

# Silence Speaks

## — A Minimalist Analysis of Multiple Sluicing —

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### Abstract

This paper aims to explore a possible alternative analysis of multiple sluicing within the framework of the minimalist program. It is surprising that multiple sluicing, where more than one *wh*-phrase is left with some parts deleted by sluicing, is possible in a certain context even in English with non-multiple *wh*-fronting. In order to explain how this phenomenon is derived, after examining previous analyses by Richards (2001) and Lasnik (2014), I will consider another account based on the phase-based theory, and claim that a general parallelism should be also applied to multiple sluicing. In addition, I argue that the second *wh*-phrase in multiple sluicing is moved neither overtly nor covertly, but is bound by an operator. Furthermore, I will propose that operator insertion is induced for both the antecedent and the elided in multiple sluicing at Spell-Out (the verb phrase (*vP*) phase) with their parallelism checked simultaneously. The analysis proposed here will be a stepping-stone for a more satisfactory account of multiple sluicing.

### 1. Introduction — Background

In this paper, I would like to explore an alternative analysis of multiple sluicing, as in (1), where two *wh*-phrases are left with some elements deleted in the second clause, and consider how it is derived within the framework of generative grammar.

(1) I know that in each instance of the girls got something from one of the boys.

? But which from which? (Bolinger (1978: 109))

As for the second sentence in (1), some speakers judge it as acceptable, which is very interesting since English is a non-multiple fronting language and allow only one *wh*-phrase to occur in the front position.

As is well known, in natural language, there are phenomena where some words or phrases are missing, but are nonetheless interpreted just as they might exist. These phenomena are called ellipsis or gapping. Since there are a wide variety of interesting

facts found in sentences involving ellipsis or gapping, a lot of research and studies on deletion have been conducted by many linguists such as Ross (1969), Lobeck (1995), and Merchant (2001), not only within the framework of generative grammar but also inter-disciplinarily, and quite intriguing accounts of them have been presented so far. In the course of discussion, other examples of elliptical phenomenon in English have also been pointed out. Below are some of the well-known examples.

(2) Verb Phrase (VP) Deletion

- a. Mary met Bill at Berkeley and Sue did too.
- b. Mary met Bill at Berkeley although Sue didn't. (Lobeck (1995: 22))

(3) Gapping

- a. Mary met Bill at Berkeley and Sue at Harvard.
- b. Mary met Bill and Sue \*(Peter). (Lobeck (1995: 23))

(4) Pseudogapping

- a. Mary hasn't dated Bill, but she has Harry. (Jayaseelan (1990: 65))
- b. This should make you laugh — it did me. (Gengel (2013: 1))

(5) Sluicing

- a. Somebody just left. — Guess who. (Ross (1969: 252))
- b. Ralph is going to invite somebody from Kankakee to the party, but they don't know who/whom. (Ross (1969: 252))

A number of linguists have conducted extensive research on these elliptical structures, and a lot of analyses have been proposed.<sup>1</sup> Generally speaking, VP deletion, as in (2), is defined as including a deleted verb phrase with the preceding auxiliary intact, but the verb phrase, *met Bill at Berkeley*, is consistently interpreted by the hearer. In gapping, as in (3), the object or locative phrase still remains as remnant elements, but there is neither a verb nor an auxiliary present in the structure. In fact, the object *Peter* in (3b) must remain as intact with the verb deleted. Nevertheless, we can understand the sentences in (3) correctly. Furthermore, pseudogapping, as in (4), bears properties of both VP deletion and gapping with the matrix verb deleted and the remnant object and auxiliary intact.<sup>2</sup> Another interesting elided structure is so called sluicing, as in (5), where the structure following the *wh*-phrase, *who*, is deleted. What is more interesting about this structure is that even if the *wh*-phrase moves out of an embedded island clause, violating an island condition, the syntactic violation will be salvaged by sluicing the structure below the *wh*-phrase, as in (6).

- (6) a. \* She kissed a man who bit one of my friends, but Tom doesn't realize  
which one of my friends she kissed a man who bit.  
b. ? She kissed a man who bit one of my friends, but Tom doesn't realize  
which one of my friends. (Ross (1969: 276))

This fact was first pointed out by Ross (1969), and its unique properties have since attracted much attention from a lot of generative linguists.<sup>3</sup>

Besides, there is another mysterious elliptical structure pointed out by some linguists, so-called multiple sluicing, as in (7), which I would like to account for in this paper. Consider the sentences below.

- (7) I know that in each instance one of the girls got something from one of the boys.  
But they didn't tell me which from which.  
(Richards (2001: 137) adapted from Bolinger (1978: 109))

The puzzles of this construction come from the widely-known facts in English. In English, only one *wh*-phrase can occupy the forefront position, namely, the Specifier position of Complementizer Phrase (Spec-CP), as in (8).

