

THE SYMMETRY CONDITION ON LABELING*

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Abstract

Chomsky (2013, 2015) proposes that a label of a syntactic object is provided via Minimal Search, but the notion of Minimal Search has not been clarified and there remains a question of how far it locates a head that provides a label. This article addresses this issue, proposing that an XP-YP structure is labeled via feature sharing only if X and Y have the same depth of embedding. The proposed condition provides a unified account of freezing effects, *wh*-island effects, and Proper Binding Condition effects. This condition also predicts that there are no multiple-Specs created by feature sharing, and hence this article re-examines constructions that have been analyzed in terms of multiple-Specs.

Keywords: Labeling Algorithm, freezing effects, *wh*-island effects, Proper Binding Condition effects, multiple-Specifiers

1. Introduction

Chomsky (2013, 2015) proposes labeling as a process of providing information on interpretation of a syntactic object (SO) at the interfaces. An SO is labeled by a fixed algorithm, Labeling Algorithm (LA), which “licenses SOs so that they can be interpreted at the interfaces, operating at the phase level” (Chomsky (2013: 43)). LA is an instantiation of

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Minimal Search (MS) to detect a lexical item (LI) that provides the label of an SO. Chomsky states that LA works in the following way.

- (1) “Suppose $SO = \{H, XP\}$, H a head and XP not a head. Then LA will select H as the label, [...]. The interesting case is $SO = \{XP, YP\}$, neither a head [...]. Here minimal search is ambiguous, locating the heads X, Y of XP, YP, respectively.” (Chomsky (2013: 43))

Chomsky (2013: 43) argues that there are two cases to provide a label to the $\{XP, YP\}$ structure. One case is when SO is modified “so that there is only one visible head.” To be specific, movement of XP out of $\{XP, YP\}$ makes the lower copy of XP “invisible” to LA, since not every occurrence of XP is in the domain of $\{XP, YP\}$. Then, the $\{XP, YP\}$ structure is labeled YP. Another case is when “X and Y are identical in a relevant respect, providing the same label.” Suppose that X and Y, heads of XP and YP, involve agreement features F. Then, LA simultaneously finds heads X and Y, providing the label $\langle F, F \rangle$, the pair of features shared between X and Y. Since LA “licenses SOs so that they can be interpreted at the interfaces,” an SO that remains unlabeled crashes at the conceptual-intentional (CI) interface and externalization.

As noted above, LA is an instantiation of MS. However, the notion of MS and LA is not formally defined in Chomsky (2013, 2015), and in particular, there remains a question of how far they will locate relevant heads deeply embedded in the structure. Chomsky (2015: 6) suggests that “LA seeks heads H within its search domain (observing the Phase Impenetrability Condition PIC),” but this has not been empirically examined in previous works. The phase-based restriction of LA predicts that both (2a) and (2b) successfully provide labels via feature sharing between X and Y, but (2c) provides no label when H is a phase head and its complement is rendered inaccessible owing to the PIC.

- (2) a. $\{XP, YP\} = \{\{X_{[F]}, WP\}, \{Y_{[F]}, ZP\}\}$

- b. $\{XP, YP\} = \{\{UP, \{X_{[F]}, WP\}\}, \{Y_{[F]}, ZP\}\}$
- c. $\{XP, YP\} = \{\{H, \{X_{[F]}, WP\}\}, \{Y_{[F]}, ZP\}\}$

There also remains a question whether the PIC is the only condition to narrow the domain of LA. Consider (2a, b) again. If MS is carried out in a “top-down” fashion, MS to seek relevant features in (2a) firstly reaches $\{X_{[F]}, WP\}$ and $\{Y_{[F]}, ZP\}$, and then it finds out $X_{[F]}$ and $Y_{[F]}$ simultaneously. In (2b), on the other hand, the “top-down” search firstly reaches $\{UP, \{X_{[F]}, WP\}\}$ and $\{Y_{[F]}, ZP\}$, secondly $\{X_{[F]}, WP\}$ and $Y_{[F]}$, and finally $X_{[F]}$. Crucially, the “top-down” search in (2a) locates the relevant heads $X_{[F]}$ and $Y_{[F]}$ at the same step, whereas the one in (2b) requires an extra step to find out $X_{[F]}$ after locating $Y_{[F]}$. Thus, an economy principle restricting search space for computation would prefer the former to the latter, since the former narrowly restrict the search space for LA. On the basis of this idea, this article proposes the Symmetry Condition on Labeling (SCL) in (3).

(3) *The Symmetry Condition on Labeling*

An XP-YP structure provides a label via feature sharing between X and Y only if X and Y have the same depth of embedding.

Suppose that depth of embedding is defined in terms of set-membership. In (2a), both X and Y have same depth of embedding, since X as well as Y is a member of a member of the set $\{XP, YP\}$. In (2b), in contrast, X and Y differ in depth of embedding: X is a member of a member of a member of the set $\{XP, YP\}$, whereas Y is a member of a member of the set $\{XP, YP\}$. Since the “top-down” MS in (2b) requires superfluous steps to locate a relevant head when X and Y do not have the same depth of embedding, the SCL bars labeling of the XP-YP structure in (2b), although LA observes the PIC. Thus, (2a) provides a label $\langle F, F \rangle$ via feature sharing, whereas (2b) yields no label. If this proposal is correct, it will be suggested that the PIC is too weak to constrain LA, and the SCL, presumably a third factor constraint, restricts the search domain of LA.

This article is organized as follows. Section 2 demonstrates that (3) is empirically supported by ban on extraction out of moved elements (aka. freezing effects). It argues that freezing configurations create structures like $\{XP, YP\} = \{\{UP, \{X_{[F]}, WP\}\}, \{Y_{[F]}, ZP\}\}$, where $\{UP, \{X_{[F]}, WP\}\}$ is a moved category and UP a sub-extracted category, so that they result in labeling failure owing to the SCL. Section 3 accounts for *wh*-islands in terms of labeling, arguing that *wh*-islands create configurations like $\{Wh_{[Q]}, \{Wh, \{C_{[Q]}, TP\}\}\}$, which cannot provide the label $\langle Q, Q \rangle$ because of the SCL. Section 4 illustrates that the proposed condition also explains Proper Binding Condition (PBC) effects. It shows that both remnant creating movement and remnant movement produce unlabelable structures, thereby causing labeling failure twice. Section 5 examines *prima facie* counterexamples to the SCL. Since it predicts that there are no multiple-Spec configurations created by feature sharing (i.e., structures like $\{UP_{[F]}, \{XP_{[F]}, \{Y_{[F]}, ZP\}\}\}$, where UP and XP are multiple Specs-Y), section 5 examines some novel constructions that have been analyzed in terms of multiple-Specs: Multiple Nominative Constructions in Japanese, embedded Topicalization and Focalization in English, Transitive Expletive Constructions in Germanic languages, and Multiple *Wh*-Fronting in Slavic languages. Section 6 is a conclusion.

