

On Strict Cyclicity and Label: Toward Elimination of Late Merge

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Abstract

In the Minimalist Program, strict cyclicity of structure building is ensured by No-Tampering Condition (NTC). In the literature, however, counter-cyclic (i.e., NTC-violating) operations, such as Late Merge, are proposed in order to explain Argument/Adjunct asymmetry (Lebeaux (1988); Fox (2002)) and A/A' asymmetry (Takahashi and Hulsey (2009)) of reconstruction effects. In this article, I will propose to define the cyclic nodes of structure building as labeled nodes (Label-Based No-Tampering Condition, LNTC) to subsume Late Merge under cyclic application of Merge. I will also show that LNTC not only explains A/A'-asymmetry of reconstruction effects, but also accounts for data that are problematic to Takahashi and Hulsey's proposal.

Keywords: No-Tampering Condition, Labeling Algorithm, Late Merge, reconstruction

1. Introduction

This article aims to reconsider strict cyclicity from a viewpoint of Labeling Algorithm proposed by Chomsky (2013, 2015). Strict cyclicity is

the condition that prohibits any rules to be applied solely to a domain dominated by a cyclic node after the derivation has passed on to the stage of a larger cycle. A classical illustration of strict cyclicity is given in (1), quoted from Freiden (1978).

(1)*Who does John know what saw?

- a. [_{S'} Comp [_S John knows [_{S'} Comp [_S who saw what]]]
- b. [_{S'} Comp [_S John knows [_{S'} who [_S saw what]]]
- c. [_{S'} who [_S John knows [_{S'} Comp [_S saw what]]]
- d. [_{S'} who [_S John knows [_{S'} what [_S saw]]]

(adapted from Freiden (1978: 520))

To derive (1) without violation of subjacency, *who* in (1a) must be first extracted to the embedded Comp as in (1b); then it is moved toward the root Comp as in (1c). After that, *what* in the embedded S is raised to the embedded Comp as in (1d). However, the derivation in (1d) violates the condition of strict cyclicity: In the stage of (1c), the derivation reaches the cycle of the root S'. Given that S' is the cyclic node, no rule can be applied to the embedded S' after (1c). However, the *wh*-movement in (1d) affects solely to the domain of the embedded S', and violates the condition of strict cyclicity.

Throughout the history of generative grammar, strict cyclicity has played a crucial role to restrict possible derivations. In the minimalist program, strict cyclicity of structure building is ensured by No-Tampering Condition, henceforth NTC (Chomsky 2004, 2007, 2008, 2013). NTC dictates that Merge (X, Y) does not modify the structure of X and Y.

(2) *No-Tampering Condition*

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Merge of X and Y leaves the two syntactic objects unchanged. (adapted from Chomsky (2008: 138))

NTC prohibits counter-cyclic merger like (3) since it modifies the structure of α : Merger of γ with α to create $\{\{\alpha, \gamma\}, \beta\}$ involves replacement of α with $\{\alpha, \gamma\}$, and hence it changes the structure of α .

$$(3) * \{\alpha, \beta\} \rightarrow \{\{\alpha, \gamma\}, \beta\}$$

Accordingly, Merge is invariably applied to the top-node of the structure. (4) is the illustration of NTC-observing derivation: Merge is always applied to the top-nodes, and it does not modify the structure of the targets of Merge.

$$(4) \{\alpha, \beta\} \rightarrow \{\gamma, \{\alpha, \beta\}\} \rightarrow \{\delta, \{\gamma, \{\alpha, \beta\}\}\}$$

As a result, Merge always expands the tree by virtue of NTC. In other words, NTC defines the cyclic node of structure building as the *top-node* created by Merge: Once the derivation reaches the stage when $\{\alpha, \beta\}$ is created by Merge (α, β), Merge cannot be applied to the α, β , and nodes dominated by them.

