Accent deletion and phrase formation in Fukuoka Japanese WH constructions

Jennifer L. Smith
University of North Carolina, Chapel Hill

1. Introduction

(1) Background

a. Fukuoka Japanese (FJ) has a wh-specific intonational structure (Hayata 1985; Kubo 1989 et seq.)

b. Has implications for the study of the syntax-prosody interface:
- Needs information beyond phrase edges and focused constituents (Selkirk 2000, 2003)
- Makes reference to a wh chain (a wh element and its coindexed C) —> see Richards (2006, this workshop)

c. The FJ intonation pattern is independent of post-focus accent reduction
- Differs from Tokyo Japanese (see, e.g., Ishihara 2002, 2003; Deguchi & Kitagawa 2002)
- FJ has a wh-specific intonational contour

(2) Goals of this talk

a. To provide empirical support for one aspect of the Hayata/Kubo description
- Lexical pitch accents are deleted inside the wh-intonation span

b. To organize and interpret a fuller range of the wh data described by Kubo
- Develop a preliminary OT analysis of accent deletion and phonological-phrase formation in FJ
- Consider some broader implications of this analysis

2. WH intonation in FJ: Basic facts

(3) "Fukuoka dialect" Kubo (1989 et seq.)

a. Spoken in the city of Fukuoka (Fukuoka pref., Kyushu) and the surrounding area

b. The city can be broadly divided into two subareas, Hakata and Fukuoka

c. There are differences between Hakata and Fukuoka dialects, but they generally pattern together with respect to the wh phenomena discussed here

Map image courtesy of Wikimedia Commons, Maps_of_Japan

(4) The wh intonational contour: Rule-based analysis, from Kubo (1992 et seq.)

a. Between a wh expression and a coindexed C[+WH] such as *ka,* all pitch accents and phonological-phrase (PhP) boundaries are deleted
- "Flat H-tone contour" is actually long span with no pitch accents

b. The resulting single PhP is assigned a default penultimate accent
- Exception: With null C[+WH] (matrix clause only), no accent is inserted

(5) Reinterpretation from a constraint-based perspective (preliminary version)

a. A wh expression and a coindexed C[+WH] such as *ka* must be in the same PhP (see also Richards (2006, this workshop)

b. This PhP must bear unmarked penultimate accent

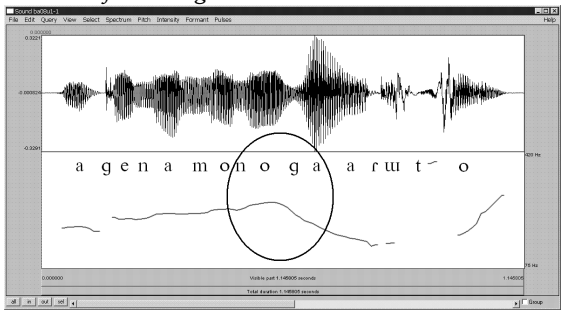
c. A matrix null C[+WH] resists the default accent assignment (but lexical accents are still lost)

(6) Example of accent deletion (participant 5)

a. Yes-no question: No wh intonational contour; no accent deletion (ó: realized accent)

age-na	mo**nó**-ga	aru	to	Ø[–WH]?
that.kind.of	*thing-NOM*	*exist*	*NZR*	*C*

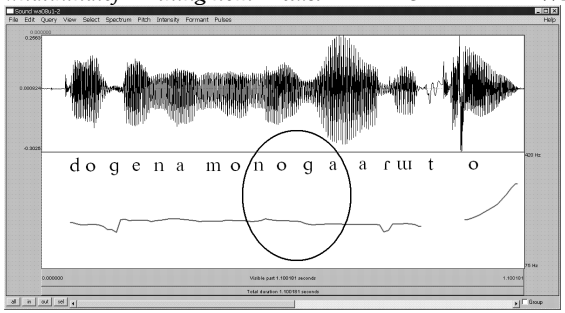
'Is there that kind of thing?'



b. wh question: Subject to wh intonational contour; accent deletion (ò: unrealized acc)

doge[+WH]-na	mo**nò**-ga	aru	to	Ø[+WH]?
what.kind.of	*thing-nom*	*exist*	*NZR*	*C*

'What kind of thing is there?'



