On final rises and fall-rises in German and Swedish

Ambrazaitis, Gilbert

Published in:
Proceedings FONETIK 2008

2008

On final rises and fall-rises in German and Swedish

Gilbert Ambrazaitis
Linguistics and Phonetics, Centre for Languages and Literature, Lund University

Abstract

This study explores the intonational signalling of a 'request address' in German and Swedish. Data from 16 speakers (9 Germans, 7 Swedes) were elicited under controlled conditions, and intonation contours produced on the test phrase "Wallander?" were classified according to their phrase-final pattern. Both 'rises' and 'fall-rises' were produced frequently by both Germans and Swedes, which is in line with Ohala's frequency code, but challenging for the Lund model of Swedish intonation.

Introduction

The tonal system of Swedish is usually said to differ largely from that of otherwise closely related languages such as German, Dutch, or English. One reason for this conception is, of course, the presence of the tonal word accents in Swedish, which are absent in the standard variety of, e.g., German. But the difference between the intonational systems of German and Swedish, as they have been described in the literature, goes far beyond the presence or absence of lexical tonal phenomena, respectively. Table 1 displays one example each of phonological accounts of Swedish and German intonation: the Lund model for Swedish (Bruce, 1998; 2005), and GToBI for German (Grice et al., 2005). They have been chosen because both are contemporary and formulated in terms of autosegmental-metrical (AM) phonology, i.e., they should be formally comparable.

Table 1. Accents and final boundary tones (b.t.) in GToBI for German (Grice et al. 2005) and the Lund model for Swedish (Bruce 1998; 2005).

function	Standard German *accents*	*b. t.*	Standard Swedish *accents*	*b. t.*
lexical			H+L*	
			H*+L	
non-lexical	H*	L-		
	L+H*	H-	H-	
	L*	L-%		L%
	L*+H	L-H%		LH%
	H+L*	H-%		
	H+!H*	H-^H%		

According to Table 1, Swedish and German differ not only with respect to lexical, but also largely with respect to non-lexical, or utterance-related, tonal features: While German has six different accents on the utterance-level, Swedish has only one, known as the 'focal accent'. A similar relation holds for final boundary tones. But the conclusion that Swedish has a much 'poorer' utterance prosody than German may, of course, only be drawn under the premise that the two models in Table 1 are (a) adequate and (b) equivalent, in the sense that they have been developed under equivalent conditions. However, it may be argued that Swedish and German intonation research are characterized by different preconditions and traditions to the extent that a formal comparison even of contemporary models does not reveal any reliable information on actual differences between the intonational systems of the two languages.

This study is part of a larger comparative project on Standard Swedish and Standard German intonation, from a communicative-functional perspective. Its general hypothesis is that there are more similarities than indicated by contemporary models (cf. Table 1). The general method is to elicit certain utterance types, or speech acts, defined by constructed (but realistic) discourse contexts, in both Swedish and German, keeping the material, the situational context, and the recording conditions as constant as possible.

This paper deals with one such utterance type, which may be labelled a 'request address' as exemplified by *"Wallander?"* in the following situational context: *A police officer from Ystad (Southern Sweden) to his colleague: "Wallander? Would you mind if I asked you for a favour?"* The goal of this paper is to gain a preliminary impression of the intonation patterns used by Germans and Swedes in such 'request addresses'. For that, a classification of the obtained intonation contours is undertaken, and the distribution of patterns, as well as the phonetic form of the most frequent patterns, is compared for Swedish and German. The classification concentrates on the phrase-final accent pattern, or the 'nuclear tune' in the British tradition, defined as the last (in this study, the only

one present) pitch accent in an intonation phrase plus the final boundary tone (cf. next section).

Phrase-final intonation patterns

For German, a large variety of phrase-final intonation patterns exists according to Table 1. For the purpose of this study, however, a less detailed classification will suffice: The nuclear pattern is either a 'fall', a 'rise', or a 'fall-rise'. A 'fall' has a high stressed or post-stress syllable and a low boundary tone (e.g., (L+)H* L-%, L*+H L-%); a 'rise' has a boundary tone higher than the last accentual tone (e.g., L* H-%, H* H-^H%); and finally, a 'fall-rise' has a high stressed or post-stress syllable, and a low-high sequence as a boundary tone (e.g., H* L-H%).