- (8) a. Who did John see?  
b. \* Who whom sees?  
c. Who saw whom?

Since, as shown in (8), multiple *wh*-fronting is never possible in English, it is easily expected that the second sentence in (9) is also ruled out, where there are two *wh*-phrases fronted to the embedded Spec-CP.

- (9) a. I know that in each instance one of the girls got something from one of the boys. — \* They didn't tell me which from which got something.  
b. \* One of the students spoke to one of the professors, but I don't know which to which spoke. (Lasnik (2014: 4))

However, surprisingly, if some elements in the second clause are deleted, the sentence will become grammatical. The derivation seems to be salvaged by a kind of deletion similar to sluicing.<sup>4</sup> Compare (10) with (9a).

- (10) I know that in each instance one of the girls got something from one of the boys. — ? But they didn't tell me which from which.

Why does apparent multiple *wh*-fronting in (10) become possible in a non-multiple *wh*-fronting language such as English, when their inner sentential constituent is deleted?

How can syntax move the second *wh*-phrase which should not have been fronted? Is it actually moved from the base position?

This fact looks similar to the one observed in simple sluicing we have seen above, in that some kind of violation may be repaired by deletion. See (11).

- (11) She kissed a man who bit one of my friends, but Tom doesn't realize [which one of my friends] [~~she kissed [a man who bit *t*]]].~~

Like the multiple sluicing in (10), the *wh*-phrase which should not have moved seems to be moved, but it seems that its violation is canceled by deletion. In particular, in (11), the violation of Complex Noun Phrase Constraint is salvaged by deleting the inner sentential constituent after the *wh*-phrase (Ross (1969)). Given this fact, my concern here goes to a question of how multiple sluicing as in (10) is derived within the current minimalist framework. In particular, as I have mentioned above, how can syntax deal with the movement of the second *wh*-phrase and deletion? Are there any similarities between simple sluicing and multiple sluicing?

Clearly, it is challenging to provide a perfect solution to the facts observed in multiple sluicing, but I would like to consider one possible account of multiple sluicing by seeing some empirical facts. Especially, following Chomsky (2001, 2008), I would like to claim (1) that the second *wh*-element in multiple sluicing doesn't move at all (either overtly or covertly) and (2) that the inner structure can undergo deletion under parallelism, contrary to a conventional analysis that deletion should be applied to a Tense Phrase (TP) constituent. I also claim (3) that the parallelism is checked at a certain point of derivation, particularly, a *v*P phase.

This paper is organized as follows. In the next section, in order to see what multiple sluicing is like, I will provide more empirical data of multiple sluicing. In section 3, I will closely examine previous analyses, and some problems with them will be pointed out. Section 4 discusses a possible alternative account of this elliptical structure. Section 5 concludes the paper.

## 2. Some More Facts in Multiple Sluicing

Before reviewing some previous analyses, let us look more closely at instances of multiple sluicing already observed in the literature. Some linguists claim that although examples of multiple sluicing are quite often observed in Bulgarian and Japanese, they are not so commonly acceptable in English.<sup>5</sup> It is convincing that multiple sluicing is

possible in Bulgarian, because it allows multiple *wh*-fronting as in (12a). However, it is surprising to observe the phenomenon even in English with non-multiple *wh*-fronting (cf. note 4). See (12) and (13).

- (12) a. Kogo kakvo e pital Ivan?  
whom what AUX asked Ivan  
'Who did Ivan ask what?' (Richards (2001: 1))
- b. Njakoј vidja njakogo, no ne znam koj kogo [vidja].  
someone saw someone but not I-know who whom  
'Someone saw someone, but I don't know who whom'  
(adapted from Richards (2001: 137) )
- (13) ? One of the students spoke to one of the professors, but I don't know which  
to which. (Lasnik (2014: 4))

Since English multiple sluicing, as in (13), is not considered to be a ubiquitous phenomenon, it is worthwhile to observe some other examples. Let's see more facts below.

As pointed out by Richards (1997, 2001), Nishigauchi (1998), Lasnik (2014), and Fox and Pesetsky (2003), among others, in addition to the fact that more than one *wh*-phrase appears to be moved, there seem to be at least two more interesting features observed in multiple sluicing: the preference of Preposition Phrase (PP) over Determiner Phrase (DP) for the second remnant, and the clause-boundness of the second *wh*-phrase. Some examples of the former are given in (14-15), and ones of the latter in (16-17).