3. Empirical investigation of the WH contour

(7) Claim to test: Accents are deleted in a wh question in FJ
- Four experimental conditions, plus hypothesis based on Hayata/Kubo analysis

	lexically accented		*lexically unaccented*	
YN question	mo**nó**-ga	(accent realized)	ni**wa**-ni	(no accent realized)
WH question	mo**nò**-ga	(no accent realized)	ni**wa**-ni	(no accent realized)

(8) Participants
- Four undergraduate students at Kyushu University (three female, one male)
- Self-reported native speakers of FJ
- Received token thank-you gifts for participation

(9) Materials (recorded as part of a larger set of utterances)

a. 2 sentence sets, the 8-mora set and the 10-mora set

b. Each set had 1 sentence from each of the following categories (2 repetitions)
- YN-acc **yes/no** question containing **accented** lexical item
- WH-acc **wh** question containing **accented** lexical item
- YN-un **yes/no** question with only **unaccented** lexical items
- WH-un **wh** question with only **unaccented** lexical items

c. Within each set, the sentences were designed in segmentally matched pairs
- YN-acc and WH-acc: identical except for the initial word (wh or not)
- YN-un and WH-un: identical except for the initial word (wh or not)
- However, *acc* and *un* items were not matched segmentally

(10) Sentence sets
- The critical mora is **underlined** (lexically accented mora, or equivalent position)

a. 8-mora set

YN-acc	age-na	mo**nó**-ga	aru	to	Ø[–WH]
	that.kind.of	*thing-NOM*	*exist*	*NZR*	*C*
WH-acc	**doge**[+WH]-na	mo**nò**-ga	aru	to	Ø[+WH]
	what.kind.of	*thing-NOM*	*exist*	*NZR*	*C*
YN-un	yome-ga	ni**wa**-ni	oru	to	Ø[–WH]
	bride-NOM	*garden-LOC*	*exist*	*NZR*	*C*
WH-un	**dare**[+WH]-ga	ni**wa**-ni	oru	to	Ø[+WH]
	who-NOM	*garden-LOC*	*exist*	*NZR*	*C*

b. 10-mora set

YN-acc	age-na	on**ná**-ga	mieru	to	Ø[–WH]
	that.kind.of	*woman-NOM*	*be.visible*	*NZR*	*C*
WH-acc	**doge**[+WH]-na	on**nà**-ga	mieru	to	Ø[+WH]
	what.kind.of	*woman-NOM*	*be.visible*	*NZR*	*C*
YN-un	age-na	aya**me**-ga	mieru	to	Ø[–WH]
	that.kind.of	*iris-NOM*	*be.visible*	*NZR*	*C*
WH-un	**doge**[+WH]-na	aya**me**-ga	mieru	to	Ø[+WH]
	what.kind.of	*iris-NOM*	*be.visible*	*NZR*	*C*

(11) Measurement procedure

a. Analysis was carried out in Praat, v. 4.6.04

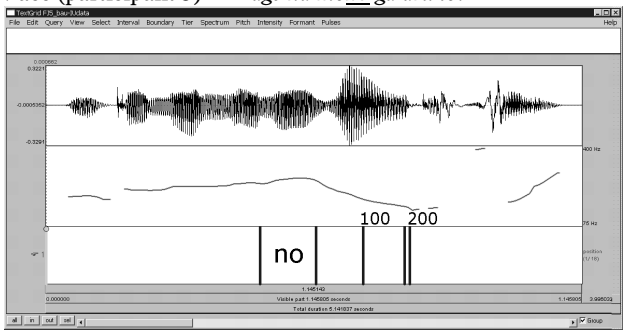
b. The **critical mora** was demarcated and its *mean* F0 was recorded

c. F0 measurements were also taken at these duration *points:*
- **100ms** and **200ms** after the right edge of the critical mora
- Why these values?
  - 100ms seemed to approximate one mora
  - 200ms because generational difference in accent perception reported by Hayata (1985: 7-9) might mean that young FJ speakers have a slower F0 fall

