Empirical approaches to Fukuoka Japanese wh prosody

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0. Overview

§1 wh prosody and the syntax-phonology interface
§2 Kubo’s generalizations about Fukuoka Japanese wh prosody
§3 General experiment design
§4 Analysis 1: Deaccenting in the wh domain?
§5 Analysis 2: wh prosody/scope correlation?

1. wh prosody and the syntax-phonology interface

(1) Intonation often depends on syntactic structure
   (a) Thus, syntax can influence phonology
   (b) How does this work? What kinds of syntactic information are available to the phonology?

(2) One testing ground: wh prosody/scope correlation in Japanese
   (a) Main clause wh scope —> main clause wh prosody
   (b) Embedded wh scope —> embedded wh prosody

1.1 Tokyo Japanese wh prosody

(3) wh scope correlates with extent of low F0 (low pitch)
   (e.g., Ishihara 2002, 2003, 2007; Deguchi & Kitagawa 2002)

1.2 Beyond Tokyo: Fukuoka

(4) Both dialects show a wh prosody/scope correlation
   —> Both dialects require an explanation for how syntactic scope can affect or determine
   phonological/prosodic structure

(5) But phonetic implementation is different
   (a) Tokyo wh prosody may be a subcase of focus prosody (though see Ishihara 2007 for
       another view)
       • wh words are focused
       • focus in Tokyo triggers pitch-range reduction on subsequent material
       • thus, focus phonology may explain wh phonology (other than the scope problem)

   (b) Fukuoka wh prosody is distinct from focus prosody
       • not pitch range reduction, but accent deletion
       • potentially easier to confirm empirically than Tokyo, where pitch range is gradually
       reduced across the clause anyway
(6) Fukuoka pitch accent / intonation basics (Hayata 1985; Kubo 1989 et seq.)
   • Basic pattern resembles Tokyo Japanese
     (a) Nouns may be accented or unaccented (verbs, adjectives have default accents assigned)
     (b) Accent is realized as a pitch fall
     (c) A phrase with no accented words has a flat high, gradually falling tone
     (d) A phrase (usually) begins with a L tone

2. Kubo’s generalizations about FJ wh prosody

2.1 The basic pattern

(7) Hayata/Kubo description of the basic pattern (there are further very interesting details):
   • wh elements initiate a “high flat tone”

(8) Kubo’s phonological analysis of the basic pattern
   (K1) The wh element triggers accent deletion on all nouns inside wh prosody domain
       • If sentence-final null [+wh] C, wh domain is one single unaccented phrase
       • Otherwise (e.g., embedded [+wh] C), default accent is inserted on –penult mora
   (K2) The wh prosody domain correlates with the scope of the wh element

2.2 Further, theoretically intriguing claims about FJ prosody

(9) Two more claims with potentially important implications for the syntax-phonology interface
   (a) Multiple wh, one C [wh…wh…C]: there’s a phrase break at the second wh
   (b) Nested wh/C pairs [wh1…[wh2…C2]…C1]: No phrase breaks at all
       • These facts can be used as the basis for an argument that the wh/C phrasing requirement
         is driven by the C, not the wh element (Smith to appear; see Selkirk 2009 for another
         interpretation of the generalization in (b))

2.3 Testing Kubo’s generalizations

(10) Kubo’s generalizations are largely based on introspection plus some consultation with FJ
     speakers in a similar age range
     (a) Introspective judgments about intonation are notoriously tricky
     (b) Hayata (1985) discusses an apparently large change in the phonetics of accent between
         his elderly informants and Kubo’s generation

(11) Can Kubo’s generalizations be replicated in an empirical study with ‘naive’ native speakers?
     (And are there new generational differences?)
     (a) Empirical study of college-age Fukuoka speakers
     (b) Stage 1 of analysis: Looking for evidence for Kubo’s claims about the basic patterns of
         Fukuoka wh prosody — accent deletion (§4) and wh scope/prosody correlation (§5)
Overview of findings to date:

- Some young-adult speakers do exhibit accent deletion and wh prosody/scope correlations
- No speaker in the study produced dialect-typical prosody for every wh utterance (although some came very close) → effects of exposure to Tokyo or other dialects?

