

"Prosodic Domain of Wh-questions in Japanese"

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5. Background — Wh-domain Again:

(1) Wh-focus prosodic domain (henceforth **Wh-domain**) in Tokyo Japanese:

- a. It starts with prominence on a Wh-focus e.g.) *DAre-to* 'who-with' in (2a-b)
- b. Wh-focus is followed by substantial pitch compression (Post-focal reduction (**PFR**)) up to COMP. e.g.) The underlined part indicated by " \leftarrow PFR \rightarrow " in (2a-b)
- c. The end of the Wh-domain is signaled by "Post-COMP rise" in the matrix clause.
e.g.) The initial rising in *sirabeteiru* 'searching' in (2a)

(2)

a. keesatu-wa [kanozyo-ga ano-ban DAre-to atteita-ka] sirabeteiru-no \uparrow ?
 police-TOP she-NOM that-night **who-with** seeing-COMP_{Wh} searching-COMP_{Y/N}
Focus \leftarrow **PFR** \rightarrow
 'Are the police investigating [**who**₁ she was with t₁ that night]?'

b. keesatu-wa [kanozyo-ga ano-ban DAre-to atteita-ka] sirabeteiru-no \uparrow ?
who-with -COMP_{Wthr} -COMP_{Wh}
Focus \leftarrow **PFR** \rightarrow
 '**Who**₁ is such that the police are investigating [whether she was with him₁ that night]?'

(3) Prosody-Scope Correlation of the Wh-domain: (Deguchi and Kitagawa (2002), Ishihara (2002))

Numbers of Tokyo speakers recognize that how long the focus prosody continues in a Wh-question determines the scope of the Wh-focus in that sentence:

(2a): Local Focus Prosody (**Local FPD**) \Rightarrow **Subordinate** Wh-scope

(2b): Global Focus Prosody (**Global FPD**) \Rightarrow **Matrix** Wh-scope

6. What prosodic unit is Wh-domain?

(4) The MaP Analysis: (Nagahara (1994), Hirotsu (2004) cf. Pierrehumbert and Beckman (1988), Selkirk and Tateishi (1991))

a. Wh-domain = Major Phrase (MaP)

b. Why "Post-COMP rise"?

— Because a pitch range is reset when one MaP as Wh-domain ends and a new MaP starts.

(5) Hirotsu's (2004: 7) Scope-Prosody Correspondence (SPC):

The scope of a term X should not extend beyond the Major (phonological) Phrase (MaP) containing X.

7. Experiments on "Downstep into Wh-Domain":

(6) Motive for experiments:

- a. If the beginning of the Wh-domain cannot be identified as the beginning of a MaP (because of "downstep into Wh-domain"), its end should not be either.
- b. Need of paradigmatic examination of downstep (Kubozono (2007))
 - ⇒ Rise of pitch can not necessarily be interpreted as the absence of downstep.
 - ⇒ "Post-COMP rise" may not necessarily be regarded as the reset of the pitch range caused by the MaP boundaries.
- c. If it is shown that downstep observed within the subordinate Wh-domain continues into the matrix clause (henceforth "downstep out of Wh-domain"), this Wh-domain cannot be identified as MaP.

(7) Design:

- a. 10 college students (ages 18-23) were asked to read aloud the sentences included in larger corpus in randomized orders. The peak F_0 values of all the involved words in the recordings were measured.
- b. Indirect Wh-questions containing a sequence of accented words as in (i) below and those containing a sequence of unaccented words as in (ii) are compared:

	[CP	Wh	N ₁	N ₂	V ₁	COMP CP]	V_{Target}	
(i) A-set:			a	a	a		—	⇒ e.g., (8A)
(ii) U-set:			u	u	u		—	⇒ e.g., (8U)

(8) Test sentences:

A: 何がガレージの中にあるか見に行ったの。↓

NAni-ga gare'ezi-no na'ka-ni a'ru-ka
 What-NOM garage-GEN inside-LOC exist-COMP_{WH}

'I went to see what is in the garage.'

