A Prosodic Observation in English Hyperbaton

Kazuaki ICHIZAKI
Lecturer, Miyazaki Women's Jr. College

英語の転置における韻律観察

市 﨑 一 章

要 旨

通常語順の英語平叙文と、その中で転置が起きた（パラフレーズによって構成語彙が異なる場合を含む）文のペアを対象に、それぞれの韻律特性（卓立、基本周波数曲線、特定の語彙の長さ、ポーズの有無とポーズ長）を調査した。英語を母語とする７名の発話者が、計８組１９種の英語文を発話し、それを音声分析ソフトを用いて調査した結果、以下のような知見を得た。

全資料を通じて、韻律特性の中でもピッチ変動が卓立を生み出しやすい。卓立は、文の中位より文末の方に、文頭より文末の方に置かれやすい。ポーズの挿入によって、１文とそれが分離された２文を区別することが多いが、必ずしもそれだけではなく、ポーズの長さによってそれらは区別されることもある。文の中位に現れた人称代名詞には卓立は置かれず、固有名詞に卓立が置かれる傾向があるが、その際、ピッチ変動や継続時間には関係無く、その差は、音の強さに依存している可能性が高い。ピッチのピークを３つ以上含む文では、あるピークがひとつだけ他のピーク（上昇下降調）と音調が異なっていれば、そのピークのピッチが高くなくても、卓立を帯びやすい。否定辞が２度現れる文では、２番目の否定辞には必ずしも卓立は置かれず、聴者は、文末項を聴き取ったり、２番目の否定辞のピッチ変動を感知することで、連続否定を理解している可能性が高い。

1. Introduction

Whenever a message is uttered, it always has some prosodic traits. A message usually consists of given information corresponding to a theme and new information corresponding to a focus in structure. Both the theme and the focus sometimes appear in unmarked (expected) form and sometimes appear in marked (unexpected) form. Then, from a prosodic point of view, what prosodic traits are such a theme and a focus embodied with in actual utterance? It is the aim of this paper to investigate the prosodic conditions of English sentences which differ in meaning by controlling prominence.

It has been said from earlier times by Coleman (1914), Muyskens (1931), Lee (1956), Bolinger (1958), Peterson, Wang, and Sivertsen (1958) and so on that pitch is the major attribute which bears prominence. In the present paper, intonation, a variation of pitch in a sentence, will be discussed by observing its perceptual correlate, fundamental frequency (F_0 henceforth), although there is strictly a distinction between pitch and F_0. F_0 is the rate at which the vocal cords open and close during voiced portions of speech while pitch depends not only on the rate of vocal cord vibration but also on factors such as speech intensity, according to Sorensen and Cooper (1979). It was, however, illustrated by Stevens and Volkmann (1940) and others that pitch changes in proportion to F_0, in the range of 50-1,000 cps which is the range of human speech, can be easily observed with sound analyzing software.

2. Investigation and Analysis

2.1 Corpus

A pilot study on prosody of hyperbaton has been carried out in Ichizaki (2000, 2001d), whose corpora were sentences with normal word order and sentences with hyperbaton, both of which consisted of identical words. When some words are shifted leftward in a sentence, which could be deemed to be a kind of paraphrasing, some words have to be deleted and some words need to be added sometimes. The corpora of this paper were: the pair of sentences with normal word order and those with hyperbaton, sentences with normal word order and those with hyperbaton consisting of different words; original sentences and paraphrased ones, between which there was a slight difference in meaning. The original sentences were quoted from a few titles which are listed at the end of this paper and the number of the corpus resulted in eight sets, consisting of nineteen sentences in all. Neither a description of intonation nor one of nuclei was added to them. Thus the sentences having their connotation only were given to the informants.

The tonetic stress-marks used by Quirk *et al.* (1972), which are shown in Table 1, were adopted in describing intonation. This was because the tonetic stress-marks could represent both features, pitch transition and stress, with one mark and are one of the simplest and most convenient systems for describing such prosodic traits.

Table 1 Tonetic Stress-Marks Used in This Paper

Rising (´)
Falling (`)
Rise-fall (^)
Fall-rise (ˇ)
Level (-)

2.2 Informants

Seven native speakers of English who are teaching English at colleges in Japan were asked to be the informants for the investigation in this paper. Their nationalities (regions), sexes and ages were: a female American (New Jersey), age 27; a female American (Vermont), age 36; a female American (Florida), age 42; a male American (New Mexico), age 57; a male Canadian (Ontario), age 40; an Englishman (East Anglia), age 45; an Englishman (Somerset), age 53. The F_0 range of each informant was: the American female (New Jersey), 135-353cps; ditto (Vermont), 128-367cps; ditto (Florida), 116-416; the American male (New Mexico), 82-243cps; the Canadian male, 77-220cps; the Englishman (East Anglia), 81-199cps; ditto (Somerset), 79-217cps.