- (14) a. ? Someone talked about something, but I can't remember who about  
what.  
b. ?\*Someone saw something, but I can't remember who what.
- (15) a. ? Mary showed something to someone, but I don't know exactly what to  
whom.  
b. ?\*Mary showed someone something, but I don't know exactly who what.  
(Lasnik (2014: 8))
- (16) a. Fred thinks a certain boy talked to a certain girl.  
(Fox and Pesetsky (2003))  
b. \* One of the students said that Mary spoke to one of the professors, but I  
don't know which student to which professor. (Lasnik (2014: 6))

- (17) a. Some of the students wanted to go to some of the lectures, but I'm not sure which to which.  
 b. \* Some of the students wanted John to go to some of the lectures, but I'm not sure which to which. (Lasnik (2014: 10))

As the examples above illustrate, multiple sluicing is apparently better with PP as the second remnant than as DP. Furthermore, it seems that the second *wh*-phrase in the sluiced clause cannot move out of the embedded clause. If the second *wh*-phrase is associated with the first one outside the embedded Complementizer Phrase (CP), the sentence will be ungrammatical. Thus, the movement of the second *wh*-phrase might have violated some conditions, which cannot be salvaged. In fact, these properties make this elliptical structure more difficult, and consequently more exciting to tackle. In the coming sections, I will quickly review some of the previous analyses of these questions and discuss some problems raised there.

### 3. Previous Analyses

There have been several analyses of multiple sluicing already proposed within generative grammar so far (Nishigauchi (1998), Merchant (2001), Richards (2001), Fox and Pesetsky (2003), Lasnik (2013)). Particularly, Richards (2001) and Lasnik (2013) propose interesting accounts of this mysterious phenomenon in the framework we are currently pursuing here. In this section, I will quickly review their analyses and point out possible problems with them.

#### 3.1 Richards (2001)

Richards claims, assuming the existence of strong/weak features and Copy Theory of movement involving Copy, Move, and Deletion, that multiple sluicing is licensed by some kind of violation repair, namely, by eliminating violated structures. More specifically, he attempts to provide accounts, by proposing the principles below.

- (18) 1. PF must receive unambiguous instructions about which part of a chain to pronounce.  
 2. A strong feature instructs PF to pronounce the copy in a chain with which it is in a feature-checking relation. (Richards (2001: 105))

The principles in (18) specify which copy in a chain should be pronounced. Therefore, given the principles in (18), in a normal *wh*-question, the *wh*-phrase, which is moved by

the strong feature in the Head position of Complementizer (C) with its original left in the base position, is easy to identify as an element to pronounce.

- (19) [<sub>CP</sub> **What** [ C <sub>(strong)</sub> [ did you buy *what* yesterday]]]?

Since *what* in (19) is moved from the object position of *buy* by the strong feature in C, *what* is correctly pronounced in the foremost position, instead of *what* in the original position.

The claim developed in his paper will lead to a consequence that there is a possibility that a weak feature overtly attracts an element, as in (20), adapted from Richards (2001: 105).

- (20) [ XP<sub>i</sub> H <sub>(weak)</sub> [ ... XP<sub>i</sub> ]]

There are two elements (copies) of a single XP in (20), where the XP in the Spec-HP is moved overtly by the weak feature in H. However, the principles in (18) cannot decide which element PF should pronounce. The overt movement of XP in (20), therefore, is not ruled out under the PF conditions in (18). Note that covert movement of an element by the weak feature, of course, is not always blocked because PF can determine which element to pronounce in some contexts: for example, one “membered” chain without any movement and an associating copy moved by a different strong feature.

Based on these principles, Richards proposes an analysis of multiple sluicing in (7), repeated as in (21).

- (21) I know that in each instance one of the girls got something from one of the boys. — But they didn’t tell me which from which.

In languages such as English, which lack overt multiple *wh*-fronting, only one *wh*-phrase can be fronted overtly with others left in situ in the case of multiple *wh*-questions. Therefore, it has been widely assumed that as for *wh*-absorption as in (22), the upper *wh*-phrase is moved by a strong feature (maybe, Extended Projection Principle (EPP) feature or an edge feature in the current framework), but the lower should be moved covertly for the purpose of appropriate interpretation.

- (22) a. [ **Who<sub>i</sub>** [ *what<sub>j</sub>* [ C [ *who<sub>i</sub>* bought **what<sub>j</sub>** ]]]]?  
 b. \* [ **Who<sub>i</sub>** [ **what<sub>j</sub>** [ C [ *who<sub>i</sub>* bought *what<sub>j</sub>* ]]]]?

The bold parts in (22) are overtly (phonologically) spelled out. Thanks to the covert *wh*-movement of *what* to (lower) Spec-C in (22a), the appropriate interpretation of a pair list reading is obtained. On the other hand, if *who* is overtly moved by a strong feature on C, and at the same time, *what* is overtly moved by a weak feature, as in

(22b), then PF cannot read under (18) which *what* in (22b) should be pronounced as a representation. Thus, (22b) is ruled out under (18).