2. Freezing Effects

This section demonstrates that the SCL accounts for freezing effects like (4), where extraction out of an A- or A'-moved category leads to degradation in acceptability.

- (4) a. $?*Who_i$ do you think that [pictures of t_i] $_j$ t_j are on sale?
 b. $??Who_i$ do you wonder [which picture of t_i] $_j$ Mary bought t_j ?

(Lasnik and Saito (1993: 101-102))

Section 2.1 briefly reviews a previous label-based analysis of freezing effects by Bošković (2018), pointing out its problem. Section 2.2 proposes an alternative analysis of freezing

effects on the basis of the SCL.

2.1 A Previous Analysis: Bošković (2018)

Bošković (2018) tries to deduce freezing effects within the phase theory (Chomsky (2000, 2001)) and the theory of labeling (Chomsky (2013, 2015)), postulating (5).

(5) Only phases undergo movement.

(5) states that phases are mobile, whereas non-phases are immobile. Bošković assume that in English, CP, vP, and DP are phases. Crucially, for Bošković, the notion of phase is defined in terms of a label: if an SO is labeled vP, for example, it constitutes a phase. On the other hand, an SO that has no label does not count as a phase under such label-based definition of phase. Accordingly, (6) follows from (5).

(6) Unlabeled SOs cannot undergo movement.

With these assumptions in place, Bošković tries to account for freezing effects like (4a). Since DP is a phase, *who* in the subject DP must be extracted to the edge of the DP before the subject is introduced to Spec-*v*; otherwise, extraction of *who* violates the Phase Impenetrability Condition (PIC), whereby movement out of the phase-head-complement (PHC) is barred after completion of a phase. Given that, the subject in (4a) must have the structure like (7a), and then it undergoes External Merge (EM) into Spec-*v* as in (7b).

- (7)
- a. [?? *who* [DP D [NP pictures of t_{who}]]]
 - b. [?? [?? *who* [DP D ...]] [vP *v* ...]]
 - c. [TP T [?? [?? *who* [DP D ...]] [vP *v* ...]]]

Note that, crucially, the subject in Spec-*v* does not have a label since there is no feature-sharing between *who* and D; hence, it does not constitute a phase. EM of T yields (7c), but the subject (= [?? *who* [DP D ...]]) cannot undergo Internal Merge (IM) to Spec-T since it is immobile owing to (6). Thus, (4a) cannot be derived.

Although Bošković's (2018) deduction is tempting, one conceptual problem arises: the SCL is imposed on IM but not on EM. Chomsky (2004, 2007, 2008, 2013, 2015) argues that IM and EM are two possible instances of a single rule, $\text{Merge}(\alpha, \beta) = \{\alpha, \beta\}$: $\text{Merge}(\alpha, \beta)$ is called IM when α is internal to β ; $\text{Merge}(\alpha, \beta)$ is called EM when α is external to β . Since IM and EM are two instances of the single rule, to bar either type requires stipulation. Notice that Bošković's (2018) analysis bars IM of a non-phasal category, though it allows EM of a non-phasal one (e.g., the derivation in (7b)). Thus, his analysis leaves it unclear why one of the two types of the single rule is constrained. Unless his analysis gives a principled explanation on prohibition of IM without stipulation, it precludes unification of EM and IM into the single rule, Merge.

2.2 A Proposed Analysis

This subsection proposes an alternative analysis of freezing effects on the basis of the SCL, without recourse to stipulation to bar IM. Let us first consider how the SCL accounts for ban on extraction out of A-moved elements like (4a), repeated here as (8).

(8) ?*Who_i do you think that [pictures of t_i]_j t_j are on sale?

(8) is derived in the following way (notice that *who* is a phrase, but its internal structure is abstracted away for simplicity of illustration).

- (9)
- a. {D, {pictures, {of, who}}}
 - b. {who, {D, {pictures, {of, t_{who} }}}}
 - c. {{who, {D, ...}}, vP}
 - d. {T, {{who, {D, ...}}, vP}}
 - e. {{who, {D, ...}}, {T, { $t_{\{\text{who}, \{\text{D}, \dots\}\}}$, vP}}}}
 - f. {C, {{who, {D, ...}}, {T, ...}}}
 - g. {who, {C, {{ $t_{\{\text{who}, \{\text{D}, \dots\}\}}$, {T, ...}}}}}}

(9a) shows the stage of the derivation before the subject is introduced to Spec- v . Assuming that D as well as C and v is a phase head (see Citko (2014) and references therein), *who* must be extracted to the edge of D as in (9b); otherwise, *wh*-extraction violates the PIC. Then, the subject is externally merged into Spec- v , yielding (9c). After introducing T as in (9d), the subject internally merges into Spec-T, yielding (9e). The derivation reaches a phase-level when C is introduced as in (9f). In (9g), *who* undergoes IM to Spec-C, the SOs in the phase-head-complement (PHC) of C gets labeled, and the PHC gets transferred. Crucially, the masked SO in (9g), repeated here as (10), cannot be labeled owing to the SCL.

$$(10) \quad \{\{\text{who}, \{D_{[\varphi]}, \dots\}\}, \{T_{[\varphi]}, \dots\}\}$$

To label (10), LA must find the phi-features on T and the ones on D. In (10), however, LA cannot find out the relevant heads, since (10) violates the SCL: D is embedded more deeply than T (i.e., D is a member of a member of a member of the set (10), whereas T is a member of a member of (10)). Since MS into (10) requires a superfluous step to find out D after locating T, the economy condition restricting search space prevents (10) from undergoing labeling via feature sharing, thereby causing crash at the interfaces.¹

One might claim that (8) can be derived without labeling failure if it undergoes the following derivation.

$$(11) \quad \begin{array}{l} \text{a.} \quad \{T, \{\{\text{who}, \{D, \dots\}\}, vP\}\} \\ \text{b.} \quad \{\{D, \dots\}, \{T, \{\{\text{who}, t_{\{D, \dots\}}\}, vP\}\}\} \\ \text{c.} \quad \{C, \{\{D, \dots\}, \{T, \{\{\text{who}, t_{\{D, \dots\}}\}, vP\}\}\}\} \\ \text{d.} \quad \{\text{who}, \{C, \{\{D, \dots\}, \{T, \{\{t_{\text{who}}, t_{\{D, \dots\}}\}, vP\}\}\}\}\} \end{array}$$

(11a) shows the stage of the derivation where T is introduced to the structure. A crucial difference with (9) is that in (11b), $\{D, \dots\}$ is extracted to Spec-T, leaving *who* behind. After introduction of C as in (11c), *who* is extracted to Spec-C. Given this derivation, the PHC of C is labeled $\langle \varphi, \varphi \rangle$, observing the SCL. However, the SO = $\{\text{who}, \{D, \dots\}\}$ cannot be labeled,

since both *who* and $\{D, \dots\}$ are lower copies. Thus, the derivation in (11) results in labeling failure.

