generated by the project, today no less than 59 altogether, please see the reference list on our project information homepages,
http://www.ling.umu.se/~anderse/SWEDIA.

profiles. With a slight oversimplification one may say that the Umeå department has focused on temporal aspects (e.g. quantity), the Stockholm department on typological issues and the Lund department on intonation, especially word accents, but there are, of course, no water tight barriers between these specializations.

6.1 Research on quantity

The Umeå department has focused their research on the Swedish quantity distinction. This department has a long history of research on temporal aspects of speech with Eva Strangert's work on phrasing and pauses leading the way. In the context of research within the Swedia project this has quite naturally been extended to research on quantity. A doctoral student (Felix Schaeffler) employed by the Swedia project is working on a typology of Swedish quantity. Although phonological quantity is an important aspect of Swedish phonology, very little has been known about its phonetic realization except for a few studies of standard Swedish, most notably a classic work by Elert (1964). In the standard Swedish variety one may say, with a slight oversimplification, that the quantity distinction is realized by a short vowel followed by a long consonant or a long vowel followed by a short consonant, the two together occupying approximately the same duration. Research performed, so far, by the Umeå research team reveals an enormous variation between dialects with respect to how these durational cues are used (Strangert & Wretling, 2003). There is also some evidence that the complimentary quantity (short-long vs. long-short) is being replaced by a quantity distinction in the vowel only, involving both length and quality. It is too early to say, however, if this is an unambiguous trend (Shaeffler *et al*., 2002).

It was mentioned above that during the transcription process it was observed that the aspiration following the stressed vowel varied considerably, and as it would appear systematically, between dialects. It was not known at the time, however, if this should be given a phonological interpretation or of if would only be ascribed to automatic articulatory mechanisms. In the course of work done by the research team in Umeå it has been shown, however, that preaspiration is used phonologically as a cue to the long-short distinction in at

least two of the analyzed dialects – Arjeplog and Vemdalen – and that preaspiration may have replaced duration as the main cue to the distinction, an interesting and quite unexpected result. (Wretling *et al.*, 2002).

6.2 Research on segmental typology

Traditional dialectal divisions are based, to a large extent (almost exclusively, in fact) on geographical location. Phonological systems characterizing the different dialects show, however, remarkable coherence. It is unlikely that this coherence has arisen by accident. A more likely explanation is that there are constraining factors that make the dialects differ and diverge as reasonably coherent systems. If this is so it should be possible to reconstruct dialects through studies of the variation of various phonological features which should then tend to cluster into, more or less, separable phonological systems. This is one of the ideas behind the dialect research that goes on at the department of linguistics in Stockholm. In this spirit, Peder Livijn whose is a doctoral student at the Stockholm department has taken a close look at the dialectal variation in the production of coronal consonants. The results so far indicate that there are systematic differences with respect to place of articulation (dental *vs*. alveolar) and that the differences follow areal patterns. (Livijn, 2002; Livijn & Engstrand 2001) To what extent these patterns coincide with traditional dialect divisions is, however, too early to tell.

6.3 Research on prosodic typology

Research on the acoustics of the Swedish word accent system has a long history dating back to the work begun by Meyer (1937, 1954) and continued by Eva Gårding (e.g. 1977) and Gösta Bruce (e.g. 1977) in Lund and others. The study of the Swedish word accent also plays a prominent role in the Swedia project. Among the studies published so far may be mentioned a study by Engstrand and Nyström (2002) on the variation in accent contour timing among the dialects spoken in Dalarna, a study by Bruce (2003) on North Swedish intonational phonology, a study by Olander (2001) on the word accent in the Orsa dialect, and a study by Svärd and Eriksson (2001) on accent realization in the Närpes dialect.

7. Closing remarks

As was mentioned in the introduction, funding of the project ends in 2003. Research based on the collected data will continue, of course, but will have to be financed by other sources. A problem that must be solved, however, if the database is to remain the rich resource for dialectal research that it is today, is to find the financial resources for maintaining and developing the database. At the time of writing this problem has not been solved.

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