STOCKHOLM ACCENTS IN FOCUS

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INTRODUCTION

The main purpose of this investigation is to determine how the fundamental frequency contours of Swedish sentences vary with accent (accent 1 or acute and accent 2 or grave) and focus in different dialects. In accordance with current terminology, the term focus is used to denote the new information in the sentence, i.e. "the information in the sentence that is assumed by the speaker not to be shared by him and the hearer" (Jackendoff 1972; 230). The old information, non-focus, is "the information in the sentence that is assumed by the speaker to be shared by him and the hearer" (op.cit).

The main result of my present report, which only concerns the Stockholm dialect, is briefly that the f_0 patterns of the accents in focus are specific, and not to be found in non-focus position.

PROCEDURE

A typical test sentence in my speech sample has the form of an answer to a question. The question is formulated in three different ways in order to make the speaker choose one of three possible parts of the sentence as the focus and carrier of primary stress. In the following example "One can buy white blouses " focus is indicated by capital letters:

Question 1:	What white things can one buy?
Answer 1:	One can buy white BLOUSES.
Question 2:	What blouses can one buy?
Answer 2:	One can buy WHITE blouses.
Question 3:	What can one do with white blouses?
Answer 3:	One can BUY white blouses.

There are three sets of test sentences in my material (A, B and C).

(A) Man kan {lämna¹ / anámma} nåra {långa² / längre} {nunnor³ / númmer}.

(One can {leave / accept} some {long / longer} {nuns / numbers}).

The numbers denote three possible focus locations. In each position there are words with accent 1 (´) or accent 2 (`). These words are disyllabic and stressed on the first syllable with the exception of the acute trisyllabic verb anámma, which is stressed on the second syllable. The first and second positions are separated by three unstressed syllables, the second and third by one.

(B) Man kan lämna nåra $\left\{\begin{matrix}\text{långa}\\\text{längre}\end{matrix}\right\}$ $\left\{\begin{matrix}\text{lámm}\\\text{laméller}\\\text{bumeránger}\end{matrix}\right\}$.

(One can leave some $\left\{\begin{matrix}\text{long}\\\text{longer}\end{matrix}\right\}$ $\left\{\begin{matrix}\text{lambs}\\\text{laminas}\\\text{boomerangs}\end{matrix}\right\}$.)

The second set has the same basic pattern as the first. The accent 2 verb only is used in the first position, and in the third position the number of syllables of the accent 1 noun is varied.

(C) Man kan lämna nåra $\left\{\begin{matrix}\text{Långalamm}\\\text{Långalameller}\\\text{Långanummer}\\\text{Långabumeranger}\end{matrix}\right\}$.

One can leave some $\left\{\begin{matrix}\text{lambs}\\\text{laminas}\\\text{numbers}\\\text{boomerangs}\end{matrix}\right\}$ from Lång.

In the third set the noun phrase - adjective and noun - occupying the second and third positions of the first and second sets is replaced by a compound noun (accent 2) whose first component has accent 2 when standing alone and whose second component has accent 1 when standing alone. The compound word has the same segmental structure as the corresponding noun phrase in the second set. The first component of the compound is to be interpreted as a place name.

Words with sonorant consonants have been chosen as far as possible to provide continuous, undisturbed f_0 curves of the utterances. Vowels with approximately the same degree of opening - non-high vowels - have been used to avoid differences in intrinsic f_0 (cf. Lehiste and Peterson 1961), which might complicate the interpretation of the contours. Moreover all the vowels are phonologically short.

The speech material, which consists of 50 sentences, was recorded in the sound studio of the institute according to routine procedures. The speaker was a female student of phonetics from Stockholm. Each test sentence appeared three times in three different order arrangements.

The recording was analysed with the aid of a pitch extracting device. The figures 1–6 are examples of the extracted f_0 curves. Intensity curves and oscillograms were used for segmentation.

RESULTS AND DISCUSSION

Accents in focus

Sentence final position. The observations made here are based on the f_0 tracings presented in the figures. One such tracing is only one instance of a test sentence. The other repetitions of a test sentence look about same.

The upper part of figure 1 shows the f_0 patterns used by my informant for disyllabic words in focus in sentence final position. These f_0 patterns are in agreement with those shown by earlier investigations (Meyer 1937, Öhman 1965 and 1967, Gårding 1967, Alstermark and Eriksson 1971, Gårding and Lindblad 1973). The main characteristics are summarized below.

