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TWO TYPES OF MULTIPLE SCRAMBLING IN JAPANESE*

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1 Introduction

The free word order property of Japanese is now standardly assumed to follow from the existence of a movement operation referred to as scrambling (Ross, 1967, Harada, 1977, Hoji, 1985, Saito, 1985). Example (1b), for example, arises as a result of the scrambling of the dative object to the initial position of the clause. I will refer to such examples, which involve a single scrambled element, as Single Scrambling (SS). The number of scrambled elements is not limited to one. As shown in (1c), two (or more) phrases can be scrambled at the same time. Cases like this will be referred to as Multiple Scrambling (MS):

(1) a. John-ga Mary-ni hon-o ageta.
John-NOM Mary-DAT book-ACC gave
'John gave Mary a book.'

b. Mary-ni$_1$ John-ga t_1 hon-o ageta. [SS]
Mary-DAT John-NOM book-ACC gave
'Lit. Mary$_1$, John gave t_1 a book.'

c. Mary-ni$_1$ hon-o$_2$ John-ga t_1 t_2 ageta. [MS]
Mary-DAT book-ACC John-NOM gave
'Lit. Mary$_1$ a book$_2$, John gave t_1 t_2.'

Though SS has been a major topic in Japanese syntax and its properties have been much discussed from various angles (see Nemoto 1999, Sato and Goto 2014 and references cited therein), less attention has been paid to MS, with the main exception of Agbayani et al. (2015). Also, it has been more or less tacitly assumed that MS is a homogeneous phenomenon.

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The aim of this paper is to examine the nature of MS in Japanese, taking its phonological properties into consideration. It will be argued that MS in Japanese is a heterogeneous phenomenon, and that there are two subtypes of it, the headless vP-movement option and the multiple SS option. These options exhibit distinct syntactic and phonological properties, as explicated in section 2. It will be shown that this eclectic approach is motivated because there is a correlation between syntax and phonology of MS, i.e., between syntactic properties of scrambled elements and their prosodic phrasing.

This paper is organized as follows. Section 2 spells out my proposal. Section 3 presents evidence for it. Section 4 evaluates alternative analyses of MS. Section 5 concludes.

2 Proposal

I propose that there are two ways to derive MS in Japanese. The first type is analyzed as involving headless vP-movement in the syntax, as originally proposed by Koizumi (1995, 2000). He argues that due to overt V-raising out of vP, a constituent that contains two internal arguments, but not the verb, can be formed in Japanese. This constituent can then be an input to scrambling, as shown in (2c). Another way of deriving MS is what I will refer to as the multiple SS option. This option is the one traditionally assumed for MS and involves multiple application of SS in the syntax, as shown in (3):

(2) Headless vP-movement option

a. [Subj [$_{vP}$ IO DO V] T]

b. [Subj [$_{vP}$ IO DO t_V] V+T]

c. [[$_{vP}$ IO DO t_V] [Subj t_{vP} V+T]]

(3) Multiple SS option

a. [Subj IO DO V]

b. [IO DO [Subj t_{IO} t_{DO} V]]

I argue that (2) and (3) correlate with different phonological properties. Following Ishihara (2007), I assume that vP is mapped onto prosody as a Major Phrase (MaP). I adopt the standard assumption that MaP is the domain where tonal downstep (or catathesis) takes place (Poser, 1984, Pierrehumbert and Beckman, 1989, Selkirk and Tateishi, 1991), i.e., when there are two or more accented words within a MaP, the non-initial pitch accents will be pronounced on a lower pitch, but the first pitch accent will remain intact. Under the vP-fronting option, MSed elements are within a single vP, hence they form a MaP. This captures Agbayani et al.'s (2015) observation that MSed phrases form a phonological unit, and that there is a tonal downstep within them. These phonological properties hold for the vP-fronting option. As for the multiple SS option, I claim that the first scrambled element forms an independent MaP. As a result, there is a pause between MSed phrases and no tonal downstep within them:

(4) Headless vP-movement option

a. [[$_{vP}$ IO DO t_V] [Subj t_{vP} V+T]] [Syntax]

b. (IO DO)$_{MaP}$ Subj V [Phonology]

(5) Multiple SS option

a. [IO DO [Subj t_{IO} t_{DO} V]] [Syntax]

b. $(IO)_{MaP}$ DO Subj V [Phonology]

Henceforth, I will use the term SS-prosody for cases where there is a pause between the scrambled elements, and vP-prosody for cases where the scrambled elements form a phonological unit.

