A Minimalist Analysis of Sluicing

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Abstract

This paper aims to provide a more adequate analysis of Sluicing as in (1) under the current minimalist framework advocated in Chomsky (1995, 2000, 2001a, 2001b, 2005).

(1) 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 she kissed a man who bit.

Since the 1960s, how this kind of construction is generated has been one of the most mysterious topics, for which a lot of proposals have been presented. However, none of them can explain this construction with reasonable solutions, specifically in Chomsky (2005).

To provide a more adequate account, I argue that as a Sluicing operation, harmful islands are deleted at PF before movement of a *wh*-phrase, and the deletion of islands allow a *wh*-phrase to move successive cyclically under the phase-based theory as PF movement. Thanks to this operation, movement can avoid violating any island condition. I also claim that as a licensing condition of Sluicing, Fox's (2000) Parallelism must be satisfied, and this requirement is only satisfied when the dependency in the antecedent which is established as a result of cyclic LF movement is structurally isomorphic to the dependency in the second created as a result of *wh*-movement for interpretation. Besides, I discuss the possibility that my analysis of Sluicing can explain another empirical evidence of pseudo-gapping with control infinitives.

Keywords: the Minimalist Program, Sluicing, Parallelism, PF movement, cyclic derivation

1. Introduction

Since the early study of the generative grammar, sentences called "sluicing" like (1) have been one of the most interesting phenomena, and a lot of linguists have tried to explain how they are generated.

(1) a. Ralph is going to invite somebody from Kankakee to the party, but they don't

know who he's going to invite to the party.

    b. Ralph is going to invite somebody from Kankakee to the party, but they don't

      know who.   (Ross (1969 : 252))

The sentences in (1) are both grammatical even if the embedded clause except the moved ele-
ment *who* is deleted as in (1b). However, things are different when the unsaid constituents
include a so-called "island."

  (2) 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. I believe the claim that he bit someone, but they don't know who (*I believe the

      claim that he bit).   (Fox and Lasnik (2003 : 144[1]))

    c. Sandy was trying to work out which students would be able to solve a certain

      problem, but she wouldn't tell us which one (* ?she was trying to work out

      which students would be able to solve).

                     (Chung, Ladusaw, and McCloskey (1995 : 272))

Here the silent parts include a familiar island : a relative clause in (2a), a noun complement
in (2b), and a *wh*-island in (2c). As seen above, if the island is phonologically realized, the
sentence will be ungrammatical as island violation unlike (1). The island violation, however,
seems to be obviated if everything but the preposed *wh*-phrase in the complemen is deleted.[2]
This seems to be a special property of this construction (Fox and Lasnik (2003)). To my
knowledge, with respect to these mysterious phenomena, no satisfying explanation has not
been suggested within the minimalist approach, specially in Chomsky (2005).

    In this paper, by clarifying special features of Sluicing, I would like to provide a possible
alternative analysis of Sluicing within the framework of the minimalist approach advocated
by Chomsky (1995, 2000, 2001a, 2001b, 2005). Specifically, I argue that Sluicing is a result of
both deletion of islands before movement of a *wh*-phrase at PF and satisfying of Parallelism
that Fox (2000) suggests for a various kinds of ellipsis. I also claim that for Sluicing to be
licensed, there must be an element in the antecedent to establish an operator-variable de-
pendency under a phase-based theory, and it should be established by cyclic LF movement.
It is also suggested that a *wh*-phrase in the second clause is spelled out in situ and moved
phase by phase at PF after island deletion, instead of one-fell-swoop movement assumed in
Fox and Lasnik (2003), and that if the dependency created as a result of interpretation of a
wh-phrase in the second clause is structurally isomorphic to that in the antecedent, Sluicing
is allowed.