ACCENT 2: nunnor [ˈnʉn:ɔr] = $C_1V_1C_2V_2C_3$, "nuns".
Rise in C_1, f_0 maximum at the beginning of V_1, fall, f_0 minimum at V_1C_2, rise, f_0 maximum at the beginning of V_2, fall, f_0 minimum at the end of V_2

ACCENT 1: nummer [ˈnʉm:ɛr] = $C_1V_1C_2V_2C_3$, "numbers".
f_0 minimum at the beginning of V_1, rise, f_0 maximum in C_2, fall at C_2V_2, f_0 minimum at the end of V_2.

Non-final position. The mid part of figure 1 shows the corresponding f_0 patterns in a non-final position: lämna, anamma, långa, and längre. The accent patterns of the two positions are similar except for the final part. In sentence final position for both accent 1 and accent 2 words there is an f_0 fall (see above), which is missing in non-final position. Instead there is a fall in the stressed syllable of the following stressed word (fig. 1, lower part). This fall seems to correspond to the final fall of the accented word in sentence final position. When there are several unstressed syllables between a word in focus and the following stressed syllable, the peak between the focus rise and the fall of the following stressed syllable becomes a plateau (fig. 1). Moreover the length of the plateau is determined by the accent of the word in

focus. An accent 1 word in focus will have a longer plateau, as can be seen in the lower part of figure 1.

Accents out of focus

As can be seen in figure 2 the f_0 pattern of the accent 2 word långa in non-focus position is partly similar to the corresponding focus pattern. We find an f_0 maximum at the beginning of the stressed vowel and a fall. In non-focus position, however, the f_0 minimum is not reached until C_2V_2 (compare compounds below). In addition the rise of the second syllable of the word in focus is totally absent out of focus. It seems as if the rise - in focus position - starts before the target f_0 minimum value is reached. In spite of greater f_0 expansion (higher starting point) in post-focal position compared to pre-focal, the same f_0 minimum value is reached.

The accent 1 word lángre (fig. 2) shows quite a different pattern in non-focus positions than in focus position. In both pre-focal and post-focal positions we find a fall in C_1 to the f_0 minimum, which is reached at the beginning of the stressed vowel. The fall is much larger in post-focal positions, having started from a much higher frequency. The low level is maintained throughout the word. The rise and the following peak, features which are regarded as typical of accent 1, are totally absent. We notice also that the f_0 minimum value here is lower than in focus positions. The non-focus value may - also for accent 1 - be interpreted as the target, which is not reached in the focus word, the rise preventing the target f_0 minimum from being reached.

Corresponding differences between focus and non-focus position are found also for the pairs lämna/anámma and nùnnor/númmer (fig. 2). In the last pair the difference in frequency range in the two positions after focus is large, but the pattern remains the same, i.e. the timing of the fall and the reaching of the f_0 minimum in both the accent 1 and the accent 2 word is approximately the same in the two positions. Although the fall is about 75 Hz in the first position after focus and only 10-15 Hz in the second position after focus, the same f_0 minimum value is obtained in both cases.

The obvious difference between focus and non-focus position is the f_0 rise and the f_0 peak, which is present only in the focus words inde-

pendently of accent. It is evident from the lower part of figure 2 that it is the same tonal phenomenon that is found in both the accent 1 and the accent 2 words. The accent 1 and the accent 2 words in focus, can be decomposed - regarding their f_0 manifestations - into one accent-dependent part which is different for the two accents, and one accent-independent part (focus part) which is the same for both accents. The timing of the focus part is different, however, for the two accents.

The f_0 data presented here show that accent 1 - like accent 2 - has a stable f_0 pattern of its own even out of focus. According to my analysis accent 1 is a "true" word accent on a par with accent 2. It is not merely stress and sentence intonation as has been proposed (see e.g. Haugen 1967, Elert 1970, Gårding 1970).