2.3 Procedure

The informants pronounced the following corpora considering their connotation. The utterance was given at natural speed, as used in their daily life. Every informant had read through all the corpora at least once before he/she uttered them and confirmed if there were some corpora whose meaning he/she didn't understand. Their utterance was given only once as long as they didn't stop uttering with a cough, mispronunciation or the like. A microphone and a mini-disc recorder were used for recording. The recorded materials were analyzed with sound analyzing software 'Onseirokubunken' (Imagawa and Kiritani 1989) and F_0 contours of each item were printed out.

As indicated in Maekawa (1996), it is difficult to extract F_0 completely, especially at the end of an utterance, where the vocal cords are apt to vibrate aperiodically. There were not a few utterances whose F_0's were not identified although a total of seven F_0's should have been obtained for each corpus since there were seven informants. Such utterances were eliminated from effectual objects to analyze. The direction of pitch change was shown on the upper line of each corpus, above only prominent syllables, and the number shown on the lower line means how many informants put prominence there. A prominent syllable is indicated with bold type without changing the size of letters although it is indicated with small capitals in Quirk *et al.* (1972). Syllabification is not always the same as the separation in spelling. The numerators which were five or more were reckoned as the majority who used the representative prominence distribution for the sentence. This was because Ichizaki (2001a, 2001b, and 2001c) demonstrated that many well-known studies showed the typical intonation or nucleus/nuclei of

the sentence with a concordance of just 60% or so. The numbers which were smaller than five were added with braces for comparing prominence as occasion demanded. The corpora were classified into three groups according to the meaning or particular words/phrases used. The report concerned prominence, pitch, duration, and in some cases pause. Both the American male and the Englishman from Somerset helped with identification of such features.

3. Results and Remarks

3.1 Negatives

(1a) There were **nó** fingerprints of the robber found in **án**y of the **ròoms**.
Prominence 7 (2) (4) 7 6

(1b) In **nóne** of the **rooms** were there **án**y fingerprints of the robber **fòund**.
Prominence 6 5 6 (2) (4) 6

All informants made *no fingerprints* the highest peak and made *rooms* fall in (1a). The American male and the Englishman from Somerset made *any* another salient peak which was as high as *no fingerprints*, the American female from Vermont and the Canadian gave *any* a moderate high pitch, and the other three informants made *of the - the rooms* fall gradually. In (1b) *none*, *any*, and *robber* were made to rise and reached highest pitch with this order in five informants. The *none* and *any* pronounced by the American female from Vermont reached the same pitch level. The other informant, the American female from New Jersey, made *none* rise but her *any* proceeded almost level and her *robber* also proceeded perfectly level. She used a similar flat contour for (1a) in which only *no* rose clearly and almost level contour was observed thereafter. For *rooms* in (1b) four informants used fall-rise and three used fall; one out of the three, who was the American female from New Jersey, put a pause of 237ms after *rooms*. She used another pause of 307ms after *fingerprints*. As indicated by earlier studies such as Quirk *et al.* (1972, 1985) and Leech and Svartvik (1975), information focus came last; *rooms* in (1a) and *found* in (1b) both of which showed that falling contour produced prominence without any exceptions. Eventually prominence was recognized with pitch movement in both corpora, rising contour on five syllables and falling contour on two syllables.

(2a) This **door** must **nót** be left unlocked at any **tìme**.
Prominence 7 5 (1)(3) (2) 7

(2b) At **nó tìme** must this door be left un**lòcked**.
Prominence 7 7 (2) 7

The overall F_0 contours of (2a) were identical among the informants: they fell at *door*, rose at *not*, fell again at *-locked*, and fell at *time*. The contours of (2b) also appeared with some consistency: they

rose at *no*, fell at *time*, and fell at *-locked.* Only the American female from New Jersey used a fall-rise tone at the sentence end of both corpora: for *time* in (2a) and for *unlocked* in (2b). She and another female from Vermont divided each corpus into two breath groups: the former put a pause of 186ms after *door* in (2a) and that of 102ms after *time* in (2b); and the latter, that of 77ms after *door* in (2a) and that of 160ms after *door* in (2b). As in the pair of corpora (1a) and (1b), salient pitch movement accompanied some prominence in this pair. Although the syllable *-locked* in (2a) showed some pitch movement, it was not clearly recognized to have prominence whereas it was recognized to be a prominent syllable in (2b) in all informants. This result seems to demonstrate that prominence depends on the position in the sentence, i. e. it got greater at the end than in the middle in this case. It might be in order to deliver the negative meaning clearly that *not* in (2a) showed salient pitch movement and was recognized to be prominent although it appeared in the middle of sentence.

