TWO NOTES ON COPY FORMATION*

Mamoru Saito
Nanzan University

1. Introduction

The control phenomenon, exemplified by (1), has been discussed extensively in the literature.

(1) John tried [$_{CP}$ [$_{IP}$ PRO to win the race]]

Yet it has resisted a satisfactory analysis. For one thing, the empty category PRO is postulated only for the phenomenon and its status is far from clear. Given this, Hornstein (1999) proposed to analyze control in terms of movement and to eliminate PRO. (1) would then be analyzed as in (2).

(2) John tried [$_{CP}$ [$_{IP}$ _ to win the race]]

The analysis is based on the assumption that movement is allowed into θ-positions.

Chomsky (2021) adopts Hornstein's insights but proposes an alternative analysis that does not rely on movement into θ-positions. According to the analysis, *John* is externally merged into θ-positions in both embedded and matrix clauses. Then, the operation Form Copy identifies the two instances of *John* as copies and the copy in the embedded clause deletes, as shown in (4).

(3) John tried [$_{CP}$ [$_{IP}$ ~~John~~ to win the race]]

The analysis is similar on the surface to the old equi NP deletion analysis, but is now formulated as a consequence of the Strong Minimalist Thesis.

This paper consists of two notes on the Form Copy analysis of control. The first note, presented in Section 2, concerns the locality of (obligatory) control. Form Copy is assumed to apply in the domain specified by phase. I show first that this necessitates revision in the standard definition of phase and the PIC (Phase Inpenetrability Condition). Then, I argue that the definition suggested in Saito (2017a) makes the Form Copy analysis consistent with the phase theory. The second note in Section 3 compares the movement analysis and the

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Form Copy analysis of control. There is not much difference in empirical coverage between the two analyses as long as sideward movement is incorporated into the movement analysis. Chomsky's (2021) argument for the Form Copy analysis is conceptual. He argues that Merge, as the simplest structure-building operation, should be subject to Minimal Yield, which disallows sideward movement. On the other hand, Kitahara (2017) presents an empirical argument for Minimal Yield, showing that it explains the proper binding effect in English.[1] I discuss a difference between English and Japanese with respect to the proper binding effect and show that it also follows from Minimal Yield, coupled with the definition of phase and the PIC introduced in Section 2. This constitutes additional empirical evidence for Miminal Yield, and hence, for the Form Copy analysis of control. Section 4 concludes the paper.

2. On the Definition of Phase and the PIC

2.1. The Form Copy Analysis of Control and the Locality Problem

In this section, I first briefly introduce Chomsky's (2021) analysis of control in terms of Form Copy. In particular, I explain its background and why it was proposed as an alternative to Hornstein's (1999) movement analysis. Then, I point out a locality problem that arises with it. The problem is inherited from Hornstein's analysis and arises because control takes place across a CP/IP pair as illustrated in (2) and (3).

Chomsky (2021) entertains two fundamental hypotheses in pursuit of the Strong Minimalist Thesis (SMT). One is a principle of UG called the Duality of Semantics. Its final formulation is shown in (4).

(4) Duality of Semantics: for A-positions, EM (External Merge) and EM alone fills a θ-position.

This prohibits Internal Merge (movement) into θ-positions and hence is inconsistent with the movement analysis of control.

The other is a condition on Merge, called Minimal Yield (MY). It reflects the nature of Merge as the simplest structure-building operation and states that Merge can introduce at most one new accessible item in the Workspace (WS). Suppose that Merge applies to the WS in (5a).

(5) a. {{a, b}, c}
b. {{c, {a, b}}} … External Merge
c. {{a, {a, b}}, c} … Internal Merge

There are four items that are accessible in (5a). *{a, b}* and *c* are accessible as they are, and

[1] Kitahara (2017) actually provides a supporting argument for the predecessor of Minimal Yield, called 'Determinacy', that Chomsky proposed in his 2017 Reading Lecture.

a and *b* are accessible by applying Minimal Search to *{a, b}*. External Merge can yield (5b) from (5a). In (5b), *{a, b}*, *c*, *a* and *b* conitinue to be accessible because Minimal Search into *{c, {a, b}}* yields them. In addition, the newly constructed item *{c, {a, b}}* is accessible. So, External Merge introduces one new accessible item to the WS. (5c) is constructed when Internal Merge applies to (5a), merging *a* and *{a, b}*. Minimal Search into *{a, {a, b}}* first yields *a* and *{a, b}*. At this point, it stops searching for *a* for accessibility because it is already accessible. That is, any element c-commanded by its copy is inaccessible. Then, further search into *{a, b}* only yields *b*. Thus, the accessible items in (5c) are *a*, *{a, b}*, *b*, *c* and the newly constructed *{a, {a, b}}*. Again, only one new item is accessible compared with (5a).

MY, like the Duality of Semantics, is inconsistent with the movement analysis of control. (1), repeated in (6a), is an example of control into a CP complement.

(6) a. John tried [$_{CP}$ [$_{IP}$ PRO to win the race]]
b. John left the room [$_{PP}$ after [$_{IP}$ PRO talking to Mary]]

However, control takes place into adjuncts as well, as shown in (6b). In this case, the example cannot be derived by direct movement as in (7) because movement out of an adjunct is illicit.

(7) John left the room [$_{PP}$ after [$_{IP}$ ~~John~~ talking to Mary]]

Hornstein (2001) proposes to derive examples of this kind with 'sideward movement'. The derivation takes place as in (8).

(8) a. Form the adjunct [$_{PP}$ after [$_{IP}$ John talking to Mary]].
b. Form the *v**P of the main sentence [$_{v*P}$ *v** [leave the room]].
c. Merge 'John' in the adjunct with the *v**P to form [$_{v*P}$ John [$_{v*P}$ *v** [leave the room]]].
d. (Pair) Merge the adjunct to the *v**P formed at Step c.
e. Merge I and the *v**P formed at Step d to form IP.
f. Internally Merge 'John' at Spec, *v**P to IP.

Step c is a case of 'sideward movement', which merges an item within α to a separately formed constituent β. And this is one case of the application of Merge that MY excludes.

Let us use the simple WS in (9a) to illustrate the point.

