PARASITIC GAPS UNDER MULTIPLE DOMINANCE

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In the recent literature, various arguments have been presented in favor of the existence of multiple dominance in syntax. The aim of this paper is to present another piece of evidence to support multiple dominance in syntax, based on the parasitic gap construction. It is argued that the proposed analysis captures various otherwise puzzling properties of the construction discovered in the literature. It is also shown that the proposed multiple dominance analysis is more plausible than Nunes's (2001, 2004) sideward movement analysis. Finally this paper attempts to accommodate anti-reconstruction effects in parasitic gaps, by extending the Wholesale Late Merger hypothesis, proposed by Takahashi (2006) and Takahashi and Hulsey (2009).*

Keywords: multiple dominance, parasitic gaps, object shift, Late Merger, islands

1. Introduction

Under the Minimalist Program, Merge, which is in charge of structure building, is one of the fundamental operations of syntactic computation. Chomsky (1993) suggests that Merge has to extend the root, which is referred to as the Extension Condition. One of the important consequences of this requirement is that structures are not allowed to have multiple mothers, as schematically illustrated in (1) (see Chomsky (1995, 2007, 2008) and Hornstein (2009) for relevant discussion). A structural relation such as (1) is referred to as multiple dominance in this paper.

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However, the ban on multiple dominance has been challenged in the literature, including the pre-minimalist era (MacCalwley (1982), Wilder (1999), Citko (2005), Riemsdijk (2006), Gracanin-Yuksek (2007), Hiraiwa and Bodomo (2008), and Bachrach and Katzir (2009), among many others).

The aim of this paper is to argue for the existence of multiple dominance in human language, on the basis of the so-called parasitic gap construction such as (2).

(2) Which paper did you file \( t_1 \) without reading \( pg_1 \)?

In (2), there are two gaps which are associated with which paper. The gap in the adverbial clause, represented as \( pg \), is called a parasitic gap in the sense that the existence of a gap in the matrix clause makes the parasitic gap available. If the matrix clause involves no gap associated with the wh-phrase, the example becomes ungrammatical as shown in (3), which is an instance of adjunct island effects.

(3) *Which book did you review this paper without reading \( t_1 \)?

This paper argues that the derivation of a parasitic gap construction involves multiple dominance. Specifically, the wh-phrase which is base-generated in an adverbial clause merges with a matrix verb at some point of the derivation, which is an instance of Parallel Merge in the sense of Citko (2005). It is shown that the proposed multiple dominance approach accounts for otherwise puzzling properties of the construction.

This paper is organized as follows: Section 2 critically examines a previous approach which is proposed by Nunes (2001, 2004). Section 3 analyzes parasitic gap constructions in terms of multiple dominance and shows that major properties of the construction follow from the proposed analysis. Section 4 sketches an analysis of anti-reconstruction effects in parasitic gaps, which is originally attributed to Kearney (1983), by extending a particular theory of Late Merger, proposed by Takahashi (2006) and Takahashi and Hulsey (2009). Section 5 concludes the paper.


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Chomsky (1993, 1995) proposes that movement involves an operation of copying a constituent in different positions, which has been known as the copy theory of movement. Extending the copy theory of movement, Nunes proposes that it is possible to copy a constituent (α in (4a)) and merge it with an independent syntactic object (L in (4a)).

(4) a. \[K \ldots \alpha_1 \ldots\] \[\alpha_1 \leftarrow \text{Merge} \rightarrow L \ldots\]

(K and L are independent syntactic objects.)

b. \[K \ldots \alpha_1 \ldots\] \[\alpha_1 \leftarrow \text{Merge} \rightarrow \left[\begin{array}{c} M \\ \alpha_1 \\ L \ldots\end{array}\right]\]

Under Nunes’s analysis, as schematically illustrated in (4b), a constituent is allowed to move into a non-c-commanding position. This type of movement is called sideward movement, which he argues is involved in parasitic gaps. Let us take (2) as an example. As shown in (5), which paper is copied and merged from the adverbial clause into the matrix clause to satisfy the thematic requirement of the matrix verb.

(5) \[K = \left[\begin{array}{c} CP C \\ TP PRO_1 \\ T \left[ T \left[ vP t_1 \left[ v \left[ vP \text{reading [which paper]]}\right]\right]\right]\right]\end{array}\]

\[L = \text{file [which paper]}\]

Sideward movement

The derivation proceeds and the adverbial PP merges with the matrix vP and finally which paper moves to [Spec, CP] in (6).

(6) Chain 1

\[[\text{which paper}] \text{did+Q [you [\left[ vP \text{you [\left[ v \left[ vP \text{file [which paper]]}\right]\right]\right]\right]\right]\right]\]

\[\text{pp without PRO reading [which paper]]}\]

Chain 2

Form Chain applies to the copies of the wh-phrase and creates two chains. One is a chain between the copy in the matrix [Spec, CP] and the copy in the matrix object position. The other one is created between the copy in the matrix [Spec, CP] and the copy in the adverbial clause. Nunes crucially assumes that the head of a chain should c-command the tail of the chain to make a chain (see Hornstein (2001) for relevant discussion).\(^1\) Thus

\(^1\) Nunes assumes that Form Chain is subject to the following conditions (Nunes (2004: 91)):...
no chain is created between the matrix object and the copy in the adverbial clause.

Nunes points out that multiple occurrences of a lexical item are nondistinct copies and they pose problems for linearization. For example, let us consider the chain between the copy in the matrix [Spec, CP] and the copy in the object position in (6). The higher copy of \textit{which paper} asymmetrically c-commands \textit{you} and \textit{you} asymmetrically c-commands the lower copy of \textit{which paper}. Given Kayne's (1994) Linear Correspondence Axiom (LCA), the former asymmetric c-command relation is mapped into the linear order where \textit{which paper} precedes \textit{you}. The latter asymmetric c-command relation yields the linear order where \textit{you} precedes \textit{which paper}, which leads the asymmetry condition on linearization to be violated. Furthermore, the asymmetric c-command relation between the copies of \textit{which paper} yields the linear order where \textit{which paper} precedes itself. The irreflexivity condition on linearization, which does not allow anything to precede itself, is violated as well. In order to solve these problems on linearization, Nunes (2001, 2004) formulates Chain Reduction in the following way:

\begin{enumerate}
  \item \textbf{Chain Reduction}
  \begin{enumerate}
    \item Delete the minimal number of constituents of a nontrivial chain CH that suffices for CH to be mapped into a linear order in accordance with the LCA.
  \end{enumerate}
\end{enumerate}

The deletion of the lower copies in each chain in (6) makes the ill-formed structure linearizable at PF.

Nunes’s analysis nicely captures various interesting properties of the construction, which are discovered by Engdahl (1983). First, Engdahl (1983):

\begin{enumerate}
  \item Conditions on Form Chain
    Two constituents $\alpha$ and $\beta$ can form the nontrivial chain $CH = (\alpha, \beta)$ if
    \begin{enumerate}
      \item $\alpha$ is nondistinct from $\beta$;
      \item $\alpha$ c-commands $\beta$;
      \item there is at least one feature $F$ of $\alpha$ such that $F$ enters into a checking relation with a sublabel of the head of the projection with which $\alpha$ merges and for any such feature $F$ of $\alpha$, the corresponding feature $F'$ of $\beta$ is accessible to the computational system; and
      \item there is no constituent $\gamma$ such that $\gamma$ has a feature $F'$ that is of the same type as the feature $F$ of $\alpha$, and $\gamma$ is closer to $\alpha$ than $\beta$ is.
    \end{enumerate}
  \item Sublabel
    $\sigma$ is a sublabel of the head $H$ iff $\sigma$ is a feature of $H$ or a feature of some element adjoined to $H$.
  \item Closeness
    $\gamma$ is closer to $\alpha$ than $\beta$ is iff (a) $\alpha$ c-commands $\gamma$ and $\gamma$ c-commands $\beta$, and (b) $\gamma$ is not in the same minimal domain as $\alpha$ or $\beta$.
\end{enumerate}
observes that what is able to license a parasitic gap is overt movement, not covert movement, which is referred to as the S-structure effect. (8a) is the relevant example.


b. Who [[filed [which report]] [without PRO reading [which report]]]?

