VP-scrambling, Linearization Preservation, and the Theories of Control

Synopsis: The aim of this paper is two-fold: First, I provide a novel observation regarding an interaction of quantifier-floating and VP-scrambling in Japanese. Specifically, I show that although VP-scrambling can strand a subject, the sentence becomes ungrammatical if the scrambled VP contains a floating quantifier (FQ) whose host is the stranded subject. Second, I propose that this observation can be explained by combining the theory of linearization that crucially employs the notion of *Linearization Preservation*, which requires that a linear ordering of constituents established by an application of Spell-out at a certain point of derivation be not contradicted by another linear ordering established by a later application of Spell-out (Fox & Pesetsky 2003, 2005, Ko 2007), with *the movement theory of control*, which argues that obligatory control relations are created by movement of the controller (MTC; see Bowers 1973 and Hornstein 1999, among many others), thus providing support for these theories. I also argue that as a consequence of the proposal, it is necessary to allow an obligatory control relation to be created via covert lowering of the controller.

Observation: (1b) is an example of VP-scrambling in Japanese, which is derived from (1a). In Japanese, a VP must be attached by certain particles like *sae* 'even' when the VP undergoes scrambling. Since such particles separate main verbs from tense morphemes, the verb *su-* 'do' is required to appear, irrespective of whether VP undergoes scrambling.

(1) a. Taroo-ga [$_{VP}$ hon-o yomi]-sae si-ta
T.-NOM book-ACC read-even do-PST
'Taroo even read a book'

b. [$_{VP}$ Hon-o yomi]-sae$_i$ Taroo-ga t_i si-ta
book-ACC read-even T.-NOM do-PST
'(lit.) [Even read a book]$_i$, Taroo did t_i'

As in (1b), a subject can follow the moved VP in Japanese VP-scrambling. The paradigm in (2) is the novel observation which this paper tries to explain. As in (2a), which is the baseline, the numeral quantifier *hutari* can be separated from its host, i.e. the subject *gakusei-ga* 'students' by adverbs like *awatete* 'abruptly'. VP-scrambling is possible if the subject and the FQ appear after the scrambled VP, as in (2b). Note that the adverb can appear either inside of the scrambled VP, or outside of it. Crucially, if the FQ is contained within the moved VP as in (2c), the sentence becomes ungrammatical.

(2) a. Gakusei-ga (awatete) **hutari** hon-o yomi-sae sita
students-NOM abruptly 2.CL book-ACC read-even did 'Two students even read a book abruptly'

b. [$_{VP}$ (Awatete) hon-o yomi]-sae$_i$ gakusei-ga (awatete) **hutari** t_i sita
abruptly book-ACC read-even student-NOM abruptly 2.CL did

c. *[$_{VP}$ (Awatete) **hutari** hon-o yomi]-sae$_i$ gakusei-ga (awatete) t_i sita
abruptly 2.CL book-ACC read-even student-NOM abruptly did

Preliminary discussion: The contrast between (2b-c) may trivially be explained if there is no position for the FQ within the scrambled VP in (2c). The fact that an adverb can appear in the fronted VP as in (2b) already suggests that the situation is not so simple, however. Furthermore, there is evidence that indicates that what moves in Japanese VP-scrambling is indeed vP, which includes a position for subjects (cf. Huang 1993). As in (3a), *karezisin* 'himself' requires a local antecedent. As in (3b), scrambling of *karezisin* allows it to be bound by the matrix subject. In (3c), which involves VP-scrambling, local binding of *karezisin* is blocked, however. This follows if what is moved in VP-scrambling is vP, which contains some null element Δ which is bound by *Hanako*, as in (3d): This null element is the closest binder for the reflexive even after VP-scrambling; hence *Taroo* cannot bind *karezisin* (the identity of Δ will be discussed below).

