

[Article]

# A Phase-Based Analysis for Adjuncts\*

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## 1. Introduction

In the history of generative grammar, the nature of adjuncts has often been at the center of attention. Nevertheless, to the best of our knowledge, no studies have fully captured their peculiar behavior. Chomsky (2004) states the following for adjuncts:

- (1) There has never, to my knowledge, been a really satisfactory theory of adjunction, and to construct one is no slight task.

(Chomsky 2004: 117)

It is well known in the literature that adjuncts behave as if they are invisible in syntax. A piece of evidence for their invisibility is from their islandhood. Since Ross (1967), the prohibition of extracting from adjuncts has been known as the adjunct island, as exemplified in (2) (see also Huang (1982)).

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- (2) a. \*Who<sub>i</sub> did John go home [before he talked to  $t_i$ ]?  
 b. \*Who<sub>i</sub> did John go home [after he talked to  $t_i$ ]?  
 c. \*Who<sub>i</sub> did John fall asleep [while he was talking to  $t_i$ ]?

(Truswell 2011: 176)

To capture this invisibility of adjuncts, Chomsky (2004) proposes a special type of Merge for adjuncts, namely pair-Merge. According to Chomsky (2004, 2008), adjuncts are invisible in syntax since they are introduced via pair-Merge: pair-Merged elements go to a “separate plane” and thus extraction from them is disallowed. However, the original pair-Merge analysis of adjuncts is empirically problematic, as Oseki (2015) points out, since extraction from some adjunct clauses is allowed (Truswell (2011)):

- (3) a. What<sub>i</sub> did you come round [to work on  $t_i$ ]? (Truswell 2011: 129)  
 b. Who<sub>i</sub> did John get upset [after talking to  $t_i$ ]? (ibid.)  
 c. What<sub>i</sub> did John come back [thinking about  $t_i$ ]? (ibid.)

If pair-Merged adjuncts are truly invisible in syntax, as Chomsky (2004) argues, extraction from adjuncts should be impossible.

In this paper, we propose a phase-based approach for adjuncts, attributing the invisibility of adjuncts to the Phase Impenetrability Condition, and claim that adjuncts should be visible in syntax contra Chomsky’s (2004) assumption, thereby eliminating the concepts of a “separate plane” and the stipulated operation SIMPL.

The organization of this paper is as follows. Section 2 focuses on pair-Merge and overviews how it accounts for the unique properties of adjuncts. Section 3 points out that the original pair-Merge explanation for adjuncts is empirically and theoretically problematic. Section 4 reviews one intriguing analysis by Oseki (2015), which argues that pair-Merge should be eliminated from syntax. Section 5 provides the phase-based analysis for adjuncts, with the claim that the notions of the “separate plane” and the operation SIMPL should be eliminated. Based on our proposal, we also derive adjunct control without a

dubious operation, Sideward Movement. Section 6 concludes this paper.

## 2. Two Types of Merge: Set-Merge and Pair-Merge

Chomsky (2004) proposes two types of Merge: set-Merge and pair-Merge. They correspond to substitution and adjunction respectively in the previous generative framework. The operation of set-Merge forms an unordered set from two syntactic objects, while that of pair-Merge forms an ordered pair. Originally, pair-Merge was introduced to explain the peculiar phenomena of adjunction. Chomsky (2004) makes the following statements about adjunction:

- (4) The construction is crucially asymmetric: if  $\alpha$  is adjoined to  $\beta$ , the construction behaves as if  $\alpha$  isn't there apart from semantic interpretation, which is not that of standard X-bar-theoretic construction...  
(Chomsky 2004: 117)

In order to capture this asymmetry, he has put forth the notion of pair-Merge:

- (5) But it is an empirical fact that there is also an asymmetric operation of adjunction, which takes two objects  $\beta$  and  $\alpha$  and forms the ordered pair  $\langle \alpha, \beta \rangle$ ,  $\alpha$  adjoined to  $\beta$ .  
(ibid.)

Crucially, the operation of pair-Merge renders syntactic objects invisible in syntax, and they are metaphorically taken to be on a “separate plane”:

- (6) Given the basic properties of adjunction, we might intuitively think of  $\alpha$  as attached to  $\beta$  on a separate plane, with  $\beta$  retaining all its properties on the “primary plane,” the simple structure.  
(Chomsky 2004: 117-118)

Thus, the invisibility of adjuncts is explained by pair-Merge. However, since adjuncts need to be interpreted at the interfaces, they must come back to the

“primary plane” at the timing of the Transfer. Therefore, Chomsky (2004) proposes the operation SIMPL, which converts an ordered pair  $\langle \alpha, \beta \rangle$  to a simple unordered set  $\{\alpha, \beta\}$  at the timing of the Transfer. Due to this operation, pair-Merged syntactic objects can be interpreted at the interfaces.

Let us see how the pair-Merge analysis accounts for the behavior of adjuncts. The first case is the adjunct island. In the literature, extraction from adjunct clauses has been taken to be impossible, which is called the adjunct island, as briefly touched upon in Section 1.

