1. Introduction

It has been widely assumed in generative literature that relatively free word order in Japanese should be accounted for by transformations called scrambling (see, among others, Harada 1977 and Saito 1985). (2a, b), for example, are derived from (1) in terms of long-distance scrambling:

1) John-ga [Mary-ga Bill-ni sono tegami-o watasita to] omotteiru (koto)
   John-NOM Mary-NOM Bill-DAT that letter-ACC handed that think (fact)
   'John thinks that Mary handed that letter to Bill.'

2) a. Sono tegami-o John-ga [Mary-ga Bill-ni t watasita to] omotteiru (koto)
    that letter-ACC John-NOM Mary-NOM Bill-DAT handed that think (fact)
    'John thinks that Mary handed that letter to Bill.'
   b. Bill-ni John-ga [Mary-ga t sono tegami-o watasita to] omotteiru (koto)
      Bill-DAT John-NOM Mary-NOM that letter-ACC handed that think (fact)

Saito (1985: 163, 185) and Koizumi (2000: 239) observe that if multiple constituents are scrambled out of an embedded clause in terms of long-distance scrambling, the result is degraded, as the contrast between (2) and (3) shows:

3) a.??Sono tegami-o Bill-ni John-ga [Mary-ga t_i t_j watasita to] omotteiru (koto)
   that letter-ACC Bill-DAT John-NOM Mary-NOM handed that think (fact)
   'John thinks that Mary handed that letter to Bill.'
   b.??Bill-ni sono tegami-o John-ga [Mary-ga t_i t_j watasita to] omotteiru (koto)
      Bill-DAT that letter-ACC John-NOM Mary-NOM handed that think (fact)

As Koizumi (2000) and Fukui and Sakai (2006) observe, however, “multiple long-distance scrambling” improves significantly if the scrambled element forms an intonational phrase, though we rather argue that the relevant phonological phrase is not an intonational phrase but a major phrase (aka “intermediate phrase”). The boundary of a major phrase is often marked by a pause or glottalization. The major phrase is also the domain for catathesis (downstep in McCawley 1968). In (4), the major phrase is italicized and put in parentheses; a major phrase contains two or more recursively embedded minor phrases, each consisting of one or more non-lexical words (like sono ‘that’) plus a lexical word (like tegami ‘letter’ or Bill-ni ‘Bill-DAT’):

4) a. (Sono tegami-o Bill-ni) John-ga [Mary-ga watasita to] omotteiru (koto)
   (that letter-ACC Bill-DAT) John-NOM Mary-NOM handed that think (fact)
   'John thinks that Mary handed that letter to Bill.'
   b. (Bill-ni sono tegami-o) John-ga [Mary-ga watasita to] omotteiru (koto)
      (Bill-DAT that letter-ACC) John-NOM Mary-NOM handed that think (fact)

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As observed by Kuno (1978: 58) and Saito (1985: 261), examples with “multiple clause-internal scrambling” are also degraded, though the contrast is subtler. Kuno’s examples, together with his judgments, are shown in (5-7):

5) John-ga Mary-ni Tom-o syookaisita
   John-NOM Mary-DAT Tom-ACC introduced
   ‘John introduced Tom to Mary.’

6) a. Tom-o John-ga Mary-ni t syookaisita
    Tom-ACC John-NOM Mary-DAT introduced
    ‘John introduced Tom to Mary.’
   b. Mary-ni John-ga t Tom-o syookaisita
    Mary-DAT John-NOM Tom-ACC introduced

7) a. ?Tom-o Mary-ni John-ga t t syookaisita
    Tom-ACC Mary-DAT John-NOM introduced
    ‘John introduced Tom to Mary.’
   b. ?Mary-ni Tom-o John-ga t t syookaisita
    Mary-DAT Tom-ACC John-NOM introduced

We observe that just like “multiple long-distance scrambling,” “multiple clause-internal scrambling” also improves if scrambled elements form a major phrase as shown in (8):

8) a. (Tom-o Mary-ni) John-ga syookaisita
    (Tom-ACC Mary-DAT) John-NOM introduced
    ‘John introduced Tom to Mary.’
   b. (Mary-ni Tom-o) John-ga syookaisita
    (Mary-DAT Tom-ACC) John-NOM introduced

This paper presents a PF-movement analysis of “multiple scrambling” in Japanese which is purely prosodic. The organization of this paper is as follows. Section 2 explicates previous analyses of “multiple scrambling,” pointing out their inadequacies. Section 3 argues that there are two kinds of scrambling, *i.e.* syntactic scrambling and prosodic scrambling. It is shown that the latter type of scrambling, which targets a prosodic constituent rather than a syntactic constituent, accommodates “multiple scrambling.” Section 4 presents consequences of our analysis. Section 5 makes concluding remarks.