The accent distinction

In figure 3 the f_0 manifestations of accent 1 and accent 2 in non-focus position are compared. It appears that the accent distinction - as far as the f_0 patterns are concerned - is retained in non-focus position, both before and after focus (for another interpretation see Gårding 1967). The main difference is in the timing of the fall in connection with the stressed syllable. The fall of an accent 1 word comes in the prevocalic consonant of the stressed syllable, whereas in an accent 2 word the fall does not start until the stressed vowel has begun. The timing difference, which is about 100 msec, results in an f_0 maximum for accent 2 and an f_0 minimum for accent 1 at the beginning of the stressed vowel. The frequency difference between accent 1 and accent 2 is greatest in a position directly after focus and least in the second position after focus, where we find a very slight difference. For the positions before focus, the difference is intermediate. It can be observed that the fall is often steeper in the accent 1 words.

In figure 5 we can observe that the f_0 peak value of the pre-tonic syllable of läng*re*, which belongs to the preceding word, is approximately the same as the corresponding value of the stressed syllable of lå*nga*. It seems to be the same peak for both accents; there is only a difference in timing.

The difference between position before and after focus should be noted. In position before focus the f_0 peak - in the stressed vowel of accent 2

and in the pretonic vowel of the stressed syllable of accent 1 - is normally reached by a directly preceding rise, while in position after focus the f_0 maximum is the final part of a tonal plateau and has no directly preceding rise.

Although there is a systematic f_0 difference between accent 1 and accent 2 in the non-focus positions it should be tested, whether the accent distinction is not only an acoustical but also a perceptual reality. According to phonological analyses of Swedish the accent distinction is neutralized in non-primary stress position.

Accents in compounds and in two word phrases

So far we have considered the influence of focus position on f_0 in simple disyllabic words. In this section compounds and two-word phrases will be treated. In the Stockholm dialect compounds as a rule have accent 2. Secondary stress is attributed to the stressed syllable of the last component of the compound. Like simple accent 2 words compounds in focus have two tonal peaks: the first peak occurs in the stressed syllable of the first element, and the second one is tied to the syllable carrying secondary stress. This means that in long compounds like Lå̀ngalameller and Lå̀ngabumeranger (fig. 6) the peaks are well separated.

In post-focal position, compounds, like simple accent 2 words, have no second peak: when the fall from the peak of the first component has been completed, f_0 remains low throughout the word (fig. 6).

As is evident from figure 3 one difference between LÅ̀NGALAMM (compound noun in focus) and lå̀nga LÁMM (noun phrase with noun in focus) is a peak in the second syllable of långa (in the phrase), which does not occur in the corresponding compound (compare in fig. 3 also LÅ̀NGANUMMER - lå̀nga NÚMMER). At first glance one might assume that this peak is part of accent 2. The peak is, however, not present in the second syllable of långa in the examples lå̀nga LAMÉLLER and lå̀nga BUMERÁNGER, but occurs later in the phrase (fig. 4). The examples of figures 3 and 4 show that the peak occurs in the syllable preceding the stressed syllable of the accent 1 word in focus. Therefore the peak can be assumed to be tied to the following accent 1 and not to the preceding accent 2.

Comparing phrase pairs like långa LÁMM - längre LÁMM and långa NÚMMER - längre NÚMMER (fig. 5) we find for both phrase types a peak in the pretonic syllable of the accent 1 word in focus. In a phrase like längre NÚMMER this peak cannot possibly be tied to any accent 2. As mentioned above we find a peak in the pretonic syllable of an accent 1 word even in non-focus position (fig. 5). So it is clear that this peak is somehow tied to accent 1, although it can appear in a word preceding the accented one.

It is obvious from the data presented here that the f_0 pattern of a compound like LÅNGANUMMER is not merely a combination of one accent 2 part and one accent 1 part, as has been suggested (Öhman 1965, Alstermark and Eriksson 1971). The two word phrase långa NÚMMER contains a peak, which is not present in the compound, in the syllable preceding the last stressed syllable (compare also duration differences between the stressed syllable of accent 1 and the secondary stress syllable, Lindblom and Rapp 1973).

That the f_0 pattern of compounds is distinct from that of two-word phrases is also evident from the lower part of figure 4. In non-focus position the two-word phrase contains a tonal modification in connection with the last stressed syllable. The corresponding compound has no such tonal modification, as has been mentioned above.

An additional observation is that in the compounds of figure 6 the f_0 minimum is reached at C_2V_2; i.e. later than in the simple disyllabic accent 2 words in focus (fig. 1), but at the same point as in the non-focus accent 2 words (fig. 2). Whether or not the target f_0 minimum is reached evidently does not have anything to do with the compound/simple word distinction, but rather is dependent on the timing of the rise. In these compounds the rise towards the second peak does not start in conjunction with the first peak, so the fall is not interrupted but is allowed to reach its target minimum. As can also be seen in figure 6, there is no difference in f_0 minimum after the fall from the peak of the stressed syllable between focus and non-focus compounds.

