

A Prosodic Study of English Inverted Sentences : Intonation Patterns, Nuclei, and Rate of Utterance

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英語倒置文の韻律研究 —音調・核・発話速度—

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要 旨

倒置によって有標となった項は、いかなる韻律を伴って具現されるのか。計6組17例の倒置された英語文を7名の英語母語話者が発話し、それを音声分析ソフトを用いて分析した。英語文のイントネーションと核を、先行研究のデータより70%以上（7名中5名以上）の一致をもってその典型とみなして、それぞれの言語資料に付記した。倒置文では核は左方に現れると指摘されているが、特に何の意味も持たない *there* で始まる文はまだしも、近接という位置概念を有する *here* で始まる文でも、それらの項自体には核は現れず、核は最後の内容語に現れるにとどまった。これらの言語資料を除けば、上記指摘は、単文ではその通り、そして複文では従属節における最初の内容語に核が現れるというかたちで実証された。ただ、*The + 比較級...*, *the + 比較級...* の構文では、それ自体が屈折して比較を表す項も、それ自体は屈折せず *more* を伴って比較を表す項も、それらの項自体に核が現れた。倒置された言語資料すべてに共通した核の出現位置は、主節の最後に現れる内容語においてであった。つまり、情報の焦点は最後の内容語が担うというこれまでの指摘が、倒置文においても実証された。なお、言語資料中、複文については、従属節と主節の発話速度を調べる意で、ポーズを除いた発話時間をそれぞれ計測し、その差の有無を検定した。その結果、概して従属節の方がゆっくりと発話される傾向が見られたが、例外もあり、絶対的な現象とまでは言えなかった。

1 . Introduction

The elements which do not usually appear at the beginning of the sentence are sometimes assigned as marked items by inversion or hyperbaton. Shifting to leftward position bears some emphasis in information since the hearer generally expects given information at the beginning of the utterance. Then, what prosodic traits do the inverted elements appear with? From a viewpoint of prominence some inverted sentences, focusing especially on their duration and fundamental frequency (F_0 henceforth), were investigated by using sound analyzing software in this paper. In chapter three it will not be F_0 but intonation that is actually mentioned since pitch can be reckoned as a perceptual correlate of F_0 , i. e. the rate at which the vocal cords open and close during voiced portions of speech. How do such prosodic traits change after inversion or hyperbaton? Are such changes observed in any inverted sentence if there are or are they limited to some sentences having special structures or elements? The present paper is aiming to clarify how such prosodic features are embodied and related with information focus.

2 . Investigation and Analysis

2.1 corpus

As the corpora for the investigation, six sets of seventeen inverted English sentences were quoted from earlier titles on linguistics : Greenbaum *et al.* (1990), Nagai (ed.) (1967), Takanashi (1973), and Quirk *et al.* (1985). The source of each corpus is shown at the end of this paper.

In describing intonation, a tonetic stress-marks system, especially the marks used in Quirk *et al.* (1972) was adopted in this paper. Samples of the system are shown in Table 1. This was because a unit of consistent marks leads to better understanding and tonetic stress-marks could represent both features, pitch transition and stress, with one mark. The typical intonation pattern and nucleus/nuclei of each corpus were shown with such marks and broad type, respectively, with a concordance of 70% or more among the informants, i. e. the concordance of five or more out of seven. Ichizaki (2001a, 2001b, 2001c) reported that many well-known earlier studies showed the typical intonation or nucleus/nuclei of the sentence with a concordance of just 60% or so.

Table 1 Tonetic Stress-Marks Used in This Paper

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

* Nuclear syllable is described with boldface without changing the size of letters although it is described with small capitals in Quirk *et al.* (1972). Syllabification is not always the same as the separation in spelling.

2.2 informants

Seven native speakers of English who are teaching English at colleges in Japan were chosen as the informants as follows :

Table 2 Details of Informants

initial	sex	age	country	place of growing up	frequency range of the utterance
S. P.	female	27	U.S.A.	New Jersey	142—353
C. L.	female	36	U.S.A.	Vermont	112—353
C. I.	female	42	U.S.A.	Florida	105—381
S. D.	male	57	U.S.A.	New Mexico	82—286
T. S.	male	40	Canada	Ontario	82—220
M. T.	male	45	England	East Anglia	78—225
R. B.	male	53	England	Somerset	69—237

2.3 procedure

The informants were asked to pronounce the corpus mentioned above considering their meaning. The utterance was given with natural speed, as used in their daily life, and was proceeded with even when they found no difference in intonation among some corpora. Every informant had read through all the corpus 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 the F_0 of each item was printed out.