2. Previous Analyses

2.1. Koizumi’s (2000) String Vacuous Overt Verb Raising Analysis

Koizumi (2000) argues that there is vacuous overt verb raising in Japanese and that “multiple long-distance scrambling” cases like (4) are derived by scrambling of the remnant VP whose head V has been raised. Under his analysis, (4b) would be derived as follows:

   John-NOM Mary-NOM [VP Bill-ACC that letter-ACC handed that think]
   - Verb Raising ->
      - Scrambling of a Remnant VP ->
   c. [VP Bill-ni sono tegami-o t_p] John-ga [Mary-ga t_VP watasita to] omotteiru

In (9), the embedded verb *watasita* ‘handed’ is raised out of VP overtly, and then the remnant VP *Bill-ni sono tegami-o* ‘that letter to Bill’ is scrambled. In his analysis, the fronted elements form a single syntactic constituent, that is, VP, which leads to the above-mentioned requirement that the fronted elements must
form an intonational phrase. It should be noted that his analysis can be extended to “multiple clause-internal scrambling” cases like (8), though he does not deal with such cases.

2.2. Fukui and Sakai’s (2006) PF Phrase-Level Merger Analysis

Fukui and Sakai (2006) counter that there is no string vacuous overt verb raising in Japanese. Moreover, they show that it is possible to scramble a portion of an alleged VP as long as it forms a major phrase as shown in (11):

10) John-ga [Kiyomi-ga Hawai-de Masami-ni purezentō o katta to] omotteiru (koto)
   John-NOM Kiyomi-NOM Hawai-in Masami-DAT present-ACC bought that think (fact)
   ‘John believes that Kiyomi bought a present for Masami in Hawaii.’
   (Koizumi 2000: 239)

11) a. (Hawai-de Masami-ni) John-ga [Kiyomi-ga purezentō o katta to] omotteiru (koto)
    Hawai-in Masami-DAT) John-NOM Kiyomi-NOM present-ACC bought that think (fact)
   b. (Masami-ni Hawai-de) John-ga [Kiyomi-ga purezentō o katta to] omotteiru (koto)
      Masami-DAT Hawai-in) John-NOM Kiyomi-NOM present-ACC bought that think (fact)

(11a, b) are derived from (10) in terms of “multiple long-distance scrambling.” In (11), the portion of VP, Hawai-de Masami-ni/Masami-ni Hawai-de ‘for Masami in Hawaii’, is scrambled and the result is acceptable. Under Koizumi’s (2000) analysis, however, there is no way of scrambling a portion of VP; it would wrongly rule out examples like (11).

For these reasons, Fukui and Sakai propose that the fronted elements are reanalyzed at PF in terms of Phrase Level Merger (extending Marantz’s (1988, 1989) Morphological Merger) where they form a new constituent. Scrambling then applies to this new constituent in the PF component. As Fukui and Sakai admit, however, the notion of Phrase-Level Merger is obscure. In principle, any material may be subject to merger and scrambled. We show, however, that only material that forms a prosodic constituent can move at PF.

3. Prosodic Scrambling

We propose that there are two kinds of scrambling in Japanese, one in the syntax proper (involving an XP) and the other at PF (involving a major phrase). Syntactic scrambling targets a syntactic constituent and obeys the usual constraints one expects in syntax. Scrambling at PF targets a prosodic constituent (12) and ignores the usual constraints one expects in syntax:

12) Prosodically scrambled material must be a major phrase.

According to (12), only material that already forms a major phrase may be scrambled at PF. Consider the scrambling in cases like (2), repeated in (13), where the moved constituent is a single syntactic XP:

13) a. [Sono tegami-o] John-ga [Mary-ga Bill-ni t watasita to] omotteiru (koto)
   that letter-ACC John-NOM Mary-NOM Bill-DAT handed that think (fact)
   ‘John thinks that Mary handed that letter to Bill.’
   b. [Bill-ni] John-ga [Mary-ga t sono tegami-o watasita to] omotteiru (koto)
      Bill-DAT John-NOM Mary-NOM that letter-ACC handed that think (fact)

Here the movement is straightforwardly syntactic, involving a single XP. A case like (3), repeated in (14), cannot be generated by the narrow syntax because the moved material does not constitute a single syntactic constituent. Neither can it be moved at PF because the moved material is not combined into a single prosodic constituent:

14) a.?[(Sono tegami-o) (Bill-ni)] John-ga [Mary-ga watasita to] omotteiru (koto)
   that letter-ACC Bill-DAT John-NOM Mary-NOM handed that think (fact)
   ‘John thinks that Mary handed that letter to Bill.’
domains can only be associated with the matrix clauses but not with the embedded clauses; (18b, 19b) are true adjuncts.

