Scrambling, Control, and Phases*

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Abstract
This article presents new evidence for two recent proposals about movement: a movement analysis of control and an analysis of movement in terms of copying and deletion of features in chains. The evidence comes from hitherto unnoticed facts about scrambling out of a control clause in Japanese. It is proposed that those facts can be accounted for only under a movement analysis of control and a feature-deletion analysis of scrambling. It is also shown that the proposal has important consequences for the nature of scrambling, a phase-based theory of syntactic derivation, and "tucking-in" operations for movement.

Keywords: control, Japanese, movement, phase, scrambling, tucking in


*For their helpful comments, questions, and discussion, I would like to thank Jun Abe, Hiroshi Aoyagi, Tomohiro Fujii, Koji Hoshi, Daisuke Inagaki, Aiko Ishikawa, Howard Lasnik, Roger Martin, Mikinari Matsuoka, Shigeru Miyagawa, Takashi Munakata, Masashi Nomura, Toshifusa Oka, Kaori Okamoto, Norvin Richards, Mamoru Saito, Koji Sugisaki, Daiko Takahashi, Kensuke Takita, Hanae Terashima, Juan Uriagereka, Akira Watanabe, and Hideaki Yamashita, as well as audiences at the symposium of the Twenty-Fifth Conference of the English Linguistic Society of Japan (Nagoya University), Tohoku Gakuin University, Yokohana National University, and Nanzan University.

Against this backdrop, this article aims to make a contribution toward a better understanding of the nature of syntactic movement and derivation, by looking at the interaction of scrambling and control in Japanese. I will show that a close examination of scrambling out of a control clause in Japanese gives us a new clue to answering questions about the nature of scrambling and control. On the basis of a discovery of new facts about scrambling out of a control clause and an analysis proposed to account for them, I will particularly argue (i) that a movement analysis of control is correct, (ii) that scrambling differs from both A-movement and A'-movement (operator movement), (iii) that scrambling out of a phase involves movement of phonological features alone, (iv) that movement is required to "tuck in" only when it enters into checking/agreement, and (v) that scrambling takes place without entering into checking/agreement. I will also show that this proposal has important consequences for a phase-based theory of syntactic derivation. Specifically, I will claim that vP, but not CP, of the embedded clause of control constructions is a phase, whereas vP of the embedded clause of causative constructions is not.

This article is organized as follows. In section 1 I will present previously unnoticed facts about scrambling out of a control clause in Japanese. In section 2 I will outline an analysis of those facts that relies crucially on a movement analysis of control. In section 3 I will point out further properties of Japanese scrambling that should be accounted for together with those revealed in section 1. In section 4 I will propose a full analysis, adopting an approach to Japanese scrambling proposed recently by Saito (2003, 2005) as well as a movement analysis of control. In section 5 I will discuss other issues directly related to the main proposal of this article. Finally, section 6 concludes the discussion.

1 An Initial 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)

(1a)  *Soko-no sotugyousei-ga mittu-izoyo-no daigaku,-ni syutugansita.
      it-GEN graduate-NOM three-or.more-GEN university-DAT applied
      'Their graduates applied to three or more universities.'

b.  *Soko,-no syain-ga mittu-izoyo-no kaisya,-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 a graduate of 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.' In contrast, the intended bound variable interpretation becomes possible when the object QP scrambles to the front of the sentence:

(2a)  Mittu-izoyo-no daigaku,-ni soko,-no sotugyousei-ga syutugansita.
      three-or.more-GEN university-DAT it-GEN graduate-NOM applied

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

A standard approach to these facts is to appeal to a necessary condition on 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 bound variable interpretation, as expected.

(3a)  *Soko-no sotugyousei-ga Aya-ni [Ken-ga mittu-izoyo-no
      it-GEN graduate-NOM Aya-DAT Ken-NOM three-or.more-GEN
      daigaku,-ni syutugansita to] itta.
      university-DAT applied that told
      'Their graduates told Aya that Ken applied to three or more universities.'

b.  *Soko,-no syain-ga Aya-ni [Ken-ga mittu-izoyo-no
      it-GEN employee-NOM Aya-DAT Ken-NOM three-or.more-GEN
      kaisya,-o tyoosasita to] itta.
      company-ACC investigated that told
      'Their employees told Aya that Ken investigated three or more companies.'

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 Hojii (2003), I avoid using QPs like daremo 'everyone' and subete 'all' that can be used to refer to a specific group of entities. Hojii points out that use of such QPs obscures judgment on bound variable interpretation in Japanese.
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).

(4a. *Mittu-izyoo-no daigaku-ni soko-no sotugyosei-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-o soko-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:

(5a. *Aya-ga soko-no sotugyosei-ni [Ken-ga mittu-izyoo-no Aya-NOM it-GEN graduate-DAT Ken-NOM three-or-more-GEN
daigaku-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-no syain-ni [Ken-ga mittu-izyoo-no Aya-NOM it-GEN employee-DAT Ken-NOM three-or-more-GEN
kaisya-o tyoosasita to] itta.
company-ACC investigated that told
'Aya told their employees that Ken investigated three or more companies.'

(6a. *Mittu-izyoo-no daigaku-ni Aya-ga soko-no sotugyosei-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-o Aya-ga soko-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 (1990) pointed out that in Hindi scrambling out of a (obligatory) control 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 control constructions in Japanese and concludes that the same holds in this language. Let us compare (7) and (8) below.
(7a. *Soko-no sotugoosei-ga [mittu-izyoo-no daigaku-ni it-GEN graduate-NOM three-or.more-GEN university-DAT syutugansiyoo to] sita.
apply that did
'Their graduates tried to apply to three or more universities.'

b. *Soko-no syain-ga [mittu-izyoo-no kaisya-o tyoosasiyoo it-GEN employee-NOM three-or.more-GEN company-ACC investigate to] sita.
that did
'Their employees tried to apply to three or more companies.'

(8a. Mittu-izyoo-no daigaku-ni soko-no sotugoosei-ga three-or.more-GEN university-DAT it-GEN graduate-NOM [syutugansiyoo to] sita.
apply that did

b. Mittu-izyoo-no kaisya-o soko-no syain-ga [tyoosasiyoo three-or.more-GEN company-ACC it-GEN employee-NOM investigate to] sita.
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).

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

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

(10a. ?Mittu-izyoo-no daigaku-ni Ken-ga soko-no sotugoosei-ni three-or.more-GEN university-DAT Ken-NOM it-GEN graduate-DAT
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[syutugansuru yoo] susumeta.
apply that recommended
b. ?Mittu-izyoo-no kaisya-o Ken-ga soko-no syain-ni	hree-or.more-GEN company-ACC Ken-NOM it-GEN employee-DAT
[tyoosasuru yoo] iraisita.
investigate that asked

(11)a. ?Ken-ga mittu-izyoo-no daigaku-ni soko-no sotugyoosei-ni
Ken-NOM three-or.more-GEN university-DAT it-GEN graduate-DAT
[syutugansuru yoo] susumeta.
apply that recommended
b. ?Ken-ga mittu-izyoo-no kaisya-o soko-no syain-ni
Ken-NOM three-or.more-GEN company-ACC it-GEN employee-DAT
[tyoosasuru yoo] iraisita.
investigate that 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).2 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).