Based on this theory, Richards claims that the second *wh*-phrase in multiple sluicing is still overtly moved by a weak feature, but the movement becomes possible if the other copies of *wh*-phrase are deleted. Since the deletion makes the other candidates for pronunciation go missing, the PF principles in (18) can identify which element (*from which*, in the case of (21)) to pronounce. See the examples below.

- (23) a. ? I know somebody talked to somebody, but I can't remember who to whom. (Richards (2001: 107))  
 b. \* I know somebody talked to somebody, but I can't remember who to whom talked. (adapted from (Richards (2001: 107)))
- (24) a. I know that in each instance one of the girls got something from one of the boys.  
 But they didn't tell me which from which.  
 b. I know that in each instance one of the girls got something from one of the boys.  
 \* But they didn't tell me which from which got something. (Lasnik (2013: 5))

In both of the (a) examples, the copies of the second *wh*-phrase are deleted, enabling PF to find only one option to pronounce.

As we have seen above, Richards' analysis of multiple sluicing is based mainly on deleting phonologically the embedded TP where two kinds of *wh*-movement are induced. Since the assumption that deletion should be applied to constituents is widely accepted in the analyses of deletion, his analysis doesn't seem to raise serious problems. However, there seem to be other theoretical and empirical problems with his proposal. First, one theoretical problem is pointed out easily within the current minimalist program. Within the probe-goal agreement system, as has been assumed since Chomsky (2000), the applicability of overt phrasal movement is determined by the presence of the EPP feature (or the edge feature). Chomsky's theory now assumes that un-interpretable features of an element, which used to be a motivation for movement for feature-checking, can be checked *in situ* under the probe-goal agreement. Thus, since, in English, there is supposed to be only one (strong) EPP feature available in Spec-CP, the movement of the second *wh*-phrase to Spec-CP should be induced



covertly only for interpretable reasons, but probably not by weak features.<sup>6</sup> Besides, the feature-strength cannot be assumed any more in terms of the strong minimalist thesis. Therefore, it is doubtful that overt multiple *wh*-fronting per se, as seen in Bulgarian and Serbo-Croatian, is possible in English even if by weak features. That is, since the second *wh*-phrase never rises to CP in the overt syntax, the concept of violation repair proposed by Richards is not welcome in the sense of the thesis followed here.

As for an empirical problem, if there was a weak feature to overtly attract another *wh*-phrase, for which phonological contents were determined by deleting the original copy, an interrogative sentence, as in (25b), should be grammatical.

(25) A: I had to make something with some tool for my summer project.

B: Oh, really?

a. What did you have to make with which tool?

b. \* [What]<sub>i</sub> [with which tool]<sub>j</sub> did you [~~make *t<sub>i</sub>* *t<sub>j</sub>*~~]?

(25a) is a normal *wh* in-situ interrogative, but in (25b) two *wh*-phrases are fronted to the Spec-CP with the VP deleted. The proposed analysis, however, expects (25b) to be grammatical because the original copy of the second *wh*-phrase moved by the weak feature undergoes deletion. PF should be able to determine a single position for pronunciation in this case. However, the movement results in the ungrammaticality in (25). This indicates that Richards' analysis is not persuasive enough.

### 3.2 Lasnik (2013)

Against Richards (2001) and Merchant (2001), Lasnik (2013) makes a somewhat different analysis of multiple sluicing, assuming that the second *wh*-phrase undergoes a rightward focus movement. Let us see how correctly his account explains this phenomenon.

Lasnik points out that if Richards' account of violation repair by deletion is correct, the example in (29) should be grammatical.

(29) \* One of the students said that Mary spoke to one of the professors, but I don't know which student to which professor. (Lasnik (2013: 6))

As (29) shows, multiple sluicing involving the second *wh*-phrase in the embedded clause associated with the *wh*-phrase in the matrix is not possible. This fact is not expected by Richards' explanation. In order to explain the facts above, Lasnik claims

that the second *wh*-phrase is not a true *wh*-phrase, but a kind of focus element to be extraposed, which, therefore, must follow the Right Roof Constraint.<sup>7</sup> The preference of PP over DP as the second *wh*-phrase in multiple sluicing, shown in (30), is explained in this point. In fact, in constructions which involve rightward focus movement, PP can be the end focus element even when it is not so “heavy,” as in (32). Suppose here that the more (new) information relevant elements have, the “heavier” they will be. Compare (30) and (31-32).

