

Remarks on question intonation in child-directed speech in Swedish¹

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INTRODUCTION

Investigating question intonation involves studies in sentence intonation as a whole. To find the characteristics of question intonation it is necessary to compare with non-questions. Statements are a natural choice. The situation for investigating child-directed speech is obviously the same. So adult-directed speech, in the form of both statements and questions, is needed as comparison for describing question intonation in child-directed speech. Descriptions of adults' sentence intonation in Swedish are found in Gårding 1979 and in Bredvad-Jensen 1983. These will be used as reference material for the present study which includes a presentation of a pilot study.

CHILD-ADJUSTED COMMUNICATION

The child acquires language in a dialogue where speech is functional and the adult's speech is directed towards the child and where the context is here and now. It is important that the adult shows interest in and pays attention to the child, and that he is cooperative and supportive. A poor language acquisition has been noted when the mother is depressed and uninterested in her child. It is commonly agreed upon that speech addressed towards small children represents a special speech register; see Ferguson 1977, (phonological and lexical features), Snow 1977 (semantical and redundancy features), and Garnica 1977 (prosodic and paralinguistic features) for reports of 'baby talk', which was a term often used at that time. Junefelt 1987 has coined the more adequate term child-adjusted communication, CA, which refers to both verbal and vocal as well as somatic aspects of communication.

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Both prosodic and paralinguistic features are clearly affected by CA (Garnica 1977). The pitch range is increased considerably. The pitch of voice is raised and there are more intonational variations. The speech tempo is slowed down. The loudness of the voice is varied, either increased or decreased. So acoustically both F_0 (fundamental frequency), amplitude and duration are changed in this special child-directed speech. This is especially evident in the sentence/phrase accented (or focussed) parts of speech. The new and important information in a sentence is singled out and emphasized in this special way by the adult. Entire utterances may also be characterized by a special 'tone of voice', which has been called 'nursery tone', the characteristics of which are the special emotional and affective qualities of the voice.

Although these facts are well-known, only few studies have been made using instrumental methods investigating CA, and even fewer have analysed the same speech material in both adult-directed and child-directed speech (only Garnica 1977, Jacobson et al. 1983, and Shute & Wheldall 1989 as far as I know). The major part of the reports on CA speech deal with the speech of American middle-class women. Shute & Wheldall report individual F_0 -data; other studies report average F_0 (for more than one speaker). No report that I know of has studied sentence intonation. My aim is to find text samples which may function in a natural way when addressed to children as well as when addressed to adults. In this way I will exclude many of the characteristic features in CA (phonology, lexicon, etc.), all of which are verbal, thereby focussing on whatever differences there may be for the vocal features (prosody, articulation, speech tempo and voice characteristics). Primarily intonation will be analysed and discussed.

THE ROLE OF DIALOGUE IN CHILD LANGUAGE ACQUISITION

For his survival the infant is dependant on an adult, usually his mother. Not only his material needs must be cared for, but also contact and communication with others are of vital importance for the little child. When the infant vocalizes, the adult often becomes silent (listening) and then responds in some way. In this way the adult trains the child into a form of dialogue called 'protoconversation'. This is established when the infant is 2-3 months old (Bateson 1979). Already in these early dialogues the child is an active participant; see for example Trevarthen and Marwick 1986. The child starts to communicate with cries, body movements and vocalizations

and later on with babbling. In this way he masters turntaking in dialogue form before he starts acquiring verbal language, which may then be seen as building a house on a foundation which is already there.

Apart from being a model for the child, CA prosody is supposed to both arouse and keep the child's attention, thereby facilitating the child's understanding and acquisition/learning. Waterson 1990 points to the fact that the prosody of nursery rhymes is used to chunk up texts into pieces appropriate for the processing of both perception and production for the little child. It is evident that the prosody of speech directed towards a one-year-old child is different from that directed towards a three-year-old. Is it possible to find a systematic change in the prosody of the adult depending on the age of the child? According to Vygotsky's theory about the proximal zone of development, the adult is one step ahead of the child all the time, and in that way he anticipates the child's learning (Vygotsky 1978).

SPEECH MATERIAL AND RECORDING SESSIONS

The major part of the earlier recordings of child-adult dyads have been spontaneous, natural dialogues. The traditional recordings in phonetic research are based on readings of texts written in advance by the researcher. The advantage of the first situation is obvious. The second one benefits from having a completely controlled text corpus, which is invaluable for doing intonational analysis, and also permits making high quality recordings in a studio. In a pilot study I have tried to combine the best of the two recording situations. Reading a fairy-tale to a little child is a natural communicative situation. Reading aloud to another adult is done in special situations, for example if you have just read an interesting newspaper article and you want to discuss it with your friend/husband/ etc. immediately and if he/she is doing something which prevents him/her from reading himself/herself. I try to recreate these two natural situations: reading to a child and reading to an adult in the recording studio. It is important that the adult (informant) is reading aloud to a listener in the adult-directed version also, not just reading aloud. Both the listener and the speaker are allowed to make interruptions, e.g. to ask questions and to make comments in the two recording situations. In this way the reading of the text will be embedded in a natural communication situation.