One might also claim that LA may provide a label in (10), since the lower copy *who* is “invisible” to LA. To reply this, let us consider the formal status of the SO = $\{t_{XP}, YP\}$, where t_{XP} is a lower copy of XP. Given invisibility of traces in labeling, t_{XP} ignored by LA. However, this does not mean that t_{XP} is eliminated from the structure: since IM leaves a copy behind, $\{t_{XP}, YP\}$ does not re-analyzed into a singleton set $\{YP\}$. With this much, consider whether $\{XP, YP\} = \{\{t_{UP}, \{X_{[F]}, WP\}\}, \{Y_{[F]}, ZP\}\}$ can provide a label in accordance with the economy condition to prevent superfluous steps of search. The “top-down” search firstly finds $\{t_{UP}, \{X_{[F]}, WP\}\}$ and $\{Y_{[F]}, ZP\}$ simultaneously, and secondly reaches $\{X_{[F]}, WP\}$ and $Y_{[F]}$. To find $X_{[F]}$, a superfluous step is required, thereby ruled out by the economy condition. Thus, the proposed system correctly bars MS into $\{\{UP, \{X_{[F]}, WP\}\}, \{Y_{[F]}, ZP\}\}$, whether UP is a lower copy or not.

The proposed analysis also accounts for freezing effects in A'-movement like (4b), repeated here as (12).

(12) ??Who_i do you wonder [which picture of t_i]_j Mary bought t_j ?

Owing to the PIC, *who* must be extracted to Spec-D before the object DP is merged with the verb. Given that, *wh*-movement of the object to the embedded Spec-C yields the structure in (13).

(13) $\{\{who, \{D_{[Q]}, \{pictures, \dots\}\}\}, \{C_{[Q]}, TP\}\}$

To label this structure, LA must simultaneously locate the interrogative Q-feature on D, on the one hand, and the one in C, on the other. However, again, LA cannot find out them, since D and C do not have the same depth of embedding. Thus, the structure cannot provide a label.²

Let us next consider extraction out of objects. (14) illustrates that a *wh*-phrase cannot be moved out of a shifted object, whereas it is successfully extracted out of a non-shifted one.

- (14) a. *Who did Mary call [friends of *t*] up?
 b. Who did Mary call up [friends of *t*]? (Lasnik (2001: 110))

Lasnik (2001) argues that shifted objects obligatorily undergo movement to Spec-AgrO, but non-shifted objects may remain in the base position. Following Chomsky (2008), according to which the landing site of object movement is Spec-V, let us assume that the shifted object in (14a) moves from the base position to Spec-V, whereas the non-shifted object in (14b) remains in Comp-V. Then, the sentences in (14) are structured as follows.

- (15) a. $\{\{\text{who}, \{D_{[\varphi]}, \{\text{pictures}, \dots\}\}\}, \{V_{[\varphi]}, t_{Obj}\}\}$
 b. $\{V_{[\varphi]}, \{\text{who}, \{D_{[\varphi]}, \{\text{pictures}, \dots\}\}\}\}$

(15a) is an XP-YP structure. The SCL prohibits (15a) from providing a label via feature-sharing, since D is embedded more deeply than V. In contrast, there arises no labeling failure in (15b), since it is of the form V-DP. Thus, the contrast between (15a) and (15b) is accounted for in terms of labeling.

The proposed analysis also explains the subextraction asymmetry between objects and ECM subjects like (16).

- (16) a. Which artist do you admire [paintings by *t*]?
 b. ?/* Which artist do you expect [paintings by *t*] to sell the best?
 (Polinsky (2013: 580))

Polinsky (2013: 580) notes that (16a) is unproblematic, whereas (16b) is “marginal at best, and many native speakers reject this extraction altogether.” Suppose that the direct object in (16a) optionally moves to Spec-V, whereas the ECM subject in (16b) obligatorily moves from Spec-T to Spec-V. Then, (16a) does not result in labeling failure, since the verb phrase is of the form V-DP. In contrast, (16b) creates a DP-VP configuration like (17).

- (17) $\{\{\text{which artist}, \{D_{[\varphi]}, \dots\}\}, \{V_{[\varphi]}, \text{TP}\}\}$

To label this structure, LA must simultaneously find out the phi-features on D, on the one hand,

and the one in V, on the other. However, MS looking for these features violates the SCL, since D and V do not have the same depth of embedding. Thus, the derivation crashes at the interfaces.

The proposed analysis also explains the finite/non-finite asymmetry with respect to extraction out of clausal subjects like (18).

- (18) a. *Who does [that she can bake ginger cookies for *t*] give her great pleasure?
 b. ??Who does [(for her) to be able to bake ginger cookies for *t*] give her great pleasure?
 c. ?Who does [being able to bake ginger cookies for *t*] give her great pleasure?

(adapted from Kluender (2004: 118-119))³

Kluender (2004: 118) observes that extraction out of the non-finite subject clauses in (18b, c) is better than extraction out of the finite clause in (18a). Let us first consider (18a). (19) illustrates the stage of the derivation where the subject clause in (18a) internally merges into Spec-T (notice that *who* is extracted to Spec-C before EM of the subject into Spec-*v*, since C is a phase-head).

- (19) $\{\{who, \{C_{[\varphi]}, \{she, \dots\}\}\}, \{T_{[\varphi]}, vP\}\}$

Under the assumption that C involves phi-features to agree with T, LA must locate C and T simultaneously to provide a label $\langle \varphi, \varphi \rangle$. However, LA cannot find out them owing to the SCL, thereby causing labeling failure. Let us next consider (18b, c). Suppose that non-finite C is not a phase-head (Kanno (2008)). Then, *who* does not have to be extracted to Spec-C before the subject clause is externally merged with the independent SO. Given that, (18b, c) have the following structures at some point of their derivations.

- (20) a. $\{\{C_{[\varphi]}, \{her, \{to, \{who, \{v, \dots\}\}\}\}\}, \{T_{[\varphi]}, vP\}\}$
 b. $\{\{C_{[\varphi]}, \{PRO, \{being, \{who, \{v, \dots\}\}\}\}\}, \{T_{[\varphi]}, vP\}\}$

In (20a, b), *who* is located in Spec-*v*, the highest phase-edge of the subject clause. Since C

and T have the same depth of embedding, LA locates C and T simultaneously, providing the label $\langle \varphi, \varphi \rangle$. Thus, the sentences in (18b, c) do not result in labeling failure.

3. *Wh*-Island Effects

This section attempts to account for *wh*-island effects in terms of labeling. (21) illustrates that a *wh*-phrase cannot be extracted out of a finite clause when its Spec-C is occupied by another *wh*-phrase.

(21) *?To whom_j did you wonder what_i they gave t_i t_j ? (Cinque (1990: 52))

Section 3.1 briefly reviews a previous minimalist analysis of *wh*-island effects by Chomsky (2000), pointing out its problems. Section 3.2 proposes an alternative analysis of *wh*-island effects on the basis of the SCL.