U: 何がおとなりの庭にいるか見に行ったの。↓

NAni-ga otonari-no niwa-ni iru-ka
 What-NOM neighbor-GEN garden-LOC exist--COMP_{WH}

'I went to see what is in the neighbor's garden.'

mi'-ni-it-ta-no
 went.to.see-DECL

mi'-ni-it-ta-no
 went.to.see-DECL

(9) Prediction:

If downstep is observed within the Wh-domain and it is not blocked by its right boundary (= CP), the peak F_0 value of the target verb in the matrix should be noticeably lower in the A-set than in the U-set.

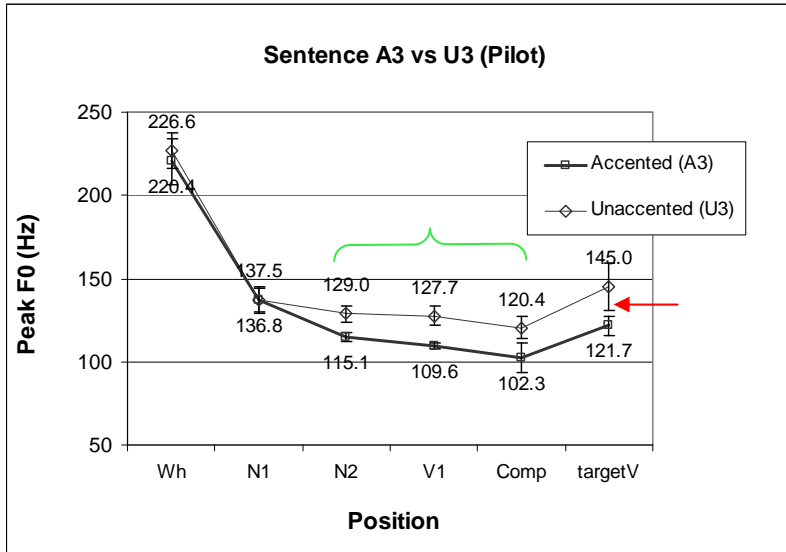
(10) Observations:

- a. A sequence of downsteps and its cumulative effect in the A-set (but not U-set) is clearly observed within the Wh-domain.

Note: This suggests that deaccenting does not take place in the PFR of the Wh-domain.

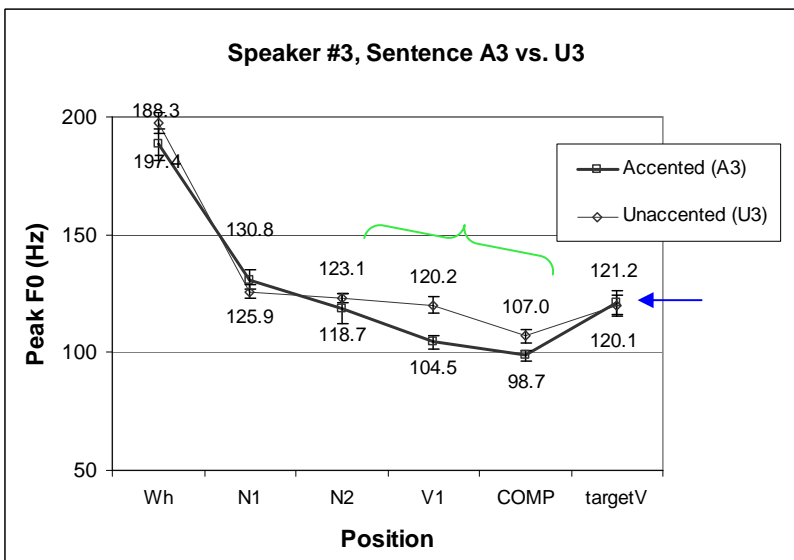
- b. Mixed results: Downstep effects continued onto the target verb in some cases, as in (11a). But in others, they were almost completely neutralized at the target verb, as in (11b).

(11) a.



The result of Pair 3 (Sentence A3 vs. U3) by Pilot subject. Mean F0 is given for each measurement point. Error bars show the size of 1 standard deviation. t-tests were conducted for V¹, Comp and targetV to see if the mean F0s are statistically different due to downstep condition (accented vs. unaccented). In this case, mean F0 difference is statistically significant for V1, Comp and targetV ($p > .01$).

b.



The result of Pair 3 (Sentence A3 vs. U3) by speaker #3. In this case, mean F0 difference is statistically significant for V1, Comp ($p > .001$), but not for target V.

