

# Production and Perception of Swedish Word Accents by Somali L1 speakers

Anna Hed

# Abstract

In this thesis, the production and perception of Swedish word accents by Somali L1 speakers is investigated. The Feature hypothesis, stating that it is easier to acquire a phonological feature in an L2 if the same phonological feature is used in the L1 will be the framework used. Somali is a language that also makes use of word accents. Therefore, the two languages are placed in the same level of the Tonal prominence hierarchy and the L2 acquisition of Swedish word accents by Somali L1 speakers is suitable to test. The production is tested by analyzing read speech, with elicited target words in focal position with either accent 1 or accent 2. The perception is tested with a discrimination test of the two word accents, and two different Swedish varieties are used: Central Swedish and South Swedish. Two groups are tested. One consists of Somali L1 speakers with Swedish L2 and one consists of speakers with both Somali and Swedish L1. The results show that the L2 group does not make the distinction between A1 and A2 in the production test, but the result for the 2L1 group is less clear and can be interpreted as that they did not make use of the Swedish word accents. In the perception test, none of the two groups performed better than chance and had significantly lower scores than a Swedish L1 control group. The findings in this thesis confirm the Feature hypothesis in the production part, but contradict it in the perception part.

*Keywords:* prosody, second language acquisition, Somali, Swedish, word accents

# Acknowledgements

There are some people I would like to give my thanks to. First and foremost the subjects that let me test my theories on them: Najmma Ibrahim, Amran Jama, Kaltun Alibashi Mohammed, Raage Haji and one anonymous. Without them, this thesis would be nothing at all. The second thank you goes to my supervisor Susanne Schötz who guided me through my writing and experimenting with Praat and construction of tests. I would like to thank Mechtild Tronnier and Gisela Håkansson for input and pointing me towards relevant literature. Katlego Matsila, Lea Brooklyn and Beatrice Giordano are to be thanked for letting me do some pilot studies with them. Thanks also to Mathilda Ljungqvist and Jonna Ingvarsson for lending me their voices for the stimuli in the perception tests. The Swedish L1 control group should also have big thanks. Isabella Völker, Alexandra Loonin, Maud Byström, Cecilia Annertz and others have been a great help for finding informants. Joost van de Weijer for the help with the statistics. And last but not least all my friends and family for eternal support!

# Table of contents

<b>1</b>	<b>Introduction.....</b>	<b>1</b>
1.1	Purpose .....	1
1.2	Research questions .....	2
<b>2</b>	<b>Theory .....</b>	<b>3</b>
2.1	Feature hypothesis.....	3
2.2	Tonal prominence hierarchy.....	5
2.3	Swedish .....	6
2.3.1	Swedish word accents .....	6
2.4	Somali.....	7
2.4.1	Somali word accents.....	8
2.5	Comparison between Swedish and Somali word accents .....	8
2.6	Definition of L2.....	9
<b>3</b>	<b>Method .....</b>	<b>10</b>
3.1	Production test.....	10
3.2	Perception test .....	12
3.3	Additional information .....	14
3.4	Informants .....	14
<b>4</b>	<b>Results.....</b>	<b>14</b>
4.1	Production test.....	16
4.1.1	AJ .....	16
4.1.2	KA .....	18
4.1.3	RH .....	20
4.1.4	NI.....	22
4.1.5	NN .....	23
4.2	Perception test .....	24
<b>5</b>	<b>Discussion .....</b>	<b>27</b>
5.1	Production .....	27
5.2	Perception.....	28
5.3	Overall discussion .....	29

<b>6</b>	<b>Summary.....</b>	<b>31</b>
<b>7</b>	<b>References.....</b>	<b>32</b>

# 1 Introduction

“L2 features not used to signal phonological contrast in L1 will be difficult to perceive for the L2 learner and this difficulty will be reflected in the learner’s production of the contrast based on this feature.” This is the “Feature hypothesis”, as formulated in McAllister et al. (2002). Research has been done on both segmental and suprasegmental features that support this hypothesis. For example, it seems to be relevant when it comes to production and perception of the complementary distribution of long and short vowels and consonants (V:C/VC:) in Swedish syllables as shown in McAllister et al. (2002) and Thorén (2005). But what about the intonational features, such as word accents in Swedish? Some findings seem to contradict this. Tronnier & Zetterholm (2013a) conclude that there is no clear evidence that speakers of an L1 with tones produce the word accents of Swedish more accurately than speakers of an L1 without tone. In addition, Kaiser (2011) has shown that German L1 speakers with Swedish as an L2 do not produce the Swedish word accent distinction accurately. Furthermore, there is also research that shows that the tones in tone languages are perceived and produced more accurately by L2 speakers with an L1 with phonological tones as shown by e.g. Darcy & Schaefer (2013) and Gottfried & Suiter (1997), which is discussed further below.

However, the research by Tronnier & Zetterholm had some interesting findings when it comes to the L2 acquisition of Swedish word accents by Somali speakers, another language that also makes use of word accents. In their study, the Somali speakers seemed to produce these more accurately than the other subjects, maybe pointing towards the conclusion that L2 speakers with the same kind of intonational features more easily learn these in a second language.

## 1.1 Purpose

In this thesis there are a few different aims. I want to look at the production of the Swedish word accents, to develop and expand Tronnier & Zetterholm’s studies. The prosodic aspect investigated is the fundamental frequency of speech. One reason for investigating production is also that most research of the acquisition of intonational features is done on perception, and more research is needed on the production part. I have also chosen Somali L1 speakers since Tronnier & Zetterholm found some interesting results in their study that I want to look further into. Though, they did not investigate the subjects’ perception of the word accents in their study and I am going to do that as a complementary research to investigate the connection between the perception and production of

intonational features. There is also a lack of research on the acquisition of word accents, since most work is done on tone, which will make this thesis a good contribution to ongoing research in the field.

## 1.2 Research questions

The research questions aimed to be answered in this thesis are:

- **Do Somali L1 speakers with Swedish as L2 produce the Swedish word accents according to the Swedish patterns?**

The Feature hypothesis and the findings of Zetterholm & Tronnier imply that this should be the case and this study will be an addition to the research of this field.

- **Do speakers with both Somali and Swedish L1 produce Swedish word accents?**

In addition the speech of some speakers with both Somali and Swedish L1 will be analyzed.

- **Do Somali L1 speakers with Swedish as L2 produce the Swedish word accents consistently?**

Is there a word accent once in a while, or do they have different F0 patterns in different instances?

- **Do Somali L1 speakers with Swedish as L2 perceive the Central Swedish and the South Swedish word accents?**

The subjects will take a discrimination test of both the Central Swedish and the South Swedish word accents and their results will be compared to a Swedish L1 control group to see how accurately they perceive the word accents.

- **What is the connection between the perception and the production of the word accents?**

The Feature hypothesis states that the production of the word accents will reflect the perception of the word accents and the aim is to investigate the connection between perception and production.

## 2 Theory

In this chapter the theories used and related previous research will be presented. The Feature hypothesis and the Tonal prominence hierarchy will be explained along with earlier findings on L2 acquisition of intonational features. The word accent systems of Swedish and Somali will also be discussed.

### 2.1 Feature hypothesis

The Feature hypothesis is a hypothesis concerning the acquisition of phonological features in L2 speech, and states that:

*"L2 features not used to signal phonological contrast in L1 will be difficult to perceive for the L2 learner and this difficulty will be reflected in the learner's production of the contrast based on this feature" (McAllister et al. 2002).*

It was a part of Flege's (1995) speech learning model (SLM) and has been tested on both segmental (See Flege 1995) and suprasegmental features. On Swedish suprasegmental features there are a few tests done on the complementary distribution of VC:/V:C (Thorén 2005; McAllister et al. 2002) showing that speakers with an L1 with contrastive duration of segments performed equally well as the Swedish L1 control group in perception and production tests, while speakers of L1 without this distinction were less successful. McAllister et al.'s test was made on Estonian, English and Spanish L1 speakers, who had all been living in Sweden for at least 10 years. Estonian is a language with more expanded use of contrastive segment duration than Swedish; English is a language that makes some, but less, use of contrastive segment duration; and Spanish has no contrastive segment duration. The native Estonian speakers performed equally to Swedish L1 speakers, the native English speakers performed less successful and the native Spanish speakers performed least successful. This made the authors suggest a refinement on the Feature hypothesis to include a formulation of a Feature Prominence Hypothesis, something that will be looked in to more below in the case of intonational features.

There is also a somewhat big field of research done on the acquisition of intonational features that support the Feature hypothesis. Most seems to be done on tone languages though, such as Thai and Mandarin. Darcy & Schaefer (2013), Gottfried & Suiter (1997), Burnham et al. (1996) are different examples of studies that investigate the perception of tone in tone languages. They all show results



stating that it is easier for native speakers of a language with tone distinctions to perceive the tones of another tone language, whether they speak it as an L2 or have no knowledge about it at all. These also mostly investigate the perception, and not the production of tones, which reflects the whole field where, as stated above, more research is done on perception.

