

# Pitch Contours in Negative Sentences

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## ABSTRACT

This paper presents the results of a study of the intonation of negative sentences in a corpus of spontaneous interactive English speech. First, we found more instances of a high pitch accent marking the negative morpheme or auxiliary suffixed with contracted *not* than has been found in other interactive corpora. Only forms of the auxiliary *do* with contracted negation showed any likelihood to be unaccented or marked with a low pitch accent. Secondly, we found more rising or level tunes in negative as compared to positive declarative sentences. There were a relatively large number of rising L\**LH*% tunes in the negative sentences and none in the positive sentences. We identified this tune as the ‘contradiction contour’ and found that while it occurs on some contradictions in our data, not all contradictions are marked by this tune since some end with falling tunes.

## 1. INTRODUCTION

While the syntax, semantics and pragmatics of negative sentences have been quite intensively studied in recent years, c.f. [1], their prosody has been relatively little studied. The purpose of the current research was thus to examine the intonational properties of negative utterances in the context of a larger study exploring intonational meaning in interactive spoken discourse, c.f. [2, 3]. In this paper, we focus on the intonational properties of the negative morpheme and the final intonational contour, and preliminarily discuss their interactional meanings.

## 2. METHODS

We analyzed 104 examples of negative utterances from televised spontaneous spoken discourse. The data were taken from three half-hour episodes of the political discussion program The McLaughlin Group, which airs on the Public Broadcasting System in the United States. We videotaped these episodes in May and June 2002, and downloaded transcripts from the World Wide Web. The discussions took place between a moderator and four journalist guests, with widely differing political views, which assured lively interchanges. All participants were speakers of American English. Each program consisted of the discussion of four issues, and we analyzed all the negative utterances in the first issue of each program.

We digitized the utterances using the Computerized Speech Lab 4300, and obtained the pitch tracks using Pitchworks Version 5.0. The prosodic notation of the contours was made using the Guidelines for ToBI labeling, Version 3 [4].

## 3. LOCUS OF NEGATION

Because the negative morpheme is a carrier of information critical to the meaning of the sentence, some researchers have concluded that it is reasonable to expect that it should be prosodically highlighted, c.f. the ‘Cognitive Prominence Principle’ of [5] and [6]. [7] had concluded from a study of read speech that uncontracted negative particles are very likely to be produced with a high F<sub>0</sub>, because they are an essential component in conveying the negative polarity of the utterance. More recently, it was concluded in [8] that the negative article, negative modals, and negative *do* should be included in the class ‘closed\_accented’ items in order to optimally predict whether they were accented or not in a corpus of read radio newscasts.

The distribution of pitch accents on the locus of negation in our data is presented in Table 1.

	L+H*	H*	!H*	L*	o	N
Contracted auxiliary with <i>not</i>	4	11	3		1	<b>19</b>
Uncontracted auxiliary with <i>not</i>	1	12	12	2		<b>27</b>
Contracted <i>not</i> on modal or copula	3	7	2	1	1	<b>14</b>
Contracted <i>not</i> on <i>do</i>	3	4	3	1	16	<b>27</b>
<i>No</i> -negation	3	5	7		3	<b>18</b>
<i>why not</i>					1	<b>1</b>
<b>N</b>	<b>14</b>	<b>39</b>	<b>27</b>	<b>4</b>	<b>22</b>	<b>106</b>

Table 1: Type of Accent on Locus of Negation.

Following [9] we distinguish ‘*not*-negation’ from ‘*no*-negation’, the former referring to cases of the negative particle *not* associated with an auxiliary verb, and the latter referring to instances of the determiner *no* or the negative words *nothing*, *no one*, *nobody*, *nowhere*, *never*, *not even*, *neither* and *nor*. For *not*-negation, we distinguished contracted negative particles from uncontracted negative particles, and in the latter class, we distinguished those cases where the auxiliary verb is contracted onto the subject pronoun (*it’s not*, *that’s not*, *we’re not*, *they’re not*, *I’m not*) from those where the auxiliary appears in the full form

(would not, cannot, might not, is not, was not, are not, am not, have not, do not, did not). Within contracted negation we distinguished cases where the negative particle is contracted onto a modal auxiliary or copula (*wouldn't, can't, won't, couldn't, shouldn't, wasn't, isn't, ain't*) from cases where the negative particle is contracted onto a form of *do* (*don't, doesn't, didn't*). In the case of contracted negative particles, we coded the entire negative auxiliary for pitch accent, following the practice in the literature [10, 11].

On the locus of negation we only found the following four tonal categories: L+H\*, H\*, !H\* and L\*, and we found several cases where the locus of negation was unaccented.