The corpora were classified into six groups according to their meaning or grammatical structure. The results concerned intonation, pitch, prominence, nucleus, duration, or pause as occasion demanded, which were reported in 3. 1. Both an Englishman and an American male helped with identification of such features.

For the complex sentences, corpus No. (4)–(6), the time spent for the utterance of the subordinate clause and the main clause was separately measured and compared. The results were reported in 3. 2.

3. Results and Remarks

3.1 intonation, pitch, prominence, nucleus, and pause

A. Imperative sentences

(1 a) **Dón' t** you go **swimming**.

(1 b) **Don' t** you do such a **thing**.

Focusing on the final syllable of (1 a), three informants used rising tone, three used falling tone, and one, the American female (Florida), used level tone. All the three informants who used falling tone rose at *Don't* and fell gradually thereafter. Three of the other four informants, on the other hand, showed gradual rising from *Don't* to *sw-*. Only the American male kept a consistent pitch from *go* to *swim-* after rising at *Don't*. Those who used rising or level tone at the end of the sentence made a rather soft tone.

At the end of (1 b), five informants used falling tone while two American females (New Jersey and Florida) used rising tone. The former fell gradually after the rising at *Don't* and the latter kept rising from *Don't* to *do* and made *do* a nucleus with the highest pitch. Four informants used the same intonation pattern for both the corpora : two Englishmen and an American female (Vermont) used falling intonation and an American female (New Jersey) used fall-rise, whereas the other three informants used different intonation for them. As concerns nucleus, all the informants had a double nucleus, *Don't* and *swimming*, in (1 a); while there was not such consistency in (1 b) : two informants had a triple nucleus, *Don't*, *do*, and *thing*, two informants made *Don't* a nucleus, and the others had a different nucleus/nuclei each other.

B. Sentences beginning with "there + be"

(2 a) There **was** in the **vicinity** a helpful **doctor**.

(2 b) There **came** to the village a **beggar**.

(2 c) There **lived** a boy whose name was **Ben**.

Five informants uttered *There... vicinity* in (2 a) with one tone unit while the other two informants used two tone units. Four out of the former and one out the latter used fall-rise tone for *vicinity*. Only the Canadian inserted a pause of 166ms after *vicinity* although (2 a) has the most syllables, thirteen, while three informants inserted a pause after *village* in (2 b) which has nine syllables, and none did in (2 c) which has eight syllables. Six informants made *vicinity* and *doctor* nuclei and four of them added *was* as another nuclei which was made the only nuclei by the American female (New Jersey).

Three patterns were used for *came* in (2 b) : four informants used rising, two informants used rise-fall and the other used level tone which started with a higher pitch than the preceding syllable. On the other hand, all the informants fell at *beggar*. Four informants made two peaks at *came* and *beggar*, two informants made an additional peak at *village*, and the American female (New Jersey) showed a small peak at *came to* and gradual falling thereafter. All the informants made *came* and *beggar* nuclei and three of

them made *village* another nucleus besides.

In (2 c) five informants made *lived* rise-fall and the other two made it rising. The highest pitch was observed at *lived* and a gradual falling continued to *Ben* among six informants while the Englishman (Somerset) made *whose* the highest peak. All the informants uttered *Ben* as a nucleus, six of them made *boy* another nucleus, and two of them added *lived* as the third nucleus.

C. Sentences beginning with "here + be"

(3 a) Here is your *tea*.

(3 b) Here is something for *you*.

(3 c) Here comes the *train*.

(3 d) Here it *comes*.

Most of the informants ended (3 a), (3 b), and (3 c) with falling tone. Only the American female (Florida) used fall-rise at the end of the three corpora. The other exceptional informants were the American male who used fall-rise at the end of (3 b) and the American female (New Jersey) who also used fall-rise at the end of (3 c). Nevertheless in (3 d) five informants ended with fall-rise and the American female (Florida) and the Englishman (East Anglia) ended with falling. This might be caused by a difference in sentence structure : only (3 d) ends with a verb.

The last item was inclined to be a nucleus throughout the series of (3 a)-(3 d) in the identification of nucleus : all informants made *tea* the only nucleus in (3 a), six made *you* a nucleus in (3 b), all of them made *train* the only nucleus in (3 c), and all of them made *comes* a nucleus in (3 d).

D. Conditional clauses

(4 a) Were I *rich*, I would go *abroad*.

(4 b) Had I the *money*, I would *buy* it.

(4 c) Should you change your *plans*, please let me *know*.