As pointed out by Saito (1985) and Koizumi (2000), the main difference between heavy NP-shift in English and scrambling in Japanese is that the movement is rightwards in the former but leftwards in the latter. Since PF-movement occurs after syntax, (15) is not subject to syntactic conditions, and the scrambled material is interpreted in situ at LF. We call this movement prosodic scrambling. The next section presents consequences of our prosodic scrambling.

4. Consequences

4.1. Multiple Long-Distance Scrambling

4.1.1. Scrambling of a “True Adjunct”

As pointed out by Saito (1985) and Koizumi (2000), the long-distance scrambling of a “true adjunct” results in complete ungrammaticality:

b.*[Bill-ni]_{s} (sono tegami-o)_{s} John-ga [Mary-ga watasita to] omotteiru (koto)
Bill-DAT that letter-ACC John-NOM Mary-NOM handed that think (fact)

If the fronted material is made into a single major phrase, however, it can be moved prosodically, giving us the example above in (4), repeated in (15). We assume that the resulting major phrase is a recursively embedded phrase, adopting Itô and Mester’s (2007) idea that major phrases in Japanese are generally just recursive minor phrases, as illustrated in (16):

15) a. ((Sono tegami-o)_{s} (Bill-ni)_{s}) John-ga [Mary-ga watasita to] omotteiru (koto)
(that letter-ACC Bill-DAT) John-NOM Mary-NOM handed that think (fact)
‘John thinks that Mary handed that letter to Bill.’

b. ((Bill-ni)_{s} (sono tegami-o)_{s}) John-ga [Mary-ga watasita to] omotteiru (koto)
(Bill-DAT that letter-ACC) John-NOM Mary-NOM handed that think (fact)

16) ( (...)_{s} (...)_{s} ... )_{s} = major phrase (Itô and Mester 2007)

We observe that if material can move syntactically, it does. On the other hand, if movement clearly targets material that is not a syntactic constituent, but is a phonological constituent, then that material moves at PF. Our proposal is roughly parallel to Zec and Inkelas’s (1990) analysis of Heavy NP-shift in English. They claim that a “shifted” noun phrase must contain at least two phonological phrases, while any attempt to shift an NP consisting of only a single phonological phrase is ungrammatical as shown in (17a, b):

17) a. Mark showed to John ((some letters)_{s} (From Paris)_{s})
   b.*Mark showed to John (some letters)_{s}

The main difference between Heavy NP-shift in English and scrambling in Japanese is that the movement is rightwards in the former but leftwards in the latter. Since PF-movement occurs after syntax, (15) is not subject to syntactic conditions, and the scrambled material is interpreted in situ at LF. We call this movement prosodic scrambling. The next section presents consequences of our prosodic scrambling.

In (18b, 19b), the “true adjuncts” riyuu-mo naku ‘without any reason’ and naze ‘why’ in the matrix domains can only be associated with the matrix clauses but not with the embedded clauses; (18b, 19b) are
deviant with the interpretations of (18a, 19a). As pointed out by Koizumi (2000), however, when a true adjunct is scrambled with another element with which it forms a major phrase, the result is acceptable, as shown in (20, 21) (cf. Sohn 1994):

20) a. \((\text{Riyuu-mo naku})(\text{sono setu-o})\) Mary-ga [John-ga sinziteiru to] omotteiru (koto)  
(reason-even without that theory-ACC) Mary-NOM John-NOM believe that think (fact)  
‘Mary thinks [that John believes in that theory without any reason].’

b. \((\text{sono setu-o})(\text{riyuu-mo naku})\) Mary-ga [John-ga sinziteiru to] omotteiru (koto)  
(that theory-ACC reason-even without) Mary-NOM John-NOM believe that think (fact)

21) a. \((\text{Naze})(\text{sono hon-o})\) Mary-wa [Bill-ga katta to] itta no  
(why that book-ACC) Mary-TOP Bill-NOM bought that said Q  
‘Why did Mary say [that Bill bought the book?]’

b. \((\text{sono hon-o})(\text{Naze})\) Mary-wa [Bill-ga katta to] itta no  
(that book-ACC why) Mary-TOP Bill-NOM bought that said Q  
(Koizumi 2000: 243)

This fact is compatible with our prosodic scrambling analysis; scrambling of a major phrase takes place at PF component and thus has no effect on LF. The scrambled “true adjuncts” in (21, 22) can be properly associated with the embedded clause.