(9) a. {{a, b}, {c, d}}
b. {{c, {a, b}}, {c, d}} … sideward movement

In (9a), *{a, b}* and *c* are accessible. If they are merged by sideward movement, the new WS (9b) is produced. It has a new accessible item *{c, {a, b}}*. In addition, the *c* within *{c, {a, b}}* and the *c* in *{c, d}* are both accessible as neither c-commands the other. Thus, sideward

movement produces two new accessible items in violation of MY.

The movement analysis of control has many attractive features. But it must be radically reformulated so that it does not involve movement if the Duality of Semantics and MY are maintained. Chomsky's (2021) Form Copy analysis of control serves this purpose.

Chomsky's analysis of control is an extension of his analysis of raising, refined under the SMT. Let us consider (10) as an example of raising.

(10) Mary is likely [~~Mary~~ to win the prize]

The example is derived by IM (Internal Merge), and *Mary* in the embedded clause is a copy of *Mary* in the matrix clause. But if derivations are strictly Markovian and a derived Workspace has no access to the derivational history, this information is not available at the matrix phase. What is found in (10) is simply two instances of *Mary*. Chomsky, then, proposes the operation, Form Copy (FC), to assign the relation *Copy* to the two *Mary*s. At the matrix phase, MS (Minimal Search) selects *Mary* in the matrix clause and searches its sister for an identical element. It finds *Mary* in the embedded clause and take the two *Mary*s to be copies. Consequently, the one in the embedded clause deletes.

As FC does not see the derivational history, it should apply to two identical elements that are independently introduced into the structure by EM (External Merge). This, according to Chomsky (2021), yields control. Let us consider (11).

(11) Mary tried [~~Mary~~ to win the prize]

Given the Duality of Semantics, the two *Mary*s are introduced into their respective clauses by EM. And FC assigns the relation *Copy* to them and the instance in the embedded clause deletes. As Chomky notes, this is similar to the old equi NP deletion analysis but is formulated in accordance with the SMT. It inherits the advantages of Hornstein's (1999) movement analysis of control without assuming movement into θ-positions. But it also inherits a problem of locality from the movement analysis. The remainder of this section is devoted to the illustration of this problem.

The derivation of (11) under the movement analysis of control is more precisely as in (12).

(12) [IP Mary [*v**P Mary [VP tried [CP [IP Mary [IP to [*v**P Mary [VP win the prize]]]]]]]]

Here, the problematic step is the movement from embedded Spec, IP to the matrix Spec, *v**P. The standard definition of phase and the PIC, as proposed and entertained, for example, in Chomsky (2000, 2008), is as in (13).

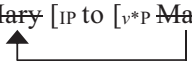
(13) a. CPs and *v**Ps constitute phases.

b. PIC: Once a phase is constructed, its complement is inaccessible to further operation.

The embedded CP in (12) is a phase. Hence, upon its completion, any element within its complement IP is inaccessible and cannot be moved. The phase theory, thus, predicts that the movement from Spec, IP to Spec, *v**P in (12) should be impossible.

The FC analysis faces a similar problem as long as FC applies at the phase level as Chomsky (2021) assumes. The structure of (11) is as in (14).

(14) [$_{v*P}$ Mary [$_{VP}$ tried [$_{CP}$ [$_{IP}$ ~~Mary~~ [$_{IP}$ to [$_{v*P}$ ~~Mary~~ [$_{VP}$ win the prize]]]]]]]



Mary is merged at the embedded Spec, *v**P and at the matrix Spec, *v**P by EM. If *Mary* in the embedded clause merges at Spec, IP by IM, the structure in (14) obtains. FC assigns the relation *Copy* to the lowest *Mary* and the middle *Mary*, and the former deletes. Then, FC should make the middle *Mary* and the highest *Mary* copies, and the middle *Mary* should delete. But this should be impossible because the embedded CP is a phase. When *Mary* is merged at the matrix Spec, *v**P, the middle *Mary* is already inaccessible as it is contained within the IP complement of the embedded CP phase. The problem arises in the same way even if *Mary* in the embedded Spec, *v**P remains in place and does not internally merge at Spec, IP. It seems then necessary to adopt a definition of phase and the PIC that is different from (13) in order make the FC analysis work properly. In the following section, I introduce the definition of phase and the PIC proposed in Saito (2017a) and show that it serves the purpose.

2.2. ϕ-feature Agreement and Phase

The definition of phase and the PIC in Saito (2017a) was proposed in an attempt to develop Quicoli's (2008) analysis of binding condition (A) effects in terms of the phase theory. I first illustrate Quicoli's analysis and then the proposals in Saito (2017a) in this section.

Quicoli assumes, following Chomsky (2000, 2008), that the phase complement is transferred to the CI interface upon the completion of a phase and that this explains the PIC. With this assumption, he proposes (15) to capture condition (A) effects.

(15) Information on the reference of an anaphor is sent to the CI interface along with a transfer domain that includes the anaphor.

This makes correct predictions for the examples in (16).

(16) a. John nominated himself
b. *John thinks that himself is qualified
c. *John expects Mary to nominate himself

The reflexive in (16a) is transferred to the CI interface when the *v**P phase is formed as in (17).

(17) [$_{v*P}$ John [$_{VP}$ nominate himself]]

The transfer domain is VP, but as *John* appears in the structure and c-commands *himself*, the information 'himself = John' can be sent to the CI interface along with the VP.

In (16b), an example of the NIC effect, the reflexive is transferred upon the completion of the embedded CP phase, as illustrated in (18).

(18) [$_{CP}$ that [$_{IP}$ himself …]]

Here, there is no NP that c-commands *himself* when the complement IP is transferred. The example is ruled out because the CI interface fails to receive information on the reference of the reflexive. (16c) is an example of the SSC effect. The reflexive is transferred when the embedded *v**P phase is formed as in (19).

(19) [$_{v*P}$ Mary [$_{VP}$ nominate himself]]

Mary c-commands *himself* in (19) but does not qualify as its antecedent. In this case too, the information on *himself* cannot be sent to the CI interface along with the transfer domain.

Although Quicoli's proposal has wide empirical coverage, there are a few patterns that it fails to explain. For example, an IP constitutes a binding domain for an anaphor in the subject position when the IP exhibits subject ϕ-feature agreement as in (16b). But as discussed in detail in Chomsky (1981), an IP without subject agreement is not a binding domain for a subject anaphor. Thus, the examples in (20) are grammatical.