3.1 A Previous Analysis

Chomsky (2000: 128) tries to account for the *wh*-island effects in terms of the Defective Intervention Constraint (DIC), according to which Agree relation must be established between the probe P and the goal G closest to P.

(22) In a structure $\alpha > \beta > \gamma$, where $>$ is c-command, β and γ matches the probe α , but β is inactive, Agree between α and γ is blocked.

(adapted from Chomsky (2000: 123))

To see how this works, consider (23).

(23) [C you wonder [what_i C they gave t_i to whom?]]

To extract *to whom* to the matrix Spec-C, the matrix C must probe its goal *to whom*. However, the Agree relation cannot be established owing to the DIC, since *what* is an inactive goal intervening between the matrix C and *to whom*. Thus, *to whom* cannot be moved to the matrix Spec-C. How is the DIC account accompanied by the phase theory? Although Chomsky

(2000) does not offer concrete illustration of the derivation of sentences like (21), the argument would run as follows. (24) illustrates the stage of derivation when the matrix v is introduced. Crucially, *what* and *to whom* are extracted to the outer Spec-C and the inner one, respectively.

(24) $\{v, \{\text{wonder}, \{\text{what}, \{\text{to whom}, \{\text{C}, \dots\}\}\}\}\}$

Chomsky (2000: 194, fn. 91) postulates that “C (and v with its φ -set deleted) may have a non-specific P[eripheral]-feature [...], perhaps contingent on assignment of the EPP-feature to a phase” (P-features are features to drive A'-movement). To extract *to whom* to Spec- v to satisfy the EPP feature on v , Agree relation must be established between v associated with P-features and *to whom*. However, the DIC blocks Agree between v and *to whom*, since an inactive goal *what* intervenes between them. Thus, movement of *to whom* to Spec- v (and the subsequent movement to Spec-C) cannot take place.⁴

This explanation is, however, not without problems. Conceptually, the DIC account crucially relies on the assumption that Agree is prerequisite for movement: nothing can be moved without Agree (recall that Chomsky (2000:101) defines Move as a composite operation of Agree and Pure Merge (= EM)). This assumption is, however, problematic since it prevents unification of IM and EM. Under the unified view of Merge, no restriction can be imposed on either of IM and EM, since they are two instantiations of Merge. Thus, the assumption of Agree as a prerequisite for movement, the kernel of the DIC account, is no longer tenable within the unified theory of Merge.

Empirically, it is unclear how Chomsky's (2000) analysis accounts for the finite/nonfinite asymmetry in terms of *wh*-island effects. It is observed that *wh*-extraction out of an infinitival indirect question like (25) is relatively better than extraction out of a finite one like (21) (Ross (1968), Chomsky (1986), and Cinque (1990), among others).

(25) To whom_j did you wonder what_i to give t_i t_j ? (Cinque (1990: 52))

The DIC rules out extraction of *to whom* out of the embedded interrogative clause, whether it

is finite or non-finite. Notice that the DIC analysis yields incorrect prediction even if non-finite C is not a phase head (Kanno (2008)). (26) illustrates the stage of derivation when the matrix v is introduced.

(26) $\{v, \{\text{wonder}, \{\text{what}, \{C, \{\text{PRO}, \{T, \{\text{to whom}, \{v, \dots\}\}\}\}\}\}\}\}$

Crucially, *to whom* is located not in the embedded Spec-C but in the embedded Spec- v , owing to lack of phasal status of the non-finite C. To attract *to whom* to the matrix Spec- v , Agree relation must be established between v and *to whom*. However, the DIC blocks this, since *what* intervenes between them. Thus, the DIC account incorrectly rules out extraction of *to whom* out of the embedded non-finite interrogative clause.

3.2 A Proposed Analysis

This subsection attempts to explain the *wh*-island effects in terms of the SCL. Consider again (21), repeated here as (27).

(27) *?To whom_{*j*} did you wonder what_{*i*} they gave *t_i t_j*?

Owing to the PIC, *to whom* must undergo successive-cyclic movement to the embedded Spec-C, creating configurations like (28), where the two *wh*-phrases occupy multiple Specs-C of the embedded clause.

(28) a. $\{\{\text{what}_{[Q]}, \dots\}, \{\{\text{to}, \{\text{whom}, \dots\}\}, \{C_{[Q]}, \text{TP}\}\}\}$
 b. $\{\{\text{to}, \{\text{whom}, \dots\}\}, \{\{\text{what}_{[Q]}, \dots\}, \{C_{[Q]}, \text{TP}\}\}\}$

Notice that, given free Merge, no principle of narrow syntax precludes extraction of *to whom* toward either the inner Spec-C as in (28a) or the outer one as in (28b). Accordingly, in order to explain *wh*-island effects, we have to consider what excludes both of these derivations.

Let us first consider (28a). To label this structure, LA must locate *what* involving [Q], on the one hand, and C with [Q], on the other.⁵ However, the structure in (28a) does not satisfy the SCL, since C is embedded more deeply than the locus of the [Q] feature of the *wh*-phrase.

Thus, (28a) cannot provide a label, causing crash at the interfaces.⁶

Let us next consider (28b). This structure does not cause labeling failure since $SO_i = \{\{\text{what}_{[Q]}, \dots\}, \{C_{[Q]}, TP\}\}$ is labeled $\langle Q, Q \rangle$, satisfying the SCL. $SO_j = \{\{\text{to}, \{\text{whom}, \dots\}\}, SO_i\}$ is an XP-YP structure, but is labeled $\langle Q, Q \rangle$ since the lower copy *to whom* is “invisible” to LA. Thus, every term in (28b) is successfully labeled. This article, however, suggests that (28b) results in an anomalous interpretation at the CI interface. Assuming with Chomsky (2013) and Epstein et al. (2015) that an SO labeled $\langle Q, Q \rangle$ is interpreted as a *wh*-question at the CI interface. Then, it is natural to postulate that the SO with the label $\langle Q, Q \rangle$ is interpreted as an operator-scope configuration at CI. Suppose, for example, we have a sentence like *what did you eat?*, which is of the form $\{\{\text{what}_{[Q]}, \dots\}, \{C_{[Q]}, \dots\}\}$. Then, the CI interface interprets *what* as a *wh*-operator, and $\{C_{[Q]}, \dots\}$ as its scope. Given this much, consider (28b) again. It is an XP-YP structure with the label $\langle Q, Q \rangle$. Then, $XP = \text{to whom}$ must be interpreted as a *wh*-operator, and $YP = \{\{\text{what}_{[Q]}, \dots\}, \{C_{[Q]}, TP\}\}$ as the scope of XP. However, this results in an anomalous interpretation at the CI interface: since *what* is an intermediate copy, it cannot behave as an operator.⁷ Although the CI interface must interpret (28b) as an operator-scope configuration in accordance with its label $\langle Q, Q \rangle$, it contains no *wh*-element that qualifies as an interrogative operator. Thus, (28b) is also correctly ruled out at the CI interface.

