Terminal rises in infant-directed and adult-directed questions

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Terminal rises in infant-directed and adult-directed questions

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Abstract
Questions addressed to a prelinguistic infant do not have the same function as those addressed to an adult. In this study, I investigated whether, as a consequence of this differing function, infant-directed questions have a terminal rise equally often as adult-directed questions. I analyzed a sample of infant-directed and adult-directed Yes-No questions, Wh questions, and, as a control, statements. The results showed no significant difference between the infant-directed and the adult-directed statements. On the contrary, the infant-directed questions ended with a terminal rise significantly less often than the adult-directed questions.

Introduction
Questions are common in infant-directed (ID) and child-directed (CD) speech, possibly even more common than in adult-directed (AD) speech (Snow, 1977). Nonetheless, a question addressed to an infant or a young child does not have the information-seeking or directive function that it normally has when it is addressed to an adult. In the present study, I examine whether this differing function affects the way ID questions are realized.

One characteristic of questions is a rising tone at the end of the utterance, the terminal rise. Statements, on the contrary, usually end with a falling tone, the terminal fall. Since terminal rises are typical for questions, they have a subjective meaning of incompleteness (Bolinger, 1989).

The relation between intonation and utterance type, however, is by no means straightforward. Terminal rises are not always present in questions, and, similarly, statements do not always end with a fall (Bolinger, 1989). Furthermore, terminal rises are not universally found in questions. In Danish, for example, questions are not characterized by a terminal rise, but instead by the absence of declination (Grønnum, 1992).

The results of a recent study suggest that in Dutch (which is also the language of investigation of the present study), questions frequently have a terminal rise but statements do not (van Heuven & Haan, 2000). Terminal rises were found in approximately 65% of Wh questions, 85% of Yes-No questions, and 100% of 'declarative questions' (i.e., questions that are not marked by a change in word order or a question word). Statements, on the contrary always had a terminal fall (the percentages are derived from their Figure 6.2 on page 124).

In the present study, I ask whether terminal rises which are typical for AD questions, are also found in ID questions. I analyzed a sample of ID and AD questions, and, in order to obtain a clear pattern in the results, I also included ID and AD statements which constituted a control condition.

Methodology
The material that was used in the present study was selected from a corpus of naturalistic input to a prelinguistic infant. The corpus consists of almost all the language that one infant heard during 18 days selected from the period when she was between six and nine months old. This corpus is described in my dissertation (van de Weijer, 1998).

During these 18 days, the infant heard speech that adults addressed to her, but also speech that adults addressed to each other. Most of the speech was produced by only three adults whose utterances are used for the present study: the infant's father and mother, and a babysitter.

Naturally, not all the material is suitable for an acoustic analysis. The corpus was recorded in a variety of situations, usually with several people present, sometimes in noisy conditions. Therefore, a large part of the material cannot be used because the speech signal is either too weak or disturbed by background noise (another speaker, the infant crying, sounds of daily activities, etc.).
For the purpose of previous studies (for instance, van de Weijer, 2001), I selected and transcribed a sample of the material with comparatively good acoustic quality. The sample consists of a variety of utterances, including statements and questions, but also imperatives, social expressions, discourse markers, and so on.

I separated out ID and AD statements and questions on the basis of the transcripts. In principle, both questions and statements come in a large variety of forms, and the relation between the form of an utterance and its intonation is extremely complex (Bolinger, 1989). For that reason, I avoided statements and questions with a structure that potentially affects the intonation contour. Specifically, I did not select utterances that were followed by a tag (e.g., Dat is mooi he, ‘That is nice, isn't it?'), or a vocative (e.g., Dat is mooi, Josje, ‘That is nice, Josje'). Furthermore, I did not include ‘alternative Yes-No questions' (i.e., a series of Yes-No questions combined by the conjunction or, e.g., Heb je honger of ben je moe, 'Are you hungry or are you tired'). Finally, statements or questions where the speaker quotes someone else were not included either.

In total, there were 171 ID and 251 AD questions, and 356 ID and 878 AD statements, which makes a total of 1656 utterances to be analyzed.

The questions were divided into a group of Wh questions and Yes-No questions. In Dutch, Wh questions are marked by the Wh word and a change in word order, whereas Yes-No questions are marked by a change in word order only. Van Heuven and Haan found that this difference had an effect on the intonation. Yes-No questions (with only one interrogativity marker) more often had a terminal rise than Wh questions (with two markers).

The waveform of each utterance was displayed on the computer screen aligned with the intonation contour. Utterances with a clear intonation contour were labeled; those with unclear contours were excluded.