- (30) a. ? Someone talked about something, but I can't remember who about what.  
b. ?\*Someone saw something, but I can't remember who what.  
(Lasnik (2013: 8))
- (31) a. \* Mary saw yesterday Harry.  
b. Mary saw yesterday her old friend Mary.  
c. Mary saw yesterday Harry Hetherington. (Lasnik (2013: 9))
- (32) Mary spoke yesterday to him. (Lasnik (2013: 9))

As the examples above illustrate, while rightward DP movement is only possible when it has heavy information, PP can be moved rightward even when it is light. The facts in (31) and (32) are very similar to the ones observed in multiple sluicing in (30), where the second *wh*-phrase as PP can function as a remnant element, but DP cannot. Surprisingly, if the DP in the antecedent clause corresponding to the second *wh*-phrase in the elided clause is heavy or focused, multiple sluicing seems to be slightly better even when the second *wh*-phrase is DP.

- (33) ? Some linguist criticized (yesterday) some paper about sluicing, but I don't know which linguist which paper about sluicing. (Lasnik (2013: 9))

With the discussion above, Lasnik concludes that the second *wh*-phrase undergoes the rightward focus movement at least to a position higher than a deleted constituent. Consequently, this conclusion explains the grammaticality of (29) because of the clause bound condition of rightward movement.

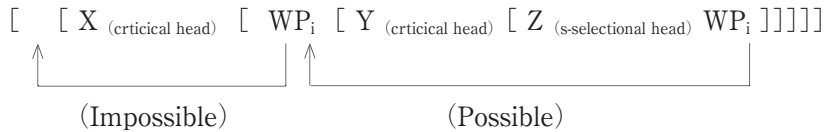
However, there are some problems with his analysis, too. One of them has something to do with the criterial freezing effect advocated by Rizzi (2006, 2010). According to Rizzi (2010), an element once moved to another position for scope interpretation or surface semantic (discourse) interpretation such as informational structures, topicalization or focalization, cannot move anywhere for another different

interpretation, whether overtly or covertly. This terminates “the chain as soon as the first Criterial position is reached” (Rizzi (2010: 20)), which is illustrated as (34).

(34) Criterial Freezing

In a criterial configuration, the Criterial Goal is frozen in place.

(Rizzi (2010: 22))



(Adapted from Rizzi (2010))

This principle explains the facts below.

- (35) a. Who thinks that Mary hates which problem?  
b. \* Who thinks that which problem, Mary hates *t*? (Rizzi (2010: 23))

According to Rizzi, the *wh*-phrase in (35b) is moved to a topicalized position in the embedded clause, but it freezes in the place and cannot be moved for another interpretation as an operator. This is one of the criterial freezing effects.<sup>8</sup> If Rizzi's analysis shown here is correct, Lasnik's proposal that the second *wh*-phrase in multiple sluicing first moves rightward becomes wrong. That is, the second *wh*-phrase freezes in the extraposed position in the embedded clause and, as a result, it will be prevented from moving further for another interpretation as a *wh*-operator. This is crucial for Lasnik's analysis. Therefore, another analysis is needed to explain multiple sluicing. In the next section, I would like to consider a possible analysis, which is not perfect but becomes a stepping stone for a better analysis.

#### 4. A Possible Alternative Analysis of Multiple Sluicing

Before considering an alternative analysis, it seems worthwhile to examine another fact observed in multiple sluicing. As pointed out by Bolinger (1978) and Nishigauchi (1998), multiple sluicing is only possible when it admits a pair-list reading like in (36). Compare (36) and (37).

- (36) A: Who brought what?  
B: Bradon brought wine, Dice beer, Cindy vodka.
- (37) A: In every class, one of the students had to talk about one of the topics given by the professor, but do you know who about which topic?  
B: Yes, as far as I know.

- a. Brandon talked about NFL games, Dice about NHL, and Cindy about the new Chomsky book...
- b. \* Brandon talked about which topic, Dice about which topic, and Cindy about which topic...

Just like (36), the second sentence in (37) requires two elements as the answer to the antecedent sentence. Since a pair-list reading is possible as an answer, the second *wh*-phrase also should be fronted to Spec-CP somehow. In fact, it may have to be interpreted at least at the position for the derivation to converge, or it should not be given an appropriate interpretation as an operator. The facts above, therefore, may apparently support Richards' idea that both of the *wh*-phrases move to Spec-CP. However, as we have seen above, no features should attract multiple *wh*-fronting in English. If so, we have to ask how the *wh*-movement is induced? Furthermore, how is the ellipsis site for multiple sluicing guaranteed? I claim, instead, that the second *wh*-phrase doesn't move, but the relevant parts can be deleted under parallelism, with the second *wh*-phrase remaining in the original position.

Now, I will make the following proposals as an alternative analysis of multiple sluicing.

