Gothenburg Swedish word accents: a fine distinction

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Abstract

In a previous investigation (Segerup, 2003) the word accent manifestations in a number of West Swedish dialects and Gothenburg Swedish were examined. Contrary to the generally accepted picture of the word accent distinction the results showed no clear and systematic distinction between the word accents with respect to the timing and shape of the pitch contours. The present paper focuses on the pitch contours of the word accents in Gothenburg Swedish. The acoustic analysis shows that in focal position both accents involve a fall in the first (stressed) vowel and a peak late in the second syllable. The word accent distinction is carried by relatively small differences in the timing and/or the height of this fall. It will be suggested that the timing and height of the pitch contours in the stressed vowel enter into a 'trading relation' perceptually.

INTRODUCTION

The received wisdom is that the Swedish word accent distinction involves a specific time alignment of the word accent gesture. In accent 1 words, the word accent peak is timed earlier in relation to the stressed syllable than in accent 2 words. Additionally, accent 2 generally shows a more stable and consistent pattern in relation to the stressed syllable than accent 1. Not only is the timing of the word accent gesture relevant for the distinction between the two word accents, but also for dialectal identity. The difference between the dialect types - South, East, Central and West - is the absolute timing of the word accent peak in relation to the stressed (accented) syllable (Gårding, 1973, with Lindblad, 1975).

Each of the word accents has a focal and a non-focal phonetic representation, respectively. In one-peaked dialects (South, East) where the pitch contour of a disyllabic accent 2 word has one peak, there is an overlap of word accent and focal accent manifestation, whereas in two-peaked dialects (Central, West), where the pitch contour of a disyllabic accent 2 word has two peaks, the focal accent is separated from the word accent (Bruce & Gårding, 1978).

In this view, the pitch contours of the word accents in West Swedish, where the prototype is Gothenburg Swedish, involve one peak in the post-stressed syllable for accent 1 words and two peaks, one in each syllable, for accent 2 words. This representation, however, may not apply to Gothenburg Swedish since, according to Bruce (1998), Gothenburg Swedish is characterised by two-peaked pitch contours for both word accents with an earlier timing in accent 1. Hitherto, however, there has been no systematic study of the word accents of Gothenburg Swedish, and it is this gap which the present paper aims to rectify.

EXPERIMENTAL DESIGN

Materials, subjects and speaking mode

The basic approach was to measure F0 at specific points in the pitch contour of contrastive disyllabic accent 1 and accent 2 words (a total of 10 word pairs). For the elicitation of the word accents in initial/medial/final positions and pre-focal/focal positions, several sets of sentences, questions and statements, were designed.

Speakers were 5 elderly male native speakers of Gothenburg Swedish. The recordings were made on DAT tape in their home environment. The speakers read the various sentences (both statements and questions) in two different speaking modes: normal and loud/clear voice. One native Gothenburg Swedish interlocutor was engaged to read questions to which the subjects read the answer. The different speaking modes were attained simply by changing the distance between the interlocutor and the subject. The method proved to work very well for this purpose. Three repetitions of every sentence in each speaking mode (in random order) were recorded for all 5 subjects.

The materials analysed and discussed here comprise the accent 1 word *Polen* ('Poland')

and the accent 2 word *pålen* ('the pole'). Three tokens of each word per speaker were extracted from statement utterances in which they were in final focal position.

Acoustic analysis

The acoustic analysis involved segments' duration and pitch values at specific points. The 7 pitch measurement points were the following: the height of the preceding vowel, the start of the stressed (accented) vowel, the top corner of the fall, the bottom corner of the fall, the start of the rise, the phrase accent peak and the end. In Figures 1-4 below the different measurement points are marked by triangles in the pitch contour of accent 1 and squares in the pitch contour of accent 2.

Perception test

In order to verify whether Gothenburg Swedish speakers perceive the word accent distinction in their own dialect a perception test based on three speakers' production of the accent 1 word *Polen* and the accent 2 word *pålen* was designed. The words in final focal position were extracted from statements spoken in a clear/loud speaking mode. Three tokens of each word per speaker were included in the perception test and presented in random order. Six native Gothenburg Swedish speakers acted as subjects for the perception test (presented on a portable computer). The subjects' task was to listen (via headphones) to each token once (or at the most twice) and state whether they heard the word 'Poland' or 'pole'.

RESULTS

First, the results of the perception test will be reported briefly. Out of the 6 subjects 2 listeners made one error out of 18 trials and 1 listener made two errors (this listener had no hearing in one ear). The other 3 subjects made no errors despite all subjects being of an age at which some hearing loss can be expected. The overall correct identification rate of 96.3 % indicates clearly that the word accents are distinct.

The acoustic results are exemplified in Figures 1-4. Figure 1 shows the data for speaker GL's clear style. Here, as in each of the Figures, the pitch measurements for accent 1 are shown as triangles and those for accent 2 as squares. The bar at the bottom of the graph shows the duration of the stressed vowel for accent 1 and the bar at the top shows the same for accent 2. The contours are aligned at the start of the stressed vowel and earlier points are shown as having negative times relative to the alignment point.