3. General experiment design

3.1 Participants

Map of Fukuoka prefecture, with participants’ place of origin

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3.2 Materials

Unavoidable trade-off between naturalistic production and controlled experiment design

Two tasks:

(a) Controlled production: Speakers were given a context and asked to produce a wh question as if it were uttered in that context

(b) Conversation: Speaker pairs were asked to carry out communicative tasks designed to generate wh questions

- One of the larger goals of the project is to compare the intonation of the utterances generated in the two tasks
- For today: Discussion of controlled production task only
Example stimulus from the controlled production task

Your brother brought his daughter Noriko to a party. Everyone is taking turns looking after Noriko, but you suddenly get confused about whose turn it is, so you ask:

\[
\text{Dare-ga} \ [\text{Noriko}-\text{ga} \ \text{doko-de} \ \text{asobi-yoo } \text{ka}] \ \text{wakaru} \ \text{to} \ \emptyset?
\]

‘Who knows [where Noriko is playing]?’

- Contexts and stimuli were presented in Japanese orthography

4. Analysis 1: Deaccenting in the wh domain?

4.1 Identifying accents

A crucial distinctive characteristic of Fukuoka wh prosody in the Kubo account is the deletion of accents in the wh domain

Goal: To investigate this claim empirically with the young-adult speakers in this study

BUT: To determine whether accents are deleted, we need a diagnostic for accentedness

On diagnosing accent in Fukuoka Japanese

- Generally similar to the Tokyo pitch accent system (Hayata 1985. Kubo 1989 et seq.)
  (a) Accent = fall from high (H) to low (L)
  (b) At most one accent per word
  (c) Some words have no accent, or surface with no accent

How much of a pitch fall is enough to “count”?

Hayata (1985: 8) — spectrogram from elderly FJ speaker; 3rd glottal harmonic is highlighted

(a) /...ka.mi-go.hu.ku.mā.ti/  • elderly Fukuoka speakers
   • ‘young’ Kitakyushu, Iizuka
   • Hayata himself (Tokyo)

(b) /...ka.mi-go.hu.kū.ma.ti/  • ‘young’ FJ speakers
   • ‘young’ Saga, Nagasaki
Potential complications in identifying accents
(a) FJ speakers may differ in size of necessary F0 drop
(b) ...and in accent status of individual lexemes

Goal: Develop an empirical diagnostic for accentedness
Proposed method: Compute F0 decrease score
(a) Mark the vowel portion of each mora of a word
(b) Measure the average F0 in each interval
(c) Calculate ratios for each pair of adjacent moras
(d) Ratio shows amount and direction of change:
   - $\mu_2/\mu_1 = 1$ no change
   - $\mu_2/\mu_1 > 1$ F0 rise
   - $\mu_2/\mu_1 < 1$ F0 fall
(e) Take ln of $\mu$-to-$\mu$ F0 ratios (Models F0 perception — proportional to semitones)
   - $\ln(\mu_2/\mu_1) = 0$ no change
   - $\ln(\mu_2/\mu_1) > 0$ F0 rise
   - $\ln(\mu_2/\mu_1) < 0$ F0 fall
(f) Add together all negative values for the word
   $\rightarrow$ Result is F0 decrease score
   • Finding: Distinguishes accented from unaccented words (would need to be normalized for mora count)
   • Proposal: Can also diagnose accent inside a wh span