3.2 Sentences Including so (=also), neither, nor

(3a) She was **an**gry and I was, **too**.
Prominence 6 (3) 6

(3b) She was **an**gry and so was **I**.
Prominence 7 (1) 7

(3c) She was **an**gry. So was **I**.
Prominence 7 (4) 7

Most informants made *an-* and *too* prominent syllables in (3a). The latter was pronounced with a falling tone while the former was with different contours. For the word *angry*, four informants used a fall-rise, two used a rising, and the other used a falling tone. The only informant, the American female from Florida, that did not give *an-* prominence, made *I* and *too* prominent syllables, which were accompanied with a rising tone and a falling tone, respectively. Pauses, 134ms and 307ms, were inserted after *angry* by two informants. Falling tone was used for *I* by all informants but different contours were used for *angry* in (3b). They were two level tones, two falling, two rise-falls, and one fall-rise. Nobody used a pause in (3b). In contrast with (3b), all informants used a pause, 288ms-544ms, after the first sentence in (3c) as anticipated. Prominence was added to *an-* and *I* in (3c) as it was in (3b). All informants used a falling tone for *I* in (3c), the last item of the second sentence, whereas for *angry*, the last item of the first sentence, nobody used a level tone and the tone used was divided into three types (four used a falling, two used a rising, and one used a rise-fall), which was dissimilar to the result in (3b). Since rising tone is said to lead some following items, the two informants who used rising may have dealt with *angry* in (3c), which consists of two clearly separated sentences in surface structure, like an item appearing in the middle of sentence. If this is true, pause may not be a cue to separate the sentence with a period. However, the two informants who put a pause of 134ms and 307ms after *angry* in (3a) used a longer pause of 390ms and 544ms in (3c). Therefore, the length of pause

could be the cue for them to differentiate the single sentence from the two sentences separated with a period. A falling tone was used for *So* in (3c) by four informants who made it a prominent syllable. It was a common result in the three corpora that the only content word, regardless of its position, and the last item were given prominence. With regard to prominence distribution for *I* in the three corpora, *I* in (3a) which appeared in the middle of a sentence was given prominence by just three informants whereas rightmost *I* in (3b) and (3c) were prominent in all informants. Such items that showed a difference in prominence distribution were chosen and the duration of them were measured, t-tested, and shown in Table 2 at the end of this paper. Both the difference of *I* between (3a) and (3b) and that between (3a) and (3c) were significant at the 5% level, which suggests that duration is a key prosodic feature on which the prominence of *I* depended among these corpora.

(4a) John saw the accident and **Mȃry** did, **tòo**.
Prominence (4) (4) 7 7

(4b) **Jóhn** saw the accident and so did **Màry**.
Prominence 6 (4) (1) 7

(4c) **Jóhn** saw the **acc**ident. So did **Màry**.
Prominence 7 7 (2) 7

The set of corpus (4) is similar to the set of corpus (3) in the way that the word *too* or *so* was embedded, but it has a different sentence pattern, a different verb, and more content words. All informants gave ***Mary*** in (4a), which was the counterpart of *I* in (3a), prominence with a rise-fall tone. The *I* in (3a) was also accompanied with a rise-fall in the utterances of six informants out of seven but was given no prominence at all. As shown in Table 2 the t-test of duration of *Mary* between (4a) and (4b) and that between (4a) and (4c) resulted in significance at the 5% level although ***Mary*** in (4a) was prominent among all informants like ***Mary*** in (4b) and (4c). While *I* in (3a) was also shorter compared with *I* in (3b) and (3c), like *Mary* in (4a) compared with *Mary* (4b) and (4c), it was recognized to be prominent in just three informants, unlike ***Mary*** in (4a). The results seem to suggest that the difference of prominence distribution between *I* in (3a) and ***Mary*** in (4a) did not depend on pitch movement or duration but the other prosodic feature, intensity, and this result may be a natural difference in pronunciation between pronoun and proper noun. The last item of (4a), *too*, was given prominence with a falling tone as was done in (3a). Neither *John* nor *accident*, which were the other content words in (4a), however, was given prominence by five or more which is the significant number in identifying prominence in this paper. *John* in (4b) was accompanied with a rising in the pronunciation of six informants and was recognized as a prominent syllable but *accident* did not have enough informants to be recognized as such an item. The F_0 contour of *accident* was divided into various tones and there are no typical tones among either those who made it prominent or the others who didn't. In (4c), on the other hand, *accident* appeared at the end of the sentence and that seems to be why it became a prominent item. It was accompanied with three level tones, three rise-falls, and one falling. For *John* in (4c) five

informants used a rising tone while two used a level tone. The informants used a falling tone for *Mary* in (4c), excluding the American female from Vermont who used a fall-rise for *Mary* in (4c) and (3c).