When it comes to L2 acquisition of word accents, there is not a lot of research to be found. The research done on the L2 acquisition of Swedish word accents will be presented here.

Kaiser (2011) researched perception and production of the word accents by L2 speakers with German L1, a word stress language. She tested this with a perception test of the word accents in post-focal position, and the results showed that German L1 speakers did not perceive the difference. In the production test, the subjects were asked to imitate the word accents, both in post-focal position and in isolated context. The study showed that they were not able to distinguish between the two word accents in the post-focal position, but they imitated the word accents in isolated context, pointing towards the conclusion that the German L1 speakers did not associate the word accents to different meanings.

Tronnier & Zetterholm (2013a) investigated the production of Swedish word accents by L2 speakers with Farsi, Somali, Vietnamese and Thai as L1. Farsi is a stress accent language, Somali a word accent language and Vietnamese and Thai are both tone languages. They had two speakers of each L1 and concluded that only the Somali L1 speakers were consistent in making a distinction between accent 1 and accent 2. Later, they also did a perception study on the same material where Swedish L1 speakers were asked to discriminate between the two accents (Tronnier & Zetterholm 2013b). They concluded that the Swedish L1 speakers had a bias to evaluate the L2 word accents as accent 1 and were therefore more careful with their conclusion that the Somali L1 speakers had distinguished between the word accents. This thesis will try to further develop their results with data from additional informants. A problem with their results was also the extent of unvoiced segments in the elicited words, disrupting the F0 contour.

Burnham & Torstensson (1995) investigated the perception and production of Swedish word accents and vowels with non-Swedish speaking English L1 subjects. In their perception test, they searched for a bias in either tone perception or vowel perception, and it seems like the vowels were more important for the discrimination and identification than the tone was. In their production test the subjects performed better with tones than with vowels in a repetition task. They also concluded that 6 year olds are less sensitive to tone than older subjects.

Norwegian, a language closely related to Swedish, also with similar word accents, was investigated by van Dommelen & Husby (2009). They investigated Mandarin L1 and German L1 speakers and their perception of the Norwegian word accents. They also investigated whether training in distinguishing between the accents improved the perception. In their study, they concluded that Mandarin L1 speakers did better in discriminating the word accents than German L1 speakers. In an identification test, both groups performed with lower accuracy in

comparison to the discrimination test. Special training in recognizing the word accents only had a minor effect on improving the results.

To summarize this section: There is research done on the L2 perception and production of intonational features, but most is done on perception as opposed to production, and tone as opposed to other, less extended tonal systems such as word accents. Another conclusion is that it seems to be easier to acquire the tones in an L2 if the L1 makes use of tone, but when it comes to Swedish word accents, this is not entirely clear.

## 2.2 Tonal prominence hierarchy

In this section the Tonal prominence hierarchy as stated in Schaefer & Darcy (2013) will be presented. The hierarchy is built upon the presence and importance of intonational features in a language, with tone languages having the most salient intonational features and intonation only languages having the least salient intonational features. The hierarchy is structured as follows:

1. Tone language (Mandarin, Thai)
2. Pitch accent language (Japanese, Swedish, Somali)
3. Word stress language (English, German)
4. Intonation only language (Korean, French)

They suggest that speakers of an L1 higher in the hierarchy are more accurate when perceiving tone in another language, even when they have no knowledge of the language. Speakers of an L1 lower in the hierarchy are less accurate when perceiving tone in other languages higher in the hierarchy. They do not suggest anything about the production of intonational features, though.

As discussed above, a Feature prominence hypothesis has been suggested and when it comes to intonational features, this Tonal prominence hierarchy can perhaps be seen as this wanted addition to the original Feature hypothesis. Of course this is just a hypothesis with the need of further investigation, and this thesis will be an attempt to do so.

In the case of the two languages concerned in this thesis, both Swedish and Somali would be placed on the same level of this hierarchy. This hypothesis would then state that Somali L1 speakers will have an easier time perceiving, and maybe also producing, the Swedish word accents than e.g. German L1 speakers (Kaiser 2011). However, Swedish and Somali word accents differ, both in their F0 patterns and in their usage (lexical in Swedish, and grammatical in Somali, respectively). This makes it seem unclear how much this Tonal prominence hierarchy in fact can be relied on. As stated above, the Feature hypothesis states that phonological contrast used in the L1 is easier to acquire in an L2, but if the usage and the intonational pattern differs, as in the case of the word accents in Swedish and Somali, the question is if this hypothesis holds. More research remains to be done on this issue and this thesis is hopefully a step in that

direction. From Tronnier & Zetterholm's studies it seems like at least the production of word accents is not aided by having an L1 higher in the hierarchy when learning the Swedish word accents. Their study (2013a) shows that Vietnamese and Thai speakers do not produce the Swedish word accents accurately, suggesting that this hierarchy might be valid for perception but not production. However, their data set was small and it is hard to draw any general conclusions.

In the next two sections, the different word accent systems of Swedish and Somali will be explained and similarities and dissimilarities will be discussed further.

## 2.3 Swedish

Swedish belongs to the North Germanic branch of the Indo-European language family. It is mostly spoken in Sweden and by a minority in Finland and has 8.3 million speakers according to Ethnologue (2013).

### 2.3.1 Swedish word accents

There are two word accents in Swedish, usually called accent 1 and accent 2, in this thesis also A1 and A2. The accents are present in every accented word in speech (Bruce 2010:55). The F0 pattern for each accent varies between different regional varieties of Swedish. Both of the accents contain a rise and a fall in pitch, an HL-pattern, and A2 will always have a later F0 peak than A1. The 2A and 2B patterns show two peaks, and it is the second peak of the A2 that is the realization of the later intonational peak. Figure (1) shows the different accent types present in different varieties of Swedish according to Gårding (from Bruce 2010) as realized in disyllabic words in focal position:

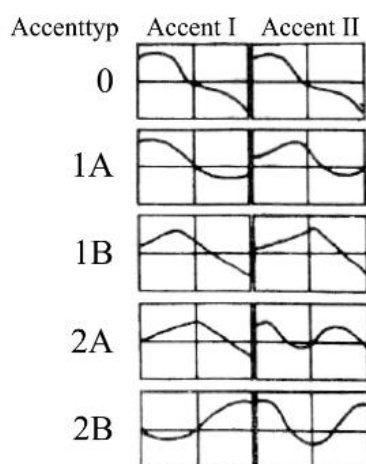


Figure (1). Swedish word accent patterns.

This thesis will deal with two of the types. The 1A, as it is the one of the South regional varieties where some of the subjects have learned Swedish and thereby are surrounded by it in everyday life. In addition, the 2A which is the Central Swedish accent type and the one present in the Swedish that the other informants have learned and are surrounded with. The 2A variety is also the one that is most common on television, radio and in other media, and the informants in Skåne are probably surrounded with this variety too, more than the other informants are by the 1A variety. More about the informants are presented below.

The predictability for choice of accent type is fairly high. The factors for assigning accent type are the placement of stress and the morphological structure of the word (Bruce 2012:56). For example, words with final stress and monosyllabic words always take A1, and different derivation suffixes are correlated with one of the two accents. A common pattern relevant for this thesis is that disyllabic verbs have A2 in the infinitive form and A1 in the present tense. However, it does not hold as a rule for all disyllabic verbs.

A1 is more common than A2 and different researchers (Riad 2006, Roll et al. 2011) argue that A2 is the marked one. There are word accent-distinguished minimal pairs, but they are not very common. Swedish Wikipedia has a list of minimal word accent pairs that is approximately 120 words long, so that can be taken as at least an indication (Wikipedia 2013). Some minimal pairs are exemplified in the methodology chapter (section 3.2), as they are used in the perception test. There are also varieties of Swedish, mostly the one spoken in Finland, that do not make use of the word accents, seen as pattern 0 in figure (1) above. This shows that the accent distinction is not a very important cue for lexical differences and surrounding semantic cues are more important for intelligibility. Therefore a lot of L2 speakers of Swedish omit the distinction, without lowering the intelligibility (Thorén 2005). Thorén also notes that the difficulty in the big regional variation between the accent patterns also makes it harder to both teach and learn the Swedish word accents, as opposed to the duration of V:C/VC:-distribution discussed above.

## 2.4 Somali

Somali is a language belonging to the Cushitic branch of the Afro-Asiatic language family. It has 16.5 million speakers (Ethnologue 2013). It is mostly spoken in Somalia, but due to political conflict and the economic situation of the country speakers of the language have migrated all over the world. That has resulted in a fairly large Somali population in Sweden. 53.200 people in Sweden speak Somali and most of them speak Swedish as an L2 or as a second L1.

### 2.4.1 Somali word accents

Somali has often been described as a tone language, but Saeed (1999) and Puglielli (1997), among others, have reanalyzed the intonational features of the language and conclude that it should be described as a tonal accent language. There are two different tones, high and low, that make up different accent patterns. The tones are assigned to the mora of the vowel. Short vowels have one mora and long vowels and diphthongs have two morae. This makes it possible for a realized falling tone with a high tone on the first mora of a long vowel or diphthong and a low on the other one; and also a rising tone with a low tone on the first mora of the long vowel or diphthong and high on the following. The tones are mostly distributed in three different accent patterns, below called AP:

AP1: High tone on the last mora, low elsewhere.