(20) a. John prefers [$_{CP}$ for [$_{IP}$ himself to be nominated]]
b. They want very much [$_{CP}$ for [$_{IP}$ each other to succeed]]

If CP is always a phase and its complement IP is transferred upon its completion, (15) incorrectly rules out these examples.

The crucial factor that distinguishes (16b) and (20) is not whether the embedded clause has tense but is whether it exhibits agreement. Thus, as Huang (1982) and Yang (1983) showed, tensed embedded clauses pattern with (20) in East Asian languages because those languages lack ϕ-feature agreement altogether. The generalization can be illustrated with the subject-oriented local reflexive *zibun-zisin* in Japanese. Only the embedded subject *Hanako* can be the antecedent of *zibun-zisin* in (21).

(21) Taroo-wa [$_{CP}$ [$_{IP}$ Hanako-ga zibun-zisin-o suisensu-ru] to] omotte i-ru
Taroo-TOP Hanako-NOM self-self-ACC nominate-Pres. C think-Pres.

'Taroo thinks that Hanako will nominate self (= Hanako).'

This shows that *zibun-zisin* requires a local antecedent. Yet, the examples in (22) with tensed embedded clauses are grammatical just like those in (20).

(22) a. Taroo-wa [$_{CP}$ [$_{IP}$ zibun-zisin-ga suisens-are-ru] to] omotte i-ru
Taroo-TOP self-self-NOM nominate-Passive-Pres. C think-Pres.

'Taroo thinks that self (= Taroo) will be nominated.'

b. Hanako-wa [$_{CP}$ [$_{IP}$ zibun-zisin-ga sore-o mi-ta] to] syutyoosi-ta
Hanako-TOP self-self-NOM it-ACC see-Past C insist-Past

'Hanako insisted that self (= Hanako) saw it.'

This confirms that ϕ-feature agreement makes an IP the binding domain for subject anaphors.

If the contrast between IPs with and without subject agreement is to be captured by Quicoli's (2008) phase analysis, the transfer domains for CP phases should be as in (23).

(23) a. [$_{CP}$ [C [$_{IP}$ subject [I $_{[+AGR]}$ [$_{v/v*P}$ ...]]]]]
b. [$_{CP}$ [C [$_{IP}$ subject [I $_{[-AGR]}$ [$_{v/v*P}$ ...]]]]] (order irrelevant)

The shaded constituent is transferred upon the completion of CP. (23b) is the pattern of (22b), for example. When the embedded CP is formed, the embedded *v**P is transferred. Then, the matrix *v**P is constructed as in (24).

(24) [$_{v*P}$ Hanako-ga [[$_{VP}$ [$_{CP}$ [[$_{IP}$ zibun-zisin-ga [[$_{v*P}$ ...] I $_{[-AGR]}$]] C]] syutyoos] *v**]]

The shaded domain, which includes *zibun-zisin*, is transferred at this point. But as *Hanako* is already in the structure, the information 'zibun-zisin = Hanako' can be sent to the CI interface at the same time.

Chomsky (2008) proposes that the phase heads, C and *v**, are the locus of uninterpretable ϕ-features (agreement features) and that I and V inherit them from C and *v** respectively. Given this, Saito (2017a) proposes the definition of phase and transfer domain in (25) and shows that it yields (23).[2]

(25) a. C, $v^{(*)}$ are phase heads.
b. I/V inherits phasehood from C/*v** along with ϕ-features.
c. A phase HP is transferred upon the completion of the next phase up.

(25) makes the same predictions as the standard definition for *v**P phase and CP phase with

[2] Saito (2017a) argues, following Legate (2003) and Bošković (2016), that *v*, in addition to *v**, is a phase head. The idea in (25c) that phases, and not phase complements, constitute transfer domains are entertained in Chomsky (2000) and proposed in Bošković (2016), although their definitions of phase and transfer domain differ from (25).

ϕ-fearure agreement. According to (25b), the VP complement of *v** is a phase because V inherits phasehood along with ϕ-features from *v**. (25c) states that the VP phase is transferred upon the completion of the *v**P phase. Similarly, IP is a phase when I inherits ϕ-features from C. It is transferred upon the completion of the next phase up, that is, CP.

But (25) makes a new prediction for CP phase without ϕ-feature agreement. When I does not inherit ϕ-features from C, IP is not a phase. Then, what is transferred when the CP phase is constructed is not the complement IP but the $v^{(*)}$P complement of I, which is the maximal phase contained within CP. This is precisely what is illustrated in (23b), repeated below as (26).

(26) [$_{CP}$ [C [$_{IP}$ subject [I $_{[-AGR]}$ [$_{v/v*P}$ ...]]]]] (order irrelevant)

Thus, the English examples in (20) and the Japanese examples in (23) are accounted for.

(25) opens up a way to explain other apparent differences between English and Japanese. For example, it has been noted that there is an interesting difference between the two languages with respect to the binding domains in causative sentences. Let us consider first the English example in (27).

(27) *Mary made John nominate herself

If the clausal complement of (27) is a small clause as Stowell (1981) argues, then its structure is as in (28).

(28) [$_{v*P}$ John [$_{VP}$ nominate herself]]

The ungrammaticality of (27) straightforwardly follows. As V inherits ϕ-features from *v**, VP becomes a phase. It is transferred when *v**P is completed, but the information on the reference of *herself* is missing at this point.

Japanese causative sentences look like simple sentences on the surface, but it is widely assumed since Kuroda (1965) that they involve clausal embedding. The best known evidence for this is that the long-distance subject-oriented reflexive *zibun* can take the causee as well as the causer as its antecedent. The dative argument in a ditrasitive sentence, not being a subject, does not qualify as the antecedent of *zibun*, as shown in (29a).