**Sideward movement**

Under Nunes’s analysis, *which report* undergoes sideward movement from the adverbial clause to the matrix object position and stays there without moving further, as shown in (8b). Since Form Chain cannot make a chain with the two copies because no c-command relation holds with them, Chain Reduction is not applicable. The two occurrences of *which report* remain at PF, which is problematic in terms of linearization, as noted above.

Nunes’s analysis also derives the so-called anti-c-command requirement, which is also observed by Engdahl (1983) (see also Taraldsen (1981)). The licensing of a parasitic gap depends on the structural relation between a parasitic gap and a gap in the matrix clause. As shown in (9a), the parasitic gap cannot be c-commanded by the matrix gap. The representation in (9b) is obtained for (9a) as a result of movement.

(9) a. *I wonder which man called you before you met pg. (Nunes (2004: 109))

b. I wonder [CP [which man]Copy4 [TP [which man]Copy3 [vP [which man]Copy2 called you before you met [which man]Copy1]]]

*Which man* undergoes sideward movement to the matrix [Spec, vP]. Then, the wh-phrase moves to [Spec, TP] for Case-checking and it moves to [Spec, CP], finally. Nunes argues that (9a) is ungrammatical because the copy in the adverbial clause, which is referred to as Copy1, cannot form a chain with any other copies. The copy in the matrix subject position, which is referred to as Copy2, cannot form a chain with Copy1, because the c-command requirement is not satisfied, on the assumption that [Spec, vP] does not c-command the adverbial clause.² The copy in the matrix [Spec, TP], referred to as Copy3, cannot form a chain with Copy1. This is because

² Nunes’s assumption on the adjunction site of an adverbial clause is questionable. As will be argued in section 3, the adjunction site in question is AspP, which is between VP and vP. Thus, [Spec, vP] does c-command an adverbial clause, contrary to Nunes. If so, the copy at [Spec, vP] (Copy2) would make a chain with that in the adverbial clause (Copy1) in (9), which leads Chain Reduction to apply to Copy1. It is wrongly expected that (9) would be grammatical.
Copy3 enters into a Case-checking relation with T but the subject in the adverbial clause, which is also a Case-bearing element, intervenes between Copy3 and Copy1. Copy1 cannot form a chain with the copy in [Spec, CP], referred to as Copy4, either, because Copy3 is closer than Copy1. All the copies in the matrix clause form a chain and Copy2 and Copy3 are deleted through Chain Reduction and Copy4 remains at PF. However, Copy1 also remains at PF, which is problematic in terms of irreflexivity and asymmetry on linear order in a similar way to the S-structure effect.

His analysis also explains the fact that A-movement cannot license a parasitic gap (Engdahl (1983: 13)), as given below:

(10)  
\begin{itemize}
  \item a. *The book \textsubscript{1} was filed \textsubscript{t1} without my reading pg \textsubscript{1} first.  
    
    (Chomsky (1995: 75))
  \item b. *[The book] \textsubscript{1} was filed [the book] \textsubscript{2} [without my reading [the book] \textsubscript{3} first].
\end{itemize}

Intervene

*The book* undergoes sideward movement into the matrix clause and then moves to [Spec, TP]. The highest copy cannot form a chain with the copy in the adverbial clause, because *my*, which is also a Case-bearing element, intervenes between them, as shown in (10b). The copy in the object position also fails to form a chain with that in the adverbial clause because they are not in a c-command configuration. The copy in the adverbial clause cannot be deleted through Chain Reduction and thus the same problem arises.

As has been reviewed so far, Nunes’s analysis successfully captures the otherwise puzzling properties of the construction without any construction-specific rule. He reduces the three ungrammatical cases given in the previous section to the unlinearizablity at PF interface. This is a desirable result.

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3 In contrast to (9) and (10), (ia) has no overt DP subject in the adverbial clause. (ia) is analyzed as (ib) under Nunes’s analysis.

(i)  
\begin{itemize}
  \item a. *I wonder [TP which article \textsubscript{1} was filed \textsubscript{t1} [before reading pg \textsubscript{1}]].
  \item b. I wonder [TP which article was filed which article [before PRO reading which article]].
\end{itemize}

A reviewer raised the question as to whether it is possible to make a chain between the copy in the matrix [Spec, TP] and that in the adverbial clause in (i). Nunes (2004: 109) assumes that PRO also has a Case-feature, which makes it an intervener between the copies in the same way as (9) and (10). Thus, the copy in the matrix [Spec, TP] and that in the adverbial clause fail to make a chain. That is, it does not matter whether the intervening subject in question has phonological features. (ii) also confirms the same point:

(ii) *The article \textsubscript{1} was filed \textsubscript{t1} without PRO reading pg \textsubscript{1} first.
under the Minimalist Program, which attempts to reduce an explanation of properties of language to those of interface systems and general considerations of computational efficiency.

However, his analysis still faces an empirical problem, which is pointed out by Agbayani and Ochi (2008). They argue that Nunes’s explanation for the S-structure effect makes a wrong prediction. Recall that the S-structure effect is due to the fact that the two copies of the wh-phrase violate the conditions on linearization. If ellipsis made one of the copies unpronounced, the example would be grammatical. However, this expectation is not borne out. As Agbayani and Ochi observe, there is no contrast between the following examples:

(11)  a. *Who read what₁ before John read pg₁?
     b. *Who read what before John did [read pg₁]?

(Agbayani and Ochi (2008))

In (11b), the copy of what in the adverbial clause is not pronounced with recourse to VP-ellipsis. They point out that there should be no problem with linearization in (11b) under Nunes’s analysis because what is supposed to have only one occurrence at PF. (11b) is wrongly expected to be better than (11a) but it is not the case. In the next section, it will be shown that an alternative analysis does not face the problem which Agbayani and Ochi point out.

3. Proposal

3.1. A Multiple Dominance Analysis

Before demonstrating the derivation of parasitic gap constructions, two assumptions made in this paper will be spelled out. The first one is that English has overt object shift, which is independently motivated by Johnson (1991), Koizumi (1993) and Runner (1995), among others. Originally, Johnson (1991) attempts to capture the so-called Case adjacency effect, where a Case-assigner and a Case-assignee should be adjacent (Chomsky (1981) and Stowell (1981)).

(12)  a. *Mary visited quietly his parents.
     b. Chris walked quickly down the street. (Johnson (1991: 580))

In (12a), the adverb intervenes between the verb and the object NP. On the other hand, PPs, which do not need Case, are not subject to such a requirement as shown in (12b). Following Pesetsky (1989), Johnson (1991) assumes that verbs move out of VP. He argues that object NPs also move to [Spec, VP] in addition to the verb movement. (12a, b) are analyzed in the
following way under Johnson's analysis, respectively:

(13)  
   a. Mary visited₁ [\textit{VP} quietly [\textit{VP} his parents₂ [\textit{t₁ t₂}]]]
   b. Chris walked₁ [\textit{VP} quickly [\textit{V′} t₁ down the street]]

On the assumption that the manner adverbs can adjoin to V′, not to VP, the contrast above is captured. (12a) is ungrammatical because the object shift prevents \textit{quietly} from adjoining to V′. Refining Johnson's analysis under the Minimalist Program, Koizumi (1993) argues that the landing site of object shift is [Spec, AgrOP]. Under his analysis, (12a, b) are analyzed in the following way, respectively:

(14)  
   a. Mary visited₁ [\textit{AgrOP} quietly [\textit{AgrOP} his parents₂ [\textit{VP} t₁ t₂]]]
   b. Chris walked₁ [\textit{VP} quickly [\textit{VP} t₁ down the street]]

The contrast in (12) is similarly captured, if the manner adverbs can adjoin to VP, not to AgrOP. The theoretical status of AgrP, however, has been questioned because it is not motivated in terms of the interfaces (Chomsky (1995)). This paper assumes that the relevant functional category which triggers overt object shift is Asp(ect), following Borer (1994) and Hiraiwa (2005).

