

Pitch accent deletion and pitch range compression in Fukuoka Japanese

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1. Introduction

The present study investigates the intonational system of Fukuoka Japanese. The main purpose of this work is to identify the similarities and differences in the intonational system between Fukuoka and Tokyo Japanese. While there has been no detailed instrumental investigation, careful impressionistic description in earlier works suggests that Fukuoka shares a quite similar prosodic structure with Tokyo (Hayata 1985). It is still remains uncertain to what degree the intonational system of Fukuoka resembles that of Tokyo.

It is known that in Tokyo Japanese the right-branching syntactic boundary expands pitch range, whereas the left-branching boundary does not. This intonational process, called ‘branching constraint’ (Kubozono 1988), is reported to be observed for several Japanese dialects (Kori 1989, 2005; Maekawa 1990; Igarashi 2007a; Igarashi 2007b). Does Fukuoka also have branching constraint?

Previous qualitative works also reveals that Fukuoka exhibits a quite unique intonational pattern for WH question (Hayata 1985). It is what the author calls ‘WH deaccenting’, in which lexical pitch accents are deleted in the stretch between WH element and its associated complementizer (Kubo 1989, forthcoming; Smith 2005). In Tokyo, on the other hand, the pattern for WH question is similar to that of a sentence with discursual focus (Pierrehumbert and Beckman 1988; Maekawa 1994). Fig. 1.1 compares the pattern for non-WH (echo) questions (a, b) with that for WH question (c) in Tokyo. The focused word located at the beginning of the sentences is lexically unaccented *Yamada* in (a), and accented *Ya'mano* in (b). In (a), focused unaccented word is tonally merged with the immediately following word (they are *dephrased* into an accentual phrase) and the pitch range of the remaining words is compressed. In (b), range compression is observed in all the words following the focused word. The pattern for WH question (c) exhibits considerable similarities with that in (b), because the WH word *da're* ‘who’ is lexically accented in Tokyo.

To the author’s knowledge, no systematic investigation has hitherto been made concerning focus intonation in Fukuoka. Is focus intonation the same as WH intonation in Fukuoka? In other words, are accents deleted in non-WH sentences with focus as well?

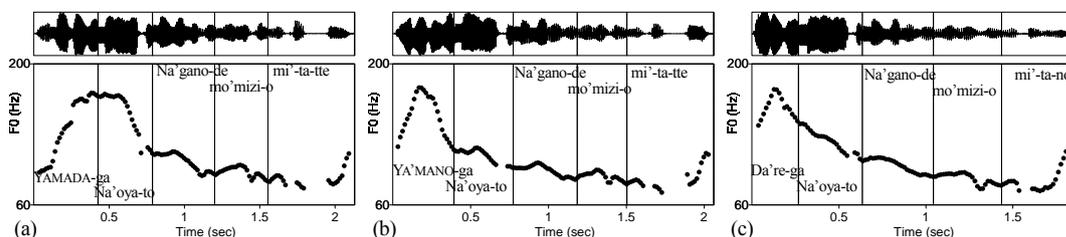


FIGURE 1.1 Waveforms and F0 contours of **Tokyo Japanese**: *YAMADA-ga Na'oya-to Na'gano-de mo'miji-o mi'-ta-tte?* ‘Did YAMADA enjoy the autumn leaves with Naoya in Nagano?’ (a), *YA'MANO-ga Na'oya-to Na'gano-de mo'miji-o mi'-ta-tte?* ‘Did YAMANO enjoy the autumn leaves with Naoya in Nagano?’ (b) and *Da're-ga Na'oya-to Na'gano-de mo'miji-o mi'-ta-no?* ‘Who enjoyed the autumn leaves with Naoya in Nagano?’ (c), produced by the author. Vertical lines mark the boundaries of prosodic words.