SUMMARY

We can summarize the main findings of this investigation of the Stockholm accents as follows:

The main result is briefly that the f_0 patterns of the accents in focus are specific, and not found in non-focus position.

Accents in focus. Accent 2 has two tonal peaks and accent 1 one peak. In sentence final position there is for both accents an f_0 fall in the last syllable, which is missing in non-final position. In non-final position there is, however, a corresponding f_0 fall in connection with the stressed syllable of the following stressed word.

Accents out of focus. Words out of focus have a different f_0 pattern from words in focus: the tonal peak that is found in focus - i.e. the second peak of accent 2 words and the only peak of accent 1 words - is missing in non-focus position.

The accent distinction. The difference in f_0 manifestation for the two accents is retained even out of focus: accent 1 is distinguished from accent 2 by a difference in timing of the f_0 fall tied to the stressed syllable; thus at the beginning of the stressed vowel accent 1 has an f_0 minimum and accent 2 an f_0 peak.

Accents in compounds and two-word phrases. Out of focus compounds, like simple accent 2 words, have no second peak. A compound like LÅNGANUMMER does not have entirely the same f_0 pattern as a two-word phrase consisting of one grave and one acute word: långa NÚMMER. The two-word phrase contains a tonal modification - in both focus and non-focus position - which is not present in the compound.

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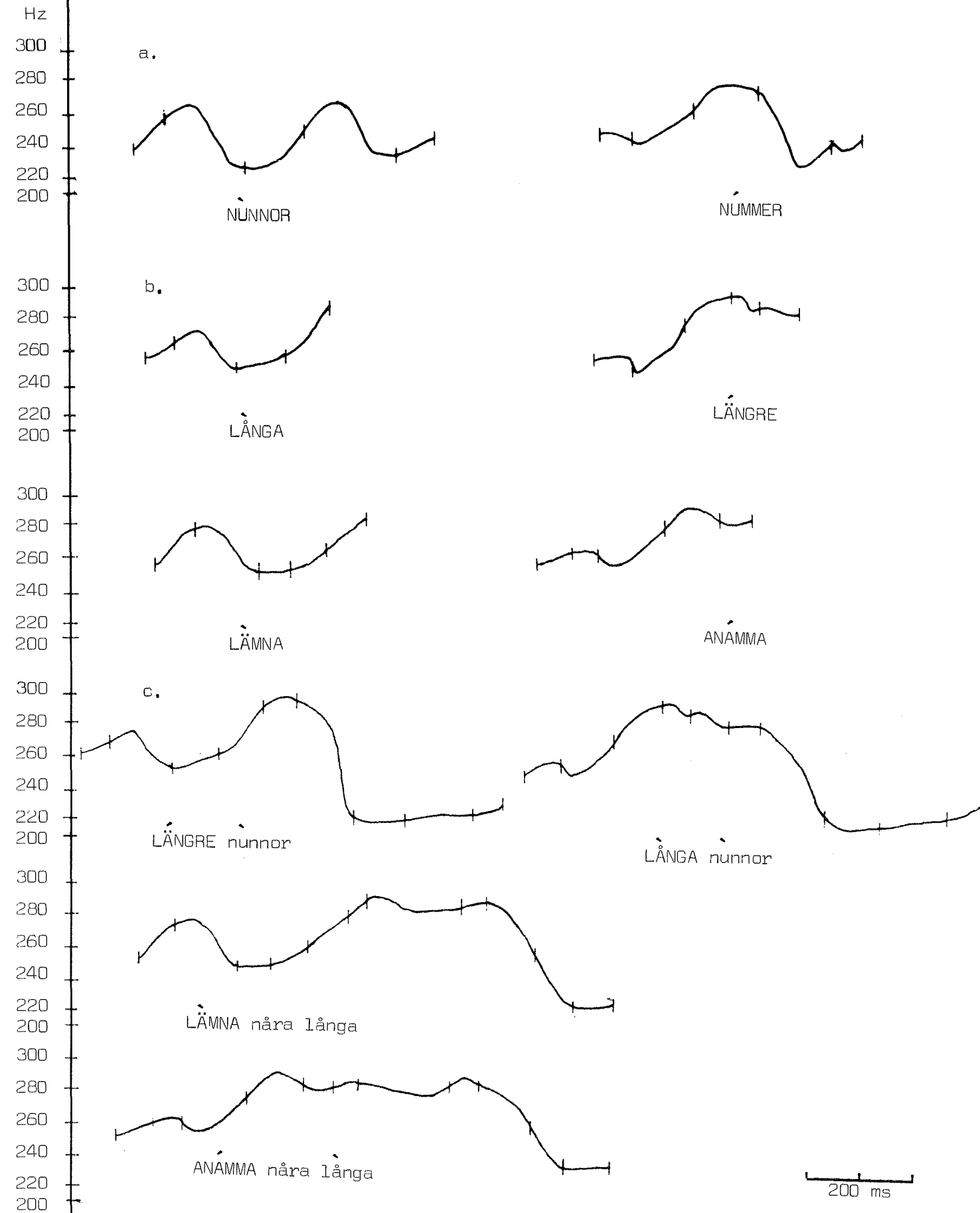