This proposal makes a prediction about the syntax and phonology of MS. Specifically, it predicts that, under vP-prosody, MS shows the behavior of 'standard' vP-fronting, whereas, under SS-prosody, MSed phrases show the behavior of SSed phrases. In the next section, it is shown that this prediction is borne out.

3 Evidence

3.1 C-command

Under SS- and vP-prosody, MSed elements have different c-command relations. Consider cases with the IO-DO-Subj-V order, derived by MS of IO and DO. Under SS-prosody, IO c-commands Subj as a result of MS since IO undergoes SS in the syntax. Under vP-prosody, on the other hand, IO does not c-command Subj after MS, since it is embedded within a moved vP. Thus, the present analysis predicts that MS with SS-prosody will change the c-command relationship of MSed elements, while MS with vP-prosody will not. This prediction is borne out. Consider (6), where Subj and IO are quantificational ((6) is based on Hoji 2003 and Agbayani et al. 2015). (6a) is a base sentence. Since Japanese is a scope-rigid language, Subj scopes over IO. (6b) shows that SS of IO results in ambiguity, affecting the c-command domain of IO (Kuroda, 1970). (6c) involves MS; its judgment varies depending on its prosody. Under SS-prosody (when there is a pause between IO and DO), (6c) is ambiguous, just like (6b). However, if IO and DO form a phonological unit, Subj must take wide scope, i.e. MS with vP-prosody does not affect scope, as pointed out by Agbayani et al. (2015):

(6) a. 3-tu-no ginkoo-ga Toyota-dake-ni monku-o itta.
3-CL-GEN bank-NOM Toyota-only-DAT complaint-ACC said
'Three banks made complaints only to Toyota.' three > only; *only > three

b. Toyota-dake-ni$_1$ 3-tu-no ginkoo-ga t_1 monku-o itta. [SS]
Toyota-only-DAT 3-CL-GEN bank-NOM complaint-ACC said
'Only to Toyota$_1$, three banks made complaints t_1.' three > only; only > three

c. Toyota-dake-ni$_1$ monku-o$_2$ 3-tu-no ginkoo-ga t_1 t_2 itta. [MS]
Toyota-only-DAT complaint-ACC 3-CL-GEN bank-NOM said
'Lit. Only to Toyota$_1$ complaints$_2$, three banks made t_2 t_1.'
SS-prosody: three > only; only > three vP-prosody: three > only; ??only > three

The same conclusion can be obtained from the licensing of a bound variable reading. Hoji (2003) argues that the bound variable reading holding between NP-*sae* and *soko* is available if the former c-commands the latter at LF. (7a) does not have a bound variable reading since this

c-command requirement is not met. (7b) shows that the bound variable reading is licensed as a result of SS:

(7) a. *?Soko$_i$-no kantoku-ga Mettu-sae$_i$-o saibansyo-ni uttaeta.
that-place-GEN manager-NOM Mets-even-ACC court-DAT sued
'Its$_i$ manager sued even the Mets$_i$ in court.'

b. Mettu-sae$_i$-o$_1$ soko$_i$-no kantoku-ga t_1 saibansyo-ni uttaeta. [SS]
Mets-even-ACC that-place-GEN manager-NOM court-DAT sued
'Even the Mets$_{i1}$, its$_i$ manager sued t_1 in court.' (Agbayani et al., 2015:73)

The present analysis then predicts that the availability of bound variable readings under MS depends on its prosody since MS can affect the c-command relationship only under SS-prosody. The prediction is borne out: MS allows the bound variable reading only under the SS-prosody ((8) is based on Agbayani et al. 2015):

(8) Mettu-sae$_i$-o$_1$ saibansyo-ni$_2$ soko$_i$-no kantoku-ga t_1 t_2 uttaeta. [MS]
Mets-even-ACC court-DAT that-place-GEN manager-NOM sued
'Lit. Even the Mets$_{i1}$ in court$_2$, its$_i$ manager sued t_1 t_2.'
SS-prosody: ✓ vP-prosody: *?

