Prosodic Traits of Question Mark in the Middle of a Sentence to Express Doubt or Irony

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疑念・皮肉を表す文中のQuestion Markにかかわる韻律特徴

市 﨑 一 章

要 旨

文中で括弧に挟まれて現れ、疑念と皮肉を表す疑問符について、その場所およびその前後における韻律特性の変化を調べた。調査対象は、いずれも「形容詞＋（？）＋名詞」という環境であったが、疑念を表す際には、文中であっても圧倒的に上昇調が好まれ、上昇調の形容詞の後、一旦ピッチは下降し、後続の名詞は再度、上昇調となる傾向が認められた。他方、皮肉を表す場合は、先行する形容詞では上昇調が比較的多用され、上昇調を用いた場合は、後続する名詞は平板調となる傾向が認められた。いずれの場合も共通して、疑問符の位置での、ポーズの有無や長さ・音の強さには、有意な変化は認められなかった。また、疑問詞の位置で、ポーズが挿入された場合は、共通してピッチ変化を伴った。音調をはじめとする韻律の変化様式については、疑念を表す場合よりも、皮肉を表す場合の方が、多様かつ複雑であることが示唆された。

1. Introduction

A punctuation mark usually has two or more meanings, but the context generally shows the meaning the writer intends, and guides the reader's interpretation. When some writing having punctuation mark(s) is read out, a speaker seems to control prosodic features of the adjacent syllables or words appropriately to deliver the connotation of the mark(s) to hearers precisely, although punctuation marks themselves are not pronounced. The author carried out research on the duration of pauses associated with English punctuation marks and reported the results in Ichizaki (1996). Since the marks appear at the boundary of tone units in the flow of speech, they surely convey some prosodic features such as pitch, intonation, sound pressure, or duration other than pause peculiar to themselves. It will be shown with objective data

on prosodic features how the question mark appears depending or not depending on its context, making the question mark, meaning doubt or irony, with parentheses appearing in the middle of a sentence a target for the research in this paper. It is expected that this paper would provide learners of English a model for reading to imitate and they would take the data into account when they try to read written materials or listen to the material being read out.

2. Investigation and Analysis

2.1. sentences for analysis

Two kinds of carrier sentences having a question mark within parentheses in the middle of a sentence were adopted for an investigation. The question mark is put between an adjective and a noun in each sentence as follows:

(1) *This is a genuine (?) diamond, or at least it looks like one.*

(2) *When Steven slipped on the ice, he gave a gentle (?) roar of pain.*

The meanings assigned the question marks is doubt in sentence (1) and irony in sentence (2), respectively.

2.2. subjects

A total of ten native speakers of English, five males and five females, served as subjects. The subjects should be those who speak standard English and all of them were professors teaching English conversation mainly at Japanese colleges. The details of them are as follows:

Table 1 Details of Subjects

subject	sex	age	home region	register (Hz)
J. C.	f	30	California, USA	139—340
D. S.	f	30	California, USA	87—432
E. O.	f	35	Indiana, USA	95—355
C. S.	f	38	New York, USA	70—235
L. S.	f	48	Connecticut, USA	81—290
J. A.	m	28	Hawaii, USA	72—222
S. B.	m	34	Oregon, USA	94—207
S. S.	m	44	Colorado, USA	99—200
S. V.	m	53	New Mexico, USA	97—205
R. B.	m	50	Somerset, England	50—202

2.3. procedure

The subjects were shown the above phonetic materials and were asked to pronounce them three times for each sentence with the speed and natural manner of their daily speech. Their utterances were recorded onto mini-disk with a microphone. After the recording their utterances were played and they were asked to choose the one utterance out of three that sounded most natural to their ears, and then the chosen utterance was adopted for the analysis using sound analyzing software called *SUGI Speech Analyzer* (Sugito, 2000). The items measured and identified were: tone of the syllable preceding the question mark, the difference in pitch between the highest and the lowest value of the preceding word, the difference in pitch between the syllables adjacent to the question mark, the difference in the maximum sound pressure level between the adjacent syllables, and the duration of pause at the question mark. Also, the contour of fundamental frequency (F_0 henceforth), which was carefully observed and identified, was recognized as a substitute for intonation as it is well known that pitch changes in proportion to F_0 in the range of 50-1,000Hz which is the range of human speech. Concerning sound pressure level, as it is a unit used for convenience when referring to intensity, it will be described as sound pressure hereafter.

The investigation here was conducted with the same subjects' dealing with the question mark appearing in different contexts. Referring to Winer (1972) the investigation was reckoned as a single-factor experiment having repeated measures on the same elements. According to Kirk (1968), analysis of variance for the experiment and multiple comparison test, Tukey (a) procedure/the HSD (the honestly significant difference) test, were carried out to check if there is a significant difference between the items measured. The data for every item were listed, with their averages and standard deviations (SD), in Table 2-(1) and Table 2-(2) in the appendix at the end of this paper corresponding to material sentence (1) and (2). The results of the items will be discussed in next section, proceeding from left to right in the tables, comparing the data in the two tables with each other.