In the literature, however, some counter-cyclic (that is, NTC-violating) operations are proposed. One well-known instance of counter-cyclic operation is Late Merge. Late Merge is first proposed by Lebeaux (1988) to explain argument/adjunct asymmetry with respect to reconstruction effects like (5) (the italics in the examples stand for co-referentiality).

- (5) a. *Which report that *John* was incompetent did *he* submit *t*?
b. Which report that *John* revised did *he* submit *t*?

Binding Condition C is violated in the trace position in (5a), where the *wh*-phrase is accompanied by the complement clause. In contrast, it is not violated in (5b), where the *wh*-phrase involves the adjunct clause. In order to explain the argument/adjunct asymmetry, Lebeaux (1988) proposes that adjunct clauses, but not argument clauses, can be introduced to the derivation after *wh*-movement takes place. This operation, called Late Merge, is counter-cyclic in that merger operation is applied to a subpart of the entire phrase marker.

Now we are faced with the question whether structure building is really strict-cyclic (i.e., NTC-observing). Although Late Merge accounts for asymmetries of reconstruction effects such as argument/adjunct asymmetry like (5) (more cases are introduced in section 2), recourse to counter-cyclic operation complicates narrow-syntactic operations and mappings to the phonological structure and the semantic structure (see Chomsky (2004) for discussion). Here we are faced with tension between description and explanation: In order to explain the phenomena above we must admit that UG allows counter-cyclic operations, whereas in order to restrict possible derivations, we must eliminate counter-cyclic operations in favor of a condition of cycle like NTC.

The goal of this article is to provide a solution to this problem. Specifically, I will claim that derivation must be cyclic, but the cyclic node of structure building is not defined as the *top-node* created by Merge, but rather as the *labeled node*. In other words, I will redefine NTC as a condition that prohibits applying Merge inside a labeled syntactic object (henceforth, SO). I dub this version of NTC as Label-Based No-Tampering Condition (henceforth, LNTC).

(6) *Label-Based No-Tampering Condition (LNTC)*

Merge of X and Y leaves the two SOs unchanged if X or Y is dominated by a labeled node.

LNTC permits derivations like (7) only when $\{\alpha, \beta\}$ is an unlabeled SO: Although (7) changes the structure of α by Merge (γ, α), it is not ruled out by LNTC since α is not dominated by a labeled node.

$$(7) \quad \{\alpha, \beta\} \rightarrow \{\{\gamma, \alpha\}, \beta\}$$

This article will show that Late Merge (strictly speaking, Wholesale Late Merger, which is introduced in section 2.2) is one of “cyclic” applications of Merge: Late Merge is subsumed under Merge that is applied to the SO dominated by an unlabeled SO. If this proposal is on the right track, we can resolve the tension between description and explanation with respect to reconstruction effects.

This article is organized as follows. In section 2, I briefly review previous approaches to asymmetries of reconstruction effects, and argue that in order to eliminate Late Merge, we have to explain A/A' asymmetry of reconstruction effects without recourse to counter-cyclicity. Section 3 proposes a revised version of NTC, LNTC, based on Chomsky's (2013, 2015) Labeling Algorithm. Section 4 shows that LNTC makes it possible to explain A/A' asymmetry of reconstruction as well as the data that are problematic to the previous approach discussed in section 2 without counter-cyclic operations. Section 5 is a conclusion.

2. Previous Approaches to Asymmetries of Reconstruction Effects

2.1. Argument/Adjunct Asymmetry

It is known that *wh*-movement shows argument/adjunct asymmetry in terms of reconstruction effects. As illustrated in (8), the *wh*-phrase involving an argument CP violates Binding Condition C in the trace position, whereas the one with adjunct CP doesn't.

- (8) a. *Which report that *John* was incompetent did *he* submit *t*?
b. Which report that *John* revised did *he* submit *t*?

(Freidin (1986:179))

Lebeaux (1988) tries to explain this asymmetry by assuming that adjunct CP, but not argument CP, can be introduced to the landing site of movement. This counter-cyclic merger operation is called Late Merge. Thanks to Late Merge, (8b) avoids Binding Condition C violation in the base position, since the base copy does not contain the adjunct CP that includes *John*.