The results indicate that over three-quarters of the loci of negation (80/106) are marked by a high pitch accent, most commonly the H\*. However, there is one type of locus of negation that is significantly different: the tokens with contracted negation on *do* (*don't, doesn't didn't*), which 63% of the time (17/27) received no pitch accent (and in one case L\*).

An example with a very prominent locus of negation is shown in (1) and illustrated in Figure 1.

- (1) Mr. Lowry: And this is what's happening. This is the post Moussaoui model of counterterrorism. It's preemptive. It means **you can't build the case**  
L+H\* !H\* !H\*HH%  
**very carefully**, but you move fast, and you detain  
H\* H\*!HH%  
 those guys as enemy combatants, which they are.

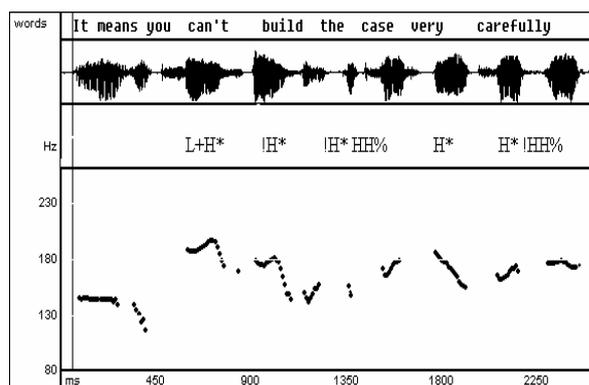


Figure 1: L+H\* on *can't*.

An example with a locus of negation lacking a pitch accent (on *don't*) is shown in (2) and Figure 2.

- (2) Ms. Clift: Well, the attorney general used the phrase "mass deaths and injury." Well, I've since gotten educated on this too. **I don't think we**  
H\* o H\*  
**would see mass immediate deaths.**  
H\* !H\*HL% H\* H\* H\*LL%

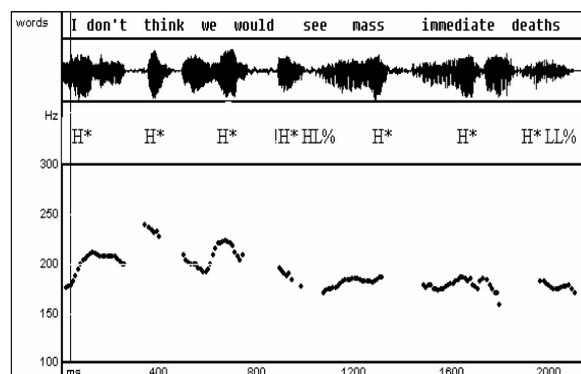


Figure 2: Unaccented *don't*.

One reason for the lack of accentual prominence on a negative element is suggested in the work of Yaeger-Dror [5,10]. Her findings indicate that in interactive natural discourse, negative elements overwhelmingly tend to lack prosodic prominence, in her view because of the "Social Agreement Principle", which states that speakers will tend to de-emphasize disagreement in order to mitigate threats to the addressee's 'face'. In [6] the authors explore how this effect is modulated by the register of the interaction. In the polite telephone conversations between strangers of the Switchboard Corpus, only 16.8% of the *not*-negatives (32/191) were prominent, whereas in adversarial presidential debates, 52% of the *not*-negatives were prominent (318/612). They conclude that the Social Agreement Principle is inverted in adversarial discourse.

In our data, however, 75% of *not*-negatives were intonationally prominent. It could be that our categories of prosodic notation were different, or the McLaughlin Group exemplifies a register even more adversarial than presidential debates, more interactive and less formal, with the participants always competing for the floor.

#### 4. FINAL TUNES

We were also interested in looking at final tunes in negative sentences, to see whether these differ from the final tunes in positive sentences. We focus here on declarative negative sentences given the low number of negative questions in our data (only 4). In order to find a comparable sample of positive sentences, we analyzed the final tunes in the 70 positive declarative utterances semantically coded as containing 'plain foci' or 'contrastive foci' in the data collected from McLaughlin Group videotapes for the study in [2]. The results of this comparison are shown in Table 2.

While there is a trend in the data for negative utterances to end in a level or rising tune as opposed to a falling tune in comparison with positive utterances, this tendency is not statistically significant ( $\chi^2 = 2.18, p < .15$ ). It is interesting that the final contours reported on in [12] for declarative utterances in a corpus of spontaneous speech of humans interacting with a computer to make air travel plans, were level or rising 35.8% of the time (113/316). This proportion

is close to what we found for negative declaratives (33/100 or 33%). Our positive declaratives, however, only showed 21.4% rising or level final contours (15/70).

