

# Prosody vs. Syntax: Prosodic rebracketing of final vocatives in English

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## Abstract

We examine the prosodic incorporation of utterance-final vocatives in American English. Our report is based on two separate experiments to test the claim by Beckman and Pierrehumbert (1986) ([1]) and Pierrehumbert and Hirschberg ([9]) that the phonetic manifestation of an L\* tone on the final vocative is indicative of its contrastive behavior. Our first experiment, involving the dramatic reading of two scenes from a make-believe play, shows that in contexts approximating natural speech, final vocatives are prosodically integrated into the matrix structure. A second experiment with decontextualized "out-of-the-blue" readings, by contrast, shows patterns similar to Beckman and Pierrehumbert (1986)([1]) and Pierrehumbert and Hirschberg ([9]).

**Index Terms:** final vocatives, prosodic incorporation, syntax-phonology interface

## 1. Introduction

While the prosody of free and utterance-initial vocatives has been widely discussed in the literature, especially under the notion of "vocative chant" (e.g. [3], [6], [7]), the prosodic behavior of utterance-final vocatives has not received the same attention. Exceptions are [1], [9], [8], [4], and [10]. Pierrehumbert and Hirschberg ([9]) argue for a separate L\* tone assignment for final vocatives, as in Anna, example (1).

- (1) Your lunch is ready     *Anna*  
      H\*     H\*L     L\*   LH%

Beckman and Pierrehumbert (1986) ([1]) similarly argue for a L\* tone on final vocatives, based on the low f<sub>0</sub> on the vocative *Manny* in figure 1 (lower panel). Moreover, they observe lengthening on the preceding *win*. This contrasts with the similar structure in the upper panel of figure 1, which does not have low f<sub>0</sub> on the final object or lengthening on the preceding verb. Beckman and Pierrehumbert ([1]) therefore argue for the presence of an intermediate phrase (ip) boundary between phrase-final *win*, and the vocative *Manny*.

Beckman and Pierrehumbert's accounts ([1]) conflict with the claim by Liberman ([8]) that phrase-final vocatives are deaccented. Similarly Rappaport ([10]) claims that while initial vocatives are separated by "comma intonation", final vocatives are not; see (2). Unfortunately, Rappaport does not provide phonetic evidence for his claim.

- (2) a. [Jóhn] [I can't come]  
      b. \*[I can't come] [Jóhn]  
      c. [I can't come John]

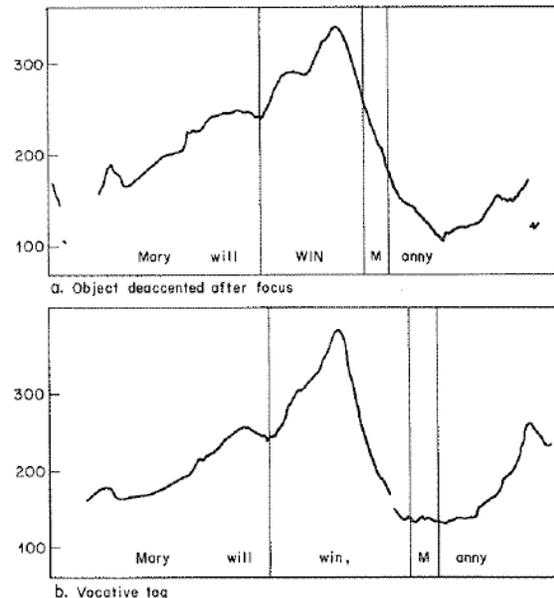


Figure 1: *Contrastive status of vocative tags: Lower panel shows phonetic manifestation of the L\* tone (Reproduced from Beckman and Pierrehumbert, 1986)*

Such evidence has been provided more recently by Goldsmith ([4]), who argues on the basis of a perception study that final vocatives do not sound natural with a preceding prosodic break and that they behave like clitics, without independent pitch accent.