3.2 MS from different clauses

Ishihara (2016) notes that MS is subject to the clause-mate condition when MSed phrases form a prosodic constituent. In (9), MS targets an indirect object in a matrix clause and a direct object in a finite embedded clause. The example is degraded when they form a phonological unit. He also points out that the example improves when there is a phonological boundary between the MSed phrases, i.e., under SS-prosody:

(9) Bob-o$_1$ Mary-ni$_2$ John-ga t_2 [Bill-ga t_1 nagutta to] itta.
Bob-ACC Mary-DAT John-NOM Bill-NOM hit that said
'Lit. Bob$_1$ to Mary$_2$, John said t_2 that Bill hit t_1.'
SS-prosody: ✓ vP-prosody: ??

Ishihara (2016) only discusses MS involving a finite embedded clause. A different pattern emerges when an embedded clause is non-finite. (10) involves MS which targets a matrix argument and an argument in a non-finite embedded clause, and it is acceptable under vP-prosody as well as SS-prosody:

(10) Bob-o$_1$ Mary-ni$_2$ John-ga t_2 [t_1 naguru yooni] tanonda.
Bob-ACC Mary-DAT John-NOM hit asked
'Lit. Bob$_1$ Mary$_2$, John asked t_2 to hit t_1.'
SS-prosody: ✓ vP-prosody: ✓

These patterns of MS follow from my proposal. Consider first the cases with vP-prosody. Recall that I have argued that vP-prosody arises when the syntax involves headless vP-movement. This option requires that 'scrambled' phrases be in the same vP. It is then predicted that if two phrases cannot be within the same vP, they cannot undergo MS under vP-prosody.

Saito (1985) reported the following contrast between SS from finite clauses and SS from non-finite clauses with regard to their landing sites:

(11) a. ??John-ga [sono hon-o]$_1$ minna-ni [Mary-ga t_1 motteriru to] itta.
John-NOM that book-ACC everyone-DAT Mary-NOM have that said
'Lit. John, that book$_1$, said to everyone that Mary has t_1.' (Saito, 1985:267)

b. Mary-ga [sono hon-o]$_1$ Bill-ni [t_1 yomu yooni] itta.
Mary-NOM that book-ACC Bill-DAT read said
'Lit. John, that book$_1$, asked Mary to read t_1.' (Saito, 1985:225)

It shows that SS from non-finite clauses, but not SS from finite-clauses, can land in the position between the subject and the indirect object, which can be taken as evidence that only the former can target vP-edge. Given this contrast, the vP-fronting approach to MS predicts that, when MS targets an element in the matrix clause and an element in an embedded finite clause, sentences are degraded; SS from a finite-clause cannot target vP-edge, and therefore the MSed phrases cannot be within the same matrix vP. (9) with vP-prosody is thus degraded. SS from a non-finite clause, on the other hand, can land in the edge of vP, and (10) with vP-prosody can be derived in the following manner:

(12) Derivation of (10) with vP-prosody

a. $[_{vP}$ Subj IO $[_{non-finiteCP}$ DO V] V]

b. $[_{vP}$ Subj DO IO $[_{non-finiteCP}$ t_{DO} V] V]

c. $[_{TP}$ $[_{vP}$ Subj DO IO $[_{non-finiteCP}$ t_{DO} V] V] T]

d. $[_{TP}$ Subj $[_{non-finiteCP}$ t_{DO} V] $[_{vP}$ t_{Subj} DO IO t_{CP} t_V] V+T]

e. $[_{vP}$ t_{Subj} DO IO t_{CP} t_V] ... $[_{TP}$ Subj $[_{non-finiteCP}$ t_{DO} V] t_{vP} V+T]

(12a) illustrates the structure when the matrix vP is constructed. The object of the embedded clause moves to the edge of the matrix vP through [Spec, CP] in (12b). Then, the matrix T is introduced into the derivation in (12c). At the point of (12d), the subject, the non-finite CP, and the matrix verb move out of the matrix vP so that they will not be pied-piped when the matrix vP undergoes movement. Finally, by moving the vP in (12e), we get (10).[1] The present analysis thus accounts for why vP-prosody is allowed only when an embedded clause is non-finite.