2. Experiment

2.1 Methods

The aims of the experiment were 1) to examine whether Fukuoka shares branching constraint with Tokyo Japanese, and 2) to see whether deaccenting occurs in non-WH question with focus in this dialect. The general approach of this experiment was a ‘simulation method’. First, subjects were asked to translate the prepared sentences written in standard Japanese into their own dialect. Second, they were asked to read aloud the translated sentences for multiple times as if they were talking to their friends. Produced utterances were recorded and analyzed on the basis of measurement of the extracted F0.

Note that this experiment was not designed to examine whether lexical pitch accents are *indeed deleted* in WH question in Fukuoka. They are assumed to be eliminated at all in the present study.

2.1.1 Speech materials

Four sets of test sentences were designed. Datasets I-III were designed to investigate effect of branching structure (Table 2.1). For each dataset, (a) contained left-branching structure while (b) had right-branching structure, with the right-branching boundary between the first and second words (see. Maekawa 1990).

Table 2.2 shows Dataset IV, which was designed to compare the intonation patterns for WH questions (a) and that for non-WH questions with focus. It contained WH question (c) with the first word being WH element and non-WH questions with focus on the first word (a, b). They were all echo questions and were in short dialogues, so that focus naturally fell on the first word.

Table 2.1: Test sentences. Branching structures are indicated by brackets.

| | |
|--|--|
| Dataset I | |
| (a) | [[[Ao'i ya'ne-no] ie'-ga] mieru]. I see a house with a blue roof. |
| (b) | [[Ao'i [ooki'i ie'-ga]] mieru]. I see a blue big house. |
| Dataset II | |
| (a) | [[Zi'roo-ga yo'n-dara] [nemuku naru-ttyan]]. I get sleepy if Jiro reads. |
| (b) | [Zi'roo-wa [no'n-dara [nemuku naru-ttyan]]]. Jiro gets sleepy if he drinks. |
| Dataset III | |
| (a) | [[Na'gano-no oba'atyan-ni] [ringo morat-ta-to-tte]]. I was given an apple by the grandmother in Nagano. |
| (b) | [Na'gano-de [oba'atyan-ni [ringo morat-ta-to-tte]]]. In Nagano I was given an apple by a grandmother. |
| Dataset IV (Test sentences are underlined) | |
| (a) | – <u>Yamada-wa Na'oya-to Na'gano-de mo'miji-o mi-ta-n-yo.</u> –Yamada enjoyed the autumn leaves with Naoya in Nagano? –E? –Uh? <u>Dare-ga Na'oya-to Na'gano-de mo'miji-o mi-ta-tte?</u> Who enjoyed the autumn leaves with Naoya in Nagano? –Yamada-ga-yo –It's Yamada. |
| (b) | – <u>Yamada-wa Na'oya-to Na'gano-de mo'miji-o mi-ta-n-yo.</u> –Yamada enjoyed the autumn leaves with Naoya in Nagano? –E? –Uh? <u>YAMADA-ga Na'oya-to Na'gano-de mo'miji-o mi-ta-tte?</u> Did YAMADA enjoy the autumn leaves with Naoya in Nagano? –Un, so. Yamada-ga. –Right. It's Yamada. |
| (c) | – <u>Ya'mano-wa Na'oya-to Na'gano-de mo'miji-o mi-ta-n-yo.</u> –Yamada enjoyed the autumn leaves with Naoya in Nagano? –E? –Uh? <u>YA'MANO-ga Na'oya-to Na'gano-de mo'miji-o mi-ta-tte?</u> Did YAMANO enjoy the autumn leaves with Naoya in Nagano? –Un, so. Yamano-ga. –Right. It's Yamano. |

2.1.2 Measurements

In order to confirm that pitch range was expanded after the right branching boundary, *Relative Peak Height* (RPH) of the second word was calculated for Datasets I-III. RPH was defined as the peak F0 value of the second word (P2) divided by the peak F0 value of the first word (P1). For Dataset IV, the peak F0 value of each word (P1, P2, P3, P4 and P5, respectively) was measured to see to what degree pitch range was compressed after focus. The F0 value at the final mora was not measured (in the case of P5), so that effects of the question-marking rise could be avoided.

