SCRAMBLING AND THE NATURE OF MOVEMENT*

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1. Introduction

This paper is concerned with the nature of scrambling and its status in the general theory of movement. It is well known that (Japanese) scrambling has properties that are apparently not shared by other kinds of movement. There have thus been a lot of work on this topic and many proposals have been made to account for those properties (see, among others, Bošković 2004, Bošković and Takahashi 1998, Fukui 1986, 1993, Grewendorf and Sabel 1999, Kawamura 2004, Kitahara 2002, Ko 2007, Kuroda 1988, Miyagawa 1997, 2005, 2006, Nemoto 1993, Nishigauchi 2002, Oka 1989, Saito 1985, 1989, 1992, 2003, 2005, Saito and Fukui 1998, Sauerland 1999, Tada 1990, 1993, Takano 1995, 1998, and Yamashita 2006). Given this backdrop, this article aims to make a contribution toward a better understanding of the nature of scrambling from a novel perspective, by looking at its interaction with control in Japanese. I will show that a close examination of scrambling out of an obligatory control clause (i.e., the complement clause of an obligatory control construction) in Japanese reveals interesting asymmetries in binding effects that have previously been unnoticed. I will propose that these newly discovered facts can be accounted for only if the following two claims hold: (i) unlike the previous view to the contrary, scrambling out of an obligatory control clause behaves exactly like scrambling out of a finite clause and (ii) obligatory control involves movement of the controller. I will also discuss new issues that arise from this proposal about the nature of movement.

This paper is organized as follows. In section 2, I will present previously unnoticed facts about binding effects with scrambling out of a control clause in Japanese. In section 3, I will propose an analysis of those facts that relies crucially on the two claims mentioned above. In section 4, I will discuss issues that arise from this proposal. Finally, section 5 summarizes the discussion.

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2. The Puzzle: Scrambling out of a Control Clause in Japanese

It is well known that there are asymmetries between clause-internal and long-distance scrambling in Japanese (Saito 1992, Tada 1990, 1993; see also Mahajan 1990 for the same facts in Hindi). The following examples show that a pronominal element contained in the subject cannot be bound by a quantificational phrase (QP) in the object:[1]

(1) a. *Soko$_i$-no sotugyoosei-ga mittu-izyoo-no daigaku$_i$-ni syutugansita.
it-GEN graduate-NOM three-or.more-GEN university-DAT applied

'Their graduates applied to three or more universities.'

b. *Soko$_i$-no syain-ga mittu-izyoo-no kaisya$_i$-o tyoosasita.
it- GEN employee-NOM three-or.more-GEN company-ACC investigated

'Their employees investigated three or more companies.'

Thus, the example in (1a) cannot be interpreted as "there are three or more x, x a university, such that someone who graduated from x applied to x." Similarly, the example in (1b) cannot receive the interpretation "there are three or more x, x a company, such that an employee of x investigated x." These are typical cases of weak crossover effects in Japanese.[2]

In contrast, the intended bound variable interpretation becomes possible when the object QP scrambles to the front of the sentence:

(2) a. Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei-ga syutugansita.
three-or.more-GEN university-DAT it-GEN graduate-NOM applied

b. Mittu-izyoo-no kaisya$_i$-o soko$_i$-no syain-ga tyoosasita.
three-or.more-GEN company-ACC it-GEN employee-NOM investigated

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[1] A few words about Japanese examples are in order. First, in this article I use *soko* as a pronominal element to be bound by a QP. *Soko* literally means "that place" but I gloss it as "it" for ease of exposition. Second, following Hoji (2003), I avoid using QPs like *daremo* 'everyone' and *subete* 'all' that can be used to refer to a specific group of entities. Hoji points out that use of such QPs obscures judgment on bound variable interpretation in Japanese.

[2] If the QP is the subject and the pronominal is contained in the object, the QP can bind the pronominal:

(i) Mittu-izyoo-no daigaku$_i$-ga soko$_i$-no sotugyoosei-o saiyoosita.
three-or.more-GEN university-NOM it- GEN graduate-ACC employed

'Three or more universities employed their graduates.'

This example permits a bound variable interpretation for *soko*, so that it can be interpreted as "there are three or more x, x a university, such that x employed someone who graduated from x."

A standard approach to the facts in (1) and (2) is to appeal to a necessary condition on pronominal variable binding to the effect that a pronominal needs to be c-commanded by a QP if the former is to be bound by the latter. Given this condition, the contrast between (1) and (2) follows since in (1) the object QP does not c-command the pronominal, whereas in (2) it does, because of scrambling. In this way, clause-internal scrambling has the effect of making variable binding possible.

Long-distance scrambling (i.e., scrambling out of a clause) does not show the same effects. The examples in (3), without scrambling, do not permit a bound variable interpretation, as expected.

(3) a. *Soko$_i$-no sotugyoosei-ga Aya-ni [Ken-ga mittu-izyoo-no
it-GEN graduate-NOM Aya-DAT Ken-NOM three-or.more-GEN
daigaku$_i$-ni syutugansita to] itta.
university-DAT applied that told

‘Their graduates told Aya that Ken applied to three or more universities.’

b. *Soko$_i$-no syain-ga Aya-ni [Ken-ga mittu-izyoo-no
it-GEN employee-NOM Aya-DAT Ken-NOM three-or.more-GEN
kaisya$_i$-o tyoosasita to] itta.
company-ACC investigated that told

‘Their employees told Aya that Ken investigated three or more companies.’

What is surprising is the fact that the bound variable interpretation does not become possible even if the object QP of the embedded clause scrambles to the front of the matrix clause, as shown in (4).

(4) a. *Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei-ga Aya-ni
three-or.more-GEN university-DAT it-GEN graduate-NOM Aya-DAT
[Ken-ga syutugansita to] itta.
Ken-NOM applied that told

b. *Mittu-izyoo-no kaisya$_i$-o soko$_i$-no syain-ga Aya-ni
three-or.more-GEN company-ACC it-GEN graduate-NOM Aya-DAT
[Ken-ga tyoosasita to] itta.
Ken-NOM investigated that told

The same pattern can be seen when the pronominal is contained in the indirect object, instead of the subject, of the matrix clause:

(5) a. *Aya-ga soko$_i$-no sotugyoosei-ni [Ken-ga mittu-izyoo-no
Aya-NOM it-GEN graduate-DAT Ken-NOM three-or.more-GEN
daigaku$_i$-ni syutugansita to] itta.
university-DAT applied that told

'Aya told their graduates that Ken applied to three or more universities.'

b. *Aya-ga soko$_i$-no syain-ni [Ken-ga mittu-izyoo-no
Aya-NOM it-GEN employee-DAT Ken-NOM three-or.more-GEN
kaisya$_i$-o tyoosasita to] itta.
company-ACC investigated that told

'Aya told their employees that Ken investigated three or more companies.'

(6) a. *Mittu-izyoo-no daigaku$_i$-ni Aya-ga soko$_i$-no sotugyoosei-ni
three-or.more-GEN university-DAT Aya-NOM it-GEN graduate-DAT
[Ken-ga syutugansita to] itta.
Ken-NOM applied that told

b. *Mittu-izyoo-no kaisya-$_i$o Aya-ga soko$_i$-no syain-ni
three-or.more-GEN company-ACC Aya-NOM it-GEN employee-DAT
[Ken-ga tyoosasita to] itta.
Ken-NOM investigated that told

These facts thus indicate clearly that long-distance scrambling does not produce new binding relations, in sharp contrast to clause-internal scrambling.