- (7) a. \*Who<sub>i</sub> did John go home [before he talked to t<sub>i</sub>]? (= (2a))  
 b. \*Who<sub>i</sub> did John go home [after he talked to t<sub>i</sub>]? (= (2b))  
 c. \*Who<sub>i</sub> did John fall asleep [while he was talking to t<sub>i</sub>]? (= (2c))

Chomsky (2008) applies pair-Merge to the adjunct island:

- (8) The adjunct-island subcase follows if an adjunct is not in the search domain of the probe. (Chomsky 2008: 146)

Since adjunct clauses are introduced via pair-Merge, they become invisible to probes or c-command relations and thus extraction from them is disallowed.

The second case concerns the anti-reconstruction effect of adjuncts. Consider the following contrast:

- (9) a. Which claim [that John<sub>i</sub> made] was he<sub>i</sub> willing to discuss ~~which claim [that John<sub>i</sub> made]~~? (Chomsky 1995: 204)  
 b. \*Which claim [that John<sub>i</sub> was asleep] was he<sub>i</sub> willing to discuss ~~which claim [that John<sub>i</sub> was asleep]~~? (ibid.)

(9a) contains a relative clause (*that John made*), which is taken to be the adjunct of *claim*, while (9b) includes an appositive clause (*that John was asleep*), which is considered to be the complement of *claim*. (9b) is ungrammatical since the lower copy of *which claim that John was asleep* causes a violation of Binding

Condition C: *he* in the matrix clause c-commands the co-indexed R-expression *John* in the appositive clause. However, this analysis cannot account for the grammaticality of (9a) since the adjunct clause also contains the copy which includes R-expression *John*. On the basis of Lebeaux (1988), Chomsky (1995) argues that unlike a complement in (9b), an adjunct in (9a) can be merged counter-cyclically, and this operation is called Late Merge. Under this proposal, the relative clause which contains the co-indexed R-expression *John* in (9a) is introduced after the movement of DP into the sentence-initial position, so that no reconstruction effects arise in the case of adjuncts. On the other hand, since the complement is selected by a higher syntactic object, it needs to be introduced cyclically for the selectional requirement. In this way, Late-Merge can account for the grammaticality of (9a, b).

Though the Late-Merge-based analysis for adjunctions manages to account for asymmetrical behaviors of complements and adjuncts, this is not theoretically desirable in that Late-Merge requires counter-cyclic operations, which violates the No-Tampering Condition, as cited in (10).

(10) The No-Tampering Condition

Merge of X and Y leaves the two SOs unchanged.

(Chomsky 2008: 138)

Thus, Chomsky (2004) provides a pair-Merge analysis for the asymmetry of (9a, b). As the adjunct clause in (9a) is pair-Merged on a “separate plane,” it is not c-commanded by *he* in the matrix clause. Then, at the timing of the Transfer of *claim* in the fronted position in (9a), the operation of SIMPL is applied, converting the adjunct clause to the visible object on the “primary plane.” Furthermore, SIMPL also explains seemingly visible adjuncts:

(11) a. John<sub>k</sub> looked for a camera [PRO to take a picture of himself<sub>k</sub>].

(Bode 2020: 74)

b. John worked rarely [before any of the exams]. (Bode 2020: 39)

In (11a), PRO in an adjunct clause, which refers to the matrix subject *John*, seems to c-command *himself* locally. In (11b), the negative polarity item (NPI) *any* is also located in an adjunct clause and is c-commanded by *rarely* in the matrix clause. These data can be explained if pair-Merged adjuncts come back to the “primary plane” by SIMPL. At first sight, the approach with pair-Merge looks appealing. However, we will see in the following section that pair-Merge faces empirical and theoretical problems.

### 3. Problems with Pair-Merge

Under Chomsky (2004, 2008), adjunct island effects are explained by the assumption that they are on a “separate plane,” where adjuncts are invisible in syntax and the extraction from inside is impossible. However, Truswell (2011) observes that there are cases where extraction from adjunct clauses is not always impossible, as we can see the difference in acceptability between (12) and (13). As Oseki (2015) points out, if an adjunct island is truly invisible in syntax, we cannot explain why extraction from adjuncts is possible in (13).

- (12) a. \*Who<sub>i</sub> did John go home [before he talked to t<sub>i</sub>]? (= (2a))  
 b. \*Who<sub>i</sub> did John go home [after he talked to t<sub>i</sub>]? (= (2b))  
 c. \*Who<sub>i</sub> did John fall asleep [while he was talking to t<sub>i</sub>]? (= (2c))
- (13) a. What<sub>i</sub> did you come round [to work on t<sub>i</sub>]? (= (3a))  
 b. Who<sub>i</sub> did John get upset [after talking to t<sub>i</sub>]? (= (3b))  
 c. What<sub>i</sub> did John come back [thinking about t<sub>i</sub>]? (= (3c))

Moreover, if *wh*-adjuncts are introduced via pair-Merge, as Otsuka (2017) points out, movement operation cannot be applied to *how*, *when*, and *where* in (14) since they are on a “separate plane” and thus would be invisible.<sup>1</sup>

- (14) {How/When/Where[<sub>uQ</sub>]} do you fix it {~~how/when/where~~[<sub>uQ</sub>]}?

Next, let us consider the following examples:

- (15) a. \*I believe sincerely him to be honest. (Matsubara 2002: 254)  
 b. \*It is important for tomorrow her to go to Kochi. (ibid.)  
 c. \*Mary likes very much me. (ibid.)