(13)a. *Soko-no sotugyoosei-ga Ken-ni [mittu-izyoo-no daigaku-ni
it-GEN graduate-NOM Ken-DAT three-or.more-GEN university-DAT
syutugansuru yoo] susumeta.
apply that recommended
'Their graduates recommended Ken to apply to three or more universities.'

b. *Soko-no syain-ga Ken-ni [mittu-izyoo-no kaisya-o
it-GEN employee-NOM Ken-DAT three-or.more-GEN company-ACC
tyoosasuru yoo] iraisita.
investigate that asked
'Their employees asked Ken to investigate three or more companies.'

2) 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).
(14a) *Mittu-izyoo-no daigaku-ni soko-no sotugyoosei-ga Ken-ni
three-or.more-GEN university-DAT it-GEN graduate-NOM Ken-DAT
[syutugansuru yoo] susumeta.
apply that recommended

b. *Mittu-izyoo-no kaisya-o soko-no syain-ga Ken-ni
three-or.more-GEN company-ACC it-GEN employee-NOM Ken-DAT
[tyooasuru yoo] iraisita.
investigate that 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). 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. 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 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).

(15a) *Ken-ga soko-no sotugyoosei-no mae-de
Ken-NOM it-GEN graduate-GEN front-at
mittu-izyoo-no daigaku-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-no syain-no mae-de
Ken-NOM it-GEN employee-GEN front-at
mittu-izyoo-no kaisya-o hihansita.
three-or.more-GEN company-ACC criticized
'Ken criticized three or more companies in the presence of their employees.'

(16a) Mittu-izyoo-no daigaku-ni Ken-ga soko-no
three-or.more-GEN university-DAT Ken-NOM it-GEN

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3 ) 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. I consulted twelve speakers (all linguists) and eight 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 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 and needs an account. I will return to the variation in judgment in section 5.3.

4 ) Thanks to Daiko Takahashi for bringing the relevance of such cases to my attention.
sotugyosei-no mae-de denwasita.
graduate-GEN front-at called
b. Mittu-izyoo-no kaisya,-o Ken-ga soko,-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,-no sotugyosei-no mae-de Yumi-ni
Ken-NOM it-GEN graduate-GEN front-at Yumi-DAT
[mittu-izyoo-no daigakui-ni syutugansuru yoo] susumeta.
three-or.more-GEN university-DAT apply that recommended
'Ken recommended Yumi in the presence of their graduates to apply to three or more universities.'

b. *Ken-ga soko,-no syain-no mae-de Yumi-ni
Ken-NOM it-GEN employee-GEN front-at Yumi-DAT
[mittu-izyoo-no kaisya,-o tyoosasuru yoo] iraisita.
three-or.more-GEN company-ACC investigate that 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-ni Ken-ga soko,-no
three-or.more-GEN university-DAT Ken-NOM it-GEN
sotugyosei-no mae-de Yumi-ni [syutugansuru yoo] susumeta.
graduate-GEN front-at Yumi-DAT apply that recommended
b. ?*Ken-ga mittu-izyoo-no daigaku-ni soko-ni
Ken-NOM three-or.more-GEN university-DAT it-GEN
sotugyosei-no mae-de Yumi-ni [syutugansuru yoo] susumeta.
graduate-GEN front-at Yumi-DAT apply that recommended
c. ?*Mittu-izyoo-no kaisya,-o Ken-ga soko,-no
three-or.more-GEN company-ACC Ken-NOM it-GEN
syain-no mae-de Yumi-ni [tyoosasuru yoo] iraisita.
employee-GEN front-at Yumi-DAT investigate that asked
d. ?*Ken-ga mittu-izyoo-no kaisya,-o soko-ni
Ken-NOM three-or.more-GEN company-ACC it-GEN
syain-no mae-de Yumi-ni [tyoosasuru yoo] iraisita.
employee-GEN front-at Yumi-DAT investigate that 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 it is surely the case that the presence of a 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).

(19)a. *Mittu-izyo-no daigaku-ni soko,-no sutugyoosei,-ga
three-or.more-GEN university-DAT it-GEN graduate-NOM
[pro, syutugansita to] itta.
applied that said
'Their graduates said that they applied to three or more universities.'

b. *Mittu-izyo-no kaisya-o soko,-no syain,-ga
three-or.more-GEN company-ACC it-GEN employee-NOM
[pro, tyoosasita to] itta.
investigated that said
'Their employees said that they investigated three or more companies.'

2 Binding under a Movement Analysis of Control

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. Why is this difference relevant? In this section I will outline an analysis that answers this question. I will develop a full analysis in section 4 after discussing more properties of scrambling in section 3 that need to be accounted for together with the puzzle at hand.

I propose that the contrast in question ceases to be a puzzle if the following holds:

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

b. Control involves movement (i.e., PRO = a trace/copy of the moved controller).

c. The relevant variable binding in (8)/(10)/(11) is licensed by clause-internal scrambling.

(20a) is an alternative to generalization (12) above. (20b) is an analysis of control proposed by Hornstein (1999) and defended in Boeckx 2000, Boeckx and Hornsterin 2003, 2004, and Hornsterin 2001, 2003 (see also Fujii 2006 for arguments in favor of a movement analysis of control constructions in Japanese). (20c) is a consequence of (20a)
and (20b).

To see how this proposal works, let us consider the derivation of the examples in (8) shown in (21), where material surrounded by angled brackets indicates copies without phonetic realization.

\[
\begin{align*}
(21) & & \text{(II) control} \\
& & \downarrow \\
Y-\text{DAT}/\text{ACC} & & X-\text{NOM} & \text{[}Y-\text{DAT}/\text{ACC}\text{]} & <X> & \text{[}Y-\text{DAT}/\text{ACC} > V\text{]} & V \\
& & \uparrow \\
& & \text{(III) scrambling} & \text{(I) scrambling} \\
\end{align*}
\]

The first important step of the derivation is scrambling of the embedded object Y within the control clause. This clause-internal scrambling puts Y in a position c-commanding the embedded subject X. Under the movement analysis of control, the embedded subject position is where the controller is base-generated. Therefore, at this point of the derivation Y binds the pronoun contained in X. The next step is movement of X to the matrix clause, in accordance with the movement analysis of control. Finally, Y scrambles to the matrix clause. Given (20a), this scrambling has no effects on binding (see (4) and (19)).