    The discussion below falls in 5 sections. In Section 2, I will review briefly previous analy-
ses of LF Copying suggested in Chung, Ladusaw, and McCloskey (1995) (CLM) and PF
Deletion mainly in Ross (1969), Chomsky (1972), and Merchant (2001), claiming that LF
copying is not welcome because of "late-merge" or "no-tampering condition," and partly
agreeing with PF-deletion. Section 3 provides a possible alternative analysis of Sluicing with-
in the minimalist framework by modifying Fox and Lasnik (2003), adapting Fox's (2000)

Parallelism, and assuming cyclic LF movement (quantifier raising (QR)). Then, in Section 4, I also show that my analysis can also explain other empirical evidence, and Section 5 is for a conclusion.

2. Previous Analyses

2.1 LF Copying and Its Problems

The most significant analysis of Sluicing in favor of LF copying is suggested by CLM. Following Chao (1987) and Lobeck (1995), CLM argues that Sluicing involves LF-copying of TP (IP in their term) called "IP (TP) recycling," without any movement or deletion. According to their suggestion, the sluiced clause involves the structure illustrated in (3), where the C-head and its complement TP are null, and the content of the antecedent corresponding to the elided part is copied into the null TP at LF for the interpretation of a constituent question. Thus, Sluicing is attributed to whether the interpretation is possible or not. Let's consider, for example, (3). The first TP in the antecedent is copied into the null TP, deriving (3b).

(3)   a. $[_{TP}$ John $[_{VP}$ saw someone$]]$, but I wonder $[_{CP}$ who $[_{C'}$ e $[_{TP}$ $e]]]$

   b. $[_{TP}$ John $[_{VP}$ saw someone$]]$, but I wonder $[_{CP}$ who $[_{C'}$ e $[_{TP}$ John saw someone$]]]$

Following Heim (1982), CLM assumes that indefinites only provides a variable that is bound by an operator, in this case, existential closure. Thus, the logical form of the antecedent clause (4a) is roughly illustrated as in (4b).

(4)   a. $[_{TP}$ John $[_{VP}$ saw someone$]]$

   b. $(\exists x : person(x))$ $[John saw x]$[3)

Since in the elided clause, where the speaker is wondering about the meaning expressed by the complement CP, *who John saw*, the dislocated *wh*-phrase has no variables to bind, this will violate a condition on vacuous variable-binding. This problem is remedied by a recycling (copying) operation called "merger." If the content of the antecedent TP (4b) is copied into the null TP in the second clause, the obtained logical form will be (5). Since an indefinite noun provides a variable, the *wh*-phrase binds the variable provided by the indefinite, avoiding the problem. Consequently, the intended interpretation will be available.

(5)   a. $[_{CP}$ who $[_{C'}$ e [John [saw someone]]]]

   b. For which x: person(x) ([John saw x])

The point here is whether LF Copying can provide variables that the fronted *wh*-phrase can bind. Since no movement is implemented in their analysis, it is possible to expect no island violation to hold.

However, there are some problems that arise immediately. First, as Ross (1969) and Merchant (2001) point out, the remnant *wh*-phrase shows the Case-agreement with one of the deleted elements, instead of the matrix elements.

(6) a. Somebody from Kankakee is going to be invited to the party by Ralph, but they
         don't know who/*whom is going to be invited to the party by Ralph.

     b. Somebody from Kankakee is going to be invited to the party by Ralph, but they
         don't know who/*whom.   (Ross (1969 : 254))

In an English dialect that distinguishes between *who* and *whom*, only *who* is allowed in the
context in (6), but not *whom*. Similar facts can also be found in Greek. Consider (7).

(7) a. Kapjos irthe, alla dhe ksero (pjos/*pjon).

         someone came, but not know-1SG who-NOM/*who-ACC

         'Someone came, but I don't know who.'

     b. Dhe ksero (*i apantisi/tin apantisi).

         not know-1SG *the answer-NOM/the answer-ACC

         'I don't know the answer.'   (Merchant (2001 : 43))

If Accusative Case is assigned to the object of the verb *know* as in (7b), Accusative Case
should also be assigned to the object *who* in the second clause in (7a), but Nominative Case
is assigned to the objects. If Case is assigned in Syntax under probe-goal agreement system,
some probe that values the Case of *wh*-phrase must appear in Syntax. This requirement and
these facts just shown above show that the salvaged elements have been extracted out of the
elided clause. LF copying, however, cannot possibly meet this requirement or explain this
empirical evidence.