As shown in (15), if adverbs intervene between case assigners and case assignees, the sentences become ungrammatical. Whatever analysis is used, if adverbs are invisible in syntax, it is not clear how we can explain the (un)grammaticality of (15).

Moreover, the pair-Merge analysis for adjuncts cannot account for the existence of overt inflection on adjectives in some languages. Generally, it is assumed that adjectives are adjuncts, and inflection arises as a result of the operation Agree (Chomsky (2008)), so that adjectives should be visible in syntax.

Recall that pair-Merge was originally introduced for empirical reasons, and the evidence of visible adjuncts is highly problematic to the “separate plane” assumption. Furthermore, to the best of our knowledge, the nature of SIMPL has been unclear in the previous literature. As Oseki (2015) and Bode (2020) point out, the notions of “separate plane” and SIMPL do complicate the grammar. If it is possible to account for empirical facts without recourse to these notions, a theoretically desirable consequence is obtained. Before going onto our proposal, let us go over one previous analysis for adjuncts, which attempts to eliminate the notion of pair-Merge for structure building.

#### 4. Reconsideration of Oseki (2015)

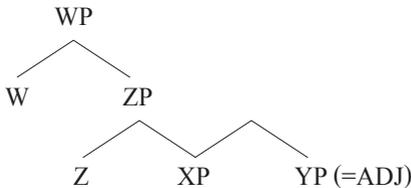
Oseki (2015) proposes an insightful analysis to eliminate pair-Merge since it faces empirical and theoretical problems. He argues that pair-Merge is theoretically problematic in that it seems construction-specific, which is reminiscent of the approach seen in early Transformational Grammar (Chomsky (1957)). His argument against pair-Merge is that the pair-Merge approach to adjunct island effects is too restrictive because some adjuncts allow extraction from within an adjunct clause, as shown in (13). Furthermore, he demonstrates that the explanation of reconstruction effects by pair-Merge to Binding Con-

dition C is too loose since some adjuncts get obligatorily reconstructed, thus violating Binding Condition C:

- (16) a. \*[In Ben<sub>i</sub>'s office], he<sub>i</sub> lay on his desk.  
 b. \*[With John<sub>i</sub>'s computer], he<sub>i</sub> began to write a book.  
 c. \*[To Beni's office], he<sub>i</sub> takes the bus.  
 d. \*[For Mary<sub>i</sub>'s brother], I heard she<sub>i</sub> was given some clothes.  
 (Speas 1991: 250)

Therefore, Oseki (2015) concludes that pair-Merge should be eliminated and puts forth a “two-peaked” analysis for adjunction in its place as in (17), extending Hornstein’s (2009) Label Accessibility Condition and Epstein, Kitahara and Seely’s (2012) “two-peaked” structure analysis.

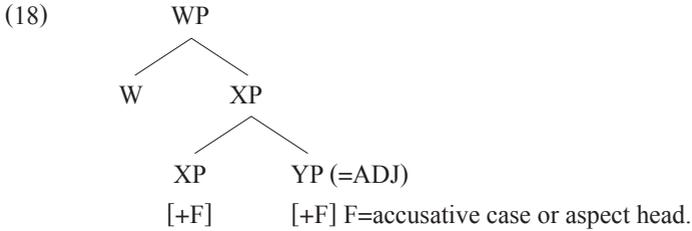
- (17) “Two-peaked” structure for adjuncts



(Oseki 2015: 307)

Given that only the label of a syntactic object is accessible to Merge (Hornstein (2009)), Oseki argues that adjuncts inevitably generate a “two-peaked” structure since adjuncts create the XP-YP structure and cannot be labeled; hence, one peak including adjuncts must be transferred for the derivation to converge, and adjuncts become invisible to extractions, in principle.

He further assumes that adjuncts can be labeled and become visible through prominent feature sharing, on the basis of Chomsky (2013). Following den Dikken (2012) and Miyamoto (2012), Oseki assumes an accusative case or aspect head for prominent feature sharing, so that adjuncts become a “one-peaked” structure in (18). Hence, extraction from adjuncts is allowed.



Though his approach is intriguing, the analysis also faces problems. Bode (2020) points out that in Oseki's analysis, it is unclear which feature is shared in the following sentence:

- (19) What<sub>*t*</sub><sub>*i*</sub> did John arrive whistling <sub>*t*</sub><sub>*i*</sub>?  
 (Borgonovo and Neeleman 2000: 200)

Since *arrive* is an unaccusative verb, it is doubtful that the accusative case is related to feature sharing here. If agreement of aspect head, as argued by Miyamoto (2012), renders the inside of adjuncts extractable in (19), the ungrammaticality of the following repeated examples cannot be explained:

- (20) a. \*Who<sub>*t*</sub> did John go home [after he talked to <sub>*t*</sub><sub>*i*</sub>]? (= (2b))  
 b. \*Which break<sub>*t*</sub> did they meet [after <sub>*t*</sub><sub>*i*</sub>]? (Bode 2020: 64)

Furthermore, it seems dubious to assume some features for adjuncts because adjuncts in English do not inflect for them. In any case, further evidence is needed for validating his argument.

