

# The Prosody of Questions in Natural Discourse

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## Abstract

For this paper, we examined a corpus of 73 wh-questions and yes/no questions, both positive and negative, from natural discourse. We found that the locus of interrogation (the initial auxiliary in yes/no questions or the initial wh-word in wh-questions) most frequently gets an L+H\* pitch accent, especially in wh-questions and negative yes/no questions. Positive yes/no questions are more variable, and included 40% unstressed auxiliaries. Nuclear stress was primarily falling in wh-questions, as expected; but positive yes/no questions were almost twice as often falling or level as rising, contrary to expectation. Finally, the topic of the question turned out to be marked primarily with some version of an H\* accent rather than an L+H\* accent, and the focus with L+H\* rather than some variant of H\*, contrary to predictions in the literature.

## 1. Introduction

The semantics and pragmatics of questions have long been the object of linguistic exploration. There are several types of questions in English: yes/no questions, wh-questions, alternative questions, tag questions, and intonation questions. We concentrated on wh-questions and yes/no questions, since these were the most prevalent in our data.

Formal semantic theories have defined the meaning of questions as the set of their contextually possible answers [6]. Thus a wh-question such as (1a) would have as its semantic value, the denotation in (b), assuming that the set {Bill, Mary, Sue} is the pragmatically restricted set of entities under consideration.

- (1) (a) Who saw John?  
(b) {Bill saw John, Mary saw John, Sue saw John}

Likewise a yes-no question has as its semantic value the set of propositions containing the positive and negative form of the proposition questioned, as in (2):

- (2) (a) Did John leave?  
(b) {John left, John didn't leave}

The pragmatics of questions is more controversial. One important issue in the pragmatics of questions is their information structure, i.e. the topic-focus articulation of questions. One puzzle, for example, is that nuclear stress, which is a marker of focus, tends to fall on the body of a wh-question instead of on the wh-element, but the wh-element is often considered to be the focus of the wh-question, following the semantic analysis of wh-questions outlined above, which treats the wh-element as the locus of interrogation in the semantic representation of the question.

This problem has recently been addressed in [9]. The authors conclude that the wh-element is the focus of the question and that the nucleus in the body of the question represents an accented topic. The authors suggest that the wh-element tends to be unaccented (or at least to not attract the nuclear stress) because “there is no commitment on the part of the speaker to the effect that she knows the identity of the referent of the expression” (p. 515). Wh-words are unaccented for the same reason that indefinite expressions like “someone” or “something” are unaccented in declarative sentences: “there simply is no referent that the addressee is expected to identify at the time of utterance (p. 515).” The authors of [9] don't discuss yes/no questions, but presumably they would analyze the preposed auxiliary as the focus and any accents in the body of the question as topic accents.

The previous account claims that the pragmatic focus is identified with what might be called the semantic focus, i.e. the locus of interrogation in the semantics of the question. Thus, the focus of (1a) would be “who” and the focus of (2a) would be the positive-negative polarity element. This treatment goes back to [2] and [8], who proposed that the focus of an answer and the focus of the question it is an answer to must match to be felicitous. It is uncontroversial that the focus of a declarative statement is the prosodically prominent constituent that answers the question that evokes it. Since the answer always narrows down the locus of interrogation in the question to one element, the locus of interrogation in the question is taken as its focus.

Another approach to the pragmatics of questions is that of [4]. Her definitions of topic, comment, and focus are the following:

### Topic

An entity, E, is the topic of a sentence, S, iff, in using S, the speaker intends to increase the addressee's knowledge about, request information about or otherwise get the addressee to act with respect to E.

### Comment

A predication, P, is the comment of a sentence, S, iff, in using S the speaker intends P to be assessed relative to the topic of S.

### Focus

That part of the linguistic expression that realizes the comment.

What is interesting about these definitions is that questions and other speech acts as well as statements can be said to have information (topic-focus) structure that doesn't necessarily coincide with any particular syntactic distinction. It is possible that there could be a divergence between the semantic

locus of interrogation and the pragmatic focus. It is most likely that the locus of interrogation would be part of the focus, however, since (1) and (2) in the appropriate context could be taken as questions about John, with the speaker asking who saw him or whether he left.

Very little literature is available to date on the prosody of questions in English and how questions fit into their discourse context. It is important to explore questions in natural discourse to examine aspects of their prosodic structure. We decided to focus on three issues: the prosody of the locus of interrogation, the direction of the final nuclear tune, and the issue of a potential prosodic difference between topic and focus.