The object control cases receive a similar analysis. Let us consider (22), which is a derivation for the examples in (10).

\[
\begin{align*}
(22) & & \text{(II) control} \\
& & \downarrow \\
Y-\text{DAT}/\text{ACC} & & Z-\text{NOM} & X-\text{DAT} & \text{[}Y-\text{DAT}/\text{ACC} > X & \text{<}X & \text{<}Y-\text{DAT}/\text{ACC} > V\text{]} & V \\
& & \uparrow \\
& & \text{(III) scrambling} & \text{(I) scrambling} \\
\end{align*}
\]

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

What is crucial in both (21) and (22) for the pronoun contained in X to be bound by Y is that long-distance scrambling is composed of shorter steps of scrambling and that an intermediate step of long-distance scrambling can produce new binding relations if it does not cross a clause boundary. That an intermediate step of long-distance scrambling can produce new binding relations can be independently seen in cases like the following:

(23a. '"Ken-ga Aya-ni [soko-no sotugyoosei-ga Ken-NOM Aya-DAT it-GEN graduate-NOM mittu-izyoo-no daigaku-ni syutuganasita to] itta.' three-or-more-GEN university-DAT applied that told 'Ken told Aya that their graduates applied to three or more universities."

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5) Here and throughout I adopt a derivational approach to binding according to which binding is licensed when the c-command condition is met in the course of a derivation.
b. *Ken-ga Aya-ni [soko-no syain-ga
   Ken-NOM Aya-DAT it-GEN employee-NOM
   mittu-izyoo-no kaisya-o tyoosasita to] itta.
three-or.more-GEN company-ACC investigated that told
'Ken told Aya that their employees investigated three or more companies.'
(24a) Mittu-izyoo-no daigaku-ni Ken-ga Aya-ni [soko-no
   three-or.more-GEN university-DAT Ken-NOM Aya-DAT it-GEN
   sotugyoosei-ga syutuganasita to] itta.
   graduate-NOM applied that told
b. Mittu-izyoo-no kaisyai-o Ken-ga Aya-ni [sokoi-no
   three-or.more-GEN company-ACC Ken-NOM Aya-DAT it-GEN
   syain-ga tyoosasita to] itta.
   employee-NOM investigated that told

In (23) the pronominal is contained in the embedded subject and the QP is an embedded object. In (24) the embedded object QP has undergone long-distance scrambling out of a finite clause. The pronominal cannot be bound by the QP in (23), but can be in (24). Since we know that scrambling out of a finite clause does not affect binding (see (4) and (6)), what makes variable binding possible in (24) must be a shorter step of long-distance scrambling, that is, scrambling within the embedded clause, on a par with step (I) in (21)/(22). Thus, the claim that an intermediate step of long-distance scrambling 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. This in turn argues strongly for the movement analysis 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).

3 Further Puzzles

An important question arises with the analysis just proposed: why can't scrambling out of a control clause license variable binding? Given the claim in (20a), this question boils down to the question why scrambling out of a clause cannot license variable binding. One possible answer is (25).

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

This hypothesis has in fact been entertained by many researchers (see, among others, Mahajan 1990 for Hindi and Miyagawa 2005, 2006 for Japanese). One strong motivation for this hypothesis comes from a contrast like that in (26).
(26a) *Who, did his, mother call t?

b. Who, t seems to his, mother [t to be smart]?

The example in (26a) shows a so-called 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 who in (26b) due to overt movement. The difference 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 the former is necessarily A’-movement.

Although this line of thinking seems to work at a descriptive level, it is hard to make it a coherent theoretical explanation. One problem has to do with the concepts of A- and A’-movement, which are based on the supposed distinction between A- and A’-positions. As is well known, the traditional concepts of A- and A’-positions are hard to define within the current theoretical framework (see Abe 1993 and Chomsky 1995: chap. 1 for relevant discussion). A more fundamental question is why A-movement, but not A’-movement, can license variable binding. There seems to be no principled account of this distinction. Moreover, the analysis relying on (25) assumes crucially that clause-internal scrambling can be A-movement as well as A’-movement, whereas long-distance scrambling can only be A’-movement. Such a distinction is also hard to motivate on independent grounds. It is thus desirable to come up with an account that dispenses with such an unmotivated distinction for clause-internal and long-distance scrambling. 6

In fact, the most serious problem with (25) can be seen if we consider scrambling out of a control clause. Given the local nature of A-movement, the hypothesis in (25) sounds valid (again intuitively) for scrambling out of a finite clause. However, the situation is different for scrambling out of a control clause. Recall that the analysis of (8)/(10)/(11) presented in the preceding section relies crucially on the movement analysis of control. More specifically, movement of X in (21) and (22) plays a crucial role in making binding possible. Note that here X moves from the embedded clause to a θ-position in the matrix clause. On the traditional criterion, this is A-movement (θ-positions are considered to be typical A-positions). This means that A-movement out of a control clause is possible. Therefore, (25) cannot be correct for scrambling out of a control clause. If so, we need to seek some other way to account for why scrambling out of a control clause cannot license variable binding.

Another fact relevant in this connection is that scrambling differs from A’-movement (operator movement) in its ability to affect binding. Let us compare scrambling with focus movement seen in Japanese (pseudo-)left constructions. The example in (27) is

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6) This is why Tada (1990, 1993) and Saito (1992, 2003, 2005) attempt to propose a uniform analysis of Japanese scrambling in which all scrambling, whether clause-internal or long-distance, receives the same treatment regarding their landing sites. See also Abe 1993 for a proposal to eliminate the concepts of A- and A’-positions from Universal Grammar.
an instance of the cleft construction (NM = nominalizer).

(27) Ken-ga syutugansita no wa sono daigaku,-ni da.

Ken-NOM applied NM TOP that university-DAT be

'It is that university that Ken applied to.'

It has been well known since Hojii's (1987) work on this construction that it involves overt movement. Hojii's original analysis claims that the focus element (i.e., the element appearing between the nominalizer and the copula) is base-generated in its surface position and that a null operator associated with it undergoes overt movement within the clause preceding the focus element, as shown in (28), where X is a focus element.

(28) [Op, Sub t_o, V] NM TOP X, be

An alternative analysis is proposed by Hiraiwa and Ishihara (2001) which derives the construction in the following way (see also Fukui and Sakai 2003 for a similar proposal):

(29a) [ysub X V] NM be → focus movement of X

b. X [ysub t_x V] NM be → topicalization of Y

c. [ysub t_x V] NM TOP X t_y be

The derivation starts with a clause followed by the nominalizer and be, which is claimed to be an equivalent of *It is that Sub V X* in English, with Y in (29a) corresponding to the *that*-clause. Then the focus element X undergoes focus movement (29b), followed by topicalization of Y (29c). In this analysis what undergoes overt movement is the focus element itself rather than a null operator. For the sake of discussion, I assume the second analysis.

Let us consider now the examples in (30), which involve clause-internal focus movement of a QP.

(30a) ??Sokoo-no sotugyoosei-ga syutugansita no wa
   it-GEN graduate-NOM applied NM TOP
   mittu-izyoo-no daigaku-ni da.
   three-or.more-GEN university-DAT be

'It is three or more universities that their graduates applied to.'

b. ??Sokoo-no syain-ga tyooosaitsu no wa
   it-GEN employee-NOM investigated NM TOP
   mittu-izyoo-no kaisyai-o da.
   three-or.more-GEN company-ACC be

'It is three or more companies that their employees investigated.'