The examples in (3)-(6) above have finite clauses as their embedded clauses. However, Mahajan (1989) pointed out that in Hindi scrambling out of an infinitival clause exhibits a different pattern from scrambling out of a finite clause. On the basis of Mahajan's work on Hindi, Nemoto (1993) closely examines scrambling in obligatory control constructions in Japanese and concludes that the same holds in this language. Let us compare (7) and (8) below.

(7) a. *Soko$_i$-no sotugyoosei-ga [mittu-izyoo-no daigaku$_i$-ni
it-GEN graduate-NOM three-or.more-GEN university-DAT
syutugansi-yoo to] sita.
apply-will that did

'Their graduates tried to apply to three or more universities.'

b. *Soko$_i$-no syain-ga [mittu-izyoo-no kaisya$_i$-o
it-GEN employee-NOM three-or.more-GEN company-ACC
tyoosasi-yoo to] sita.
investigate-will that did

'Their employees tried to apply to three or more companies.'

(8) a. Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei-ga
three-or.more-GEN university-DAT it-GEN graduate-NOM
[syutugansi-yoo to] sita.
apply-will that did

b. Mittu-izyoo-no kaisya$_i$-o soko$_i$-no syain-ga
three-or.more-GEN company-ACC it-GEN employee-NOM
[tyoosasi-yoo to] sita.
investigate-will that did

The examples in (7) are subject control constructions. As expected, the pronominal contained in the matrix subject cannot be bound by the embedded object QP. In contrast, the intended variable binding becomes possible when the object QP scrambles to the front of the matrix clause, as shown in (8). The contrast between (4) and (6) on the one hand and (8) on the other shows an asymmetry between the two types of long-distance scrambling: whereas scrambling out of a finite clause does not make variable binding possible, scrambling out of a control clause does, as Nemoto (1993) observes.

The same effects can be seen with object control constructions. Compare (9) with (10) and (11).

(9) a. *Ken-ga soko$_i$-no sotugyoosei-ni [mittu-izyoo-no daigaku$_i$-ni
Ken-NOM it-GEN graduate-DAT three-or.more-GEN university-DAT
syutugansuru yoo(ni)] susumeta.[3]
apply C recommended

'Ken recommended their graduates to apply to three or more universities.'

b. *Ken-ga soko$_i$-no syain-ni [mittu-izyoo-no kaisya$_i$-o
Ken-NOM it-GEN employee-DAT three-or.more-GEN company-ACC
tyoosasuru yoo(ni)] iraisita.
investigate C asked

'Ken asked their employees to investigate three or more companies.'

[3] Following Uchibori (2000), I assume that *yoo(ni)* appearing at the end of the embedded clause of the object control construction is a complementizer. See Uchibori 2000 for detailed discussion and arguments in favor of this position.

(10) a. ?Mittu-izyoo-no daigaku$_i$-ni Ken-ga soko$_i$-no sotugyoosei-ni
three-or.more-GEN university-DAT Ken-NOM it-GEN graduate-DAT
[syutugansuru yoo(ni)] susumeta.
apply C recommended

b. ?Mittu-izyoo-no kaisya$_i$-o Ken-ga soko$_i$-no syain-ni
three-or.more-GEN company-ACC Ken-NOM it-GEN employee-DAT
[tyoosasuru yoo(ni)] iraisita.
investigate C asked

(11) a. ?Ken-ga mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei-ni
Ken-NOM three-or.more-GEN university-DAT it-GEN graduate-DAT
[syutugansuru yoo(ni)] susumeta.
apply C recommended

b. ?Ken-ga mittu-izyoo-no kaisya$_i$-o soko$_i$-no syain-ni
Ken-NOM three-or.more-GEN company-ACC it-GEN employee-DAT
[tyoosasuru yoo(ni)] iraisita.
investigate C asked

The examples in (9) are object control constructions without scrambling and those in (10) and (11) are their variants with scrambling of the embedded object to the matrix clause, the difference between (10) and (11) lying in the landing site of scrambling. The bound variable reading is impossible in (9) but it is possible in (10) and (11).[4] This is another indication that scrambling out of a control clause behaves differently from scrambling out of a finite clause.

These observations naturally lead to the generalization in (12).

(12) Scrambling out of a control clause patterns with clause-internal scrambling.

In fact, Nemoto (1993) tries to derive this generalization from the properties of control constructions and movement.

However, on closer inspection, we see that the situation is more complicated. Let us consider the cases in (13) and (14).

[4] Nemoto (1993) judges examples like (10) and (11) to be fully acceptable on the bound variable reading. Although I find (10) and (11) slightly worse than (8), the important point is that (10) and (11) are much better than (4) and (6).

(13) a. *Soko$_i$-no sotugyoosei-ga Ken-ni [mittu-izyoo-no daigaku$_i$-ni
it-GEN graduate-NOM Ken-DAT three-or.more-GEN university-DAT
syutugansuru yoo(ni)] susumeta.
apply C recommended

'Their graduates recommended Ken to apply to three or more universities.'

b. *Soko$_i$-no syain-ga Ken-ni [mittu-izyoo-no kaisya$_i$-o
it-GEN employee-NOM Ken-DAT three-or.more-GEN company-ACC
tyoosasuru yoo(ni)] iraisita.
investigate C asked

'Their employees asked Ken to investigate three or more companies.'

(14) a. ?*Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei-ga Ken-ni
three-or.more-GEN university-DAT it-GEN graduate-NOM Ken-DAT
[syutugansuru yoo(ni)] susumeta.
apply C recommended

b. ?*Mittu-izyoo-no kaisya$_i$-o soko$_i$-no syain-ga Ken-ni
three-or.more-GEN company-ACC it-GEN employee-NOM Ken-DAT
[tyoosasuru yoo(ni)] iraisita.
investigate C asked

The cases in (14a, b) are scrambling variants of those in (13a, b), respectively. It is not surprising that the latter do not allow a bound variable interpretation. What is striking is that long-distance scrambling does not make the bound variable reading possible in (14), in contrast to what we saw in (8)/(10)/(11).[5] Given that the cases in (14), just like those in (8)/(10)/(11), involve scrambling out of a control clause, the contrast between them shows that the generalization in (12) is not correct.

The point can be strengthened by considering cases where the pronominal is contained in an adjunct belonging to the matrix clause.[6] First of all, as in the case of (1) and (2), where the pronominal is contained in the subject, clause-internal scrambling of the object

[5] As far as I know, the contrast between cases like (8)/(10)/(11) on the one hand and those like (14) on the other has been unnoticed in the literature. Uchibori (2000) reports a judgment according to which there is no such contrast (but Uchibori uses *daremo* 'everyone' as a QP; see note 1). I consulted fourteen speakers (all linguists) and ten of them agreed with my judgment. Three of them agreed that there is a contrast in the direction indicated here but did not find the bound variable interpretation in (14) to be as bad as I do. The remaining one speaker found the bound variable interpretation to be impossible in all cases in (8), (10), (11), and (14). In any case, what is crucial is the fact that those speakers who detect a contrast between (8)/(10)/(11) and (14) all find (14) to be worse than the others, not the other way around. This is an important fact that calls for an account.