(29) a. Hanako-ga Taroo-ni zibun-no syasin-o okut-ta
Hanako-NOM Taroo-DAT self-GEN picture-ACC send-Past

‘Hanako sent her picture to Taroo.’ (zibun = Hanako)

b. Hanako-ga Taroo-ni zibun-no syasin-o sute-sase-ta
Hanako-NOM Taroo-DAT self-GEN picture-ACC discard-make-Past

‘Hanako made Taroo discard her/his picture.’ (zibun = Hanako or Taroo)

(29b), on the other hand, shows that the dative causee in a causative sentence can be the antecedent of *zibun*. *Taroo* in this example, then, must be the subject of the embedded clause. Murasugi and Hashimoto (2004) argue further that Japanese causative sentences have precisely the same structure as their English counterparts with embedded $v^{(*)}$P small clauses.

However, (29b) remains ambiguous even when the local reflexive *zibun-zisin* is substituted for *zibun*. Kato (2016) observes contrasts like (30) and shows that the embedded clause is normally the binding domain for a local anaphor in the embedded object position but not in causative sentences.

(30) a. Hanako-ga [$_{CP}$ Taroo-ga zibun-zisin-o suisensi-ta to] omotte i-ru (koto)
Hanako-NOM Taroo-NOM self-self-ACC nominate-Past C think-Pres. fact

'Hanako thinks that Taroo nominated himselfself.' (zibun-zisin = Taroo)

b. Hanako-ga Taroo-ni zibun-zisin-o suisens-ase-ta (koto)
Hanako-NOM Taroo-DAT self-self-ACC nominate-make-Past fact

'Hanako made Taroo nominate him/herself.' (zibun-zisin = Hanako or Taroo)

The interpretive property of (30b) is different from its English counterpart in (27). Kato's generalization is confirmed with another local anaphor *otagai* 'each other' in (31).

(31) a. *Karera-ga [$_{CP}$ Hanako-ga otagai-o suisensi-ta to] omotte i-ru (koto)
they-NOM Hanako-NOM each.other-ACC nominate-Past C think-Pres. fact

'Lit. They think that Hanako nominated each other.'

b. Karera-ga Hanako-ni otagai-o suisens-ase-ta (koto)
they-NOM Hanako-DAT each.other-ACC nominate-make-Past fact

'Lit. They made Hanako nominate each other.'

In (31b), *otagai* in the embedded object position can take the matrix subject as its antecedent.

This difference between English and Japanese causatives is precisely what (25) predicts. (27) is repeated in (32a) with the structure of its *v**P complement in (32b).

(32) a. *Mary made John nominate herself
b. [$_{v*P}$ John [$_{VP}$ nominate herself]]

As explained above, the VP in (32b) is a phase because V inherits phasehood along with ϕ-features from *v**. When (32b) is formed, VP, which is the lower phase, is transferred without information on the reference of *herself*. The situation is different in Japanese because the language lacks ϕ-feature agreement. The structures of the embedded *v**P and the matrix *v**P of (30b) are shown in (33a) and (33b) respectively.

(33) a. [v*P Taroo-ni [VP zibun-zisin-o suisens]]
b. [v*P Hanako-ga [VP [v*P Taroo-ni [VP zibun-zisin-o suisens]] (s)ase]]

VP is not a phase in (33a) as V does not inherit ϕ-features from *v**. Hence, nothing is transferred at this point. When (33b) is formed, the lower *v**P phase, which includes *zibunzisin*, is transferred. But as *Hanako* is already in the structure, the information 'zibunzisin = Hanako' can be sent to the CI interface along with the *v**P.

2.3. The Locality of Obligatory Control

Among the consequences of (25) is that it makes the movement analysis of control consistent with the phase theory, as discussed in detail in Saito (2017b). Let us consider (12) again, repeated in (34).

(34) [IP Mary [v*P Mary [VP tried [CP [IP Mary [IP to [v*P Mary [VP win the prize]]]]]]]]

The problem was the second step. Suppose that the complement IP is transferred when a CP is formed. Then, *Mary* in the specifier position of the embedded IP becomes inaccessible upon the completion of the embedded CP, and cannot move to a position in the matrix clause. On the other hand, the definition of phase and transfer domains in (25) allows this movement. Since the embedded I does not inherit ϕ-features from the embedded C, the embedded IP is not a phase. Then, what is transferred upon the completion of the embedded CP is not the complement IP but the embedded *v**P. *Mary* remains accessible and can move to the specifier position of the matrix *v**P.

(25) makes the phase theory consistent with the FC analysis of control in the same way. Let us go over the problem first. The relevant structure in (14) is repeated in (35).

(35) [v*P Mary [VP tried [CP [IP ~~Mary~~ [IP to [v*P ~~Mary~~ [VP win the prize]]]]]]]

Mary is externally merged at the specifier positions of the embedded *v**P and the matrix *v**P because of the Duality of Semantics. *Mary* in the embedded clause merges with the embedded IP by IM. At the embedded CP phase, FC assigns the relation *Copy* to the two *Mary*s in the embedded clause and the lower copy deletes. Then, at the matrix *v**P phase, FC should assign the relation *Copy* to the highest *Mary* and the middle *Mary*, and the latter should delete. But if the complement IP becomes inaccessible upon the completion of a CP phase, the middle *Mary* should be inaccessible to FC. This problem does not arise if (25) is assumed. As Chomsky (2021) does not assume Transfer and maintains the PIC as such, let me first restate (25) in terms of the PIC.

(36) a. C, $v^{(*)}$ are phase heads.
b. I/V inherits phasehood from C/*v** along with ϕ-features.
c. A phase HP *becomes inaccessible* upon the completion of the next phase up.

In (35), the embedded IP is not a phase as I does not inherit ϕ-features from C. Then, what becomes inaccessible upon the completion of the embedded CP is not this IP but the embedded *v**P. The middle *Mary* in (35) remains accessible at the matrix *v**P phase, and FC can successfully apply.

(36) not only allows the derivation in (35) but also accounts for the locality of obligatory control. For example, it rules out the following derivations:

(37) a. Mary thinks [$_{CP}$ that [$_{IP}$ John [$_{v*P}$ tried [$_{CP}$ [$_{IP}$ ~~Mary~~ to be elected]]]]]
b. Mary wants (very much) [$_{CP}$ for [$_{IP}$ John to [$_{vP}$ be proud ~~Mary~~]]]

FC cannot apply to the two *Mary*s in (37a) because the most deeply CP becomes inaccessible upon the completion of the *v**P of the middle clause. For (37b), it is crucial that *v*P, in addition to *v**P, is a phase. The *v*P of the embedded clause becomes inaccessible when the embedded CP is formed. Thus, the two *Mary*s fail to have the *Copy* relation.