3. Results and Discussion

All subjects used rising tones at *genuine*, the syllable preceding the question mark meaning doubt, in sentence (1) whereas a divergence was noticed in the tones used for *gentle*, the syllable preceding the question mark meaning irony, in sentence (2). Among the tones used for *gentle*, rising tone was more popular and used by half of the subjects. Although they were not listed in either table, the tones of the word following the question marks are mentioned — eight subjects used rising tones for *diamond* in sentence (1) and seven used level tones for *roar* in sentence (2). Comparing the highest pitch at *gentle* and that at *diamond* both of which were pronounced with rising tone, six out of the eight subjects finished their *diamonds* with higher pitches.

The averaged pitch width of *genuine* was 77Hz and its SD was only 33 whereas that of *gentle* was 18Hz and its SD was considerably as large as 97. Since the variance of *gentle* was not homogeneous, Welch test was carried out and there was no significant difference between the pitch changes ($t=1.83$, $df=11.1$, ns).

Concerning pause at the question mark, five subjects inserted one and five subjects didn't in sentence (1). There was a great range in duration as seen in the speech of subject C. S. who inserted a pause as long as 1,135ms, which resulted in a rather greater SD 377 compared with the averaged duration 254ms. In sentence (2), on the other hand, three subjects inserted no pause at the question mark and the averaged duration was 296ms with a smaller SD 280. Neither significant difference was noticed as in the case of the pitch changes mentioned above between the pauses in both sentences (t=0.44, df=9, ns) .

Nine negative values appeared in the column of 'pitch changes' of *genuine* — *diamond* in Table2-(1), which means the starting pitches of *diamond* were lower than the ending pitches of *genuine*. The averaged value of pitch changes, −36.3Hz, had a comparatively small SD, 27.9. Taking the preference of rising tone for the adjacent items into account, the continuous rising tone with a pitch fall in the middle seems to be the intonation typical to a phrase having the question mark meaning doubt. Figure 1, pronounced by A. O., was given as a fine specimen representing the intonation contour. In the same column in Table2-(2), there were four subjects whose pitches increased and the values were so small, 11Hz or less. Five subjects whose pitches decreased, on the other hand, showed comparatively clear decreases from −43Hz to −130Hz. And it was interesting to notice that the five were those who used rising tones for *gentle*. Neither significant difference was noticed in pitch changes at the question mark between the sentences (t=0.06, df=9, ns).

As regards sound pressure change between the syllables adjacent to the question mark, particular tendency was not recognized in either in sentence (1) or sentence (2) although many subjects showed somewhat increase (t=1.31, df=9, ns). The values of SD were rather large compared with the averaged values in both sentences.

Although they were not listed in either table, the correlations of pause and pitch changes at the question marks were calculated. It was 0.478 in sentence (1), which meant that there was a significant tendency at the 10% level while it was 0.053 in sentence (2), which meant that there was a significant difference at the 5% level.

4. Conclusion

Rising tone was overwhelmingly preferred for the syllable preceding to the question mark meaning doubt. As the syllable belonged to the word modified by the question mark, in other words, rising tone is a particular tone for doubt even in the middle of a sentence. Moreover, the word following to the question mark preferred rising tone after preceding pitch fall. Therefore, "rising, approx. 80Hz + pitch fall, approx. 35Hz + rising" would be the intonation used most often for "adjective + (?) meaning doubt + noun" structure in the middle of a sentence. There was no remarkable tendency of presence /absence of a pause, the duration of the pause, or the change of sound pressure at the place of (?) meaning doubt.

Rising tone was also preferred comparatively for the syllable preceding to the question mark meaning irony but a few other tones could be used for the rising. Those who used rising tone for the last

syllable of the preceding adjective seem to use level tone for the following noun. No significant peculiarity was recognized of the pitch change of the adjective, presence/absence of a pause, the duration of the pause, or the change of sound pressure at the place of (?) meaning irony. Such results suggest that speakers use various combination of changes in prosodic features when they express irony in the middle of a sentence.

In both cases, at the question mark meaning doubt and at the question mark meaning irony, a pause accompanies some change of pitch with a high possibility. This is the only prosodic feature that both question marks had in common in the investigation.

Compared with the prosodic features appeared at the question mark meaning doubt, those at the question mark meaning irony seems to have been elusive and complicated. Between native speakers of English, however, communication is easily established with little misunderstanding. This fact might suggest that there are plural ways of controlling prosodic features to deliver the meaning of irony and more subjects with different approaches would clarify them.

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APPENDIX

Table2-(1) Prosodic Data of Sentence (1):

This is a genuine (?) diamond, or at least it looks like one.

* Positive values means increase and negative values means decrease in pitch change and pressure change.

subject	genuine		pause (ms)	genuine − diamond	
	tone	pitch change (Hz)		pitch change (Hz)	pressure change (dB)
J. C.	Rising	99	87	−77	1
D. S.	Rising	132	0	9	4
A. O.	Rising	90	424	−27	0
C. S.	Rising	42	1135	−61	1
L. S	Rising	67	0	−15	−2
J. A.	Rising	22	0	−14	−7
S. B.	Rising	90	599	−47	4
S. S.	Rising	53	0	−27	−1
S. V.	Rising	65	0	−30	3
R. B.	Rising	106	298	−74	1
average		77	254	−36.3	0.4
SD		33	377	27.9	3.3

Table2-(2) Prosodic Data of Sentence (2):

When Steven slipped on the ice, he gave a gentle (?) roar of pain.