There are two written text versions, one for the child-directed situation and one for the adult-directed situation. Both texts contain six kernel sentences which are exactly the same for both versions, (see table one).

Table 1. Sentences included in both recording situations.

Focus positions	Statements	Questions
Initial	Manne lämnar alla nallarna. Manne is leaving all the teddy-bears.	LÄMNAR Manne alla nallarna? Is Manne LEAVING all the teddy-bears?
Medial	Manne LÄMNAR alla nallarna. Manne is LEAVING all the teddy-bears.	Lämnar MANNE alla nallarna? Is MANNE leaving all the teddy-bears?
Final	Manne lämnar alla NALLARNA. Manne is leaving all the TEDDY-BEARS.	Lämnar Manne alla NALLARNA? Is Manne leaving all the TEDDY-BEARS?

These six kernel sentences consist of voiced segments only. The questions have reversed word order. So in this study the same speech material, consisting of both questions and statements with different focus positions, has been recorded in two different versions: A) an adult-directed version and B) a child-directed version. The text samples have been chosen in such a way as to facilitate a comparison with Bredvad-Jensen 1983.

In the pilot study different texts were used in the adult-directed situation:

- 1) Reading of the same fairy-tale as in the child-directed version before the recording of the latter.
- 2) Reading of a list of sentences which were related to each other and among which the six kernel sentences were included.
- 3) Reading of sentences on cards, where each kernel sentence was surrounded by other sentences.
- 4) Reading of a whole text (newspaper article), where the kernel sentences were embedded in such a way as not to complicate the intonational comparison. This text was also constructed with the aim of making the reading aloud process easier for the informants and more natural.

INFORMANTS

Informants are adults (mothers and fathers) in adult-adult dyads as well as in adult-child dyads where the ages of the children range from one year old up to four years old. The reason for choosing these ages is that there is a general assumption that child-adjustment in speech to children older than three years of age only occurs on special occasions (the child is extremely tired/shows lack of concentration and it is necessary to attract the child's

attention by some reinforced means, for example by using child-adjusted speech).

The voice of the informant in the pilot study is a 'normal' voice which has not been trained in any way. It is a weak voice which exhibits losses of voice now and then. The informant found it hard to read some of the material, especially the earlier adult-directed versions, as she experienced the sentences with sonorants as tongue-twisters. The informant's dialect is a mixture of both Central and South Swedish influences.

AUDITIVE AND ACOUSTIC ANALYSIS

Only analysis from the pilot study, which was done with a mother-child dyad where the child was 3;5 years of age, will be referred to here. The auditive analysis of the interaction as a whole, which means the reading of the fairy-tale and the conversation which spontaneously arises when reading this text, shows very clear differences between the child-directed (CD) and the adult-directed (AD) versions. Some intonational adjustment can be heard in the CD version, especially as turnpassers (the mother tries to engage her child to take his turn in the conversation), but this adjustment is not heard in every sentence. A common feature, occurring in the CD version is the loudness of the voice, which is markedly lower for the CD version than for the AD version. Also, in the CD version many more and much longer pauses are used, and the voice quality is filled with warmth and tenderness as compared to the AD version.

The analysis of the Fo-curves of the six kernel sentences in the pilot study was complicated because of the informant's shifts in prominence and style. Most of the shifts of prominence were found in the second and third AD version (lists and cards). The AD speech in the figures below is taken from AD version four (text). AD version one was excluded from analysis at once as the informant, although she was reading the fairy-tale for an adult, here and there used her reading-to-a-little-child-voice. For AD versions two and three some sentences were found with exactly the same stylistic pronunciation as in the CD version. These sentences showed that there is no difference between AD and CD statements as far as Fo is concerned. For the medially focussed statements the initial word 'Manne' had both longer duration and greater amplitude in the CD version as compared to the corresponding AD versions two and three. This relation also holds for comparison with AD version four (text), which can be seen in Figure 1. In spite of the tonal variation here between the sentences (stylistic shift), it is

clear that the two sentences belong to the same Fo-range, and share the same Fo-maximum, and that the size of the Fo-movements (rise and fall) in the focussed words 'lämnar' is about the same.