How does the proposed system account for the relaxation of *wh*-island effects in non-finite contexts like (25), repeated here as (29)?

(29) To whom_j did you wonder what_i to give $t_i t_j$?

This fact is accounted for by the SCL. Assuming with Kanno (2008) that non-finite C is not a phase head, *to whom* does not have to move toward the embedded Spec-C. Then, the embedded clause is structured as in (30), where *to whom* is located in the highest phase-edge, Spec-*v*:

(30) $\{\{\text{what}_{[Q]}, \dots\}, \{C_{[Q]}, \{\text{PRO}, \{T, \{\{\text{to}, \{\text{whom}, \dots\}, vP\}\}\}\}\}\}$

This structure is labeled $\langle Q, Q \rangle$, since MS locates interrogative Q features on D and C simultaneously, observing the SCL. Thus, (29) is successfully interpreted at the interfaces.

4. Proper Binding Condition Effects

This section attempts to explain Proper Binding Condition (PBC) effects shown in (31) in terms of labeling.

(31) * $[\text{Which picture of } t_i]_j$ do you wonder who_i John likes t_j (Saito (1989: 187))

In (31), *who* is extracted to the embedded Spec-C, and subsequently the phrase containing a lower copy of *who* undergoes movement to the matrix Spec-C (the first movement is called internal movement, and the latter remnant movement). This kind of derivations results in severe degradation in acceptability, which is greater than that in freezing cases like (32).

(32) ?? Who_i do you wonder $[\text{which picture of } t_i]_j$ John likes t_j (Saito (1989: 187))

The goal of this section is to account for why PBC effects arise, and why sentences with PBC effects are worse than ones with freezing effects. Section 4.1 briefly reviews a previous phase-based approach to the PBC (Cecchetto (2001)), and points out its problems. Section 4.2 proposes an alternative analysis on the basis of the SCL.

4.1 A Previous Analysis

Cecchetto (2001) proposes to deduce PBC effects from the PIC.⁸ He suggests that (31) undergoes the following derivation.⁹

(33) a. $[\text{CP } \text{who}_i \text{ C } [\text{TP } \text{you T } [\text{vP } t_i' \text{ v } [\text{VP } \text{likes } [\text{DP } \text{which picture of } t_i]]]]]$
 b. * $[\text{vP } [\text{DP } \text{which picture of } t_i]_j \text{ v } [\text{VP } \text{remember } [\text{CP } \text{who}_i \text{ C } [\text{TP } \text{you T } [\text{vP } t_i' \text{ v } [\text{VP } \text{likes } t_j]]]]]]]$

(33a) show the stage of derivation when the embedded CP is constructed. *Who* is extracted Spec-C successive-cyclically, leaving a copy in Spec-v. Then, the PHC of the vP phase

becomes inaccessible to Merge (Ceccetto adopts the weak PIC rather than the strong PIC). The strong PIC dictates that the PHC of a phase α becomes inaccessible when α is completed, whereas the weak one states that the PHC of a phase α becomes inaccessible when the derivation reaches the next highest phase β). Since *which picture of t_i* is contained within the inaccessible VP, it cannot undergo movement to the matrix Spec- v (and subsequent movement to the matrix Spec-C) as in (33b). Thus, (31) is not derived owing to the PIC. How about the derivation in (34), where *which picture of who*, rather than *who*, undergoes movement to the embedded Spec-C as in (34a)?

- (34) a. [CP [DP *which picture of who*] _{j} C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]
 b. [_{VP} v [_{VP} wonder [CP [DP *which picture of who*] _{j} C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]]]]]

In (34b), *which picture of* cannot be attracted to the matrix Spec- v (and subsequently to Spec-C), since it is not a constituent. Accordingly, (34) also cannot derive the sentence in (31). Cecchetto (2001) also tries to account for the relative acceptability in the freezing cases like (32). He states that they are derived in the following way.

- (35) a. [CP [DP *which picture of who*] _{j} C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]
 b. [_{VP} v [_{VP} wonder [CP [DP *which picture of who*] _{j} C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]]]]]
 c. [_{VP} who_i v [_{VP} wonder [CP [DP *which picture of t_i*] _{j} C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]]]]]
 d. [CP who_i C [TP you T [_{VP} t_i'' v [_{VP} wonder [CP [DP *which picture of t_i*] _{j} C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]]]]]]]

(35a) shows the stage of the derivation when *which picture of who* is extracted to the embedded Spec-C. After the V and v are introduced as in (35b), *who* undergoes movement to Spec- v as in (35c), and to Spec-C as in (35d). Thus, (32) is derived without violation of the PIC.

Although Cecchetto's (2001) phase-based analysis is attractive, it is not without problems. First, (31) can be derived without violation of the PIC if it undergoes the following derivation.

- (36) a. [CP [DP which picture of who]_j C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]
 b. [CP who_i [CP [DP which picture of t_i]_j C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]]
 c. [_{VP} [DP which picture of t_i]_j v [_{VP} wonder [CP who_i [CP t_j'' C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]]]]]]
 d. [[DP which picture of t_i]_j C [TP you T [_{VP} t_j''' v [_{VP} wonder [CP who_i [CP t_j'' C [TP you T [_{VP} t_j' v [_{VP} likes t_j]]]]]]]]]]]

In (36a), *which picture of who* is extracted to the embedded Spec-C. A crucial difference with (33) and (34) is that *who* is extracted to the outer Spec-C as in (36b). After that, *which picture of t* moves to the root Spec-v, and subsequently to the root Spec-C. In this derivation, there is no violation of the PIC. Thus, for his theory to work, availability of multiple Spec-C must be constrained so as to block the derivation in (36).

Second, it does not account for degradation in acceptability in (32). As noted above, nothing in Cecchetto's (2001) system prohibits the derivation in (35). Although his analysis accounts for the fact that freezing cases like (32) are better than PBC cases like (31), it leaves unexplained why freezing cases like (32) are marginal.

4.2 The Proposed Analysis

This subsection proposes an alternative analysis of PBC effects like (31), repeated here as (37), on the basis of the SCL.

- (37) *[Which picture of t_i]_j do you wonder who_i John likes t_j

(37) is derived in the following way (notice again that although *who* is a phrase, its internal structure is abstracted away for simplicity of illustration).

