

# Acoustic analysis of Japanese English Prosody: Comparison between Fukushima dialect speakers and Tokyo dialect speakers in declarative sentences and yes-no questions

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## ABSTRACT

L1 transfer may be able to explain prosodic errors in an L2. For Japanese English prosody, several comparative studies have been conducted. Despite this, only oral reading texts have been used in previous studies and not much attention has been paid to the effect of differences in the L1 dialect, especially in the case of an “accentless” Japanese dialect. This preliminary study describes an investigation of the differences in L1 dialect prosodic transfer to English between speakers of the Fukushima dialect (an accentless dialect) and the Tokyo dialect (an accent dialect) in declarative sentences and yes-no questions. A two-way communicative task was selected to induce natural utterances. The fundamental frequency at each of twenty equally-spaced points of observation of three female voices from each dialect group was measured. The major finding is there do appear to be dialectal differences in L1 transfer of prosody. However, this preliminary study is not conclusive and more comprehensive investigation will be necessary.

## 1. INTRODUCTION

Comparative studies of intonation are of critical importance in discussion of interlanguage phonology. There is an increasing number of studies which have compared intonation across languages [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15].

It is a common phenomenon to observe prosodic errors when second language learners speak in the target language. Although native language transfer cannot predict all errors [16, 17], there are many research studies that identify negative transfer from an L1 to an L2. For native speakers of Japanese, several studies have been conducted to clarify this issue. Among them, a series of works by Sugito and her colleague has been frequently cited for Japanese English. Sugito and Fujisaki [14] find characteristics of a foreign accent of Japanese native speakers in oral reading of English. These studies reveal (1) differences in placement of boundaries of phrase components; (2) redundant use of accent component; and (3) emphasis used on inappropriate words. They suggest that these prosodic errors are the results of transfer from their native language, Japanese, to the L2, English.

Language transfer may thus possibly serve to explain prosodic errors in L2 performance. However, there is a further question to be answered: not much attention appears to have been paid to the effect of the L1 dialect, except by Sugito [13, 18], though it

is well known that there are prosodic differences among local dialects in Japan [14]. Sugito [13, 18] compares the English sentences produced by an Osaka dialect (a western accent) speaker and a Tokyo accent (the standard accent in Japanese) speaker by asking them to read one sentence. She states that the Osaka dialect speaker is more likely to put an accent on every word than is the Tokyo dialect speaker, probably because of the transfer from the Osaka dialect features.

Kiritani et al. [19] criticise most studies on the quantitative analysis of pitch contours in Japanese for concentrating on the Tokyo dialect and the Kinki dialect (a western dialect), which are both word accent dialects. Using electromyography, they investigate the pitch contour of the Ibaraki dialect of Japanese, an accentless dialect, in comparison with that of Tokyo. The study reveals that the accentless dialect speaker exhibits a slight initial rise, and then a flat pitch contour until the end for declaratives, and pitch fall at the end of the utterance, starting about the middle of the penultimate mora, for yes-no questions. For the pitch contour of the Tokyo dialect speaker, it has been shown that there is a pitch rise at the beginning for declaratives and a final pitch rise for yes-no questions.

This study has led us to consider the following important question: are there differences in prosodic transfer from an accentless dialect and from a word accent dialect for Japanese learners of English?

This paper presents a preliminary study of differences in L1 dialect prosodic transfer to English. For this purpose, we investigate the prosodic differences in English spoken by speakers of the Fukushima dialect (an accentless dialect) and by those of Tokyo dialect in their production of declaratives and yes-no questions.

## 2. THE STUDY

### 2.1 The methods

#### 2.1.1 Subjects

Eight Japanese university students were participants in this study. Four of them (three females and one male) speak the Fukushima dialect. Four of them (three females and one male) speak the Tokyo dialect. They are aged from 18 to 21 years. None of the subjects have ever been to any country where English is widely spoken.