In Figure 2 the medially focussed questions are shown (CD version and AD version four in all figures) and the stylistic variation results in the different manifestations of the third peak. In spite of the tonal variation here, it is clear that the Fo-range is shifted upwards and expanded in the CD version as compared to the AD version; the beginning is shifted up almost 60 Hz in the CD version. Fo-maximum is higher for the CD version and there is an extended Fo-movement in connection with focus.

Figure 3 is a comparison between statement and question with medial focus in the CD version. In the question, the Fo-range is shifted upwards (higher beginning) and expanded (the minimum values are the same for both sentences). Fo-maximum is higher and the Fo-movement in connection with focus is more extended in the question than in the statement. This comparison is in accordance with the descriptions of sentence intonation in both Gårding 1979 and in Bredvad-Jensen 1983, in spite of the fact that the tonal contours in Figure 3 are not stylistically homogenous.

Figure 4 is a comparison between statement and question with medial focus in the AD version four. Except for the stylistic difference in the tonal contours, the only possible sentence intonation difference between the two sentences is in the first peak, which is shifted up to a higher frequency range in the question. When listened to the question is heard as having question intonation. This is a much weaker question intonation manifestation than in the CD version above and than in the above mentioned studies. Bolinger 1978 has pointed out that an utterance can be more or less marked as a question. We have certain question markers available, morphological, syntactical, intonational etc., which can be used singly or in combination to make a question. The more question markers we use, the stronger the likelihood that an utterance will be perceived as a question by the listener. In Swedish reversed word order in main clauses is a strong interrogative marker, and such a sentence must not be manifested with question intonation in order to be perceived as a question.

DISCUSSION

To sum up, the differences between question and statement intonation in Swedish as clearly manifested here in the CD version are the following for questions in comparison with statements:

- 1) Wider Fo-range and shifted upwards
- 2) Higher Fo-maximum
- 3) Extended Fo-movement in connection with the focussed word.

1 above is a global feature, characterizing the sentence as a whole or a large part of it; 2 and 3 are local features characterizing small parts of the sentence (part of a word).

Now 1, 2, and 3 above also characterize the difference between CD questions and AD questions in this study. So the same parameters which are used to manifest a question in contrast to a statement are also used to manifest a CD question in contrast to an AD question. Parameters 1 and 2 are also used to mark involvement in speech (Bruce 1982). To find out more clearly which role these parameters play in manifesting questions, involvement, and child-directed speech, synthetic manipulations will be executed and then tested perceptually.

CONCLUDING REMARK

When the child is more than three years old one does not expect any regular child adjustment to occur in the speech directed to the child. In this study the child is almost three and a half years old. It is interesting that the tonal adjustments found here are in the questions, as the adult's questions play a special role in the child's language development.

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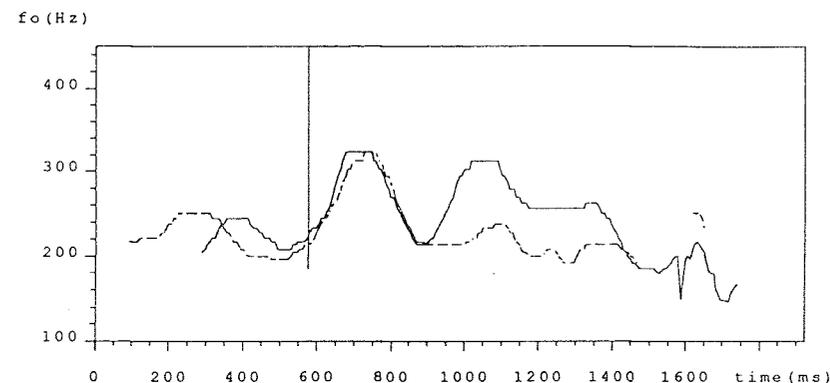


Figure 1. Medially focussed statements. Line-up point in the time domain is the first CV-boundary in the medial word. Adult-directed version: solid line; child-directed version: broken line.

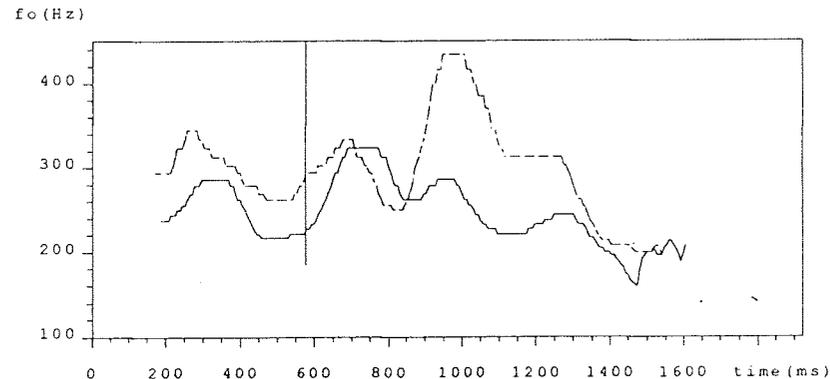


Figure 2. Medially focussed questions. Line-up point in the time domain is the first CV-boundary in the medial word. Adult-directed version: solid line; child-directed version: broken line.