* Positive values means increase and negative values means decrease in pitch change and pressure change.

subject	gentle		pause (ms)	gentle − roar	
	tone	pitch change (Hz)		pitch change (Hz)	pressure change (dB)
J. C.	Rising	130	0	−98	7
D. S.	Rising	142	348	−130	2
A. O.	Rising	76	379	−43	8
C. S.	Falling	−41	532	11	4
L. S	Rising	80	52	−43	1
J. A.	Rise-fall	−127	0	35	−12
S. B.	Rising	77	651	−91	10
S. S.	Level	−14	262	1	−2
S. V.	Falling	−34	0	0	0
R. B.	Fall-rise	−113	735	8	4
average		18	296	−35	2.2
SD		97	280	55	6

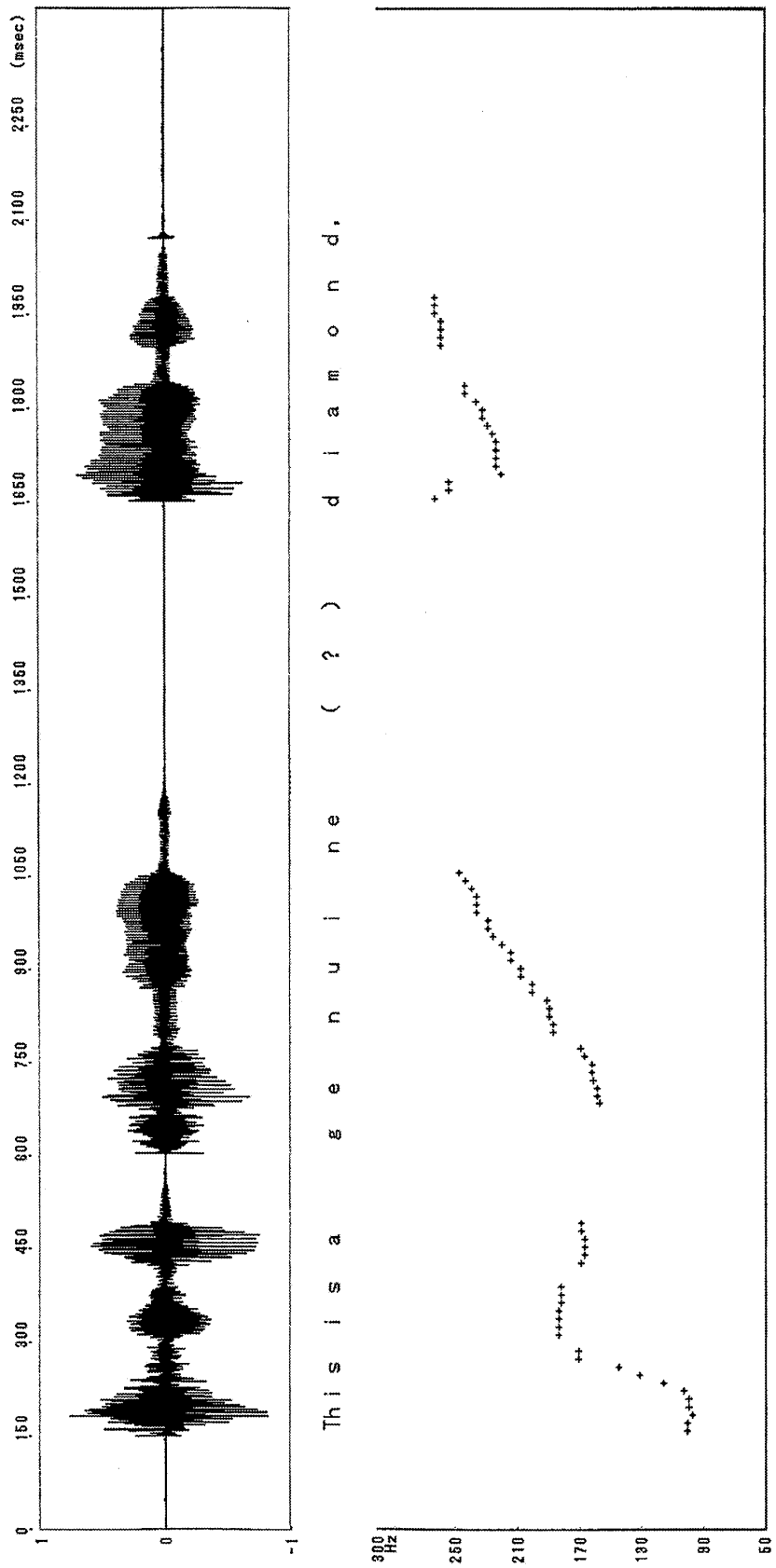

Figure 1 A Model Contour of the First Half of Sentence (1) Pronounced by A. O.