In this section, I pointed out a locality problem with Chomsky's (2021) FC analysis of control and argued that the problem can be overcome by revision in the definition of phase and the formulation of the PIC. I suggested that (36), which is motivated on independent grounds, serves the purpose and hence, can be considered a candidate for the revision.

3. Evidence for Minimal Yield and hence for Form Copy

The FC analysis of control presupposes the Duality of Semantics and Minimal Yield (MY) and in this sense, is quite different from the movement analysis. Yet, the two analyses have similar empirical coverage. This is not surprising because the FC analysis follows the movement analysis in unifying raising and control. Hornstein argued that both raising and control involve movement. Chomsky, on the other hand, proposed that FC applies to both raising and control structures. In this section, I discuss the similarities and differences between the two analyses in the empirical domain in more detail. In 3.1, I briefly discuss how the two approaches deal with different types of control constructions and other phenomena like parasitic gaps. In 3.2, I introduce Kitahara's (2017) analysis of the proper binding effect in terms of MY and present further evidence for it, showing that it also explains an interesting difference between English and Japanese with respect to proper binding. As FC is based on MY and the movement analysis of control is inconsistent with it, the evidence for MY constitutes supporting evidence for the FC approach as well.

3.1. Control into Adjuncts and Related Phenomena

It was illustrated in Section 2 how the movement analysis accounts for examples of control into adjuncts with sideward movement. The FC analysis straightforwardly accounts for them as well without assuming any 'sideward relation'. FC only applies to two items in c-command relation. The two approaches also successfully explain some cases that resist analysis in terms of PRO. Let me illustrate the point first with the examples of depictive

secondary predicates in (38).

(38) a. John ate the meat naked
b. John ate the meat raw

In (38a), for example, *John* is an argument of *naked* as well as *eat*. In this case, a PRO cannot be postulated in the projection of *naked* if the distribution of PRO is limited to the subject position of a nonfinite IP.[3] On the other hand, the example can be straightforwardly analyzed with FC, as illustrated in (39).

(39) [IP John$_1$ [v*P [~~John~~$_2$ [VP eat the meat]] [AP ~~John~~$_3$ naked]]]

John is externally merged in θ-positions in the main clause and the secondary predicate (*John*$_2$ and *John*$_3$). *John*$_2$ internally merges at Spec, IP and then, FC applies to *John*$_1$ and *John*$_2$ as well as to *John*$_1$ and *John*$_3$, deleting *John*$_2$ and *John*$_3$. The movement analysis can also account for the example with sideward movement of *John* from the position of *John*$_3$ to the position of *John*$_2$.

The analysis can be extended to resultative small clauses like (40a) although they are not adjuncts.

(40) a. John pounded the metal flat
b. [v*P John [v* [VP the metal [VP pound [AP ~~the metal~~ flat]]]]]

Let us assume that the v*P of the example has the structure in (40b).[4] The noun phrase *the metal* is externally merged at the object position and also within the resultative small clause. FC assigns the relation *Copy* to the two instances and the copy in the small clause deletes, exactly as with the depictive small clauses. In this case, the movement analysis need not appeal to sideward movement. If movement into θ-position is allowed, *the metal* in the AP can move to the object position of the main clause and pick up the internal θ-role of *pound*.[5]

As Chomsky (2021) mentions, FC makes a principled account for parasitic gaps possible. For example, (41a) can be analyzed as in (41b).

(41) a. Which paper did John file after he read

[3] It is worth noting that Hornstein and Lightfoot (1987) propose to account for examples like (38) as instances of control with PRO in a governed position within the secondary predicate.

[4] Throughout this paper, I assume, following Chomsky (2000), that V moves to (or amalgamates with) $v^{(*)}$, as indicated in (40b).

[5] This analysis was argued for in Saito (2001).

b. which paper$_1$ [did John [file ~~which paper~~$_2$] [after [~~which paper~~$_3$ [he read ~~which paper~~$_4$]]]]

The wh-phrase externally merges with *file* (*which paper*$_2$) and moves to the matrix Spec, CP (*which paper*$_1$). It also externally merges with *read* (*which paper*$_4$) and moves to Spec, CP within the adjunct (*which paper*$_3$). Form Copy applies in the usual manner, and *which paper*$_2$ and *which paper*$_4$ delete. In addition, it can apply to *which paper*$_1$ and *which paper*$_3$ as they belong to the same phase domain. Then, *which paper*$_3$ deletes. The structure obtained is as if the wh-phrase moved to the matrix Spec, CP from two θ-positions although movement out of an adjunct does not actually take place.[6] Interestingly, Hornstein (2001), building on Nunes (1995), appeals to sideward movement for the analysis of parasitic gaps. The basic idea is that *which paper* in (41) moves from the position of *which paper*$_3$ to the position of *which paper*$_2$ to pick up the internal θ-role of *file*.

The sideward movement analysis of (41) implies that movement from an A'-position to an A-position is possible. This sort of movement is widely assumed to be illicit because the derivation of (44a) in (44b) is ruled out.

(44) a. *John seems that it is likely to submit a paper
b. [$_{IP}$ John$_1$ [seems [$_{CP}$ John$_2$ [that [$_{IP}$ it is likely [$_{IP}$ John$_3$ [to submit a paper]]]]]]]

The illicit movement in (44b) is called improper movement. Hornstein (2001) argues that movement from an A'-position to an A-position is allowed and that examples of improper movement are ruled out on independent grounds. One possibility is to exclude them as Condition (C) violations, as originally proposed by May (1981). It is possible that *John*$_3$ is locally A'-bound by *John*$_2$ and hence is subject to Condition (C).[7] It is ruled out as it is bound by *John*$_1$ in an A-position.

On the premise that A'-to-A movement is possible, Hornstein proposes further that null operators can be eliminated. Let us consider the purpose expressions in (45).

(45) a. John bought the book to please Mary
b. John bought the book to read

(45a) is a straightforward example of control and can be derived as in (46) with sideward movement.