In this paper, we report on two acoustic phonetic experiments on English utterance-final vocatives. One of the experiments operates with list-readings of "Out-of-the-Blue" utterances - a common procedure in the field. The other uses dramatic dialogue, performed by subjects with previous theater experience, to emulate more natural speech. The latter experiment resulted in utterances that generally support the Liberman-Rappaport-Goldsmith ([8, 10, 4]) claim that final vocatives are prosodically integrated into the preceding utterance. The list-reading experiment resulted in a larger number of utterances with prosodic break before the vocative, a finding which is more consonant with the claims of Beckman and Pierrehumbert ([1]) and Pierrehumbert and Hirschberg ([9]). Beyond the factual findings, our experimental procedure shows that dramatic reading can be a valuable tool for getting (close-to) natural speech data in controlled experiments.

The paper is organized as follows: Section 2 outlines the methodology employed in our experiments and the justification

for running two separate experiments. Section 3 presents the results of our experiments. Section 4 contains a summary of our findings and their implications.

## 2. Methodology and Justification of our Approach

### 2.1. List-Reading vs. Dramatic Dialogue

To avoid the problem that under “Out-of-the-Blue” list-reading conditions subjects would be tempted to automatically insert an intonational break corresponding to the comma of the written version and to ensure that the data we obtained are as close to natural as possible, we devised a novel methodology - an experiment consisting of two dialogues from a (make-believe) play, containing vocatives in initial, medial, and final position, as well as sentences without vocatives, and we asked pairs of subjects with theater experience to perform the dialogue. Subjects were furnished “stage instructions”, characterizing the two interlocutors, *John* and *Jean*, as a married couple that likes mountain climbing, has a dog etc., as well as expresses their love by addressing each other by name frequently. (The latter element was included to make subjects more comfortable with the frequent occurrence of vocatives. While some of the subjects commented afterwards that they found this particular feature slightly peculiar, none of them was able to guess the purpose of having the vocatives in the dialogue.)

To further assess the usefulness of our novel methodology, we ran a second experiment under the usually employed list-reading conditions. As we show further below, there is a clear difference in results, with the dialogue experiment yielding results that generally conform to the Liberman-Rappaport-Goldsmith perspective ([8, 10, 4]), while the list-reading experiments resulted in patterns more in keeping with the Beckman and Pierrehumbert ([1]) and Pierrehumbert and Hirschberg ([9]) perspective.

### 2.2. Data

Both experiments employed utterances with initial, final, and medial vocatives, in addition to structures with light adverbs in similar positions, as well as distractor utterances. See (3) for selected examples.

- (3) a. Jean, could you check the mail for me  
 b. I'm getting tired of this, John  
 c. OK, let's go then  
 d. Maybe we have a new mailman

### 2.3. Subjects

Six male and six female speakers participated in the dialogue experiment, while for the list-reading experiment we were able to find only five males and one female. All subjects were native speakers of American English, and most were students at the University of Illinois, except for one faculty member. As noted earlier, the participants in the dialogue experiment all had prior experience in theater.

### 2.4. Methodology

Subjects were recorded in the sound booth of the Phonetics Laboratory, University of Illinois at Urbana-Champaign, Department of Linguistics, employing head-mounted AKG microphones and a Tascam DA-P1 portable DAT recorder. Speech

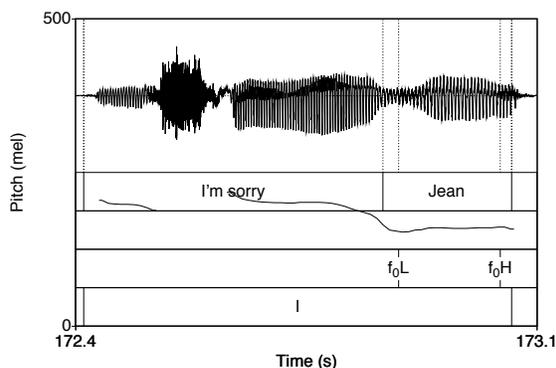


Figure 2: Absence of pauses and  $f_0$  resetting (DD: John3)

data were digitized and sampled at 22050 Hz, using a Kay Electronics CSL box.