Second, this paper adopts the assumption that an object occupies a higher position than an adverbial phrase. Contreras (1984), Lasnik and Saito (1991) and Runner (1995) provide pieces of evidence in favor of this. Let us consider the following examples:

(15)  
   a. *I called him₁ without dialing John’s₁ number.
   b. *I saw the bastard₁ before John₁ left.
   c. ?The DA accused the defendants during each other’s trial.
   d. I saw none of the children after any of the parents left.

(Runner (1995: 26))

The Binding Condition C requires R-expressions not to be c-commanded by their antecedents. The ungrammaticality of (15a, b) shows that the R-expressions are c-commanded by their antecedents. On the other hand, anaphors and negative polarity items should be c-commanded by their antecedents and negative expressions, respectively. The grammaticality of (15c, d) confirms that the anaphor and the negative polarity item in the adverbial clauses are c-commanded by \textit{the defendants} and \textit{none of the children}, respectively.

In what follows, let us illustrate how parasitic gap constructions are derived, taking (2) as an example, whose numeration is given in (16).

(16) \[ N = \{ \{A \text{ PRO}, \text{v, reading, Asp, which, paper}\} \{B \text{ C, T}\} \{C \text{ you, v, file, Asp, without}\} \{D \text{ CQ, did}\} \}

This paper adopts the assumption made by Nunes and Uriagereka (2000:
40) that “prepositions that select clausal complements must belong to the subordinating array, and not to the array associated with the complement clause.” Thus, *without* is included in the same subarray as the matrix *v*. First of all, the adverbial clause is built up with the subarray A and the subarray B, as shown in (17).

(17) \[CP \text{ which paper}_1 C \ [T \ [vP \text{ which paper}_1 vP PRO v [AspP \text{ which paper}_1 Asp reading which paper}_1]]]]\]

Within the adverbial clause, *which paper* moves to the edge of CP through the edge of vP on the assumption that the edges of vP and CP are landing sites of successive cyclic movement (Chomsky (2000) and Fox (2000)). Then the computational system merges *which paper* with *file*, which is a member of the subarray C, which creates a multiple dominance structure, as illustrated in (18).

(18) \[
\begin{array}{c}
\text{VP} \\
\text{file} \leftarrow \text{which paper}_1 \text{C'} \\
\text{reading which paper}_1
\end{array}
\]

Following McCalwley (1982), Wilder (1999), Citko (2005), Riemsdijk (2006), Gracanin-Yuksek (2007), Hiraiwa and Bodomo (2008), and Bachrach and Katzir (2009), among many others, this paper assumes that the UG allows nodes to have multiple mothers. The next step is that *which paper* undergoes overt object shift to [Spec, AspP] in (19).

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4 This type of merger, which creates multiple dominance structures, must be able to find a category embedded inside another category without appealing to the probe-goal algorithm. In contrast, under the standard approach, which does not allow multiple dominance, External Merge can only apply to the root, but not to the inside of the root. A second reviewer raises the question of whether this type of merger expands the search domain of the narrow syntax from the one determined by the probe-goal algorithm. On the assumption that some instances of optional movement such as scrambling in Japanese involve no probe-goal algorithm (cf. Saito and Fukui (1998), among others), the computational system must be able to find a moved phrase, which is inevitably embedded inside the root, irrespective of whether multiple dominance is allowed or not. Thus, allowing this type of merger as an option of UG will not necessarily lead to the expansion of the search domain of the narrow syntax because searching a category embedded inside another category is independently motivated from obtaining multiple dominance structures. However, this issue needs further investigation because the assumption made above concerning optional movement is still controversial. In fact, several researchers, for example Miyagawa (2001), who analyze syntactic properties of Japanese scrambling, assume that the probe-goal algorithm is involved in that construction.
Since *which paper* has been already assigned Case by the head of AspP in the adverbial clause, it undergoes Case assignment twice in total in the course of the derivation, which is incompatible with the standard assumption that a single DP can receive at most one Case. However, cross-linguistic studies suggest that multiple case assignment is possible as an option of UG (see Moore (1998) for Turkish, and Ura (1998) for Igbo, among others). Departing from the standard assumption, this paper pursues the possibility that multiple Case assignment is also possible in English.

However, this paper does not intend to suggest that multiple Case assignment is freely available in English. If it were the case, so-called improper movements such as (20), which involve movement from an A-position to another A-position via an A-bar-position, would be wrongly ruled in.

(20) *[Who₁ seems [CP t₁ [TP t₁ is intelligent]]]?

As a reviewer points out, the derivation given in (19) also involves the improper movement configuration in the same way as (20). Chomsky (2000) suggests that uninterpretable features enable the goal of a probe to undergo Agree or Move, which is referred to as the Activity Condition. Once a DP undergoes φ-feature agreement with some head, and its Case feature is valued, that DP is not active anymore and never undergoes Case assignment through Agree. The Activity Condition correctly captures the ungrammaticality of (20) because *who* receives a Case value in the embedded clause, which makes it inactive for movement to the matrix [Spec, TP]. The derivation given in (19) is also excluded by the Activity Condition in the same way as (20), which is an undesirable result. To solve this problem, it is necessary to postulate some additional mechanism such that multiple Case assignment is allowed under some context. It is suggested in this paper that multiple Case assignment in English is regulated in the following way: 5

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5 The idea of associating Case assignment with theta-role assignment goes back to the Visibility Condition given in (i), proposed by Chomsky (1986b).
(21) If a DP $\alpha$, which has already received a theta-role $\theta_1$ and a Case value $c_1$, receives another theta-role $\theta_2$, then $\alpha$ needs to be assigned another Case value $c_2$.

Put differently, multiple Case assignment is triggered by multiple theta-role assignment. Since the relevant DP needs to be assigned another Case value, it is reasonable to count it as active again in terms of the Activity Condition and it is capable of moving to another Case position. Let us consider the derivation given in (19) under (21). In (19) which paper has been assigned a Case value in the embedded clause and the Activity Condition does not allow it to move to another Case position. However, by receiving another theta-role from the verb in the matrix clause, which paper is active enough to move to the matrix [Spec, AspP], which is another possible Case position for it.

One might wonder whether the movement of which paper to [Spec, AspP] out of the adverbial clause induces an adjunct island violation. With respect to this point, this paper agrees with Nunes (2001, 2004) and Nunes and Uriagereka (2000) that the adverbial clause does not work as an island before it is merged with the structure. Put in a different way, when which paper moves out of the adverbial clause, the adverbial clause is still an independent syntactic object. In the derivational model of syntax, some constituent becomes a subject or an adjunct when it merges with a structure. Before it does, it is not an island because it is characterized as neither a subject nor an adjunct. Thus, nothing blocks the extraction out of the adverbial CP in (19).

The merger of the adverbial clause and the preposition without yields PP, which in turn merges with AspP, as illustrated in (22a). Then, the verb undergoes head movement and the wh-phrase moves to [Spec, CP] through the edge of vP, as shown in (22b).6, 7

(i) An element is visible for $\theta$-marking only if it is assigned Case.

(Chomsky (1986b: 94))

At this point this paper does not offer any deeper explanation for (21). Further investigation is left for future research.

6 In the rest of the paper, verb movement will be omitted in the structure, unless it is relevant to discussion.

7 One might wonder if the computational system could select the subarray C in (16) and merge which paper with file right after it uses up the subarray A, that is, at the level of vP. Nunes and Uriagereka (2000) assume that the computational system handles a subarray in such a way that it works with one subarray at a time and the subarray must be used up before a new subarray is selected. On this assumption, the derivation in question would be excluded. On the derivation where the subarray C is selected right
after the subarray A, *without* cannot merge with anything because *without* has to select CP. The workspace would have only the two vPs, created from the subarray A and C. Since the computational system cannot select a new subarray, it is stuck. Consequently, the adverbial clause should be built up to CP before the matrix clause starts to be built up.