(46) [$_{v*P}$ John [$_{VP}$ [$_{VP}$ buy the book] [John to please Mary]]]

[6] Hayashi (2021) works out this analysis in more detail and shows that it captures the main properties of parasitic gaps discussed in Chomsky (1982, 1986).

[7] Or alternatively, *John*$_3$, being locally A'-bound by *John*$_2$, must be valued for Case. And if it is valued for Case, it is subject to Condition (C).

The standard analysis of (45b), on the other hand, is with a null operator movement as in (47).

(47) [$_{v}$*P John [$_{VP}$ [$_{VP}$ buy the book] [$_{CP}$ Op [PRO to read Op]]]]

Hornstein proposes to analyze the example without a null operator by moving *the book* from the object position of *read* to Spec, CP of the purpose clause, and then, to the object position of *buy*. As (48) illustrates, the last step is sideward movement.

(48) [$_{v}$*P John [$_{VP}$ [$_{VP}$ buy the book] [$_{CP}$ the book [John to read the book]]]]

Hornstein extends this analysis to other kinds of examples that have been assumed to involve null operators. For example, (49a), which is standardly analyzed as in (49b), can be derived instead as in (50).[8]

(49) a. Mary is easy (for us) to talk to
b. Mary is easy [$_{CP}$ Op [$_{IP}$ (for us) [to talk to Op]]]

(50) [$_{AP}$ Mary [easy [$_{CP}$ Mary [$_{IP}$ (for us) [to talk to Mary]]]]]

(50) contrasts with (44a) and is not in violation of Condition (C). This is because the copy of *Mary* in Spec, CP serves a role in interpretation, connecting the other two *Mary*s in A-positions. Although it is deleted phonetically, it is retained in Spec, CP and protects the copy of *Mary* in the initial position from being locally A-bound by the copy in Spec, AP. According to Hornstein, this is what a null operator is.

Chomsky (2021) pursues a different direction to rule out improper movement. He proposes (51).

(51) From an A-position, FC searches A-positions.

Let us consider (44), repeated in (52), to see how this works.

(52) a. *John seems that it is likely to submit a paper
b. [$_{IP}$ John$_{1}$ [seems [$_{CP}$ ~~John~~$_{2}$ [that [$_{IP}$ it is likely [$_{IP}$ ~~John~~$_{3}$ [to submit a paper]]]]]]]

FC searches *John$_{1}$*'s sister, which is the matrix IP excluding *John$_{1}$*. But since it searches A-positions, it fails to identify *John$_{2}$* as a potential copy of *John$_{1}$*. Consequently, FC does not assign the relation *Copy* to *John$_{1}$* and *John$_{2}$*, and the former fails to be connected to a θ-position.

[8] Hornstein assumes that *Mary* receives a θ-role from *easy* in the matrix clause. This is in part because he assumes that movement is subject to Greed and must have a "reason" to apply.

Thus, Hornstein maintains that A'-to-A movement is allowed whereas Chomsky excludes it with (51).[9] But as far as I can see, this difference is not rooted in the difference in their approaches to control. For example, one can maintain the FC approach, and at the same time, abandon (51) on the assumption that improper movement is ruled out on independent grounds. In that case, (45b) can be analyzed as in (53).

(53) [$_{v*P}$ John [v* [$_{VP}$ the book$_1$ [[buy ~~the book$_2$~~] [$_{CP}$ ~~the book$_3$~~ [$_{IP}$ ~~John~~ to read ~~the book$_4$~~]]]]]]

The book in the purpose clause internally merges at Spec, CP (*the book$_3$*). On the other hand, *the book* in the main clause internally merges at Spec, VP (*the book$_1$*) so that VP can be properly labeled, as proposed in Chomsky (2015). FC applies to *the book$_1$* and *the book$_3$*, and the latter deletes. Similarly, (49a) can be accounted for as in (54).

(54) [$_{vP}$ Mary$_1$ [$_{VP}$ be [$_{AP}$ easy [$_{CP}$ ~~Mary$_2$~~ [$_{IP}$ (for us) [to talk to ~~Mary$_3$~~]]]]]]

Mary is externally merged as the complement of *to* (*Mary$_3$*) and as the specifier of the matrix vP (*Mary$_1$*).[10] The former internally merges at Spec, CP (*Mary$_2$*). FC applies to *Mary$_1$* and *Mary$_2$*, and the latter deletes.

Then, the FC approach and the movement approach have very similar empirical coverage. However, Kitahara (2017) presents evidence for MY, and this serves to distinguish the two approaches on empirical grounds. This is so because the FC analysis is based on MY whereas MY excludes sideward movement, which is an important part of the movement analysis of control. I turn to his argument in the following subsection.

3.2. Proper Binding Effects in English and Japanese

There is an asymmetry between A'-movement and A-movement with respect to the proper binding effect. This is illustrated in (55).

(55) a. *[$_{CP}$ [Which picture of _] does [$_{IP}$ John [$_{vP}$ wonder [$_{CP}$ who [$_{IP}$ Mary [$_{vP}$ likes _]]]]]]
b. I wonder [$_{CP}$ [how likely _ to win] [$_{IP}$ John is _]]

In (55a), first, *who* internally merges at the Spec of the embedded CP, an A'-position. Then the remnant wh-phrase, *which picture of*, is internally merged at the Spec of the matrix CP. The wh-phrase, *who,* does not c-command its initial site, and the example is ungrammatical. In (55b), the initial movement is IM of *John* at the embedded subject position, an A-position. Then, the remnant wh-phrase, *how likely to win*, is internally merged at Spec, CP. The

[9] This difference is reflected in their explanations of the anti-c-command requirement on parasitic gaps as well. Hornstein maintains its explanation in terms of Condition (C), which was originally proposed in Chomsky (1982). Chomsky, on the other hand, seems to assume that it is due to (51).

[10] The Duality of Semantics, as formulated in (4), does not exclude EM at a non-θ A-position.

example is grammatical despite the fact that *John* does not c-command its intial site.

Kitahara (2017) shows that the contrast in (55) follows from the predessor of MY, Determinacy, that Chomsky proposed in his 2017 Reading Lecture. In this subsection, I first introduce his argument. I assume MY instead of Determinacy because Kitahara's analysis holds with either of them. Then, I introduce the observation by Hoji, Miyagawa and Tada (1989) that the Japanese counterpart of (55b) is ungrammatical. I show that this fact also follows from MY with the definition of phase and the PIC argued for in Section 2.