2.1.2 Subjects, recording, and analysis procedure

Four young female native speakers (N, O, T and Y) of Fukuoka Japanese participated in the experiment. Subjects' information is shown in Table 2.2. Subjects read entire set of the translated sentences five times. The recordings were made using Marantz PMD 660 and saved onto a Compact Flash memory card at a 44.1 kHz sampling rate. Recorded materials were analyzed using the Praat software (Boersma & Weenink 2005).

Table 2.2: Subjects' information.

| Subjects | Born | Linguistic environments |
|----------|------|---|
| N | 1983 | Fukuoka-shi, Fukuoka pref. (0-23 y.-o.) |
| O | 1984 | Koga-shi, Fukuoka pref. (0-22 y.-o.) |
| T | 1984 | Kasuya-gun, Fukuoka pref. (0-22 y.-o.) |
| Y | 1985 | Nagasaki-shi, Nagasaki pref (0-2 y.-o.), Kasuya-gun, Fukuoka pref. (2-22 y.-o.) |

2.2 Results

2.2.1 Branching structure (Dataset I-III)

Figures 2.1 - 2.3 illustrate the F0 contours for Dataset I-III (specific tokens produced by subject Y or T). P2 in the right-branching utterances (b) was higher than that in the left-branching utterances (a) for all the datasets, indicating that pitch range was expanded after the right-branching syntactic boundary. The results of Datasets I – II for subjects O were less clear than the others.

Figure 2.4 shows the mean for RPH for each dataset and for each subject separately. T-tests, for each dataset and for each subject separately, revealed that, except Subject O's datasets I-II, the RPH was significantly higher in (b) than (c) for all datasets and subjects. Overall, the results confirmed that the intonational system of Fukuoka Japanese has branching constraint.

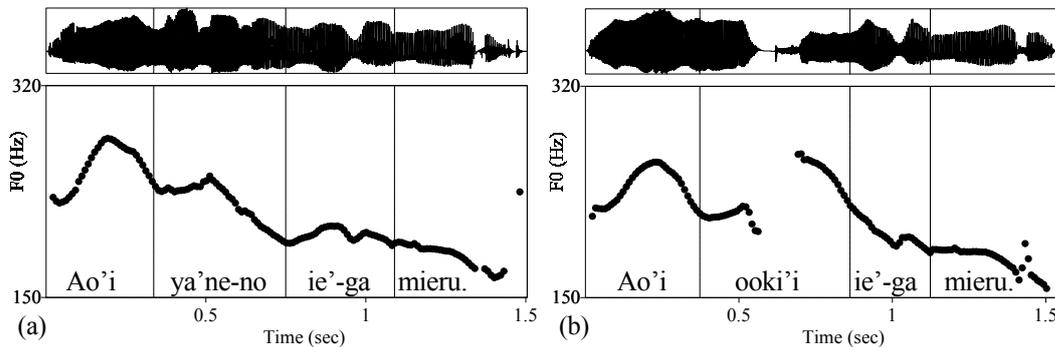


FIGURE 2.1 Waveforms and F0 contours for Dataset I. *Ao'i ya'ne-no ie'-ga mieru.* 'I see a house with a blue roof.' (a) and *Ao'i ooki'i ie'-ga mieru.* 'I see a blue big house.' (b), produced by subject Y. Vertical lines mark the boundaries of prosodic words.