- (38) a. Parallelism: Multiple sluicing obeys a kind of parallelism, which has been proposed for other elliptical structures. (cf. Fox (2000), Merchant (2001) among others)
- b. Phase-based evaluation for parallelism: Suppose that all derivations proceed phase by phase (Chomsky (2000)). As a matter of fact, since multiple sluicing is limited to a minimal clause, which I call "phase-mateness," suppose that the *v*P containing *wh*-phrases and the one in the antecedent clause are subject to evaluation of parallelism in the course of their derivations.
- c. The second *wh*-phrase doesn't move at all (overtly or covertly): The second *wh*-phrase is bound in situ by an operator in the containing *v*P.

(Higginbotham and May (1981) and Reinhart (2006))

My claim in (38a) is natural. It has been widely accepted that a kind of parallelism between an antecedent clause and the elided one should hold in order to license phonological reduction or deletion. Although parallelism for deletion has been interpreted in various ways, one of the conditions they have in common is some

kind of isomorphism, which seems to play a very important role to license deletion. Abstracting the isomorphism from Fox (2000) and Merchant (2001), therefore, let's take parallelism as (39).

(39) Parallelism

Deletion is licensed only if the LF of a structure containing the elided material is structurally isomorphic to that of the antecedent.<sup>9</sup>

Since it seems reasonable to apply the general condition of parallelism above to multiple sluicing in question too, our claim in (38a) is not unnatural at all.

As for (38b), I assume, following the phase-based theory proposed by Chomsky (2000, 2001, 2008), that derivation proceeds cyclically, in particular, phase by phase, and each phase undergoes Spell-Out. This is summarized as below.

- (40) Computation hands each phase to the sensorimotor (SM) interface and the conceptual-intentional (CI) interface. (phase = *v*P and CP)  
(cf. Chomsky (2000, 2001, 2008))

Following the strong minimalist thesis, it is essential to adopt this conventional minimalist assumption. Based on the cyclic Spell-Out in (40), it is unproblematic that evaluation for parallelism should also be induced cyclically. Recall that, as discussed by Fox and Pesetsky (2003), multiple sluicing is only possible when *wh*-phrases are all in the same minimal clause: clause-mateness, which I take as “phase-mateness.” I will turn to this issue later.

With respect to (38c), the idea is not extraordinary, either. As seen above, the second *wh*-phrase in an English multiple question such as (41) does not move overtly, but a pair-list reading is still possible.

- (41) a. A: Who read the book that criticized who?  
B: John read the book that criticized Chomsky, Bill read the book that criticized Hornstein, and Tom read the book that criticized Lasnik.  
b. A: Who wonders where we bought what?  
B: John wonders where we bought apples, Bill wonders where we bought oranges, and Tom wonders where we bought bananas.

The second *wh*-phrase is deeply embedded, functioning as the object in the second sentence. Nevertheless, the second *wh*-phrase can be interpreted in conjunction with the first *wh*-phrase. In order to account for this fact, following Reinhart (2006), I assume that the second *wh*-phrase is bound in the original position by a certain

operator without any covert movement (See Higginbotham and May (1981) and Reinhart (2006)). This is roughly illustrated as in (42).

- (42) (WH x) (WH y) (x read the book that criticized y).

Applying this to multiple sluicing, I claim that the second *wh*-phrase in multiple sluicing is not moved at all, but is bound by its associated operator as shown in (42). If so, it is possible to assume that the second *wh*-phrase undergoes neither *wh*-movement proposed by Richards (2001) nor rightward focus movement proposed by Lasnik (2013), but the binding relation between the operator and its *wh*-phrase above will also hold in multiple sluicing.

Now I turn to the fact that multiple sluicing is a very local phenomenon. See (43-44).

- (43) a. Fred thinks a certain boy talked to a certain girl.  
b. I wish I could remember which boy to what girl.
- (44) a. A certain boy said that Fred talked to a certain girl.  
\* I wish I could remember which boy to what girl. (Lasnik (2013: 12))  
b. \* One of the students said that Mary spoke to one of the professors, but I don't know which student to which professor. (=16b) (Lasnik (2013: 6))

Fox and Pesetsky (2003) provide the examples above, showing that grammatical multiple sluicing includes the *wh*-phrases in the same minimal clause. Furthermore, they claim that remnant elements should be both in the same phase in terms of linearization of constructed structures. This observation seems to be correct. In fact, Lasnik proposes semantic accommodation and claims that (43b) is derived from (45a), not (45b).

- (45) a. I wish I could remember which boy talked to what girl.  
b. I wish I could remember which boy Fred thinks talked to what girl.  
(Lasnik (2013: 12))

That is, in multiple sluicing lies some kind of very local relationship, which seems to be one of the peculiar properties of the elided structure in question. Considering that their account is correct and that multiple sluicing is limited to the same minimal clause domain, I can propose that there is a peculiar condition of “phase-mateness” involved in multiple sluicing (as in (38b)). This analysis also correctly explains the ungrammaticality of (44) since the relevant *wh*-phrases are not both in the same phase.<sup>10</sup>

With the proposals in (38), let's see how they work to account for the derivation of multiple sluicing. Consider the derivation of (1) for example, repeated as in (46). First, following Lasnik's accommodation, suppose that the second clause in (46a) is derived from (46b).