The QP was originally in the object position and has moved to a focus position where it c-commands the pronounal contained in the subject (the QP is equivalent to X in (29b) above). However, in (30a, b) the pronounal cannot be interpreted as a variable bound by the focus QP. In other words, clause-internal focus movement does not make variable binding possible. The situation thus contrasts with that seen in (2),
where clause-internal scrambling does make variable binding possible.

Focus movement out of a control clause shows the same pattern: it never makes variable binding possible. (31) is to be contrasted with (8), and (32) with (10) and (11).

(31a) "*Soko-no sotugyoosei-ga syutugansiyoo to sita no wa
    it-GEN graduate-NOM apply that did NM TOP
    mittu-izyoo-no daigaku,-ni da.
three-or-more-GEN university-DAT be
    'It is three or more universities that their graduates tried to apply to.'

(31b) "*Soko,-no syain-ga tyoosasiyoo to sita no wa
    it-GEN employee-NOM investigate that did NM TOP
    mittu-izyoo-no kaisya,-o da.
three-or-more-GEN company-ACC be
    'It is three or more companies that their employees tried to investigate.'

(32a) "*Ken-ga soko,-no sotugyoosei-ni syutugansuru yoo
    Ken-NOM it-GEN graduate-DAT apply that
    susumeta no wa mittu-izyoo-no daigaku,-ni da.
recommended NL TOP three-or-more-GEN university-DAT be
    'It is three or more universities that Ken recommended their graduates to apply to.'

(32b) "*Ken-ga soko,-no syain-ni tyoosasuru yoo
    Ken-NOM it-GEN employee-DAT investigate that
    iraisita no wa mittu-izyoo-no kaisyai,-o da.
asked NL TOP three-or-more-GEN company-ACC be
    'It is three or more companies that Ken asked their employees to investigate.'

Given that these cases are all ill formed, one might wonder whether there are cases in which the pronominal can be bound by a QP occurring in the focus position. There are indeed such cases:

(33a) Ken-ga soko,-no sotugyoosei-o saiyoosuru yoo
    Ken-NOM it-GEN graduate-ACC hire that
    susumeta no wa mittu-izyoo-no daigaku,-ni da.
recommended NL TOP three-or-more-GEN university-DAT be
    'It is three or more universities that Ken recommended to hire their graduates.'

(33b) Ken-ga soko,-no raibarugaisya-to
    Ken-NOM it-GEN rival.company-with
    gappei-saseta no wa mittu-izyoo-no kaisya,-o da.
merge-caused NL TOP three-or-more-GEN company-ACC be
    'It is three or more companies that Ken made merge with their rival companies.'
In the cases in (33) the pronominal is in the complement of the embedded verb. Thus, the focus QP is already higher than the pronominal before focus movement, in contrast to the examples in (30)-(32), where the focus QP is lower than the pronominal before focus movement. This makes it clear that focus movement, unlike scrambling, cannot affect binding.

That focus movement does not affect binding in Japanese is not surprising, given the well-known fact that wh-movement does not affect binding in English, as shown in (34).

(34) *Who, did his, mother call?

What needs to be accounted for is why scrambling differs in this respect. Recall that we want an account that does not make reference to A- and A’-movement (recall the discussion surrounding (25)).

There is another important question to ask. Note that (30)-(32) can be accounted for in the same way as (34) only if the QP undergoes focus movement all the way from its base position to the focus position. But Japanese has scrambling. It is thus possible to imagine derivations for (30)-(32) where the QP first undergoes clause-internal scrambling and then focus movement. If such derivations were possible, the examples in (30)-(32) would allow a bound variable interpretation, contrary to fact, since, as we have seen, clause-internal scrambling does make variable binding possible. So we need to explain why focus movement cannot follow scrambling.

In this section we have seen properties of scrambling that make it different from both A-movement and A’-movement (operator movement). Scrambling differs from A-movement in that it cannot make variable binding possible when it takes place out of a control clause, even though A-movement out of a clause can make variable binding possible (as in (26b)) and A-movement (of the controller) is possible out of a control clause. Scrambling differs from A’-movement as well in that it can make variable binding possible when it occurs within a clause. Moreover, scrambling has the curious property of being unable to be followed by focus movement. In the next section I will propose an analysis that provides a principled account of these properties of scrambling, elaborating on the analysis outlined in section 2.

4 A Full Analysis

The discussion so far leads us to address the following issues related to scrambling:

(35)a. Why can’t scrambling out of a (control) clause license variable binding?

b. Why can scrambling, unlike focus movement, license variable binding when it occurs clause-internally?

c. Why can’t scrambling be followed by focus movement?

The key to answering the question in (35a) can be found when we examine closely the derivations illustrated in (21) and (22). The relevant portion is repeated in (36).
There are two points that need to be considered in this derivation. First, scrambling of Y (step (I)) crosses X. Second, movement of X (step (II)) crosses Y. Under current assumptions about movement, these kinds of crossing requires caution because they apparently violate minimality. Let us put the first case aside for the moment and consider the second case.

Given that this derivation is possible, the second case implies that the head of Y’s chain does not block movement of X. Recall that X is a controller. Under the movement analysis of control, it moves to a θ-position in the matrix clause (it may move further in the matrix clause, which is not relevant here). Assuming with Hornstein (1999) that this movement of X is induced by the necessity for a head of the matrix clause to assign a θ-role, the situation makes sense if the head of Y’s chain is not a potential θ-role bearer. That is, the head of Y’s chain is “invisible” to a θ-role assigning head of the matrix clause, and that is why the latter can attract X skipping the closer element Y.

Y is originally an object of the verb, which means that it must be assigned a θ-role by the verb. In contrast, the conclusion just reached is that Y becomes invisible to θ-marking after scrambling. How is this possible? The apparently conflicting situations receive a natural account under a theory of movement recently proposed by Saito (2003, 2005). Modifying and extending Chomsky’s (1995:chap. 3) proposal about 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 checking/agreement and θ-marking.

Let us consider a concrete case. Under the copy theory of movement, the sentence in (37a) has the structure in (37b).

(37)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-feature, which makes who function as an argument with referential properties.7

7) Saito calls the third feature a D-feature in Saito 2003 but an argument-feature in Saito 2005. I follow the latter here, referring to it as an A-feature.
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. Saito assumes that each of P-, O-, and A-features is retained at only one position in a chain. 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 agreement/checking 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 q-marked there), but is not selected in Spec,C. Thus, it is deleted in Spec,C. This results in the structure in (37c), 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 (38).