Besides the problems just mentioned, it faces more empirical issues. Consider here again the following examples:

- (21) a. John<sub>*k*</sub> looked for a camera [to take a picture of himself<sub>*k*</sub>]. (= (11a))  
 b. John worked rarely [before any of the exams]. (= (11b))

Under Chomsky's (2004) pair-Merge approach, these examples are explained

by SIMPL, which renders adjuncts visible at the interface. As for this, Oseki makes the following statements:

- (22) [W]e simply assume following Obata (2010) that the chunks sent to interfaces via Transfer are “re-assembled” into one representation for global semantic computations like Condition C. This line of inquiry remains to be worked out. (Oseki 2015: 309)

From this statement, it is not clear how Binding Condition A or NPI are licensed, and thus further investigation is needed to explain visible adjuncts. Furthermore, as Oseki himself admits, his approach cannot explain why adjuncts can move like (14), which is repeated as (23).

- (23) {How/When/Where<sub>[uQ]</sub>} do you fix it {~~how/when/where~~<sub>[uQ]</sub>}?  
(= (14))

Although the elimination of pair-Merge from syntax is theoretically welcome, his analysis faces serious empirical problems just as pair-Merge and SIMPL do. That is, Oseki (2015) does not fully eliminate the concept of pair-Merge. As Chomsky (2004) claims, pair-Merge plays an important role not for argument structures and edge properties, but for the richness of expressive power, which are not provided by set-Merge.

Furthermore, if pair-Merge does not exist for adjuncts at all, adjuncts inevitably create the unlabelable XP-YP structure, which is problematic under the labeling algorithm in Chomsky (2013, 2015). Hence, pair-Merge is still clearly necessary for structure building in syntax. Though numerous studies try to eliminate pair-Merge from syntax,<sup>2</sup> as Bode (2020) precisely points out, they introduce additional mechanisms for capturing the peculiar properties of adjuncts, which complicate the grammar more. This paper, instead, attempts to pursue the possibility of pair-Merge and reduce the complication of pair-Merge, specifically proposing that adjuncts are actually visible in syntax, contrary to Chomsky’s (2004) assumption and the notion of SIMPL should be eliminated.

## 5. A Proposal

### 5.1. Phase Theory

Before going onto our proposal, let us introduce the framework this paper adopts. Chomsky (2000) introduces the notion of a phase, which is a computational unit of syntactic derivations. He argues that sentences are constructed phase by phase and transitive  $v^*P$  and CP constitute a phase. Upon completion of the syntactic operations in a phase, the phase head transfers its complement to the Conceptual-intentional (CI) interface and the Sensorimotor (SM) interface, as illustrated in (24).

$$(24) \text{ [Phase Phase-Head [}_{\text{phase-comp}} \text{ Comp-Head [Complement]]]}$$

Since they are already transferred to the interfaces, no syntactic objects within the complement of phases can be accessed. This constraint is known as the Phase Impenetrability Condition (henceforth, PIC):

(25) Phase Impenetrability Condition

In phase  $\alpha$  with Head H, the domain of H is not accessible to operations outside  $\alpha$ , only H and its edge are accessible to such operations.

(Chomsky 2000: 108)

This concept allows the computational burden to be dramatically reduced since the domain of the earlier phases is rendered inaccessible to later syntactic operations and further syntactic computation cannot be conducted.

Under the phase theory, various attempts have been made to account for the island effects in previous literature. Since Ross (1967), it has been well known that no elements can be extracted from the *wh*-clause, which is called the *wh*-island. However, it is observed that *wh*-movement out of *wh*-island is possible if the embedded complement is infinitival, as shown in (26a).

- (26) a. What<sub>*t*<sub>i</sub></sub> do you wonder [how<sub>*j*</sub> PRO to repair *t*<sub>*i*</sub> *t*<sub>*j*</sub>?  
 (Manzini 1992: 51)  
 b. \*What<sub>*t*<sub>i</sub></sub> do you wonder [how<sub>*j*</sub> Mary repaired *t*<sub>*i*</sub> *t*<sub>*j*</sub>? (ibid.)

Kanno (2008) provides a phase-based explanation for the asymmetry between the non-finite clause in (26a) and finite clause in (26b).<sup>3</sup> Kanno (2008) argues that extraction from the non-finite wh-island is allowed since C of the control complements does not constitute a phase and is not subject to PIC.<sup>4</sup> A number of researchers also argue that infinitival constructions in English do not form a phase (e.g. see Miyagawa (2011), Wurmbrand (2013), Sugimoto (2016), and Grano and Lasnik (2018)).

As for the determining factor of phasehood, Kanno (2008) proposes that the presence of both an Agree feature and a Tense feature on CP makes CP a phase, while the absence of one or both of these features makes it a non-phase.<sup>5</sup> According to his proposal, the CP of finite complements in (26b) has both features, thereby constituting a phase. In contrast, the CP of control constructions in (26a) is not a phase because it does not have an Agree feature or a Tense feature. According to Kanno (2008), the lack of Agree feature can be checked through the quantifier floating in (27).