4.1.2. Scrambling of a Nominative Subject

Saito (1985) has claimed that scrambling of a nominative subject is not possible as shown in (22) and (23):

John-NOM that train-NOM Tokyo-in arrived that think (fact)  
‘John thinks that that train has arrived in Tokyo.’

b.*??Sono ressya-ga, John-ga [\(t_1\) Tookyoo-ni tuita to] omotteiru (koto)  
that train-NOM John-NOM Tokyo-in arrived that think (fact)

23) a. John-ga [syatyyo-no hoosin-ga syain-no urami-o katteiru to] omotteiru (koto)  
John-NOM president-GEN policy-NOM employee-GEN hostility-ACC earn that think (fact)  
‘John thinks that the president’s policy is making an enemy of the employees.’

b.*??Syatyyo-no hoosin-ga, John-ga [\(t_1\) syain-no urami-o katteiru to] omotteiru (koto)  
president-GEN policy-NOM John-NOM employee-GEN hostility-ACC earn that think (fact)

It should be noted that it is clear from the semantics that the preposed nominative subjects sono resssa-ga ‘that train-NOM’ and syatyyo-no hoosin-ga ‘president-GEN policy-NOM’ are to be interpreted as the subjects of the embedded clauses. Hence, the deviancy of (22b, 23b) should not be due to an “anti-ambiguity device at the performance level” (24) advocated by Kuno (1980: 175) but to some syntactic constraint:

24) In general, the greater the likelihood of ambiguous interpretation, the more difficult it is to switch the word order of two NPs marked with the same grammatical formative (e.g., particles).

As shown in (25), however, when a nominative subject scrambles with another element and they form a major phrase, the result is acceptable:

25) a. \((\text{Sono resssa-ga})(\text{Tookyoo-ni})\) John-ga [tuita to] omotteiru (koto)  
(that train-NOM Tokyo-in) John-NOM arrived that think (fact)  
‘John thinks that that train has arrived in Tokyo.’

b. \((\text{Syatyyo-no})(\text{hoosin-ga})(\text{syain-no})(\text{urami-o})\) John-ga [katteiru to] omotteiru (koto)  
(president-GEN policy-NOM employee-GEN hostility-ACC) John-NOM earn that think (fact)  
‘John thinks that the president’s policy is making an enemy of the employees.’

Under our analysis, prosodic scrambling moves a major phrase. This takes place at PF and is therefore not subject to the syntactic constraint on scrambling of a nominative phrase; (25a, b) are acceptable.
4.1.3. Condition C of the Binding Theory

As pointed out by, among others, Van Riemsdijk and Williams (1981), Lebeaux (1988, 1991), and Chomsky (1995), there is an argument/adjunct asymmetry with reconstruction effects as shown in (26):

26) a. Which pictures of John does he like?
   b. Which pictures near John does he like?

While John and he can be coreferential in (26b), they cannot be coreferential in (26a). The difference between (26a) and (26b) resides in the fact that while the R-expression John is the argument of the noun pictures in (26a), it is within the adjunct modifying pictures in (26b). Lebeaux uses this contrast as evidence for his theory of phrase structure, which claims that adjuncts may be merged after argument-of-relations are established. In (26a), John, which is an argument of pictures, must be merged with pictures when pictures first appears in the complement position of like. Hence, the entire wh-phrase which pictures of John is visible as a copy in its original position, which leads to a Condition C violation at LF. In (26b), on the other hand, John, which is within the adjunct, may be merged after the wh-phrase which pictures has moved to the Spec of C. Hence, the copy in the original position may only be which pictures so that Condition C is not violated.

Nishigauchi (2002) and Miyagawa (2005, 2006) observe that there is a similar argument/adjunct asymmetry with reconstruction effects in Japanese scrambling, as the contrast between (27a) and (27b) shows (Miyagawa 2005: 193):

27) a. [Minna-no John-no hihan-o] kare-ga [Hanako-ga tj osiete-kureta to] itta
   everyone-GEN John-GEN criticism-ACC he-NOM Hanako-NOM told-him that said
   'Everyone’s criticism of John, he said that Hanako told him.'

   everyone-NOM John-from was-hiding criticism-ACC he-NOM Hanako-NOM
told-him that said
   'The criticism that everyone was hiding form John, he said that Hanako told him.'