4.2 Are N accents deleted?
(24) First: For each speaker, how are accented and unaccented N distinguished in non-wh contexts?
(25) Then: Do lexically accented N in wh questions behave more like accented or unaccented N in non-wh contexts?
(26) Example (speaker s10) — F0 decrease scores for lexically unaccented and accented N in non-wh contexts (left graph), versus lexically accented N in wh contexts (right graph)
(27) Pattern 1: Discontinuity in wh matches acc/unacc split

s10

s10 | unacc vs acc N

s10 | N accent in wh span

s12

s12 | unacc vs acc N

s12 | N accent in wh span

s07

s07 | unacc vs acc N

s07 | N accent in wh span

s08

s08 | unacc vs acc N

s08 | N accent in wh span
Categorization criteria for Pattern 1 (discontinuity match)

(a) wh points above the discontinuity are unaccented (’.’ in charts below)
(b) wh points below the discontinuity are accented (’■’, ’●’ in charts below)

Observations

(a) N accents sometimes appear in the wh span
(b) Different speakers show quite different numbers of deaccented N in the wh span
(c) In non-wh contexts, not all speakers always have the expected lexical accent patterns
- Some “accented” N pattern as unaccented
- Some “unaccented” N pattern as accented

Pattern 2: Multiple discontinuities in wh; ambiguous points
Categorization criteria for Pattern 2 (multiple discontinuity)

(a) wh points outside the ambiguous range are unaccented and accented, respectively (‘.’ and ‘■/●’ in charts below)

(b) Inside the ambiguous range, consider the dividing line to be either:
   - uppermost sharp discontinuity
   - match with acc/unacc N discontinuity

(c) Items in ambiguous range above dividing line coded as ‘probably unaccented’ (‘□/◊’ in charts); treated as unaccented in analysis to follow

(d) Items in ambiguous range below dividing line coded as ‘probably accented’ (‘■/●’ in charts); treated as accented in analysis to follow

Nature of variation in accentedness (wh and non-wh) not different from Pattern 1 speakers
(33) Other: Subtle/no matching discontinuities in wh points

(a) s05: Subtle discontinuity is good match for highest non-wh accented point; divide here

(b) s14: Difficult to judge!

- Sharpest discontinuities seem too high or too low
- Lowest unaccented non-wh point does not correspond with any discontinuity at all
  Impressionistically, doesn’t ‘sound’ like a FJ speaker
  Will be excluded from further analysis for now

(34) Noun accents in wh domain, by speaker; deaccenting is frequent/medium/infrequent

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(35) Noun accents in wh domain, by speaker and by item; deaccenting frequent/medium/infreq

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Factors that inhibit deaccenting?

- The w7 structure [the ‘ambiguous’ -te-mo sets; see below]
- The lexical item onigiri ‘rice ball’?

(36) Noun accents in wh domain, by speaker and by item — infrequently deacc spkrs excluded

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(37) The next analysis — prosody/scope correlation — will focus on these 8 speakers
5. **Analysis 2: wh prosody/scope correlation?**

5.1 Scope match? — Ambiguous

(39) **Question:** Does wh domain match wh scope when wh scope is potentially ambiguous?

(a) **Test structure:** [ wh ... C1 ] ... C2 ] (code w7)

(b) C1 must be compatible with [+wh] and [-wh] interpretations

- Embedded complementizer *ka* is only [+wh] in FJ; need, e.g., *ka doo ka* for [-wh]

(40) *wh* prosody obtains in [ *wh* V-te *mo* ] structure (Kubo 1989): ‘wh-ever Vs’; ‘no matter wh Vs’

(41) **Materials:** Same string presented with two different contexts

(a) **Context that facilitates embedded scope**

バイト先の店では、にぎりずしや酒類などは、決まった人しか売ってはいけない。海苔巻きはそうでもないようであるが、確かめるために、こう尋ねる。

*At the store where you work part time, only designated people are allowed to sell things like nigiri-zushi and alcohol. It seems that this is not the case for norimaki, but in order to make sure, you ask:*

[Dare-ga norimaki-o ut-te mo] ii to Ø?

who-NOM norimaki-ACC sell-TE okay PRT C

‘Is it okay, no matter who sells norimaki?’