## 2. Methods

For data, we explored two databases of natural speech, both videotaped from television, with the transcripts available on the World Wide Web: The McLaughlin Group and Washington Week, both available from the Public Broadcasting Service in the United States. Both are public affairs discussion programs in which journalists get together to talk about current issues of the day. On the McLaughlin Group, in particular, the guests have widely differing political beliefs. Therefore the discussion gets heated and is quite spontaneous. We used four episodes of the McLaughlin Group and one episode of Washington Week, videotaped during October and November 2001.

We aimed at marking eight wh-questions and eight yes/no questions from each transcript, distributed over the entire transcript, but in some cases there were not enough. We ended up with 35 wh-questions and 38 yes/no questions that were usable. We distinguished positive from negative questions since we wanted to find out if there is any difference between the two, and as will be seen, there is. We also looked for alternative questions and tag questions but didn't find enough to come to any conclusions. Working independently, one of us (Hedberg) analyzed the questions for information structure, and the other one of us (Sosa) did the intonational coding.

Hedberg used the definitions of topic and focus from Gundel 1988. An utterance was analyzed as having a topic if it contained a phrase linking the question back to the preceding context, or if it passed the "as for" test from [3]. Otherwise the utterance was coded as all-focus.

The utterances were digitized and analyzed using the CSL 4300. Sosa followed ToBI [1], but included the H\*+L pitch accent to show a steep fall on a single syllable that couldn't be attributed to the following H\*, as well as the downstepped pitch accent !H\*. Upstep (¡H\*) marks an increased local range on specific syllables, particularly with nuclear tones.

The two codings were matched up on a spreadsheet and information was extracted about the pitch accent on the locus of interrogation, the nuclear tune and the pitch accent introducing the topic phrase. The spreadsheet was sorted accordingly and the distributions were calculated.

## 3. Locus of Interrogation

As discussed in section 1, what we are calling "the locus of interrogation" of a wh-question is the fronted wh-word, and the locus of interrogation of a yes/no question is the fronted auxiliary. These elements syntactically mark a sentence as a question. We were interested in exploring the pitch accent on this initial element. See Table 1 for the results.

Table 1: Pitch Accent on Locus of Interrogation

	H*	L+H*	L*	o	N
Pos. WH	9	20	4	1	34
Neg. WH	0	1	0	0	1
Pos. Yes-No	7	5	5	12	29
Neg. Yes-No	1	8	0	0	9
N	18	33	9	13	73

One interesting finding is that the wh-word in wh-questions is overwhelmingly marked with a L+H\* pitch accent (21 out of 35 examples, or 60%). 9 more or 26% were marked with H\*. The fronted negative auxiliary in negative yes/no questions was also overwhelmingly marked with L+H\* (8 out of 9 examples or 89%). The L+H\* accent is a particularly salient pitch accent, and the fact that the locus of interrogation was so often marked with this pitch accent suggests that it is a major marker of interrogative sentences right from the start. See Figures 1 and 2 for examples. (The topic is underlined in the text portions of the examples.)

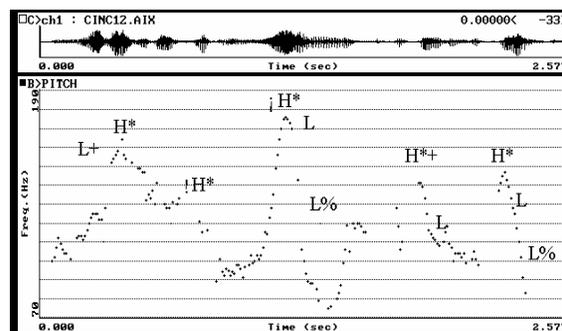


Figure 1: L+H\* on wh-word.

Why is it going take a year to put it into place?

L+H\*            !H\*    ¡H\*LL% H\*+L    H\*LL%

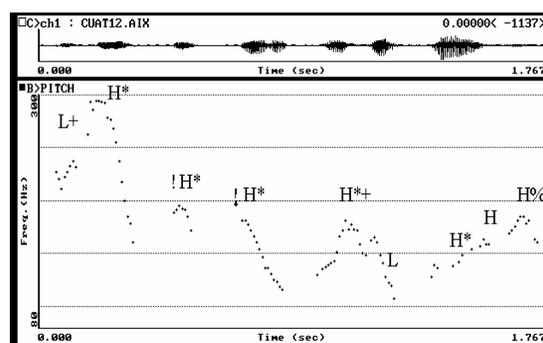


Figure 2: L+H\* on negative auxiliary in Yes/No question with topic marked !H\*

Isn't that kind of underhanded?