For Swedish, no such three-fold contrast has been described. The focal accent H- always involves either a high stressed syllable (words with accent I), or a high tone later in the word (words with accent II). Combining this H- with the two possible boundary tones in Table 1 results in a 'fall' (H- L%), or a 'fall-rise' (H- LH%), respectively. That is, a 'rise' (at least one connected to utterance-level prominence, cf. discussion), as defined for German above, is not recognized by the Lund model for Swedish.

Final rises (or fall-rises) are often associated with the notion of 'question intonation' or with 'continuation' in a variety of languages. For German, e.g., 'question' and 'continuation' intonation seem to differ in range and shape of the rise (Dombrowski and Niebuhr, 2005). Syntactic factors have some influence on whether a German question is falling or rising, but in general, in accordance with Ohala's (1984) *frequency code*, a rise signals a greater subordination of the enquirer towards the addressee (Kohler, 2005). Rising intonation may thus more frequently be found in connection with 'polite questions'. In Swedish, questions are typically said not to be marked by final rises (Gårding, 1979). The rising boundary tone LH% of the Lund model has in fact hardly been discussed from a functional perspective; one function that has been mentioned is the signalling continuation (Gussenhoven, 2004).

Hypothesis

According to the contemporary descriptions, Swedish and German intonation patterns should be expected to differ in the expression of a 'request address'. Considering a 'request address' as some kind of 'polite question', or at least a function connected with a subordination of the speaker towards the addressee, one would expect a rise, or possibly a fall-rise for German. For Swedish, on the other hand, a fall and a fall-rise are the only patterns offered by the Lund model, where the fall-rise is not associated with 'question intonation'.

Method and materials

German and Swedish subjects were asked to read test utterances from a computer screen in an experimental studio at the Humanities Laboratory at Lund University. All utterances constituted parts of constructed dialogues. For each test item, a short text describing a situational context was displayed on the screen, followed by the test utterance. The speakers were asked to 'render the test utterance as natural as possible'. Five repetitions of each item were recorded. There were 13 test items in total, and the whole list of 65 items was randomized. So far, 7 speakers of Standard Swedish (4 female), and 9 speakers of Standard German (6 female) have been recorded.

The test material of this study consists of one of the 13 items, the one-word phrase *"Wallander?"*, both for German and for Swedish. It constituted the first part of the test utterances *"Wallander? Skulle jag kunna få be dig om en tjänst?"* (Swedish), and *"Wallander? Dürfte ich Sie um einen Gefallen bitten?"* (German). The database of this study consists of all 5 repetitions by all 16 speakers, hence 80 renderings of *"Wallander?",* 35 by Swedish, and 45 by German speakers.

As a first step in data analysis, all intonation contours were categorized according to their phrase-final patterns as described above. The classification was done 'manually' (by inspecting the F0 contours, auditorily and visually) by the author. In a second step, differences between the German and Swedish realizations of the categories obtained in step 1 were looked for. For that, each token of *"Wallander?"* was segmented into 5 units corresponding to /(v)a/, /l/, /a/, /nd/, /de(r)/. The segmentation was done manually with the help of a spectrogram. All segments were fully voiced; initial fricatives (as possible realization of /v/) were, if present, excluded from the initial segment. The boundary between /nd/ and /de(r)/ was set immediately before the plosive burst of /d/. For the purpose of visual comparison, F0 contours were time-normalized, by representing each of the 5 segments by 10 equidistant F0 measurements.

Results

In most cases, a classification as either fall, rise, or fall-rise was unproblematic, since these contours were produced rather prototypically. There were only two cases (one for each language), where a decision between fall or fall-rise was problematic (there was a slight rise of less than 1 semitone). Four patterns (all by the same female Swedish speaker Fek) were classified as 'other': Two were actually falling, but lacked the typical rising focal accent H-, and two cases exhibited a high-level monotone throughout the word.