This consequence is important because it captures Kayne’s (1983) observation that if the island which includes a parasitic gap is embedded into another island, the example
As a reviewer points out, under the definition of c-command given in (23), [Spec, AspP] does not c-command the adverbial PP in (22) because the category AspP dominates [Spec, AspP] but does not dominate the adverbial PP, which violates the third condition in (23a).

(23) a. X c-commands Y iff X and Y are categories and X excludes Y and every category that dominates X dominates Y.
    (Kayne (1994: 16))

b. X excludes Y if no segment of X dominates Y.
    (Chomsky (1986a: 9))

This paper modifies the definition in (23a) in the following way:

(24) X c-commands Y iff X and Y are categories and X excludes Y and for every category Z that dominates X, (i) Z dominates Y or (ii) one of the segments of Z dominates Y.

Under the definition above, [Spec, AspP] c-commands the adverbial clause which adjoins to AspP and the examples given in (15) are correctly accounted for.8

Note that the movement of which paper to [Spec, AspP] is crucial for linearizing the multiple dominance structure above. Under Kayne’s LCA, the multiple dominance structure is unlinearizable. Chomsky (1995), contrary to Kayne, suggests that the LCA applies only at PF, because linearization matters at PF. This suggestion is developed by Moro (2000), who argues becomes ungrammatical, as given below:

(i) *Which book\textsubscript{t} did you borrow \textsubscript{t} after leaving the bookstore \textsubscript{t} without finding pg\textsubscript{t}?
    (Nunes (2001: 327))

The adverbial clause leaving the bookstore without finding should be completely built up before the matrix clause starts to be built up. Before which book merges with the matrix verb borrow, the former must move to the edge of the higher adverbial clause, as assumed in the text. However, this movement induces an island violation because it crosses the lower adverbial clause without finding, which has already adjoined and become an island.

8 There is another point to be mentioned with the definition given in (24), under which the adverbial PP also c-commands the matrix [Spec, AspP]. Thus there is no way to determine the linear order between the shifted object and the adverbial PP based on the LCA. In (22b), the shifted object ends up staying at the matrix [Spec, CP] and the copy at the matrix [Spec, AspP] is not relevant to linearization, but in the case of non-wh-phrases such as (15), [Spec, AspP] is relevant to the process of linearization. Much debate has been made since Kayne (1994) concerning the issue as to whether rightward adjuncts fall under the LCA, but the LCA approach to rightward adjuncts has been empirically challenged and thus the issue has not been settled yet (cf. Ernst (2002)). This paper adopts a weaker version of the LCA in the sense that adjuncts are exempted from the LCA unlike specifiers and complements. Further investigation of the process of linearization of adjuncts is left for future research. I am indebted to a reviewer for bringing my attention to the discussion in this note.
that an ill-formed structure in terms of the LCA can be repaired by the overt movement of a constituent which is the source of the ill-formedness. This is because overt movement makes the relevant offending constituent invisible for linearization. Citko (2005) adopts this idea under the context of ATB movement. She argues that the multiple dominance structure involved in ATB movement such as (25) is linearizable because the shared constituent (what in (25)) moves to [Spec, CP], which is a non-shared position and the shared position ends up being unpronounced.

(25) I wonder what₁ Gretel recommended t₁ and Hansel read t₁?

The same explanation is carried over to the structure in (22). Since the shared position ends up being unpronounced due to the movement to [Spec, AspP], it poses no problem for linearization.

Let us confirm that the proposed analysis also derives a parasitic gap in the subject such as (26a) illustrated in (26b–d).

(26) a. Who₁ would [pictures of pg₁] impress t₁?

b. DP
   └── D  NP
    └── pictures  PP
         of  who <—Merge—> impress

c. DP       AspP
    └── D  NP  who  Asp′
         pictures  PP  Asp  VP
            of  who  impress

d. vP
   └── v′
    └── DP  v  AspP
         └── D  NP  who  Asp′
              pictures  PP  Asp  VP
                  of  who  impress
In (26b), the subject DP is built up and the *wh*-phrase inside the subject merges with the matrix verb. Then, *wh*-phrase, which is assigned Case by *of*, moves to [Spec, AspP] in the matrix clause in (26c) and receives another Case there before the subject DP merges as a subject in (26d). The derivation proceeds and the *wh*-phrase finally moves to [Spec, CP] through the edge of vP.

### 3.2. Deriving the Properties of Parasitic Gaps

This subsection shows how the multiple dominance analysis derives the otherwise puzzling properties of the construction. First, let us consider the anti-c-command requirement, which is exemplified by (9), repeated as (27).

\[(27) \text{*I wonder which man} \, t_1 \text{ called you before you met pg}_1.\]

As illustrated in (28), *which man* merges with *v′* after it moves to the edge of CP.

\[(28)\]

\[
\begin{array}{c}
\text{vP} \\
\text{v} \\
\text{AspP} \\
\text{you met which man}_1 \\
\text{C′}
\end{array}
\]

Recall that it has been assumed that the adjunction site of adverbial clauses should be lower than the moved object, that is, [Spec, AspP]. Since the derivation reaches the vP-level, the option of adjunction of the adverbial clause to AspP is not available anymore. The ungrammaticality of (27) follows.

Let us turn to the S-structure effect. The relevant example is repeated below:

\[(29)\]

\[
\begin{array}{c}
\text{AspP} \\
\text{which report}_1 \\
\text{Asp′} \\
\text{Asp} \\
\text{VP} \\
\text{CP} \\
\text{file which report}_1 \\
\text{C′} \\
\text{without reading which report}_1
\end{array}
\]

Under the proposed analysis, *which report* moves from the edge of CP and stays at [Spec, AspP] without further movement to [Spec, CP] in
(29b). What is wrong with this derivation? Following Chomsky (2000), this paper assumes that in order for a constituent to be visible for movement, it has to have an uninterpretable feature, which cannot be checked at the intermediate step of successive cyclic movement (see also Bošković (2007) for further discussion). The feature which activates a *wh*-phrase for *wh*-movement is referred to as [−*wh*], which is supposed to be checked as a reflex of Q-feature-checking in C. Thus, the [−*wh*] feature of *which report* ends up being unchecked, which makes the derivation illegitimate. 9

There is another derivation to be considered, where the *wh*-phrase has no activation feature for *wh*-movement. In this derivation, the *wh*-phrase does not move to the edge of CP in the adverbial clause but stays at [Spec, AspP] like non-*wh*-objects. After the adverbial clause is built up, the *wh*-phrase merges with the matrix verb and then moves from [Spec, AspP] in the adverbial clause to the matrix [Spec, AspP], as illustrated in (30). Note that under this derivation the *wh*-phrase has no activation feature which makes (29b) illegitimate.

\[
\text{(30) CP}
\]

\[
\text{C} \quad \text{TP}
\]

\[
\text{DP} \quad T'
\]

\[
\text{AspP} \quad T \quad vP
\]

\[
\text{which report} \quad \text{Asp'} \quad \text{DP} \quad v'
\]

\[
\text{Asp} \quad \text{VP} \quad v \quad \text{AspP}
\]

\[
\text{file} \quad \text{which report} \quad \text{Asp'}
\]

\[
\text{Asp} \quad \text{VP}
\]

\[
\text{reading} \quad \text{which report}
\]

The ill-formedness of this unwelcome derivation is derived in terms of

---

9 It is important to mention that the theoretical status of the [−*wh*] feature is not uncontroversial. Chomsky (2008: 151) recently suggests that it is not necessary to postulate any activating feature for A-bar movement, including the [−*wh*] feature, as a reviewer points out. This paper does not offer any detailed discussion of Chomsky’s (2008) criticism, which is left for future research.
cyclicity. Chomsky (2000) proposes the Phase Impenetrability Condition (PIC) below (see also Chomsky (2001, 2004)):

\[(31) \text{Phase Impenetrability Condition} \]

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))

On the assumption that $vP$ and $CP$ are phases, AspP, which is the complement of $v$, has not been accessible any more at the CP-phase. Thus, the matrix verb cannot merge with which report at [Spec, AspP] in the adverbial clause, because it is included in the inaccessible domain.\(^{10}\)