While John and kare can be coreferential in (27b), they cannot be coreferential in (27a). The R-expression John is an argument of the noun hihan ‘criticism’ in (27a), whereas it is within the adjunct modifying hihan ‘criticism’ in (27b). Assuming Lebeaux’s analysis, Nishigauchi and Miyagawa claim that in (27a), John must be merged with hihan ‘criticism’ when hihan ‘criticism’ first appears first in the complement position of osiete-kureta ‘told-him’. The copy of John is visible in this position, which results in a Condition C violation. In (27b), on the other hand, John may be merged after scrambling has taken place. Hence, there is no Condition C violation.

We observe, however, that such argument/adjunct asymmetry disappears with “multiple long-distance scrambling” as shown in (28). Crucially, (28b) violates Condition C, even though John is within the adjunct modifying hihan ‘criticism’:

28) a. Ookuno tomodati-ni (minna-no) (John-no) (hihan-o) kare-ga
   (many friend-to everyone-GEN John-GEN criticism-ACC) he-NOM
   [Hanako-ga barasita to] itta
   Hanako-NOM disclosed that said
   Lit. ‘[Everyone’s criticism of John to many friends], he said that Hanako disclosed.’

   b. Ookuno tomodati-ni (minna-ga) (John-kara) (kakusite-ita) (hihan-o) kare-ga
   (many friend-to everyone-NOM John-from was-hiding criticism-ACC)
   he-NOM Hanako-NOM disclosed that said
   Lit. ‘[The criticism that everyone was hiding form John to many friends], he said that Hanako disclosed.’
The deviancy of (28b) is unexpected under the analysis proposed by Lebeaux, Nishigauchi, and Miyagawa. Under our analysis, scrambling in (28) takes place at PF because the moved constituent is not syntactic but prosodic (a major phrase). The entire scrambled phrase in (28b), therefore, is interpreted in its original position at LF, which leads to a Condition C violation.

4.1.4. Scope Economy

It has been pointed out by, among others, Tada (1993) and Miyagawa (2005, 2006) that long-distance scrambling does not lead to a new scope relation (Miyagawa 2005: 201):

29) Daremo-ni₁ dareka-ga [John-ga t̄₁ kisusita to] omotteiru
everyone-DAT someone-NOM John-NOM kissed that think
Lit. ‘Everyone, someone thinks that John kissed.’
*e>someone, someone>everyone

While the existential quantifier dareka-ga ‘someone-NOM’ may take scope over the universal quantifier daremo-ni ‘everyone-DAT’, the inverse scope reading is not allowed. In other words, the scrambled phrase daremo-ni ‘everyone-DAT’ must be reconstructed to its original position at LF. Miyagawa (2005, 2006) observes, however, that if the embedded subject is replaced by a quantificational expression, the sentence becomes ambiguous (though the judgment is subtle) (Miyagawa 2006: 9):

30) Daremo-ni₁ dareka-ga [hutari-no-kodomo-ga t̄₁ kisusita to] omotteiru
everyone-DAT someone-NOM two-GEN-kids-NOM kissed that think
Lit. ‘Everyone, someone thinks that two kids kissed.’
OK?*everyone>someone, someone>everyone

Miyagawa argues that the contrast between (29) and (30) follows from Fox’s (2000) Scope Economy (31):

31) Scope Economy
A Scope Shifting Operation can move XP₁ from a position in which it is interpretable only if the movement crosses XP₂ and <XP₁, XP₂> is not scopally commutative. (Fox 2000: 26)