Distribution of patterns

Table 2 displays the distribution of the patterns obtained for Swedish and German speakers. It does, however, not include exact information on how the N occurrences of a particular pattern are distributed over the speakers listed under 'Speak.'. Most speakers in fact produced the same pattern type in all of their 5 repetitions. Only 4 of the German (Mas, Fjd, Fll, Fcf) and 2 of the Swedish speakers (Mnh, Fek) occasionally produced different pattern types.

Table 2 shows that each of the three nuclear intonation patterns (fall, rise, fall-rise) was produced by at least two speakers of each language. However, the German speakers most frequently chose a (simple) rising pattern, while the Swedes seemed to prefer a fall-rise. But note that the fall-rise was actually produced by only 3 of the 7 Swedish speakers, while the (simple) rise is distributed over 7 of 9 German speakers. In order to test for an interaction of language and preference for either a rise or a fall-rise, the data were re-arranged as follows: If a speaker had produced pattern X in at least 3 (of 5) repetitions, s/he was classified as a 'X speaker'. This arrangement is shown in Table 3.

Table 2. Distribution of nuclear intonation patterns by Swedish and German speakers. N = absolute number of items; Speak. = speakers who (at least once) produced a pattern; the first letter in speaker label indicates sex (M = male; F = female).

	German			Swedish		
	%	N	Speak.	%	N	Speak.
Fall	13.3	6	Mmk; Mas	17.1	6	Fss; Mnh
Fall-rise	17.8	8	Fjd; Fll: Fcf	42.9	15	Fkb; Fcw; Mmr
Rise	66.7	30	Fib; Fjd; Fkm; Fmt; Fcf; Mms; Mas	25.7	9	Mmu; Mnh
Unclear	2.2	1	Fll	2.9	1	Fek
Other	0.0	0	-	11.4	4	Fek
Sum	100	45	9	100	35	7

Table 3. Number of German and Swedish speakers who preferred either a rise or a fall-rise.

	German	Swedish	sum
'Fall-rise speakers'	*2*	*3*	**5**
'Rise speakers'	*6*	*2*	**8**
Sum	**8**	**5**	**13**

Fisher's exact test, however, revealed that the interaction between language and preference for either a rise or a fall-rise, which is slightly indicated by the data, is not significant (p=.2494).

Contour shape of rises and fall-rises

Figure 1 displays the mean F0 contours of the rises and the fall-rises in semitones as produced by the relevant German and Swedish speakers (cf. Table 2). Since F0 was not speaker-normalised and the curves emerge from speakers of different sex, the *absolute height* of F0 values should be ignored. However, F0 movements, or *relative heights*, may be compared, since the F0 measure used is logarithmic.

Both for the rise and for the fall-rise there appears to be at least one salient difference between the Swedish and German productions: As for fall-rises, the final rise spans about 5

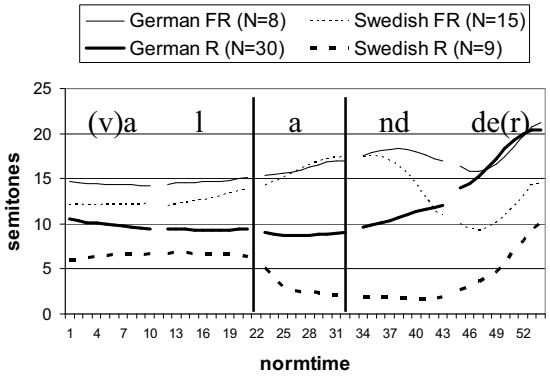

Figure 1. Average F0 contours in semitones (0 semitones set to 100 Hz) of rises (R) and fall-rises (FR) by German and Swedish speakers. Time is normalized (10 data points per segment); the breaks in the curves indicate segment boundaries; vertical lines mark the vowel of the stressed syllable. Observe that the curves are based on productions from speakers of different sex: German FR (female); German R (female and male); Swedish FR (female and male); Swedish R (male).

semitones for both Germans and Swedes, but the relative height of the end point differs crucially: it is higher than the accentual F0 peak for German, but lower than the accentual ('focal') peak for Swedish. Furthermore, the accent peak appears to be timed somewhat later in the German compared to the Swedish data. As for the rises, there is a pronounced tonal step down from the pre-stress to the low stressed syllable in the Swedish productions, which is very small in the German data. There was only little variation among the repetitions within each category and language regarding these characteristics.