A question arises why adjuncts, but not arguments, undergo Late Merge. Fox (2002) claims that the argument/adjunct asymmetry in (8) follows from Trace Conversion. Trace Conversion is composed of two operations, Variable Insertion (9a) and Determiner Replacement (9b).

(9) *Trace Conversion*

- a. (Det) Pred \rightarrow (Det) [Pred $\lambda y(y=x)$]
b. (Det) [Pred $\lambda y(y=x)$] \rightarrow the [Pred $\lambda y(y=x)$] (Fox (2002: 67))

Suppose that we get the LF-representation [*which report*] λx did [*he submit*

[*which report*]] from [*he submit [which report]*] by *wh*-movement. Variable Insertion creates a variable bound by the *wh*-operator, and derives the structure [*which report*] λx *did* [*he submit which [report $\lambda y(y=x)$]]]. Determiner replacement exchanges the *wh*-word in the base position into the definite determiner, so that we get the representation [*which report*] λx *did* [*he submit the [report $\lambda y(y=x)$]]], which is interpreted as ‘(I wonder) which report *x* is such that he submitted *x*.’**

Given Trace Conversion, (8) has the following structure:

- (10) a. [Which report [that *John* was incompetent]] λx [*did he* submit [the [report $\lambda y(y=x)$]]]?
 b. [Which report [that *John* revised did]] λx [*he* submit [the [report $\lambda y(y=x)$]]]?]

Argument and adjunct CPs are introduced to the *wh*-phrases in the landing site by Late Merge. *Report* in (10a) is of the type $\langle t, et \rangle$ since it takes a CP complement. However, it is incompatible with the inserted variable $\lambda y(y=x)$, which is of $\langle e, t \rangle$ type. In contrast, *report* in (10b) is of the type $\langle e, t \rangle$ since it doesn’t take a CP complement. Thus, it is well suited with the $\langle e, t \rangle$ type predicate $\lambda y(y=x)$ thanks to Predicate Modification in the sense of Heim and Kratzer (1998: 65), which combines two $\langle e, t \rangle$ type predicates into one $\langle e, t \rangle$ type predicate.

A crucial idea here is that applicability of Late Merge is not regulated by a condition of cycle in syntax; rather, unwanted result of Late Merge as in (8a) is ruled out by ill-formedness of the semantic representation. This idea is dubbed *the LF-interpretability approach* by Takahashi and Hulsey (2009).

(11) *The LF-Interpretability Approach*

Late merger is permitted whenever an output representation can be interpreted in the semantic component.

(Takahashi and Hulsey (2009: 338))

However, as discussed in section 1, recourse to counter-cyclic operation makes it difficult to restrict possible derivations, and it is conceptually desirable to eliminate Late Merge in favor of NTC. The goal is achieved when we explain argument/adjunct asymmetry without recourse to counter-cyclic merger operations. One way is suggested by Chomsky (2004), which proposes the interpretive mechanism of adjuncts. Chomsky claims that adjunction of α to β yields an ordered set $\langle \alpha, \beta \rangle$ (pair-Merge), and an adjunct generated by pair-Merge does not have any relationship, including c-command, with other elements in the structure during the computational process. In order for adjuncts to be interpreted in the interfaces, it must undergo operation SIMPL, which converts a pair-Merged structure $\langle \alpha, \beta \rangle$ into a set-Merged structure $\{\alpha, \beta\}$. The argument/adjunct asymmetry shown in (8), repeated as (12), is then explained without counter-cyclic merger. See the following structures, where the base copies contain argument and adjunct CPs:

- (12) a.* $[_{DP} \text{ which } [_{NP} \text{ report } [_{CP} \text{ that } \textit{John} \text{ was incompetent}]]]$
 did *he* submit $[_{DP} \text{ which } [_{NP} \text{ report } [_{CP} \text{ that } \textit{John} \text{ was incompetent}]]]$?
- b. $[_{DP} \text{ which report } [_{CP} \text{ that } \textit{John} \text{ revised}]]$ did *he* submit
 $[_{DP} \text{ which report } [_{CP} \text{ that } \textit{John} \text{ revised}]]$?