It is worth noting here that Bošković (2007) develops a new theory of successive-cyclic movement, by employing the relevant activating feature for movement. Specifically, he argues that the uninterpretable feature of a moving element plays a crucial role for implementing successive-cyclic movement. Let us consider the scenario given in (ia), where $Y$ has to undergo successive-cyclic movement to [Spec, WP] through the edge of XP. It is assumed that the uK is checked as a reflex of F-feature checking between $W$ and $Y$. (\(i\) indicates an interpretable feature and \(u\) an uninterpretable feature.)

\[
\text{(i) } W \ [XP \ldots X \ldots Y] \quad \text{XP = phase} \\
\quad \text{uF} \quad \text{iF} \\
\quad \text{EPP} \quad \text{uK}
\]

At the point when XP is built up, the PIC requires $Y$ to move to the edge of XP for further movement. If $Y$ does not move but stays in-situ, the uK of $Y$ will not get checked, which leads to a crash. This is because XP involves no feature which checks the uK, as shown in (ii).

\[
\text{(ii) } [XP \ldots X \ldots Y] \quad \text{XP = phase} \\
\quad \text{iF} \\
\quad \text{uK}
\]

It is necessary to know at the point of the derivation in (ii) that $Y$ has to move to the edge of XP. Bošković claims that the uK of $Y$ enables us to know that $Y$ has to undergo movement in (ii) since no feature within XP checks the uK. His analysis does not face any lookahead problem because the application of successive-cyclic movement is determined locally, within XP in (ii). He formulates Las Resort in the following way:

\[
\text{(iii) } X \text{ undergoes movement iff without the movement, the structure will crash (with crash evaluated locally).} \quad \text{(Bošković (2007: 610))}
\]

Another crucial point of his analysis is that the movement of $Y$ to the edge of XP involves no feature-checking, contrary to Chomsky (2000). Bošković also convincingly shows that there is no feature-checking in intermediate landing sites targeted by successive-cyclic movement. See Bošković (2007) for details of his arguments.

\(^{10}\) Let us go back to the legitimate derivation of the parasitic gap construction such as (22). As a reviewer points out, the shared position in (22) can be counted as an A-position because it is an argument position of file. On the assumption that [Spec, AspP] is also an A-position, one might think that the movement to the shared position could be counted as A-movement and that (ia) would be grammatical in the same way as (ib), which does involve A-movement.
A similar explanation is given for the observation that A-movement cannot license a parasitic gap. Let us consider (32).

(32) *The book\textsubscript{1} was filed \textsubscript{t} without my reading pg\textsubscript{1} first. The book stays at [Spec, AspP] in the adverbial clause like which report in (28) because the book has no activation feature [−wh]. After the adverbial CP is built up, the book is not accessible to the computational system anymore and it fails to be a target of Merge with the matrix verb, again.

The proposed analysis correctly captures the fact that VP-ellipsis cannot rescue the S-structure effect, which Agbayani and Ochi point out is problematic for Nunes’s analysis. The relevant example is repeated below:

(33) *Who read what before John did [read pg]? Under the proposed analysis, (33) has two sources of ungrammaticality. First, let us consider the derivation where what has an activation feature. The unchecked activation feature of what makes the derivation illegitimate. It is obvious that VP-ellipsis taking place in the adverbial clause has no way to eliminate the unchecked activation feature of the wh-phrase in the matrix clause. In the other derivation where what has no activation feature, read cannot merge with what because what is included in the inaccessible domain to the computational system. It is also reasonable that VP-ellipsis is not helpful for solving this kind of cyclicity problem.

The proposed analysis also gives a natural explanation for the categorial restriction on parasitic gaps. Parasitic gaps are restricted to the category NP, as shown below (Emonds (1985: 91), Cinque (1990: 102), cf. Pesetsky

(i)  
\begin{itemize}
  \item a. *The man\textsubscript{1} we invited \textsubscript{t} \textsubscript{1} [without giving pg\textsubscript{1} the invitation].
  \item b. John\textsubscript{1} was given \textsubscript{t} \textsubscript{1} the invitation.
\end{itemize}

However, the ungrammaticality of (ii) shows that the movement involved in the adverbial clause in (ia) behaves like A-bar movement rather than A-movement.

(ii) *Who\textsubscript{1} did you give \textsubscript{t} \textsubscript{1} the book?

All of the examples above fall under the traditional A/A-bar distinction. On the other hand, it is apparently unclear how to capture them under the proposed analysis. This paper offers an alternative analysis in terms of Chomsky’s (2000) activation features. Such an analysis does not appeal to the A/A-bar distinction, whose theoretical status is not clear under the current syntactic theory. As mentioned in the text, in the legitimate derivation of the parasitic gap construction, the wh-phrase has to have [−wh] feature, which activates it for wh-movement and Topicalization. Otherwise, it could not move to the edge of CP but should stay at [Spec, AspP] in the adverbial clause, which is not accessible to the merger with the matrix verb. Based on the ungrammaticality of (ii), it is reasonable to postulate a constraint which does not allow an indirect object of give to have the [−wh] feature. The ungrammaticality of (ia) is also explained by this constraint because of the unavailability of the [−wh] feature in (ia) in a similar way to (ii). Since the [−wh] feature is not involved in passivization, nothing rules out (ib).
PARASITIC GAPS UNDER MULTIPLE DOMINANCE

(1982: 584), Chomsky (1982: 55)).

(34) a. *[How sick] did John say he felt \( t_1 \) before getting pg\(_1\)?
   b. *[How long] does John drink \( t_1 \) before lecturing pg\(_1\)?
   c. *This is a topic [about which] you should think \( t_1 \) before talking pg\(_1\)?

Let us take (34a) as an example. First, *how sick* moves to the edge of CP in the adverbial clause and merges with *feel* in (35a). The matrix VP merges with Asp but *how sick* does not move to [Spec, AspP]. Rather it stays at the shared position unlike the nominal *wh*-phrase in (22) because it is not a nominal and thus does not need Case. Only after the adverbial PP

\[ PP \text{ Till himlen} \] är det inte säkert att \[ NP \text{ alla } [S' som längtar } [PP \text{ pg}] \]

 gets

‘To heaven, it is not certain that everyone who longs (there) gets.’

\[ AP \text{ Fattig} \] vill \[ NP \text{ ingen } [S' som någonsin varit } [AP \text{ pg}] \] bli \( t_1 \) igen.

‘Poor want no-one that has ever been become again’

Engdahl (1983: 17))

It is beyond the scope of this paper to figure out why Swedish does not exhibit the relevant categorial restriction. A detailed investigation of Swedish parasitic gaps will be needed, which will be left for future research.

The categorial restriction on parasitic gaps would be problematic for Nunes’s analysis. Recall that under his approach, sideward movement to the matrix clause is driven by theta-properties of the matrix predicate. This correctly expects that adjuncts cannot license a parasitic gap because adjuncts have no theta-relation with predicates and thus have no motivation for sideward movement. This expectation is confirmed by the ungrammaticality of (34a, b). However, more controversial is a case where the antecedent of a parasitic gap is a PP argument like (34c). Hornstein and Nunes (2002) suggest that PP arguments behave like adjuncts rather than arguments with respect to being unable to cross a weak island, as shown below:

(ii)  a. *How do you wonder whether Jane cooked the chicken \( t_1 \)?
   b. *Why do you wonder whether to put the book on the shelf \( t_1 \)?

