

# Prosody-Scope Match and Mismatch in Japanese *Wh*-questions (E)\*

Shinichiro Ishihara, Universität Potsdam  
<ishihara@rz.uni-potsdam.de>

November 13, 2004

## 1 Introduction

In this talk, I extend the discussion of prosody-scope correspondence observed in *wh*-questions (Deguchi and Kitagawa, 2002; Ishihara, 2002, among others). In particular, I focus on the case of *wh*-scrambling, in which this prosody-scope correspondence breaks down. First, I show, based on the experimental result, that the earlier observation of *wh*-scrambling was not quite accurate. Then I propose a production model which accounts for the correspondence as well as the mismatch.

## 2 Focus Intonation–*Wh*-Scope Correspondence (FI=WH)

cf. Kitagawa’s handout (also Deguchi and Kitagawa, 2002; Ishihara, 2002, 2003)

- (1) *Deguchi and Kitagawa (2002): F-agreement*<sup>1,2,3</sup>
- a. Optional lexical introduction of F-features in a focus construction:
    - (i) An **uninterpretable** F-feature to COMP = feature complex (Phonetic F-feature ( $F_{\text{PHON}}$ ), Semantic F-feature ( $F_{\text{SEM}}$ ))
    - (ii) An **interpretable** F-feature to any **focused lexical category**.
  - b. F-agreement:
    - (i) At LF: Between uninterpretable  $F_{\text{SEM}}$  on COMP and the interpretable  $F_{\text{SEM}}$  on focus  $\rightarrow$  Domain for *Wh*-scope assignment at C-I
    - (ii) At PF: Between uninterpretable  $F_{\text{PHON}}$  on COMP and the interpretable  $F_{\text{PHON}}$  on focus  $\rightarrow$  Domain for EPD assignment at A-P
- $\Rightarrow$  The prosody-scope correlation is captured by agreement involving “complex” F-features.

---

\*Some parts of this talk were presented at *Workshop on Prosody, Syntax, and Information Structure (WPSI)*, held at Indiana University, Bloomington on April 29–May 1, 2004. The presentation slides for this talk will be available at my home page. Visit [http://alum.mit.edu/www/s\\_i/](http://alum.mit.edu/www/s_i/).

<sup>1</sup>It was originally called *E-agreement* in Deguchi and Kitagawa (2002).

<sup>2</sup>This example and (4) are provided to me by courtesy of Yoshi Kitagawa. Notations and terminologies are copied from his, with minimal modifications.

<sup>3</sup>Some terminologies used in this talk are different from his:

Focus Intonation (FI) (= Deguchi and Kitagawa’s (2002) “EPD”)  
P(rosodic)-focalization (= “Emphatic Accent”)

### 3 FI–*Wh*-scope Mismatch (FI≠WH)

There is a case where FI and the *wh*-scope cannot correspond to each other properly.

#### 3.1 *Wh*-scrambling

- (2) a. *No scrambling, Indirect wh-question*  
 Náoya-wa [ Mári-ga **náni**-o nónda **ka** ] ímademo obóeteru  
 N.-TOP M.-NOM what-ACC drank Q even.now remember  
 ‘Naoya still remembers what<sub>i</sub> Mari drank t<sub>i</sub>.’
- b. *Scrambling, Indirect wh-question*  
**náni**<sub>i</sub>-o Náoya-wa [ Mári-ga t<sub>i</sub> nónda **ka** ] ímademo obóeteru  
 what-ACC N.-TOP M.-NOM drank Q even.now remember

#### 3.2 Intonation of *wh*-scrambling sentences

- (3) *Ishihara (2002): Stipulative generalization*  
 “Wh-phrases are always P-focalized. [Post-Focus Reduction (PFR)] takes place between the particle *ka* or *mo* (henceforth, Q-particle) and the rightmost *wh*-phrase that it semantically binds.” (p.186, ex.(10))
- (4) *Deguchi and Kitagawa’s (2002) in the F-agreement analysis:*
- a. SO<sub>i</sub>: [CP Mary-ga **nani**<sub>1</sub>[F]-o tabeta-**ka**<sub>COMP</sub>[F] ]  
└──────────────────────────────────┘  
*Wh*-scope
- b. SO<sub>j</sub>: [CP [XP **NA**n<sub>i</sub><sub>1</sub>[F]-o John-wa [vP [ e ] [CP Mary-ga t<sub>1</sub> tábeta-**ka**<sub>COMP</sub>[F] ] ]-no<sub>COMP</sub> ] ]  
└──┘  
Short-EPD

Both analyses predict that *wh*-scrambling sentences have the following FI<sup>4</sup>:

- (5) In *wh*-scrambling examples, PFR appears after the scrambled *wh*-phrase until the embedded Q-particle *ka*. A *pitch reset* occurs after the embedded clause.
- [CP WH [TP ... [CP [TP ... t<sub>WH</sub> ... ] **ka** ] α ... ]  
↑  
Pitch reset

<sup>4</sup>P-focalization is indicated by boxes, PFR by underlines.