In (12a), NP is of the form {report, CP}, which is generated by set-Merge. Then *John* in the base copy enters into c-command relation with *he*, and (12a) violates Binding Condition C. In (12b), on the other hand, the NP is of the form <report CP>, generated by pair-Merge. If SIMPL is not applied to <report, CP> in the base-copy, *John* does not enter into c-command relation with *he*, so that Binding Condition C violation is avoided. After *wh*-movement, <report, CP> in the landing site undergoes SIMPL so as to be interpreted in the interfaces.

2.2. A/A'-Asymmetry

If Chomsky's (2004) analysis is on the right track, we do not have to rely on Late Merge in order to explain the argument/adjunct asymmetry with respect to reconstruction effects. However, the asymmetry is not limited to argument/adjunct distinction. The contrast between (a) and (b) in the following examples shows that Binding Condition C is violated in the trace position of A'-movement (*wh*-movement), while it is not violated in A-movement (subject raising).

- (13) a. ??/*Which argument that *John* is a genius did *he* believe *t*?
(Fox (1999: 164))
- b. Every argument that *John* is a genius seems to *him t* to be flawless.
(Fox (1999: 192))
- (14) a. *Which claim that *John* was asleep was *he* willing to discuss *t*?
- b. The claim that *John* was asleep seems to *him t* to be

correct. (Chomsky (1995: 204))

- (15) a. *Which pictures of *John* does he like *t*?
b. Pictures of *John* seem to *him* to be great.
(Lebeaux (2009: 32-33))

To account for the A/A' asymmetry, Takahashi and Hulsey (2009) claim that NP undergoes Late Merge only if D and NP appropriately receive Case in the landing site (Wholesale Late Merger, henceforth WLM). Then, they derive the A-movement cases by extracting the D head as in (16a) first, and then introducing NP in the landing site as in (16b). As a result, *John* is not bound by *him*.

- (16) a. [_D every] seems to *him* [_D every] to be flawless
b. [_{DP} every [_{NP} argument that *John* is a genius]] seems to
him [_D every] to be flawless

This derivation is licit under the LF-interpretability approach since Case is appropriately assigned: D and NP in (16b) receive Nominative Case from T after NP is introduced in the Spec, TP. In contrast, the NP must be base-generated in A'-movement to receive Case appropriately, as schematized in (17).

- (17) * [which [argument that *John* is a genius]] did *he* believe
[which [argument that *John* is a genius]]

Accordingly, A'-movement inevitably leads to Binding Condition C violation.

Thus, Takahashi and Hulsey account for the A/A' asymmetry of reconstruction by WLM. However, There are two cases that are problematic to their analysis. Firstly, Takahashi and Hulsey cannot explain the contrast in (18).

- (18) a. ? [how many [pictures of *John*]] do you think [*t'* that *he* will like *t*]?
- b. ?* [how many [pictures of *John*]] does *he* think [*t'* that I like *t*]?
- (Huang 1993: 110)

(18) shows that Binding Condition C violation is avoided at the intermediate position: In (18a), the intermediate trace *t'* is not c-commanded by *he*, while it is c-commanded in (18b). This contrast suggests that WLM can be applied to the intermediate site of A'-movement, as schematized in (19) (the box indicates the position where WLM is applied).

- (19) a. [_{CP} [_{DP} how many [_{NP} pictures of *John*]]_{*i*} do you think [_{CP} [_{DP} how many [_{NP} pictures of *John*]] that *he* will like [_{DP} how many]]?
- b.* [_{CP} [_{DP} how many [_{NP} pictures of *John*]]_{*i*} does *he* think [_{CP} [_{DP} how many [_{NP} pictures of *John*]] that I like [_{DP} how many]]?