(3) a. *Taroo-ga [$_{CP}$ Hanako-ga [karezisin-o home]-sae sita to] omotteiru
T.-NOM H.-NOM himself-ACC praise-even did C think 'Taroo thinks that Hanako even praised himself'

b. Taroo-ga [$_{CP}$ karezisin-o$_i$ Hanako-ga [t_i home]-sae sita to] omotteiru

c. *Taroo-ga [$_{CP}$ [karezisin-o home]-sae$_i$ Hanako-ga t_i sita to] omotteiru

d. [*Taroo*$_k$ … [$_{CP}$ [$_{vP}$ Δ$_i$ *himself*$_{i/*k}$ *praise*]-*even*]$_j$ *Hanako*$_i$ t$_j$ *did* …] …]

Analysis: I assume, following Hoshi (1994) and Saito & Hoshi (2000), among others, that the verb *su-* 'do' appearing in Japanese VP-scrambling is a control verb which takes the fronted vP as its complement. Furthermore, I adopt Ko's (2007) hypotheses that the relevant Spell-out domains in Japanese include the whole vP, involving its edge, and that the FQ and its host must form a constituent when they are introduced to the structure (cf. Kuroda 1980, Sportiche 1988). Given the MTC together with these assumptions, (2a) has the schematic (partial) derivation depicted in (4) below.

(4) a. [$_{vP1}$ [*student* FQ] *book read*]-*even* ➔ Linear Order at vP$_1$: *student*>FQ>*book*>*read-even*

b. [$_{vP2}$ *student*$_i$ [$_{vP1}$ [t_i FQ] *book read*]-*even do*] ➔ Linear Order at vP$_2$: *student*>FQ>*book*>*read-even*>*do*

(5) [$_{XP}$ [$_{vP1}$ [t_i FQ] *book read*]-*even*$_j$ … [$_{vP2}$ *student*$_i$ t$_j$ *do*]] ➔ Linear Order at XP: FQ>*book*>*read-even*>…>*student*>*do*

First, when the lower vP$_1$ is undergoes Spell-out, the linear order given in (4a) is established. Then, the derivation proceeds to the point in (4b), where the higher vP$_2$, whose main verb is *su-* 'do', is constructed. The subject of the lower vP$_1$ moves to the Spec, vP$_2$ to receive the theta-role assigned by *su-* 'do', in accordance with the MTC. When Spell-out

applies to the vP_2, the linear order in (4b) is established (x>y means "x precedes y"). Note that the established linear orderings in (4a) and (4b) do not conflict with each other. Thus, the derivation can observe Linearization Preservation, giving rise to the surface word order of (2a). To derive the surface order of (2c), the vP_1 in (4b) must undergo scrambling across *student* at a later point of the derivation and Spell-out at XP must establish a linear ordering where the elements contained in the vP_1 precedes *student*, as in (5). The linear ordering in (5), however, contradicts the ones in (4a-b), violating Linearization Preservation. Hence, the surface order of (2c) fails to be derived if the scrambling of vP_1 takes place *after* the Spell-out of vP_2. If vP_1 undergoes scrambling *before* vP_2 gets Spelled-out, the structure in (6) is obtained.

(6) $[_{vP2}[_{vP1}[t_i$ FQ] *book read*]-*even*$_j$ *student*$_i$ t_j *do*] ➔ Linear Order at vP_2: FQ>*book*>*read-even*>*student*>*do*

Then, when Spell-out applies to the vP_2, the linear order in (6) is established. It contradicts the one in (4a), however, on a par with the case of (5). Thus, this derivation also violates Linearization Preservation. Therefore, it follows that there is no way to derive the surface order of (2c), where the FQ is contained within the scrambled vP.