- (46) I know that in each instance one of the girls got something from one of the boys.
- a. But they didn't tell me which from which.
- b. But they didn't tell me which got something from which.

Given the cyclic derivation, the first Spell-Out is induced for the embedded  $vP$  in both the antecedent clause and the elided clause.<sup>11</sup> According to Heim (1982), an indefinite noun can be converted into a variable and bound by an existential closure.<sup>12</sup> Under this analysis, the LF structure of the antecedent  $vP$  is illustrated as in (47).

- (47)  $(\exists x \text{ } x: \text{a girl}) (\exists y \text{ } y: \text{a boy}) (\text{}_{vP} x \text{ got something from } y)$

What about the second clause with the elided structure? Adapting the assumption we have just seen in (42) (Higginbotham and May (1981), and Reinhart (2006)), if binding operators are inserted locally into  $vP$ , the LF structure of the  $vP$  with *wh*-phrases is roughly represented as in (48).

- (48)  $(\text{which } x \text{ } x: \text{a girl}) (\text{which } y \text{ } y: \text{a boy}) (\text{}_{vP} x \text{ got something from } y)$

At this point of the derivation, parallelism is checked. The LF structures in both the antecedent clause and the elided one are exactly the same. Therefore, contrary to the conventional assumption that the TP constituent is deleted, the parallelism in (39) allows the inner constituent to be deleted. This is illustrated as in (49).

- (49) The antecedent clause:  $(\exists x \text{ } x: \text{a girl}) (\exists y \text{ } y: \text{a boy}) (\text{}_{vP} x \text{ got something from } y)$
- The elided clause:  $(\text{which } x \text{ } x: \text{a girl}) (\text{which } y \text{ } y: \text{a boy}) (\text{}_{vP} x \text{ got something from } y)$

As a result, (46a) is obtained by deleting the inner structure, which is illustrated in (50).

- (50) ... But they didn't tell me which  $[\text{}_{vP} \text{ } \cancel{t(\text{got something})}]$  from which]. (PF Deletion)

Although, under conventional analyses, a constituent such as CP, TP, or  $vP$  is supposed to be deleted, it seems possible to delete some limited parts in a structure as long as parallelism is observed.

The procedure of local insertion of semantic operators into the smallest  $vP$  showed

above may be a special treatment only for multiple sluicing. One may argue against the proposals here and question why an element in *vP* should be bound at the point of Spell-Out of a *vP* phase. However, the local insertion of those operators, itself, doesn't raise so serious problems, because it is plausible that some elements in *vP* are bound by a certain operator at the *vP* level. This is supported by an analysis of VP deletion as in (51).

(51) Mary met Bill at Berkeley and Sue did too.

In order to account for the possibility of VP deletion, a similar account based on parallelism has been proposed.

(52) VP Deletion

A VP can be deleted only when the LF of the deleted VP is isomorphic to that of the antecedent. (cf. Merchant (2001))

Under the condition above, the LF structures of (51) are as follows.

(53) VP (antecedent) =  $(\exists x) (x \text{ met Bill})$

VP (ellipsis) =  $(\exists y) (y \text{ met Bill})$

Since the LF structures of both VPs are the same, observing parallelism, (51) is correctly derived under (52). If the LF structure of each VP is used to evaluate the parallelism of VP deletion, it is possible that the LF structure of the *vP* in multiple sluicing should also be available in order to check their parallelism.

Given the phase-mateness in multiple sluicing and the proposals here, the inapplicability of the local insertion of operator to the structures outside the embedded *vP* will explain the impossibility of the multiple sluicing involving the first *wh*-phrase in the matrix or a higher clause and the second *wh*-phrase in the embedded clause, as in (16b), repeated as (54).

(54) \* One of the students said that Mary spoke to one of the professors, but I don't know which student to which professor. (Lasnik (2014: 6))

Considering the LF structures of each *vP* in (54), they don't match each other.

(55) *vP* (antecedent) =  $(\exists x \ x: \text{a professor}) (\text{Mary spoke to } x)$

*vP* (ellipsis) =  $(\text{which } x \ x: \text{a student}) (\text{which } y \ y: \text{a professor}) (\text{ } x \text{ said that Mary spoke to } x)$

The LF structure of *vP* with ellipsis is not possible under (38b). Because of the LF structural difference between the LF structures of *vPs*, the multiple sluicing in (54) is ruled out.



In this section, based on the proposals in (38), we have seen how the mysterious multiple sluicing is derived.