However, Takahashi and Hulsey's analysis does not allow WLM to be applied to the intermediate site of A'-movement since the NP cannot receive Case in the intermediate position. Therefore, Takahashi and Hulsey incorrectly predict that (18a) violates Binding Condition C since NP must be introduced

at the base position so that NP receives Case.

Secondly, as Takahashi and Hulseley admit, pied-piping cases of A'-movement like (20) can be problematic to their analysis.

(20) *<sub>[PP In <sub>[DP which _[NP corner of *John's* room]]] was *he* sitting
in *t*? (Takahashi and Hulseley (2009: 401, fn12))</sub></sub>

Given that the preposition *in* is responsible for Case-assignment, NP should be able to undergo WLM in the landing site. Then it is incorrectly predicted that (20) does not violate Binding Condition C. According to Takahashi and Hulseley, one way to avoid this problem is “to assume that any Case assignment is done immediately upon merger of Case-assigning head and an element needing Case.” (p. 401, fn12) That is, Case assignment in (20) takes place when *in* and DP are merged at the base position just after NP is introduced. However, this assumption lacks independent motivation, and then should be eliminated if we come up with an alternative analysis of (20).

2.3 Interim Summary

Late Merge is proposed by Lebeaux (1988) and advanced by Fox (2002) to explain the argument/adjunct asymmetry with respect to reconstruction effects. However, since recourse to Late Merge complicates possible derivations, it is theoretically desirable to eliminate Late Merge in favor of cyclic application of Merge. One way to achieve this goal is suggested by Chomsky (2004), which accounts for contrast like (8) without Late Merge. However, the asymmetry with respect to reconstruction effects is not limited to the argument/adjunct distinction: A/A' distinction also displays the asymmetry. Thus, we cannot rely on Chomsky's (2004) analysis in order to

account for the A/A' asymmetry. Then, our question is whether we can explain A/A' asymmetry of reconstruction effects without counter-cyclic operations. In the remainder of this article, I will explain the contrast like (13) without recourse to WLM.

3. Proposal

Chomsky (2013, 2015) proposes that SOs are labeled through a fixed algorithm (Labeling Algorithm, henceforth LA). LA is minimal search that looks into a SO and selects a lexical item or features as the label of the SO. Let us suppose that we have the structure $SO = \{H, XP\}$, where H is a head and XP is a complex phrase. Since H is the prominent head in the structure, LA selects H as the label of the SO. In the case of $SO = \{XP, YP\}$, where both XP and YP are complex phrases, the minimal search is ambiguous (i.e., LA cannot identify which of X and Y are the prominent head that serves as the label of the structure). In that case, there are two ways to determine the label. The first is that LA finds features that are shared between XP and YP. When both XP and YP share a feature F, the pair of the features $\langle F, F \rangle$ serves as the label of $\{XP, YP\}$. The second way is to create a copy of one of the two phrases by internal Merge: Internal Merge of XP makes it invisible from LA since not every occurrence of XP is contained in $\{XP, YP\}$. On the other hand, every occurrence of YP is contained in the SO, so that LA picks up YP as the label of the SO.

Although Chomsky postulates that LA applies when the relevant SO is transferred to the interfaces, this assumption is not adopted in this article. Instead, I suppose that LA is applied as soon as possible (i.e., when the relevant structure is created).

Given LA, I propose a revised version of NTC, Label-Based

No-Tampering Condition (LNTC).

(21) *Label-Based No-Tampering Condition*

Merge of X and Y leaves the two SOs unchanged if X or Y is dominated by a labeled node.