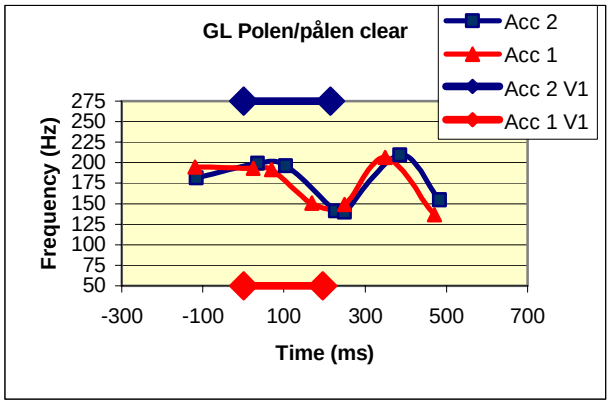

Figure 1. The average pitch contours for accent 1 (triangles) and accent 2 (squares) for speaker GL in clear speaking mode. The bars indicate the duration of the stressed vowel for accent 1 (bottom) and accent 2 (top)

It is immediately clear that the shape and timing of the pitch contour is strikingly similar for the two accents. Both accents involve a fall in the stressed vowel. As suggested by Bruce (1998) (see above), the fall is earlier for accent 1, but only marginally.

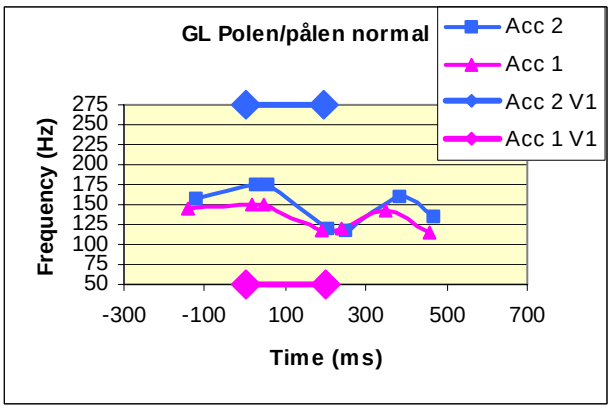

Figure 2. The average pitch contours for accent 1 (triangles) and accent 2 (squares) for speaker GL in normal speaking mode. The bars indicate the duration of the stressed vowel for accent 1 (bottom) and accent 2 (top)

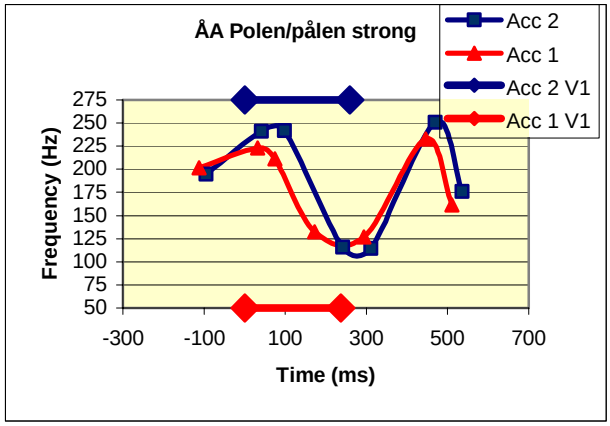

Figure 3. The average pitch contours for accent 1 (triangles) and accent 2 (squares) for speaker ÅA in clear speaking mode. The bars indicate the duration of the stressed vowel for accent 1 (bottom) and accent 2 (top)

Figure 2 shows the equivalent comparison for GL's normal speaking style. Here it can be seen that the fall takes place at effectively the same time for both accents, but that the word accent peak (and indeed the phrase accent peak) are higher for accent 2.

In Figures 3 and 4 speaker ÅA's clear and normal contours, respectively, are shown. For this speaker accent 2 is cued by both a later fall in the stressed vowel and a higher word accent peak in both styles.

DISCUSSION

The most striking finding is the similarity of the word accents in Gothenburg Swedish. In particular it is noticeable that the expected timing difference between accent 1 and accent 2 is less than in the other dialect types. Were it not for the perception test, there might be doubt as to the viability of the distinction. However the performance of the subjects as listeners leaves no doubt as to the robustness of the distinction.

As for the cues which support the distinction, from speaker ÅA it is apparent that both timing and pitch height may be playing a role. In both his styles, accent 2 is marked by a later fall in the stressed syllable and a higher word accent peak. In speaker GL, however, we see these two dimensions operating separately in the two styles. In clear style (where pitch is higher overall than in normal style), the distinction seems to be maintained only by a small difference in timing, whereas in normal style the timing of the fall is essentially identical, and the distinction relies on pitch height.

The overall picture from these two speakers and from the others not shown here suggests a possible 'trading relation' between pitch height and timing. The collaboration of these two cues may be described in terms of the 'pitch integral' of the stressed vowel, as outlined in Segerup (2004). The pitch integral reflects the overall percept of the pitch of the stressed vowel, and can be increased either by raising pitch or by lengthening the portion of the vowel carrying high pitch, as when the fall is delayed. This explanation will be further elaborated and tested in Nolan and Segerup (2004).

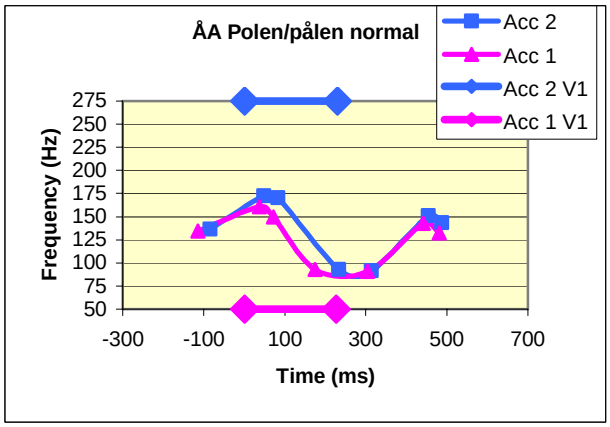

Figure 4. The average pitch contours for accent 1 (triangles) and accent 2 (squares) for speaker ÅA in normal speaking mode. The bars indicate the duration of the stressed vowel for accent 1 (bottom) and accent 2 (top)

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