Second, there is a conceptual problem that is crucial in the minimalist framework advo-
cated by Chomsky (2001b, 2005). If Strong Minimalist Thesis (SMT) and strict efficient
computation that follows from it must be preserved, it is assumed that each derivation goes
phase by phase, and computation "forgets" phases that have already been passed. That is, ev-
ery derivation is assumed to proceed in parallel in terms of PF and LF. This assumption has
eliminated the level of (global) LF representation. If so, LF copying that tries to copy more
than one phase into categories already finished is not acceptable. Furthermore, this LF
copying operation may also violate "no-tampering condition" (see Chomsky (2005)). Thus,
we can conclude that this operation is impossible with the minimalist framework.

In addition, the operation LF Copying requires a heavy burden of "late-merge," some ver-
sion of which is suggested by Lebeaux (1988). Lebeaux (1988) argues that some kind of
late-merge of adjuncts is necessary to explain the fact of (8).

(8) [Which [picture [of Bill]] [$_{ADJ}$ that John liked]]$_i$ did he buy t_i ?

In (8), the relation between *Bill* and *he* is impossible because of Condition C, while the rela-
tion between *John* and *he* is not. Lebeaux claims that the fact of obviation of Condition C in
(8) is accounted for by assuming that the adjunct, *that John liked* is merged later, perhaps
after "spell-out." This idea, however, never fit well in the single cyclic derivation required in
favor of efficient computaion.[4]

Another problem is that this approach cannot explain ungrammaticality of (9), as pointed
out by Merchant (2001).

(9)   *What$_i$ did you buy something$_i$ at that store ?

If the logical form of an indefinite and *wh*-phrase is represented as in (4) and (5) respectively, the logical from of (9) should be possible as in (10).

(10)   *For which x : thing(x) 「you bought x」

　　　(cf. You bought something.＝(∃x : thing(x)) 「you bought x」)

The ungrammaticality of (10) shows that CLM's approach is not on the right track. Therefore, we can conclude that another account must be required for more adequate explanation of Sluicing.

2.2 PF Deletion and Its Problems
2.2.1 PF Deletion

Instead of copying into elided categories at LF, proposals of deleting relevant constituents at PF have also been provided. To my knowledge, the first one is proposed by Ross (1969), which analyzes Sluicing by island repair. He claims that there is a rule of Sluicing in the linguistic theory, which applies after "Question Formation," and the application of this rule contributes to improvement of (2a) repeated as (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).

Building on Ross's (1969) analysis, Chomsky (1972) accounts for the grammatical improvement found in sluiced sentences in terms of derivational constraints. Chomsky claims that "#" is assigned to the relevant category if elements cross any syntactic island. That is, if movement violates island constraints, the relevant categories will result with having #s at surface structures. Then, a "filter-like" device rules out sentences with #s as deviance of island violations unless they are erased as a result of PF deletion. This means that if the PF operation, Sluicing applies, it deletes a phrase with # - checked categories, leading to remedying the derivation. This analysis is illustrated as in (12), where only relevant part is represented.

(12)   ⋯, but Tom doesn't realize [$_{CP}$ which one of my friends]$_i$ [$_{IP}$ she kissed [# a man
　　　[who bit t_i]]].   (PF Deletion (Sluicing))

However, there are some crucial problems with this analysis in terms of the current framework. First of all, why island violating movement is possible in the first place ? If derivation proceeds phase by phase, keeping to the Phase Impenetrability Condition (PIC) which requires successive cyclic movement to go through every phase edge, Spec-CP and Spec-v^*P, why one-fell-swoop-like movement is allowed ? Second, if a harmful mark # is assigned in the course of derivation of an expression, this will cause a conceptual problem in the minimalist framework; violation of "inclusiveness principle." According to Chomsky (2001b, 2005), no new elements can be introduced or added to categories that are already formed in narrow syntax. As requirements of efficient computation, descriptive devices such as bar-levels, traces, and indices must be dispensed with unless they have a principled ex-

planation which meets Strong Minimalist Thesis.