AP2: High tone on the penultimate mora, low elsewhere.

AP3: Low tones on all morae

There is another much less frequently used accent pattern, only used with some proper nouns:

AP4: High tone on the first mora. Low elsewhere.

Stress is connected with the high tone and each word can contain only one high tone. The accent patterns are mostly used as grammatical markers. They mark gender, case and number on NPs, and declension class on verbs among other things. In rare cases there are also minimal pairs which are not derived from the same word. Some minimal pairs showing different grammatical features are:

islâan	isláan	GENDER
'old male'	'old female'	
Soomáali	Soomaalí	NUMBER
'Somali person'	'Somali persons'	
Cali	Cáli	CASE
'Ali (name)'	'Ali.VOC'	

([<sup>^</sup>] represents HL and [<sup>˘</sup>] represents H)

## 2.5 Comparison between Swedish and Somali word accents

The most obvious similarity between Swedish and Somali word accents is that they are both analyzed as word accent languages and thereby placed in the same category of the tonal prominence hierarchy. This is the main reason why these

languages are chosen for this thesis. However, the realizations of the word accents differ. Only one high tone per word is allowed in Somali, whereas in the 2A and 2B patterns of Swedish word accents, two high tones are realized in A2. This is interesting for this thesis since the perception test consists of both Central Swedish, with two peaks in the A2 and South Swedish with one peak in the A2. It remains to be seen if this affects the results.

One other difference between the Somali and the Swedish word accents is the distribution. In Somali the accents carry grammatical information such as case, number and gender, as seen above. In Swedish, the distribution is often described as lexical, however, different grammatical structures affect the choice of word accent, as in the case of verbs described above. In these cases, though, other morphological properties carry the grammatical information.

There is a chance that this could mean that the importance of the word accents in the two different languages is not of equal measure and could affect the results and conclusions of this thesis, but since this is an issue that is not really investigated, I will go on with the method from the framework present today, that it is the sensitivity for intonational features present in the L1 that is transferred.

## 2.6 Definition of L2

There are a lot of different definitions of a second language in the literature. Factors of different theories can be the age when the language is acquired or how many other languages the subject has learned. In this thesis, the definition of an L2 is any language acquired after 7 years of age. It does not matter if other languages are learned in between the L1 and the L2 and one speaker can speak several L2. This can be done since this thesis only concerns one L1, Somali, and one L2, Swedish. Other languages that the subjects speak will be included in the thesis and discussed and problematized if needed.

This definition also makes it necessary to distinguish between two groups of Somali L1 speakers in this thesis. Two of the informants have both Swedish and Somali L1; and three of them have Somali L1 and Swedish L2. This will be presented in more detail below.

## 3 Method

The methods for the two different tests will be presented in this chapter. There will be one section for the production test and one for the perception test. In both these sections, discussions of choice of stimuli and difficulties are discussed. A description of additional information provided by the informants is included and last in the chapter, the informants are presented.

### 3.1 Production test

The production test material consists of a list of sentences which the informants read out loud. The choice of using read speech is for the sake of comparability, even if spontaneous speech would have been more interesting and valuable to analyze. All subjects read the same text, constructed to elicit words in focal position. That assured that the analysis was made on exactly what was looked for: disyllabic words with either A1 or A2 in focal position.

The subjects, presented below, were asked to read six different sentences to elicit three verbs in the present tense with A1 and three verbs in the infinite tense with A2. A1 is marked by [ˈ] and A2 is marked by [ː]. Note that the accents were not marked in the text the informants were given. The sentences were:

Om du går rakt fram hamnar du vid Nobeltorget, men om du **svån**ger kommer du till Möllan.

*'If you walk straight ahead you will end up at Nobeltorget, but if you turn you will get to Möllan.'*

Du ska inte gå rakt fram, utan du ska **svån**ga, sa jag.

*'You should not walk straight ahead, but you should **turn**, I told you'*

Det är trevligt när du smsar, men när du **rín**ger blir jag extra glad.

*'It is nice when you text me, but when you **call** I become extra happy.'*

Att smsa kostar 45 öre, men att **rín**ga kostar bara 35 öre.

*'To text is 45 cent, but to **call** is only 35 cent.'*

Du går åt fel håll nu, men om du **vänder** kommer du rätt.  
*'You're now walking in the wrong direction, but if you  
turn around you will end up at the right place.'*

Du kan inte gå åt det hållet, du måste **vända**, sa jag.  
*'You can't walk in that direction, you have to turn  
around, I told you.'*

The reasons for choosing these verbs instead of the minimal pairs seen in a variety of other studies of Swedish word accents (Kaiser 2011, Zetterholm & Tronnier 2013) are a few: One is that if the subjects have learned about the word accents in Swedish they will probably have come across the minimal pairs (and as stated above, there are not that many). This would have made it possible for the subjects to figure out what the test was about and that could have affected the results of the production of the words. Note that some of these minimal pairs are used in the perception test of the study (presented below), making that test more transparent than this one.

Another reason for choosing these words are that these are fairly common verbs that hopefully assures that the subjects are familiar with the words and have been surrounded by them, avoiding that unfamiliarity with the words would have affected the results.

The words are also chosen to have only voiced segments from the onset of the first vowel and throughout the word, to make sure that the F0 curves would not be disrupted.

It is also important to note that the informants were not told exactly what was investigated in the study. They were told that second language acquisition was studied, and more particularly their speech, but not that word accents were the target for the study. This was to make sure that the knowledge of being observed would not interfere more with their performance than it already did. Of course one should still be aware that a situation where a subject is being recorded while reading is still an unusual one, and might affect the speech. After the recordings were made and the perception test was done it was explained to the informants what the study was about.

The target words will be evaluated as containing Swedish word accents if they resemble the Swedish varieties and contain a later peak in the A2 than in the A1.

The subjects were recorded with a portable recorder (TASCAM DR-07). The target words were then segmented from the onset of the first vowel, which is also the stressed vowel in this case. The F0 patterns of the target words were analyzed with a Praat script that normalized the curves by putting the minimum Hz value of each word at a base line with the value 0 in a semitone scale. The normalization was made to be able to compare the different speakers' relative F0 patterns. The script was constructed by Susanne Schötz for the research project on Swedish dialects, Simulekt, and has been used for several of her studies on Swedish word prosody (e.g. Schötz et al. 2010). The script has then been adapted and further developed for this particular study by the author.



## 3.2 Perception test

The perception test was a two part discrimination test constructed and executed in Praat. The two parts consisted of one test with Central Swedish word accents and one other identical test, but with South Swedish word accents. The test was constructed with three Swedish minimal word accent pairs:

anden /ánden/ 'the duck'	anden /ànden/ 'the spirit'
stegen /sté:gen/ 'the (foot)steps'	stegen /stè:gen/ 'the ladder'
Polen /pó:len/ 'Poland'	pålen /pò:len/ 'the pole'

The words were presented within a frame sentence: “Det var X jag menade” (‘it was X that I meant’). There were three recordings of every sentence, to avoid that the subjects found other cues for discriminating the sentences. In the test, two sentences were played after each other. The sentences contained words from each minimal pair, so either A1+A1; A2+A2; A1+A2 or A2+A1 were played. All together there were 9 repetitions of A1+A1; 9 repetitions of A2+A2; 9 repetitions of A1+A2 and 9 repetitions of A2+A1. The subjects were then asked if the words in the middle of the frame sentences were the same or different, with two different boxes to click. The subjects were able to repeat the sentences once by clicking another box. As already stated the same test was done twice, with the only difference that two different Swedish varieties were represented. One of the tests was constructed with a female 23 years old Central Swedish (below CS) speaker whose typical accent patterns looked like in figures (2) and (3):

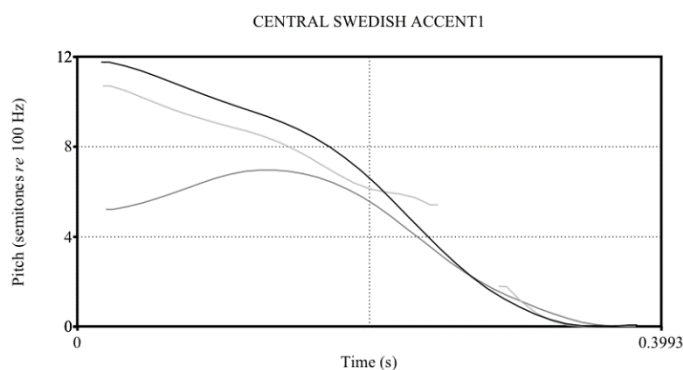


Figure (2). Central Swedish A1

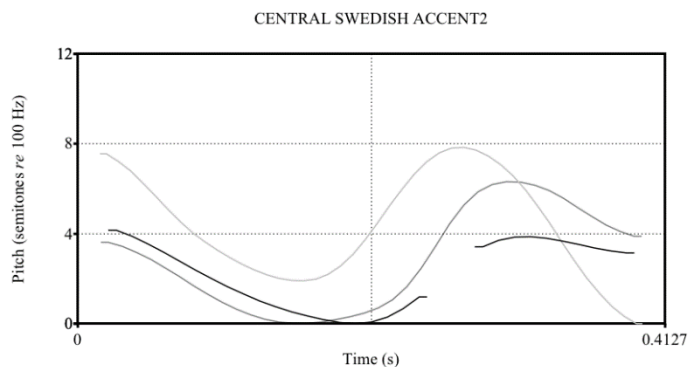


Figure (3). Central Swedish A2

The other one was constructed with a female 24 years old South Swedish (below SS) speaker whose typical accents looked like in figure (4) and 5.