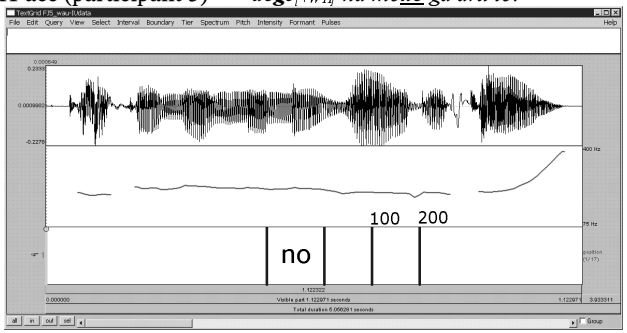
d. Two values were computed for each utterance:
- F0 change at 100ms = (Critical-mora mean F0) – (F0 at 100ms point)
- F0 change at 200ms = (Critical-mora mean F0) – (F0 at 200ms point)

(12) Sample utterances, with measurement points labeled

a. YN-acc (participant 5) *age-na mo**nó**-ga aru to?*



b. WH-acc (participant 5) ***doge**[+WH]-na mo**nò**-ga aru to?*

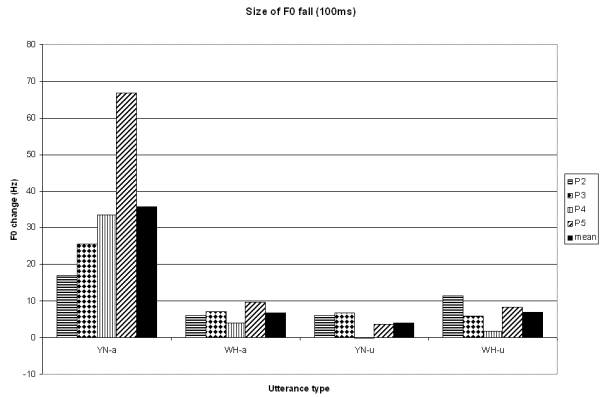


(13) Predictions
a. The F0 change for YN-acc should represent the usual realization of an accent
b. If accents are lost in WH questions:
i. YN-acc F0 change should be significantly larger than WH-acc F0 change
ii. WH-acc F0 change should not be different from those for WH-un, YN-un

(14) Results: F0 change at 100ms (Hz)

a. Means by participant for each condition

Participants	***YN-acc***	*WH-acc*	*YN-un*	*WH-un*
2	**16.89**	6.04	6.00	11.52
3	**25.60**	7.12	6.78	5.89
4	**33.55**	4.03	-0.10	1.89
5	**66.94**	9.67	3.67	8.37
Mean	**35.74**	6.73	4.09	6.92



b. Statistical analysis: Mixed model, to account for multiple observations within subject

i. YN-acc different from mean of other 3 conditions

Estimates

Label	*Estimate*	*Standard Error*	*DF*	*t Value*	*Pr > |t|*
YN-a vs mean of (YN-u WH-a WH-u)	29.8310	3.7640	57	7.93	**<.0001**

ii. WH-acc, YN-un, WH-un not different

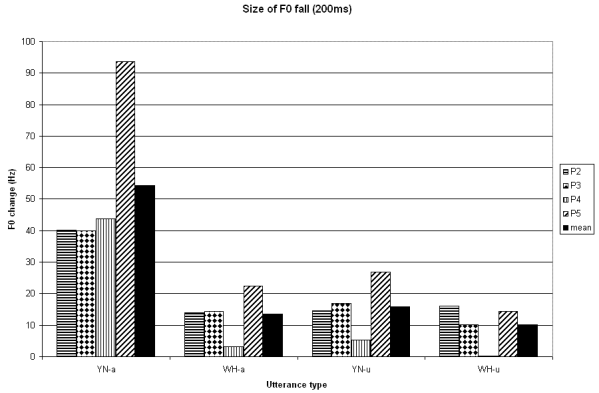
Contrasts

Label	*Num DF*	*Den DF*	*F Value*	*Pr > F*
ITEM_TYPE	3	57	21.09	<.0001
YN-u vs. WH-a vs. WH-u	2	57	0.24	**0.7906**