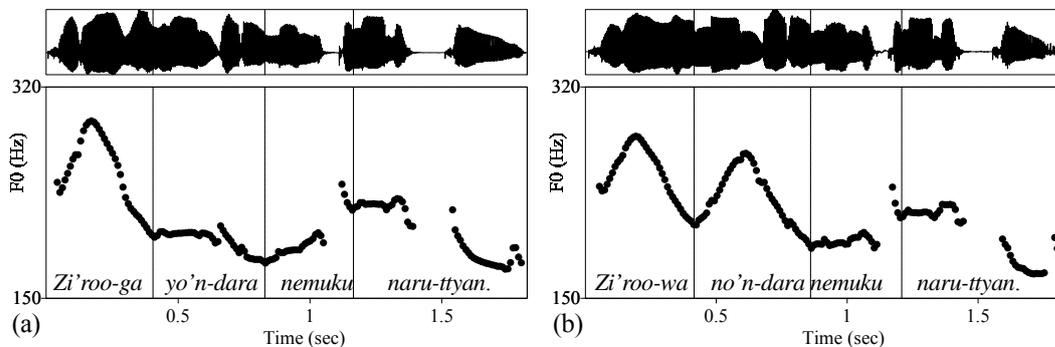


FIGURE 2.2 Waveforms and F0 contours for Dataset II. *Zi'roo-ga yo'n-dara nemuku naru-ttyan.* 'We get sleepy if Jiro reads.' (a) and *Zi'roo-wa no'n-dara nemuku naru-ttyan.* 'Jiro gets sleepy if he drinks.' (b), produced by subject Y.

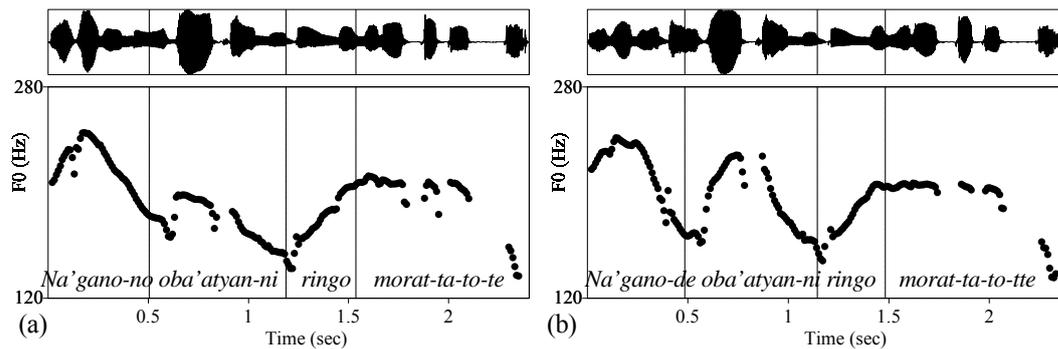


FIGURE 2.3 Waveforms and F0 contours for Dataset III. *Na'gano-no oba'atyan-ni ringo morat-ta-to-te*. 'I was given an apple by the grandmother in Nagano.' (a) and *Na'gano-de oba'atyan-ni ringo morat-ta-to-te*. 'In Nagano, I was given an apple by a grandmother.' (b), produced by subject T.

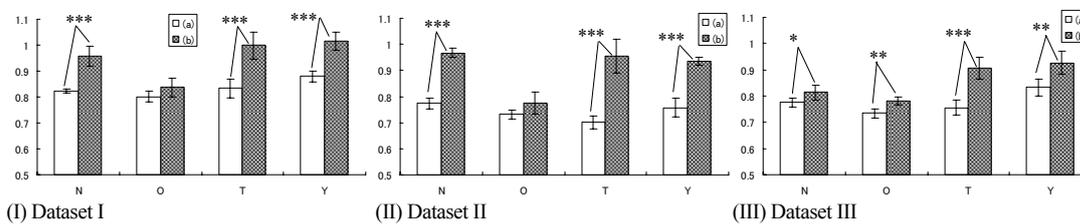


FIGURE 2.4 Means for RPH for Datasets I–III (bars indicate standard deviations). Diacritics *, ** and *** represent significance at $P < 0.05$, $P < 0.01$ and $P < 0.001$, respectively.