- (38) a. {{who, {which, ...}}, {C, ...}}

- b. {who, {{*t*_{who}, {which, ...}}, {C, ...}}}
- c. {*v*, {wonder, {who, {{*t*_{who}, {which, ...}}, {C, ...}}}}}
- d. {{*t*_{who}, {which, ...}}, {*v*, {wonder, {who, {{*t*_{who}, {which, ...}}, {C, ...}}}}}

(38a) illustrates the stage of derivation in which *which picture of who* is extracted to the embedded Spec-C. Crucially, *who* is placed in the edge of D owing to the PIC. In (38b), *who* involving [Q] undergoes movement to the outer Spec-C (cf. the stage of derivation in (36b)). After introduction of V and *v* as in (38c), {{*t*_{who}, {which, ...}} is extracted to the edge of *v*, and the PHC of *v* gets labeled and transferred as in (38d). However, this derivation results in labeling failure, since the SO in (39) (i.e., the embedded clause) cannot be labeled owing to the SCL.

$$(39) \quad \{who_{[Q]}, \{\{t_{who}, \{which, \dots\}\}, \{C_{[Q]}, \dots\}\}\}$$

To label this structure <Q, Q>, MS must find the interrogative Q-features on *who* and C simultaneously. However, (39) is a multiple-Spec configuration involving agreement of C with the outer Spec-C, so that it is ruled out by the SCL, as the *wh*-island configuration in (28a) is. Thus, (39) cannot provide a label.¹⁰ Furthermore, the matrix clause also causes labeling failure. (40) illustrates the stage of the derivation where *which picture of t* is extracted to the matrix Spec-C.

$$(40) \quad \{\{t_{who}, \{which_{[Q]}, \dots\}\}, \{C_{[Q]}, \dots\}\}$$

Again, this structure cannot be labeled <Q, Q>, since it violates the SCL. Thus, the sentence in (31) is faced with labeling failure twice. This accounts for the fact that PBC effects lead to more severe degradation in acceptability than freezing effects, as shown in (31) and (32), repeated here as (41).

- (41) a. *[Which picture of *t*_i] do you wonder who_i John likes *t*_j
- b. ??Who_i do you wonder [which picture of *t*_i]_j John likes *t*_j

In PBC cases like (41a), both the root and embedded CPs cause labeling failure. In freezing cases like (41b), in contrast, the derivation results in labeling failure only once: in the embedded CP (see the discussion in section 2.2). Thus, this cumulative effect of mislabeling yields severe degradation in acceptability in (41a).^{11,12}

5. Notes on Multiple Specifiers

This section examines another consequence of the SCL: ban on building multiple-Specs via feature sharing. Under the theory of Bare Phrase Structure (BPS) by Chomsky (1995a, 1995b), presence of a multiple-Spec configuration is a null hypothesis. The BPS defines Merge as an operation to take two SOs α and β and yield $SO = \{\gamma, \{\alpha, \beta\}\}$, where γ is the label of the SO. The label γ is constructed from one or the other of α, β : the label of either α or β becomes the label γ . Given this formulation of Merge, nothing precludes generation of a structure with multiple-Specs. Suppose that we have $SO_i = \{\gamma_2, \{XP, \{\gamma_1, \{H, YP\}\}\}\}$, where $\gamma_1 = \gamma_2 = HP$. Then, Merge (UP, SO_i) yields $SO_j = \{\gamma_3, \{UP, \{\gamma_2, \{XP, \{\gamma_1, \{H, YP\}\}\}\}\}\}$, where γ_3 is the label of SO_j . Since $\gamma_2 (= HP)$ is the label of SO_i , it may serve as the label of SO_j . In this configuration, XP and UP are multiple Specs-H (Spec-H is defined in the BPS as every maximal projection within HP other than the Comp-H). Thus, multiple-Specs follow from the way of label determination under the BPS. However, under the simplest Merge (Chomsky (2004, 2007, 2008, 2013, 2015)), whereby Merge is defined as an operation to take two SOs α and β and yield $SO = \{\alpha, \beta\}$, and the theory of labeling by Chomsky (2013, 2015), whereby the label of an SO is determined by an independent algorithm, LA, availability of multiple-Specs is not self-evident: it crucially relies on how far MS will locate heads or features that provide a label. To see this, consider the structure like (42), where U and X, the heads of UP and XP, involve features to be shared with Y.

$$(42) \quad \{\{U_{[F]}, \dots\}, \{\{X_{[F]}, \dots\}, \{Y_{[F]}, ZP\}\}\}$$

If the search domain of LA is constrained by nothing beyond the PIC, MS may locate U, X, and Y, providing F as the label of (42). On the other hand, if the MS of LA does not involve superfluous step to find out the loci of agreement features, a structure involving multiple-Spec is not available. In other words, the SCL rules out structures like (42), since it Y is embedded more deeply than U.

Thus, the proposed system predicts that there are no multiple-Spec configurations created by feature sharing, thereby requiring reconsideration of constructions analyzed in terms of multiple-Specs. Vermeulen (2005: 169-170) gives a list of constructions that have been analyzed in terms of multiple-Specs: Multiple Nominative Constructions (MNCs) in Japanese (Ura (1993, 1994) and Koizumi (1995)), Transitive Expletive Constructions (TECs) in Germanic languages (Chomsky (1995b)), and embedded Topicalization and Focalization in English (Koizumi (1995)).¹³ This list should include Multiple *Wh*-Fronting (MWF) in Slavic languages, which has been analyzed in terms of multiple Specs-C (Koizumi (1995), Pesetsky (2000), and Richards (2001), among others).

(43) *Multiple Nominative Constructions in Japanese*

Bunmeikoku-ga dansei-ga heikin-zyumyoo-ga mizikai
civilized countries-Nom men-Nom average life-span-Nom short
‘It is civilized countries that man — their average life-span is short in.’

(adapted from Kuno (1973: 71))

(44) *Transitive Expletive Constructions in Icelandic*

Það hafa margir jólasveinar borðað buðinginn.
there have many Christmas-trolls eaten the pudding

‘Many Christmas trolls have eaten the pudding.’ (Joans (1996: 168))

(45) *Embedded Topicalization and Focalization in English*

Becky said that these books, only with great difficulty can she carry.

(Koizumi (1995: 140))

(46) *Multiple Wh-Fronting in Bulgarian*

Koj kogo običa?

who whom loves

‘Who loves whom?’

(Bošković (2002: 353-354))

If these constructions have multiple-Spec structures created by feature sharing, they pose problems to the SCL. In the literature, however, there has been analyses without multiple-Spec configurations created by feature sharing.

For Multiple Nominative Constructions in Japanese, Saito (2016) proposes that the Case particle in Japanese involves an anti-labeling feature, which makes available multiple-Spec configurations without feature sharing. If Saito’s analysis is on the right track, MNCs do not pose a problem to the SCL.