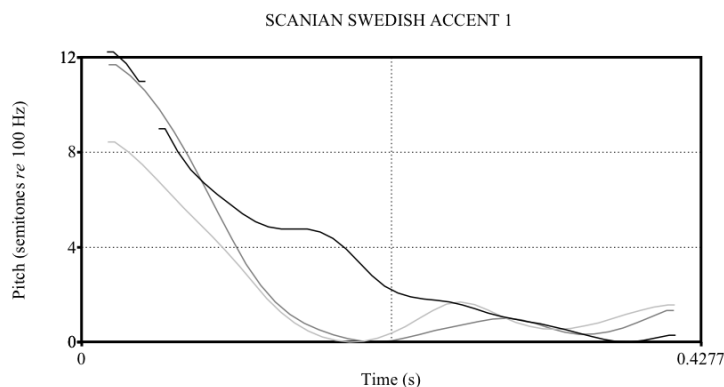


Figure (4). South Swedish A1

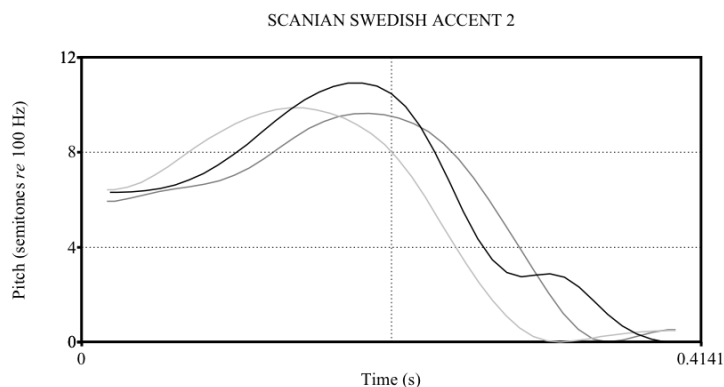


Figure (5). South Swedish A2

The CS accents fit into the 2A category of Gårding's typology, presented above in figure (1), and the SS accents fit into the 1A category of the same typology. The reason for doing the discrimination test with two different accents is that they are realized quite different in different varieties of Swedish. The subjects in Skåne are probably surrounded in everyday life by SS, but CS is the variety mostly heard on TV, on the radio, and in other media, so it would be interesting to see if there are any differences in the perception of the accents of the two different varieties. The subjects in Sundsvall are by far mostly surrounded

with the CS variety and therefore they were only tested on this variety. The subjects will be presented in detail below.

After the test they were asked to judge the difficulty of the test on a scale from 1 to 7.

In addition, an L1 Swedish speaking control group also took the test.

The results were then analyzed to find mean scores for the three different groups, presented below, and the scores for the Somali L1 group and the Swedish+Somali L1 group will be compared with the L1 Swedish group. The results were analyzed with a t-test to assure that there was statistical significance.

### 3.3 Additional information

After the test, information about the subjects was collected. They were asked about age, place of birth, when they started learning Swedish, what other languages they spoke and how they evaluated their Swedish in comparison with their Somali.

### 3.4 Informants

There are three subgroups of informants presented here: The first group consists of three speakers of L1 Somali and L2 Swedish. The second group consists of two speakers of both L1 Somali and L1 Swedish. The third group is the L1 Swedish speaking control group for the perception test. First off are the three L2 Swedish speakers:

One 33 year old female, born in Hargeiesa, Somalia, and raised in Kenya. She started learning Swedish when she was 28 years old. She was recorded in a school environment at the school in Helsingborg she was attending. She also spoke Swahili and Norwegian. Since Norwegian is also a word accent language with similar word accents as Swedish this should be taken in consideration. She had started learning Norwegian in Oslo at the age of 16. On the 1-10 scale she put Somali as a 10, Swahili as a 9, Norwegian at a 6 and Swedish as a 5. Below, this speaker will be referred to as AJ.

This informant is more surrounded with the SS accent patterns as she lives in Skåne and she had not been living in any other part of Sweden, making it possible to assume that her accent patterns would be the SS ones described above.

One 30 year old female, born in Mogadishu, Somalia. She started learning Swedish when she was 20 years old. She was recorded in her home in Sundsvall. She also spoke Dutch, English and Arabic. On the 1-10 scale she put Dutch, English, Somali and Swedish at 10 and Arabic at 6. Below, this speaker will be referred to as KA.

One 38 year old male, born in Mogadishu and raised in Lafoole, Somalia. He had started learning Swedish when he was 18 years old. He was recorded in his home in Sundsvall. He also spoke English. On the 1-10 scale he put Somali on 10, Swedish at 9 and English at 6. Below, this speaker will be referred to as RH.

These two informants are mostly surrounded with the CS patterns as they live in Sundsvall, and it was the only place in Sweden that they had been living. Since the CS patterns are much more common than the SS on TV and radio, they were only tested on this pattern in the perception test, and also because there was a lack of time when the testing took place. It is assumed that their Swedish accent patterns would be the CS ones.

None of these three informants had had any training of the Swedish word accents when they learned Swedish. Below, this group will be referred to as L2. The next informants presented are the two L1 Somali and L1 Swedish speakers:

They were both 16 years old. Both were born in Malmö and spoke Somali at home. They started acquiring Swedish in kindergarten, at 1-2 years of age. They were recorded in a school environment at the school they were both attending in Malmö. On the 1-10 scale they both put Swedish as a 9 and Somali as a 7. They will be referred to individually as NI and NN below. As a group they will be called 2L1.

The small number of informants and the variation of Swedish variety learned could affect the results. Other aspects that could affect language acquisition are not brought up in this thesis because of lack of space and time. Because of the variation of the informants, some variation is suspected in the results, and it will be brought up and discussed in the Results and the Discussion sections.

The Swedish control group that was tested on the perception part of the study consisted of 5 persons: 2 males and 3 females, with Swedish as their L1. They were between 20 to 25 years old and four of them spoke varieties of Swedish with CS accent patterns. The fifth one spoke both with the SS pattern and also the 2B pattern described in figure (1) above. Below, this group will be referred to as L1.

## 4 Results

In this chapter the results of the two different parts of the study will be presented. The results of the production test will be demonstrated first, followed by the results of the perception test.

### 4.1 Production test

The results of the production test will be presented speaker by speaker. The words are segmented from the onset of the first, and stressed, vowel of the elicited words. All sections will start with an overview of the A1 words and the A2 words and this will be followed by a closer presentation of things of interest in the results.

#### 4.1.1 AJ

These are the F0 curves of the target words by AJ:

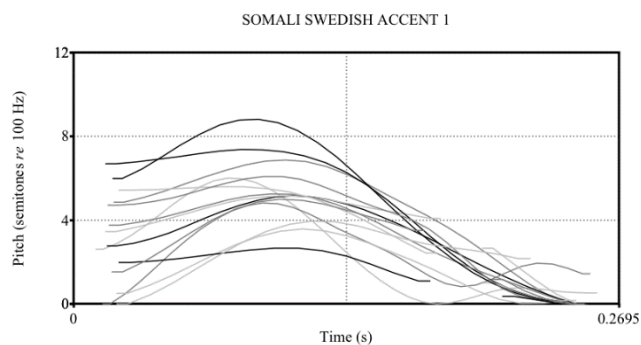


Figure (6). AJ, 14 instances of A1

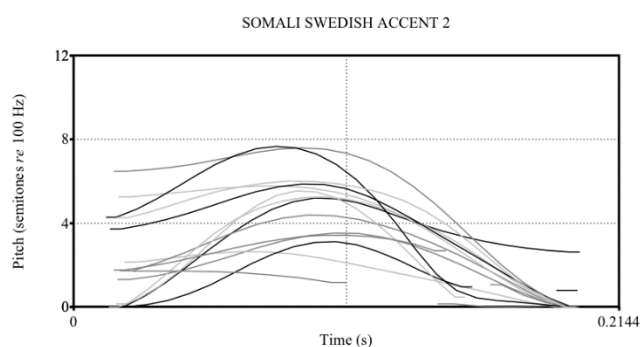


Figure (7). AJ, 14 instances of A2

Figure (6) and figure (7) shows 14 instances each of A1 and A2-words. There was a notable exception of one of the instances of A1 that is considered a mistake since there was only one example of it, and is therefore excluded from the diagram. There was a background noise artefact in one of the instances of the A2 words and that one is therefore also excluded. As can be seen, the accent patterns fit well in to the South Swedish accent patterns with an earlier peak in A1 and a later peak in A2. This is even clearer in figure (8) and (9) where some exceptions are excluded. This pattern is what would be expected since SS is the Swedish variety she has been learning and is surrounded with in everyday life.