(15) F0 change at 200ms (Hz)

a. Means by participant for each condition

Participants	***YN-acc***	*WH-acc*	*YN-un*	*WH-un*
2	**40.11**	13.92	14.54	16.17
3	**39.98**	14.40	16.85	10.25
4	**43.68**	3.26	5.31	0.15
5	**93.70**	22.48	26.80	14.37
Mean	**54.37**	13.52	15.88	10.23



b. Statistical analysis: Mixed model, to account for multiple observations within subject

i. YN-acc different from mean of other three conditions

Estimates

Label	*Estimate*	*Standard Error*	*DF*	*t Value*	*Pr > |t|*
BAU vs mean of (YN-u WH-a WH-u)	41.1594	3.9222	57	10.49	**<.0001**

ii. WH-acc, YN-un, WH-un not different

Contrasts

Label	*Num DF*	*Den DF*	*F Value*	*Pr > F*
ITEM_TYPE	3	57	37.17	<.0001
YN-u vs. WH-a vs. WH-u	2	57	0.70	**0.5027**

(16) Conclusion of empirical study

The results of this small-scale study support the claim that accents are deleted in the wh intonational span

4. OT analysis of (aspects of) the WH intonational contour

(17) Overview of the analysis

a. WRAP-C *Every* $C_{[+WH]}$ is required to be in the same PhP with *some* wh element with which it is coindexed (WRAP-XP, -VP: Truckenbrodt 1995)

b. ALIGN-L(CP) Every CP left-edge must be aligned with some PhP left-edge (but WRAP-C takes priority) (ALIGN: McCarthy & Prince 1993)

c. ALIGN-L(WH) Every wh element must appear at the left edge of a PhP

d. *and a possible role for:*
ALIGN-L(FOCUS) Every focused element must appear at the left edge of a PhP

(18) Transcription conventions

- Data in this section are taken from the meticulous, detailed impressionistic descriptions by Tomoyuki Kubo, especially Kubo (1989, 1990a)

a. { } demarcates the "flat high tone" intonational contour

b. ^ marks sentence-final rising tone

c. | marks a PhP boundary (induced from Kubo's pitch contour)

d. Penult accent is marked (ó) inside the { } domain if it is realized

e. Inside { } or outside, accents are marked (ó) only when actually realized

f. Some changes from Kubo's original presentation of the data:
i. I have added some syntactic bracketings and traces (*t*) or empty arguments (*e*)
ii. I'm treating *"meisi-ku"* (Kubo 1989) as DP rather than NP
iii. I'm using CP for S'

4.1 WRAP-C vs. ALIGN: Inclusion for $C_{[+WH]}$ takes precedence over edge marking for wh, CP

A. Two wh elements bound by same C

- Requires phrase break at "constituent" (apparently CP? anything else?) containing second wh element
- A wh intonational contour is initiated at the first wh element (even though there is no C at the right edge) and again at the second wh element

(19) { **doko**$_1$-no daigaku-no gakusei-ga } | { **nan**$_1$-nin ki-ta tte$_{[+WH]1}$ ^ } (K 1989: 3)
where-GEN university-GEN student-NOM how.many.people come-PRF C.QUOT
'How many students came from which university, reportedly?'
- Kubo (1989: 3) explicitly says ungrammatical without the break

(20) Minimal pair, depending on syntactic position of *kyonen* (K 1990a: 108)
a. { **dare**$_1$-ga kyonen } { **doko**$_1$-no kuni kara kita hito to kekkon sita to Ø$_{[+WH]1}$ ^}
[[dare-ga kyonen [[doko-no kuni kara kita] hito] to kekkon sita to] Ø$_{[+WH]}$]
who-NOM last.year where-GEN country-GEN from came person with married NZR C
'Who married, last year, the person who came from which country?'

b. { **dare**$_1$-ga } | kyónen { **doko**$_1$-no kuni kara kita hito to kekkon sita to Ø$_{[+WH]1}$ ^ }
[[dare-ga [[kyonen doko no kuni kara kita] hito] to kekkon.sita to] Ø$_{[+WH]}$]
'Who married the person who came last year from which country?'