LNTC prohibits application of Merge to SOs inside a *labeled* structure. Given a labeled structure $\{\alpha, \beta\}$, LNTC tolerates Merge $(\gamma, \{\alpha, \beta\})$ yielding $\{\gamma, \{\alpha, \beta\}\}$, but it permits neither Merge $(\gamma, \alpha) = \{\{\gamma, \alpha\}, \beta\}$ nor Merge $(\gamma, \beta) = \{\alpha, \{\gamma, \beta\}\}$ since the former and the latter modify the structure of α and β , respectively. In contrast, when we have an unlabeled structure $\{\alpha, \beta\}$, LNTC allows application of Merge to the internal structure of $\{\alpha, \beta\}$, yielding $\{\{\gamma, \alpha\}, \beta\}$ or $\{\alpha, \{\gamma, \beta\}\}$ since modifying the targets of Merge is tolerated when they are not dominated by a labeled node (of course, Merge $(\gamma, \{\alpha, \beta\}) = \{\gamma, \{\alpha, \beta\}\}$ is also licit in this case).

4. Eliminating Wholesale Late Merger

This section demonstrates that LNCT explains A/A'-asymmetry of reconstruction effects and data that are problematic to Takahashi and Hulsey (2009).

4.1. Explaining the A/A' Asymmetry

Let us begin with the A/A' asymmetry of reconstruction effects like (22).

(22) a. The claim that *John* was asleep seems to *him* *t* to be

correct.

- b.* Which claim that *John* was asleep was *he* willing to discuss *t*? (Chomsky (1995: 204))

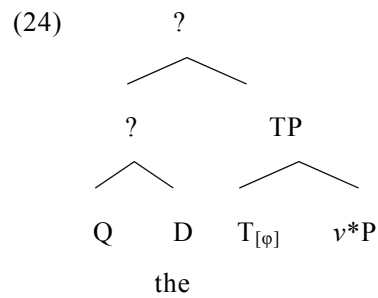
Before looking into the derivation of (22), let me introduce two assumptions. Firstly, I assume with Cable (2010) that *wh*-phrases have the structure [QP Q [DP D NP]], where Q is a phonologically empty question particle. Then, *which argument* is represented as [QP Q [DP [D which] [NP argument]]]. Additionally, I postulate that noun phrases like *the claim* and *every claim* are headed by a functional head \mathbb{Q} , which encodes quantificational force. I further assume that QP is always projected in the structure whether it is overtly manifested or not; that is, noun phrases have the structure like [QP \mathbb{Q} [DP D NP]]. For example, *every argument* and *the argument* have the structure [QP [Q every] [DP D [NP argument]]] and [QP \mathbb{Q} [DP [D the] [NP argument]]], respectively.

Secondly, I postulate that the locus of interpretable ϕ -features is the head noun N, rather than the determiner D. This claim is supported by considering, for example, *der Spiegel* ‘the mirror’: Being masculine is inherent of property of the noun *Spiegel*, not the determiner *der*.

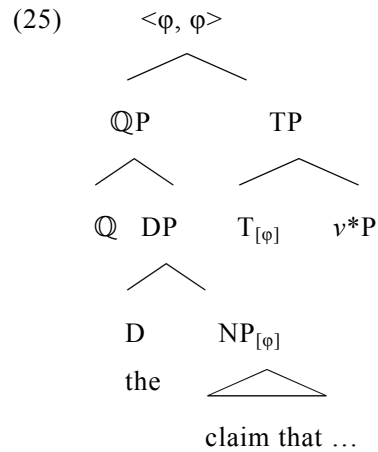
Given these two assumptions, let us see the derivation of A-movement in (22a). (23) shows the structure before A-movement, where the noun phrase is introduced without NP *claim that John was asleep* so as to avoid Binding Condition C violation in the base position.

(23) $[_{TP} T_{[\phi]} [_{vP} \text{seems to } \textit{him} [_{?} Q [_D \textit{the}]] \textit{to be correct}]]]$

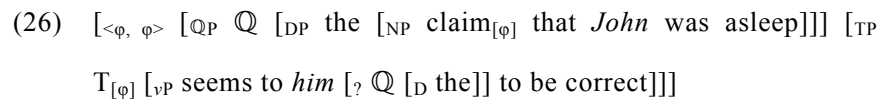
Since the noun phrase is of the form $\{Q, D\}$ structure, it does not yield a label (I mark unlabeled structures as ?). Next, the Q-D complex undergoes subject-raising to the sister of TP (Spec of TP, in the traditional sense), as illustrated in (24).