	Neg Decl		Pos Decl	
<b>Fall:</b>				
L+H*LL%	7		3	
H*LL%	34		32	
!H*LL%	19		9	
L*LL%	7		11	
	<b>67</b>	<b>67%</b>	<b>55</b>	<b>78.6%</b>
<b>Level:</b>				
H*+!HHL%			1	
L+H*HL%	2			
H*HL%	4		1	
!H*HL%	4		3	
	<b>10</b>	<b>10%</b>	<b>5</b>	<b>7.1%</b>
<b>Rise:</b>				
H*HH%			1	
H*!HH%	1			
L*HH%	2		6	
L+H*LH%	2		1	
H*LH%	3		2	
!H*LH%	1			
L*LH%	14			
	<b>23</b>	<b>23%</b>	<b>10</b>	<b>14.3%</b>
<b>N</b>	<b>100</b>		<b>70</b>	

Table 2: Declarative Final Tunes.

It is noteworthy that the rising tune L\*LH% is the most likely final tune in negative sentences, after the unmarked falling tunes H\*LL% or !H\*LL%. The L\*LH% tune is never used in our positive sentences.

## 5. CONTRADICTION CONTOUR

In the intonational literature, particular attention has been paid to contradictions, starting with the characterization in [13] of the “contradiction contour” as constituted by a rising initial contour followed by a more or less extended valley and ending with a rise. This contour is described in [14] as L\*LH%, without an initial rise, but the authors point out that this contour is not only used on contradictions and not all contradictions are marked by this contour. The initial rise is described in [15] as an L\*+H pitch accent.

Preliminary analysis of our data reveals that at least some examples of L\*LH% mark contradictions, as seen in example (3), illustrated in Figure 3.

- (3) Mr. Zuckerman: Yeah, I’ll tell you, forget the movie, I mean, as Tony and you were saying before, we are faced with an unbelievably serious problem, which the military has been telling us privately for

years. **This isn’t something that they just found out**  
**H\* !H\* !H\* L\***  
**about on nine/eleven.** They have been terrified about  
**L\* L\* L\*LH%**  
 this for years.

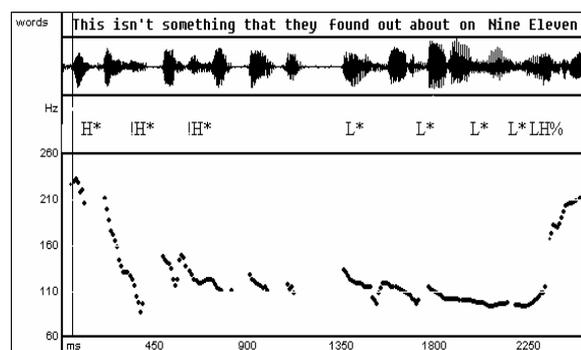


Figure 3: Contradiction exhibiting L\*LH%.

This sentence carries most of the prosodic characteristics associated with the contradiction contour: the L\* extended valley and the L\*LH% tune.

Note that the proposition contradicted in this example has not been explicitly evoked in the context. Thus we can’t equate the type of negative sentence marked by this contour with the “explicit denials” distinguished from “implicit denials” and “rejections” in [9]. It is not clear whether it can be equated with the “repair” or “remedial” as opposed to “informative” negative utterance distinction posited in [5] and [6].

For [16], the L\* pitch accent indicates a rheme that exhibits lack of agreement between speaker and hearer, i.e. one that is contentious. The rising LH% boundary indicates hearer commitment as opposed to speaker commitment. In our view, contradictions are by definition contentious and it is the hearer who is committed to the truth of the contradicted proposition rather than the speaker. Note that the contradiction contour can also occur on positive contradictions.

As discussed in [14], however, not all contradictions are marked with the L\*LH% tune, e.g., the direct contradiction from our data shown in (4) and Figure 4.

- (4) Ms. Clift: I have no interest in seeing that film.  
 Mr. McLaughlin: Which film?  
 Ms. Clift: The film you just touted, the new Clancy movie. I have –  
 Mr. McLaughlin: “The Sum of All Fears”.  
 Ms. Clift: Right. I get -- I get –  
 Mr. McLaughlin: **I am not touting the film.**  
**L\* H\* !H\* !H\*LL%**  
 I happened to be at the premiere.

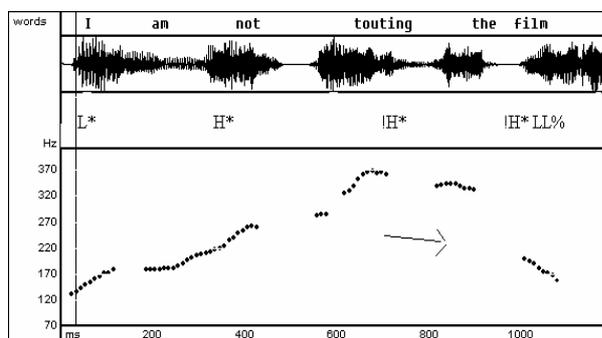


Figure 4: Contradiction without L\*LH%<sup>1</sup>.