All informants inserted a pause, 250ms-799ms, after the first sentence of (4c) while only the Canadian male put one after *accident* in both (4a) and (4b), 166ms and 294ms, respectively. The length of his pause in (4c) was 799ms which was far greater than the other ones and he used level tones for three *accident*s in all corpora, which may again show that he distinguished one sentence from two sentences by the difference of pause length. Throughout the set of corpus (4) the last item always became prominent, which shows the superiority of the sentence end in producing prominence; besides, proper nouns showed a strong tendency to become prominent regardless of their positions.

(5a) John didn't see the accident and **Máry**, didn't **éi**ther.
Prominence (3) (2) (4) 7 (0) 7

(5b) **Jo̍hn** didn't see the **a̅cc**ident and neither did **Máry**.
Prominence 6 (4) 6 (2) 7

(5c) **Jo̍hn** didn't see the **acc**ident. Neither did **Mary**.
Prominence 7 (1) 6 (4) 7

It was remarkable in (5a) that *Mary*, although it appeared in the middle of the sentence, became the highest peak in two informants and became another salient peak which was as high as *John* at the beginning in two informants. As the height of *Mary* suggested, it was given prominence by all informants. The other two informants, who made *Mary* the second highest peak, made *didn't* the highest and both of their *didn't*s wore prominence. In the case of (5b) the overall F_0 contour appeared in various ways: two informants made *John, didn't, neither,* and *Mary* four equal peaks; two informants made *didn't* the highest and *neither* the second highest; another informant made *didn't* the highest and *Mary* the second; another *didn't* the highest, *accident* and *Mary* the second highest; and the other *John* and *didn't* the equal highest, *accident-neither* the second highest mount, and *Mary* the third. The term *accident* which was never the highest or the second highest except in just one informant was given prominence in six informants. Most of the other peaks above mentioned appeared as a rise-fall while *accident* appeared as a rising tone in five informants and as a level tone in two informants. A particular tone different from other tones in the sentence having three or more peaks might be the reason it became prominent regardless of its pitch. Conversely, the term *neither* was recognized to be prominent in just two informants although it was (one of) the highest in two informants and the second highest in two informants. And it did not become prominent among three out of the four informants. This is an example of pitch height not always directly bearing prominence. All informants inserted a pause, 154ms-774ms, after the first sentence in (5c) while only the Canadian did in (5a) and (5b), 51ms and 128ms, respectively. It was the same tendency mentioned in the previous section of (4) that he distinguished the sentence structures depending on the length of pause. Four informants uttered the first sentence with a successive falling tone, two made *John* the highest peak and *accident* the second highest

peak, and the other made *accident* her only peak. For the second sentence five informants made *Neither* the highest peak and *Mary* the second while the other two used a successive falling tone. It was *Neither* that had the highest pitch in the second sentence but there were just four informants who gave it prominence. The last item *Mary* being given prominence by all informants seems to show the superiority of the sentence end over the beginning in producing prominence. In comparing each corpus, it is intriguing to speculate how speakers tried to deliver the second negation. If the negatives appearing second, i. e. the term *didn't* in (5a), *neither* in (5b), and *Neither* in (5c), had directly functioned as a negative cue, they would have been given some prominence. Apart from *Neither* in (5c) which was moderately recognized prominent, neither *didn't* in (5a) nor *neither* in (5b) was given much prominence. That suggests that listeners unconsciously concentrate on the end of a speech or the last item automatically remains as the greatest auditory image in their mind. The corpus (5a) is a compound sentence with a normal word order. Listeners might judge the second negation by listening to just *either* in the end even though they didn't hear *didn't*. The corpus (5b) is also a compound sentence but with hyperbaton. Listeners might judge that *Mary*'s behavior is also negated by listening to just *Mary* in the end. This must be a mere conjecture at the moment and the role of word order has to be studied further.

(6a) I am **not rich,** and I do **not** wish to be.
Prominence 6 6 6 (3)

(6b) I am not **rich**, nor do I **wish** to be.
Prominence (4) 7 (2) 6

Many informants made *not* rise and *rich* fall-rise in the first clause of both corpora. As the similarity of F_0 contours of both corpora suggested, prominence distribution in each clause was also similar. Different from the first clause, there was not such a strong consistency in the overall contours of the second clause of (6a): three informants made it a monotonous gradual falling, another informant made *and-not* level and *wish* rise, another made *and* fall and *not* rise, another made *and-not* rise, and the other put pauses before and after *and* which was made level and began *I* with the highest pitch and fell steeply thereafter. The *not* of the second clause of (6a) was recognized to be prominent although there was only one informant that uttered *not* with the highest pitch within the range of the second clause and no particular pitch movement was noticed at *not* among the other informants. On the other hand, *wish* of (6a) was not recognized to be prominent with enough informants while *wish* of (6b) was recognized although the t-test on duration between them gave a nonsignificant result. This result may be attributed to English rhythm, i. e. the repetition of weak syllables and strong syllables. A total of three weak syllables in succession followed after stressed ***rich*** in both corpora, so the fourth items, *not* in (6a) and *wish* in (6b), seem to have been necessarily stressed. As the result, the fifth item, *wish*, in (6a) was not automatically given enough intensity, which led to the *wish* being given prominence by just three informants. Nor was there a strong consistency in the contour of the second clause of (6b):