Note here that if we assume not the MTC but the theories of control which assume that an overt controller is Merged only in the highest theta-position (cf. Chomsky 1981, Landau 2004; Manzini & Roussou 2000; Culicover & Jackendoff 2001), we fail to explain the ungrammaticality of (2c): This is because under the above analysis, if the controller, i.e. *student*, can be Merged only in the higher theta-position, the linear order established at the end of the lower vP (namely, a control complement) would be something like (PRO)>FQ>*book*>*read-even*. Then, it becomes unclear why it contradicts the one in (6). Thus, it wrongly predicts that (2c) is grammatical. Note further that not only the MTC but also Fox & Pesetsky's (2003, 2005) Linearization Preservation plays a crucial role: The structures in (5) and (6) are ruled out because they contain the linear orderings which contradict the ones established earlier points of the derivation, which Linearization Preservation forces to respect. Without Linearization Preservation, it is not easy to distinguish the structures in (5) and (6) from the one in (4b), which is legitimate. Note that the unbound traces in (5) and (6) should not induce the Proper Binding Condition effect (cf. Fiengo 1977), because these unbound traces are created by movement into a theta-position, while VP-scrambling is presumably an A'-movement. (cf. Müller's 1996, Kitahara 1997). In this way, the proposed analysis provides a unique argument for *both* of the MTC and Linearization Preservation.

This analysis has an interesting consequence for ways of creating an obligatory control relation. Suppose that a controller XP is Merged into the lower theta-position ($\_\_\theta_1$), as in (7a). Then, when the vP_1 completes, Spell-out establishes the linear ordering where XP precedes V_1-*even*. Suppose further that the XP moves to the other theta-position ($\_\_\theta_2$) and vP_1 undergoes scrambling, as in (7b). Then, when vP_2 undergoes Spell-out, the established linear order contradicts the one in (7a), violating Linearization Preservation.

(7) a. $[_{vP2}\ \_\_\theta_2[_{vP1}$ XP$_{\theta1}$ … V_1]-*even do*] ➔ Linear Order established at Spell-out of vP_1: XP>…>V_1-*even*

b. $[_{vP2}[_{vP1}\ t_{\theta1}$ … V_1]-*even*$_j$ XP$_{\theta2}$ t_j *do*] ➔ Linear Order established at Spell-out of vP_2: …>V_1-*even*>XP>*do*

Notice at this point that the linear order in (7b) represents the surface word order of sentences like (1b). Hence, if a controller can be base-generated only in a lower theta-position, it is wrongly predicted that a subject cannot be stranded in Japanese VP-scrambling. We can solve this problem if the following derivation is possible, however.

(8) a. $[_{vP1}\ \_\_\theta_1$ … V_1]-*even* ➔ Linear Order established at Spell-out of vP_1: …>V_1-*even*

b. $[_{vP2}$ XP$_{\theta2}[_{vP1}$ $\mathbb{XP}_{\theta1}$ … V_1]-*even do*] ($\mathbb{XP}$ = phonologically null)

c. $[_{vP2}[_{vP1}\ \mathbb{XP}_{\theta1}$ … V_1]-*even*$_j$ XP$_{\theta2}$ t_j *do*] ➔ Linear Order established at Spell-out of vP_1: …>V_1-*even*>XP>*do*

In (8a), Spell-out applies to vP_1, whose Spec is left open. Then, the XP is base-generated into the higher theta-position, and undergoes *covert lowering* into the lower theta-position, as in (8b). Finally, vP_2 is Spelled-out after scrambling of vP_1 takes place, as in (8c). This derivation can establish consistent linear orderings at each point of Spell-out, observing Linearization Preservation. That is, the surface linear order of sentences like (1b) can be derived if we assume that an obligatory control relation can be created not only by *upward* movement but also by *downward* movement. Note that this analysis can restrict the possibility of lowering by assuming that arguments can be base-generated only in a theta-position, which seems to be adopted in most theories at least tacitly. That is, lowering into a theta-position is possible iff there is another theta-position; it thus follows that such a lowering is restricted only for obligatory control.

Given this discussion, the contrast between (2b) and (2c) can be fully explained: In (2c), since the FQ appears within the scrambled vP, its host, i.e. the controller, must originate within the scrambled vP; hence the derivation necessarily induces an ordering contradiction (cf. (4)-(6)). In (2b), on the other hand, the FQ appears outside of the moved vP, indicating that the controller originates in the higher theta-position; hence, it can have a derivation like (8), avoiding an ordering contradiction.

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