(38a). Who do you think John saw?

b. \[c_T \langle \text{who} \rangle \langle \text{John saw} \rangle \langle \text{who} \rangle \]
   \[
   \{P, O, A\} \quad \{P, O, A\}
   \]
c. \[c_T \langle \text{who} \rangle \langle \text{John saw} \rangle \langle \text{who} \rangle \]
   \[
   \{P, O\} \quad \{A\}
   \]
d. \[c_T \langle \text{who} \rangle \langle \text{do you think} \rangle \langle c_T \langle \text{who} \rangle \langle \text{John saw} \rangle \langle \text{who} \rangle \rangle \]
   \[
   \{P, O\} \quad \{P, O\} \quad \{A\}
   \]
e. \[c_T \langle \text{who} \rangle \langle \text{do you think} \rangle \langle \text{c_T \langle \text{John saw} \rangle \langle \text{who} \rangle \rangle} \]
   \[
   \{P, O\} \quad \{A\}
   \]

Saito assumes that the sentence in (38a) is derived by two successive *wh*-movements, the 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 (38b), 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 (38c) results. Then the second *wh*-movement applies, copying the feature set of *who* in Spec,C of the embedded clause and deriving (38d). 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.\(^8\)

\(^8\) Saito (2003) assumes with Chomsky (2000) that the feature of the intermediate C that attracted the O-feature at step (38b) deletes after its selectional requirement is satisfied. As a result, the O-feature is not selected in the intermediate Spec,C at step (38d) and hence it is deleted there in (38e).
Regarding Japanese scrambling, Saito 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 the P-features of the scrambled element. Let us consider clause-internal scrambling first:

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

   b. \([\tau \sigma \text{sono daigaku-ni Ken-ga sono daigaku-ni V}]\)
      (P, A)

   c. \([\tau \sigma \text{sono daigaku-ni Ken-ga sono daigaku-ni V}]\)
      (P)

   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 (39b). Since the A-feature is selected in the tail of the chain but not in its head, they are deleted in the head, resulting in (39c).

   Consider next long-distance scrambling:

(40)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. \([\tau \sigma \text{sono daigaku-ni Ken-ga sono daigaku-ni V to}]\)
      (P, A)

   c. \([\tau \sigma \text{sono daigaku-ni Ken-ga sono daigaku-ni V to}]\)
      (P)

   d. \([\tau \sigma \text{sono daigaku-ni Masao-ga Yumi-ni}]\)
      (P)

   e. \([\tau \sigma \text{sono daigaku-ni Masao-ga Yumi-ni}]\)
      (P)

   The derivation up to (40c) is identical to that in (39). 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 (40d). Given that the P-features are retained only in the head of the chain, those in the intermediate Spec,C

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are deleted. The result is (40e).

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 (40d), scrambling out of a clause affects only the P-features of the scrambled element, with its A-feature staying in place in its original position. Given that binding requires the antecedent to have an A-feature, total reconstruction effects follow as a natural consequence of this analysis, without any operations posited after the syntactic cycle needed for overt derivations.9)

We might extend Saito's proposal to scrambling out of a control clause. We might claim that in (36) further scrambling of Y out of the control clause involves movement of its P-features alone and hence that scrambling out of a control clause cannot license variable binding. However, there is a problem with this move. Recall that Saito claims that chains are interpreted as they are formed. On the assumption that the first step of long-distance scrambling is to Spec,C of an embedded clause, Saito's analysis works for scrambling out of a finite clause, as we have seen. But what forces this first step? Although Saito is not explicit on this point, a natural answer under current assumptions will be that it is forced because CP is a phase and the Phase-Impenetrability Condition requires all movement from within a phase to move first to the edge of the phase (Chomsky 2000). If so, scrambling out of a control clause cannot be treated in the same way. This is because the control CP is not a phase. Recall that we have evidence based on the contrast between (8)/(10)/(11) on the one hand and (14)/(18) on the other that the movement analysis of control is correct. This means that A-movement (of the controller) out of a control clause is possible, which in turn means that the control CP is not a phase (assuming that improper movement is impossible). Then nothing would force scrambling out of a control clause to proceed by way of Spec,C of the control clause.

9) 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
Ken-NOM graduated university-DAT he-NOM
[Yumi-ga syutsugansuru to] emotteiru.
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 stays in the embedded clause and hence is c-commanded by kare. If that is the case, coreference between kare and Ken would violate condition C. Here I can only speculate about a possible solution to the problem. Note that even in Saito's analysis long-distance scrambling forms a chain and this chain is retained after chain interpretation, in such a way that its head has P-features and its tail has an A-feature. This chain is a syntactic object and so can undergo syntactic operations. Assuming an approach that accounts for anti-reconstruction effects by allowing relative clauses to be late-merged with moved elements (Lebeaux 1998, Nishigauchi 2002, Miyagawa 2006), it is possible to analyze (i) as involving late-merger of the relative clause containing Ken with the scrambled DP. This derivation will ensure that (i) does not violate condition C. However, another question arises as to how the relative clause is interpreted, given that it is merged with the element that has no features entering into interpretation. I suggest that a chain plays a role here. Given that the relative clause is merged with the head of the chain formed by scrambling, it can be interpreted as semantically related to the tail of that chain.
To resolve this problem, I suggest modifying Saito’s original proposal as follows. Let us assume, as seems natural under a phase-based theory of syntactic derivation, that chains are interpreted phase by phase. Let us also assume with Chomsky 2000 and his subsequent work that not only CP but also vP is a phase. Then scrambling of an object out of vP must first move to Spec,v, as shown in (41), where Y is the object.

(41) \[ vP \ Y \ X \ [vp <Y> \ V] \ v \]

Y’s chain then undergoes deletion, resulting in a chain where Y’s P-features are retained in its head and Y’s A-feature is retained in its tail. Further scrambling of Y carries only its P-features, so that it has no effects on binding. The situation remains the same if X undergoes movement (to Spec,T, for instance).

Notice that although Y’s A-feature gets deleted from the head of the chain after chain interpretation, there is a point in the derivation where Y has its A-feature and c-commands the subject X, namely, immediately after scrambling to Spec,v. Under a derivational approach to binding, as Saito (2003) argues, the very existence of this derivational point makes it possible for Y to bind an element contained in X.

This analysis can account for the following facts: that clause-internal scrambling makes variable binding possible (2)/(16), that long-distance scrambling out of a finite CP does not make variable binding possible (4)/(6), and that scrambling out of a control CP makes variable binding possible if the pronominal is contained in the controller (8)/(10)/(11), but does not otherwise (14)/(18). Thus, we have an answer to (35a). What about (35b, c)?

Addressing the questions in (35b, c) requires us to compare scrambling with focus movement. Recall that focus movement, unlike scrambling, does not produce new biding relations. The relevant contrast is repeated below:

(2)a. Mittu-izzyoo-no daigaku-ni soko-no sotugyoosei-ga syutugansita.
   three-or.more-GEN university-DAT it-GEN graduate-NOM applied
   'Their graduates applied to three or more universities.'

(30)a. *Soko-no sotugyoosei-ga syutugansita no wa
   it-GEN graduate-NOM applied NM TOP
   mittu-izzyoo-no daigakui-ni da.
   three-or.more-GEN university-DAT be
   'It is three or more universities that their graduates applied to.'