- (27) a. \*They tried all to leave. (Baltin 1995: 200)  
 b. They tried to all like John. (Baltin 1995: 235)

Given that the quantifier *all* occupies the same position as the element which it modifies, (27) suggests that control complements do not have an Agree feature attracting PRO to TP Spec. Kanno (2008) uses temporal morphology as evidence of the presence of a Tense feature on CP. Since English control complements cannot have any temporal morphology such as *-ed* or *-en*, it follows that they do not have a Tense feature.<sup>6,7</sup> Hence, control complements lack both a Tense feature and an Agree feature, so that they do not constitute a phase. Therefore, extraction from their complement is possible, capturing the contrast of (26a, b). Adopting this assumption, the subsequent subsection provides a

phase-based analysis to adjuncts and demonstrates that adjuncts are in fact visible in syntax.

## 5.2. A Phase-Based Approach to Adjuncts

Here, we propose a revised version of pair-Merge. First, the fact regarding extraction and binding suggests that an adjunct is visible in syntax, unlike Chomsky's (2004) assumption. Thus, this paper proposes the following:

- (28) A pair-Merged syntactic object does not contribute to labeling but is visible in syntax.

Under this proposal, adjuncts, which are introduced by pair-Merge, do not have a label but are visible in syntax.<sup>8,9</sup> Thus, extraction from an adjunct clause is a theoretically viable option like (3), repeated here as (30).

- (29) a. \*Who<sub>i</sub> did John go home [before he talked to  $t_i$ ]? (= (2a))  
 b. \*Who<sub>i</sub> did John go home [after he talked to  $t_i$ ]? (= (2b))  
 c. \*Who<sub>i</sub> did John fall asleep [while he was talking to  $t_i$ ]? (= (2c))
- (30) a. What<sub>i</sub> did you come round [to work on  $t_i$ ]? (= (3a))  
 b. Who<sub>i</sub> did John get upset [after talking to  $t_i$ ]? (= (3b))  
 c. What<sub>i</sub> did John come back [thinking about  $t_i$ ]? (= (3c))

Then, why is extraction from finite adjunct clauses impossible as in (29)? This paper demonstrates that their invisibility is attributed to PIC under phase theory.<sup>10</sup> Following Haegeman (2012), we assume that the temporal operator is located in the edge of adjuncts.<sup>11</sup> Hence, it cannot be used as an escape hatch. Recall that under Kanno (2008) C of finite complements constitutes a phase, while C of control complements does not constitute a phase because they lack both an Agree feature and Tense feature. In (29), the C of adjunct clauses is finite, so that the *wh*-phrase cannot be extracted due to PIC. On the other hand, in (30), C of the adjunct clause is non-finite; thus, no phases are constituted, and *wh*-extraction is therefore possible.<sup>12,13</sup> In this way, adjunct island effects can be

reduced to PIC in the same way as *wh*-island effects in Kanno (2008).<sup>14</sup>

Now that we can deduce the islandhood of adjuncts from PIC, the notions of the “separate plane” and SIMPL should be dispensed with. Thus, the present analysis readily accounts for the following repeated examples:

- (31) a. John<sub>i</sub> looked for a camera [to take a picture of himself<sub>k</sub>]. (= (11a))  
 b. John worked rarely [before any of the exams]. (= (11b))

Under our analysis, adjuncts are originally visible, so that we do not appeal to the operation SIMPL which converts a “separate plane” to be integrated into a “primary plane” for explaining the visibility of (31). Furthermore, the movement operation can be applied to *wh*-adjuncts because they and their features are both syntactically visible in our analysis:

- (32) {How/When/Where<sub>[uQ]}</sub>} do you fix it {how/when/where<sub>[uQ]}</sub>?  
 (= (14))

The remaining concern is the asymmetry between the adjunct clause and complement clause in (9), repeated here as (33).

- (33) a. Which claim [that John<sub>i</sub> made] was he<sub>i</sub> willing to discuss ~~which claim [that John<sub>i</sub> made]~~? (= (9a))  
 b. \*Which claim [that John<sub>i</sub> was asleep] was he<sub>i</sub> willing to discuss ~~which claim [that John<sub>i</sub> was asleep]~~? (= (9b))

If adjuncts are visible in syntax, the question still remains as to why the violation of Binding Condition C is not induced in (33a). Lasnik (1988) argues that the unacceptability of (33b) arises not from syntactic factors but pragmatic ones by providing the following evidence:

- (34) a. Which piece of evidence [that John<sub>i</sub> was guilty] did he<sub>i</sub> successfully refute ~~which piece of evidence [that John was guilty]~~?  
 b. Which proof that Mary<sub>i</sub>'s theory is superior to John's did she<sub>i</sub> present ~~which proof [that Mary's theory is superior to John's]~~?  
 (Lasnik 1988: 87, partially modified)

If Lasnik's argument based on the examples in (34) is right, there is no asymmetry between complements and adjuncts, as has been assumed since Lebeaux (1988).<sup>15</sup> Thus, the contrast of (33a, b) is no longer evidence in favor of the invisibility of adjuncts.<sup>16</sup> Moreover, the condition C effect is not observed in the A copy, as shown by the grammaticality of (35).