Fig. 1. Accents in focus. (a) Words in sentence final position.
(b) Words in non-final position.
(c) Phrases in non-final position. First word in focus.

Focus is indicated by capital letters.

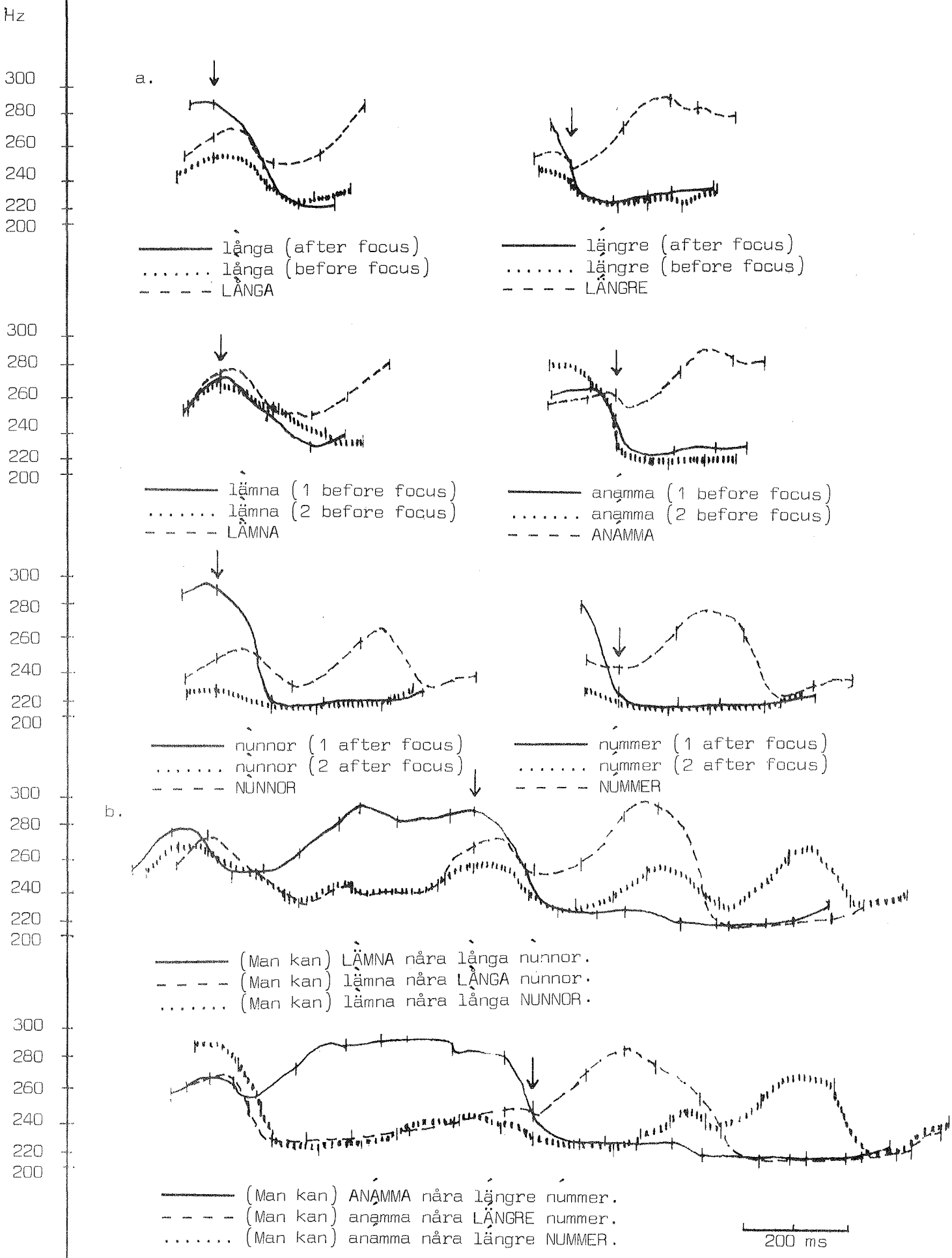

Fig 2. Accents out of focus with corresponding words in focus as a reference. (a) Words. (b) Sentences with different focus locations. ↓ = line-up point