The Fukushima dialect in Japanese is one of the local dialects in the Tohoku dialect (a northern dialect), and has been identified as a typical accentless dialect [20, 21]. It has the following prosodic characteristics: (1) relatively monotonous intonation; (2) similar length for vowels and consonants; and (3) extension of duration on /n/. Specifically, the four subjects speak with the Nakadori accent within the Fukushima dialect area, which means they are from the middle of the Fukushima prefecture.

The four Tokyo dialect speakers have never spoken in any other Japanese dialect.

### 2.1.2 Procedures

The material that was used in this experiment is a communicative task, called “spot the difference” [22] which requires two speakers to discover, through verbal interaction only, small differences between copies of a picture which each speaker is looking at. The methodologies for collecting data in the previous studies were either oral sentence or paragraph reading. There have not been enough formal studies which investigate Japanese English prosody in natural utterances despite the fact that it is important to identify problems in such utterances. Therefore, to induce something more like natural speech, the author created a much more realistic situation.

All the subjects were divided into pairs with the same dialect background. They were asked to find out the differences, using English, for ten minutes.

### 2.1.2 Recordings

The recordings were made in soundproof studios at Fukushima Medical University for the Fukushima dialect speakers and at Dokkyo University for the Tokyo accent speakers. Data was recorded on a mini-disk connected with a mixer and microphone. The data was later transmitted to a computer using a recording package. At this stage, the utterances were edited following these guidelines: (1) pauses between words were cut out, because pauses just indicate lack of fluency; and (2) adverbial phrases were cut out because they tended to distort the pitch contour as a whole. Finally, the data was examined with a speech analysis package called sfs (speech filing system) [23]

### 2.1.3 Analysis

First, the interaction for each pair was transcribed on paper. Declarative sentences and yes-no questions were marked. For this particular experiment, the author analysed only voices by the female speakers. The first utterance of each speaker was excluded. Then five examples for declaratives and five examples for yes-no questions were selected for both dialect groups. Both groups of five examples contain data from three different speakers.

Second, using sfs as mentioned above, spectrograms and fundamental frequency contours were produced, and each word was labelled. Then the whole length of each utterance was divided into 20 equally-spaced points of observation as shown in Figures 1, 2, 3, and 4 in the next section. At each point of observation, the fundamental frequency was measured.

Third, the averages of the fundamental frequency were calculated at all the points of observation for declarative sentences and for yes-no questions produced by the two dialect groups. Statistically, averaging across speakers can lead to

misleading conclusions, but our intention in this preliminary study was simply to look for trends in the data and the averaging made it possible to produce graphs that were easier to interpret. Finally, four graphs were drawn.

## 2.2. Results

### 2.2. 1 Declarative sentences

Figure 1 and Figure 2 show the pitch contours for the average of the five declarative examples in English spoken by the Fukushima dialect speakers and by the Tokyo dialect speakers.