[6] Thanks to Daiko Takahashi for bringing the relevance of such cases to my attention.

QP can make variable binding possible for a pronominal contained in an adjunct. The examples in (16) below are scrambling variants of those in (15).

(15) a. *Ken-ga soko$_i$-no sotugyoosei-no mae-de
Ken-NOM it-GEN graduate-GEN front-at
mittu-izyoo-no daigaku$_i$-ni denwasita.
three-or.more-GEN university-DAT called

'Ken called three or more universities in the presence of their graduates.'

b. *Ken-ga soko$_i$-no syain-no mae-de
Ken-NOM it-GEN employee-GEN front-at
mittu-izyoo-no kaisya$_i$-o hihansita.
three-or.more-GEN company-ACC criticized

'Ken criticized three or more companies in the presence of their employees.'

(16) a. Mittu-izyoo-no daigaku$_i$-ni Ken-ga soko$_i$-no
three-or.more-GEN university-DAT Ken-NOM it-GEN
sotugyoosei-no mae-de denwasita.
graduate-GEN front-at called

b. Mittu-izyoo-no kaisya$_i$-o Ken-ga soko$_i$-no
three-or.more-GEN company-ACC Ken-NOM it-GEN
syain-no mae-de hihansita.
employee-GEN front-at criticized

Consider now cases involving control. The examples in (17) have a pronominal contained in an adjunct of the matrix clause and a QP object in the embedded control clause. They do not permit a bound variable interpretation for the pronominal.

(17) a. *Ken-ga soko$_i$-no sotugyoosei-no mae-de Yumi-ni
Ken-NOM it-GEN graduate-GEN front-at Yumi-DAT
[mittu-izyoo-no daigaku$_i$-ni syutugansuru yoo(ni)] susumeta.
three-or.more-GEN university-DAT apply C recommended

'Ken recommended Yumi in the presence of their graduates to apply to three or more universities.'

b. *Ken-ga soko$_i$-no syain-no mae-de Yumi-ni
Ken-NOM it-GEN employee-GEN front-at Yumi-DAT
[mittu-izyoo-no kaisya$_i$-o tyoosasuru yoo(ni)] iraisita.
three-or.more-GEN company-ACC investigate C asked

'Ken asked Yumi in the presence of their employees to investigate three or more companies.'

When the object QP of the control clause scrambles to the matrix clause, the sentences in (18) result. They all disallow the intended bound variable interpretation, just like the examples in (14).

(18) a. ?*Mittu-izyoo-no daigaku$_i$-ni Ken-ga soko$_i$-no
three-or.more-GEN university-DAT Ken-NOM it-GEN
sotugyoosei-no mae-de Yumi-ni [syutugansuru yoo(ni)] susumeta.
graduate-GEN front-at Yumi-DAT apply C recommended

b. ?*Ken-ga mittu-izyoo-no daigakui-ni sokoi-no
Ken-NOM three-or.more-GEN university-DAT it-GEN
sotugyoosei-no mae-de Yumi-ni [syutugansuru yoo(ni)] susumeta.
graduate-GEN front-at Yumi- DAT apply C recommended

c. ?*Mittu-izyoo-no kaisya$_i$-o Ken-ga soko$_i$-no
three-or.more-GEN company-ACC Ken-NOM it-GEN
syain-no mae-de Yumi-ni [tyoosasuru yoo(ni)] iraisita.
employee-GEN front-at Yumi-DAT investigate C asked

d. ?*Ken-ga mittu-izyoo-no kaisya$_i$-o soko$_i$-no
Ken-NOM three-or.more-GEN company-ACC it-GEN
syain-no mae-de Yumi-ni [tyoosasuru yoo(ni)] iraisita.
employee-GEN front-at Yumi-DAT investigate C asked

The ill-formed status of the examples in (18) is unexpected under the generalization in (12).

Thus, the contrast between (8)/(10)/(11) on the one hand and (14)/(18) on the other undermines the generalization in (12) and requires a different account.

Notice that the presence of an obligatory control structure plays an essential role in making cases like (8)/(10)/(11) grammatical. If the embedded clause is finite and has a phonetically null subject coreferential with a matrix element, long-distance scrambling does not make a bound variable interpretation possible, as shown in (19).[7]

[7] Some speakers seem to find (19) to be slightly better than (14)/(18) but worse than (8)/(10)/(11). I thank Jun Abe, Daiko Takahashi, and one reviewer for pointing this out to me.

(19) a. ?*Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei$_j$-ga Ken-ni
three-or.more-GEN university-DAT it-GEN graduate-NOM Ken-DAT
[pro$_j$ syutugansita to] itta.
applied that said

'Their graduates told Ken that they applied to three or more universities.'

b. ?*Mittu-izyoo-no kaisya$_i$-o soko$_i$-no syain$_j$-ga Ken-ni
three-or.more-GEN company-ACC it-GEN employee-NOM Ken-DAT
[pro$_j$ tyoosasita to] itta.
investigated that said

'Their employees told Ken that they investigated three or more companies.'

What about the control structure makes (8)/(10)/(11) grammatical but not (14)/(18)? A close examination of the relevant examples reveals that the crucial factor distinguishing grammatical (8)/(10)/(11) from ungrammatical (14)/(18) seems to be the fact that the pronominal *soko* is contained in the controller in the former but not in the latter. The correct generalization thus seems to be (20).

(20) Scrambling out of a control clause makes variable binding possible only if the pronominal is contained in the controller.

Why does this generalization hold? In the next section, I will propose that (20) follows from an interaction of scrambling and movement of the controller under a movement theory of control.

3. Solving the Puzzle

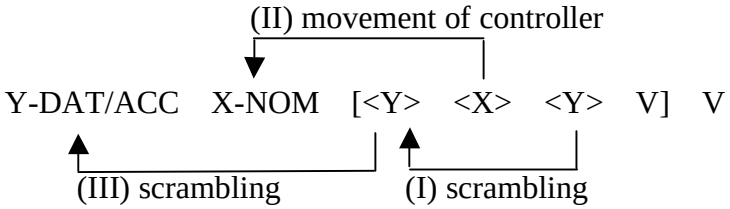
I propose that the generalization in (20) can be derived if the following claims hold:

(21) a. Scrambling out of a control clause patterns with scrambling out of a finite clause.
b. Obligatory control is derived by movement of the controller.
c. The relevant variable binding in (8)/(10)/(11) is licensed by clause-internal scrambling.

(21a) is an alternative to the generalization in (12) above. (21b) is a movement theory of control proposed (in different forms) by Bowers (1973, 2008), Hornstein (1998, 1999), and O'Neil (1995), and argued for in Boeckx (2000), Boeckx and Hornsterin (2003, 2004, 2006), Fujii (2006), and Hornstein (2001, 2003). (21c) is a consequence of (21a) and (21b).

To see how this proposal works, let us consider the derivation of the examples in (8) shown in (22), where material surrounded by angled brackets indicates copies without phonetic realization.