The salient protrusion in F_0 contour, i. e. the highest peak with the narrowest width, in the conditional clause corresponded to nucleus in (4 a). Two informants (the American females from New Jersey and Florida) whose *I* showed a higher and steeper peak than their *rich*, made *I* a nucleus. Although there were two other informants (the American female from Vermont and the Englishman from Somerset) who uttered *I* with a higher pitch, the time spent for their *Is* was longer than those of the two informants above mentioned. As the result the contours of their *Is* showed gentle slopes and their *riches* were identified as nuclei rather than their *Is*. The other three informants who uttered *rich* with a higher pitch also made it the nucleus.

All the informants made *money* a nucleus by making it a peak in (4 b). However, there was a difference in the shape of its contours between two Englishmen and the others. The Englishmen made a peak at *mon-* with rise-fall tone and uttered *-ey* with rising tone having a slight falling tail whereas the others made the whole *money* a peak with or without a slight rising tail. Although three informants made

Had higher than *mon*-, their *Hads* were not identified as nuclei.

Six informants uttered *plans* with fall-rise tone in (4 c), but the American female (New Jersey) uttered *Should...plans* as a whole peak. Three of the six separated *plans* by beginning with a high pitch after falling down at *change* whereas the other three connected *plans* to *change*. All the informants made *plans* and *know* nuclei and three of them made *change* another nucleus besides.

In the main clause, the rightmost content word was identified as nucleus in all the three corpora.

The number of informants who inserted a pause after the conditional clause were two in (4 a) consisting of eight syllables, four in (4 b) consisting of 7.5 syllables, and five in (4 c) consisting of nine syllables. Two American females (New Jersey and Florida) used a pause in all the three corpora, the Canadian and the Englishman (Somerset) used one in (4 b) and (4 c), the other American female used one in (4 c), and neither the American male nor the Englishman (East Anglia) used one in any corpus.

E. Concessionary clauses

(5 a) Even had she left a *will*, it is *unlikely* that the college would have *benefited*.

(5 b) *Whatever* may *come*, you must not give a *cry*.

(5 c) *Growl* you *will*, but *go* you *must*.

Four informants made *left* the second peak after the first peak *Even* and uttered *will* with fall-rise tone in (5 a), two informants (the Canadian and the Englishman from East Anglia) made *will* an independent peak with a rising tail after falling from the beginning, and the American female (New Jersey) made *Even...will* a gentle slope. The different peak in the concessionary clause results in no typical nucleus in the clause. It does not mean that no item should be a nucleus in the clause; there seems to be an alternative nucleus, either *left* or *will*, and the selection depended on the speaker. In the main clause the item *unlikely* which is recognized as conclusion, i. e. information focus, in such an it...that-structured sentence, and the rightmost content word *benefited* in that-clause were identified as nuclei, with falling tone made by six informants.

Except for the two Englishmen, five informants rose at *Whatever* and uttered *come* with fall-rise tone in (5 b). The Englishman (Somerset) used simple falling for *come* and the other Englishman (East Anglia) used rising for it. Regardless of the intonation pattern of *come*, *comes* of all the informants were identified as nuclei with *cry* as another nucleus (with falling tone made by six informants) in the main clause without any exception.

Four informants uttered *Growl* with rising tone and the other three used different patterns for it : falling, rise-fall, and rise to level, in (5 c). Three informants uttered *will* with fall-rise with a falling tail, two informants made it rise-fall with a rising tail, and the other informant made it a gentle fall-rise. The F_0 contours of the main clause were also various. Three informants kept level tone for *go you* and fell at *must*, two informants uttered the clause with a whole slope, and two informants fell at *go*, rose at *you*, and fell again at *must*. In either clause, both auxiliary verb and bare infinitive were identified as paired nuclei although each of them appeared apart in the sentence.

All seven informants inserted a pause after the concessory clause in (5 a) consisting of twenty-one syllables, five informants inserted a pause in (5 b) consisting of eleven syllables, and three informants inserted one in (5 c) consisting of seven syllables.

F. Sentences having the structure “ the + . . . , the + ”

(6 a) The **more** I **think**, the **less** I understand.

(6 b) The more **learned** a man **is**, the more **modest** he **is**.

There were observed various intonation patterns in the subordinate clause of (6 a). Three informants rose at *more*, slightly fell at *I* and gently rose at *think*; two informants rose at *more* and used level tone for *I think*; the American female (New Jersey) used a gentle slope for the whole clause; and the American male made *the more* a peak and used falling tone for *I think*. The starting pitches of the main clauses were much lower than the ending pitches of *think* with rising/level tone in four informants while the former was as high as the latter with falling tone in three informants. Five informants used level tone for *the...under-* and fell at *-stand*; the American female (Vermont) did the same for *the...under-* but used fall-rise for *-stand*; and the Englishman (East Anglia) made *the...under-* a gentle slope and used gentle rising for *-stand*. Five informants took a quartet nucleus, one took a triple, and the other took a double. All the seven informants made *understand* a nucleus and three items—**more**, **think**, and **less**—became nuclei in the utterances of six informants.