(Lasnik and Saito (1992: 148))

Contrary to Nunes, the proposed analysis, which derives the relevant categorical restriction from the (un)availability of movement to [Spec, AspP] in a simple way, is free from such controversy.
merges with the matrix AspP, the adverbial PP becomes an island. After the matrix vP is built up, *how sick* has to undergo successive cyclic movement to the edge of vP, as shown in (35b) but the movement is blocked because the adverbial PP has already become an island.

$$\begin{align*}
\text{(35) a.} & \quad \text{VP} \quad \text{CP} \\
& \quad \text{feel} \quad \text{how sick}_1 \quad C' \\
& \quad \quad \quad \text{getting how sick}_1 \\
\text{b.} & \quad \text{vP} \\
& \quad \text{DP} \quad \text{v'} \\
& \quad \quad \quad \text{AspP} \\
& \quad \quad \quad \quad \text{Asp} \quad \text{VP} \quad \text{before CP} \\
& \quad \quad \quad \quad \quad \text{feel} \quad \text{how sick}_1 \quad C' \\
& \quad \quad \quad \quad \quad \quad \quad \quad \text{getting how sick}_1
\end{align*}$$

The (un)availability of movement to [Spec, AspP] plays a crucial role in explaining the relevant categorial restriction on parasitic gaps. Recall from the discussion in (22) that by moving to [Spec, AspP], the nominal *wh*-phrase escapes from the adverbial PP before the latter becomes an island. This option is unavailable for *how sick* because it is not a nominal and never moves to [Spec, AspP], as just mentioned.\(^{13,14}\)

\(^{13}\) One might wonder why *how sick* cannot move, even though it is also included in the matrix clause in (35b). Following Uriagereka (1999), this paper assumes that subjects and adjuncts independently undergo Spell-Out before they merge with structures. It is also assumed that Spell-Out removes phonological and morphological features of a lexical item from the narrow syntax. Given these two assumptions, *how sick* has already lost the phonological and morphological features necessary for the application of movement when the adverbial PP merges with AspP. Thus, *how sick* fails to undergo movement to the edge of vP, even though it is a part of the matrix clause.

\(^{14}\) As one reviewer points out, Cinque (1990: 104) observes that measure NPs, which are not referential, fail to license parasitic gaps, as illustrated in the following example given by the reviewer:

(i) *How many kilos\(_1\) does he weigh \(t_1\) without believing he weighs pg\(_1\)?*
As shown in (36), ATB movement does not exhibit such a categorial restriction.

(36)  a. [How sick]$_1$ did John look $t_1$ and Betty say he actually felt $t_1$?

b. [How long]$_1$ did John want to drink $t_1$ and Bill actually end up drinking $t_1$?

c. This is a topic [about which]$_1$ you should think $t_1$ and I should talk $t_1$? 

(Postal (1993: 736))

The absence of the categorial restriction with ATB movement is also expected because the second conjunct never works as an island at any point of the derivation unlike parasitic gaps. The derivation of (36a) is illustrated below:

The reviewer points out that the proposed analysis wrongly expects that (i) should be grammatical because how many kilos is a nominal and undergoes object shift to the matrix [Spec, AspP] like other referential nominal phrases.

However, the assumption that measure NPs are capable of moving to Case positions needs to be reconsidered. As shown in (ii), measure NPs do not undergo passivization.

(ii) *50 kilos was/were weighed by him.

Based on the ungrammaticality of (ii), this paper assumes that measure NPs have no
The *wh*-phrase moves to the edge of the matrix *vP* within the second conjunct and it merges with *look*, which creates a multiple dominance structure. Moving to the edge of [Spec, *vP*] of the matrix clause is not problematic because the second conjunct is not an adjunct but the complement of &.15

To sum up, it has been shown that the proposed multiple dominance uninterpretable Case feature and do not move to any Case position. In this sense measure NPs behave like adjuncts rather than argument NPs and thus (i) receives the same explanation as (34). The ungrammaticality of (i) and (ii) falls under the correlation between unpassivizability and the unavailability of parasitic gaps, proposed by Postal (1993). Postal provides many cases where syntactic contexts which prohibit passivization also prohibit parasitic gaps. The following is one such case:

(iii)  
  a. I watched Barbara faint.
  b. *Barbara1 was watched t1 faint.
  c. *Which dancer1 did they want to operate on t1 after watching pg1 faint? (Culicover and Postal (2001: 274))

15 A reviewer points out that the *wh*-movement from the edge of *vP* in the second conjunct to the matrix [Spec, CP] in (37) seems to violate the Coordinate Structure Constraint (henceforth, CSC), formulated by Ross (1967, 1986) in the following way:

(i)  
  a. In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct. (Ross (1986: 98–99))

However, several researchers have argued that the CSC should not be stated as a constraint on movement operations themselves, but rather as a constraint on the representations which are obtained through movement (Goodall (1987), Ruys (1993), Fox (2000), Lin (2001), and Kato (2006), among others). This paper adopts the latter view, which is referred to as the representational approach to the CSC, rather than Ross’s version of the CSC given in (i). It is crucial that under the representational approach, the derivational step itself does not lead to any ungrammaticality.

To make the following discussion explicit, this paper adopts a version of the representational approach presented by Fox (2000). He argues that the CSC is not an independent constraint but rather the CSC effects are derived from the following two assumptions:

(ii)  
  a. Extraction out of a coordinate structure is possible only when the structure consists of two independent substructures, each composed of one of the coordinates together with material above it up to the landing site (henceforth, component structures).
  b. Grammatical constraints are checked independently in each of the component structures. (Fox (2000: 50))

Under these assumptions in (ii), (iii) has the component structures in (iv). The ungrammaticality of (iii) follows from the vacuous quantification in the component structure (ivb), where *who* has nothing to bind.

(iii) *Who1 do you think Mary likes 1 and Bill hates Sue?*

(iv)  
  a. Who1 do you think Mary likes t1
  b. Who1 do you think Bill hates Sue

Then let us consider the component structures of (37), which is given in (v).

(v)  
  a. [How sick], did John look t1?
  b. [How sick], did Betty say he actually felt t1?
analysis accounts for the otherwise puzzling properties of the parasitic gap construction. The proposed analysis is similar to Nunes’s analysis in that a single wh-phrase is base-generated in the adverbial clause and ends up staying at the matrix clause, while being assigned more than one theta-role. However, they differ substantially in details. The proposed analysis does not face the problem Agbayani and Ochi point out concerning the S-structure effect. Also, the categorial restriction on parasitic gaps is derived in a straightforward way.

4. On Anti-reconstruction Effects

4.1. Puzzle

Before closing the paper, let us consider the following contrast, which is originally attributed to Kearney (1983):

(38) a. [Which books about himself\textsubscript{2}]\textsubscript{1} did John\textsubscript{2} file \textit{t}\textsubscript{1} before Mary read pg\textsubscript{1}?

b. *[Which books about herself\textsubscript{2}]\textsubscript{1} did John file \textit{t}\textsubscript{1} before Mary\textsubscript{2} read pg\textsubscript{1}? (Chomsky (1986a: 60))

(38) shows that parasitic gaps do not allow reconstruction, contrary to matrix gaps. In (38b), if \textit{which books about herself\textsubscript{2}} were allowed to be reconstructed into the parasitic gap, (38b) would be grammatical, contrary to fact. The contrast above has been taken as supporting evidence for the claim that parasitic gaps are traces of null operator movement, which is independent of the movement in the matrix clause (Munn (1992), Chomsky (1986a)). Under the null operator movement analysis, (38a) and (38b) are analyzed below, respectively:

(39) a. [Which books about himself\textsubscript{2}]\textsubscript{1} did John\textsubscript{2} file \textit{t}\textsubscript{1} before Op\textsubscript{3} Mary read \textit{t}\textsubscript{3}?

b. *[Which books about herself\textsubscript{2}]\textsubscript{1} did John file \textit{t}\textsubscript{1} before Op\textsubscript{3} Mary\textsubscript{2} read \textit{t}\textsubscript{3}?