four informants reached the highest pitch at *nor* and fell thereafter, two informants made *nor* a small peak and *wish* the highest salient peak, another informant made *nor* and *wish* rise and *do I* and *to be* fall. As regards pause, six informants inserted them after the first clause in both corpora, 51ms-730ms in (6a) and 141ms-538ms in (6b). Only the American female from Florida used two pauses: 83ms after *rich* and 150ms after *and* in (6a). And only the American male did not use any pause in either corpus. The corpora (5a) and (5b) are compound negative sentences which have different subjects while the corpora (6a) and (6b) are compound negative sentences which have the same subject. Successive negation would be delivered easily by making the second *not* prominent in (6a). In the case of (6b), however, how did the informants deliver successive negation with just two informants who made the second negative *nor* prominent? Since there was no content word other than *wish* which appeared in the middle in the second clause, the end of the sentence where a function word, *be*, appeared had nothing to do with it. If there is an answer which could come out of the results this time, it may be the pitch movement after pause. Although prominence was recognized at the *nor* of just two informants, all informants made it rise and five informants reached their highest pitches at *nor* in their second clauses.

3.3 Sentences Including here/there

(7a) The **mílk**man is **here**. At the **dòor**.
Prominence 5 5/6 7

(7b) Here is the **milk**man. He's come at **làst**.
Prominence (0) 6 6

Since prosodic differences between a sentence with normal word order and that with hyperbaton are investigated in this paper, the first sentence of each corpus is the focus of our attention here. All informants made *milkman* the highest peak in (7a). Three informants began *here* with the second highest pitch and fell on it while two others, who were both Englishmen, made *here* a really tiny falling tone. Another informant made the whole sentence a successive falling with a short level tone at the end and the other informant made *milkman* a peak and made the following items level. Finishing the sentence with level tone seems to be influenced by the following utterance. Especially in (7a), the first sentence ended with the sound [r] and the second utterance began with a vowel, which supplied desirable surroundings for producing r-linking[1]. Once *here* was shifted to the beginning of a sentence as in (7b), no prominence was recognized at *Here* although it began from the highest pitch in all informants. Four informants made *Here* the highest peak and *milkman* the second peak, two informants made the whole sentence a successive falling tone, and the other informant made *milkman* fall-rise. Different from the other corpora previously mentioned, there seems to be some difference in meaning between (7a) and (7b). According to their source, Quirk *et al.* (1985),“ in contrast to ASV (=7b), the SVA (=7a) order invites us not merely to put the nuclear focus upon the A but to see these adjuncts as referring to specific places.” This may be a reason no prominence was noticed at *Here* in (7b). As prominence

distribution suggests, the t-test between two *here*s was significant at the 1% level, which shows the superiority of the sentence end over the beginning and prominence depending greatly on duration.

(8a) The book is **there**. By the **type**writer.
Prominence (0) 7 6

(8b) There's the **book**. I've been looking for it all **week**.
Prominence (4) 6 7

Like corpus (7) the first sentence of each corpus is the object to mention here. All informants made *book* rise highest and made *is* fall in (8a). Four of them made *there* a small peak while the other three made it another peak which was as high as the highest point of *book*. In spite of *book* having the highest pitch, no prominence was recognized at *book*. On the other hand, all informants made *there* a prominent syllable. It suggests that informants uttered *there* with more intensity. All informants made the first item *There's* in (8b) rise highest and made the next item *the* fall, similarly in (8a). Three informants made *book* another peak, three informants made it level, and the other made it fall. The last item *book* in (8b) was also recognized to have prominence. There is some difference in meaning between (8a) and (8b), as there was between the pair of (7a) and (7b), although each corpus has the identical constituents. The speaker emphasized the place where he/she found *the book* in (8a) while *the book* was found with a surprise in (8b). The t-test between the two *there*s[2)] showed a significant tendency. Such a mental attitude besides duration, pitch, and pitch movement seems to be an element which affected the difference of prominence distribution between the two corpora.