(12) Results of statistical tests on downstep effects:

- a. Downstep effects within the Wh-domain can be confirmed with respect to V1 and the COMP (-ka) for most speakers and test sentences.
- b. In the majority of cases, downstep effects are not confirmed beyond the COMP.
- c. All in all, the prediction in (9) was not supported, and downstep appears to be blocked across the right edge of the Wh-domain.

(13) t-test results:

Participants			Pair 1			Pair 2			Pair 3		
ID	Age	Dialect (primary)	V1	ka	targetV	V1	ka	targetV	V1	ka	targetV
pilot	32	Hino, Tokyo	ns	***	ns	**	**	ns	***	**	0.004
2	22	Adachi, Tokyo	***	**	ns	***	***	ns	***	***	ns
3	23	Sumida, Tokyo	***	***	0.004	***	**	ns	***	***	ns
4	21	Yokohama, Kanagawa	***	***	ns	***	ns	ns	***	***	0.016
5	18	Yokohama, Kanagawa	*	***	ns	***	***	ns	***	**	ns
6	19	Yamato, Kanagawa	***	ns	ns	**	ns	ns	***	ns	ns
7	19	Yokohama, Kanagawa	*	ns	0.002	ns	ns	ns	***	**	ns
8	19	Yokohama, Kanagawa	***	***	ns	***	**	ns	***	*	ns
9	20	Narashino, Chiba	***	**	ns	***	**	ns	***	**	ns
10	21	Chigasaki, Kanagawa	***	ns	ns	***	ns	0.012	***	***	ns
11	20	Yokohama, Kanagawa	***	**	ns	**	ns	0.031	***	*	ns

* : $p < .05$, ** : $p < .01$, *** : $p < .001$

Result of t-test (accented vs. unaccented) for *V1*, *ka* (COMP) and *target V* (df = 18). For *target V*, *p*-values are shown for significant differences ($\alpha = .05$). Bold *p*-values indicate the cases of significant difference (unaccented > accented). Shaded *p*-values are for the cases of significant difference in the opposite direction (accented > unaccented).

8. Interpretation:

Our experimental results did not refute the MaP Analysis as to the "downstep out of Wh-domain."

But do they support the MaP Analysis? — Not quite!

(14) Interpretation under the MaP Analysis:

- a. Right boundary of Wh-domain = Right boundary of MaP

but

Left boundary of Wh-domain \neq Left boundary of MaP

\Rightarrow The right boundary of MaP **happens to coincide** with that of the Wh-domain as in (i), (ii) or (iii). (cf. Ishihara (2007))

(i) ... [MaP1 ... [CP ... [Wh-domain ...]] [MaP2 ...]

(ii) ... [CP ... [MaP1 ... [Wh-domain ...]] [MaP2 ...]

(iii) ... [Wh-domain ... [MaP1 ...]] [MaP2 ...]

— It also remains unanswered why and how MaP1 starts and ends in that particular way.

(15) Our interpretation:

Downstep across the right boundary of Wh-domain is blocked **not because** it is the right boundary of MaP but because of some other reason.

Our claim: The COMP *-ka* is **lexically accented** and that affected the experimental results

(16) Recessive accentuation: (Poser (1984) \Rightarrow Nagahara (1994: 87-90))

The accent of a recessive affix manifests itself just in case the stem is unaccented. If the stem is accented, the accent of the stem becomes the accent of the resulting form.

(i) iku (**unaccented**) + -rasii \Rightarrow **iku-rasi'i** (**accented**)
go seem

(ii) ka'eru (**accented**) + -rasii \Rightarrow ka'eru-rasii
return

— The recessive accentuation is caused by the **lexical property** of some specific (class of) bound morphemes.

(17) Lexical accent of *-rasi(i)*:

a. Speaker 1: Owattano? Speaker 2: **Rasi'i-ne.** (**accented**)
finished So it seems.

b. **ra'si-sa** (**accented**)
appearance

(18) *-sa* as dependent suffix:

(i) too (**unaccented**) + -sa \Rightarrow too-sa (**unaccented**)
far -ness

(ii) taka' (**accented**) + -sa \Rightarrow ta'ka-sa (**accented**)
high

(19) **Recessive** suffixes (e.g., *-rasi(i)*) have their own **lexical accents** (HL).