Four informants made *learned* a peak, two made *more* a peak, and the Englishman (East Anglia) made *man* a peak in the subordinate clause of (6 b). For the following *is*, four used level tone while three used rising tone. As in (6 a), no informants started the main clause with higher pitch than the ending pitch of the previous *is*. Four informants made *modest* a peak in the main clause and three informants used falling tone for the whole clause. Only the Englishman (Somerset) used a gentle rising for *he is*. Six informants took a triple nucleus (three of them preferred *learned*, the first *is*, and *modest*) and one took a quartet nucleus. Three items—*learned*, the first *is*, and *modest*—became nuclei with six informants. Two items—the first *more* and *man*—became nuclei with two informants.

Five informants inserted a pause after the subordinate clause of (6 a) consisting of ten syllables and six did at the same position of (6 b) consisting of thirteen syllables.

3.2 rate of utterance

The average utterance time spent for the subordinate clause and the main clause of the corpus (4) – (6) is shown in Table 3, with their average rate of utterance, which was calculated with the number of syllables of the corpus divided by the time spent. All pauses inserted in the utterances were eliminated in the measurement. T-test was carried out to check if there is a significant difference in rate of utterance between the two clauses. The syllables of the main clause of (4 b) was reckoned to be 3.5 since i-linking occurred between *buy* and *it*.

Table 3 Time Spent for the Clause and Rate of Utterance

corpus No.	subordinate clause (ms)	utterance rate of s. clause (syl/sec)	main clause (ms)	utterance rate of m. clause (syl/sec)	t-test
(4 a)	769	3.90	980	5.10	t=3.79, df= 6, p<.01
(4 b)	814	6.14	769	4.55	t=5.95, df= 6, p<.01
(4 c)	1331	3.76	812	4.93	t=14.11, df= 6, p<.01
(5 a)	1453	4.13	2261	6.63	t=9.47, df= 6, p<.01
(5 b)	967	5.17	1283	4.68	t=2.12, df= 6, p<.10
(5 c)	1037	2.89	1190	3.36	t=4.03, df= 6, p<.01
(6 a)	894	4.47	1275	4.71	t=1.52, df= 6, ns
(6 b)	1502	4.66	1317	4.56	t=1.16, df= 6, ns

It was shown by t-test that the subordinate clause was uttered slower than the main clause in (4 a), (4b), (4 c), (5 a), and (5 c), while the former was uttered scarcely slowly than the latter in (5 b).

There was no significant difference in (6 a) and (6 b). Therefore, it may be said that the subordinate clause is inclined to be uttered slower than the main clause although there is not a definite difference in rate of utterance between them. In the comparison within each group, corpus (6), which has a structure "The + comparative . . . , the + comparative . . .", each clause tended to be uttered with an equal speed. Within either corpus (4) or (5), which are conditional and concessory sentences respectively, there was no consistent tendency.

4. Conclusion

It has been said that a word or phrase appears as a marked item bearing more information value at a leftward position in inverted sentences. Details of the prosodic features investigated in this paper were mentioned in the previous chapter. Looking at the distribution of nuclei, which were shown in boldface, it seems to be true throughout the corpora except for (2) and (3) although a different interpretation is required for complex sentences. It was not the leftmost item but the last item in the subordinate clause, appearing leftward ahead of the main clause, that was identified as a nucleus or a marked item in common from (4) to (6), the only exception being (5 a).

A further interpretation could be given for corpus (6). In (6 a), the item which inflects to be a comparative by itself, i. e. *more/less*, became a marked item. In (6 b), on the other hand, the item which does not inflect by itself but is accompanied by *more* to give a comparative meaning, i. e. *learned/modest*, also became a marked item, but the accompanying *more* was not given a particular prominence.

For corpus (2) and (3), a particular prominence was not added to the starting item, either *There* or

Here. It seems natural for *There* to have no prominence since *There* has no locative meaning, however, it may be remarkable that *Here* having the meaning of proximity does not become a nucleus at the beginning of the inverted sentences.

Throughout all the corpora the last content words in main clauses were identified as nuclei. It was pointed out by O'Connor and Arnold (1961), Halliday (1970), Quirk *et al.* (1972), and Leech and Svartvik (1975) that the value of information focus was the most at the end of a sentence. This claim was confirmed even in the main clause of the inverted sentences in the present paper.

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Sources of the Corpora

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