Since the parasitic gaps are traces of null operator movement, not traces of \textit{wh}-movement in the matrix clause, it follows that parasitic gaps are not workable as reconstruction sites. Under the proposed analysis so far, on the other hand, since parasitic gaps are also created by \textit{wh}-movement, nothing prevents the \textit{wh}-phrase from undergoing reconstruction into the adverbial

In contrast to (iv), (v) is well-formed in terms of the constraint against vacuous quantification, because \textit{how sick} binds a variable in each component structure. Thus, the derivation given in (37) does not pose any problem in terms of the CSC.
Recently Agbayani and Ochi (2008) have proposed an interesting analysis of parasitic gap constructions. They investigate the hypothesis that the computational system is able to split formal features of a lexical item from the rest for the purpose of External Merge and merge them into distinct syntactic positions. They propose that this type of separation takes place in parasitic gap constructions. More specifically, only formal features are inserted into a parasitic gap position. In (38b), under their analysis, only formal features of *which* merge with *read* while the rest of the *wh*-phrase merges with the matrix verb. Their analysis accounts for the relevant reconstruction asymmetry because the adverbial clause has no copy of *herself* at any point of the derivation in (38b). This paper agrees with Agbayani and Ochi in that parasitic gaps are defective in some sense, but this insight is implemented in a different way in this paper, by extending a particular theory of Late Merger, which is proposed by Takahashi (2006) and Takahashi and Hulsey (2009) on independent grounds.

4.2. Wholesale Late Merger

Lebeaux (1988) proposes that adjuncts can be introduced into a structure in a counter-cyclical way, in contrast to complements. This type of Merger has been referred to as Late Merger in the literature. The distinction between complements and adjuncts plays a crucial role in explaining the following contrast:

\[(40)\]
\[
\begin{align*}
\text{a. } *\text{Which report that John}_1 \text{ was incompetent did he}_1 \text{ submit?} \\
\text{b. Which report that John}_1 \text{ revised did he}_1 \text{ submit?}
\end{align*}
\]

(Freidin (1986: 179))

In (40b), the relative clause is capable of merging with the *wh*-phrase after the *wh*-movement takes place. Due to the application of Late Merger, *John* is not in the c-command domain of *he* at any point of the derivation. In contrast, the noun complement, which includes *John*, has to be introduced when the *wh*-phrase is base-generated in (40a). Thus, *John* is c-commanded by *he* before the *wh*-phrase moves.

Under Lebeaux’s analysis, the applicability of Late Merger is regulated by the Projection Principle (Chomsky (1981)). On the other hand, Fox (2002) proposes an alternative way to control the applicability of Late Merger, where Late Merger is allowed if an output representation is interpretable in the semantic component. Under the latter type of approach, interestingly, a complement is also allowed to undergo Late Merger unless the output representation becomes uninterpretable. Pursuing Fox’s approach in the study of
comparatives, Bhatt and Pancheva (2004) argue that a restrictor of an operator/determiner can undergo Late Merger. This type of Late Merger is referred to as *Wholesale Late Merger* (henceforth, WLM) by Takahashi (2006) and Takahashi and Hulsey (2009). They show that the WLM successfully captures the so-called A/A-bar distinction in reconstruction effects, which is a long-standing problem.

Takahashi (2006) and Takahashi and Hulsey (2009) adopt the following procedure to interpret movement chains, which is a slightly revised version of Fox’s (2002) original procedure:

(41) Trace Conversion

Variable Insertion: (Det) (Pred) → (Det) [(Pred) λy(y=x)]

Determiner Replacement: (Det) [(Pred) λy(y=x)] → the [(Pred) λy(y=x)] (Takahashi and Hulsey (2009: 398))

Fox takes up the issue as to how to interpret chains created by movement under the copy theory of movement (Chomsky (1993)). Given the Trace Conversion together with λ-abstraction, movement chains are interpretable. Let us consider (42a) as an example. After the application of QR as shown in (42b) Variable Insertion introduces a predicate λy(y=x) into the lower copy. This predicate and the restrictor of the determiner are combined through Predicate Modification. As a result of Determiner Replacement, the lower copy is interpreted as a definite description, as illustrated in (42c).

(42) a. A girl talked to every boy
   b. every boy [a girl talked to every boy]
   c. every boy λx [a girl talked to the boy x]

Let us turn to their explanation for the fact that A-movement bleeds the Condition C effect, exemplified by (43a).

(43) a. Every argument that John₁ is a genius seems to him₁ to be flawless.
   b. [[every] flawless]
   c. [vp [every] [vp seems to him₁ [tp [every] to be [[every] flawless]]]]
   d. [vp [every [argument that John₁ is a genius]] [vp seems to him₁ [[every] to be [[every] flawless]]]]
   e. [tp [every [argument that John₁ is a genius]] T [vp [every [argument that John₁ is a genius]] [vp seems to him₁ [[every] to be [[every] flawless]]]]]
   f. [[every [argument that John₁ is a genius]] λx. seems to him₁ [[the x] λy. to be [[the y] flawless]]]
As shown in (43b), the WLM approach allows only the determiner to merge with the predicate, which poses no problem in terms of interpretation, because the determiner ends up being interpreted as a definite description with no restrictor. Then the determiner undergoes successive cyclic movement alone in (43c). On the assumption that the matrix VP-adjoined position is also a landing site of successive cyclic A-movement (Sauerland (2003)), when *every* moves to the VP-adjoined position in the matrix clause, *every* merges with its restrictor as shown in (43d). Finally, the determiner moves to [Spec, TP] with its restrictor in (43e). Trace conversion yields an interpretable representation, as shown in (43f). The absence of Condition C violation is successfully expected because *John* is introduced outside of the c-command domain of *him*.

Let us turn to the issue as to how the WLM approach accounts for the fact that A-bar movement does not bleed Condition C, in contrast to A-movement, exemplified by (44).

(44)?*Which pictures of John₁ did he₁ like? (Lebeaux (1988: 144, 146))

(44) violates Condition C, which is captured if the copy of the *wh*-phrase occupies the object position of *like*, as represented in (45).

(45) Which pictures of John₁ did he₁ like which pictures of John₁?

It is necessary to block the derivation where *pictures of John* undergoes WLM after *which* moves to [Spec, CP] in (46), which would expect no Condition C effect, in a similar way to (43).

(46) Which [pictures of John₁] did he₁ like which?

Takahashi (2006) and Takahashi and Hulsey (2009) propose that the Case requirement of a restrictor NP controls the applicability of WLM. More specifically, a restrictor NP has to be introduced into a structure within the c-command domain of its Case assigner. In (46), the restrictor merges with *which* at [Spec, CP], which is not within the c-command domain of the Case assigner v. To satisfy the Case requirement, *pictures of John* is forced to merge with *which* before *wh*-movement takes place as illustrated in (45), where the Condition C is violated.

The WLM approach also attempts to accommodate the following interesting contrast:

(47) a. *Which corner of John₁’s room was he₁ sitting in?
   b. [Which corner of John₁’s room that Mary repainted] was he₁ sitting in? (Takahashi and Hulsey (2009: 408))

(47a) receives the same explanation as (44) because the restrictor NP should be introduced within the c-command domain of the Case assigner v, which
PARASITIC GAPS UNDER MULTIPLE DOMINANCE

forces John to be c-commanded by he. The Condition C is inevitably violated. On the other hand, the grammaticality of (47b) is puzzling. In (47b), John is embedded in the restrictor of the wh-determiner in the same way as (47a), but the example is acceptable. The difference between (47a, b) is that the restrictor of which is followed by a relative clause in (47b).

To address the contrast above, Takahashi (2006) and Takahashi and Hulsey (2009) adopt the assumption that relative clauses can be analyzed as raising structures (Vergnaud (1974) and Kayne (1994), among others). Under the raising analysis, the head of a relative clause is base-generated within the relative clause and then undergoes raising. Thus, the relative clause in (48a) is analyzed as (48b).

(48) a. The portrait of himself that John painted is extremely flattering. (Schachter (1973: 32))

b. [DP the [CP [portrait of himself] that [TP John painted]]]

As illustrated in (48b), the head of the relative clause moves to [Spec, CP] and the entire CP is selected as a complement of the determiner the. This raising structure readily expects the fact that himself satisfies the Binding Condition A because it is base-generated in the c-command domain of John. The crucial point to the discussion here is that the categorial status of the restrictor of the determiner is CP, which need not be assigned Case. Keeping this in mind, let us go back to (47b). Under the WLM approach, the restrictor of which is capable of undergoing WLM after it moves to [Spec, CP], as illustrated in (49) because the restrictor of which is CP, which is free from the Case requirement.

