

A PILOT INVESTIGATION OF THE  $F_0$  PATTERN  
IN AMERICAN ENGLISH

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Abstract: Fourteen declarative sentences were recorded by one native speaker of American English. The  $F_0$  pattern (the  $F_0$  movement within the stress group) was investigated, and a model was proposed. This model was compared to one based on identical material, but with a British speaker.

1. Introduction

In British English and "East Coast American English", the stressed syllables have a higher fundamental frequency than the unstressed ones (Fry, 1958, Lieberman, 1960). Bolinger (1970) mentions, however, that in other types of American English a pattern may be found in which the fundamental frequency is lower in the stressed syllables than in the unstressed ones. The purpose of the pilot experiment reported below was to examine instrumentally this opposite  $F_0$  pattern.

2. Procedure

The test material consisted of 14 declarative sentences, each consisting of a test word (either a natural word or a nonsense - but possible - word) embedded in a carrier phrase. To avoid the influence of intrinsic  $F_0$  differences among vowels, the material was constructed in such a way that each test sentence contained either low or high vowels throughout.

The test material contained the following stress combinations: Stress on the first, second, third, and fourth syllable in the test word, followed by zero, one, and two unstressed syllables.

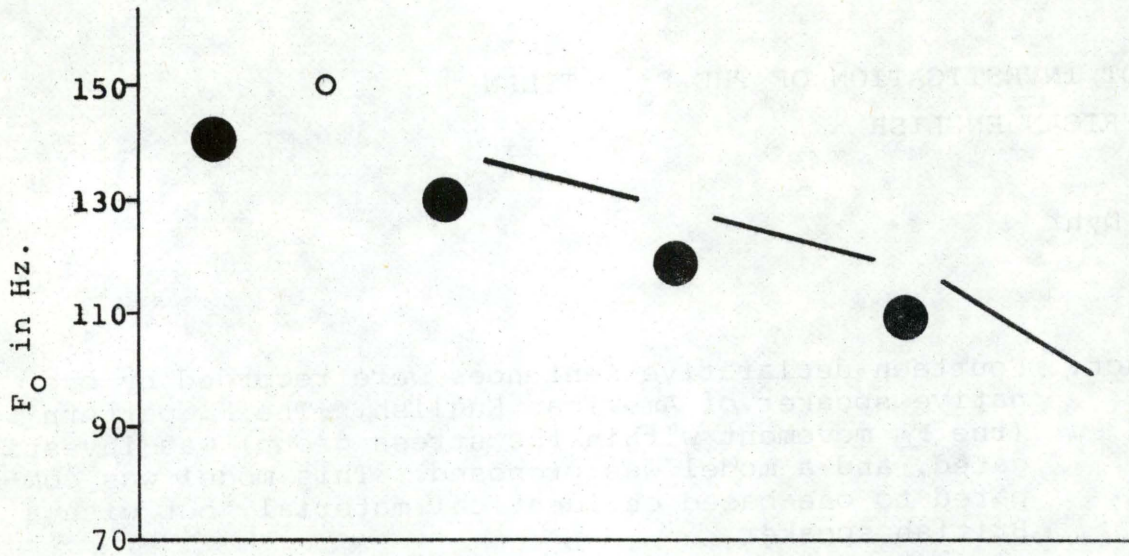


Figure 1

American model based on sentences with natural words. ● indicates stressed syllable, ○ unstressed syllable, — a series of unstressed syllables.

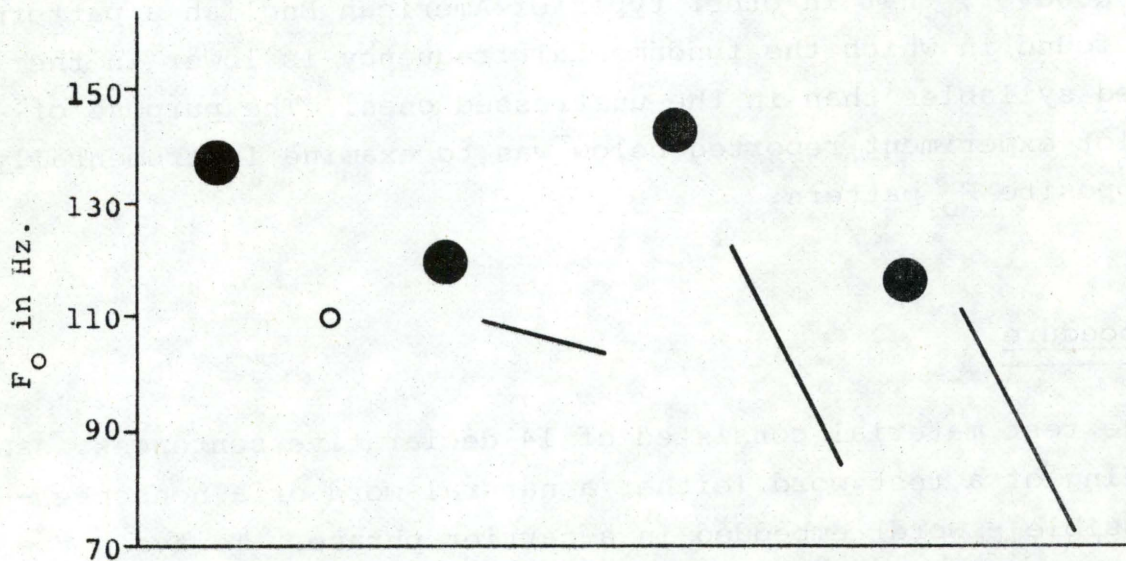


Figure 2

British model based on material identical with that of the American model. See further legend of figure 1.

The material was recorded ten times by a twenty-two year old American male speaker, born and raised in California.

Tracings of the  $F_0$  movements were made, and superimposed on one another. Average  $F_0$  curves were drawn by hand. A quantitative measure for the central tendency of the  $F_0$  level in the vowels was obtained by measuring the average  $F_0$  curves at a point two thirds from the vowel start, cf. Rossi (1971).

### 3. Results

It was found that in the natural words all the stressed syllables had a lower fundamental frequency than the unstressed ones. For the nonsense words the pattern was the opposite. This seemed to be due to the fact that the speaker, who had had no phonetic training, was unable to pronounce the nonsense words without emphasizing them. This change of pattern did not occur at the word boundary, but at the stress group<sup>1</sup> boundary (except when these coincide) - i.e., the  $F_0$  pattern did not change before the stressed syllable in the nonsense word, even when the stressed syllable was the last one in that word. This seems to indicate that the  $F_0$  pattern is controlled, not by the word, but by the stress group.

The results for the natural words can be described by the model shown in figure 1.

The model based on the data from the American speaker can be compared to one based on an identical test material, but with a British speaker, figure 2. It is evident that, apart from the opposite  $F_0$  pattern, a definite sentence nucleus (focus) is found only in the British model, which also has a greater  $F_0$  variation than the American model.

It must be pointed out that, considering the very restricted material, the present result should be viewed with care. A preliminary examination of data obtained for another American (Wisconsin) speaker, however, seems to be in good agreement with the tendencies outlined in the present paper.

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1) The stress group is defined as a stressed syllable plus the following unstressed ones.

References

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