Discussion

In this study, at least two different pattern types – a rise and a fall-rise – resulted from the elicitation of a function labelled 'request address'. Whether these two types represent two equivalent strategies for expressing the same function, or whether they in fact express different functional nuances that have not been controlled, will have to be tested in future research.

However, the results indicate that some form of rise ('rise' or 'fall-rise') is the most frequently occurring final pattern in connection with a 'request address', both in German and in Swedish. This is in line with the *frequency code* (Ohala, 1984), which associates high or rising pitch with the expression of subordination, in contrast to low or falling pitch, signalling dominance. However, the result challenges the Lund model, since the rising boundary tone (LH%) offered by the model has so far not been associated with the signalling of subordination.

The most salient difference found between the German and the Swedish data concerns the step from the pre-stress to the stressed syllable in the 'rise' patterns, which is very pronounced in the Swedish, but very small, if not absent, in the German data. This is in line with the Lund model, which predicts such an 'early fall' for accent I when a rising focal accent (H-) is missing. In fact, the only possibility of the Lund model to deal with these rises is to describe them as a non-focal accent I plus rising boundary tone (H+L* LH%).

However, utterances of the type discussed here ('request address') have traditionally not been within the scope of the Lund model, which is actually based on 'statements' only. These may be realized by several prosodic phrases, and the Lund model assumes that each of such phrases contains at least one 'focal accent' (actually, the term 'phrase accent', as used earlier, would be more appropriate, since a statement consisting of two phrases with one 'phrase accent' each could still have only one word in 'narrow focus').

Thus, the Lund model analysis H+L* LH% for the rise is problematic, since it renders a phrase lacking any 'phrase accent'. In a comparison with other Germanic languages, the original assumption by the Lund model is plausible, since at least one word in a (non-interrupted) phrase in, e.g., German and English, is always conceived of as 'accented' (necessarily on the phrase/utterance level). It has been argued that Swedish, like German, has an 'early falling' accent on the utterance-level as well, which is used in the expression of 'confirmation' (Ambrazaitis, 2007). The present Swedish data could also be analyzed in the light of this earlier finding, i.e., as instances of a *low utterance-level* accent, which exists besides the classical rising 'focal accent' H-.

References

Ambrazaitis G. (2007) Expressing 'confirmation' in Swedish: the interplay of word and utterance prosody. Proc. 16th ICPhS (Saarbrücken, Germany), 1093–1096.

Bruce G. (1998) Allmän och svensk prosodi. Lund: Institutionen för Lingvistik.

Bruce G. (2005) Intonational prominence in varieties of Swedish revisited. In Jun, S.-A. (ed) Prosodic Typology: The Phonology of Intonation and Phrasing, 410–429 . Oxford: OUP.

Dombrowski E. and Niebuhr O. (2005) Acoustic patterns and communicative functions of phrase-final F0 rises in German: Activating and restricting contours. Phonetica 62, 176–195.

Grice M., Baumann S., and Benzmüller R. (2005) German intonation in autosegmental-metrical phonology. In Jun, S.-A. (ed) Prosodic Typology: The Phonology of Intonation and Phrasing, 55–83 . Oxford: OUP.

Gussenhoven C. (2004) The Phonology of Tone and Intonation. Cambridge: CUP.

Gårding E. (1979) Sentence intonation in Swedish. Phonetica 36, 207–215.

Kohler K. (2005) Pragmatic and attitudinal meanings of pitch patterns in German syntactically marked questions. AIPUK (Arbeitsberichte IPdS Kiel) 35a, 125–142.

Ohala J.J. (1984) An ethological perspective on common cross-language utilization of F0 of voice. Phonetica 41, 1–16.