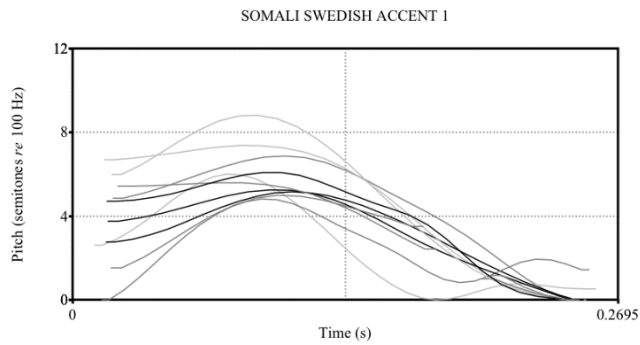


Figure (8). AJ, typical A1

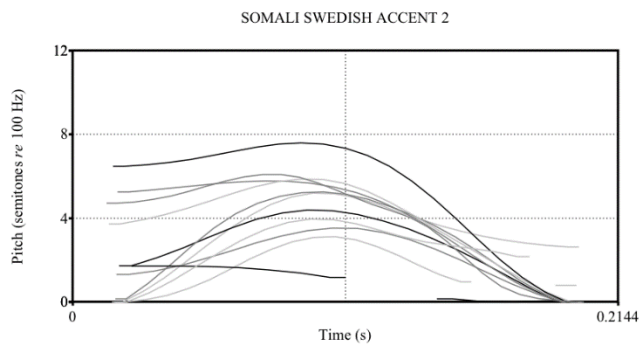


Figure (9). AJ, typical A2

## 4.1.2 KA

These are the F0 curves from KA:

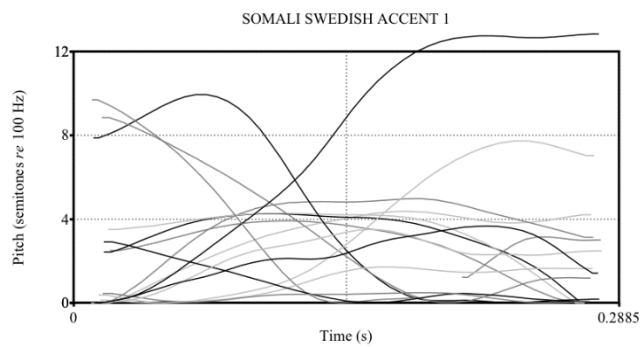


Figure (10). KA, 15 instances of A1

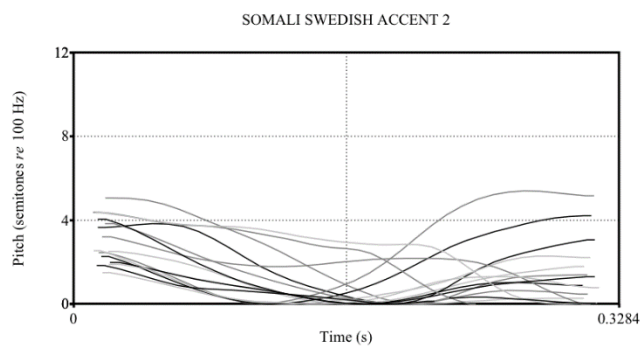


Figure (11). KA, 15 instances of A2

This speaker shows more variation in her accents, especially in the A1 words. However, within the A1 examples there are three different notable patterns.

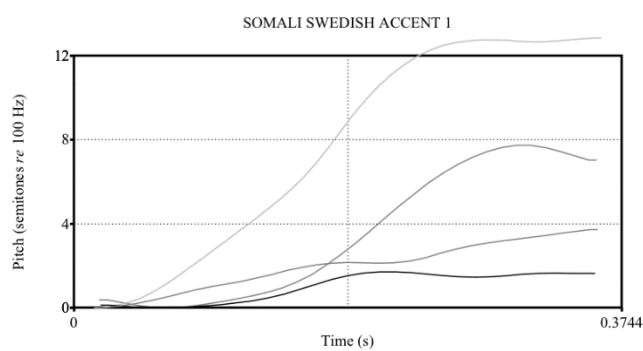


Figure (12). KA, A1 with a rise

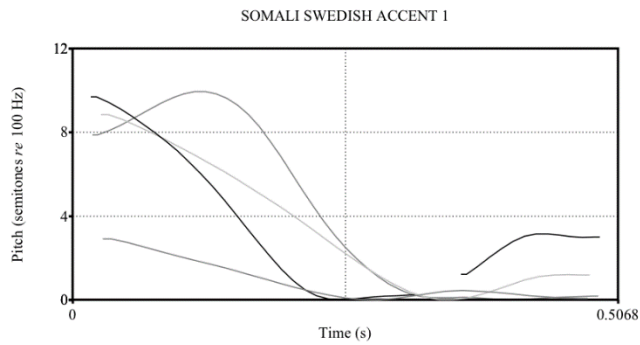


Figure (13). KA, A1 with early peak

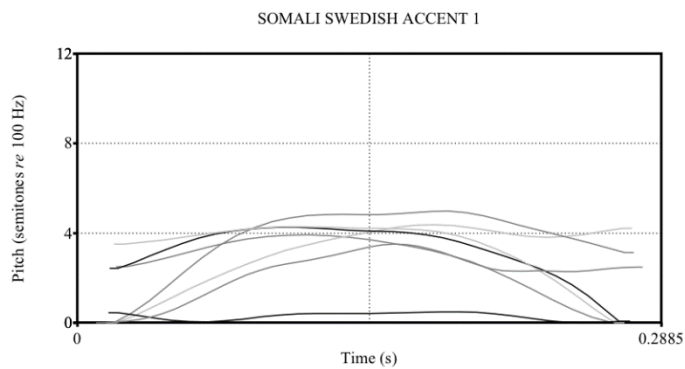


Figure (14). KA, A1 plateau pattern

Figure (12) shows the first pattern, an A1 with a rise. This accent pattern is not expected in any variety of Swedish. However, the other two patterns, with an early peak in figure (13) or the more plateau-like pattern in figure (14) should be considered reasonable Swedish A1-patterns.

As for the A2 patterns there are two patterns to be found in the different examples.

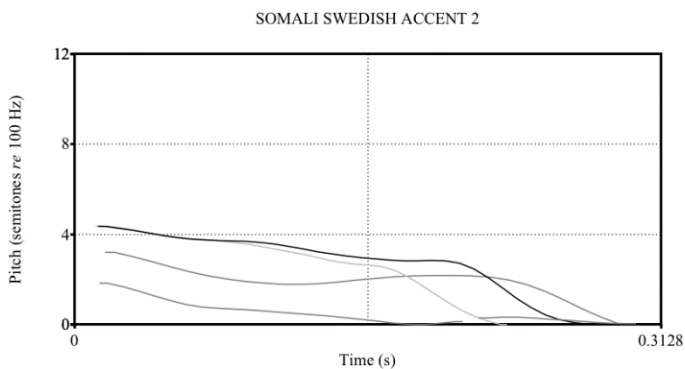


Figure (15). KA, A2 with plateau and final fall



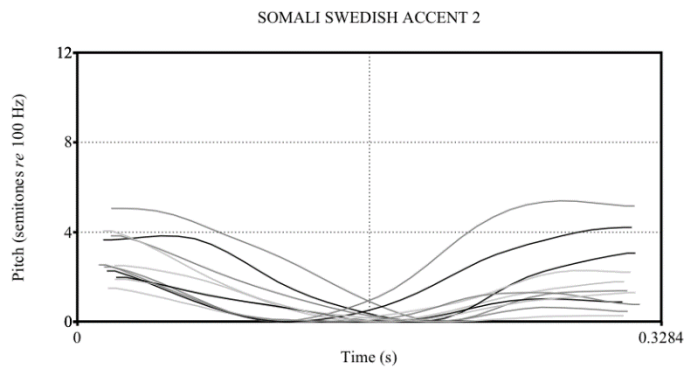


Figure (16). KA, double-peaked A2

The first one, shown in figure (15), with a plateau and a final fall is not expected to be found in any variety of Swedish. There were in total four instances of this pattern, and the second of her patterns, shown in figure (16) is therefore more common. This pattern is the one expected to be found in the variety of Swedish spoken in Sundsvall and fits well into the A2 pattern of the 2A variety in figure (1).