L+H\* !H\* !H\* H\*+L H\*HH%

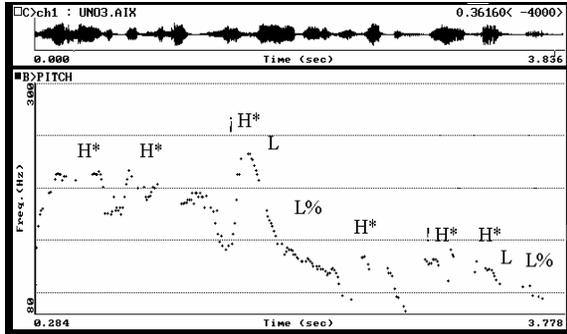


Figure 3: Yes/No question with unaccented auxiliary and falling intonation.

Did Hastert actually hear that it was weapons-grade anthrax?  
 |            |            |            |            |            |  
 H\*        H\*        ¡H\*LL%    H\*        !H\*    H\*LL%

Deaccented auxiliaries were frequent in positive yes/no questions. The fronted auxiliary was deaccented in 12 out of 29 examples or 41%. The pragmatic difference between questions with accented and deaccented auxiliaries is not obvious. More data will need to be examined to determine this. For an example, see Figure 3, where the initial auxiliary “did” is deaccented, thus further highlighting the following word, “Hastert.” Furthermore, the auxiliary in 5 out of 29 (or 17%) positive yes/no questions was marked with a relatively non-salient L\*. Again, the non-salient L\* accent may be placed on the auxiliary so that more prominence can go on a following element.

8 of 9 of the negative yes/no questions have an L+H\* pitch accent on the fronted negative auxiliary, and the remaining one an H\*. It is suggested in [10] that inverted negation necessarily bears focus and this is why it is accented so prominently. The authors suggest that focus is on the polarity in such sentences. In the approach taken here, the negative polarity is part of the focus but not the whole focus. The topic is encoded in the phrase “that” which refers to the idea of the United States sending a suspected terrorist to another country for interrogation involving torture. The focus is whether or not that is kind of underhanded.

As the authors of [10] point out, negative yes/no questions carry as an epistemic implicature that the answer to the question will be “yes,” in this case that it is indeed kind of underhanded. Positive yes/no questions are neutral concerning the polarity of the answer. Perhaps negative yes/no questions are more consistently marked with an accented auxiliary than positive yes/no questions because it is important to the content of the negative yes/no question message that this epistemic implicature be prominently marked.

#### 4. Nuclear tune

We were also interested in exploring whether the nuclei in questions from natural discourse fit the standard description of sentence-final intonation in questions. The standard assumption is that yes/no questions will be pronounced with a rising intonation at the end and that wh-questions will be pronounced with a falling intonation at the end. Our findings

support the second assumption but not the first, as can be seen in Table 2.

20 out of 29 (or 69%) positive yes/no questions were pronounced with one of the falling or level nuclear tunes. Only 9 were pronounced with the supposedly canonical rising nuclear tune. Figure 3 shows an example of a positive yes/no question with falling intonation. Figure 2 shows a canonical yes/no question with rising intonation.

Wh-questions were primarily falling as expected. 28 out of 35 or 80% were pronounced with one of the falling tunes. Figure 1 shows an example.

Further research will be required to discover whether the difference in direction of the final contour correlates with a semantic or pragmatic distinction.

Table 2: Distribution of nuclear tunes.

	Pos. WH	Neg. WH	Pos. Y/N	Neg. Y/N	N
<b>Fall:</b>					
!H*LL%	7	1	1	1	<b>10</b>
H*LL%	9		5	3	<b>17</b>
H+!H*LL%	0		2		<b>2</b>
L+H*LL%	2		3		<b>5</b>
¡H*LL%	2		5	1	<b>8</b>
L*LL%	7				<b>7</b>
	<b>27</b>	<b>1</b>	<b>16</b>	<b>5</b>	<b>49</b>
<b>Level:</b>					
!H*HL%			1		<b>1</b>
H*HL%	2		3		<b>5</b>
	<b>2</b>		<b>4</b>		<b>6</b>
<b>Rise:</b>					
!H*HH%			2		<b>2</b>
H*HH%			3	3	<b>6</b>
L*HH%	4		4	1	<b>9</b>
L*LH%	1				<b>1</b>
	<b>5</b>		<b>9</b>	<b>4</b>	<b>18</b>
<b>N</b>	<b>34</b>	<b>1</b>	<b>29</b>	<b>9</b>	<b>73</b>