(20) Accentuation in a pre-COMP position in Tokyo Japanese:

a. morau (**unaccented**) + -ka \Rightarrow **morau'-ka** (**accented**)
receive COMP_{WH} can.receive-COMP_{WH}

b. era'nda (**accented**) + -ka \Rightarrow era'nda-ka (**accented**)
chose

— This is likely to be **recessive accentuation caused by COMPs**.

(21) a. The COMP *-ka* has its own **lexical accent**.

b. In our experimental sentences:

(i) Downstep may have continued across the right boundary of the Wh-domain.

(ii) If so, the lexical accent on COMP is likely to have triggered **downstep** in both A-sets and U-sets and **neutralized** the expected contrast at the target verb.

(22) The remaining question:

Can one instance of the **immediately preceding** lexical accent be strong enough to neutralize the accumulated effects of a sequence of downsteps?

(23) Pilot experiment:

a. 2 female speakers (ages 29 and 53) were asked to read aloud 2 pairs of sentences 11 times in randomized orders.

b. Declarative sentences containing a sequence of accented words as in (i) below and those containing a sequence of unaccented words as in (ii) are compared.

	[IP	N ₁	N ₂	N ₃	N _T	Adv _{Focus}	V]
(i) A-set:		a	a	a	—	Focus		⇒ e.g., (24A)
(ii) U-set:		u	u	a	—	Focus		⇒ e.g., (24U)

— In all test sentences, the speakers were asked to emphasize (i.e., to place **focus**) on the word **following the target** noun to eliminate any effect of focus on the downstep at the target N.

c. If the contrast between the A-set and the U-set caused by **downstep** observed at N₃ is **significantly reduced at the target N** (N_T), we can conclude that the immediately preceding lexical accent at N₃ has a significant neutralizing effect.

⇒ The question in (22) would be answered in affirmative.

(24) Test sentences (**Pair 1**):

A: 裕二は 直也と 長野で 紅葉を 何度も 見た。
 yu'zi-wa na'oya-to na'gano-de mo'mizi-o NAndo-mo mita
 Yuji-TOP Naoya-with Nagano-in maple-ACC repeatedly saw
 'Yuji saw maples with Naoya in Nagano repeatedly.'

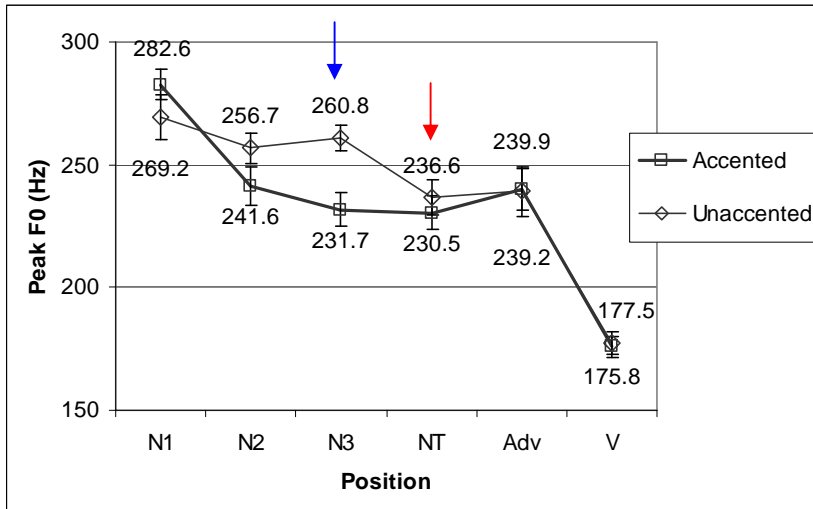
U: 百合枝は 直美と 長野で 紅葉を 何度も 見た。
 yurie-wa naomi-to na'gano-de mo'mizi-o NAndo-mo mita
 Yurie-TOP Naomi-with Nagano-in maple-ACC repeatedly saw

(25) Test sentences (**Pair 2**):