#### 4.1.3 RH

These are the F0 patterns spoken by RH:

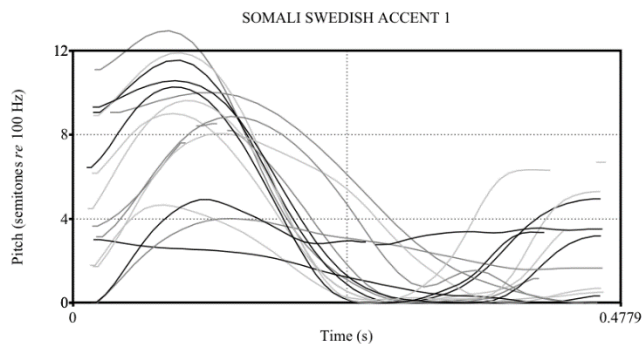


Figure (17). RH, 15 instances of A1

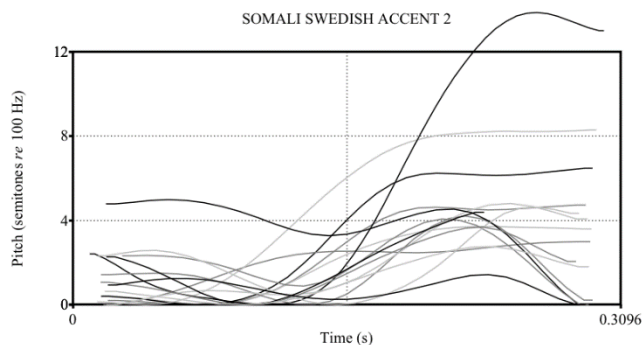


Figure (18). RH, 15 instances of A2

There is a reasonable consistency shown by RH. Some differences can be found, though. For the A1 there are two kinds of patterns:

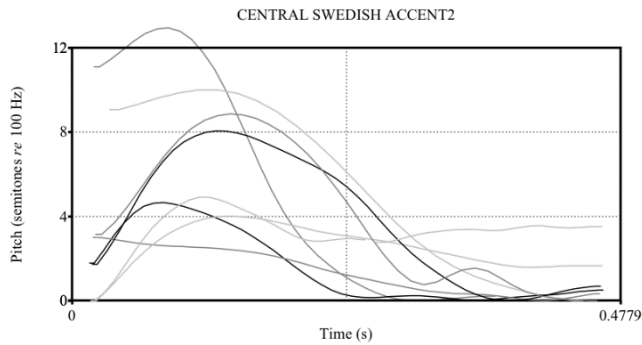


Figure (19). RH, A1 with one peak

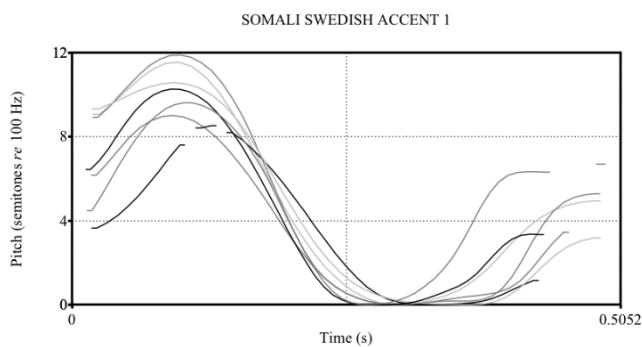


Figure (20). RH, double-peaked A1

Figure (19) shows what is expected with an early peak in the A1. However, figure (20) is kind of peculiar. A1 with two peaks are not what is expected to be found, but it will still be considered an acceptable A1 pattern. More about this will be discussed below.

As for the A2 two different patterns are seen:

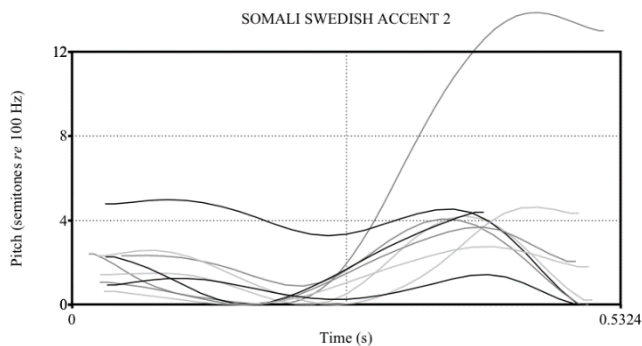


Figure (21). RH, two peak A2

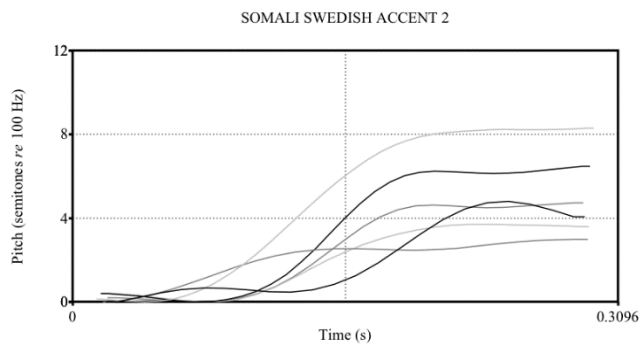


Figure (22). RH, A2 with one rise and plateau

Figure (21) shows an expected pattern, a two peak A2. However, figure (22) shows an A2 pattern with a rise and a plateau, something that is not expected to be found. What can be said, though, is that there is a notable difference between the different A1 patterns and the A2 patterns, and the patterns follow the general "rule" of a later peak in A2 than in the A1.

#### 4.1.4 NI

Now follow the results for the two speakers with Swedish as a second L1. First are the F0 curves for NI, and in the next section the results for NN are presented.

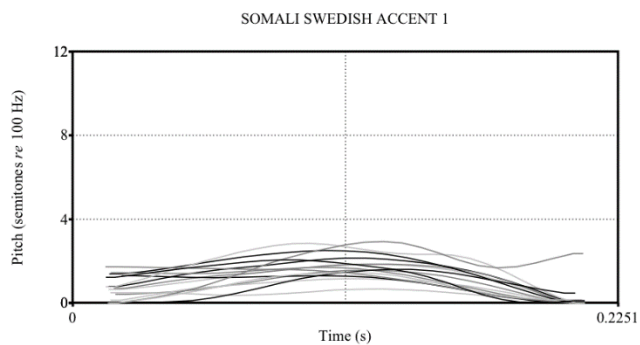


Figure (23). NI, 15 instances of A1

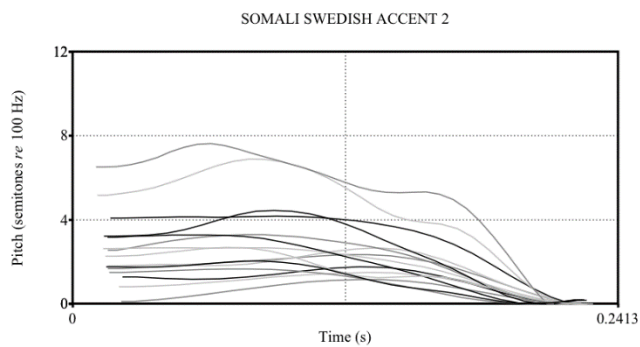


Figure (24). NI, 15 instances of A2

There is a notable and consistent difference between A1 and A2. The A1 in this case in almost every instance very flat, with just a very small movement in the F0 curve, while the A2 shows a more notable fall in pitch. However, the fall is not occurring later in the A2 than the A1 as expected in South Swedish. It is unclear if this should be described as an acceptable word accent distinction or not, and more of this will be discussed below.

#### 4.1.5 NN

This is the target words as spoken by NN:

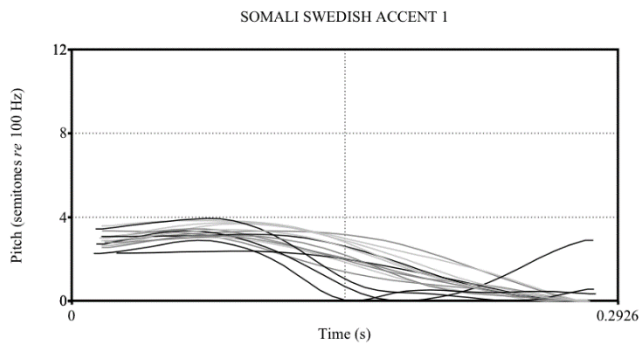


Figure (25). NN, A1

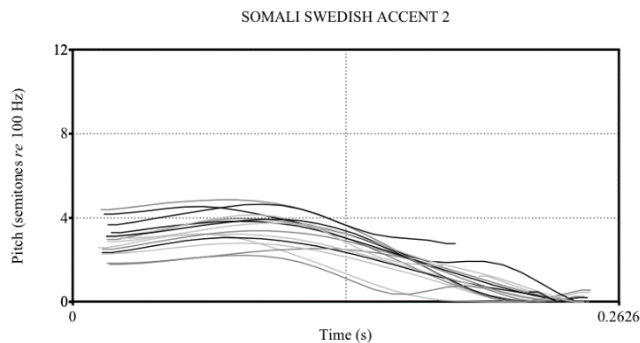


Figure (26). NN, A2

There is not any big difference found between the accent patterns in this case. In three of the instances of A1 the earlier peak, usually found in South Swedish can be seen, as in figure (27).