The data were analyzed using PRAAT, focusing on durational and pitch data in the transition between final vocatives and the preceding utterance, with special attention to evidence of  $f_0$  resetting.

## 3. Experimental Results

### 3.1. The Dialogue Experiment

Examination of our data from the dialogue experiment reveals that in most cases, final vocatives were not preceded by pauses. Additionally, under the controls set up in the dialogue experiment, we find that in the majority of cases final vocatives didn't exhibit  $f_0$  resetting; that is to say a continuous  $f_0$  trajectory was found between the phrase final word and the final vocative. Both of these observations are illustrated in the  $f_0$  contour in figure 2. This, at least, holds true in voiced contexts. Voiceless contexts, such as in Figure 3, give the appearance of a break, as well as of a slight  $f_0$  resetting. However, the apparent break can be attributed to the absence of a voice bar; and the slight  $f_0$  rise after the burst can be attributed to the crosslinguistic tendency of voiceless consonants to raise  $f_0$ .

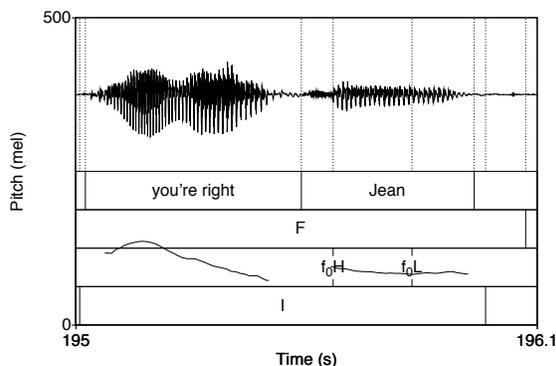


Figure 3: Apparent  $f_0$  resetting and prosodic break in voiceless context (DD: John5)

In very rare cases, we find  $f_0$  resetting in voiced contexts. In 2-3% of final vocatives in a voiced context a slight  $f_0$  rise

following the burst is noticed, as shown in figure 4.

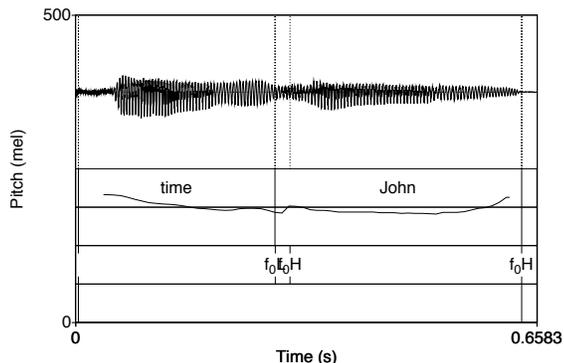


Figure 4:  $f_0$  resetting and prosodic break in voiced context (DD: Jean3)

In one case, a subject apparently interpreted a final vocative as attention-getting (presumably because of the attention-getting initial vocative of the same utterance) and inserted a strong prosodic break, as well as a strong  $f_0$  reset. This is evidenced in figure 5, where we can see strong prosodic breaks in terms of  $f_0$  contours separating intonational phrases.

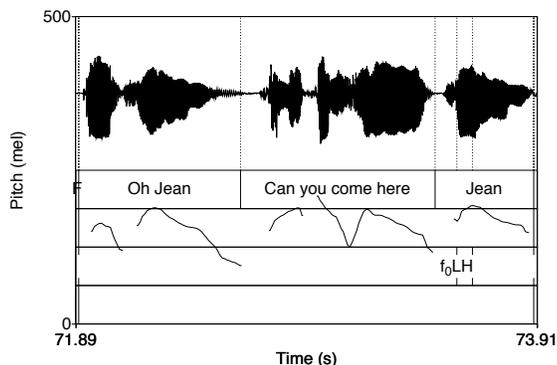


Figure 5:  $f_0$  resetting and prosodic break in final vocative interpreted to have an attention-getting pragmatic function (DD: John5)

Especially noteworthy are questions, where the final intonation rise extends from the preceding utterance through the vocative, without prosodic break or  $f_0$  reset; see figure 6. (The slight  $f_0$  lowering at the burst of the consonant onset of the vocative is attributable to the voicing of that consonant; the high  $f_0$  target of the intonational contour is firmly anchored to the vocative, showing that it is prosodically incorporated into the matrix clause.)