(22)

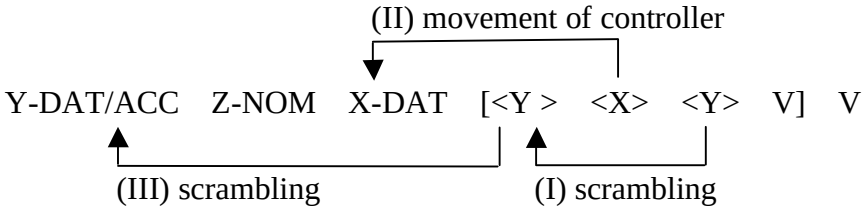


The first important step of the derivation is scrambling of the embedded object Y within the control clause. This scrambling puts Y in a position c-commanding the subject X of the embedded clause. Under the movement theory of control, the controller originates from the subject of the embedded clause and moves to the matrix clause. Given this, the next step is movement of X to the matrix clause, in accordance with the movement theory of control. Finally, Y scrambles to the matrix clause.

Given (21a), the second scrambling (i.e., step (III)) has no effects on binding. On the other hand, the first scrambling (step (I)) is clause-internal scrambling and can affect binding. Therefore, step (I) of the derivation ensures that Y can bind the pronominal contained in X.

The object control cases receive a similar analysis. Let us consider (23), which is a derivation for the examples in (10).

(23)



Here too, scrambling of Y within the control clause makes the relevant binding possible under the movement theory of control and further scrambling does not play any role with respect to binding.[8]

What is crucial in both (22) and (23) for the pronominal contained in X to be bound by Y is that long-distance scrambling is composed of shorter scramblings and that an intermediate scrambling within an embedded clause can produce new binding relations. That an intermediate scrambling within an embedded clause can produce new binding relations can be independently seen in cases like the following:

[8] In (22) and (23) Y moves past X and X moves past Y. One might think that this situation raises problems with minimality. However, it is well known that Japanese scrambling does not induce minimality effects (see, for example, Saito and Fukui 1998, Takano 1995, and Yamashita 2006 for discussion and specific proposals). Since the issue is not the main focus of this article, I simply assume this property of scrambling and do not attempt to explain it. See also note 15.

(24) a. *Ken-ga Aya-ni [soko$_i$-no sotugyoosei-ga
Ken-NOM Aya-DAT it-GEN graduate-NOM
mittu-izyoo-no daigaku$_i$-ni syutugansita to] itta.
three-or.more-GEN university-DAT applied that told

'Ken told Aya that their graduates applied to three or more universities.'

b. *Ken-ga Aya-ni [soko$_i$-no syain-ga
Ken-NOM Aya-DAT it-GEN employee-NOM
mittu-izyoo-no kaisya$_i$-o tyoosasita to] itta.
three-or.more-GEN company-ACC investigated that told

'Ken told Aya that their employees investigated three or more companies.'

(25) a. Mittu-izyoo-no daigaku$_i$-ni Ken-ga Aya-ni [soko$_i$-no
three-or.more-GEN university-DAT Ken-NOM Aya-DAT it-GEN
sotugyoosei-ga syutugansita to] itta.
graduate-NOM applied that told

b. Mittu-izyoo-no kaisya$_i$-o Ken-ga Aya-ni [soko$_i$-no
three-or.more-GEN company-ACC Ken-NOM Aya-DAT it-GEN
syain-ga tyoosasita to] itta.
employee-NOM investigated that told

In (24) the pronominal is contained in the embedded subject and the QP is an embedded object. In (25) the embedded object QP has undergone long-distance scrambling out of a finite clause. The pronominal cannot be bound by the QP in (24) but can be in (25). Since we know that scrambling out of a finite clause does not affect binding (see (4), (6), and (19)), what makes variable binding possible in (25) must be an intermediate step of long-distance scrambling, that is, scrambling within the embedded clause, on a par with step (I) in (22)/(23). Thus, the claim that an intermediate step of long-distance scrambling within an embedded clause can produce new binding relations is supported on independent grounds.

Note that on this analysis, scrambling within the control clause never puts the QP in a position c-commanding the pronominal in the case of (14) and (18), where the pronominal is not contained in the controller. As a result, variable binding is impossible in those cases. Therefore, this proposal argues strongly for the movement theory of control since there would be no difference relevant to binding between the derivations of (8)/(10)/(11) and those of (14)/(18) under a nonmovement approach to control, according to which the controller is base-generated in the matrix clause and the subject of the control clause is an independent element (i.e., PRO).

4. New Questions about the Nature of Movement

The proposal made in the previous section raises new questions for theoretical domains related to movement. In this section, I will discuss four points bearing directly on the present proposal. The purpose of this section is not to attempt to resolve them but to clarify important issues for future research.

4.1. On the Nature of Scrambling

One important claim in the present proposal is that scrambling out of a control clause can never license variable binding. Why should this be the case? Given the claim in (21a), this question boils down to the question why scrambling out of a clause cannot license variable binding. The proposed analysis of scrambling out of a control clause has an important consequence for this well-known issue.

One possible answer to the question why scrambling out of a clause cannot license variable binding is (26).

(26) Scrambling out of a clause is necessarily A'-movement.

This hypothesis has in fact been quite influential and entertained by many researchers (see in particular Mahajan 1990 and Miyagawa 2005, 2006). One strong motivation for this hypothesis comes from a contrast like that in (27).

(27) a. *Who$_i$ did his$_i$ mother call *t*?

b. Every boy$_i$ seems to his$_i$ mother [*t* to be smart].

The example in (27a) shows a weak crossover effect. The point relevant here is that *his* cannot be interpreted as a variable bound by *who* even though overt movement has put *who* in a position that c-commands *his*. In contrast, *his* can be interpreted as bound by *every boy* in (27b) due to overt movement of *every boy* (compare (27b) with **It seems to his$_i$ mother that every boy$_i$ is smart*, which does not permit a bound variable interpretation for *his*). The difference between (27a) and (27b) is usually attributed to the nature of movement: whereas A-movement can license variable binding, A'-movement cannot. Along the same lines, scrambling out of a clause cannot license variable binding if such scrambling is necessarily A'-movement.

Note that approaches relying on (26) assume crucially that whereas clause-internal scrambling can be A-movement (as in (2)), long-distance scrambling is necessarily A'-movement.[9] Those approaches typically attribute the differential properties of

[9] Cases like (i) below show that clause-internal scrambling can also be A'-movement. (Continued on next page)

clause-internal and long-distance scrambling to the properties of their landing sites; namely, clause-internal scrambling can target a specifier position, but long-distance scrambling must target an adjoined position. The scrambled phrase can thus be in an A-position in the former but in an A'-position in the latter. Given that this view claims that there are two different types of scrambling, one involving movement to a Spec and another involving adjunction, we might call it a nonuniform theory of scrambling.

Given the present proposal, the nonuniform theory cannot be the answer to the question why scrambling out of a clause does not affect binding. Recall that the analysis of (8)/(10)/(11) presented above relies crucially on the movement theory of control. More specifically, movement of X in (22) and (23) plays a crucial role in making binding inside the embedded clause possible. Note that here X moves from the embedded clause to a θ-position in the matrix clause. Given that θ-positions are considered to be typical A-positions, this is A-movement. This means that A-movement out of a control clause is possible. Therefore, (26) cannot be correct for scrambling out of a control clause. If so, we cannot appeal to a nonuniform theory of scrambling to account for why scrambling out of a control clause does not license variable binding.

An alternative to a nonuniform theory is a uniform theory of scrambling, which treats clause-internal and long-distance scrambling in the same way with respect to their landing sites and attempts to account for differences between the two without appealing to (26). One such theory has recently been proposed by Saito (2003, 2005) (other proposals for a uniform theory of scrambling include those of Abe (1993), Bošković and Takahashi (1998), Saito (1992), and Tada (1990, 1993)).