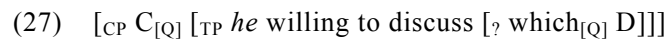
This structure cannot be labeled. (24) is of the form $\{\{Q, D\}, TP\}$ (i.e., $\{XP, YP\}$ structure), and there is no feature that is shared between $\{Q, D\}$ and TP, since it lacks NP that is the locus of interpretable ϕ -feature that agree with the uninterruptable ϕ -feature in T. Accordingly, LNTC permits applying Merge (D, NP) since D is not dominated by a labeled node, and the following structure is generated.



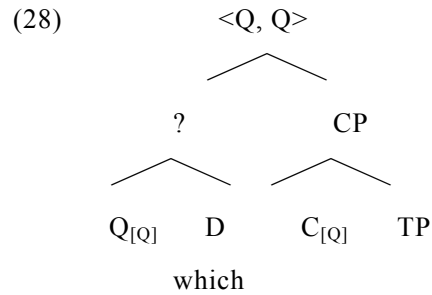
The resulting structure is labeled $\langle \varphi, \varphi \rangle$ through minimal search finding φ -features in N and T. Note that thanks to Merge (D, NP), the noun phrase is correctly labeled: {D, NP} generated by Merge (D, NP) is labeled DP; then {Q, DP} is labeled QP. (26) is the output of the derivation.



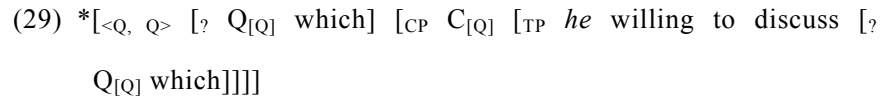
Let us next consider the derivation of A'-movement in (22b). Suppose, again, that the noun phrase is introduced to the base position without NP *claim that John was asleep* so as to avoid Binding Condition C violation:



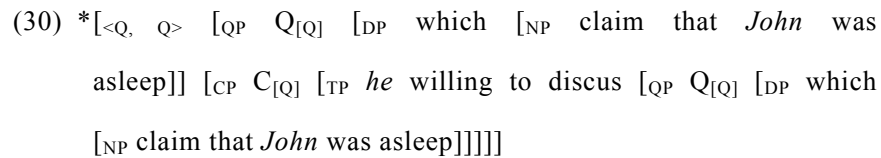
Next, *wh*-movement of {which, D} generates the following structure:



Note that this structure is labeled <Q, Q> since minimal search finds the interrogative feature [Q] involved in the Q-head, and the one involved in C. Therefore, LNTC prohibits application of Merge to D dominated by <Q, Q>.



Thus, NP must be introduced to the derivation in the base position as in (30), where Binding Condition C violation is induced.



4.2. Explaining Data that are problematic to Takahashi and Hulsey (2009)

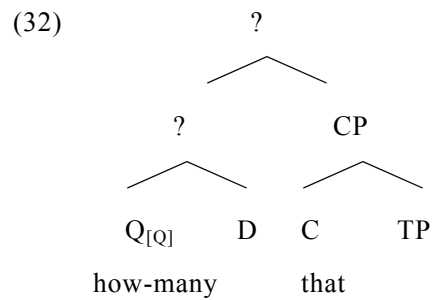
Finally, I will account for data that are problematic to Takahashi and

Hulsey's (2009) analysis.