4. Conclusion

It was observed throughout the present experiment that pitch movement rather than pitch itself was the main factor which produced prominence. Since the corpora used in the experiment were all affirmatives, a falling tone led to some prominence most frequently. As mentioned in the section of the corpus (2) prominence was placed more easily at the end of the sentence than in the middle and as in the section of (7) and (8) prominence was placed more easily at the end than at the beginning, which seems to reflect the indication of O'Connor and Arnold (1961), Halliday (1970), Quirk *et al.* (1972), and Leech and Svartvik (1975) that the value of information focus was the greatest at the end of a sentence. The difference in duration of *I* in the corpus (3) and that in the prominence distribution seen among them seem to illustrate their claim from the durational point of view. The insertion of pause, as in the corpus (3) and (4), was naturally a cue to distinguish one sentence from the sentence divided into two, and besides the duration of the pause inserted was suggested to be another cue. Comparing the item in the middle of the corpus (3) with that of the corpus (4) prominence was not given upon a personal pronoun but upon a proper noun. In that case the prominence seemed to have nothing to do with pitch movement but to have something to do with intensity. In the sentence having three or more peaks such

as the corpus (5) if a certain peak has a particular tone which is different from the tone of the other peaks, it seemed to be given prominence easily even though its peak is not so high as the other peaks. In the sentences having two successive negatives, the second negative is not always given prominence. It was suggested that listeners realized the second negation by depending on the item appearing rightmost in the sentence seen in the corpus (5) or on the pitch movement seen in the corpus (6).

The number of corpora, together with that of sentence styles, dealt with in this paper was limited, whereas the complexity of prosodic features involved in the corpus seems to have no limits. The more precisely the data of the corpus was tried to be analyzed, the more complex results were gained. Although there are 'so many men, so many styles of utterance', the models for those who try to speak natural English should be illustrated and given to them by linguists, an aim which, hopefully, was partially realized in this paper.

Table 2 Duration of Particular Items and Results of T-Tests

Corpus No.	Item	Averaged Duration (ms)	t-test
(3a) (3b)	*I* *I*	175 295	(t=2.87, df=6, p<.05)
(3b) (3c)	*I* *I*	295 275	(t=1.22, df=6, ns)
(3a) (3c)	*I* *I*	175 275	(t=3.17, df=6, p<.05)
(4a) (4b)	*Mary*[3)] *Mary*	357 417	(t=2.57, df=6, p<.05)
(4b) (4c)	*Mary* *Mary*	417 400	(t=1.80, df=6, ns)
(4a) (4c)	*Mary* *Mary*	357 400	(t=2.53, df=6, p<.05)
(6a) (6b)	*not* *not*	234 225	(t=1.23, df=6, ns)
(6a) (6b)	*wish* *wish*	257 239	(t=1.17, df=6, ns)
(7a) (7b)	*here* *Here*	327 139	(t=10.22, df=6, p<.01)
(8a) (8b)	*there* *There*	363 244	(t=2.22, df=6, p<.10)