(b) **Context that facilitates matrix scope**

今集まったバイトの人には花子、陽子、順子しかいない。そのうちの一人が海苔巻きを売る必要がある。しかし、係りの人に、誰が売るか皆さん耳にしてみると、こんな返事であった。「花子はだめ。」「陽子もだめ。」「順子もだめ。」三人のうち誰かが売ると決まっているのに！ちょっと頭にくるので、係りの人にむかって、

The only people at work are Hanako, Yooko, and Junko. One of them has to sell norimaki. But when you ask the manager who will do it, you get these answers: “Not Hanako.” “Not Yooko either.” “Not Junko either.” Even though one of the three has to do it! You’re a little annoyed, so you say this to the manager:

[Dare-ga norimaki-o ut-te mo] ii to Ø?

who-NOM norimaki-ACC sell-TE C okay PRT C

‘For whom is it okay, even if they sell norimaki?’

(42) **Measurement method**

[Dare-ga norimaki-o ut-te mo] ii to Ø?

who-NOM norimaki-ACC sell-TE C ok PRT C

(a) Measure vowel portion of antepenult μ in V (should be at or before any accented μ)

(b) Measure vowel portion of embedded C

(c) Compute ratio: \( \mu C/\mu V \)

(d) Take ln of ratio

- \( \ln(\mu C/\mu V) = 0 \) no change \( \rightarrow \) no accent at emb C

- \( \ln(\mu C/\mu V) > 0 \) F0 rise \( \rightarrow \) no accent at emb C

- \( \ln(\mu C/\mu V) < 0 \) F0 fall \( \rightarrow \) accent at emb C
Prediction:
- Embedded scope items should show a larger negative change than matrix scope items

Predicted F0 difference pattern

<table>
<thead>
<tr>
<th>emb scope</th>
<th>emb scope</th>
<th>matrix scope</th>
<th>matrix scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>-acc N</td>
<td>+acc N</td>
<td>-acc N</td>
<td>+acc N</td>
</tr>
</tbody>
</table>

Speakers who show a wh-domain/scope correlation (red checks = no deacc in N; disregard)

s08

s10

s11

s12

Speakers without consistent wh-domain/scope correlation (red checks = no deacc in N)

s01

s05
Some notes

(a) Items where deaccenting has not taken place (marked by red checked bars) are excluded from the analysis

• In most cases, an accented N earlier in the string means the V is already deaccented or pitch-compressed; large pitch fall unlikely to be observed at embedded C

(b) As noted in (37) above, these examples (structure code w7) had the highest rate of N deaccenting failure in the experiment

• The contexts (especially for the matrix scope version) may be somewhat contrived
• Matrix context may have encouraged productions with focus — how does this interact with wh prosody?

5.2 Scope match? — Unambiguous

Question: Does wh domain match wh scope when segmental string is unambiguous?

• Same measurement method as for ambiguous cases (measured vowels are shown in gray)

Test structures ( […] indicates syntactic clause structure)

(a) wh in embedded clause, embedded scope (code w2)

[ dare-ga doyoobi aniyome-o yondá kā ] siran’yatta.
who-NOM Saturday sis-in-law-ACC called C didn’t.know
‘(I) didn’t know who called (my) sister-in-law on Saturday.’

(b) wh in relative clause, matrix scope (code w3)

nomiya-de [ nan.de Morioka-ni mukau ] hito to nomi-yotta to Ø?
bar-at why Morioka-to heading person with were-drinking PRT C
‘At the bar, which person were you drinking with, identified by the reason they were going to Morioka?’

(c) 2 wh in embedded clause, embedded scope (code w5) — ‘wh-wh-C’ structure

[ dare-ga doyoobi doko de amaguri-o yaitá kā ] wakaran.
who-NOM Saturday where at chestnuts-ACC roasted C don’t.know
‘(I) don’t know who roasted chestnuts where on Saturday.’