This contradiction is not marked by any of the reported characteristics associated with the contradiction contour: there is no initial L\*+H, no L\* valley and no L\*LH% final tune. The proposal is made in [14] that the L\* marks an item that is mutually believed or should be mutually believed, so the L\*LH% melody “is only appropriate when S intends to convey that H should already be aware of what S is saying”. Note that in (4), the speaker goes on to explain why he brought up the film, thereby informing the hearer that he isn’t touting it. He doesn’t seem to be expecting the hearer to already be aware that he is not touting the film.

## 6. CONCLUSION

We investigated two aspects of the intonation of negative sentences in a corpus of spontaneous interactive speech. We found that the locus of negation is almost always marked with a high pitch accent, except in cases of the auxiliary *do* with contracted negation. The overall proportion is higher than that found in the literature for other corpora. We found a trend in the data for more rising or level final tunes in negative than in positive declarative utterances, and, in particular, a large number of L\*LH% final tunes in the negatives. We identified this tune as the ‘contradiction contour’ and found that it does sometimes mark contradictions in our data; however not all contradictions are marked by this tune. Our next step will be to look at other corpora, and to explore the semantics of contradictions in more detail.

## 7. ACKNOWLEDGEMENTS

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## REFERENCES

- [1] W. A. Ladusaw, Negation and polarity items, in S. Lappin, Ed., *The Handbook of Contemporary Semantic Theory*, pp. 321–341. Oxford: Blackwell, 1996.
- [2] N. Hedberg and J. M. Sosa, The prosody of topic and focus in spontaneous English dialogue, in D. Büring, M. Gordon and C. Lee, Eds., *Topic and Focus: Intonation and Meaning: Theoretical and Crosslinguistic Perspectives*. Dordrecht: Kluwer Academic Publishers, forthcoming.
- [3] N. Hedberg and J. M. Sosa, The prosody of questions in natural discourse, *Proceedings of Speech Prosody 2002*, pp. 375–378.
- [4] M. E. Beckman and G. A. Elam, *Guidelines for ToBI labelling. Version 3*. Columbus: Ohio State University, Department of Linguistics, 1997.
- [5] M. Yaeger-Dror, Register and prosodic variation, a cross language comparison, *Journal of Pragmatics*, Vol. 34, pp. 1495–1536, 2002.
- [6] M. Yaeger-Dror, L. Hall-Lew, and S. Deckert, Situational variation in intonational strategies, in *Corpus Analysis: Language Structure and Language Use*, C. Meyers, Ed.. Rodopi: Amsterdam, in press.
- [7] D. O’Shaughnessy and J. Allen, Linguistic modality effects on fundamental frequency, *Journal of the Acoustic Society of America* 74, pp. 1155–1171, 1983.
- [8] J. Hirschberg, Pitch accent in context, *Artificial Intelligence*, vol. 63, pp. 305–340, 1993.
- [9] G. Tottie, *Negation in English Speech and Writing: A Study in Variation*, San Diego: Academic Press, 1991.
- [10] M. L. Yaeger-Dror, Intonational prominence on negatives in English, *Language and Speech*, Vol. 28, pp. 197–230, 1985.
- [11] A. Kaufman, Negation and prosody in British English: a study based on the London-Lund Corpus, *Journal of Pragmatics*, Vol. 34, pp. 1471–1494, 2002.
- [12] J. Hirschberg, A corpus-based approach to the study of speaking style, in M. Horne, Ed., *Prosody: Theory and Experiment*, pp. 335–350. Dordrecht: Kluwer Academic Publishers, 2000.
- [13] M. Liberman and I. Sag, Prosodic form and discourse function, *Proceedings of the Chicago Linguistics Society*, vol. 10, pp. 416–427, 1974.
- [14] J. Pierrehumbert and J. Hirschberg, The meaning of intonational contours in the interpretation of discourse, in *Intentions in Communication*, P. R. Cohen, J. Morgan, and M. E. Pollack, Eds., pp. 271–311. Cambridge, MA: MIT Press, 1990.
- [15] D. R. Ladd, *Intonational Phonology*. Cambridge: Cambridge University Press, 1996.
- [16] M. Steedman, Information-structural semantics of English intonation, manuscript, Draft 2.1, October 28, 2002.

<sup>1</sup> Crosstalk is responsible for the high tones masking the downstepped ‘touting’ of the speaker. The arrow shows the actual pitch movement.