- (35) a. [This picture of John<sub>i</sub>] was given him<sub>i</sub> ~~this picture of John<sub>i</sub>~~.  
 b. [This picture near John<sub>i</sub>] was given him<sub>i</sub> ~~this picture near John<sub>i</sub>~~.  
 c. [This picture of John<sub>i</sub>] seems to him<sub>i</sub> [~~this picture of John<sub>i</sub>~~ [to ~~this picture of John<sub>i</sub>~~ be a masterpiece]].  
 d. [This picture near John<sub>i</sub>] seems to him<sub>i</sub> [~~this picture near John<sub>i</sub>~~ [to ~~this picture near John<sub>i</sub>~~ be a masterpiece]].  
 (Yusa 1989: 211, partially modified)

Although we do not go further in the detailed analysis of the Condition C, it is fair to say that examples of reconstruction do not support the invisibility of adjuncts.

### 5.3. Prepositional Adjuncts

Let us consider prepositional adjuncts in this section. It is well known in the literature that prepositional adjuncts also constitute an island, as shown in (36).

- (36) a. \*The break was met [after  $t_i$ ]. (Bode 2020: 64)  
 b. \*Which break<sub>i</sub> did they meet [after  $t_i$ ]? (ibid.)

This seems to be in contrast with prepositional arguments in terms of extraction:

- (37) a. The man<sub>*i*</sub> was talked to *t<sub>i</sub>*. (Bode 2020: 64)  
b. Which man<sub>*i*</sub> did you talk to *t<sub>i</sub>*? (ibid.)

As indicated in these examples, prepositional adjuncts seem to behave like they are on a “separate plane.” Hence, we would expect that prepositional phrases constitute a phase, just like adjunct clauses. However, prepositional phrases clearly lack a Tense feature because they cannot bear temporal morphology, so that they should not constitute a phase under Kanno (2008). Therefore, the data in (36) seems to be a counterexample to our analysis of adjuncts: why extraction from prepositional phrases are prohibited even though they do not constitute a phase?<sup>17</sup> We argue that the ungrammaticality of (36) arises not from a syntactic factor but a semantic factor. In fact, it has been frequently observed in previous literature that elements within prepositional phrases are extracted:

- (38) a. Who<sub>*i*</sub> was Mary kissed by *t<sub>i</sub>*? (Takami 1992: 10)  
b. What<sub>*i*</sub> did the gang open the safe with *t<sub>i</sub>*? (Takami 1992: 10)  
c. Who<sub>*i*</sub> did John leave the party with *t<sub>i</sub>*. (Bode 2020: 16)

These pieces of empirical evidence suggest that extraction from within adjunct clauses is syntactically possible. Based on the information status of NP, Takami (1992) proposes the following condition for the strandability of prepositions:

- (39) More/Less Important Information Condition  
An NP can be extracted out of a PP only when the NP may itself be interpreted as being more important than the rest of the sentence.  
(Takami 1992: 71)

Let us see how this condition captures the following contrast where elements from within prepositional adjuncts are extracted:

- (40) a. What<sub>*t*<sub>i</sub></sub> did the gang open the safe with *t*<sub>*i*</sub>? (= (38b))  
 b. \*Which year<sub>*t*<sub>i</sub></sub> was John still a small boy in *t*<sub>*i*</sub>? (Takami 1992: 23)

According to Takami, (40a) is grammatical because the prepositional phrase in it conveys more important (or new) information than the rest of the sentence, while (40b) is ungrammatical since the prepositional phrase in it conveys less important (or old) information. What is important here is that extraction from non-phase adjuncts is syntactically allowed but can be excluded by other factors. If one adopts Chomsky's (2004) assumption that prepositional adjuncts are on a "separate plane," extraction from them is never possible, contrary to the fact in (40a). Our approach precisely allows extraction from within prepositional adjuncts because they do not constitute a phase.

#### 5.4. Semantic Restriction

Truswell (2011) also provides a semantic analysis for extraction from adjunct clauses. To be specific, he puts forth the Single Event Condition in (41) and demonstrates that extraction from within adjunct clauses is allowed insofar as it satisfies the condition:

- (41) The Single Event Condition  
 An instance of *wh*-movement is acceptable only if the minimal constituent containing the head and the foot of the chain describes a single event. (Truswell 2011: 38)

This condition precisely explains the grammaticality of the rationale clauses:

- (42) a. Whose attention<sub>*t*<sub>i</sub></sub> is John waving his arms around [to attract *t*<sub>*i*</sub>]?  
 b. What<sub>*t*<sub>i</sub></sub> did you come round [to work on *t*<sub>*i*</sub>]?  
 c. What<sub>*t*<sub>i</sub></sub> did Christ die [to save us from *t*<sub>*i*</sub>]?  
 (Truswell 2011: 131)

Truswell (2011) argues that examples in (42), there is a contingent relation

between the events described in the matrix VP and the adjuncts, hence they constitute a single event and extraction from these adjuncts is predicted to be licit. Although many infinitival adjunct clauses allow extraction from inside, he also observes that extraction from within infinitival adjunct clauses is disallowed when they do not obey the condition in (41):

- (43) a. \*What<sub>*t*<sub>*i*</sub></sub> does John work [thinking about *t*<sub>*i*</sub>]? (Truswell 2011: 155)  
b. \*What<sub>*t*<sub>*i*</sub></sub> does John dance [screaming *t*<sub>*i*</sub>]? (ibid.)  
c. \*What<sub>*t*<sub>*i*</sub></sub> did John laugh a lot [listening to *t*<sub>*i*</sub>]? (ibid.)