Saito (2003, 2005) proposes a theory of scrambling based on the idea that movement chains are interpreted cyclically by means of deletion of features. Modifying and extending Chomsky's (1995: chap. 3) proposal for the formation of operator-variable structures by deletion of parts of chains, Saito proposes that chains are interpreted as they are formed and that chain interpretation deletes from a position of a chain all features that are not selected in that position of the chain, where selection includes feature checking (agreement) and θ-marking.

Let us consider a concrete case. Under the copy theory of movement, the sentence in (28a) has the structure in (28b).

(i) Zibunzisin$_i$-o Ken$_i$-ga semeta.
self-ACC Ken- NOM blamed

'Ken blamed himself.'

If clause-internal scrambling were always A-movement, (i) would be a violation of condition (C), contrary to fact.

(28) a. Who did John see?

b. [$_{CP}$ who did John see who]
{P, O, A} {P, O, A}

c. [$_{CP}$ who did John see who]
{P, O} {A}

Assuming that each syntactic object is a set of features, Saito claims that the *wh*-phrase *who* is a set of (at least) P(honological)-features, an O(perator)-feature, and an A(rgument)-feature, which is closely tied with the referential properties of the phrase and participates in binding relations.[10] When *who* undergoes *wh*-movement, this feature set is copied, forming a chain, so that there are two identical feature sets, one in Spec,C and another in the object of the verb. Now chain interpretation applies. Since this is overt movement, the P-features must be retained in the head of the chain and must be deleted in the tail (this is an essential part of the definition of overt movement). Deletion of the rest of the features is contingent on selection. The O-feature is selected in Spec,C (it enters into checking/agreement with C), but is not selected in the object position, so that it is retained in the former and deleted in the latter. By contrast, the A-feature is selected in the object position (the object is θ-marked there), but is not selected in Spec,C. Thus, it is deleted in Spec,C. This results in the structure in (28c), where the P- and O-features are located in Spec,C, whereas the A-feature is located in the object position. Saito claims that the copy of *who* in Spec,C, having an O-feature, functions as an operator and that that in the object, having an A-feature, functions as a variable.

Long-distance *wh*-movement is analyzed in the same way. Consider (29).

(29) a. Who do you think John saw?

b. [$_{CP}$ who John saw who]
{P, O, A} {P, O, A}

c. [$_{CP}$ who John saw who]
{P, O} {A}

d. [$_{CP}$ who do you think [$_{CP}$ who John saw who]]
{P, O} {P, O} {A}

e. [$_{CP}$ who do you think [$_{CP}$ John saw who]]
{P, O} {A}

Saito assumes that the sentence in (29a) is derived by two successive *wh*-movements, the

[10] Saito calls the third feature a D-feature in Saito 2003 but an argument-feature in Saito 2005. I follow the latter here.

first *wh*-movement being to Spec,C of the embedded clause and the second to Spec,C of the matrix clause. The first *wh*-movement derives (29b), to which chain interpretation applies. Here Saito follows Chomsky (2000) in assuming that this step of *wh*-movement takes place because a feature of C attracts an O-feature of the *wh*-phrase. On this view, the O-feature is selected in Spec,C. Therefore, the O-feature of *who* in the object position deletes. Deletion of the P- and A-features takes place in the same way as clause-internal *wh*-movement. Hence (29c) results. Then the second *wh*-movement applies, copying the feature set of *who* in Spec,C of the embedded clause and deriving (29d). Chain interpretation applies to this newly created chain. The P- and O-features are retained in Spec,C of the matrix clause for the reasons stated above.[11]

For A-movement, consider (30).

(30) Every boy_i seems to his_i mother [*t* to be smart].

Saito assumes that A-movement is driven by an EPP-feature of T and that an EPP-feature selects an A-feature. On these assumptions, (30) is derived as in (31).

(31) a. $[_{TP}$ every boy seems to his mother $[_{TP}$ every boy to be smart]]
{P, A} {P, A}

b. $[_{TP}$ every boy seems to his mother $[_{TP}$ every boy to be smart]]
{P, A} {A}

Since the A-feature is selected in both the head and the tail of the A-movement chain, it is retained in both positions. The raised DP *every boy*, retaining its A-feature, can bind *his* in the matrix clause after A-movement. The result ensures that A-movement can license variable binding.[12]

Regarding Japanese scrambling, Saito proposes that, regardless of whether it is clause-internal or long-distance, it is a uniform operation targeting a specifier position (such as Spec,T and Spec,C). He also assumes that it takes place without selection (that is, it is not triggered by checking/agreement). This means two things. First, unlike *wh*-movement, there is no O-feature involved in scrambling. Second, given that chain interpretation deletes the A-feature from the head of the chain formed by scrambling, further scrambling copies only

[11] Saito (2003) assumes with Chomsky (2000) that the feature of the intermediate C that attracted the O-feature at step (29b) deletes after its selectional requirement is satisfied. As a result, the O-feature is not selected in the intermediate Spec,C at step (29d) and hence it is deleted there in (29e).

[12] In (31) the DP *every boy* is assumed to move from Spec,T of the embedded clause. If it originates in a lower position (such as the subject position of the small clause headed by *smart*), raising will consist of two steps, the first step being to Spec,T of the embedded clause and the second step to Spec,T of the matrix clause. Under Saito's analysis, both steps of A-movement will be driven by an EPP-feature of T.

the P-features of the scrambled element.

Let us consider clause-internal scrambling first:

(32) a. Sono daigaku-ni Ken-ga syutugansita.
that university-DAT Ken-NOM applied

'Ken applied to that university.'

b. [$_{TP}$ sono daigaku-ni Ken-ga sono daigaku-ni V]
{P, A} {P, A}

c. [$_{TP}$ sono daigaku-ni Ken-ga sono daigaku-ni V]
{P} {A}

Since scrambling does not involve an operator feature, the scrambled element has no operator feature and has only P- and A-features. They are copied when scrambling takes place, giving rise to (32b). Since the A-feature is selected in the tail of the chain but not in its head, it is deleted in the head, resulting in (32c).

Consider next long-distance scrambling out of a finite clause:

(33) a. Sono daigaku-ni Masao-ga Yumi-ni
that university-DAT Masao-NOM Yumi-DAT
[Ken-ga syutugansita to] itta.
Ken-NOM applied that told

'Masao told Yumi that Ken applied to that university.'

b. [$_{CP}$ sono daigaku-ni Ken-ga sono daigaku-ni V to]
{P, A} {P, A}

c. [$_{CP}$ sono daigaku-ni Ken-ga sono daigaku-ni V to]
{P} {A}

d. [$_{TP}$ sono daigaku-ni Masao-ga Yumi-ni
{P}
[$_{CP}$ sono daigaku-ni Ken-ga sono daigaku-ni V to]
{P} {A}

e. [$_{TP}$ sono daigaku-ni Masao-ga Yumi-ni
{P}
[$_{CP}$ Ken-ga sono daigaku-ni V to] V]
{A}

The derivation up to (33c) is identical to the derivation in (32), except that the landing site is Spec,C in (33). Crucially, on this analysis, the element that has undergone clause-internal

scrambling has only P-features when it undergoes further scrambling and so scrambling out of a clause moves (copies) only the P-features of the scrambled element. This is shown in (33d). Given that the P-features are retained only in the head of the chain, those in the intermediate Spec,C are deleted. The result is (33e).