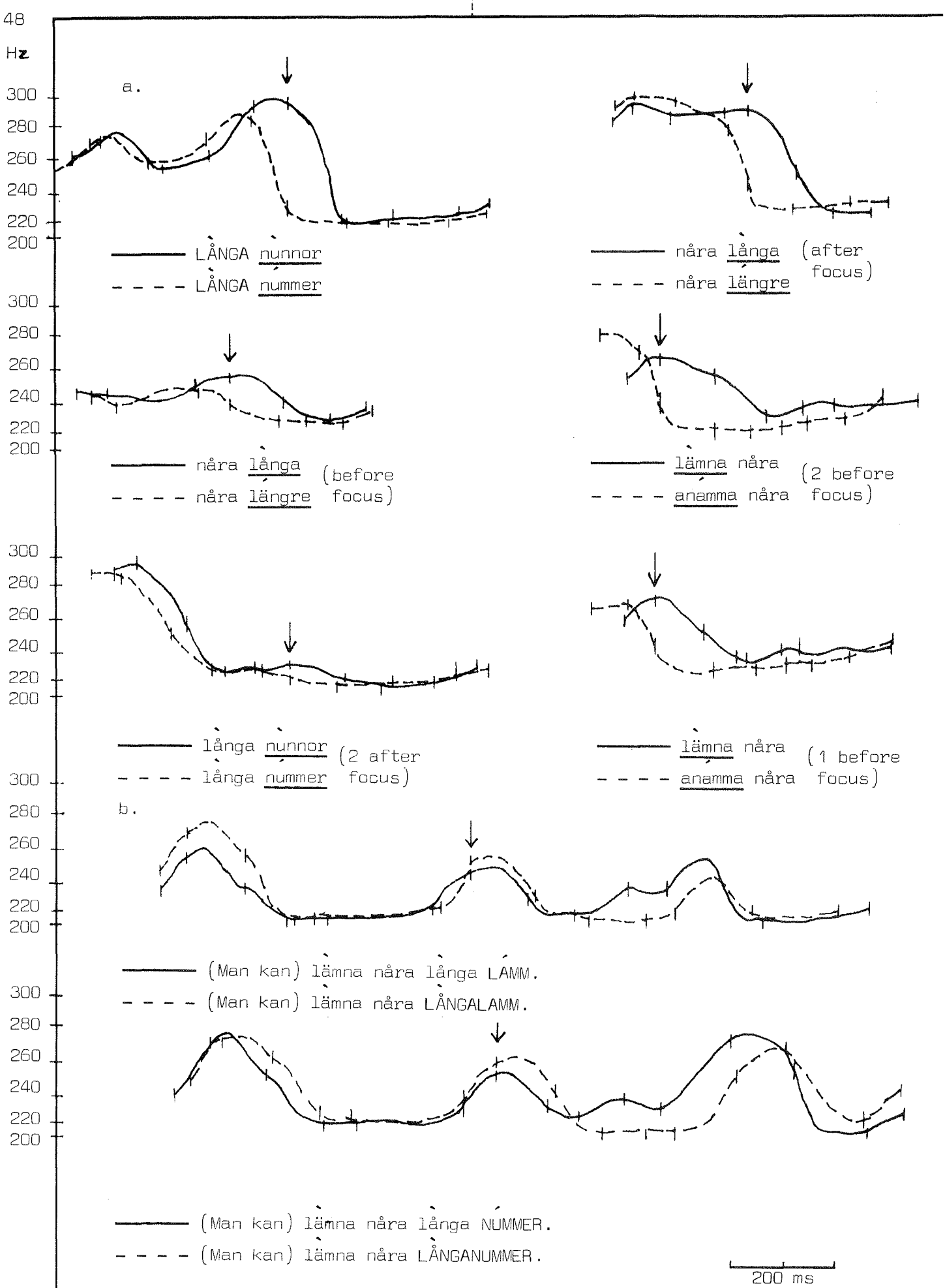

Fig 3. (a) The accent manifestations out of focus.
(b) Sentences with two-word phrases or compound words. Last word in focus.