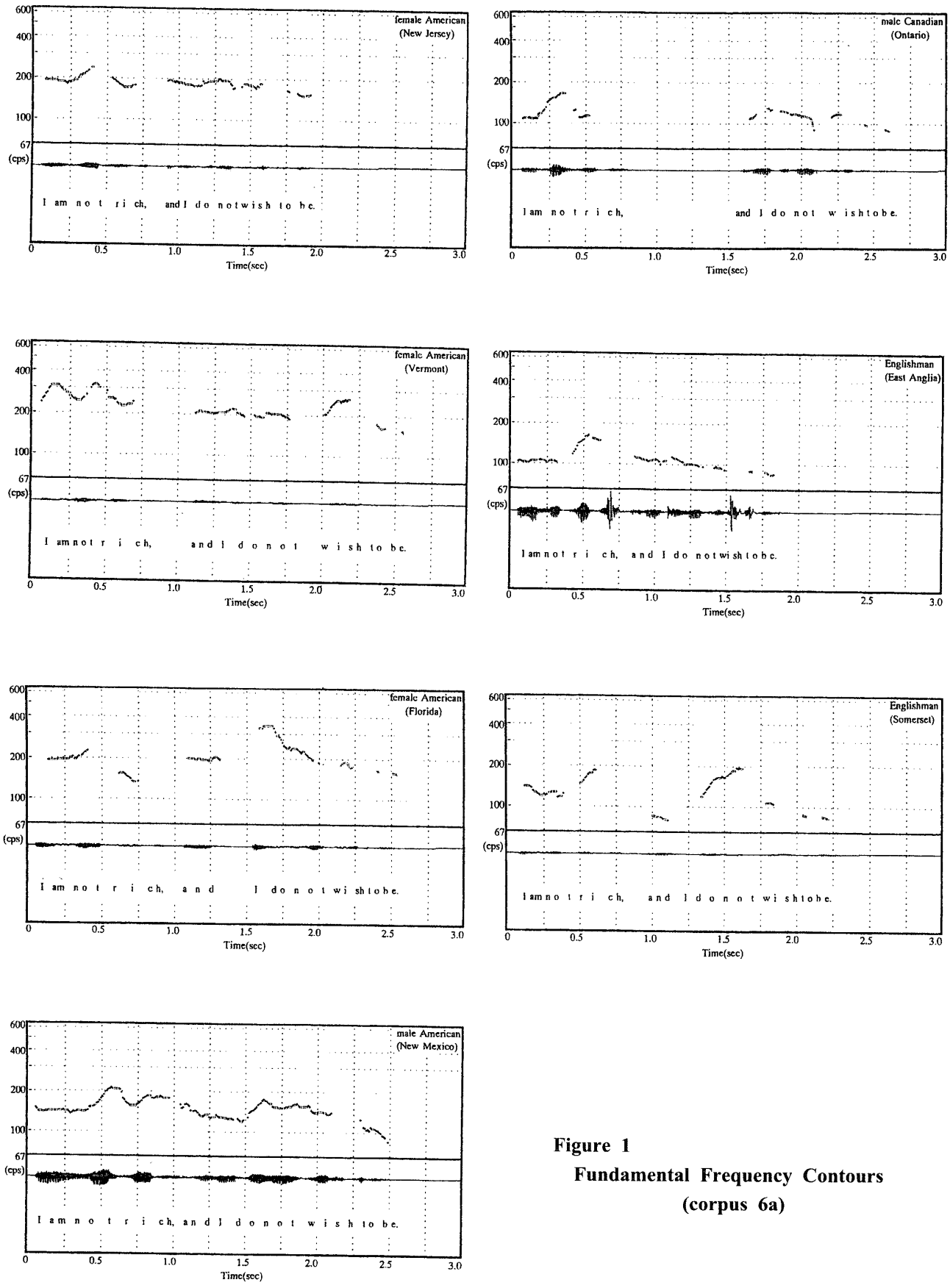

Figure 1
Fundamental Frequency Contours
(corpus 6a)