(d) 2 nested wh/C pairs, outer wh = matrix scope (code w6)

[ dare-ga ] Noriko-ga doko de asobi-yoo kā ] wakaru to Ø?
who-NOM Noriko-NOM where at is-playing C know PRT C
‘Who knows where Noriko is playing?’
(50) Predictions
- Embedded scope items should show a larger negative change than matrix scope items
- Nested wh \textit{(code w6)} should not show accent at emb C

(51) Predicted F0 difference pattern

<table>
<thead>
<tr>
<th></th>
<th>single wh</th>
<th>multiple wh</th>
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<tr>
<td>emb scope</td>
<td>(w2)</td>
<td>(w5)</td>
</tr>
<tr>
<td>-accN</td>
<td>+accN</td>
<td>-accN</td>
</tr>
<tr>
<td>matrix scope</td>
<td>(w3)</td>
<td>(w6)</td>
</tr>
<tr>
<td>-accN</td>
<td>+accN</td>
<td>-accN</td>
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</tbody>
</table>

(52) Speakers who show a wh-domain/scope correlation (red checks = no deacc in N)

(a) For both single and multiple wh structures

(b) For single wh and wh-wh-C, but not(?) for nested wh
(53) Speakers with no consistent wh-domain/scope correlation (red checks = no deacc in N)
   (a) Some evidence of correlation, but notable exceptions (needs further investigation)

(b) Completely random...?

(54) Summary by speaker: wh domain/scope correlation? ○=good; △=medium; ×=no

<table>
<thead>
<tr>
<th></th>
<th>single wh</th>
<th>wh-wh-C</th>
<th>nested wh/C</th>
<th>ambiguous</th>
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</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>s12</td>
<td>○</td>
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<td>×</td>
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<tr>
<td>s08</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
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(55) Conclusions: Scope match analysis
   (a) Four speakers show good or medium correlation between wh prosody and wh scope
   (b) Two more speakers show good or medium correlation if the w7 (-te-mo)/ambiguous items are excluded
   (c) Two speakers show little or no correlation (except in the ambiguous cases, for one)
(56) Compare Hirotani’s (2005) finding that Tokyo speakers use prosody-scope correlations more consistently in perception than in production unless deliberately disambiguating
  • Fukuoka speakers may be more consistent in production than Tokyo speakers

(57) Further points to pursue in this analysis:
  • Are there other accented items before the V/C? (Items were checked for deaccenting at one point, but some have lexically accented adverbs as well)

6. Conclusions

(58) Some, but not all, speakers showed a strong tendency to deaccent in the wh domain
  • No speaker deaccented in every case
  • Compare Igarashi (2007), Igarashi & Kitagawa (2007)

(59) Several speakers showed evidence of a wh prosody/scope correlation
  Planned follow-ups:
  • Use the more “reliable” speakers to examine further claims from Kubo’s work
  • Look for regularities in the behavior of the less “reliable” speakers
  • Pursue perception experiments with FJ speakers

(60) Possible reasons for behavior that diverges from Kubo’s descriptions
  • Speakers’ grammar may differ from Kubo’s
    - younger generation — dialect change in progress?
    - different speakers may show different degrees of convergence with non-FJ dialects
  • Kubo’s introspective judgments may not capture the whole range of grammatical intonation behavior
  • Experimental situation?
    - speakers may not have had the intended semantic representation in mind
    - the laboratory situation may have contributed to less-natural production

(61) Next analysis to try: Phrase breaks at second wh in wh-wh-C construction?

Many thanks to:

• All experiment participants
• For theoretical and conceptual discussion and comments: Tomoyuki Kubo, Randall Hendrick
• For assistance with experiment design and preparation: Noriyuki Ikeda, Yui Izumo, Tomoyuki Kubo, Naomi Matsunaga, Reiko Mazuka, Go Mizumoto, Elliott Moreton, Tsutomu Sakamoto, Kumiko Sato, Maki Takahashi, Daichi Yasunaga
• Additional support:
  - Kyushu University Linguistics Department
  - Carolina Asia Center Faculty Travel Grant
  - Shigeto Kawahara’s list of sonorant-heavy words
  - Mietta Lennes’s Praat script examples
References