Let us next consider TECs in Germanic languages. Chomsky (1995b) argues that the expletive subject and the external argument of the TECs occupy multiple-Specs of T. Chomsky’s (1995b) analysis, however, sheds little light on cross-linguistic difference in availability of TECs. TECs are available in languages like Icelandic, German, Dutch, whereas it is unavailable in languages like English, Danish, Norwegian, Swedish. To account for this contrast, Chomsky (1995b: 354) simply stipulates that languages with TECs may check the EPP feature on T twice, whereas languages without TECs cannot check it more than once. How is the cross-linguistic difference captured without stipulating the EPP feature on T? Previous approaches have shown that availability of TECs correlates with presence of V-to-I movement (Vikner’s Generalization: see Bobaljik and Thráinsson (1998), Koenenman and Neelman (2001)), or presence of Object Shift (Bures’s Generalization: see Bobaljik and Joans (1996), Koster and Zwart (2001)).¹⁴ These approaches have in common the idea that in languages with TECs, two-layered functional projections in the IP area provide positions for an expletive and an EA,

whereas in languages without TECs, the Spec position for an EA is not available. Vermeulen (2005: 179) argues for split-IP analyses of TECs and against the multiple-Spec analysis, claiming that only the former accounts for Vikner's Generalization: a language with a split-IP structure provides the positions for a raised verb and an EA within the lower IP domain, whereas languages without it do not have positions for verb movement and merger of an EA. In contrast, the analysis by Chomsky (1995b) leaves unexplained the co-relation between V-to-I movement and availability of TECs. This line of argument also makes sense when we adopt Bures's Generalization: under the split-IP analyses, the lower IP provides positions for merger of EA and Object Shift, whereas under the multiple-Spec analysis, the cross-linguistic co-relation cannot be captured. Thus, the split-IP analyses are empirically preferable to the multiple-Spec analysis, and TECs pose no problem to the SCL.

As for the embedded Topicalization and Focalization in English, Koizumi (1995) proposes that a topicalized phrase occupies the outer-Spec of Polarity Phrase (PolP), a dedicated position for a focused phrase. If this multiple-Spec analysis is the only way to accommodate the relevant construction (and Pol shares features with the elements in the multiple-Specs), the SCL is no longer tenable. However, literatures in the cartographic approaches to the left periphery (Rizzi (1997, 2004), among others) have argued that a topicalized phrase and a focalized one occupy Specs of dedicated projections, TopP and FocP. Thus, as far as this line of approach is on the right track, co-occurrence of topic and focus does not falsify the SCL.

Let us finally consider MWF in Slavic languages like Bulgarian. Some researchers argue that the multiple *wh*-phrases in Bulgarian are substituted into multiple Specs-C, forming structures like $\{Wh_1, \{Wh_2, \{C, TP\}\}\}$ (Koizumi (1995), Pesetsky (2000), and Richards (2001), among others). If MWF in Bulgarian is derived by sharing of interrogative features among the multiple *wh*-phrases and C, it poses a problem to the SCL. However, it has been claimed that MWF in Slavic languages is driven not by the interrogative feature but by focus.

Stjepanović (1999) argues that *wh*-phrases in Serbo-Croatian are inherently contrastively focused, and obligatorily undergo focus movement to the initial position. This focus movement analysis is also extended to Bulgarian (Bošković (1999), Lambova (2001), and Bošković (2002)). On the basis of this observation, Lambova (2001) argues that the first *wh*-phrase of MWF in Bulgarian moves to Spec-C to check the interrogative feature on C, whereas the second and the following *wh*-phrases move to Spec- Δ P, a dedicated position for discourse-related elements, to form a single *wh*-cluster. Given this, MWF does not involve a multiple-Spec configuration but two-layered split functional projections. Thus, if this analysis is on the right track, MWF does not pose a problem to the SCL.

To summarize, constructions that have been analyzed in terms of multiple-Specs, MNCs in Japanese, TECs in Germanic languages, the embedded Topicalization and Focalization in English, and MWF in Slavic languages, do not seem to pose a serious problem to the SCL, since plausible alternative analyses may accommodate these constructions without multiple-Specs created by feature sharing.

6. Conclusion

Chomsky (2013, 2015) proposes that a label of an SO is provided via LA, an instantiation of MS. However, the notion of LA and MS is not clarified in Chomsky (2013, 2015), and previous researches pay little attention to the question how far MS locates heads that provide a label. This article has addressed this issue, proposing that an XP-YP structure provides its label via feature sharing only if X and Y have the same depth of embedding. This condition provides a unified account of freezing effects, *wh*-island effects, and Proper Binding Condition effects. Since the proposed condition predicts that there are no multiple-Spec configurations created by feature sharing, this article has examined *prima facie* counterexamples, demonstrating that none of them falsify the proposed condition. If this proposal is on the right

track, it is suggested that the domain of LA is not unbounded; it is narrowly restricted by a third factor principle that minimizes search space for computation.

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NOTES

¹ One might claim that the SCL incorrectly rules out the sentence like *John's pictures are (beautiful)* on the ground that it is of the form $\{\{John, \{D_{[\phi]}, pictures\}\}, \{T_{[\phi]}, \dots\}\}$, where the genitive phrase occupies Spec-D. In this structure, LA cannot locate the phi-features on D owing to the SCL.

This article speculates that genitive subjects are adjuncts in some relevant sense, and they are introduced to structure counter-cyclically (Lebeaux (1988)), or introduced by pair-Merge (Chomsky (2004)). Consider (i).

- (i) a. *Which report [that John_i was incompetent] did he_i submit *t*?
- b. Which report [that John_i revised] did he_i submit *t*? (Freidin (1986:179))

(i) shows that the *wh*-movement with an argument CP does not bleed Binding Condition C violation in the base position, whereas the one with an adjunct CP does. This contrast suggests that an adjunct, but not an argument, is counter-cyclically introduced to the structure (Lebeaux (1988)), or undergo SIMPL (Chomsky (2004)) after *wh*-movement.

With this much, consider (ii).

- (ii) a. *That guy_i he_i says Eva loves *t*.
- b. ?That guy_i's mother he_i really hates *t*. (Safir (1999: 598))

(ii) illustrates that Topicalization of DP does not bleed Binding Condition C in the base position, whereas it bleeds Binding Condition C if the R-expression is a genitive subject of the DP. This contrast suggests that a genitive subject is an adjunct, and it is introduced counter-cyclically, or

undergoes SIMPL after Topicalization. On the basis of this observation, this article suggests that *John's pictures are (beautiful)* is of the form $\{\{D_{[\varphi]}, \text{pictures}\}, \{T_{[\varphi]}, \dots\}\}$ when it undergoes labeling, observing the SCL. After that, the genitive subject *John's* is introduced to the structure counter-cyclically, or undergoes SIMPL to yield $\{\{John, \{D_{[\varphi]}, \text{pictures}\}\}, \{T_{[\varphi]}, \dots\}\}$. If this analysis is correct, genitive subjects pose no problem to the proposed condition.

² One might wonder how the sentences involving pied-piping like *To whom did John talk t?* are derived in accordance with the SCL. If this sentence is of the form $\{\{P, \{D_{[Q]}, \dots\}\}, \{C_{[Q]}, \dots\}\}$, the proposed SCL incorrectly rule it out, since MS cannot locate D involving [Q].

This problem is solved if we adopt Cable's (2010) Q-system, according to which a pied-piped phrase is headed by a question particle Q, which is the locus of the interrogative [Q] feature (Chomsky (2013)). Given this, *To whom did John talk t?* is structured as $\{\{Q_{[Q]}, \{P, DP\}\}, \{C_{[Q]}, \dots\}\}$. Then, MS locates Q involving the interrogative feature and C simultaneously, observing the SCL.