Although space limitations prevent a more detailed semantic analysis of extraction from adjuncts, what is significant here is that extraction from inside is prevented not only by a syntactic restriction but also a semantic factor (see Szabolcsi (2006) and Boeckx (2012) for the related discussion). Namely, even if adjunct phrases do not constitute a phase, extraction from within is further restricted by a semantic factor. On the contrary, if adjunct phrases do form a phase, extracting elements from inside is strictly prohibited for the syntactic reason.

### 5.5. Deriving Adjunct Control Without Sideward Movement

Finally, the analysis we presented above can be extended into adjunct control. Specifically, we derive adjunct control without relying on a dubious operation, namely Sideward Movement. (44) is a typical example of adjunct control:

- (44) John<sub>*t*</sub> saw Mary after *t*<sub>*i*</sub> eating lunch. (Hornstein 2003: 30)

It was traditionally assumed that extraction from within adjunct clauses is strictly prohibited, because it forms an island. Thus, the movement-based analysis for control proposed by Hornstein (1999, 2001, 2003) and Boeckx, Hornstein, and Nunes (2010) adopts Sideward Movement (Nunes (1995, 2004)) for explaining adjunct control. The derivation of (44) is illustrated in (45).

## (45) Sideward Movement

- a. after [John eating lunch]
- b. [saw Mary] [after [John eating lunch]]
- c. [John [saw Mary]] [after [John eating lunch]]
- d. [John T [[John [saw Mary]] [after [John eating lunch]]]]

(Hornstein 2003: 31)

First, the adjunct is constructed as in (45a). Then, Merge is applied to *saw* and *Mary* in (45b). Although the numeration is already exhausted at this point, the external argument position of *saw* is not occupied yet. Hence, *John* is copied into the matrix VP Spec position as in (45c), and this copy operation is called Sideward Movement. The movement is possible because the adjunct clause is not yet constructed at this point. Finally, two sub-trees are merged, and the derivation ends up with (45d). In this way, adjunct control is derived. However, Sideward Movement faces a serious problem. Hornstein (2001, 2003) and Boeckx, Hornstein, and Nunes (2010) limit Sideward Movement by appealing to the economy or *Merge over Move* as proposed in Chomsky (1995), which states that Movement is less economical than Merge. For example, in (45b), *John* cannot be copied (moved) into the internal argument position of *saw* unlike *Mary*, because *Merge* of *Mary* is preferred over Movement of *John*. In this way, overgeneralization is restricted. However, since External Merge and Internal Merge are assumed to be equivalent operations under Chomsky (2015), Sideward Movement cannot be formulated in terms of Free Merge; that is, the rationale for Sideward Movement is completely lost and it should not be used for explaining adjunct control. Under our phase-based analysis for adjuncts, adjunct control can be readily derived by “regular” movement (Internal Merge), without relying on Sideward Movement. Recall that A'-movement from infinitival adjunct clauses is possible because they do not constitute a phase:

- (46) a. What<sub>*t*</sub><sub>*i*</sub> did you come round [to work on *t*<sub>*i*</sub>]? (= (3a))
- b. Who<sub>*i*</sub> did John get upset [after talking to *t*<sub>*i*</sub>]? (= (3b))
- c. What<sub>*t*</sub><sub>*i*</sub> did John come back [thinking about *t*<sub>*i*</sub>]? (= (3c))

The same thing should be applied to A-movement from adjunct clauses. With this in mind, consider the following derivations.

- (47) a. John saw Mary after eating lunch. (= (44))  
b. John saw Mary after ~~John~~ eating lunch.
- (48) a. \*John saw Mary after ate lunch.  
b. \*John saw Mary after ~~John~~ ate lunch.

Since the adjunct clause is infinitival in (47b), the movement of *John* into the matrix clause is possible just as *wh*-extraction.<sup>18, 19</sup> In contrast, the adjunct clause in (48a) is not infinitival, so that no extraction from inside is allowable. Based on the finiteness of adjuncts, we no longer need to assume the problematic operation of Sideward Movement for deriving adjunct clauses. Therefore, we can derive adjunct control without depending on Sideward Movement.

## 6. Conclusion

This paper has discussed the problem of pair-Merge, as proposed by Chomsky (2004). If adjuncts are introduced via pair-Merge in his manner, they are taken to be on a “separate plane,” where extraction is prohibited from within. However, this approach faces empirical and theoretical problems. Thus, we have put forth a novel phase-based analysis of adjuncts, specifically claiming that a pair-Merged syntactic object does not contribute to labeling but is visible in syntax, contrary to Chomsky’s (2004) assumption. Under the proposed analysis, adjuncts island effects (or the unique behavior of adjunct clauses/phrases) can be explained without recourse to the notions of a “separate plane” and SIMPL, which gains theoretically desirable consequences.