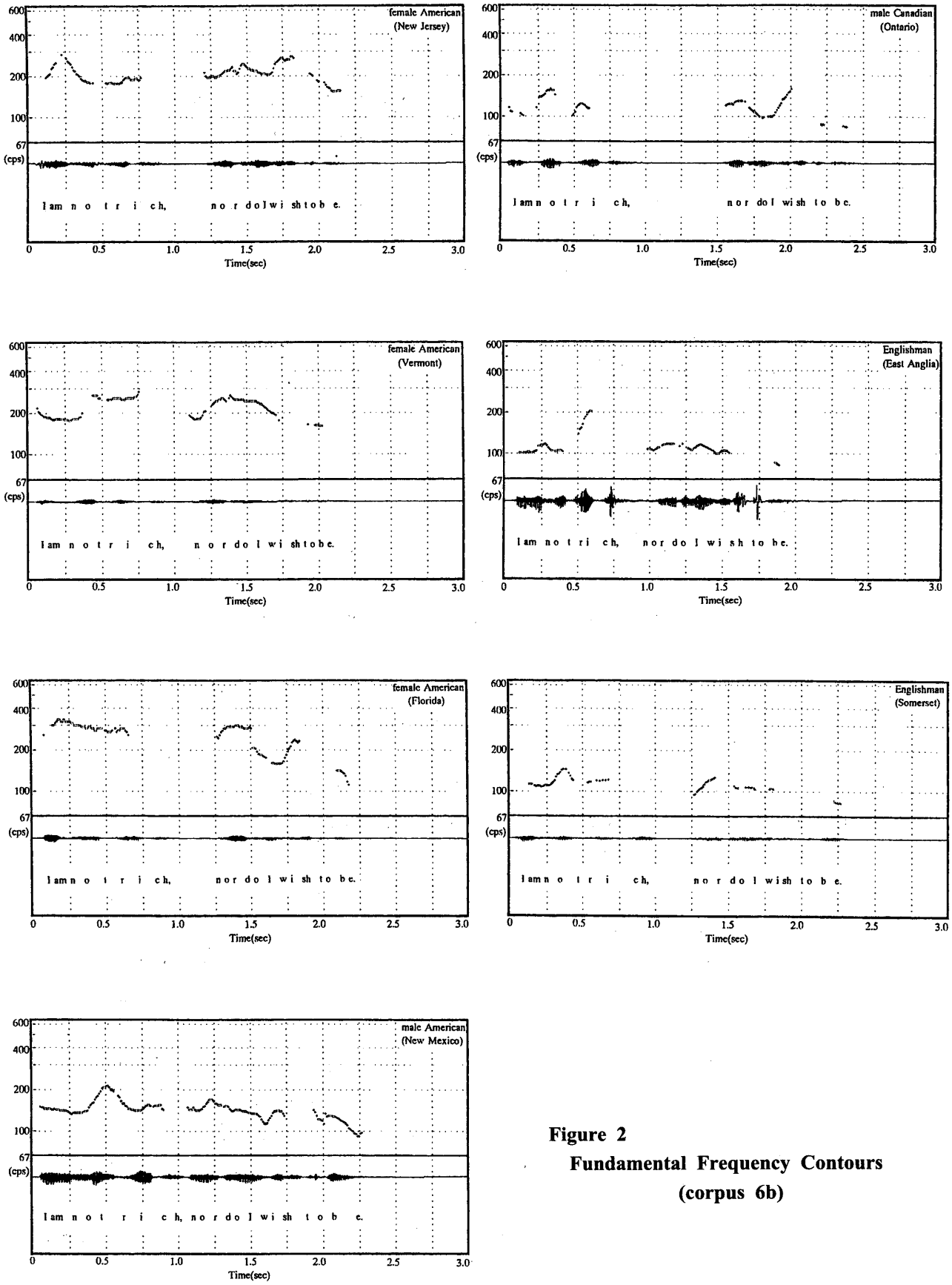

Figure 2
Fundamental Frequency Contours
(corpus 6b)

Notes

This is a revised version of an earlier paper presented to The 14th General Meeting of The Phonetic Society of Japan at Reitaku University on October 1st, 2000.

1) The r-linking occurred between *here* and *At* in the utterance of the Englishman from East Anglia and his data was excluded in the identification of prominence.
2) The *There* was separated from *There's* in (8b) and its duration was measured to compare with that of *there* in (8a).
3) It was hard to measure the duration of *Mar-* of *Mary* by separating it, so the duration of the whole item, *Mary*, was measured and listed here.

References

Bolinger, Dwight L. (1958) " A theory of pitch accent in English," *Word* 14, 109-49.

Coleman, H. O. (1914) " Intonation and emphasis," *Miscellanea Phonetica* 1, 6-26.

Halliday, M. A. K. (1970) *A Course in Spoken English: Intonation.* London: Oxford UP.

Ichizaki, Kazuaki (2000) " Gojyuntochi ni yoru eigo no keizokujikan henka," *Proceedings of the 12th Congress of Japan Phonetic Society,* 207-212.

Ichizaki, Kazuaki (2001a) " Johoteiji to inritsutokusei: Shudai to shoten eno oncho to kaku no taio," *Proceedings of the 3rd Congress of the EPSJ Kyushu-Okinawa Branch*, 26-33.

Ichizaki, Kazuaki (2001b) " Information processing and prosodic prominence in English: intonation patterns and nuclei embodied," *Journal of the English Phonetic Society of Japan* 4, 163-182.

Ichizaki, Kazuaki (2001c) " Eigo no aimaibun ni okeru intonation pattern to kaku," *Journal of the Phonetic Society of Japan* 5:2, 75-83.

Ichizaki, Kazuaki (2001d) " Gojyuntochi to joho teiji: Oncho · keizokujikan · takuritsu no jissai," *Unpublished Paper Presented to the 10th Congress of the EPSJ Chubu Branch.*

Imagawa, H. and Kiritani, S. (1989) " DSP wo mochiita pitch, formant jitsujikan chushutsu to sono hatsuonkunren eno oyo," *Technical Report of the Institute of Electronics, Information and Communication Engineers* SP 89:36, 17-24.

Lee, W. R. (1956) " English intonation: A new approach," *Lingua* 5, 345-71.

Leech, G. N. and Svartvik, J. (1975) *A Communicative Grammar of English.* London: Longman.

Muyskens, John H.(1931) " An analysis of accent in English from kymograph records," *Vox* 8, 55-65.

Maekawa, Kikuo (1996) " Onkyoonseigaku no tenbo," *Bulletin of the Phonetic Society of Japan* 211, 12-19.

O'Connor, J. D. and Arnold, G. F. (1961) *Intonation of Colloquial English: A Practical Handbook.* London: Longman.

Peterson, G. E., Wang, W. S.-Y. and Sivertsen, E. (1958) " Segmentation techniques in speech synthesis," *Journal of Acoustical Society of America* 30:8, 739-42.

Quirk, R., Greenbaum S., Leech G. and Svartvik J. (1972) *A Grammar of Contemporary English*. London: Longman.

Quirk, R., Greenbaum S., Leech G. and Svartvik J. (1985) *A Comprehensive Grammar of the English Language*. London: Longman.

Sorensen, John M. and Cooper, William E. (1979) " Syntactic coding of fundamental frequency in speech production," R.A. Cole (ed.), *Perception and Production of Fluent Speech*. Hillsdale, NJ.: Erlbaum.

Stevens. S. S. and Volkmann, J. (1940) " The relation of pitch to frequency: A revised scale," *American Journal of Psychology* 53:8, 329-53.

Sources of the corpora

Takanashi, K. (1973) *Sokaieibumpo*. Kyoto: Biseisha. > (1b), (2b), (3b), (4b), (5b), (6b)

Greenbaum, S. and Quirk, R. (1990) *A Student's Grammar of the English Language*. London: Longman. >(7a), (7b), (8a), (8b)