B. Multiple nested wh/C dependencies

- Outermost wh dependency prevails; no phrase break at inner wh element

(21) wh chain involving matrix C completely surrounds wh chain involving embedded C
$[_{CP}$ ...wh$_1$ $[_{CP}$ wh$_2$ C_2] C_1]

{ **dare**$_1$-ga [$_{CP}$ oretati-ga **doko**$_2$-ni iku ka$_2$] sit.too to ya^ Ø$_{[+WH]1}$ } (K 1989: 3)
who-NOM we-NOM where-LOC go C know.STAT NZR COP C
'Who knows where we are going?'
- Kubo (1989: 3 explicitly says ungrammatical if high-tone span ends at *ka*

(22) like (21), but further embedded in one more CP
$[_{CP}$ ..... $[_{CP}$ .....wh$_1$ $[_{CP}$ wh$_2$ C_2] C_1] .....C]

omae | { [$_{CP}$ **dare**$_1$-ga [$_{CP}$ oretati-ga **doko**$_2$-ni iku ka$_2$] sittoó ka$_1$] } | sittóo ya Ø$_{[-WH]}$ ^
you who-NOM we-NOM where-LOC go C know.STAT C know COP C
'Do you know who knows where we are going?' (K 1989: 4)

(23) Observations:
a. A $C_{[+WH]}$ must be in a PhP with at least one associated wh element (seen in A, B)
b. A wh element prefers to fall at the left edge of a PhP over being included in the same PhP with its C (seen in A)
c. When the H-tone span will be broken anyway, it is preferentially broken at the left edge of CP as well (seen in A)
d. When these factors conflict, wh at left edge and CP at left edge are both sacrificed to saisfy the C wrap effect (seen in B)

(24) Ranking: WRAP-C >> { ALIGN-L(WH), ALIGN-L(CP) }
- The latter two are satisfied only when WRAP-C is not at stake

4.2 The case of cross-serial dependencies: A Focus effect?

- Kubo (1990ab) describes prosody of echo-questions ('Who ate nattoo?' / 'Who ate WHAT?') and "meta-questions" ('Who ate nattoo?' / 'I forgot **what** you asked who ate.')
- Structurally, these involve cross-serial dependencies (may not need K's *meta* feature)

(25) Echo-question example (dialogue between A and B) (K 1990a: 113)

A: imantóko | { [$_{CP}$ **itu**$_2$ Kyooto ikú ka$_2$] } | wakar-án
right.now when Kyoto go C know-NEG
'At the moment, (I) don't know when (I)'ll go to Kyoto.'

B: { [$_{CP}$ **itu**$_2$] } | { **doko**$_1$ iku ka$_2$] wakaran tte^ Ø$_{[+WH]1}$ }
where QUOT C I follow Kubo in having both *tte* and Ø
'(You) say (you) don't know when (you)'ll go **WHERE**?'

(26) Meta-question examples (A, B, C are different speakers) (K 1990a: 115)

A: { [$_{CP}$ **itu**$_3$ Tanaka to Nagasaki ikú ka$_3$] } | wakar-án
when Tanaka with Nagasaki go C know-NEG
'(I) don't know when (I)'ll go to Nagasaki with Tanaka.'

B: { [$_{CP}$ **itu**$_3$ Tanaka to } | { **doko**$_2$ iku ka$_3$] wakar-an tte ii-yot-tá ka$_2$ } | wasuréta
*when Tanaka with **WHERE** go C know-NEG C.QUOT say-PRG-PRF C forgot*
'(I) forgot **WHERE** you were saying (you) don't know when (you)'ll go [there] with Tanaka.'

C: { [$_{CP}$ **itu**$_3$] } |{ **dare**$_1$ to **doko**$_2$ iku ka$_3$] wakar-an tte ii-yot-ta ka$_2$ wasureta tte
*when **WHO** with WHERE go C know-NEG C.QUOT say-PRG-PRF C forgot C.QUOT*
iiyottá ka$_1$ } wasuréta
say-PRG-PRF C forgot

'(I) forgot **WHO** you were saying you forgot WHERE (she) was saying (she) doesn't know when (she)'ll go [there] with [them].'

(27) Analysis so far correctly chooses location of phrase break

a. Attested pattern: ☞ { [$_{CP}$ ... } | { wh$_2$—— } | { wh$_1$——C$_2$] ——C$_1$ }
- Violates WRAP-C once (C$_2$ not in PhP with wh$_2$)
- Satisfies ALIGN-L(WH)

b. Competing candidate: * { [$_{CP}$ ... } | { wh$_2$——wh$_1$——C$_2$] } - - - C$_1$ }
- Violates WRAP-C once (C$_1$ not in PhP with wh$_1$)
- Violates ALIGN-L(WH) once (at wh$_1$)

(28) But another candidate seems wrongly predicted to win —?