What (31) claims is that optional application of QR is possible if it leads to a new scope relation. Miyagawa assumes that scrambling of a quantifier counts as an instance of overt QR. He also assumes that long-distance QR needs to go though the Spec of C or adjoined to CP. Then, in (29), the universal quantifier daremo-ni ‘everyone-DAT’ must move into the Spec of the embedded C or adjoined to the embedded CP to be extracted out of the embedded clause. This movement, however, does not lead to a new scope relation, and thus does not count as QR due to its violation of Scope Economy (31). Hence, it cannot take scope over the existential quantifier dareka-ga ‘someone-NOM’ in the matrix subject position. In (30), on the other hand, movement of the universal quantifier daremo-ni ‘everyone-DAT’ into the Spec of the embedded C or the embedded CP adjoined position leads to a new scope relation, i.e., daremo ‘everyone’ can take scope over hutari-no-kodomo-ga ‘two-GEN-kids-NOM’ in the embedded subject position; this movement is licensed as QR. The universal quantifier daremo-ni ‘everyone-DAT’ further moves across another quantifier, dareka-ga ‘someone-NOM’ in the matrix clause. This movement leads to a new scope relation and thus counts as QR. Hence, the scrambled quantifier daremo-ni ‘everyone-DAT’ can take scope over the existential quantifier dareka-ga ‘someone-NOM’ in the matrix subject position.

We observe that such scope economy effects disappear with “multiple long-distance scrambling” as shown in (32):

32) ((Daremo-ni)₃ (sono hon-o)φ₃ dareka-ga [hutari-no-kodomo-ga ageta to] omotteiru
(everyone-DAT that book-ACC) someone-NOM two-GEN-kids-NOM gave that thinks
‘Someone thinks that two kids gave that book to everyone.’
*e>someone, someone>everyone,
Although the embedded subject is the quantified expression *hutari-no-kodomo-ga* ‘two-GEN-kids-NOM’, the universal quantifier *daremo-ni* ‘everyone-DAT’ cannot take scope over the matrix subject *dareka-ga* ‘someone-NOM’, which is unexpected under Miyagawa’s scope economy account. Under our prosodic scrambling analysis, “multiple long-distance scrambling” takes place at PF and the universal quantifier *daremo-ni* ‘everyone-DAT’ can only be interpreted in-situ; it cannot take scope over the matrix subject.

4.2. Multiple Clause-Internal Scrambling

4.2.1. *Otagai* ‘Each Other’

Saito (1992; 2003) claims that clause-internal scrambling can be so called “A-movement” in the sense that the scrambled phrase can function as an “A-binder” (Saito 2003: 485):

33) a. *Karera*-ga [otagai]-no sensei-o hihansita (koto)
   
   they-NOM each other-GEN teacher-ACC criticized (fact)
   
   *‘They each other’s teacher criticized.’*

   b. *[Otagai]-no sensei-ga karera-o hihansita (koto)
   
   each other-GEN teacher-NOM they-ACC criticized (fact)
   
   *‘Each other’s teacher criticized them.’*

34) *Karera*-o [otagai]-no sensei-ga *tj* hihansita (koto)

   they-ACC each other-GEN teacher-NOM criticized (fact)

   *‘Each other’s teacher criticized them.’*

Saito argues that (33a, b) show that the reciprocal *otagai* ‘each other’, which he assumes is a local anaphor, requires a c-commanding antecedent. (34) is derived from (33b) by scrambling the object *karera-o* ‘they-ACC’. The fact that (34) improves indicates that the scrambled phrase *karera-o* ‘they-ACC’ is in a so called “A-position,” serving as an “A-binder.”

Hoji (2003, 2006) counters that *otagai* ‘each other’ is not a local anaphor. He argues that the internal structure of *otagai* ‘each other’ is *[pro [otagai] ‘each other’]*, where *pro* is a phonetically empty argument, and that what has been considered as an anaphoric relation between *otagai* ‘each other’ and its antecedent should be understood as the anaphoric relation between *pro* and its antecedent. As a piece of evidence in his analysis, Hoji shows that there are cases where the antecedent of *otagai* ‘each other’ (more precisely, *pro*) need not c-command *otagai* ‘each other’ (*pro*) as shown in (35), which is in contrast with Saito’s (33b) example (Hoji 2003: 433):

35) *[Otagai]-no koibito-ga [John to Bill]-o yuuwakusita
   
   each other-GEN lover-NOM [John and Bill]-ACC seduced

   *‘Each other’s lovers seduced [John and Bill].’*

Hoji suggests that the availability of anaphoric relation between *otagai* ‘each other’ and its antecedent is affected by various lexico-semantic, pragmatic as well as syntactic factors, especially notions like salience. Hence, contrary to Saito’s claim, Hoji argues that the improvement seen in (34) cannot be used as evidence for the “A-position” status of the landing site of clause-internal scrambling. What is important to us here, however, is that Hoji (2003; 2006) also admits that there are cases like (34) where word order change affects anaphoric relations.