### 3.2. The List-Reading Experiment

Prosodically unincorporated final vocatives, as in Figure 4, are more commonly found in the list-reading context than in the dialogue experiment. In figure 7 we see that the  $f_0$  contour reflects a contrastive  $L^*$  tone as found by Beckman and Pierrehumbert (1986) ([1]) and Pierrehumbert and Hirschberg ([9]).

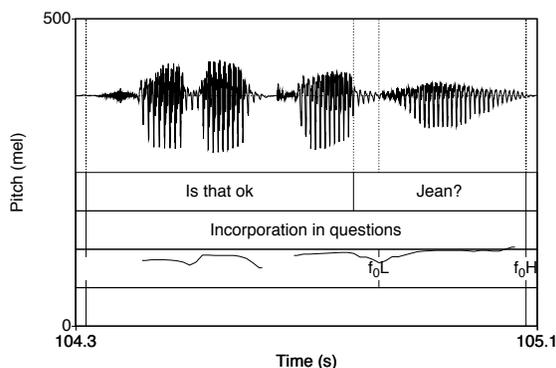


Figure 6: Intonation rise through the final vocative in questions (DD: John1)

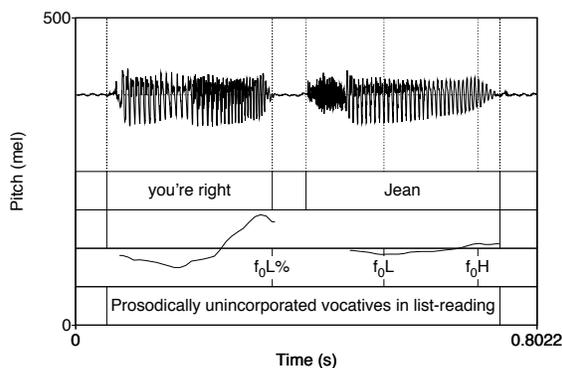


Figure 7: Prosodic breaks and  $f_0$  resetting (LRI)

However, even in the list-reading context, incorporated vocatives do occur. This pattern can be observed in figure 8, where the  $f_0$  contour moves from a high tone to a low tone and significantly lowers into the final vocative *John*.

While the decontextualized list-reading most certainly leads to more instances of unincorporated final vocatives, the ratio between incorporated and unincorporated vocatives is 2:5. That is, nearly 40% of list-reading instances show incorporation of the final vocatives, without  $f_0$  resetting or prosodic break.

In the majority of instances in the dramatic dialogue and nearly 40% of instances in the list-reading context unincorporated vocatives, especially those that pattern along the Beckman and Pierrehumbert (1986) ([1]) and Pierrehumbert and Hirschberg ([9]) are rare. In most cases, these patterns can be explained by three contributing factors. First, the nature of the data elicitation. List-reading of utterances with final vocatives results in unincorporated vocatives in 60% of cases. Secondly, segmental effects that are known to universally raise pitch following voiceless consonants and reduce pitch following voiced consonants may also be responsible for attributing a  $L^*$  tone to those vocatives that have initial voiced consonants. Thirdly, as seen in figure 5, incorrect assignment of a pragmatic function to the final vocatives can also lead to phonetic outcomes that make it difficult to explain the prosodic status of final vocatives.