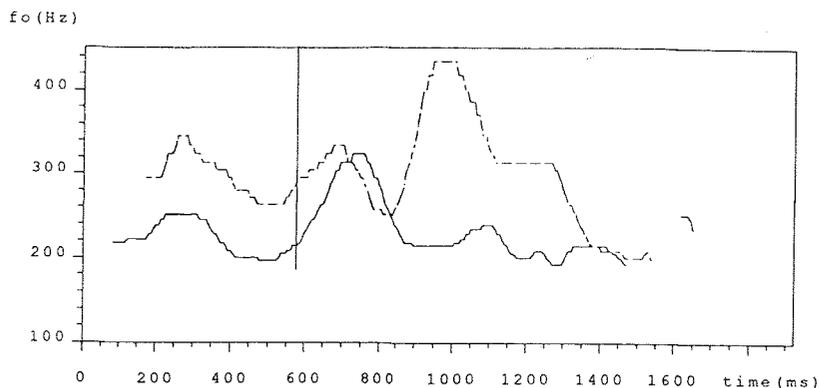


Figure 3. Medially focussed statement and question in child-directed speech. Line-up point in the time domain is the first CV-boundary in the medial word. Statement: solid line; question: broken line.

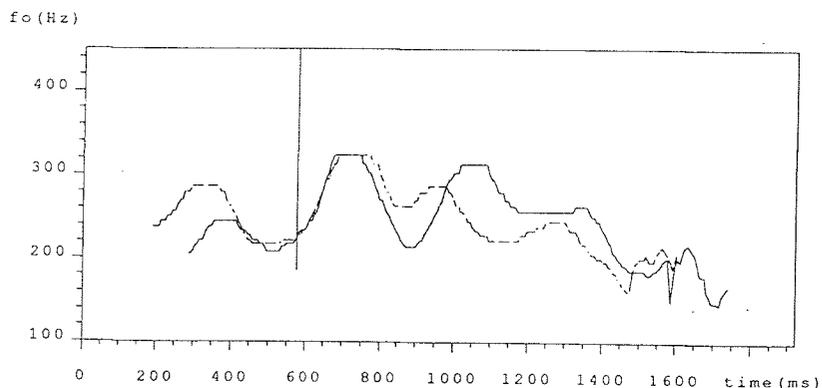


Figure 4. Medially focussed statement and question in adult-directed speech. Line-up point in the time domain is the first CV-boundary in the medial word. Statement: solid line; question: broken line.

On the Analysis of Prosody in Spontaneous Dialogue

Gösta Bruce and Paul Touati

INTRODUCTION

Although by far most phonetic research today (1990) is still done in the somewhat artificial context of a phonetics laboratory using specially designed, read test material, we are experiencing an increasing trend toward studying spoken language in its natural environment: spontaneous speech and dialogue. It may seem self-evident that the natural environment for studying speech is natural, spontaneous speech and dialogue, but many are the researchers within experimental phonetics who have experienced the overwhelming difficulties of studying real, spontaneous speech. The main difficulty in doing research based on recordings from spontaneous speech is the high degree of variability and thus the low degree of experimental control that can be obtained of whatever feature one may be studying.

One of the pioneers in the phonetic study of prosody in spontaneous speech is Eva Gårding; see for instance her classic study and comparison of Swedish prosody in spontaneous and read speech (Gårding 1967). One lesson learnt by her and taught to us is that studying phonetics, and particularly prosody in spontaneous speech, presupposes studying it in a more rigid, laboratory test setting. The idea is that one has to have fairly specific ideas about what one is going to look for and even what one is likely to find, i.e. one must have a fairly detailed model based on experience from studies of artificial, laboratory speech, in order to be able to extract interesting features of prosody from spontaneous speech. The ideal general methodology would then be some kind of cyclicity between test material and spontaneous speech using feedback from preceding studies.

Our own current interest in prosody and spontaneous speech is at present manifested through a research project called CONTRASTIVE INTERACTIVE PROSODY conducted at the Department of Linguistics and Phonetics in Lund, Sweden. This is a three year project which started in