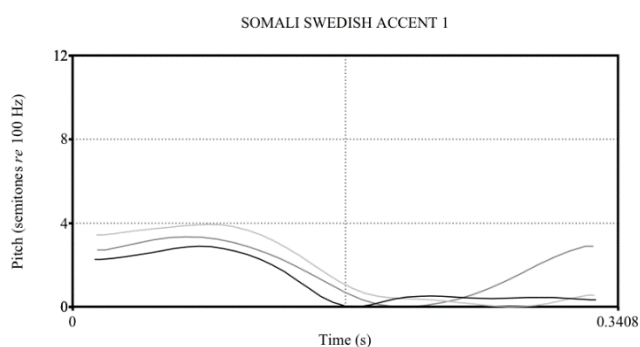


Figure (27). NN, A1 with early peak.

The F0 movement of the A2 is also a little bit bigger than in the A1 but not as much as the difference between the F0 curves of NI's A1 and A2.

## 4.2 Perception test

In this section, the results from the perception test are presented. Both the perception test itself and the reported difficulty of the test are shown in diagrams and tables.

The informants from Sundsvall were only tested on the CS word accents, because they are only surrounded with this accent pattern and there was also a lack of time when the testing took place. The informants in Skåne were tested on both accent patterns.

First, average numbers for the results of all speakers on both of the different Swedish varieties was extracted. The results are shown in figure (28) where the Y-axis shows the number of correct answers. 36 was the maximum score possible.

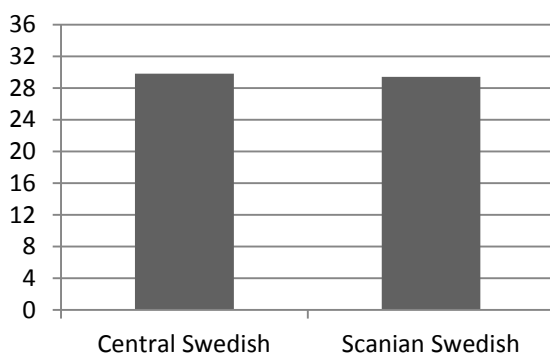


Figure (28). Mean score for CS patterns and SS patterns

The scores were 29.8 for CS and 29.4 for SS. A t-test was then made to see if there was any significant difference between the results for the different varieties, but it turned out that there was none ( $t = -0.143$ ,  $p = 0.888$ ).

Next, the mean scores for the three different groups, L2, 2L1 and L1 were compared. The results are shown in figure (29).

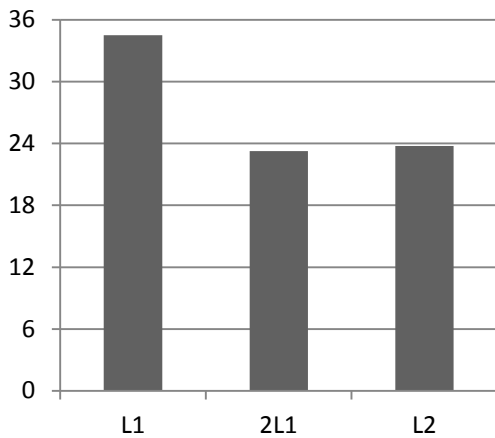


Figure (29). Mean scores for the 3 groups

The L1 group had an average score of 34.5; the 2L1 group had a score on 23.25; and the L2 group had a mean score of 23.75. The 2L1 group and the L2 group were then compared to the L1 group with a t-test and the differences were significant both for the 2L1 group ( $t = -7.596, p = 0.000$ ) and the L2 group ( $t = -7.259, p = 0.000$ ).

To have a better than chance score on the test one would have to have at least 24 correct answers. Both the 2L1 and the L2 groups show results that are not above chance. However, the data is very small and the individual difference was big. One particular result of interest was from AJ that had an above chance result (28) on the CS test but a random result (19) on the SS test, even though she made use of the SS pattern in the production test. This will be discussed further below in the discussion chapter.

The informants were also asked to report how difficult they found the tests on a scale from 1 to 7. Their answers can be seen in figure (30).

	1 Very easy	2	3	4	5	6	7 Very hard
AJ				CS		SS	
KA						CS	
RH							CS
NI			SS	CS			
NN				CS	SS		

Figure (30). Reported difficulty on the perception tests

AJ reported that the SS-test was much harder than the CS-test, putting a 6 on the SS-test and a 4 on the CS-test. It is also shown in the results that she performed better at the CS-test. KA put the CS-test as a 6, and RJ put the CS-test as a 7. NI reported the CS-test as a 4 and the SS-test as a 3. NN reported the CS-test as a 4 and the SS-test as a 5. It is unclear how much value these answers have and they mostly show that none of the informants found the test very easy, and that there were individual differences in how hard they thought the tests were.

## 5 Discussion

Here follows a discussion of the results. First, the results of the production test by itself will be discussed, followed by a discussion on the results of the perception test. Last in this chapter will be an overall discussion. Answers and discussions about the research questions posed in section 1.2 will be presented.

### 5.1 Production

The most striking thing to say about the results is that the speakers with Somali as an L1 that have learned Swedish as adults do produce word accents. The definition used was the one presented above in the Method chapter: that the word accents will be considered accurate if their patterns resemble the ones in Gårding's typology (figure (1)) and if the A2 contains a later peak than the A1.

In the case of AJ it was quite obvious that, except in some instances, the peak in the A2 target words was later than in the A1 words. She did not show any other patterns than single-peaked patterns. Moreover, the results from KA and RH were not as consistent, but there was still enough consistency in their use of different F0 patterns to consider the word accent distinction present in their Swedish.

KA produced 4 exceptions from the acceptable A1 pattern (figure (12)), and 4 exceptions from the acceptable A2 patterns. However, these instances are in minority to the acceptable ones.

RH showed two different varieties of A1. Roughly half of them contained the expected early single-peaked pattern (figure (19)), and the other half contained the early single-peaked pattern, but with an addition of a smaller second final peak (figure (20)). This second peak seems kind of peculiar but there could be different reasons for its presence. It could be a feature found in other speakers, possibly in Sundsvall. However, I have found no records on any specific investigation about the Sundsvall word accents to either confirm or deny this. All of the Norrland accents are lumped together with the CS variety in Gårding's typology (figure (1)) and maybe this variety could contain the second peak in the A1 that have showed up in these results. Some specification research on the different varieties in APs in Sundsvall, and in all of Norrland would be in place. Another possible scenario would be that it is a transfer of a continuation marker with a final high tone that is present in Somali (Saeed 1999). This could also explain the patterns in KA's figure (12) and RH's figure (22). This would then be a question of phrasing prosody.

His A2 patterns were mostly consistent with the expected double-peaked, but some showed, as already stated, a single-peaked pattern with a final high tone.



The two 2L1 showed some interesting results. They did not make any consistent difference with a later peak in the A2 than in the A1. However, NI did show a different pattern with a larger F0 range in the A2 than in the A1, as seen in figure (23) and (24), which might be perceived as a word accent. There could also be some signs of the same difference in NN's accents, as seen in figure (25) and (26), but it is much smaller and it is not really clear how this is perceived by other speakers. In addition, in some instances of NN's A1s, they contained an earlier peak than in the A2s (see figure (27)), so the results are not entirely clear. If one concludes that these speakers did not show any word accents in their results, this would mean that their variety of Swedish does not contain word accents. If this is just a case of their idiolects or a feature in a bigger variety must be left unsaid, because I have found no such study. It would be interesting to investigate the word accents or lack thereof in the Swedish spoken in the area where the two speakers were born and grew up, which is an area with a lot of different nationalities present and a lot of L2 Swedish speakers and 2L1 speakers with different L1s.

If one concludes that there might be signs of word accents in their Swedish, it could be interesting to record and analyze minimal pairs and see if they produce any difference between the word accents there, and how other speakers perceive this.

The results from this study confirm the findings of Tronnier & Zetterholm (2013a) in that Somali L1 speakers make use of word accents in their Swedish L2, even though the two 2L1 speakers might not have made this distinction. One should be careful to draw too big conclusions from this, though. There are only a few more speakers in this study compared to Tronnier & Zetterholm's two informants, and more would still be needed. However, this could imply that speakers with word accents in their L1 more easily acquire the word accents in an L2 that also makes use of this feature and confirms the Feature hypothesis.

The last thing to bring up to discussion about the results of the production test is how other Swedish L1 speakers perceive and value these accents, just like Tronnier & Zetterholm (2013b) have done. Do they sound native, acceptable or not at all? It is hard, though, to make this kind of study on the material from this study for some different reasons. One is that the target words recorded are not minimal pairs. Another is that the segmental features may not be native sounding and therefore affect the results in these kinds of studies. In conclusion: there is a lot more that could be done on this subject.

## 5.2 Perception

The results of the perception test are a bit surprising. Both the 2L1 group and the L2 group did not show a better than chance result. It would perhaps have been assumed that since the production test showed such results, the results of the perception test would have been higher. If one compares these results with the results of e.g. Schaefer & Darcy's (2013) study, and the statement in the Feature

hypothesis, higher rates would also have been assumed. However, there could be some reasons for why the results showed up like this.