## 4 Experiment

### 4.1 Stimuli & Predictions

- (6) A. *No scrambling, Non-wh-sentence*  
 Náoya-wa [ Mári-ga **rámu**-o nomíya-de nónda to ] ímademo omóteru  
 Naoya-TOP Mari-NOM rum-ACC bar-LOC drank that even.now think  
 ‘Naoya still thinks that Mari drank rum at the bar.’
- B. *No scrambling, Indirect wh-question*  
 Náoya-wa [ Mári-ga **náni**-o nomíya-de nónda **ka** ] ímademo obóeteru  
 N.-TOP M.-NOM what-ACC bar-LOC drank Q even.now remember  
 ‘Naoya still remembers what<sub>i</sub> Mari drank  $t_i$  at the bar.’
- C. *Scrambling, Non-wh-sentence*  
**rámu**<sub>i</sub>-o Náoya-wa [ Mári-ga  $t_i$  nomíya-de nónda to ] ímademo omóteru  
 rum-ACC N.-TOP M.-NOM bar-LOC drank that even.now think  
 ‘Naoya still thinks that Mari drank rum at the bar.’
- D. *Scrambling, Indirect wh-question*  
**náni**<sub>i</sub>-o Náoya-wa [ Mári-ga  $t_i$  nomíya-de nónda **ka** ] ímademo obóeteru  
 what-ACC N.-TOP M.-NOM bar-LOC drank Q even.now remember  
 ‘Naoya still remembers what<sub>i</sub> Mari drank  $t_i$  at the bar.’

The following two  $F_0$  peaks will tell us how far the expected PFR continues.

(7)	Label	Measured $F_0$ peak	In (6):
	P1:	Embedded clause verb	<i>nónda</i>
	P2:	Matrix phrase immediately following P1	<i>ímademo</i>

We have the following predictions, according to (5):

- (8) a. A vs. B  
 (i) P1:  $A > B$  (PFR expected in B)  
 (ii) P2:  $A = B$  (Pitch reset expected in B)
- b. C vs. D  
 (i) P1:  $C > D$  (PFR expected in D)  
 (ii) P2:  $C = D$  (Pitch reset expected in D)

## 4.2 Result

The prediction was *not* borne out. The expected pitch reset on P2 was observed in B, but not in D, where the PFR continued on P2, indicating that the PFR domain is the matrix clause.

(9) A vs. B

A.	[CP [TP ... [CP [TP ... XP ... P1 ] <b>to</b> ] P2 ... ]			
B.	[CP [TP ... [CP [TP ... <span style="border: 1px solid black; padding: 2px;">WH</span> ... P1 ] <b>ka</b> ] P2 ... ]	↑ PFR		
		↑ No PFR (=pitch reset)		
	A	B	diff.	p
Mean(P1)	0.174	-0.103	0.276	< .001
Mean(P2)	1.066	0.971	0.095	= .257

(10) C vs. D

C.	[CP XP [TP ... [CP [TP ... t <sub>XP</sub> ... P1 ] <b>to</b> ] P2 ... ]			
D.	[CP <span style="border: 1px solid black; padding: 2px;">WH</span> [TP ... [CP [TP ... t <sub>WH</sub> ... P1 ] <b>ka</b> ] P2 ... ]	↑ PFR		
		↑ <b>PFR</b> (=no pitch reset)		
	C	D	diff.	p
Mean(P1)	0.115	-0.185	0.301	< .001
Mean(P2)	1.182	0.780	0.402	< .0001

## 5 Multiple Spell-Out Analysis

FI=WH (§2) and FI≠WH (§3) are both results of the cyclic computation of prosody, which is triggered by the cyclic computation of syntax.

(11) *Multiple Spell-Out* (Chomsky, 2001)

- a. CPs and *vP* are *phases*.
- b. When a syntactic derivation reaches a phase (*vP/CP*) in the narrow syntax (NS), the complement of the phase head (i.e., VP/TP) is transferred to the interface levels ( $\Phi/\Sigma$ ). The phonological part of the Transfer (NS→ $\Phi$ ) is called *Spell-Out*.

[CP (Spec) C	[TP (Spec) T	[ <i>vP</i> (Spec) <i>v</i>	[VP ... ]]]
↑	↑	↑	↑
phase	Spell-Out	phase	Spell-Out

## 5.1 Proposal

- (12) a. FOCUS features on WH/Q-particle (cf. *F-agreement* analysis in (1))
- (i) An uninterpretable FOCUS feature on Q-particle ( $\text{FOC}_Q$ )
  - (ii) An interpretable FOCUS feature on WH ( $\text{FOC}_{WH}$ )
  - (iii) Invisible *wh*-movement (feature movement, copy theory, etc.)
- b. ‘Phase-by-phase’ FI creation
- (i) After establishing an Agree relation with  $\text{FOC}_Q$ ,  $\text{FOC}_{WH}$  can enter into  $\Phi$  via Spell-Out operation. The  $\text{FOC}_Q$  deletes on Agree.
  - (ii) At each Spell-Out, if any FOCUS is found in  $\Phi$ , an FI is assigned to the derivation as a phonological realization of FOCUS, namely, P-focalization on the *phonological content of WH* + PFR thereafter.
  - (iii) Any material that is introduced to the derivation at a later Spell-Out is not affected by any previously created FI.
- c. FOCUS feature inactivation/deletion
- (i) After FOCUS is phonologically realized as an FI, it becomes inactive.
  - (ii) Once inactivated, it won’t induce any more FI at a later Spell-Out.