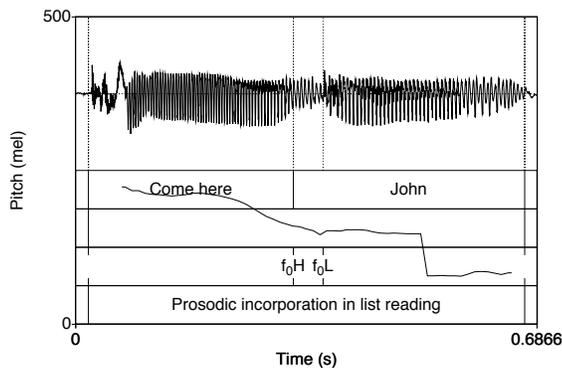


Figure 8: *Prosodically incorporated final vocatives in the LR context (LR4)*

#### 4. Conclusions and Outlook

Our experiment provides strong acoustic support for the Liberman-Rappaport-Goldsmith perspective. Utterance-final vocatives commonly are prosodically incorporated into the preceding utterance, without any appreciable break and without  $f_0$  resetting. This is especially true for the dialogue experiment, while the list-reading experiment yielded a higher proportion of unincorporated final vocatives.

What is especially noteworthy is the behavior of questions, where the final intonation rise extends from the preceding utterance through the vocative, without break or reset. Here we have strong supporting evidence for the hypothesis that final vocatives normally do not have any tonal properties of their own but that, rather, their behavior is determined by the tonal behavior of utterance intonation. In this sense, final vocatives exhibit a behavior similar to utterance-final words in Huichol which, as Grimes ([5]) has shown, lose their underlying tones and exhibit only the tonal properties of the utterance intonation.

Beyond these specific findings, we want to call attention to the novel experimental method of dramatic dialogue that we have employed. The results of this experiment clearly conform better to the perception-based finding of Goldsmith that final vocatives sound more natural if not preceded by a prosodic break and, in that sense, seem to provide more reliable evidence for natural speech behavior. The method has proved useful in another experiment, on the prosodic behavior of utterance-final verbs in Bangla (Bengali). As reported in Dutta and Hock ([2]), it helped confirm that utterance-final verbs normally are unaccented in Bangla and, moreover, it kicked up additional phonetic evidence for the non-prominence of final verbs, in terms of pervasive creaky voice.

We therefore believe that our methodology will be a useful alternative to list-reading experiments on one hand and datamining of large-scale natural-speech corpora on the other.

#### 5. Acknowledgements

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#### 6. References

- [1] Beckman, Mary and Pierrehumbert, Janet, "Intonational Structure in Japanese and English", *Phonology Yearbook III*, 15–70, 1986.
- [2] Dutta, Indranil, and Hock, Hans Henrich, "Interaction of verb accentuation and utterance finality in Bangla", in R. Hoffmann and H. Mixdorff [Eds], *CD-ROM Proceedings of Speech Prosody: 3rd International Conference*, Dresden: TUDpress: 2006.
- [3] Gibbon, Dafydd, "Perspectives of Intonation Analysis", Bern: Herbert Lang, 1976.
- [4] Goldsmith, John, "Dealing with Prosody in a Text to Speech system", *International Journal of Speech Technologies*, Volume 3, Number 1: 51–63, 1999.
- [5] Grimes, J. E., "Huichol tone and intonation", *International Journal of American Linguistics*, 25: 221–232, 1959.
- [6] Ladd, Robert, "Stylized Intonation", *Language*, 54:17–39, 1978.
- [7] Ladd, Robert, "Intonational Phonology", *Cambridge Studies in Linguistics* 79, 1996.
- [8] Liberman, Mark, "The intonational system of English", MIT Ph.D. dissertation, Cambridge, MA, 1975.
- [9] Pierrehumbert, Janet and Hirschberg, Julia, "The Meaning of Intonational Contours in the Interpretation of Discourse", in Jerry Morgan, Philip Cohen, and Martha Pollack [Eds], *Intentions in Communication*, MIT Press, Cambridge MA, 1990.
- [10] Rappaport, Gilbert, "On the linguistic function of detachment (comma intonation)", in J. F. Richardson et al., [Eds], *Papers from the Parasession on the Interplay of Phonology, Morphology, and Syntax*, 185–197, Chicago Linguistics Society, 1983.