Recall that MY states that Merge can introduce at most one new accessible item in the Workspace (WS). Kitahara points out that in order to derive (55a), *who* must be moved out of *which picture of who*, and then, the remnant, *which picture of*, must be moved to a position higher than *who* at one stage of the derivation. If this happens at the edge of the embedded *v**P, the two steps produce the structures in (56a) and (56b) respectively.

(56) a. [$_{v*P}$ who$_1$ [Mary *v** [$_{VP}$ likes [which picture of who$_2$]]]]
b. [$_{v*P}$ [which picture of who$_3$] [who$_1$ [Mary *v** [$_{VP}$ likes [which picture of who$_2$]]]]]

The IM in (56a) satisfies MY. The internally merged *who$_1$* is accessible. But *who$_2$* no longer is because it is c-commanded by *who$_1$*. Thus, the only newly accessible item is the whole *v**P produced by the IM. On the other hand, (56b) is in violation of MY. The internally merged *which picture of who* is accessible, and its copy at the initial site no longer is.[11] But *who$_3$* and *who$_1$* are both accessible because neither c-commands the other. This adds an accessible item because only one instance of *who* is accessible in (56a). Hence, the application of IM in (56b) adds two new accessible items, *who$_3$* and the *v**P it produces. (55a), then, is correctly ruled out by MY.

Kitahara, then, shows that the situation is different in the case of (55b). The IM of the subject and the subsequent IM of the wh-phrase produce the structures in (57a) and (57b) respectively.

(57) a. [$_{IP}$ John$_1$ [is [$_{AP}$ how likely [John$_2$ to win]]]]
b. [$_{CP}$ [$_{AP}$ how likely [John$_3$ to win]] [C [$_{IP}$ John$_1$ [is [$_{AP}$ how likely [John$_2$ to win]]]]]]
Not accessible

(57a) is straightforward. *John$_1$* is accessible but *John$_2$* is not because it is c-commanded by *John$_1$*. So, the new accessible item is just the IP produced by the IM. (57b), like (56b), is produced by the IM of a remnant wh-phrase at Spec, CP. *John$_3$* and *John$_1$* both appear to

[11] The tacit assumption here is that if α is inaccessible, any term of α, that is, any element contained within α, is inaccessible. Thus, *picture* within the initial site of the wh-phrase is inaccessible though it is not c-commanded by *picture* within the wh-phrase at the landing site. There is an additional factor in the case of (56b). As the IM completes the *v**P phase, the complement VP is inaccessible because of the PIC.

be accessible because neither c-commads the other. And if they are, (57b) is in violation of MY. But there is a crucial difference between (56b) and (57b). In (57b), *John*$_1$ is not at the phase edge. The IM at Spec, CP completes the CP phase. Then, the IM makes the complement IP inaccessible because of the PIC. As a result, there is only one instance of *John* that is accessible in (57b). Thus, the IM produces only one newly accessible item, that is, the CP that it produces. The IM in (57b), in contrast with the IM in (56b), conforms to MY.

With Kitahara's (2017) analysis, the contrast in (55) constitutes solid evidence for MY. Further evidence for his analysis and MY can be obtained from examples of the proper binding effect in Japanese. Let us first consider data that are standardly discussed as examples of proper binding effect.[12] As is well known, Japanese allows scrambling rather freely as shown in (58).

(58) a. [$_{TP}$ Hanako-ga [$_{VP}$ Taroo-o nagiri]-sae si-ta]
Hanako-NOM Taroo-ACC punch-even do-Past
'Hanako even punched Taroo.'

b. [Taroo-o [$_{TP}$ Hanako-ga [$_{VP}$ __ nagiri]-sae si-ta]]

c. [[$_{VP}$ Taroo-o naguri]-sae [$_{TP}$ Hanako-ga __ si-ta]]

In (58b), the object *Taroo-o* is scrambled to the sentence-initial position. When a VP appears with a focus particle as in (58a), the VP can also be scrambled. This is shown in (58c). Japanese also allows multiple scrambling. Thus, (59a) is grammatical.

(59) a. [Taroo-o (kinoo) [[$_{VP}$ __ nagiri]-sae [$_{IP}$ Hanako-ga __ si-ta]]]
Taroo-ACC yesterday punch-even Hanako-NOM do-Past
'Lit. Taroo, (yesterday), even punch, Hanako did.'

b. *[[$_{VP}$ __ nagiri]-sae [Taroo-o [$_{IP}$ Hanako-ga __ si-ta]]]
punch-even Taroo-ACC Hanako-NOM do-Past
'Lit. Even punch, Taroo, Hanako did.'

However, (59b) shows that the sentence is totally ungrammatical when the scrambled VP precedes the scrambled object. This is standardly considered a proper binding effect as the scrambled object fails to c-command its initial site, that is, the object position of *naguri* 'punch' in the scrambled VP.

(59b) already poses a question for Kitahara's analysis introduced above. It is argued in Saito (1985) that any maximal projection can be a landing site of scrambling. Then, (60)

[12] The reader is referred to Takita (2010) for a comprehensive discussion of proper binding effects in Japanese.

should be a possible structure for (59b).

(60) [$_{CP}$ [$_{VP}$ Taroo-o$_3$ naguri]-sae [$_{CP}$ [$_{IP}$ Taroo-o$_1$ [$_{IP}$ Hanako-ga [$_{VP}$ Taroo-o$_2$ naguri]-sae si]-ta]]]]

Not accessible

In (60), *Taroo-o* internally meges with IP and the VP, *Taroo-o naguri-sae*, internally merges with CP. If the PIC makes the IP complement inaccessible upon the completion of a CP phase, *Taroo-o$_1$* is inaccessible. Then, the IM of VP to CP only produces one new accessible item, the newly formed CP, and hence, conforms to MY, just like (55b).

The problem can be seen more clearly with the observation of Hoji, Miyagawa and Tada (1989) mentioned above. They observe that VP scrambling is illicit when the verb is unaccusative or passive. (61b) is perfectly fine as the verb is unergative.