We observe that even in cases like (34), “multiple clause-internal scrambling” does not affect any anaphoric relations as shown in (36c):

36) a. *[Otagai]-no sensei-ga kootyoosensei-ni karera-o syookaisita (koto)
   
   each other-GEN teacher-NOM school master-DAT they-ACC introduced (fact)

   *‘Each other’s teacher introduced them to the school master.’*

b. *Karera*-o [otagai]-no sensei-ga kootyoosensei-ni tj syookaisita (koto)

   they-ACC each other-GEN teacher-NOM school master-DAT introduced (fact)
In (36c), otagai ‘each other’ cannot take karera ‘they’ as its antecedent. This follows from our prosodic scrambling analysis, since “multiple clause-internal scrambling” is a pure PF operation and thus does not have any semantic effects including anaphoric relations. The scrambled phrase in (36c) is interpreted as if it stays in-situ as in (36a).

### 4.2.2. Quantifier Scope

It was first observed by Kuroda (1970) that clause-internal scrambling has an effect on quantifier scope, as schematically represented in (37):

37) a. QP1-Nom QP2-Dat/Acc V (Unambiguous)
   
   \[ QP_1 > QP_2, *QP_2 > QP_1 \]

b. QP2-Dat/Acc QP1-Nom V (Ambiguous)
   
   \[ QP_1 > QP_2, QP_2 > QP_1 \]

(37a) can only be understood as stating that the subject QP1 takes scope over QP2. When we scramble QP2 as in (37b), on the other hand, the result becomes ambiguous; (37b) states that QP1 takes scope over QP2 or QP2 takes scope over QP1.

Hoji (2003) claims that although there are cases where Kuroda’s generalization (37) does not hold, we can still maintain this generalization by using quantifier phrases which cannot be used to refer to a specific group of entities like NP-dake ‘only NP’, as shown in (38) (Hoji 2003: 410):

38) a. 3-tu-no ginkoo-ga Toyota-dake-ni monku-o itta

   Three banks complained to only Toyota.

   three banks > only Toyota, *only Toyota > three banks

b. Toyota-dake-ni 3-tu-no ginkoo-ga monku-o itta

   To only Toyota, three banks complained.

   three banks > only Toyota, only Toyota > three banks

(38a) is true under situation (39) but not under situation (40). (38b), on the other hand, is true under either (39) or (40). In (39, 40), “A -> B” indicates that A complains to B (Hoji 2003: 406-7):

39) Situation 1

   There are six banks (1-6) and three companies (T(oyota), N, M).
   1 -> T; 2 -> T; 3 -> T; 4 -> T, N, M; 5 -> N, M; 6 -> M

40) Situation 2

   There are three banks (1-3) and three companies (T(oyota), N, M).
   1 -> T; 2 -> T; 3 -> T, N, M

We observe, however, that “multiple clause-internal scrambling” does not affect quantifier scope at all. In (41), Toyota-dake-ni ‘Toyota-only-DAT’ is scrambled together with monku-o ‘complaint-ACC’ with which it forms a major phrase. (41) only has the interpretation that the subject QP ‘three banks’ has scope over the object QP ‘only Toyota’. In other words, (41) is true under (39) but not (40):

41) ((Toyota-dake-ni) (monku-o)) 3-tu-no ginkoo-ga itta

   Three banks complained only to Toyota.

   three banks > only Toyota, ??only Toyota > three banks
This can be accounted for by our analysis, since the scrambled phrase can only be interpreted in-situ at LF and thus (41) should have the same interpretation with its unscrambled counterpart (38a).

4.2.3. Variable Binding
Hoji (2003) argues that there are two types of bound variable anaphora. One is constrained by the c-command requirement at LF that an NP β can be construed as a variable bound by an NP α only if β is c-commanded by α and its trace at LF (Hoji 2003: 395). This type of bound variable anaphora shows reconstruction effects with clause-internal scrambling as shown in (42) (Hoji 2003: 394):

42) So-ko-no kantoku-o Mettu-sae-ga uttaeta (koto) 
   that-place-GEN manager-ACC Mets-even-NOM sued (fact) 
   'Its manager, even the Mets sued.'

The other type of bound variable anaphora, on the other hand, is constrained by the precedence requirement that an NP β can be construed as a variable bound by an NP α only if β is preceded by α at PF (Hoji 2003: 396). Unlike the “c-command” type, the “precedence” type of bound variable anaphora does not show any reconstruction effects as shown in (43) (Hoji 2003: 394), indicating that the object is not (A'-)scrambled:

43) *So-no kyuudan-no kantoku-o do-no kyuudan-mo uttaeta (koto) 
   that-GEN baseball-club-GEN manager-ACC which-GEN baseball-club-also sued (fact) 
   'That (baseball) team’s manager, every (baseball) team sued.'