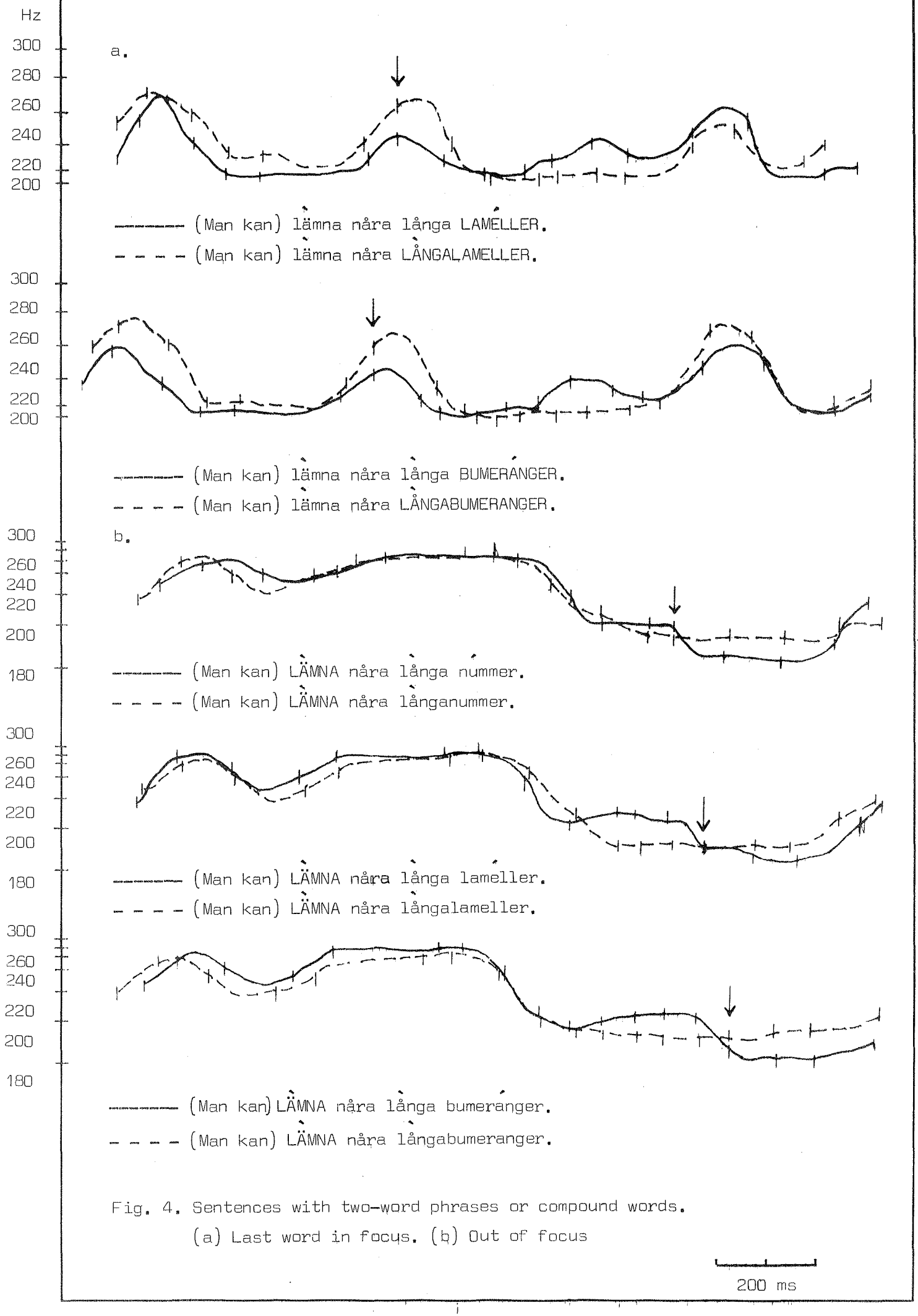

Fig. 4. Sentences with two-word phrases or compound words.
(a) Last word in focus. (b) Out of focus