c. Competing candidate: * { [$_{CP}$ ... } | { wh$_2$——wh$_1$——C$_2$] ——C$_1$ }
- *Satisfies* WRAP-C
- Violation of ALIGN-L(WH) (at wh$_1$) should be irrelevant

(29) Possible explanation?

a. As Richards (2006: 53-54) points out, echo questions typically involve destressing or reduction of all but the wh element (since everything else is old information)

b. Perhaps this is true in FJ as well, and a high-ranking ALIGN-L(FOCUS) (which dominates even WRAP-C) is responsible for the phrase break at wh$_1$ in (27a)

c. Focus is known to trigger a left phrase edge in Tokyo Japanese (Nagahara 1994; Sugahara 2003)

(30) More exceptional (?) behavior from cross-serial wh dependencies

A: { [$_{CP}$ **dare**$_2$-ga } | { **itu**$_2$ Kyooto ikú ka$_2$] } wasuréta (K 1990a: 113)
who-NOM when Kyoto go C forgot
'(I) forgot who's going to Kyoto when.'

B: { [$_{CP}$ **dare**$_2$-ga **itu**$_2$ } | { **doko**$_1$ iku ka$_2$] wasureta tte^ Ø$_{[+WH]1}$ }
*who-NOM when **WHERE** go C forgot QUOT C*
'You're saying (you) forgot who's going **WHERE** when?'

- Kubo 1990a: 113-114 (my somewhat loose paraphrase)
We would expect the phrasing '{ dare-ga } | { itu ...', but this is not what happens. ... Here, let us assume that because of the focus on *doko$_m$*, the PhP { itu } has been weakened.

(31) Conclusions from analysis so far

a. Every C$_{[+WH]}$ must be phrased with its wh element, except in some cases involving echo-questions/meta-questions

b. Much more frequently, a wh element fails to be phrased with its C$_{[+WH]}$

c. Thus, it seems that the condition on wh prosody proposed by Richards (2006:10) can be seen as a requirement imposed by C rather than by wh elements

d. On the other hand, the characteristic wh intonational contour is initiated by every wh element, even when not phrased with its C

5. Some remaining questions

5.1 What is the PhP?

(32) No matter how long the sentence is, there can be no phonological phrase breaks at all in the wh span (K 1989: 2)

(33) Evidence: No "initial lowering" inside the wh span (IL is a diagnostic for MiP edge)

a. Hayata (1985) gives the following item:
{ **nan**-ba } | { tabe-ta ne^ } (LHH | LHHH^) (K 1989: 7)
what-ACC eat-PRF (?) 'What did you eat?'

b. Kubo declares this intonational pattern ungrammatical for him

(34) Evidence: No *kusa* inside the wh span

- The particle *kusa,* roughly equivalent to Tokyo *saa,* appears phonological-phrase-finally (K 1989: 7)

a. ańta kusa | kinoo | { **nan**-ba tabe-ta ne^ } (K 1989: 7)
you KUSA yesterday what-ACC eat-PRF (?) ≅ 'So you, what did you eat yesterday?'

b. ańta | kinoó kusa | { **nan**-ba tabeta ne^ } (K 1989: 7)
you yesterday KUSA what-ACC eat-PRF (?) ≅ 'So yesterday, what did you eat?'

c. *ańta | kinoo | { **nan**-ba kusa, } | { tabe-ta ne^ } (K 1989: 8)

d. kinoo | { **nan**-ba tabe-tá ka kusa } | tyótto | yuute-n-syái (K 1989: 8)
yesterday what-ACC eat-PRF KUSA a.little say-try-IMPER
≅ 'Try telling (me), you know, what you ate yesterday.'

(35) These facts suggest that the wh intonational contour consists of a single **MiP**

- But: Does that mean that the ALIGN and WRAP constraints discussed above refer to MiP instead of MaP?

a. Possible (e.g., Sugahara 2003; Richards 2006)

b. Impossible (e.g., Truckenbrodt 1995, 1999)
- A logical possibility consistent with the FJ data (E. Selkirk, p.c.) — The ALIGN and WRAP constraints do still refer to MaP, but another constraint wants the wh span's MiP to be the most prominent or the edgemost MiP in its MaP, and this limits the MaP to one MiP

c. MaP is nothing other than a recursion of "MiP" anyway (Ito & Mester 2006, this workshop)