As Saito argues, this analysis has the important consequence of deriving the effects of "total reconstruction" induced by long-distance scrambling, examples of which are shown in (4) and (6). As can be seen in (33d), scrambling out of a finite clause affects only the P-features of the scrambled element (because the A-feature is deleted from the head of the chain formed by clause-internal scrambling, as shown in (33b-c). Given that binding requires the antecedent to have an A-feature, total reconstruction effects follow as a natural consequence of this analysis, without appeal to any covert operations like reconstruction.[13] At the same time, the very existence of the derivational point illustrated in (32b) ensures, under a derivational approach to binding, that clause-internal scrambling can make binding possible since the scrambled phrase has an A-feature right after clause-internal scrambling (even though this A-feature gets deleted eventually). Thus, Saito's uniform theory of scrambling can account for the difference between clause-internal and long-distance scrambling with respect to binding effects without appealing to (26).[14,15]

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[13] Shigeru Miyagawa (personal communication) pointed out that Saito's analysis faces a problem in dealing with anti-reconstruction effects as shown in (i) below.

(i) Ken-ga sotugyoosita daigaku-ni kare-ga [Yumi-ga syutugansuru to] omotteiru.
Ken-NOM graduated university-DAT he-NOM Yumi-NOM apply that think

'He thinks that Yumi will apply to the university Ken graduated from.'

In this example the matrix subject pronoun *kare* can be coreferential with *Ken*, which is contained in the phrase that has undergone long-distance scrambling. The problem is that if the phrase that has undergone long-distance scrambling consists of only its P-features, *Ken*'s A-feature will stay in the embedded clause and hence will be c-commanded by *kare*. If that is the case, coreference between *kare* and *Ken* should violate condition C. I suspect that the problem can be resolved in the following way. First, Saito (2005: note 3) suggests that each syntactic object has a categorial feature and that categorial features are represented at every position of a chain. Assuming now an approach that accounts for anti-reconstruction effects by allowing relative clauses to be late-merged with moved elements (Lebeaux 1988, Nishigauchi 2002, Miyagawa 2006), it is possible to analyze (i) as involving late-merger of the relative clause containing *Ken* with the scrambled DP, which retains its categorial feature. This derivation will ensure that (i) does not violate condition C. I also suggest that the relative clause can be construed with the relative head *daigaku* 'university,' whose A-feature is retained at the tail of the chain, because the relative clause and the relative head are contained in the same chain.

[14] To deal with cases like (i) of note 9, repeated below, Saito (2003) claims that, unlike condition (A), which is an anywhere condition and so is satisfied derivationally, condition (C) is an LF condition, so that it applies after chain interpretation. (Continued on next page)

Under Saito's theory, scrambling out of a control clause will be analyzed in the same way as scrambling out of a finite clause illustrated in (33). If so, it follows straightforwardly that scrambling out of a control clause does not license variable binding since this scrambling will involve movement of the P-features alone. Thus, Saito's uniform theory is a promising direction to pursue to derive the relevant properties of scrambling out of a control clause.

At the same time, however, details need to be worked out to make Saito's theory compatible with a general theory of successive-cyclic movement, given the results of much recent work on successive-cyclic movement (see Bošković 2007 and references cited there for various issues relevant to successive-cyclic movement). For instance, Bošković (2007) argues against the idea that successive-cyclic movement is driven by a feature of the head to whose specifier movement takes place. He proposes instead that all successive-cyclic movement is driven by an uninterpretable feature of the moving element. Moreover, he suggests that movement proceeds by way of a specifier of each intermediate head (in other words, every maximal projection is a phase/barrier). These aspects of successive-cyclic movement, if correct, are not compatible with Saito's theory of movement in its present form. Recall that in Saito's theory successive-cyclic movement, whether *wh*-movement or A-movement, is triggered by a feature of the head to whose specifier movement takes place. This is in conflict with Bošković's claim that successive-cyclic movement is always driven by a feature of the moving element. Another question arises about the timing of chain interpretation: when exactly does chain interpretation (in terms of deletion) apply if movement always proceeds by way of each intermediate specifier, as Bošković suggests? Thus, if the theory of successive-cyclic movement proposed by Bošković is on the right track and if we are to maintain Saito's uniform theory of scrambling to explain the properties of Japanese scrambling discussed here, then we need to seek a way to make them compatible with each other.

(i) Zibunzisin$_i$-o Ken$_i$-ga semeta.
self-ACC Ken- NOM blamed

'Ken blamed himself.'

(ii) Zibunzisin$_i$-o Ken$_i$-ga zibunzisin-o semeta.
{P} {A}

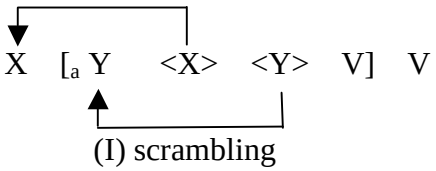
As shown in (ii), after chain interpretation, *zibunzisin* 'self' in the chain head does not have its A-feature and hence does not bind *Ken*, as a result of which a condition (C) violation does not occur.

[15] Note also that Saito's analysis has a consequence for the issue mentioned in note 8. On this analysis, A-movement of the controller past the scrambled phrase is possible because the scrambled phrase, having had its A-feature deleted, has lost its argument status when A-movement of the controller takes place and hence is invisible to that movement.

4.2. Illicit Scrambling

Recall that the present analysis of (8)/(10)/(11) rests crucially on the interaction of (clause-internal) scrambling and movement of the controller under the movement theory of control. The relevant part of the analysis is repeated in (34).

(34) (II) movement of controller



I proposed that clause-internal scrambling of the embedded object Y makes it possible for Y to bind a pronominal contained in the controller X, which moves from within the embedded clause to the matrix clause. In the relevant examples Y undergoes further scrambling out of the embedded clause, so that it ends up appearing in front of X in the matrix clause. A question arises here.[16] What happens if Y does not scramble further out of the embedded clause? The resulting sentence would have the word order X-Y-V-V, which corresponds to the order in (7a), for instance, repeated below.

(7) a. *Soko$_i$-no sotugyoosei-ga [mittu-izyoo-no daigaku$_i$-ni
it-GEN graduate-NOM three-or.more-GEN university-DAT
syutugansi-yoo to] sita.
apply-will that did

'Their graduates tried to apply to three or more universities.'

When analyzing (7a), we always assume that it does not involve scrambling of the embedded object. In that way, we can capture the ungrammaticality of this example. But if the derivation in (34) (with no further scrambling of Y) were available, (7a) would be as acceptable as (8), repeated below, contrary to fact.

(8) a. Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei-ga
three-or.more-GEN university-DAT it-GEN graduate-NOM
[syutugansi-yoo to] sita.
apply-will that did

We thus need to exclude this derivation.

In fact, the problem is more general. Problems of the same nature arise independently of the analysis of the control cases in question. Consider the following derivation for a simplex sentence:

[16] Kensuke Takita (personal communication) first brought this question to my attention.