[1]This derivation involves a violation of the Proper Binding Condition (PBC), which requires that a trace left by movement be bound by an antecedent (Fiengo, 1977, Saito, 1985, 1989). The question then arises why (12) is not excluded by a violation of the PBC. Arano (2017) shows that this insensitivity to the PBC under headless vP-fronting in fact follows from Takita's (2010) approach, where PBC effects in Japanese are reduced to linear-order preservation effects. Simplifying, the gist of the account is that Japanese has a condition that internal arguments should precede the verb in the final output. Since the DO in the embedded clause precedes the embedded V in (10), this derivation is allowed.

The present analysis also accounts for why SS-prosody is possible both in (9) and (10). SS-prosody involves multiple SS to the edge of the clause in the syntax, and there is no such requirement that MSed phrases be in the same vP. Therefore both (9) and (10) are acceptable under the SS-prosody.

4 Alternative analyses

This section discusses alternative proposals for MS in Japanese. We examine the adjunction-to-argument analysis proposed by Takano (2002), and the prosodic scrambling analysis proposed by Agbayani et al. (2015). It is shown that these proposals do not have adequate empirical coverage.

4.1 Adjunction-to-argument

Extending a proposal by Sohn (1994), Takano (2002) argues that an argument can adjoin to another argument, resulting in a single constituent, which then can undergo scrambling:

(13) a. b.

Takano's (2002) analysis allows the possibility that there are two types of MS in Japanese: The first type involves separate multiple SS, and the second type involves adjunction-to-argument, as illustrated in (13). One may well argue that under the second possibility, MSed elements form a phonological unit since they form a single constituent. This analysis, however, cannot capture the facts observed in section 3.1, where we have seen that MS of IO and DO with vP prosody does not change the c-command domain of MSed phrases. Under the adjunction-to-argument approach, what undergoes movement under MS is an argument to which another argument is adjoined. Note that Takano's (2002) analysis requires Arg2 to c-command outside of the boxed Arg1 in (13b). If Arg2 did not, the step in (13b) would be illicit since it would be movement to a non-c-commanding position. This means that the derivation of MS proposed by Takano incorrectly predicts that MS should affect the c-command domains of both Arg1 and Arg2.

4.2 Prosodic scrambling

Agbayani et al. (2015) propose that there are two types of scrambling in Japanese that take place in different components of grammar: syntactic scrambling and prosodic scrambling. Syntactic scrambling is scrambling in syntax and can only target a syntactic constituent. Importantly, they assume that multiple application of syntactic scrambling is impossible. Thus, what we have called SS here is what they call syntactic scrambling.

Prosodic scrambling, on the other hand, is scrambling in phonology that applies to canonical word order, and targets multiple phonological phrases (ϕ). These phonological phrases are scrambled prosodically and forced to be bundled into a single phonological phrase at the landing site. It applies when syntactic scrambling is impossible, i.e., when scrambled elements do not

form a syntactic constituent. Agbayani et al. (2015) assume, following Fukui and Sakai (2003), that Japanese does not have overt verb raising. Therefore, the direct object and the indirect object do not constitute a single constituent in syntax, and can only move via prosodic scrambling. Thus, the derivation of prosodic scrambling involving IO and DO proceeds in the following way:

(14) a. [Subj [$_{vP}$ IO DO V] T] [Syntax]
b. Subj (IO)$_{\phi}$ (DO)$_{\phi}$ V [Phonology]
c. (IO$_{\phi}$ DO$_{\phi}$)$_{\phi}$ Subj V [Prosodic Scrambling]

Agbayani et al.'s (2015) proposal predicts a fundamental asymmetry between syntactic scrambling and prosodic scrambling. Since prosodic scrambling takes place in phonology, it should have no consequence for semantics. Specifically, scrambled elements should be interpreted in-situ. This proposal straightforwardly account for why MS with vP-prosody does not affect scope or license a bound variable reading.[2] However, it is not always correct that MSed elements are interpreted in-situ. Consider (15), where indirect and direct objects are quantificational:

(15) a. Mary-ga 3-tu-no kaisya-ni hon-dake-o okutta.
Mary-NOM 3-CL-GEN company-DAT book-only-ACC sent
'Mary sent three companies only books.' three > only; *only > three
b. Hon-dake-o$_2$ [3-tu-no kaisya-ni]$_1$ Mary-ga t_1 t_2 okutta.
book-only-ACC 3-CL-GEN company-DAT Mary-NOM sent
'Lit. Only books$_2$ three companies$_1$ Mary sent t_1 t_2.' three > only; only > three

(15a) shows that with the Subj-IO-DO-V order, the sentence is unambiguous. Importantly, when we get the order of DO-IO-Subj-V via MS, the example is ambiguous, which shows that MS may affect the c-command domain of the MSed elements. This is not expected under the prosodic scrambling approach.[3] On the other hand, ambiguity in (15b) is straightforward under the vP-fronting analysis. It is derived via headless vP-fronting and VP-internal scrambling.

(16) [$_{CP}$ [$_{vP}$ t_{Subj} [$_{VP}$ DO IO t_{DO} t_V] t_v] [$_{CP}$ [$_{TP}$ Subj t_{vP} V+v+T] C]

Since VP-internal scrambling makes the example ambiguous, as shown in (17), (15b) is also ambiguous.

(17) Mary-ga hon-dake-o$_1$ 3-tu-no kaisya-ni t_1 okutta.
Mary-NOM book-only-ACC 3-CL-GEN company-DAT sent
'Lit. Mary sent only books$_1$ three companies t_1.' three > only; only > three

[2] In addition to these, Agbayani et al. (2015) provide a lot of evidence supporting the semantic vacuity of MS. Their arguments take the following form: When we have single scrambling (IO-Subj-DO-V), it brings certain kind of semantic consequence, while when we have MS (IO-DO-Subj-V), it does not have semantic effects. My analysis can capture this property of MS, by saying that predicate phrases like vP reconstruct obligatorily (Huang, 1993, Heycock, 1995, Takano, 1995).

[3] One may suggest that (15b) can be accounted for under the prosodic scrambling approach if syntactic scrambling moves DO above IO in syntax, and then prosodic scrambling applies to DO and IO in phonology. This derivation requires that phrases that have undergone syntactic scrambling further undergo prosodic scrambling. This derivational possibility is banned by Agbayani et al. (2015) on independent grounds: "syntactic scrambling 'bleeds' prosodic scrambling (Agbayani et al., 2015:55)."

A more severe problem for Agbayani et al.'s (2015) approach comes from the assumption that MSed elements have to form a phonological unit as a consequence of prosodic scrambling. This assumption is too strong. MSed phrases need not form a phonological unit, and whether they do or do not has important syntactic consequences, as shown in section 3.

5 Conclusion

This paper has argued that MS in Japanese is a heterogeneous phenomenon, and there are two subtypes of it:

(18) Headless vP-movement option
   a. [Subj [$_{vP}$ IO DO V] T]
   b. [Subj [$_{vP}$ IO DO t_V] V+T]
   c. [[$_{vP}$ IO DO t_V] [Subj t_{vP} V+T]]
   d. (IO DO)$_{MaP}$ Subj V

(19) Multiple SS option
   a. [Subj IO DO V]
   b. [IO DO [Subj t_{IO} t_{DO} V]]
   c. (IO)$_{MaP}$ DO Subj V

Under the headless vP-movement derivation, what is moved in syntax is a headless vP containing elements that appear to undergo scrambling on the surface. This vP is mapped onto prosody as a MaP. Thus, MSed elements form a phonological unit, and there is a tonal downstep within them. This captures the fact that when MSed elements form a phonological unit, they exhibit the same behavior as the 'standard' vP-fronting syntactically.

The multiple SS derivation involves multiple application of SS in syntax. I have argued that in this case, scrambled elements are mapped into different MaPs. Thus, there is a pause and no tonal downstep between them. This captures the fact that when MSed elements do not form a phonological unit, they behave as if they undergo separate SSs.

I have shown that this eclectic approach to MS is supported by scope, the licensing of bound variable readings, and MS from different clauses. These facts show that the analysis of MS has to allow two types of phonological phrasing, and at the same time, it has to be restrictive so that each of these phonological properties is correlated with certain syntactic properties. I have shown that this can be achieved under my analysis, but not under the alternative analyses.

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