³ Although Kluender (2004) notes that (18b, c) is noticeably better than (18a), and (18b) is more ferocious than (18c), he gives no diacritic marks to these sentences. I gave ? to (18b) and ?? to (18c) to show relative acceptability among (18a-c).

⁴ This argument does not work well if *what* and *to whom* are extracted to the inner Spec-C and the outer one, respectively, since the DIC does not block extraction of *to whom* to Spec-v in (i).

(i) $\{v, \{\text{wonder}, \{\text{to whom}, \{\text{what}, \{C, \dots\}\}\}\}\}$

To avoid this, we have to postulate that multiple *wh*-movement to Spec-C must be carried out in the manner of tucking-in in the sense of Richards (2001), according to which the highest

category moves to the outer Spec-C, and then the lowest one to the inner Spec-C (i.e., multiple *wh*-movement yields a crossing path). Given this, (i) is ruled out since it involves a nesting path.

⁵ This article assumes that *what* is not a lexical item but a phrase headed by D or a question particle Q, the locus of the interrogative Q-feature (Cable (2010), Chomsky (2013); see also fn. 2). Given these, *what* is a phrase being of the form H-XP.

⁶ At first sight, the proposed system overgenerates the sentences like *Whom_j did you wonder [[which picture of t_j]_i [to whom]_k C they gave t_i t_k]?*, whereby the embedded clause has multiple *wh*-phrases in Spec-C, and another *wh*-phrase is extracted out of the outer Spec-C. The embedded clause has the structure like $\{\{t_j, \{D_{[Q]}, \dots\}\}, \{\{Q_{[Q]}, \dots\}, \{C_{[Q]}, \dots\}\}\}$, where loci of interrogative Q-features have the same depth of embedding. Then, the SCL incorrectly allows to provide the label $\langle Q, Q \rangle$.

This problem is, however, avoided if valuation contingent on agreement is limited to one-to-one relation between the valued feature and the unvalued one. Given this, the valued interrogative feature (vQ) on C cannot assign its value to more than one unvalued interrogative feature (uQ) on the *wh*-phrases in the multiple Spec-C. Then, the unwanted structure is ruled out independently from the SCL.

⁷ More precisely, to interpret a *wh*-phrase as an interrogative operator, it must enter into agreement with C to receive an interrogative feature value. Since an intermediate copy does not establish agreement relation with C, it does not qualify as an interrogative operator. However, the interpretive requirement at CI forces (28b) to be construed as an operator-scope

configuration, owing to its label $\langle Q, Q \rangle$. Thus, $\langle Q, Q \rangle$ labeling without agreement yields anomalous interpretation at the CI interface.

⁸ Hiraiwa (2003) also attempts to derive PBC effects in Japanese from the PIC.

⁹ The VP shell structure is not assumed in the original discussion by Checcetto (2001). Since postulation of the shell does not affect the argumentation in this subsection, I adopt ν P structure in (33)-(36) for convenience of illustration.

¹⁰ Notice that (37) may have the structure $\{\{t_{who}, \{\text{which}, \dots\}\}, \{\text{who}_{[Q]}, \{C_{[Q]}, \dots\}\}\}$, whereby *who* and *which picture of* occupies the inner Spec-C and the outer Spec-C, respectively. In this structure, LA provides the label $\langle Q, Q \rangle$, observing the SCL. However, the embedded clause yields an anomalous interpretation at the CI interface, as the *wh*-island case in (28b) does: although the label $\langle Q, Q \rangle$ forces the embedded clause to be construed as an operator-scope configuration, $\{t_{who}, \{\text{which}, \dots\}\}$ in the outer Spec-C, an intermediate copy, cannot behave as an operator.

¹¹ The proposed analysis predicts that PBC effect is relaxed when the remnant is extracted out of a non-finite clause, since it skips the embedded Spec-C without violation of the PIC. Although we have to investigate more closely whether PBC effects are relaxed in non-finite cases, judgement by my informant seems to support the proposed analysis: he observes that there is difference in acceptability between the non-finite case in (iia) and the finite one in (iib), and the former is slightly better than the later.

- (ii) a. Which picture does John wonder of whom to buy?

- b. Which picture does John wonder of whom he should buy?

¹² One might wonder how we account for PBC effects in Japanese scrambling like (ia), which is contrasted with the acceptable freezing cases like (ib).

- (i) a. *[Hanako-ga t_i yonda to]_j [sono hon-o]_i Taro-ga t_j itta.
 Hanako-Nom read Comp that book-Acc Taro said
 lit. ‘That Hanako read, that book, Taro said.’
- b. Sono hon-o_i (kinoo) [Hanakoga t_i yom daro to] Taro-ga t_j itta.
 that book-Acc yesterday Hanako-Nom read will Comp Taro-Nom said
 lit. ‘That book, that Hanako would read the book, Taro said (yesterday).’

If scrambling does not involve feature sharing, and the XP-YP problem is circumvented by the anti-labeling feature on Case particles (Saito (2016), see also discussion in section 5), the proposed system incorrectly predicts that (ia) as well as (ib) is acceptable, since there is no feature sharing in the landing sites of scrambling.

Since cross-linguistic variation of PBC effects is out of the scope of this article and must be investigated in my future study, I speculate that some independent condition on scrambling renders (ia) unacceptable. Consider (ii).

- (ii) a. ?*Bill-ni_i sono mura-ni_j John-ga t_i [Mary-ga t_j sundeiru to] itta.
 Bill-Dat that village-Loc John-Nom Mary-Nom live Comp said
 ‘Bill, in that village, John told that Mary lives.’
- b. Sono mura-ni_j Bill-ni_i John-ga t_i [Mary-ga t_j sundeiru to]_j itta.
 That village-Dat Bill-Loc John-Nom Mary-Nom live Comp said
 ‘In that village, Bill, John told that Mary lives.’

(adapted from Ceccetto (2001: 110))

(iia) shows that multiple scrambling is barred when the long distance scrambling (A'-scrambling) is followed by the short-distance scrambling (A-scrambling). In contrast, (iib) illustrates that the acceptability improves when the short distance scrambling (A-scrambling) is followed by the long-distance scrambling (A'-scrambling).

The contrast in (i) seems to be reduced to the contrast in (ii): (ia) is unacceptable since the A-scrambling of the CP takes place after the A'-scrambling of *sono hon-o* 'that book.' In contrast, (ib) is acceptable since the A-scrambling takes place before the A'-scrambling.

¹³ Vermeulen's (2005) list also includes *wh*-islands (Sabel (2002)) and LF Super-Raising in Japanese (Ura (1994)). *Wh*-islands have already been examined in section 3. This article does not address the question whether LF-movement really exists, and it leaves open the question of whether it is problematic to the proposed condition.

¹⁴ See also Richards (2006) for discussion.