## 5. Conclusion: Still Some Mysteries

In this paper, I have explored a possible alternative analysis of multiple sluicing. Surprisingly, there are some instances of multiple sluicing observed even in languages without multiple *wh*-fronting. Because of their attracting phenomena, it is intriguing to propose an analysis within the minimalist framework. I have closely reviewed previous proposals by Richards (2001) and Lasnik (2013), which, I have pointed out, have some empirical and theoretical problems. In order to propose a possible alternative analysis, I have claimed (1) that a general parallelism such as Fox (2000) and Merchant (2001) should also be applied to multiple sluicing, (2) that some special interpretive procedure of local insertion of operators is applied exclusively to the *v*P in multiple sluicing, and (3) that since multiple overt-fronting is not possible in English, the second *wh*-phrase is not moved overtly or covertly, but is bound by an operator at the *v*P phase. Under these assumptions, I have proposed an alternative analysis within the minimalist program, in particular, the phase-based theory.

However, there are some problems left unsolved. It is still unclear why is PP preferred as the second remnant. Another problem is why the insertion of operators cannot wait for the a matrix clause to be established, which may be a peculiar property of multiple sluicing. It seems that this is still a construction-specific procedure for interpretation, which had better be avoided in the minimalist program. Unfortunately, so far, I don't have any solution to this question. I would like to put this problem aside for further study. Nevertheless, one possible answer to this question is that since the second *wh*-phrase is not required for other syntactic operations in the later computation, it should be spelled out once and for all, as soon as the containing phase is spelled out of the computation. However, obviously, we need further discussion to support this conclusion.

Although there are some issues left unclear and their solutions may be imperfect, the alternative analysis proposed here for multiple sluicing, as a stepping-stone, has shed a light on clarifying the derivation of multiple sluicing. Continuous study is needed to understand the faculty of language.

## Notes

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1. In addition to the examples given in this paper, there are also other examples of elliptical structures. With respect to the derivations of each structure, there have been mainly two kinds of derivations proposed in generative grammar: Phonetic Form (PF) deletion and Logical Form (LF) copying, by Ross (1969), Chomsky (1972), and Merchant (2001), and Chung, Ladusaw, and McClosky (1995), respectively to name a few. In this paper, I will not discuss which analysis is the more adequate analysis of the two, but I will keep to the PF deletion analysis for explanatory purposes.
2. Gengel (2013) provides an extensive analysis of pseudogapping. See Jayaseelan (1990) and Gengel (2013) for their discussion.
3. Although some analyses of the derivation of sluicing as in (6) have been proposed in the minimalist framework by Chomsky (1972), Chung, Ladusaw, and McClosky (1995), Fox and Lasnik (2003), Merchant (2001), Ross (1986) among others, a lot of empirical and theoretical problems still remain to be addressed. For discussion, see Hirai (2009, 2013).
4. Takahashi (1994) claims that multiple sluicing is not possible in English as shown below.
  - (i) John said someone bought something.
    - a. \* Mary wonders who what.
    - b. Mary wonders who bought what.We will turn to this issue later, to which, unfortunately, we don't have a concrete answer in this paper.
5. For other analyses and more discussion, see Bolinger (1978), Richards (1997), and Takahashi (1994).
6. Chomsky (p.c.) suggested to me that covert phrasal movement may be induced by a certain feature. However, it is still unclear what kind of feature exactly motivates the covert phrasal movement within the current framework. See also Pesetsky

- (2000).
7. The Right Roof Constraint doesn't allow any element to move rightward out of the minimal containing clause (Ross (1986)). Therefore, rightward movement induced here is clause-bound.
  8. This is also called "scope freezing." See Bošković (2008) for further discussion.
  9. See Fox (2000), Merchant (2001), Hirai (2013) among others for discussion.
  10. As shown in Lasnik (2014), there are some examples where accommodation is not available.
    - (i) a. Fred denied that a certain boy talked to a certain girl.  
       ??? I wish I could remember which boy to what girl.
    - b. Fred doubts that a certain boy talked to a certain girl.  
       ?\* I wish I could remember which boy to what girl. (Lasnik 2014: 12))
 Since all the *wh*-phrases are in the minimal phase domain, these examples should be grammatical under my proposals. However, multiple sluicing is judged as impossible. Some other aspects might have been involved in the derivation. I will put this matter for further research.
  11. Here, following Chomsky (1995), I assume that, in dual clauses, derivations proceed simultaneously for each clause.
  12. Chung, Ladusaw, and McClosky (1995), Reinhart (2006), Hirai (2009) among others argue that long distance binding by existential or *wh*-operator, is still possible for simple sluicing. However, since, as Merchant (2000) discusses, semantic accommodation is available even for simple sluicing, which ends up with no islands intervening in simple sluicing, it is possible that we can dispense with unwelcome long-distance binding.

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