(13) *Example: Embedded wh-question*

[<sub>CP2</sub> Náoya-wa [<sub>vP2</sub> [<sub>CP1</sub> Mári-ga [<sub>vP1</sub> **náni**<sub>FOC-o</sub> nónda ] **ka**<sub>FOC</sub> ] obóeteru ] ]  
 N.-TOP M.-NOM what-ACC drank Q remember  
 ‘Naoya remembers what Mari drank.’

a. *vP1 phase (Spell-Out: VP1)—No FI created*

[<sub>vP1</sub>  $\text{FOC}_{WH}$  [<sub>VP1</sub> **náni**<sub>t<sub>FOC</sub>-o</sub> nónda ] *v* ]

↑  
 Invisible *wh*-movement ( $\text{FOC}_{WH}$  not yet Agreed with  $\text{FOC}_Q$ )

b. *CP1 phase (Spell-Out: TP1)—FI created*

[<sub>CP1</sub> [<sub>TP1</sub> Mári-ga [<sub>vP1</sub>  $\text{FOC}_{WH}$  [<sub>VP1</sub> **náni**<sub>t<sub>FOC</sub></sub>-o nónda ] *v* ] T ] **ka**<sub>FOC</sub> ]

|  
 FOCUS Agreement (induces FI creation)

c. *vP2 phase (Spell-Out: VP2)—No FI created*

[<sub>vP2</sub> [<sub>VP2</sub> [<sub>CP1</sub> Mári-ga **náni-o** nónda **ka** ] obóeteru ] *v* ]

↑  
 Not affected by FI (pitch reset)

## 5.2 Wh-scrambling

The proposed analysis predicts the correct intonation for *wh*-scrambling case like (2b).

- (2b) [CP<sub>2</sub> **náni**<sub>i</sub>-o [ Náoya-wa [CP<sub>1</sub> [ t<sub>i</sub> Mári-ga [vP<sub>1</sub> t<sub>i</sub> [ t<sub>i</sub> nónda ]]]] **ka** ] ímademo  
 what-ACC N.-TOP M.-NOM drank Q even.now  
 obóeteru ]]  
 remember  
 ‘Naoya still remembers what<sub>i</sub> Mari drank t<sub>i</sub>.’
- (14) a. *CP1 phase: Spell-Out (TP1) does not contain FOC<sub>WH</sub>—No FI created*  
 [CP<sub>1</sub> **náni**<sub>i</sub>FOC-o [TP<sub>1</sub> Mári-ga [vP<sub>1</sub> t<sub>i</sub> [VP t<sub>i</sub> nónda ]]]] **ka** ]  
 ⇒ The FOC<sub>WH</sub>, after Agreeing with FOC<sub>Q</sub> at Spec,vP<sub>1</sub>, escapes from the Spell-Out domain (TP<sub>1</sub>) by scrambling to the Spec,CP. Accordingly, no FI is assigned at this Spell-Out.
- b. *Root Spell-Out (CP2): FI created*  
 [CP<sub>2</sub> **náni**<sub>i</sub>-o [TP<sub>2</sub> Náoya-wa [CP<sub>1</sub> t<sub>i</sub> [TP<sub>1</sub> Mári-ga t<sub>i</sub> nomíya-de nónda ] **ka** ]  
 ímademo obóeteru ]]  
 ⇒ The required FI is created at the root Spell-Out. As a result, the whole sentence becomes the domain of the FI. No pitch reset is expected.

The Multiple Spell-Out analysis can account for not only the FI–*Wh*-scope correspondence, but also the prosody-scope mismatch observed in the *wh*-scrambling.

## 6 A Remaining Question

One question still remains: Why did I (Ishihara, 2002) and Deguchi and Kitagawa (2002) claim a different pitch contour, as in (5)? There seem several factors to be taken into consideration, such as the degraded judgement for the *wh*-scrambling sentence, a conflict between the cyclic FI creation process and the processing mechanism that requires FI=WH, etc.

## References

- Chomsky, N. 2001. Derivation by phase. In *Ken Hale: A life in language*, ed. M. Kenstowicz, 1–52. Cambridge, MA: MIT Press.
- Deguchi, M., and Y. Kitagawa. 2002. Prosody and *wh*-questions. In *NELS 32*, 73–92.
- Ishihara, S. 2002. Invisible but audible *wh*-scope marking: *Wh*-constructions and deaccenting in Japanese. In *WCCFL 21*, 180–193.
- Ishihara, S. 2003. Intonation and interface conditions. Doctoral Dissertation, MIT.