(34) *Who, did his mother call?

Since we now have an account of (2a), what we need to do is account for (30a) and (34). Note that what is crucial in accounting for the variable binding in (2a) is the existence of the derivational point illustrated in (41). I propose that this is a situation available for scrambling but not for other kinds of movement, including focus movement.

Movement of Y in (41) crosses X. Recall that this is the first of the two cases of
crossing in (36) that need to be considered. Unlike the second case of crossing in (36), this case involves a situation where the crossed element and the crossing element occupy Specs of the same head, namely, v under the present analysis. Richards (2001) argues against this type of crossing. On the basis of extensive examination of multiple wh-movement, Richards proposes that when an element moves to the domain of a head that already has a Spec, the element must form a Spec below the existing Spec. He calls this operation tucking in. On this view, movement of an object to Spec,v must yield the structure in (42).

(42) \[ [\_p \; X \; Y \; [\_p \; \langle Y \rangle \; V] \; V] \; v] \]

In (42) Y does not c-command X. If chain interpretation applies to this structure, Y’s A-feature will be deleted from the head of Y’s chain. Thus, Y will never bind an element contained in X. This is in fact the right result for focus movement as in (30a) and (34), but causes a problem for scrambling as in (2a).

So we are in an apparent dilemma: we need the derivation in (41) for scrambling but we also need the derivation in (42) for focus movement. How can we reconcile these conclusions? A hint to achieve this can be found in Richards’s (2001) proposal to deduce tucking-in operations. Richards proposes that tucking in is a consequence of a general locality condition on Attract, which he considers to be an essential mechanism for movement. He defines Attract as in (43).

(43) An attractor K attracts a feature F, creating a copy \( \alpha’ \) of an element \( \alpha \) containing F, and Merging \( \alpha’ \) with K. The relations between \( \alpha’ \), K, and F must all obey Shortest.

Shortest, which is part of the definition of Attract (see also Chomsky 1995:chap. 4), is the general locality condition on movement that derives the effects of tucking in. Putting details aside, we can understand Richards’s proposal as follows. When movement takes place, a head K (attractor) with a feature F enters into checking/agreement with the closest F contained in the category \( \alpha \) and moves (copies) \( \alpha \) to such a position that makes the chain (\( \alpha’, \alpha \)), where \( \alpha’ \) is its head and \( \alpha \) its tail, is shortest and that makes the distance between K and \( \alpha’ \) shortest.

The derivation in (42) is consistent with this view. Let us assume that focus movement is treated on a par with wh-movement, so that it involves checking/agreement of an O-feature. In (42) v has the feature that enters into checking/agreement with the O-feature of Y. \( v \) attracts Y, which is closest to \( v \), and moves it to a Spec below X. The tucking-in movement of Y obeys Shortest, in contrast to the other possibility shown in (41), where Y moves to a Spec of \( v \) higher than X. The latter movement creates a longer chain than the tucking-in option and makes the distance between Y and \( v \) longer than the tucking-in option.

Attract as defined in (43) is feature-driven; in other words, it is contingent on checking/agreement. Richards considers all movement to be carried out by Attract. In contrast, Fukui (1986), Kuroda (1988), Saito (1985, 1989), Saito and Fukui (1998),
Tada (1993), and Takano (1998), among others, argue that Japanese scrambling is not
} driven by any checking/agreement requirement. Given that Shortest is part of the
definition of Attract and that Attract is contingent on checking/agreement, I propose
that movement is carried out by Attract and is forced to tuck in if it involves check-
ing/agreement, but takes places independently of Attract and is not forced to tuck in
if it does not involve checking/agreement. I claim that Japanese scrambling, unlike
focus movement, can form the structure in (41) and can thus make variable binding
possible because it takes place without checking/agreement.

This partially answers the question in (35b). To provide a complete answer, we also
need to exclude the following derivation for focus movement:

(44) \[
\[
\]

In this derivation Y moves to Spec,v before X (the subject) is merged. Given that
X is not present in the structure when Y becomes Spec,v, Y’s movement is consistent
with Shortest. Note that the chain formed by Y’s movement undergoes deletion. If
we assume, in the spirit of Saito’s (2003) proposal, that chains are interpreted as soon
as they are formed, that is, before the next operation applies, then chain interpreta-
tion applies to Y before step (II). This ensures that Y has no A-feature when X gets
merged. It thus follows that Y cannot bind a pronominal contained in X. The ques-
tion in (35b) is now answered.

Note that the present analysis of the difference between scrambling and focus move-
ment makes no reference to the notions of A- and A’-positions. This is a desirable
result for the reasons mentioned above. We can extend this approach to the contrast
in (26), repeated below.

(26a). *Who’s did his, mother call t?

b. Who, t seems to his, mother [t to be smart]?

The ungrammaticality of (26a) is already accounted for. What about the fact that
movement of who to the matrix Spec,T in (26b) makes variable biding possible? This
fact is usually attributed to the status of movement to Spec,T as A-movement. We
do not need that assumption here, either. There is one important point about the
derivation in (26b). There is no phase boundary between the base position of who and
Spec,T of the matrix clause. Because of this, who moves to the matrix Spec,T from
its base position without undergoing chain interpretation. This ensures that who car-
rries along its A-feature to the matrix Spec,T, thereby making binding possible. Thus,
as far as these facts are concerned, the present approach can account for them with-
out appealing to the distinction between A- and A’-movement.

In accounting for the derivation in (41), the claim that Japanese scrambling has
nothing to do with Attract (hence with checking/agreement) plays an important role.
In this connection, one might wonder how exactly Japanese scrambling occurs. I suggest that Japanese scrambling occurs to satisfy an edge feature proposed by Chomsky (2007, to appear). Chomsky proposes that for Merge to apply to X and Y, where Y projects, the head of Y must have an edge feature, which comes free and indicates that Y can be merged. Chomsky claims that this holds for both external and internal Merge (internal Merge being movement). So, on his view, all movement to Spec.H must satisfy an edge feature of H. Usually an edge feature of H is associated with other features of H that need checking/agreement. Thus, *wh*-movement and focus movement to Spec.H, for instance, occurs because H has an edge feature associated with a feature that needs to be satisfied by an O-feature of a *wh*-phrase/focus phrase. Extending this view to Japanese scrambling, I suggest that scrambling to Spec.H takes place when H has an edge feature alone, so that the edge feature can be satisfied by an element that does not enter into checking/agreement with H. Thus, in (41) v has an edge feature not associated with other features that need checking/agreement, and scrambling of Y to Spec.v takes place to satisfy this edge feature.

Let us turn now to the question in (35c): why can’t scrambling be followed by focus movement? Given the present analysis of scrambling and focus movement, we can answer this question rather easily. Let us consider the derivation in (45).

\[
\begin{array}{c}
\text{[\textit{vp} Y X [\textit{vp} <Y> V] v]} \\
\text{focus movement} \\
\text{scrambling}
\end{array}
\]

Recall that given the ungrammaticality of (30)-(32), this derivation has to be excluded. Scrambling of Y to (an outer) Spec.v is not problematic. A problem arises with focus movement. Note that under the present analysis, scrambling of Y to Spec.v involves no checking/agreement. This means that after chain interpretation, Y in Spec.v has had all features deleted except its P-features. Since Y has no operator feature, further movement of Y cannot be focus movement.