2.2.2 Focus (Dataset IV)

The peak F0 for each word in Dataset IV was analyzed in one-way analysis of variance (ANOVA), with peak F0 (P1, P2, P3, P4 or P5) as the dependent variable and with sentence type ((a), (b) and (c)) as the independent variable, for each speaker separately. Figure 2.5 shows the F0 contours, normalized across all the tokens for Dataset IV. We can see that accentual falls were clearly realized in the post-focal words in non-WH questions (b, c). When the first (focused) word was unaccented (b), the first two words were dephrased into a single accentual phrase and the pitch range of the following three words was compressed. When the first word was accented (c), the compression was found for all the post-focal words (including the immediately following one). These processes are quite similar to those in Tokyo Japanese (see Figure 1.1).

Effects of the accentedness of the focused word can most notably be observed in the peak of the second word (P2). Indeed, P2 was significantly higher in (b) than (c) for all subjects, according to the results of the ANOVA and *post-hoc* Bonferroni test (shown in Figure 2.5). We can also see that the contours (b) and (c) then converged on each other at the third word. There was no significant difference in P3, P4 and P5 between (b) and (c) for all subjects.

The unique pattern for Fukuoka was confirmed in the present experiment. Except for subject Y, WH question exhibits a high plateau with gradual fall (probably due to declination) until the end of the utterance, with pitch accents deleted at all. Subject Y did not show this pattern: instead, she produced contours almost identical with those for non-WH question (b). (We will return to the results of Y below.)

There was a tendency that the peak of WH word (a) was lower than that of the focused unaccented word in non-WH question (b). P1 in (a) were significantly lower than in (b); and P2 in (a) was again significantly lower than in (b) for all subjects. Since WH question exhibited no accentual fall in the second word, P3 and P4 in (a) were significantly higher than in (b) and (c) for subjects N, O, and T.