#### 5. Topic Pitch Accent

Finally, we were interested in exploring the information structure of different types of questions, i.e. their topic-focus articulation, and how this information structure is encoded prosodically. As discussed in section 1, one issue is the question of whether the locus of interrogation constitutes the sole focus constituent in a question or whether the focus can include part of the main body of the interrogative sentence. We couldn’t find any evidence in the data to support either side of this issue. The prominent accents in the body of the question could be analyzed as focus accents or as topic accents.

One issue that we can address, however, is whether there is a distinctive topic-accent as opposed to focus-accent in questions. It has frequently been claimed in the information structure literature [5, 9, 11, 12] that topics are marked with an L+H\* pitch accent and foci are marked with an H\* pitch accent. We find no support for this hypothesis in our data. As reported in section 3, L+H\* is frequently used to mark the locus of interrogation in both yes/no and wh-questions. The locus of interrogation is uncontroversially analyzed as the focus (or part of the focus) of the question. Examples of

L+H\* marking the wh-word or the negated auxiliary are shown in Figures 1 and 2, respectively.

When we turn to the pitch accents introducing phrases that we analyzed as topics in the body of the question, we see a great deal of variability in pitch accent, as shown in Table 3.

Only 8 out of 73 (or 11%) phrases in the body of the question that we analyzed as topics were marked with the L+H\* accent. 37 (or 51%) were marked with some kind of H\* accent ( $\downarrow$ H\*, H\*, !H\*, H\*+L), 20 (or 27%) were deaccented or marked with L\*, and 8 sentences were all focus sentences that lacked a topic. Figure 2 shows a topic phrase marked with a !H\* pitch accent.

Table 3: Pitch accents marking topic phrases.

	Pos. WH	Neg. WH	Pos. Y/N	Neg. Y/N	N
$\downarrow$ H*	1				<b>1</b>
H*	8		6	2	<b>16</b>
!H*	7	1	6	4	<b>18</b>
H*+L			1	1	<b>2</b>
L+H*	5		2	1	<b>8</b>
L*			1		<b>1</b>
o	8		10	1	<b>19</b>
ALL FOCUS	5		3		<b>8</b>
<b>N</b>	<b>34</b>	<b>1</b>	<b>29</b>	<b>9</b>	<b>73</b>

These results support our findings reported in [7] that topics in declarative and interrogative sentences are not typically marked with an L+H\* accent in natural discourse, and that foci are quite frequently so marked.

## 6. Conclusions

In sum, we found that the locus of interrogation (the wh-word in wh-questions and the preposed auxiliary in yes/no questions) is frequently marked with an L+H\* pitch accent, especially in positive wh-questions and negative yes/no questions. We hypothesized that this element gets a salient accent in order to signal the interrogative status of the sentence. H\* is also found in this position for both kinds of interrogation. In positive yes/no questions, there is a significant number of L\* (5) and deaccented (12) auxiliaries. Very likely, this lack of pitch prominence is due to the need to highlight a following element.

We found that contrary to expectation, two thirds of positive yes/no questions ended with a falling or level intonation pattern rather than a rise that is supposed to be characteristic of such questions. On the other hand, we did find that wh-questions overwhelmingly have the kind of falling intonation described in the literature.

In this data we found no support for the hypothesis that topics are marked with an L+H\* pitch accent while foci are marked with an H\* pitch accent. These findings ratify our conclusion in [7] that for English there is no clear contour that can be identified as a topic accent.

With regard to the issue discussed in section 1 concerning whether the focus of a question falls on the locus of interrogation or on the body of the question, we would like to suggest that both positions might be right. In [13], the authors distinguish two types of focus, which they label “kontrast” and

“rheme.” The authors suggest that the constituent in a wh-question that we label “locus of interrogation” marks “Kontrast” and the constituent that we label “focus” marks “rheme”.

Finally, we would like to emphasize the importance of exploring texts from natural discourse. Any claim about the prosody of information structure categories should as much as possible be substantiated with empirical evidence.

## 7. References

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