The present approach can thus answer all the questions in (35) in a unified way, by looking at the content and position of the features that enter into syntactic operations. This result is made possible under Saito’s (2003, 2005) theory of movement, coupled with the phase-based theory of syntactic derivation and Richards’s (2001) proposal for tucking-in operations.

5 Related Issues

In this section I will discuss three issues directly related to the main claims made in the previous sections.10

5.1 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
analysis of control. The relevant part of the analysis is repeated in (46).

(46)  
(II) control

\[
\begin{array}{c}
X \ [_{\text{VP}} \ [_{\text{VP}} \ <Y> \ <X> \ [_{\text{VP}} \ <Y> \ V]]] \ V \\
\end{array}
\]

(I) scrambling

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

(7a)  
*Soko-no sotugyoosei-ga [mittu-izyoo-no daigaku,-ni it-GEN graduate-NOM three-or-more-GEN university-DAT syutugansiyoo to] sita. apply 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 (46) were available, (7a) would be as acceptable as (8), contrary to fact. We thus need to exclude the derivation in (46).

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:

(47)  
(II)  

\[
\begin{array}{c}
X \ [_{\text{VP}} \ Y \ <X> \ [_{\text{VP}} \ <Y> \ V]] \ v \\
\end{array}
\]

In step (I) the object \( Y \) scrambles to Spec,v and in step (II) the subject \( X \) moves out of vP, either by scrambling or by EPP-related movement. 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.

(1a) *Soko-no sotugyosei-ga mittu-izyoo-no daigaku,-ni syutugansita.

\textit{it-GEN graduate-NOM three-or-more-GEN university-DAT applied}

'Their graduataes applied to three or more universities.'

Derivations like that in (47) 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, Hoji (1985) first proposed that the application of scrambling is prohibited if it does not produce any change in word order. Abe (1993) and Takano (1992) independently proposed to derive Hoji's constraint from economy of derivation. Takano (2007) approached the problem from a different perspective adopting Chomsky's (2000, 2001) idea and suggested that optional assignment of a feature driving scrambling (which we understand here to be an edge feature) is allowed only if it has effects on outcome on the PF side, namely, word order.\footnote{12} Note that whatever the ultimate form of the principle may be, it is global in nature. Scrambling of Y in step (I) of (47) does change word order if seen locally (Y crosses X). But later movement of X makes this effect of scrambling invisible on the surface. Due to this movement of X, the surface form of the sentence looks as if scrambling of Y had not occurred. The generalization is thus 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. In other words, it seems that scrambling is licit only when its effects can be seen on the surface. It looks as if scrambling is regulated by its PF-related effects. Although the exact nature of this generalization, despite the previous proposals, is still unclear and I leave a serious investigation of this matter for future research, it is clear that such considerations will resolve the problem raised by the derivation in (46).

5.2 Binding and Scope

We have seen that the examples in (10) and (11), repeated below, allow the pronouns to be bound by the scrambled QPs.

(10a) ?Mittu-izyoo-no daigaku,-ni Ken-ga soko,-no sotugyosei-ni

\textit{three-or-more-GEN university-DAT Ken-NOM it-GEN graduate-DAT}

\footnote{12} Ko (2007) proposes a different line of analysis that excludes derivations like (47). She argues that step (II) of (47) is blocked by Fox and Pesetsky's (2003) Linearization Preservation, which requires that linear order established at a given phase be preserved at later phases. In (47) Y precedes X at vP but X precedes Y at the next phase, due to movement of X. Ko claims that this violates Linearization Preservation and hence that the derivation is blocked. Note that although Ko's proposal works for (47), it cannot be extended to cover the derivation for (English) \textit{wh}-movement under the present analysis, in which \textit{wh}-movement of the object to Spec,v must tuck in beneath the base-generated subject. This means that at vP the subject precedes the object. However, at the next phase CP the object precedes the subject (due to \textit{wh}-movement of the object to Spec,C), which violates Linearization Preservation.
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[syutugansuru yoo] susumeta.
apply that recommended
'Ken recommended their graduates to apply to three or more universities.'
b. ?Mittu-izyoo-no kaisya-o Ken-ga soko-no syain-ni
three-or-more-GEN company-ACC Ken-NOM it-GEN employee-DAT
[tyoosasuru yoo] iraisita.
investigate that asked
'Ken asked their employees to investigate three or more universities.'

(11)a. ?Ken-ga mittu-izyoo-no daigaku-ni soko-no sotugyoosei-ni
Ken-NOM three-or.more-GEN university-DAT it-GEN graduate-DAT
[syutugansuru yoo] susumeta.
apply that recommended
b. ?Ken-ga mittu-izyoo-no kaisya-o soko-no syain-ni
Ken-NOM three-or.more-GEN company-ACC it-GEN employee-DAT
[tyoosasuru yoo] iraisita.
investigate that asked

In addition to the availability of binding, which we have already accounted for, there is another fact about these examples that needs to be accounted for. To see the problem, let us consider the examples in (48) and (49).

(48)a. Ken-ga Aya-ni [mittu-izyoo-no daigaku-ni syutugansuru yoo]
Ken-NOM Aya-DAT three-or.more-GEN university-DAT apply that
susumeta.
recommended
'Ken recommended Aya to apply to three or more universities.'
Ken-NOM Aya-DAT three-or.more-GEN company-ACC investigate that asked
'Ken asked Aya to investigate three or more companies.'

(49)a. Mittu-izyoo-no daigaku-ni Ken-ga Aya-ni [syutugansuru yoo]
three-or.more-GEN university-DAT Ken-NOM Aya-DAT apply that
susumeta.
recommended
b. Mittu-izyoo-no kaisya-o Ken-ga Aya-ni [tyoosasuru yoo]
three-or.more-GEN company-ACC Ken-NOM Aya-DAT investigate that
iraisita.
asked

(49a, b) are scrambling counterparts of (48a, b), respectively. Unlike (10) and (11), these examples do not involve variable binding. The puzzling fact can be seen when we consider the scope of the QP in these examples. The examples in (48) and (49) allow the QP to have scope over the matrix clause (wide scope) as well as the embedded clause (narrow scope). Thus, both (48a) and (49a) are ambiguous and can be
interpreted as in (50a) and (50b).

(50a) There are three or more x, x a university, such that Ken recommended Aya to apply to x. (wide scope reading)

b. Ken recommended Aya to apply to three or more arbitrary universities.