## Notes

1. Given the grammaticality of (14), an anonymous reviewer suggests one possibility that the operation pair-Merge only renders the inside of adjuncts invisible, while their head remains visible. Although this could explain why wh-adjuncts can move, it is still necessary to consider why only their inside elements become invisible by pair-Merge. We leave this possibility for future research.
2. See Gallego (2010), Oseki (2015), and Jakielaszek (2017), among others for the attempt to eliminate pair-Merge and Bode (2020) for their problems and her alternative proposal.
3. More precisely, Kanno (2008) presents the following examples from Frampton (1990):
  - (i) a. \*Sam, who I know when you said you saw *t*, ... (Frampton 1990: 70)
  - b. Sam, who I know when to try to see *t*, ... (Frampton 1990: 69)
 We use examples from Manzini (1992) only to clarify the discussion.
4. Kanno and Nomura (2012) extend this analysis into subjunctive clauses from which extraction is also possible.
5. Other definition can be seen in Chomsky (2008, 2015), Gallego (2010), Wurmbrand (2013), Bošković (2014), and Grano and Lasnik (2018), among others.
6. See Kanno (2008: 27) for additional evidence for the lack of a Tense feature in control complements.
7. As an anonymous reviewer correctly points out, diagnostics for a Tense feature varies among previous studies (e.g. Martin (1996), Landau (2000) and Wurmbrand (2014)). In this paper, we simply follow Kanno's (2008) diagnostics for a Tense feature and leave its detailed analysis for future research.
8. An anonymous reviewer suggests that if pair-Merge only differs from set-Merge in that it is ordered, then it may be a natural consequence that all syntactic objects are visible in syntax, no matter which type of Merge is used. We thank the anonymous reviewer for suggesting this point.
9. As an anonymous reviewer points out, one question arises as to how label-less adjuncts are interpreted in the interfaces. Indeed, Chomsky (2013, 2015) claims that syntactic objects need a label at the interfaces. In this paper, we follow Hornstein and Nunes' (2008) idea that adjuncts do not necessarily need a label for interpretation because they directly modify events in terms of Neo-Davidsonian semantics and are simpler than argument structures, which necessitate the notion of theta-role to modify events. See Hornstein and Nunes (2008) for a more detailed discussion about the labeling for adjuncts.
10. Phase-based approaches to adjuncts have been already proposed in many previ-

ous studies (see Raposo (2002), Narita (2011), Boeckx (2012), Munemasa (2015), Bošković (2016), and Richards (2019), among others). What we attempt to argue here is that the contrast between finite and non-finite adjunct clauses can be naturally captured by extending Kanno's (2008) proposal.

11. This analysis can be extended to other types of adverbial clauses (e.g. conditional, reason) if we assume that they also have different types of null operators in their CP Spec. See also Narita (2011), Boeckx (2012), Munemasa (2015), and Bošković (2016) for their different approaches to this point. This paper leaves their detailed analysis for future research. We would like to thank the anonymous reviewer for bringing this point to our attention.

12. An anonymous reviewer wonders how our proposed analysis can explain the following example where the *wh*-adjunct is extracted from non-finite clauses (see also Chomsky (1986: 32)):

(i) \*How did John get upset [after talking to Bill *t*]?

We argue that movement of *wh*-adjuncts like (i) is possible in syntax but excluded by other factors. It is argued in the literature that *how* and *why* cannot be extracted from infinitival clauses but *where* and *when* can (see Szabolcsi (2006)), which indicates that ungrammaticality of (i) might be attributed not to the movement itself but their referentiality (Cinque (1990), Rizzi (1990), and Szabolcsi (2006), among others).

13. As an anonymous reviewer points out, it is reported in several studies that A' elements can be extracted even from finite clauses (e.g. Taylor (2007), Truswell (2011), and Yoshimura (2013)):

(i) This is the watch that I got upset [when I lost *t*]? (Truswell 2011: 175, n.1)

At this point, we do not have a clear answer for the grammaticality of (i), but we consider that further investigation is needed for extraction from finite clauses. Since our consultants judge the sentence in (i) as ungrammatical, it seems necessary to investigate which English varieties allow (i) and how good or bad its grammaticality is, before analyzing it in detail. We leave its investigation for future research.

14. Under the proposed analysis, the invisibility of adjuncts and the existence of their label are not related: syntactic objects are visible, whether they are complements or adjuncts. This idea clearly differs from Hornstein and Nunes' (2008) argument where the invisibility of adjuncts is attributed to their lack of a label. It is not clear how the existence of a label is related to the asymmetry of (29) and (30). We thank the anonymous reviewer for clarifying this point.

15. See Lasnik (1988) for more empirical evidence.

16. Bruening and Khalaf (2018) conduct a survey using Amazon Mechanical Turk and also conclude that neither arguments nor adjuncts reconstruct with regard to Condition C. We thank an anonymous reviewer for drawing our attention to their work.
17. Several researchers (e.g. Matsubara (2000), Raposo (2002), Bošković (2004), and van Urk (2020)) claim that prepositional phrases do constitute a phase. However, as we will see in this section, the fact that extraction from prepositional phrases is allowed indicates that they should not constitute a phase.
18. An anonymous reviewer wonders whether the derivation in (47b) induces intervention effects if the movement of *Mary* crosses over *John*. Since we assume with Hornstein (2003) that the *after* clause including *John* merges with  $v^*P$ , *John* need not cross over *Mary* in the derivation and no intervention effects are exhibited.
19. We assume that  $v^*P$  Spec position is A-position, as an external argument is generated in that position, so that improper movement is not included in the derivation of (47b). We thank an anonymous reviewer for bringing this point to our attention.

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