One is the construction of the test. The different recordings of the same word could, even though the F0 curves were checked to be according to standard, have made the test too hard. Another aspect concerning the construction of the test is that the instructions given were perhaps not clear enough. Furthermore, since the subjects did not know what I was looking for, it could have been the case that they more carefully listened to other differentiating cues and missed the target of the test.

Another reason could be that the informants were unfamiliar with some of the words and since they were not presented in any context that was giving away any semantic clues, it was hard to guess what they meant, or that they meant different things.

However, from the data collected here, the results are clear and shown to have statistical significance: the L2 and 2L1 informants, as groups, did not perform better than chance in perceiving the Swedish word accents. One should note, as stated above, that the individual differences were big and one result in particular is interesting and will be discussed further here.

The fact that AJ showed South Swedish-like word accents in the production test but performed above chance in the CS perception test, and not above chance in the SS perception test, is surprising. It would have been assumed that she would be better at perceiving the word accents that she also made use of. This can be interpreted as an influence from Norwegian; the Oslo word accents are more similar to the CS word accents than the SS ones.

However, and yet again, more informants are needed to draw conclusions and more research remains to be done about what makes someone perceive an intonational feature of a language.

### 5.3 Overall discussion

First of all, let us go back to the Feature hypothesis to evaluate the results with said hypothesis as a take-off-point:

*"L2 features not used to signal phonological contrast in L1 will be difficult to perceive for the L2 learner and this difficulty will be reflected in the learner's production of the contrast based on this feature" (McAllister et al. 2002).*

To repeat what was said above in the Theory chapter: the hypothesis implies that it would be easier to pick up a phonological feature of the L2 if it is present in the speakers L1. In the case of this thesis, it would mean that the perception of Swedish word accents would be easier for a Somali L1 speaker than for a speaker of an L1 without word accents, and lead to an acquisition of the word accents in production as well. In this study that was not entirely the case. Surprisingly

enough, it was clearer in the results of the production test that the three Swedish L2 speakers made use of the word accents than it was in the perception test, since they did not perform above chance. The fact that word accents can be a part of production but not perception, at least not the conscious perception, could imply something about the unawareness of suprasegmental features. In addition to this it could be interesting to once again note that none of the informants were taught about the word accents in Swedish, so they might have been unaware of their existence and therefore did not perceive them, but they had still picked them up in their speech. If one compares this to the studies on Mandarin and Thai the awareness of the presence and function of their tonal features are quite possibly higher and there is a chance that this has affected the results.

Another question raised above was the question about how the difference between the Somali APs and the Swedish APs would affect the result, and especially if the two peak patterns would be harder to perceive and produce, but no evidence of this seems to be found. The informants in the area where double-peaked patterns were found in the variety used them in their speech and the informant in Skåne, where only single-peaked patterns are used made use of them, and there was, as stated, no significant difference between the scores in the perception test of the different patterns. There is also no evidence that the grammatical use of word accents in Somali and the lexical in Swedish affected the results.

To go forward with this kind of research more informants would be needed. Three adult learners, in this study, and two others in Tronnier & Zetterholm (2013a) is not enough to draw conclusions about the transfer of the sensitivity of intonational features, but it indicates that at least Somali L1 speakers are sensitive to the word accents in Swedish.

This study might imply that speakers of an L1 and an L2 at the same stage in the Tonal prominence hierarchy have an easier time acquiring the intonational features of this language in their production. However, what would be needed to draw these conclusions are studies with more informants. It would be interesting to see the same kind of research as in this thesis on both Somali L1 speakers as well speakers of other L1 with word accents, and L2 Swedish.

To be able to draw the conclusion that it really is the presence of this feature in the L1 that affects the acquisition of it in the L2 a lot more research could be done. It would be interesting to, just as Tronnier & Zetterholm (2013a) have done, test this hypothesis on L2 Swedish speakers with L1s of every stage in the tonal prominence hierarchy, and see if there is any connection between the stages in the hierarchy and the acquisition of the word accents.

## 6 Summary

In this thesis the Feature hypothesis has been tested on the acquisition of Swedish word accents. It has been investigated if Somali L1 speakers with Swedish L2 produce and perceive these word accents. The choice for Somali L1 is because Somali also make use of word accents, and the two languages, Swedish and Somali is therefore placed in the same level of the Tonal Prominence hierarchy. In addition a group of 2L1 speakers with both Somali L1 and Swedish L1 has been tested in the same way as the L2 group. In a discrimination test of the Swedish word accents it was shown that both the L2 group and the 2L1 group had significantly lower scores than a Swedish control group, and that none of the L2 and 2L1 groups performed better than chance in this test. The test was done on both SS patterns and CS patterns but the results of the different varieties showed no statistically significant difference. However, all the participants in the L2 group showed clearly in the production test that they made use and distinguished between the word accents. The production test consisted of read speech with elicited A1 and A2 words in focal position. The results 2L1 group was less clear. They did not make the distinction expected, but maybe distinguished between the word accents with other patterns. This could be interpreted as a feature of the Swedish variety they spoke.

The results of the perception test were surprising and not expected since the Feature hypothesis states that the production will be a reflection of the perceptions and in the L2 group this was not the case. However, the results of the production test indicates that Somali L1 speakers do make use of the Swedish word accents and in turn, this could indicate that it is easier to acquire the word accents of Swedish if the speakers L1 also make us of word accents.

## 7 References

- Bruce, G., 2010. *Vår fonetiska geografi*. Lund: Studentlitteratur
- Burnham, D., Francis, E., Webster, D., Luksaneeyanawin, S., Attapaiboon, C., Lacerda, F., Keller, P., 1996. Perception of lexical tone across languages: evidence for a linguistic mode of processing, *Spoken Language, 1996. ICSLP 96. Proceedings., Fourth International Conference on , vol.4.* 2514-2517
- Burnham, D. K. & Torstensson, C., 1995. Phonological bias and foreign accents: Perception and production of Swedish vowels and tones by English speakers, *ICPhS Proceedings, vol. 4*, 558 -561
- Ethnologue, 2013. <http://www.ethnologue.com> collected 15 november, 2013
- Flege, J. E., 1995. Second language speech learning: Theory, findings and problems. In: Strange, W. *Speech perception and linguistic experience: Theoretical and methodological issues*. Timonium, MD: York Press. 233-277
- Gottfried, T. L. & Suiter, T. L., 1997. Effect of linguistic experience on the identification of Mandarin tones, *Journal of Phonetics* 25, 207–231
- Kaiser, R., 2011. Do Germans produce and perceive the Swedish word accent contrast? A cross-language analysis. *TMH-QPSR*, 51(1), 93-96
- McAllister, R., Flege, J. E., Piske, T, 2002. The influence of L1 on the acquisition of Swedish quantity by native speakers of Spanish, English and Estonian. *Journal of Phonetics* 30. 229-258
- Puglielli, A., 1997. Somali Phonology, In: Kaye, A. S. and Daniels, P., *Phonologies of Asia and Africa Vol. 1*. Winona Lake, IN: Eisenbrauns
- Riad, T., 2006. Scandinavian accent typology. *Sprachtypol. Univ. Forsch. (STUF), Berlin* 59 (2006) 1, 36-55
- Roll, M., Söderström, P. & Horne, M, 2011. The marked status of Accent 2 in Central Swedish. *Proceedings from ICPhS 2011*, 1710-1713
- Saeed, J. I., 1987. *Somali Reference Grammar*. Wheaton, Md: Dunwoody
- Schaefer, V. & Darcy, I., 2013. Cross-linguistic perception of Thai tones is shaped by the functional prominence of lexically-contrastive pitch in L1. Presentation at New Souns 2013, Montreal
- Schötz, S., Bruce, G., Segerup, M., 2011. Dialektal variation i svensk ordmelodi – sammansatta ord. *Svenskans beskrivning* 31, Umeå universitet
- Thorén, B., 2005. Andraspråkstales realisering av svenskans kvantitets-distinktion. *Bidrag till Svenskans beskrivning* 28 Örebro universitet
- Tronnier, M., Zetterholm E., 2013b. Tendencies of Swedish Word Accent Production by L2 Learners with Tonal and Non-Tonal L1. *Nordic Prosody, Proceedings of the XIth Conference*, Tartu 2012. 391-400

- Tronnier, M. & Zetterholm, E., 2013b. Appropriate tone accent production in L2 Swedish by L1 speakers of Somali?
- Van Dommelen, W. & Husby, O., 2009. Perception of Norwegian word tones by Chinese and German listeners. In M. A. Watkins, A. S. Rauber & B. O. Babbista (Eds.), *Recent research in second language phonetics/phonology: Perception and production*, 308-321. Newcastle upon Tyne: Cambridge Scholars Publishing
- Wikipedia, 2013. Lista över svenska ordaccentsskilda minimala par. [http://sv.wikipedia.org/wiki/Lista\\_%C3%B6ver\\_svenska\\_ordaccentsskilda\\_minimala\\_par](http://sv.wikipedia.org/wiki/Lista_%C3%B6ver_svenska_ordaccentsskilda_minimala_par) collected 11 December, 2013