(49) [CP [which [CP corner of John’s room that Mary repainted]] was [TP he sitting in which]]

The Binding Condition C is satisfied because John is introduced outside of the c-command domain of he. Thus, the grammaticality of (47b), which is otherwise puzzling, is correctly captured. There is one important point to be mentioned with this analysis. As illustrated in (49), only the determiner which is base-generated as a complement of the verb first, after which it then undergoes wh-movement. One might raise a question as to how the Case assigning property of v is satisfied. Takahashi adopts the assumption that determiners can discharge Case assigning properties of heads, which Takahashi suggests might be supported by the fact that a case morphology appears on determiners as well as NPs in some languages.
4.3. PG = D

Extending the WLM approach to the construction under investigation, the proposed analysis will be revised so that the ungrammaticality of (38b), repeated as (50a), can be accommodated.

(50) a. *[Which books about herself\textsubscript{2}]\textsubscript{1} did John file before Mary\textsubscript{2} read pg\textsubscript{1}?

b. [Asp\textsubscript{P} which Asp [v\textsubscript{P} read which]]

As illustrated in (50b), which is base-generated as an object of read in the adverbial clause and then which moves to [Spec, Asp\textsubscript{P}] without being accompanied by its restrictor. This paper adopts the assumption that determiners can discharge a Case assigning property of heads, suggested by Takahashi (2006). When which moves to the edge of CP, books about herself undergoes WLM with which. Then, which books about herself merges with file, which creates a multiple dominance structure. This is illustrated below:

As shown in the structure above, books about herself is not assigned Case in the adverbial clause, because it is introduced outside of the c-command domain of the Case assigner Asp. However, there is no problem with Case assignment to books about herself in (50a) because it has another Case as-
PARASITIC GAPS UNDER MULTIPLE DOMINANCE

signer in the matrix clause, that is, the head of AspP. If (50a) has the derivation sketched above, the absence of the relevant reconstruction effect is captured because Mary has no copy of herself in its c-command domain.

However, it is generally assumed that Late Merger is an optional operation. Nothing so far prevents read from merging with which books about herself in (50a), which would wrongly raise expectations for the reconstruction effect. How would this derivation be blocked? In this unwelcome derivation, books about herself is assigned Case twice (in the matrix clause and in the adverbial clause). On the other hand, in the derivation sketched in (51), books about herself is assigned Case only in the matrix clause. This paper suggests that this unwelcome derivation, which involves no WLM, is less economical than that in (51) in the sense that fewer syntactic operations are involved in the latter, particularly with respect to Case assignment. Put differently, the computational system prefers a single Case assignment to multiple Case assignments. The preferred derivation in terms of Case assignment ends up being excluded because the anaphor cannot find an appropriate antecedent in the semantic component, however.

There is another derivation to be blocked. Let us consider the derivation where books about herself undergoes WLM with which, when the latter stops at the edge of vP in the adverbial clause, as illustrated in (52).

(52) Mary T [vP which [books about herself] [vP Mary v [AspP which Asp [vP read which]]]]

Late Merger

In (52), the edge of vP has a copy of books about herself via the application of WLM, which is c-commanded by [Spec, TP]. It is wrongly expected that (50a) would be grammatical. Crucially the economy consideration mentioned above cannot exclude this derivation because this derivation involves a single Case assignment. Books about herself is introduced outside of the Case assigner in the adverbial clause and assigned Case only in the matrix clause. What is wrong with this derivation?

It is suggested that this unwelcome derivation is illegitimate in terms of locality. More specifically, the wh-phrase intervenes between T and Mary with respect to φ-feature agreement. Before turning to the analysis of this unwelcome derivation in details, let us consider the question raised by a reviewer as to why which exhibits no intervention effect when it moves to the edge of vP in the adverbial clause in (51). Chomsky (2001) suggests that phonological features of an intervening element play a crucial role for intervention effects. Thus, in (51), further movement of which to [Spec, CP] enables the computational system to ignore the copy of which at the edge of
vP somehow. However, Chomsky’s suggestion is worth reconsidering. As shown in the following example from Icelandic, the A-bar moved phrase does not intervene between T and [Spec, vP] without appealing to further movement, as discussed in Rezac (2003) and Obata and Epstein (2008).

(53) Strákarnir1 höfðu engu grjóti2 [vP t₁ [VP hent t₂ í bilana]].

The boys had no rock thrown in the cars
‘The boys had thrown no rocks at the cars.’

(Svenonius (2000: 260))

The grammaticality of (53) shows that engu grjóti ‘no rock’ does not exhibit intervention effect, although the shifted object overtly occupies the position between T and [Spec, vP].

This paper adopts a different assumption from Chomsky (2001) with respect to what is eligible for an intervener. It is assumed in this paper that a DP is counted as an intervener for an application of φ-feature Agree, if it is active in the sense of the Activity Condition, or in other words, it needs to be assigned a Case value. In (51), since the Case feature of which is valued as a result of φ-feature agreement with Asp in the adverbial clause, which is not active when T probes a matching goal in the adverbial clause. Thus, which does not intervene between T and Mary. Also note that which becomes active again after receiving another theta-role from the matrix verb in the later point of the derivation.

Let us turn to the derivation given in (52). In (52) the edge of vP involves not only the wh-determiner but also books about herself, whose Case feature has not been valued yet, and thus the entire wh-phrase is active enough to undergo Agree or Move. Given the assumption just made about what is eligible for an intervener, which books about herself is counted as an intervener between T and Mary. The illegitimacy of the derivation in (52) is accounted for.

Before concluding the paper, let us consider Munn’s (1994) observation that parasitic gaps within subjects behave differently with respect to reconstruction, which poses a potential problem for the proposed analysis. The following contrast seems to show that reconstruction takes place into a parasitic gap rather than a gap in the matrix clause (see Williams (1990) for relevant discussion):

(54) a. *[Which picture of herself₂]₁ did [every boy who saw pg₁] say Mary₂ liked t₁?
   b. [Which picture of himself₂]₁ did [every boy who saw pg₁] say Mary liked t₁?

(Munn (1994: 407))

(54b) apparently shows that the wh-phrase undergoes reconstruction into
the parasitic gap. However, there is an alternative analysis of the grammaticality of (54b), without appealing to the reconstruction into the parasitic gap. On the assumption that successive cyclic movement leaves a copy at the edge of vP, the grammaticality of (54b) would be followed because the anaphor in the copy at the edge of the matrix vP is bound by the matrix subject every boy who saw.

(55) [Which picture of himself$_2$]$_1$ did [[every boy$_2$ who saw pg$_1$]$_3$

$_{vP}$ [which picture of himself$_2$]$_1$ [$_{vP}$ $t_3$ say Mary liked $t_1$]]?]

It is emphasized that the grammaticality of (54b) does not necessarily show that parasitic gaps within subjects allow reconstruction, which is consistent with the proposed analysis. However, it is still unclear why (54a) is ungrammatical, that is, why the wh-phrase fails to undergo reconstruction into the matrix object position. It is speculated that reconstruction into the matrix object position in (54a) is in principle possible but other factors, which might be not syntactic, are responsible for prohibiting the relevant reconstruction. To investigate what lies behind the ungrammaticality of (54a), more detailed investigation of the nature of parasitic gaps within subjects is necessary.

5. Conclusion

This paper has argued that multiple dominance structures are involved in the derivation of parasitic gap constructions. The proposed analysis captures the core properties of the construction such as the S-structure effect, the anti-c-command requirement, the lack of parasitic gaps with A-movement and the categorial restriction on parasitic gaps. The proposed multiple dominance analysis agrees with Nunes’s (2001, 2004) sideward movement analysis in that the antecedent of a parasitic gap is base-generated in the subordinate clause first and then moves into the matrix clause. However, the analyses are different in details, as discussed in this paper. It has been shown that the former analysis is more plausible than the latter empirically. Finally, by extending the WLM approach, this paper has also offered a solution to the problem concerning the lack of reconstruction effects, according to which parasitic gaps consist of only copies of determiners and their restrictor NPs undergo Late Merger in the course of the derivation.
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