5.2 What is responsible for accent deletion in the WH span?

(36) The accent that shows up on/before an embedded complementizer is inserted by rule (or constraint interaction) — it's not the intrinsic accent of the C (Kubo 1989: 8)

Rule: Accent is inserted on the second mora from the end of the PhP formed over the wh span

- Exception: No default accent insertion with matrix null C

(37) Evidence for default accent insertion (Kubo 1989: 8-9)

a. Behavior of *mo* (quantifier: 'also' / (with wh element) 'wh-ever')
- *mo* with an unaccented N is only optionally preaccenting
sakana (unacc), *sakaná-mo* ~ *sakana-mo* 'fish also'
- However, *mo* in a wh context shows mandatory penult accent
{ dono sakaná mo } *which fish MO* 'whichever fish'

b. Embedded questions allow particles to follow C, and the accent shifts

i. { **dare**-ga kuru ká wa } | wakar-án (K 1989: 8)
who-NOM come C TOP know-NEG '(I) don't know who will come.'

ii. { **dare**-ga kuru ka dáke } | osietyattén (K 1989: 9)
who-NOM come C only tell.IMPER 'Just tell me who will come.'

iii. { **itu** Kyooto it-ta ka dake dé.mo } | osietyattén (K 1990a: 109)
when Kyoto go-PRF C only even tell.IMPER
'Tell me even just when (you) went to Kyoto.'

(38) The presence of default accent insertion at the right edge of the phrase may make it difficult to say that the wh word triggers loss of lexical accent because it wants to be the most prominent element in the phrase (the Tokyo analysis)
- Why does the wh word itself surface unaccented? (Kubo 1989 suggests that for at least some speakers, wh words have initial accent underlyingly. Moreover, this shows up in their use as indefinites such as *dáre-ka* 'someone' (Kubo 1990b))

5.3 Why does the wh contour stop at the right edge of the C?

- Right edge of wh contour at coindexed C (plus cliticized particles; see 37b)

See Ishihara, Hirotani, Deguchi & Kitagawa, etc., for discussion of comparable structures in Tokyo Japanese, which (often) undergo post-focus reduction in a similar fashion, sensitive to the scope of the wh element

(39) wh with embedded scope: wh span ends at C_1, or ungrammatical (Kubo 1989: 3)
$[_{CP}$ ..... $[_{CP}$ .....wh$_1$ ——— C$_1$] .....C]

{ dare-ga Kyooto ikú ka } | wakar-án (K 1989: 3)
who-NOM Kyoto go C know-NEG '(I) don't know who's going to Kyoto.'

(40) wh word in embedded sentence modifer; wh C is matrix C (K 1989: 2)
$[_{CP}$ ..... $[_{CP}$ .....wh$_1$ ——— C] ——— C$_1$]

{ $[_{DP}$ $[_{CP}$ donna sigoto si-yoo] hito]-to ano hito *t* kekkon si-ta to^ Ø[+wh] }
what.kind.of work do-PRG person-with that person marriage do-PRF NZR C
(loosely) 'The person that person married: what kind of work do they do?'

6. Conclusions

(41) Initial empirical confirmation for the claim that accents are lost in the FJ wh intonational contour

(42) Evidence that the C is responsible for the wh-related PhP Wrap effect, and the wh element is responsible for the accent deletion

Acknowledgments

Many thanks to the following people:
- For assistance with experimental materials design and planning: Tomoyuki Kubo, Izumi Nishioka, Tsutomu Sakamoto, Lisa Selkirk
- For assistance with Praat and Perl: Elliott Moreton
- Statistical consulting: Chris Wiesen
- For discussion and feedback on this and earlier versions of this project: Randy Hendrick, Mako Hirotani, Shigeto Kawahara, Tomoyuki Kubo, Elliott Moreton, Mariko Sugahara, Mike Terry
- And in particular, many thanks to the experimental participants for their time and cooperation

References

Deguchi, Masanori, and Yoshihisa Kitagawa. 2002. Prosody and WH-questions. In Masako Hirotani, ed., *Proceedings of NELS 32.* Amherst: GLSA, 73-92.

Hayata, Teruhiro. 1985. *Hakata hougen no akusento • keitairon* [The accent and morphology of the Hakata dialect]. Fukuoka: Kyushu University Press.