We observe that when “multiple clause-internal scrambling” applies, the reconstruction effects emerge even with the "precedence type" of bound variable anaphora as shown in (44):

44) ((Komissyonaa-ni), (so-no kyuudan-no), (kantoku-o), do-no kyuudan-mo 
   (commissioner-DAT that-GEN baseball-club-GEN manager-ACC) which-GEN baseball-club-also 
   uttaeta (koto) sued (fact) 
   'Every (baseball) team sued that (baseball) team’s manager to the commissioner.'

Under our prosodic scrambling analysis, “multiple clause-internal scrambling” is a PF operation; it does not have any effect on semantic interpretation. It follows that in (44), the scrambled elements are interpreted as if they are in-situ; the reconstruction effects emerge.¹

5. Island Constraints
Saito (1985) observes that “normal” long-distance scrambling is sensitive to constraints on extraction from complex NPs and adjucts as shown in (45b, c) and (46b, c), though the island effects with scrambling are weak for some unknown reasons:

45) a. Mary-ga [[Bill-ni sono hon-o watasita] hito]-o sagasiteiru (koto) 
   Mary-NOM Bill-DAT that book-ACC gave person-ACC look-for (fact) 
   'Mary is looking for the person who gave that book to Bill.'

b. ??Bill-ni, Mary-ga [[t sono hon-o watasita] hito]-o sagasiteiru (koto) 
   Bill-DAT Mary-NOM that book-ACC gave person-ACC look-for (fact)

c. ??Sono hon-o, Mary-ga [[Bill-ni t watasita] hito]-o sagasiteiru (koto) 
   that book-ACC Mary-NOM Bill-DAT gave person-ACC look-for (fact)

¹ Note also that there is a difference in the notion of “PF” between Hoji’s analysis and ours. What Hoji (2003) means by PF is a kind of representation on the PF-side which can still feed information to semantic representation. Our prosodic scrambling, on the other hand, is purely phonological in the sense that it does not have any effect on semantic interpretation.
Mary-NOM John-NOM Bill-DAT that watch-ACC gave because be-angry (fact) 
'Mary is angry because John gave that watch to Bill.'
b.?Bill-ni, Mary-ga [John-ga t1 sono tokei-o ageta kara] okotteiru (koto) 
Bill-DAT Mary-NOM John-NOM that watch-ACC gave because be-angry (fact) 
c.?Sono tokei-o, Mary-ga [John-ga Bill-ni t1 ageta kara] okotteiru (koto) 
that watch-ACC Mary-NOM John-NOM Bill-DAT gave because be-angry (koto)

We observe, however, that if multiple elements forming a major phrase are preposed, the acceptability improves, as shown in (47, 48) (though they are still awkward):

47) ((Bill-ni) (sono hon-o) ) Mary-ga [watasita hito]-o sagasiteiru (koto) 
(Bill-DAT that book-ACC) Mary-NOM gave person-ACC look-for (fact) 
'Mary is looking for the person who gave that book to Bill.'

48) ((Bill-ni) (sono tokei-o) ) Mary-ga [John-ga ageta kara] okotteiru (koto) 
(Bill-DAT that watch-ACC) Mary-NOM John-NOM gave because be-angry (koto) 
'Mary is angry because John gave that watch to Bill.'

As we mentioned in section 1, when multiple constituents are scrambled out of an embedded clause in terms of syntactic long-distance scrambling, the result is degraded. Hence, if (47) and (48) were derived by syntactic scrambling, they should be worse than (45b, c) and (46b, c), where only one constituent is scrambled out of an island. The result, however, is the opposite of what any syntactic scrambling analysis predicts. Our prosodic scrambling analysis, on the other hand, can account for this fact. When a syntactic constituent is scrambled, it is scrambled in the narrow syntax and obeys the expected syntactic conditions. When a prosodic constituent is scrambled, on the other hand, it is scrambled at PF and therefore insensitive to any syntactic island constraints.

6. Conclusion

In this paper, we have proposed that there are two kinds of scrambling in Japanese, i.e. syntactic scrambling and prosodic scrambling. Unlike syntactic scrambling which targets an XP, prosodic scrambling targets a major phrase and ignores the usual syntactic constraints. It was also shown that prosodically scrambled elements are interpreted as if they were in-situ.

References


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