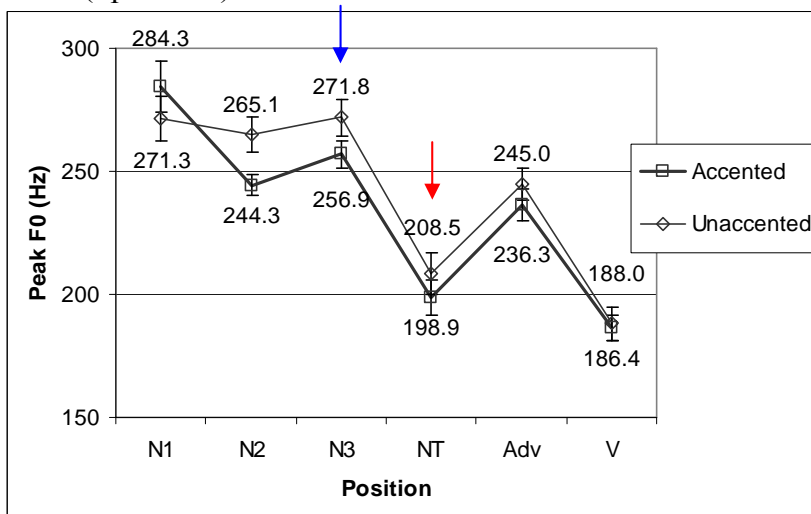
A: 兄が あの夜 美奈子の ワインを 全部 飲んだ。
 a'ni-ga ano-yo'ru mi'nako-no wa'in-o ZEnbu nonda
 brother-NOM that.night Minako's wine-ACC all drank
 '(My) brother drank all of Minako's wine that night.'

U: 姉が あの晩 美奈子の ワインを 全部 飲んだ。
 ane-ga ano-ban mi'nako-no wa'in-o ZEnbu nonda
 sister-NOM that.night Minako's wine-ACC all drank

(26) a. Pair 1 (Speaker 1):



b. Pair 2 (Speaker 2):



(27) Results:

		N3	NT
Pair 1	Speaker 1	$t(18) = 10.71, p < .001$	$t(18) = 1.84, p = .066$
	Speaker 2	$t(18) = 11.97, p < .001$	$t(18) = 1.13, p = .274$
Pair 2	Speaker 1	$t(18) = 4.98, p < .001$	$t(18) = 3.04, p = .012$
	Speaker 2	$t(18) = 0.69, p = .504$	$t(18) = 1.09, p = .291$

Result of t-tests (A-set vs. U-set) at N3 and NT for the two pairs of sentences (24, 25) by the two speakers. The results not significant at NT are in bold ($\alpha = .05$).

- N3 tends to be higher in the U-set than the A-set due to the cumulative effect of the sequence of downsteps (irrespective of differences in branching structure).
- The contrast is neutralized at NT (in Pair 1 by both speakers) or at least noticeably reduced in size (in Pair 2 by Speaker 1).

(28) Discussion:

- a. The COMPs in Tokyo Japanese have a **lexical accent** and hence are likely to have **triggered downstep** in both A-sets and U-sets in our main experiment (7) involving Wh-domains.
- b. The downstep triggered by the lexical accent in the **immediately preceding context** is very influential. \Rightarrow It almost **neutralizes** the contrast between the presence vs. absence of accumulated downstep effects up to that point.
- c. The difference between the A-sets and the U-sets in the main experiment tends to be **already somewhat reduced at the COMP** (See (11b)) perhaps because both are hitting almost the bottom of the possible pitch range of the speakers.

— The combination of all these is likely to have **masked** the expected effect of the "**downstep out of Wh-domain**" into the matrix clause.

9. Summary and conclusions:

(29) What is the prosodic Wh-domain?

- a. Our first experimental results showed:

"Downstep into Wh-domain" \Rightarrow "Left boundary of Wh-domain \neq Left boundary of MaP"

- b. The results of our second experiment did not verify:

"Downstep out of Wh-domain"

\Rightarrow They do not contradict with "Right boundary of Wh-domain = Right boundary of MaP"

- c. "Downstep out of Wh-domain" is likely to have become invisible because of the accent of the COMP *-ka*, and hence the experimental results in (29b) cannot be regarded as the critical evidence for the MaP Analysis.

- d. The MaP Analysis begs a new question concerning the accidental match of the right boundary of the Wh-domain and MaP.

— All these results cast doubt on the hypothesis "Wh-domain = MaP."

10. Additional References:

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