Another problem with this analysis is found in a similar construction with ellipsis as in (13).

(13) a. They want to hire someone who speaks a Balkan language, but I don't know
which [*(Balkan language) they want to hire someone who speaks t].

b. *They want to hire someone who speaks a Balkan language, but I don't know
which (Balkan language) they do [~~VP want to hire someone who speaks t~~].

(Fox and Lasnik (2003 : 147))

(14)   *They want to hire someone who speaks a Balkan language, but I don't know
which (Balkan language) they do [~~VP want to hire someone [#who speaks t]~~].

The # - marked representation of (13b) is illustrated in (14). The sentence in (13b), where
only the VP in the second sentence is deleted (VP-ellipsis (VPE)), is the same as (13a) in
their grammaticality. Here again, exactly like a Sluicing example (13a), a harmful mark # is
eliminated as a result of Sluicing operation as in (14). If existence of # was a crucial problem,
derivations without any #s would have to be salvaged. The grammaticality of (13b), never-
theless, can not be improved, contrary to expectation.

As discussed above, another different approach is necessary for accounting for Sluicing. In
next section, I will consider another analysis of PF deletion proposed by Fox and Lasnik
(2003) which is based on LF structures and Parallelism suggested by Fiengo and May
(1994).

2.3 PF Deletion : LF Structures and Parallelism

Fox and Lasnik (2003) mentions that in a usual case, in the sluiced constituent, there is a
trace in a position parallel to that of an indefinite NP in the antecedent clause as in (15), and
argues that the environment that allows sluicing must satisfy a Parallelism requirement
based on operator-variable dependencies.

(15) Fred said that I talked to a certain girl, but I don't know which girl [~~Fred said that I
talked to t~~].

Following CLM, they assume that an indefinite NP must be bound by existential closure just
as a trace left by a *wh*-phrase must be bound in the sluiced clause. Following Reinhart
(1997), they also assume that both the *wh*-phrase and the indefinite NP in Sluicing involve
quantification over choice functions. This is illustrated in (16), more specifically in (17), where
the pied-piped element, *girl* is deleted as a result of reconstruction, and the tail of the chain
is interpreted.

(16)   ∃f choice function [Fred said that I talked to f(girl)], but I don't know
which g choice function (Fred said that I talked to g(girl)).

(17) a. which g ~~girl~~ λg' [Fred said that I talked to g'(girl)]

b. ∃f λf' [Fred said that I talked to f'(girl)]

(adapted from Fox and Lasnik (2003 : 149-150))

In (17), the Parallelism requirement is satisfied in that *which* functions like an existential

quantifier over choice function just like the case of the indefinite determiner *a*, binding its variable from the parallel position.

This analysis seems to be straightforward and quite convincing. However, some questions arise immediately, which must be answered with other empirical evidence. One of them is about non-cyclic movement. Their crucial point is in assuming that the *wh*-phrase moves in one fell swoop to the Spec-CP in the sluiced clause. This seems to be impossible because it crosses some islands. However, they claims that this movement never causes any problems since its island violation is "canceled" as a result of the operation of Sluicing at PF, and this is exactly one of the properties in sluicing constructions. However, it is assumed under the current minimalist framework that the derivation of an expression proceeds by obeying strict successive cyclic derivation in favor of efficient computation with "phase-by-phase" spell-out. If so, the moved element has to wait for the final CP to be merged. This means that this kind of movement that does not go through each "escape hatch" is never induced and thus, impossible within this framework.[5)]

Another problem is about the assumption of the existence of the LF representation. Just like the problem just discussed with LF Copying, the LF representation, where surface structures are globally interpreted, has already been assumed to be eliminated from the syntactic theory since it requires a massive amount of computation, which must be avoided in terms of SMT (Chomsky (2001b, 2005)). Therefore, it can be concluded at this point that appealing to the Parallelism based on the operator-variable dependency at the LF representation is problematic.[6)]

Nevertheless, comparing the unexpected operation of late-merge at LF under LF Copying which we have seen above in 2.1, their insight of PF deletion and Parallelism seems to be more tempting as long as we can dispense with the (global) LF representation. To present a more adequate analysis keeping to STM more reasonably, I suggest a possible alternative approach that explains Sluicing constructions by modifying the proposal by Fox and Lasnik (2003).