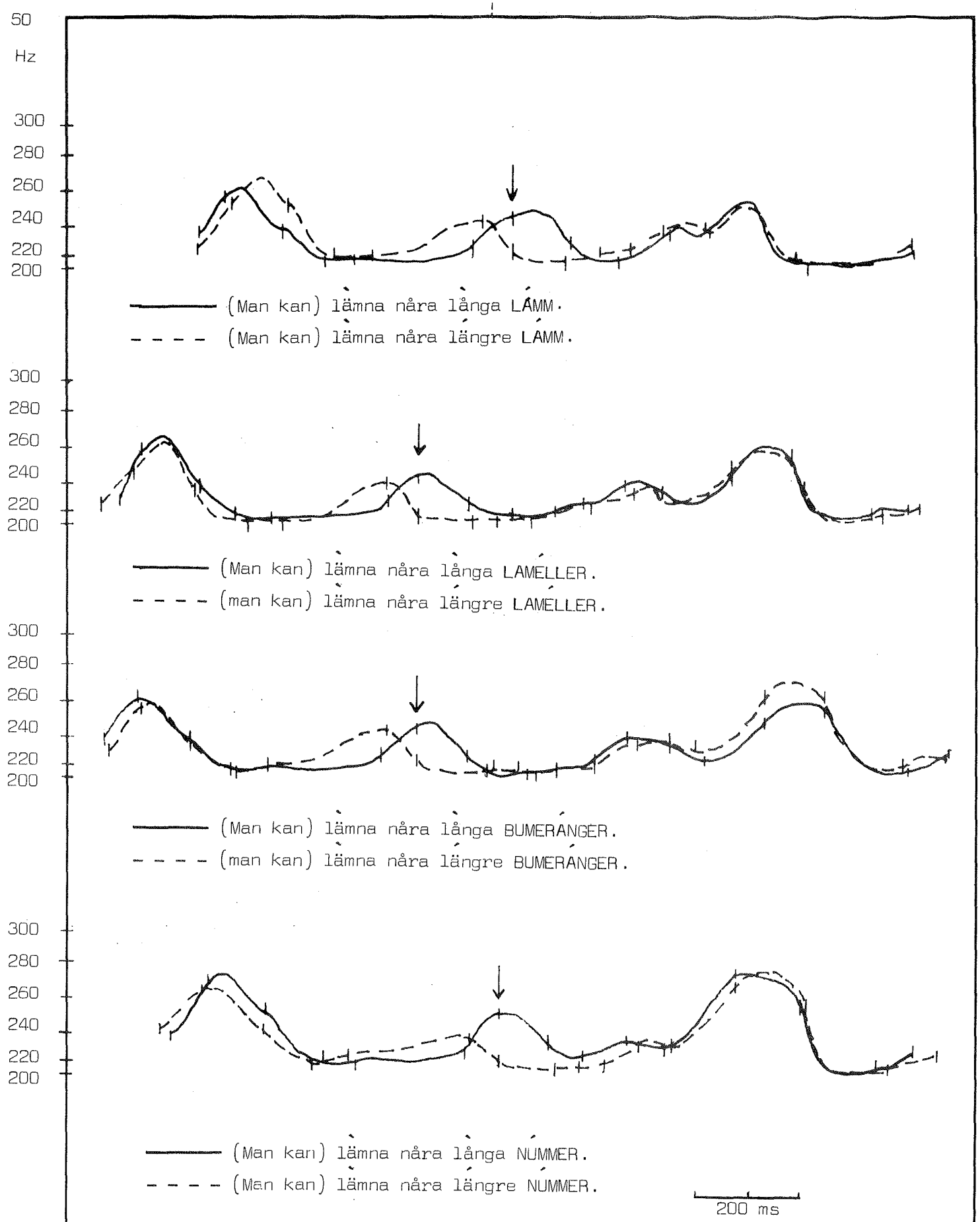

Fig 5. Sentences with two-word phrases: accent 1 + accent 1 or accent 2 + accent 1. Last word in focus.