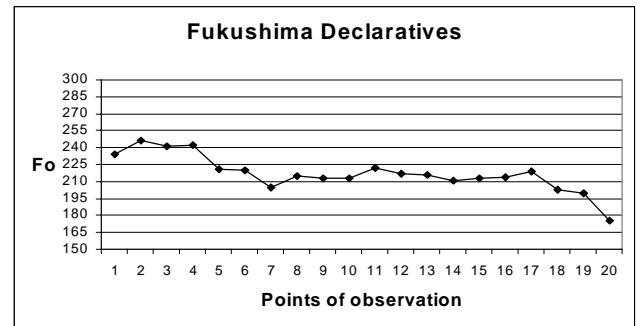


Figure 1: Fukushima declaratives

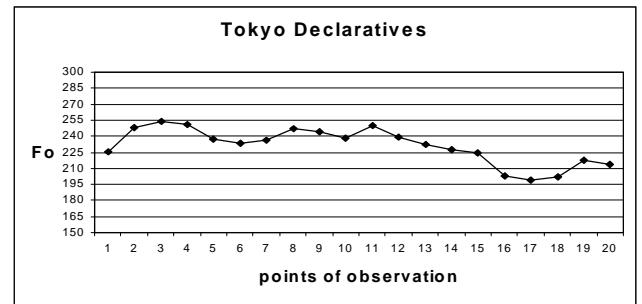


Figure 2: Tokyo declaratives

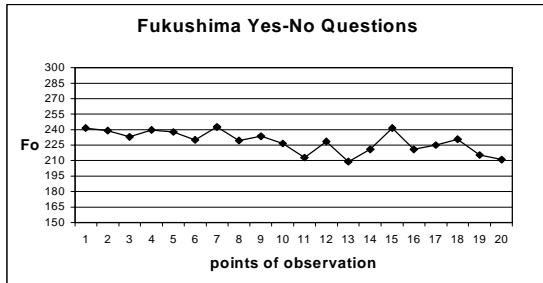
It was found that the Fukushima dialect speakers show a monotonous intonation as a whole with a slight fall at the end. On the other hand, although it shows a relatively flat pitch contour as well, a slight rise in the beginning and a slight fall and rise at the end were observed in the pitch contour of the Tokyo dialect speakers.

Comparative studies of intonation reveal that final falling in declarative sentences tend to be universally unmarked [2, 3]. Thus, the two most significant findings in declarative sentences are that the Fukushima dialect speakers exhibit a relatively flat pitch contour and the Tokyo dialect speakers show an initial rise and final fall and rise. Based on the previous research studies [19, 20, 21] the monotonous intonation of the Fukushima dialect

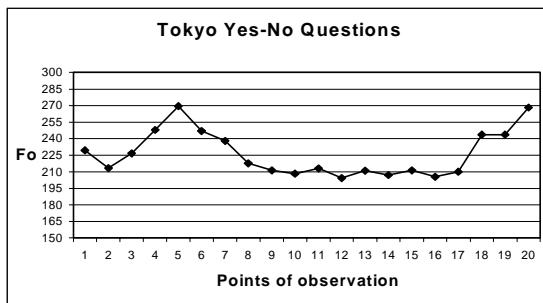
speakers and the initial rise by the Tokyo dialect speakers may be the result of an L1 transfer to English. However, there is not a slight rise in the beginning in the Fukushima declaratives and there is a final fall-rise in the Tokyo declaratives. Further investigation is necessary to clarify these issues.

### 2.2.2. Yes-no questions

Figure 3 and Figure 4 indicate the pitch contours of five examples of English utterances by the Fukushima dialect speakers and by the Tokyo dialect speakers.



**Figure 3:** Fukushima yes-no questions



**Figure 4:** Tokyo yes-no questions

It has been generally believed that a rising intonation or higher pitch in questions tends to be universal across languages [2, 3, 15]. Despite that, the Fukushima dialect speakers exhibit a level intonation from the beginning to the end. The general intonation pattern of an accentless dialect has been considered as relatively monotonous [20, 21]. Therefore, this may be the result of an L1 transfer.

The Tokyo dialect speakers show a considerable final rise at the end of the utterance, while another considerable initial rise was observed in the beginning. This final rising is probably a universal phenomenon across languages for yes-no questions. The initial rise in F0, however, may be caused by reasons other than L1 transfer.

## 2.2 Conclusions

The major finding of this preliminary experiment is that there seem to be differences in L1 dialect transfer between the Fukushima dialect speakers and the Tokyo dialect speakers in declarative sentences and yes-no questions. As discussed previously, it has been suggested that there is an L1 dialect transfer to English by comparing two different dialects among Japanese in declaratives by oral sentence reading [13, 18]. This current study may suggest that an L1 dialect transfer is differently observed both in declaratives and yes-no questions between an accentless dialect and an accent dialect in a more communicative situation.

This study also implies that an L1 dialect transfer must be taken into consideration when discussing an L1 transfer to an L2.

This preliminary study leaves us a number of questions to be answered in the future studies: (1) To what extent and why an L1 dialect transfer to English happens; (2) How differently an accentless dialect and an accent dialect among Japanese may transfer to English and why; and (3) What kind of causes, developmental errors, for example, there are for prosodic errors in English other than an L1 dialect transfer. To clarify these issues, more extensive investigation is necessary with larger samples.

## 3. ACKNOWLEDGEMENTS

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