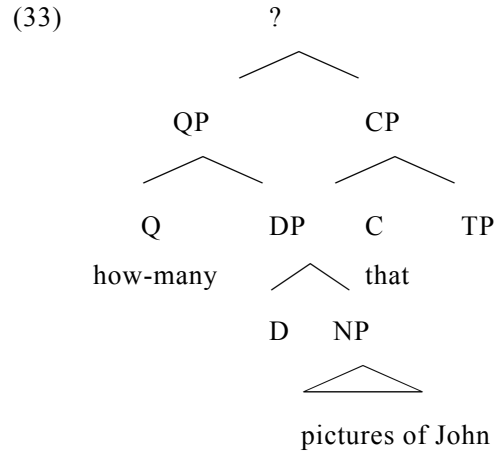
As we have seen, Takahashi and Hulsey cannot explain the contrast in (18), repeated here as (31), since WLM cannot be applied to the intermediate position of A'-movement.

- (31) a. ? [how many [pictures of *John*]] do you think [*t'* that *he* will like *t*]?
 b. ?* [how many [pictures of *John*]] does *he* think [*t'* that I like *t*]?
 (Huang 1993: 110)

In contrast, the proposed analysis accounts for (31). Suppose the *wh*-phrase are introduced into the intermediate position, as illustrated in (32).



The top node is not labeled since there are no features to be shared by {Q, D} and CP. Then, LNTC allows application of Merge (D, NP) to yield the structure in (33).



Accordingly, (31a) avoids Binding Condition C violation by introducing NP in the intermediate position. In contrast, in (31b), the similar operation does not lead to avoid Binding Condition C since the *John* is c-commanded by *he* in the matrix clause.

The second problem with Takahashi and Hulseley is that their analysis cannot account for reconstruction effects found in the pied-piping cases like (20), repeated in (34), without unmotivated assumption about the timing of Case-assignment.

- (34) *_{[PP In [DP which [NP corner of *John*'s room]]]} was *he* sitting
in *t*? (Takahashi and Hulseley (2009: 401, fn12))

Ungrammaticality of (34) is straightforwardly explained by the proposed analysis. According to Cable (2015), the pied-piping *wh*-phrases are headed by Q, and have the structure like [_{QP} Q [_{PP} P [_{DP} D NP]]. Given this assumption, (34) is derived as follows:

- (35) a. *he sitting in* [_{QP} Q [_? in [_D which]]?
 b. [_{<Q, Q>} [_{QP} Q [_{PP} in [_{DP} which]] [_{CP} [_C was] *he sitting in* [_{QP} Q [_? in [_D which]]]]]?
 c. *[[_{<Q, Q>} [_{QP} Q [_{PP} in [_{DP} which [_{NP} corner of *John's* room]]] [_{CP} [_C was] *he sitting in* [_{QP} Q [_? in [_D which]]]]]])?

The *wh*-phrase is first base-generated without NP to avoid Binding Condition C violation as in (35a), where the *wh*-phrase is of {Q, {in, which}}. {in, which} does not have a label since {in, which} is of the {H, H} structure. {Q, {in, which}} is the {H, XP} structure, and hence it is labeled QP. Next, as in (35b), the *wh*-phrase undergoes *wh*-movement and the entire structure is labeled <Q, Q> since Q involves the interrogative feature [Q] that agrees with the matrix C. Then, LNTC prohibits application of Merge (D, NP) since D is dominated by labeled nodes, QP and <Q, Q>. Consequently, the structure like (35c) cannot be derived.

To sum up, LNTC not only explains the canonical contrast of A/A' asymmetry of reconstruction like (22), but also accounts for reconstruction into intermediate position and the pied-piping case of A'-movement, which are problematic to Takahashi and Hulsey (2009).

5. Conclusion

In this article, I have proposed to define the cyclic nodes of No-Tampering Condition as the labeled nodes rather than the top-nodes (Label-Based No-Tampering Condition). LNTC subsume Late Merge under cyclic application of Merge. I have also demonstrated that LNTC accounts for A/A'-asymmetry of reconstruction effects, and data that are problematic to

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Takahashi and Hulsey's analysis which is based on counter-cyclic merger. If my analysis is on the right track, Late Merge is eliminable from syntax.

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