(35) a. [$_a$ Y X <Y> V]

b. [X Y <X> <Y> V]

In (35a) the object Y scrambles over the subject X and in (35b) the subject X scrambles over the scrambled Y. This derivation will result in the word order X-Y-V, which is identical to an SOV sentence without scrambling. If this derivation were possible, cases like (1a), repeated below, would be acceptable (Y could bind into X due to the existence of the step in (35a)).

(1) a. *Soko$_i$-no sotugyoosei-ga mittu-izyoo-no daigaku$_i$-ni syutugansita.
it-GEN graduate-NOM three-or.more-GEN university-DAT applied

'Their gradutaes applied to three or more universities.'

Derivations like that in (35) are a long-standing problem for any analysis of Japanese scrambling and there have been a number of proposals made to deal with this problem. For example, Saito (1985) proposed that the step in (35b) is disallowed because nominative phrases cannot scramble in Japanese. If so, the problem for (1a) will not arise. However, this account does not cover the problem with the derivation in (34), where the movement of X is guaranteed by the movement theory of control.

Another approach to the problem in question was suggested by Hoji (1985). He put forth the following condition:

(36) A syntactic adjunction operation cannot apply if it does not change the order of the overt lexical string. (Hoji 1985: 352)

Assuming that scrambling is an adjunction operation, Hoji claims that this condition blocks the applications of scrambling in (35) since these applications of scrambling do not change the original word order of the subject and the object.[17] This approach can be extended to cover the problem with (34) if we interpret Hoji's condition as stating that if the surface form of a given sentence corresponds to a string that can be analyzed without scrambling, the sentence is indeed understood to involve no scrambling. Since the sentence in (7a) can be analyzed without scrambling, the derivation in (34) with "superfluous scrambling" is blocked

Recently, Ko (2007) proposes a different line of analysis that excludes derivations like

[17] Hoji (1985: 367) suggests that the condition in (36) may fall outside formal grammar and belong to a domain of parsing. Abe (1993) and Takano (1992) propose to derive Hoji's condition from economy of derivation. See also Takano 2007 for a different approach capitalizing on the properties of the optional assignment of a feature that triggers scrambling.

(34) and (35). On her proposal, the derivation in (35) is blocked by Fox and Pesetsky's (2003) Linearization Preservation, given in (37), where Spell-Out Domain is a syntactic constituent relevant to the determination of linear order of syntactic elements.[18]

(37) The linear ordering of syntactic units is affected by Merge and Move *within* a Spell-out Domain, but is fixed once and for all at the end of each Spell-out Domain.

The basic idea here is that linear order is determined cyclically and that linear order established at the end of a given Spell-out Domain must be preserved at the end of each later Spell-out Domain. Let us imagine that a in (35a) is a Spell-out Domain.[19] At the end of this Spell-out Domain, the order between X and Y is fixed in such a way that Y precedes X. By Linearization Preservation in (37), this order between X and Y must be preserved at later Spell-out Domains. Therefore, the derivation in (35b) is disallowed since it changes the order between X and Y fixed at the earlier Spell-out Domain. Thus, the sentence in (1b) cannot have the derivation in (35).[20] This approach can account for the illicit derivation in

[18] Ko's (2007) proposal is intended to account for facts related to quantifier float in Korean, but can readily be extended to the cases at hand. See also Takita 2008 for a proposal that Linearization Preservation can account for scope effects with scrambling in Japanese.

[19] Ko (2007) claims that vP and CP are Spell-out Domains. The exact identity of Spell-out Domains does not concern us here.

[20] Consider the following problem, which was originally discussed by Takita (2008) in the context of scope interactions of QPs in Japanese:

(i) a. $[_a$ X Y V]

b. Y $[_a$ X <Y> V]

c. X Y $[_a$ <X> <Y> V]

At the end of the Spell-out Domain a, X precedes Y. Then Y scrambles out of a, followed by scrambling of X. The resulting order between X and Y in (ic) preserves their order determined at a in (ia). So this derivation satisfies Linearization Preservation. If the step in (ib) guaranteed Y's binding into X, (1a) would allow variable binding with this derivation. The fact that it does not suggests that Y can bind into X only within a. We can imagine a number of ways to ensure this. One possibility is to appeal to Saito's (2003, 2005) theory of scrambling, according to which scrambling out of a certain domain has no binding effects (see section 3.1). If a is the relevant domain, scrambling out of a will have no binding effects and so Y will bind into X only within a. Two other possibilities were suggested to me by Mamoru Saito. Suppose a is a domain relevant to interpretation (as well as a Spell-out Domain). Following Chomsky (2000, 2001), let us call such a domain a phase. We might then claim that binding relations are established only at the end of each phase. On this view, Y does not bind into X in the derivation in (i) because Y does not c-command X at the phase a in (ia) or at the next higher phase in (ic) (here we assume a derivational approach to binding in which only chain heads enter into binding, so that the copies of X and Y inside a in (ic) are irrelevant). Alternatively, we might entertain the hypothesis that binding relations established at a given phase must be preserved throughout a derivation. On this approach, Y does not bind into X

(34) as well. Suppose that a in (34) is a Spell-out Domain. Then the order between X and Y is fixed there, that is, Y precedes X. But this order is not preserved at a later Spell-out Domain if X moves over Y and Y does not move, as in (34). Thus, the derivation in (34) violates Linearization Preservation and hence (7a) cannot be derived in this way.[21]

As we have seen, both the approach invoking Hoji's (1985) condition in (36) and the approach appealing to Linearization Preservation can exclude the undesired derivations in (34) and (35). The two approaches are equal on this count. However, we can provide empirical evidence for the second approach based on binding effects with scrambling out of a control clause.

Observe first the following case (NC = nominal complementizer):

(38) ?Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei-ga kotosi
three-or.more-GEN university-DAT it-GEN graduate-NOM this.year
[rainen syutuganzuru koto]-o kessinsita.
next.year apply NC-ACC decided

'Their graduates decided this year to apply to three or more universities next year.'

This case involves scrambling of the embedded object out of a control clause, which makes it possible for the scrambled object to bind into the matrix subject, which is a controller. On the present analysis, the acceptability of variable binding indicates that the embedded object first scrambled within the embedded clause. Now observe the case in (39).[22]

(39)?*Soko$_i$-no sotugyoosei-ga mittu-izyoo-no daigaku$_i$-ni kotosi
it-GEN graduate-NOM three-or.more-GEN university-DAT this.year
[rainen syutuganzuru koto]-o kessinsita.
next.year apply NC-ACC decided

Here the embedded object scrambles out of the control clause to a position between the matrix subject and the matrix adjunct. Unlike the example in (38), this example does not permit a bound variable interpretation for the pronominal contained in the matrix subject (though scrambling of the embedded object itself is fine, as evidenced by the fact that (39) is grammatical if the matrix subject is replaced by *Ken*).

The fact that (39) does not allow a bound variable interpretation poses a serious problem for the approach that blocks the derivation in (34) by appealing to (36). Notice that in the case of (39), the embedded object scrambles to the matrix clause, as is clearly

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at phase a in (ia) and this binding relation must be preserved throughout the derivation. As a result, scrambling of Y out of a has no effects on binding.

[21] The same reservation applies here as the previous note.

[22] I am indebted to Norvin Richards for this example.

indicated by its position in front of the matrix adjunct. Since this scrambling of the embedded object does affect word order, from the perspective of (36), it should be allowed with the intermediate step in (34). But then the impossibility of the bound variable reading cannot be accounted for.