Hirotani, Masako. 2003. Prosodic effects on the interpretation of Japanese wh-questions. In Luis Alonso-Ovalle, ed., *On Semantic Processing.* UMOP 27. Amherst, GLSA: 117-137.

Hirotani, Masako. 2004a. Does prosodic phrasing correlate with wh-scope in Japanese? Poster presentation at the Ninth Conference on Laboratory Phonology; University of Illinois at Urbana-Champaign, June 25.

Hirotani, Masako. 2004b. Prosodic boundaries in the comprehension and production of wh-questions in Tokyo Japanese. Paper presented at the 17th Annual CUNY Conference on Human Sentence Processing; University of Maryland, College Park, March 27.

Ishihara, Shinichiro. 2002. Invisible but audible Wh-scope marking: Wh-constructions and deaccenting in Japanese. In Line Mikkelsen and Chris Potts (eds.), *Proceedings of WCCFL 21.* Somerville, Mass.: Cascadilla Press, 180–193.

Ishihara, Shinichiro. 2004. Prosody by phase: Evidence from Focus intonation–Wh-scope correspondence in Japanese. In S. Ishihara, M. Schmitz, and A. Schwarz (eds.), *Interdisciplinary Studies on Information Structure 1.* Potsdam: University of Potsdam, 77–119.

Ito, Junko, & Armin Mester. 2006. Adjunction in prosodic phonology. Slides/handout from FAJL (Formal Approaches to Japanese Linguistics) 4, Osaka.

Kratzer, Angelika, and Elisabeth Selkirk. 2007. Phase theory and prosodic spellout: The case of verbs. Ms., University of Massachusetts, Amherst.

Kubo, Tomoyuki. 1989. Hukuoka-si hougen no, *dare • nani* tou no gimonsi wo hukumu bun no pitti pataan [The pitch patterns of sentences containing WH-words in the Fukuoka City dialect]. *Kokugogaku* 156: 1–12.

Kubo, Tomoyuki. 1990a. Hukuoka-si hougen no gimonsi hyougen no akusento kisoku [Accent rules for WH expressions in the Fukuoka dialect.] *Kyuudai gengogaku kenkyuusitu houkoku* 11: 103–118.

Kubo, Tomoyuki. 1990b. Hukuoka-si hougen no toi-kaesi gimonsi gimonbun (WH-echo) no pitti-pataan [The pitch patterns of WH-echo sentences in the Fukuoka City dialect of Japanese]. *Bungaku kenkyuu* 87: 153–179.

Kubo, Tomoyuki. 2001. Hukuoka hougen ni okeru tougoron to on'inron no kyoukai ryouiki [Syntax-phonology interface in the Fukuoka dialect]. *Journal of the Phonetic Society of Japan* 5: 27–32.

Kubo, Tomoyuki. 2005. Phonology-syntax interfaces in Busan Korean and Fukuoka Japanese. In Shigeki Kaji (ed.), *Cross-Linguistic Studies on Tonal Phenomena IV.* Tokyo: ILCAA, 195–209.

Nagahara, Hiroyuki. 1994. *Phonological phrasing in Japanese.* Doctoral dissertation, UCLA.

Richards, Norvin. 2006. Beyond strength and weakness. Ms., MIT.

Selkirk, Elisabeth 1995. The prosodic structure of function words. In Jill N. Beckman, Laura Walsh Dickey, and Suzanne Urbanczyk (eds.), *Papers in Optimality Theory.* UMOP 18. Amherst, Mass.: GLSA, 439–469.

Selkirk, Elisabeth O. 2000. The interaction of constraints on prosodic phrasing. In Merle Horne, ed., *Prosody: Theory and Experiment.* Dordrecht: Kluwer, 231-263.

Selkirk, Elisabeth. 2003. Bengali intonation revisited: An Optimality Theoretic analysis in which FOCUS stress prominence drives FOCUS phrasing. In Angela Carpenter, Andries Coetzee, and Paul de Lacy (eds.), *Papers in Optimality Theory II.* UMOP 26. Amherst, Mass.: GLSA, 305–335.

Truckenbrodt, Hubert. 1995. *Phonological phrases: Their relation to syntax, focus, and prominence.* Doctoral diss., MIT.

Truckenbrodt, Hubert. 1999. On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30: 219–255.