(narrow scope reading)
The same ambiguity obtains in (48b) and (49b). The examples in (10) and (11) contrast sharply in this respect: they permit only the wide reading of the QP. This fact calls for an explanation.
The fact that (10) and (11) have only the wide scope reading of the QP is all the more puzzling because on the present analysis, the QP binds the pronominal in the embedded clause. This indicates that binding in the course of a derivation does not guarantee the scope of the binder. In other words, in addition to syntactic binding (which is derivationally established), there is a condition on the interpretation of binding and scope (cf. Brody 2001). I suggest (51).

(51) X is interpreted as a variable bound by Y only if Y takes scope over the clause in which X is interpreted.

Note that the controller in (10)/(11) is assigned a θ-role in the matrix clause (as well as in the embedded clause), so that it is interpreted in the matrix clause. The condition in (51) thus requires that the QP binding the pronoun contained in the controller take scope over the matrix clause. As a result, the QP in (10)/(11) necessarily takes wide scope.

5.3 On the Phasehood of vP

The hypothesis that vP is a phase plays a crucial role in the analysis proposed above of the interaction of movement and binding. In particular, recall that it is because vP (of the control clause) is a phase that scrambling out of a control clause does not have the effect of making new binding relations even though the embedded CP of the control construction is not a phase. This proposal predicts that if vP of an embedded clause is not a phase, scrambling out of that clause will produce new binding relations. This prediction is borne out by Japanese causative constructions.

Consider (52) and (53) below, both of which are causative constructions.

(52a) *Soko-no sotugyoosei-ga Ken-ni mittu-izyou-no daigaku-ni
        it-GEN graduate-NOM Ken-DAT three-or.more-GEN university-DAT
        syutugan-saseta.
        apply-caused
        'Their graduates made Ken apply to three or more universities.'
b. *Soko-no syain-ga Ken-ni mittu-izyoo-no kaisya-o 
it-GEN employee-NOM Ken-DAT three-or-more-GEN company-ACC 
tyooosa-saseta. 
investigate-caused
'Their employees made Ken investigate three or more companies.'

(53)a. Mittu-izyoo-no daigaku-ni soko-no sotugyooosei-ga Ken-ni 
three-or-more-GEN university-DAT it-GEN graduate-NOM Ken-DAT 
syutugan-saseta. 
apply-caused

b. Mittu-izyoo-no kaisya-o soko-no syain-ga Ken-ni 
three-or-more-GEN company-ACC it-GEN employee-NOM Ken-DAT 
tyooosa-saseta. 
investigate-caused

Since Kuroda's (1965) work on Japanese causatives it has been commonly assumed that they involve biclausal structures where the causative morpheme -sase takes a sentential complement. Let us adopt this analysis. Then in (52) the matrix subject contains a pronominal that is to be bound by the object QP of the embedded clause. The intended binding is impossible. The examples in (53) involve scrambling of the embedded object QP to the front of the matrix clause. Here scrambling out of the causative complement clause has the effect of making the intended binding possible.

The cases in (53) contrast sharply with those in (14), repeated below, where scrambling out of a control clause does not make binding possible.

(14)a. ?*Mittu-izyoo-no daigaku-ni soko-no sotugyooosei-ga Ken-ni 
three-or-more-GEN university-DAT it-GEN graduate-NOM Ken-DAT 
[syutugansuru yoo] susumeta. 
apply that recommended
'Their graduates recommended Ken to apply to three or more universities.'

b. ?*Mittu-izyoo-no kaisya-o soko-no syain-ga Ken-ni 
three-or-more-GEN company-ACC it-GEN employee-NOM Ken-DAT 
[tyooosasuru yoo] iraisita. 
investigate that asked
'Their employees asked Ken to investigate three or more companies.'

Given that the matrix subject has moved from the embedded clause neither in (14) nor in (53), we need to ask what makes binding possible in (53), in contrast to (14).

While both (14) and (53) involve scrambling out of an embedded clause, they differ in the nature of the embedded clause. In (14) the embedded clause is a control clause, which we assume to be a CP, following much current work. On the other hand, in (53) the embedded clause is a causative complement. Given that the verb in the causative complement is always bare, lacking tense morphology (whereas the verb in the
control complement is inflected for present tense), it is reasonable to assume with Murasugi and Hashimoto (2004) and Saito (2006) that the complement clause of the causative construction is a vP (without TP and CP). On this analysis, the contrast under consideration will follow if vP of the causative clause, unlike that of the control clause, is not a phase. If vP of the causative clause is not a phase, the object QP in (53) scrambles directly to Spec,v of the matrix clause. Since this is scrambling, the present analysis allows the QP to land in a higher Spec than the base-generated matrix subject (the QP does not need to tuck in beneath the base-generated subject). The existence of this derivational step makes it possible for the QP in (53) to bind the pronominal contained in the matrix subject.

In effect, I am suggesting that the phasehood of vP varies depending on its properties. vP is a phase when it is selected by T, whereas it is not a phase otherwise. That the phasehood of a category varies depending on its properties is not uncommon. It is standardly assumed that vP is a phase when its has an external argument, but is not a phase when it has no external argument, as in unaccusatives and passives (see, for example, Chomsky 2000). Recall also that I argued above that the embedded CP of the control construction is not a phase. This means that whereas finite CP is a phase, control CP is not. The claim that the embedded vP of the causative construction is not a phase can be understood in the same way—vP selected by T is like vP with an external argument and finite CP, and vP not selected by T is like vP without external argument and control CP. One might ask why the phasehood of these categories varies in this way. Intuitively speaking, CP and vP are phases only when they are "complete"—control CP, vP without an external argument, and bare vP, namely, vP not selected by T are all defective, as compared with finite CP and vP having an external argument and selected by T. The defective nature of these categories probably prevents them from constituting phases.

While I leave a fuller discussion of this suggestion for future research, I would like to mention that this line of thinking may provide an account of the variation in judgment noted in footnote 3. Recall that some speakers find the bound variable reading in cases like (14) to be more acceptable than I do. Their judgment makes sense if for those speakers vP of the control complement behaves like that of the causative complement. Perhaps there is variation among the grammars of Japanese speakers as to whether the complement clause of the control construction is analyzed as a (defective) CP or as a reduced clause equivalent to the vP complement of the causative.

6 Conclusion

In this article I have provided arguments based on newly discovered facts about scrambling in Japanese in favor of the following claims:

- Control clauses are derived by movement of the controller.
- Scrambling differs from both A-movement and A'-movement (operator
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movement).

- Scrambling out of a phase involves movement of phonological features alone.
- Movement is required to tuck in only when it enters into checking/agreement.
- Scrambling takes place without entering into checking/agreement.

Although many of these are not new claims, this study makes a unique contribution in lending additional support to them from a novel perspective. I have also shown that the present proposal has important consequences for a phase-based theory of syntactic derivation. Specifically, I have made the following claims:

- vP, but not CP, of the embedded clause of control constructions is a phase.
- vP of the embedded clause of causative constructions is not a phase.

While the approach pursued here raises new questions about scrambling and control (see footnotes 9 and 10, for example), I hope that it opens up a new perspective from which to look at the nature of syntactic movement and derivation in human language.

References
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