In contrast, the derivation in (34) is correctly excluded for (39) under the approach invoking Linearization Preservation. On this approach, the order between X and Y determined at a in (34), namely, the embedded object preceding the controller, must be preserved. But in (39) the controller precedes the embedded object, in violation of Linearization Preservation. Therefore, (39) cannot involve the derivation in (34).

These considerations show that scrambling out of a control clause provides independent empirical evidence for an approach like Ko's (2007) that constrains the application of scrambling with Linearization Preservation.

On the other hand, an important conceptual question arises with Linearization Preservation. Juan Uriagereka pointed out to me that reliance on Linearization Preservation presupposes that language has "counters," which is not a desirable move, given the fairly common assumption to the contrary. If so, we are in a dilemma: facts about Japanese scrambling do appear to support Linearization Preservation, but the latter seems to be problematic on conceptual grounds. Therefore, it is very important for future work to consider whether the facts discussed in this subsection indeed can only be explained by Linearization Preservation and if yes, what exactly the status of Linearization Preservation is in the theory of human language.

4.3. Long-Distance Scrambling: Control vs. Finite Clauses

Recall that the analysis proposed in section 3 relies heavily on the claim in (21a), repeated below.

(21) a. Scrambling out of a control clause patterns with scrambling out of a finite clause.

As we have seen, facts involving variable binding support this claim. But there are cases where scrambling out of a control clause does pattern differently from scrambling out of a finite clause. One such case is so-called "additional-*wh* effects" (see Saito 1994 for extensive discussion and an analysis of additional *wh*-effects in Japanese).

To see this, let us first consider (40).

(40) a. *Naze dare-ga sono hon-o katta no.
why who-NOM that book-ACC bought Q

'Who bought the book why?'

b. Dare-ga naze sono hon-o katta no.
who-NOM why that book-ACC bought Q

c. Nani-o naze dare-ga katta no.
what-ACC why who-NOM bought Q

'Who bought what why?'

The contrast between (40a) and (40b) shows that the Japanese *wh*-phrase *naze* cannot c-command an argument *wh*-phrase. Moreover, the grammaticality of (40c) shows that this effect can be voided by the presence of an additional argument *wh*-phrase c-commanding *naze*. Note that (40c) also indicates that a scrambled phrase can serve as an additional *wh*-phrase.

Not all scrambled phrases can serve as additional *wh*-phrases, however. Consider (41).

(41) a. *Naze dare-ga Ken-ni [Yumi-ga sono hon-o katta to] itta no.
why who-NOM Ken-DAT Yumi-NOM that book-ACC bought that said Q

'Why did who tell Ken that Yumi bought that book?'

b. *Nani-o naze dare-ga Ken-ni [Yumi-ga katta to] itta no.
what-ACC why who-NOM Ken-DAT Yumi-NOM bought that said Q

(41a) is ungrammatical because *naze* c-commands *dare*. In (41b) the object of the embedded clause is a *wh*-phrase and is scrambled to the front of the matrix clause. The sentence is still ungrammatical even though the scrambled phrase c-commands *naze*. This fact indicates that long-distance scrambled phrases cannot serve as additional *wh*-phrases.

In the case of (41b), the embedded object has scrambled out of a finite clause. Nemoto (1993) observes that a different patter emerges when the *wh*-phrase scrambles out of a control clause.

(42) a. *Naze dare-ga Ken-ni [sono hon-o kau yoo(ni)] susumeta no.
why who-NOM Ken-DAT that book-ACC buy C recommended Q

'Why did who recommend Ken to buy that book?'

b. Nani-o naze dare-ga Ken-ni [kau yoo(ni)] susumeta no.
what-ACC why who-NOM Ken-DAT buy C recommended Q

The sentence in (42b), where the *wh*-phrase has scrambled out of a control clause, does improve on the sentence in (42a). Here we see a contrast between two types of long-distance scrambling: scrambling out of a finite clause does not induce additional *wh*-effects, but scrambling out of a control clause does.

This is unexpected under the view in (21a). Recall that this view is supported by

binding facts. A detailed investigation is thus necessary to find out why binding and additional *wh*-effects should differ in this way.

4.4. Bound Pronoun Effects

As a final point, let us discuss a difference between Japanese scrambling and English *wh*-movement. Let us first consider the following well-known fact:

(43) Who did everyone buy for Max?

May (1985) observes that the sentence in (43) permits a reading on which the value of *who* covaries with that of *everyone*. Thus, (43) can be interpreted as asking for a list of pairs that specifies which person bought what. Lasnik (2007) calls this a "family of questions (FOQ) reading."

The FOQ reading is also possible with long-distance *wh*-movement, as in (44).

(44) Who do you think everyone saw?

However, May (1977) and Sloan (1991) observe that the FOQ reading is not available with long-distance *wh*-movement if the QP *everyone* is placed in the subject of the matrix clause, as in (45).

(45) Who does everyone think Mary saw?

Thus, long-distance *wh*-movement does not give rise to an FOQ reading if a QP is in the subject of the matrix clause.

Sloan (1991) points out an interesting exception to this generalization (Sloan attributes the observation to Robert May). The example in (46), though it involves long-distance *wh*-movement and a QP in the matrix subject, does allow an FOQ reading, in contrast to (45).

(46) Who does everyone$_i$ think he$_i$ saw?

The important property that distinguishes (46) from (45) is the fact that the subject of the embedded clause is a pronoun bound by the QP in the matrix subject. In fact, the FOQ reading is available in (46) only on the reading on which the embedded subject is bound by the matrix subject. Thus, the presence of a bound pronoun in the embedded subject makes possible the FOQ reading with long distance *wh*-movement that is otherwise unavailable.[23]

This situation with English *wh*-movement contrasts with what we saw with Japanese

[23] Lasnik (2007) observes that similar effects induced by bound pronouns can be found with quantifier scope, gapping, antecedent-contained deletion, reciprocal binding, extraposition, and multiple sluicing.

scrambling. Recall that in (19), repeated below, long-distance scrambling does not make variable binding possible even if *pro* in the embedded subject is bound by the matrix subject.

(19) a.?*Mittu-izyoo-no daigaku$_i$-ni soko$_i$-no sotugyoosei$_j$-ga Ken-ni
three-or.more-GEN university-DAT it-GEN graduate-NOM Ken-DAT
[pro$_j$ syutugansita to] itta.
applied that said

'Their graduates told Ken that they applied to three or more universities.'

b.?*Mittu-izyoo-no kaisya$_i$-o soko$_i$-no syain$_j$-ga Ken-ni
three-or.more-GEN company-ACC it-GEN employee-NOM Ken-DAT
[pro$_j$ tyoosasita to] itta.
investigated that said

'Their employees told Ken that they investigated three or more companies.'

Why does Japanese scrambling differ from English *wh*-movement in this respect? This is another important issue that needs to be addressed and resolved in future work.

5. Summary

On the basis of the discovery of new facts about binding effects with scrambling out of a control clause in Japanese, I have proposed an analysis of those facts consisting of two major claims:

(47) a. Scrambling out of a control clause patterns with scrambling out of a finite clause with respect to binding effects.

b. Obligatory control involves movement of the controller.

The present study thus provides a new argument in their favor. I have also pointed out that this proposal raises new questions about the nature of movement that need to be resolved in future study.

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