Furthermore, two types of utterances were excluded during the process of classification. First, upon listening to the utterances, it became apparent that some of the AD statements called for continuation, i.e., the speaker indicated that he or she was not finished speaking (non-final statements). In the intonation contour this usually is realized as a terminal rise or a level tone (Cruttenden, 1981). Since these statements did not occur in the ID speech, they were excluded.

Second, in the ID speech, there were a number of contours with a flat terminal. In ID speech, these are part of a so-called 'expanded' intonation contour type that is typical for ID speech (Fernald & Simon, 1984). This contour consists of one or more level tones and long stretched out vowels. Since similar level tones did not occur in the AD speech, these contours were also excluded.

Results

A total of 696 utterances were excluded. There were 648 utterances that had unclear intonation contours, 42 ID contours which had a flat terminal, and 6 AD utterances which were non-final statements. This reduced the total to 960 utterances. An overview of the distribution of the utterances is given in Table 1.

Table 1. Final numbers of utterances.

<table>
<thead>
<tr>
<th></th>
<th>ID</th>
<th>AD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wh questions</td>
<td>34</td>
<td>109</td>
</tr>
<tr>
<td>Yes-No questions</td>
<td>87</td>
<td>60</td>
</tr>
<tr>
<td>Statements</td>
<td>190</td>
<td>480</td>
</tr>
</tbody>
</table>

Note that there is an asymmetry in the distribution of Yes-No questions and Wh questions. In the ID speech, Yes-No questions were more frequent than Wh questions, whereas in the AD speech the opposite was found. I am not aware of any study in which a similar pattern is found, nor do I know at present whether this pattern only is characteristic of the utterances that I selected or whether it is also found in the rest of my corpus.

The numbers of contours with a terminal are listed in Table 2. The percentages, listed in the table between parentheses, are also displayed in Figure 1.

Table 2. Numbers and percentages of contours with terminal rises.

<table>
<thead>
<tr>
<th></th>
<th>ID</th>
<th>AD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statements</td>
<td>48 (25.3)</td>
<td>127 (26.5)</td>
</tr>
<tr>
<td>Wh questions</td>
<td>21 (61.8)</td>
<td>97 (89.0)</td>
</tr>
<tr>
<td>Yes-No Questions</td>
<td>41 (47.1)</td>
<td>52 (86.7)</td>
</tr>
</tbody>
</table>

As can be seen from the upper row of Table 2, the percentages of statements with terminal rises were not very much different in ID and AD speech. This difference was not significant ($\chi^2(1) = 0.10, p = 0.751$).
On the contrary, terminal rises occurred considerably less often in ID questions than in AD questions. 61.8% of the ID Wh Questions had a terminal rise, compared to 89.0% of the AD Wh questions. This difference was significant ($\chi^2(1) = 13.32, p < 0.01$).

The difference was even somewhat bigger for Yes-No questions. Only 47.1% of the ID Yes-No questions had a terminal rise, compared to 86.7% of the AD Yes-No questions. This difference was also significant ($\chi^2(1) = 23.89, p < 0.01$).

In sum, ID and AD statements had terminal rises approximately equally often, but the ID questions had terminal rises significantly less often than the AD questions.

**Discussion**

The results of this study suggest that the differing function of questions in ID speech causes a change in the way the questions are realized. The percentages of ID questions that ended with a terminal rise were significantly lower than the percentages of AD questions. For statements, on the other hand, no such difference was found.

For the discussion, two issues are worth mentioning, one has to do with the difference between the results of the present study and those found by van Heuven and Haan (2000). The other issue has to do with our explanation of modifications in ID speaking style.

Overall, the percentages of terminal rises in the AD utterances (most notably the statements and the Wh questions) were higher in the present study than those reported by van Heuven and Haan (2000). In the present study, approximately 25% of the statements had terminal rises and almost 90% of the Wh questions, whereas van Heuven and Haan reported 0% and 65% respectively.

I presume that the cause of this difference lies in the nature of the material. Van Heuven and Haan analyzed read speech recorded in the laboratory, whereas spontaneous naturalistic speech was analyzed in the present study.

The terminal rise, as pointed out in the introduction, signals incompleteness or calls for continuation. It may, therefore, be present more often in a real dialogue, where the speaker wants 'to leave the floor open' for the listener to react on what just has been said. Consequently, terminal rises are found more often, not only in questions but also in statements.
Second, it is often assumed that many modifications in the style of speaking to infants have an affective cause (e.g., Fernald, 1989). According to this account, the intonation contour more or less replaces the verbal content of the utterance. The primary function of the terminal rise is to catch the infant’s attention.

The results of the present study do not deny that this factor is part of the explanation of modifications in ID speech. However, the results clearly show that the type and the function of the utterance play a role as well, and, consequently, that the relative importance of the affective function is more restricted than often is assumed.

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References