(61) a. [$_{TP}$ Hanako-ga [$_{VP}$ hasiri-mawari]-sae si-ta]
Hanako-NOM run.around-even do-Past

'Hanako even ran around.'

b. [$_{VP}$ Hasiri-mawari]-sae [$_{TP}$ Hanako-ga __ si-ta]

On the other hand, unaccusative and passive verbs do not allow VP-scrambling, as (62) and (63) demonstrate.

(62) a. [$_{IP}$ Ame-ga [$_{VP}$ __ huri]-sae si-ta]
rain-NOM fall-even do-Past

'It even rained.'

b. *[$_{VP}$ __ huri]-sae [$_{IP}$ ame-ga __ si-ta]

(63) a. [$_{IP}$ Hanabi-ga [$_{VP}$ __ uti-age-rare]-sae si-ta]
firework-NOM shoot.off-Passive-even do-Past

'Even fireworks were shot off.'

b. *[$_{VP}$ __ uti-age-rare]-sae [$_{IP}$ hanabi-ga __ si-ta]

Hoji, Miyagawa and Tada (1989) present (62b) and (63b) as examples of the proper binding effect. In (62b), for example, *ame* 'rain' fails to c-command its initial site within the scrambled VP. Their conclusion is that these examples constitute evidence for NP-movement in Japanese. Their point is well taken. But the examples pose a mystery as well. As seen in (55b), repeated below as (64), A'-movement can be applied to a remnant of NP-movement.

(64) I wonder [$_{CP}$ [how likely _ to win] [$_{IP}$ John is _]]

(65a) and (65b) correspond more closely to (61b) and (62b) respectively.

(65) a. They said that the ball might fall __ into the ditch, and fall __ into the ditch, it did __ .

b. Mary said that she would be praised __ by the critics, and praised __ by the critics, she was __ .

In the second clause of (65a), for example, *it* moves from the complement position of *fall* to the subject position as the verb *fall* is unaccusative. Then the VP headed by *fall* is preposed to the sentence-initial position. The example parallels (62a) but is grammatical. What would be the reason for this difference between English and Japanese?

The ungrammaticality of (62b) and (63b) poses the same problem as (59b). (62b) can be derived as in (66).

(66) [$_{CP}$ [$_{VP}$ ame-ga$_3$ huri]-sae [$_{IP}$ ame-ga$_1$ [$_{vP}$ [$_{VP}$ ame-ga$_2$ huri]-sae si]-ta]]

Not accessible

There is no c-command relation between *ame-ga*$_3$ and *ame-ga*$_1$. So, the IM of VP appears to produce more than one new accessible item. But the derivation should be allowed because the IP and hence *ame-ga*$_1$ are inaccessible because of the PIC. It is then predicted incorrectly that (62b) is grammatical.

However, if the definition of phase and the PIC proposed in the preceding section is assumed, MY properly explains the contrast between the Japanese (62b)/(63b) and the English (64). The definition in (25) is repeated below in (67).

(67) a. C, $v^{(*)}$ are phase heads.
b. I/V inherits phasehood from C/v* along with ϕ-features.
c. A phase HP is transferred upon the completion of the next phase up.

It does not affect Kitahara's (2017) analysis of the English examples. For example, the derivation of the second clause of (65a) can be as in (68).

(68) [$_{CP}$ [$_{VP}$ fall it$_3$ into the ditch] [C [$_{IP}$ it$_1$ [did [$_{VP}$ fall it$_2$ into the ditch]]]]]

Not accessible

In (68), IP is a phase in addition to CP as I inherits phasehood as well as ϕ-features from C. Then, IP becomes inaccessible upon the completion of CP. As a result, only one instance of *it* is accessible and the IM of VP conforms to MY.

On the other hand, MY predicts the Japanese (62b) and (63b) to be ungrammatical. Let

us take (62b) again to illustrate this. The derivation of the example is shown again in (69).

(69) [$_{CP}$ [$_{VP}$ ame-ga$_3$ huri]-sae [$_{IP}$ ame-ga$_1$ [$_{vP}$ [$_{VP}$ ame-ga$_2$ huri]-sae si]-ta]]

Not accessible

According to (67), the IP in this example is not a phase. As Japanese lacks ϕ-feature agreement altogether, I does not inherit ϕ-features and phasehood from C. Then, what the PIC makes inaccessible upon the completion of CP is not IP but *v*P, as indicated in (69). Consequently, the IM of VP in (69) produces two newly accessible items, *ame-ga$_3$* and the CP that IM forms. The example is thus correctly ruled out by MY. The ungrammaticality of (59b), repeated in (70), is explained in the same way.

(70) *[[$_{VP}$ __ nagiri]-sae [Taroo-o [$_{IP}$ Hanako-ga __ si-ta]]]
punch-even Taroo-ACC Hanako-NOM do-Past

'Lit. Even punch, Taroo, Hanako did.'

(71) [$_{CP}$ [$_{VP}$ Taroo-o$_3$ naguri]-sae [$_{CP}$ [$_{IP}$ Taroo-o$_1$ [$_{IP}$ Hanako-ga [$_{v*P}$ [$_{VP}$ Taroo-o$_2$ naguri]-sae si]-ta]]]]

Not accessible

As indicated in (71), what the PIC makes inaccessible upon the completion of CP is not IP but *v**P. Hence, the IM of VP produces two newly accessible items, *Taroo-o$_3$* and the CP formed by the IM.

It was shown in this section that Kitahara's (2017) analysis of the proper binding effect in terms of MY extends to Japanese examples that have been problematic over the years. This provides further support for his analysis and for MY.

4. Conclusion

Chomsky's (2021) Form Copy (FC) analysis of control develops Hornstein's (1999) movement analysis. In this paper, I first pointed out that it inherits a problem with locality from the movement analysis. Then, I showed that the revision in the definition of phase and the PIC proposed in Saito (2017a) solves the problem. Secondly, I discussed the empirical coverage of the FC analysis in comparison with the movement analysis. I showed that they are expected to have similar coverage and they in fact do. Then, I introduced Kitahara's (2017) analysis of the proper binding effect in terms of Minimal Yield (MY) and presented supporting evidence for it. As MY forms a basis for the FC analysis and is inconsistent with the movement analysis, this shows that the FC analysis receives support on empirical grounds as well.

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