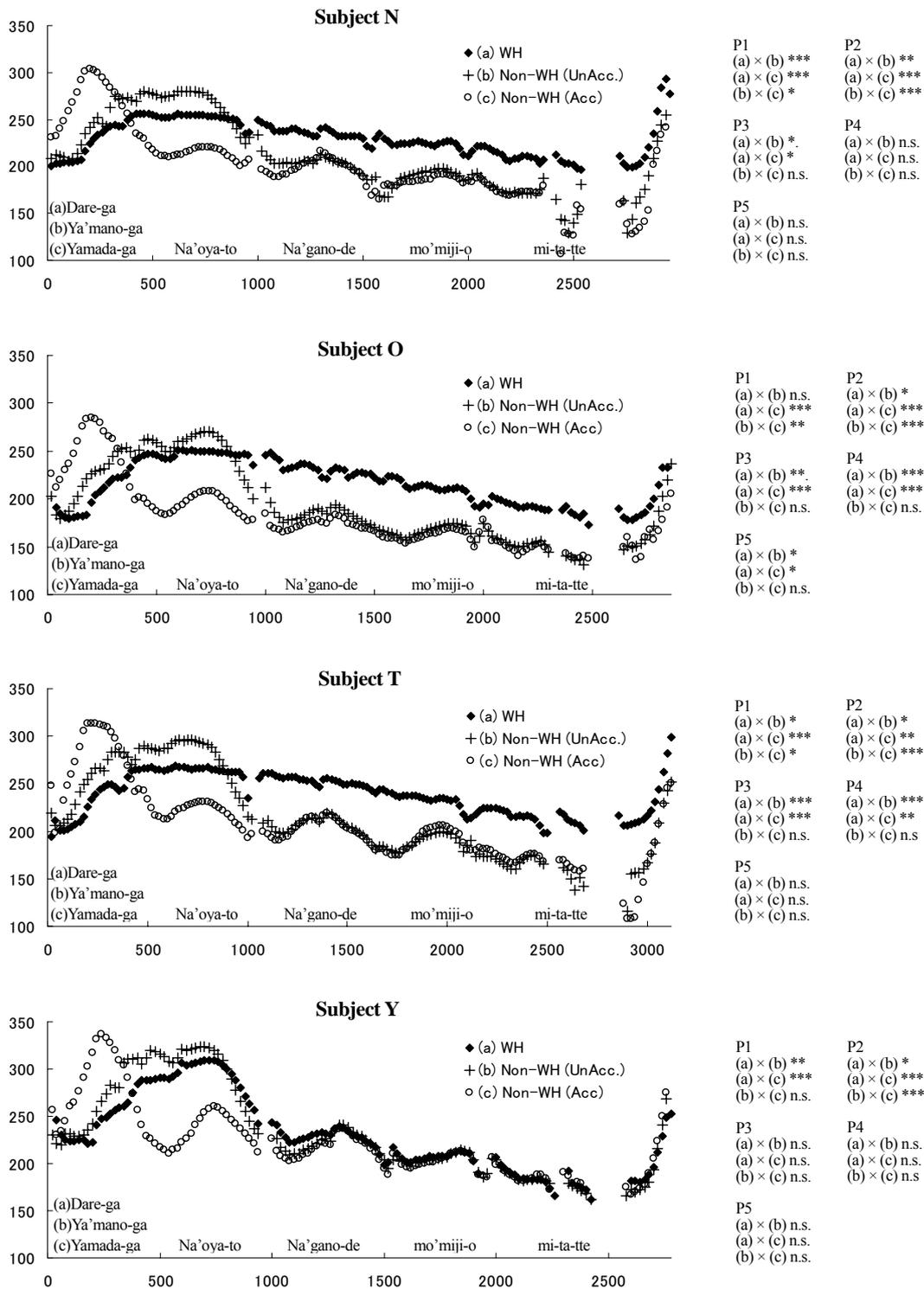


FIGURE 2.5 Normalized F0 contours for Dataset IV. The normalization was done along temporal as well as frequency scales across five repetitions. For each panel, ordinate and abscissa stand for F0 (Hz) and time (msec), respectively.

While subject Y did not show WH deaccenting for Dataset IV, it does not mean that the subject's intonational system does not have this process. In the recordings the subject surely deleted pitch accents in WH question. Figure 2.6 illustrates the F0 contour for 'Dare-ga Na'oya-to Na'gano-de mo'moji-o

mi-ta-to?’, a sentence that was not exploited for the present analysis. It can be seen that except for the fourth token, subject Y deleted pitch accents to show a flat high pattern in WH question. The question remains open as to whether the pattern without deaccenting was brought about her failure in switching from the standard variety to Fukuoka dialect, or it resulted from the standardization of the dialect.

In summary, three of four subjects consistently showed WH deaccenting; they exhibited a flat high pattern for WH question, which is quite different from the pattern in Tokyo. At the same time the subjects produced a pattern for non-WH focus, considerably similar to that in Tokyo; they compressed the pitch range of post-focal word without eliminating pitch accents.

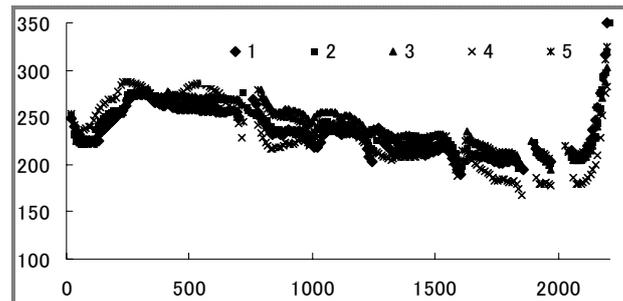


FIGURE 2.6 Normalized F0 contours for *Dare-ga Na'oya-to Na'gano-de mo'oji-o mi-ta-to?* produced by Y. Five tokens normalized along temporal scale. Ordinate and abscissa stand for F0 (Hz) and time (msec), respectively.

3. Conclusion

The results revealed the similarity between Fukuoka and Tokyo in that both share branching constraints in the intonational system. Also, difference between two dialects is identified. Unlike Tokyo, Fukuoka has two distinct intonation patterns; one for WH question and the other for non-WH question with focus. The present results of this study, though fairly preliminary, would throw light on interface research, showing that WH and non-WH focus are mapped onto different prosodic representations.

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