3. An Alternative Approach

Before presenting an alternative analysis, let's consider again properties of Sluicing to clarify the points to address. Considering the previous literature, we have noticed so far three main features of Sluicing: existence of indefinites (or its implication) in the antecedent, Parallelism, and island-insensitivity of movement in the sluiced clause. Suppose that these factors are essential for Sluicing and consider how Sluicing is generated.

As for the first, we have seen that the antecedent must involve indefinites which existential closure is supposed to bind, creating the identical dependency between an operator and variable. Without the dependency between existential closure and an indefinite DP, Sluicing would not be possible as in (18a).

However, we have some exceptions.

(18)   a .*He likes Abby, but I don't know who else (he likes t)?

         b. He likes ABBY, but I don't know who else (he likes t)?

         c. [ABBY]$_i$ He likes t_i, but I don't know [who else]$_j$ (he likes t_j)

(adapted from Fox and Lasnik (2003[8]))

It is widely observed that Sluicing cannot be licensed with the definite DP in the antecedent. In fact, as in (18a), where the definite DP in the position parallel to the trace left by the *wh*-phrase, *who else*, is a proper name, Sluicing is not possible as expected. Nevertheless, if the relevant noun in the antecedent is stressed as in (18b), the grammaticality will be improved. This might be problematic for the observation here. This problem, however, is solved easily. As Fox and Lasnik assumes, the stressed proper noun *ABBY* is semantically focused and covertly moved to the foremost position at LF, yielding the identical operator-variable relation like the dependency between existential closure and its variable (like a case of an indefinite DP). Consequently, Parallelism in their sense is satisfied, hence the grammaticality of (18b). Note that if there are any islands in the antecedent, the LF focalization is barred, and Sluicing will not be allowed.

(19)   *The detective ruled out the possibility that Fred killed ABBY, but I don't know who else (the detective ruled out the possibility that Fred killed).

As is well-known (partly discussed in Reinhart (2006)), these facts follows from the fact that quantifier raising (QR) of indefinites does not obey subjacency islands while strong quantifiers or LF focalization does in general. Thus, a normal Sluicing like (20), where an indefinite exists in the parallel position, does not causes any problem even if there is an island, while (19) does (see Reinhart (2006)).

(20)   The detective ruled out the possibility that Fred killed a girl/someone, but I don't know which girl/who (the detective ruled out the possibility that Fred killed).

Considering the discussion above, it is concluded that it is quite adequate to believe the idea that instead of the existence of an indefinite DP, there must be an element that contributes to forming a dependency between an operator-variable-like relation in the antecedent just like a *wh*-phrase and trace in the sluiced clause.[8]

If the idea we have discussed is on the right track, the next problem we have to solve is how the expected operator-variable dependency can be obtained without the recourse to the (global) LF representation. As I have discussed above, derivation must proceed phase by phase in the current framework of the minimalist program. If so, previous phases cannot be looked back at once the subsequent phase is reached. Chomsky formulates this as PIC, conforming as closely as possible to SMT. Thus, following Chomsky (2005), I assume that LF operations such as QR are also implemented phase by phase, specifically by a phase-head when transferred.[9] Following Fox (2000) in part, suppose that the ambiguity of (21) is illustrated as in (22). The indefinite DP, *a girl* moves through each phase-edge to the foremost edge position, Spec-CP, providing a specific reading.

(21) Every boy loves a girl. ($\forall > \exists$) ($\exists > \forall$)

(22) a. [$_{TP}$ Every boy$_i$ [$_{v*P}$ a girl$_j$ [t_i [$_{VP}$ loves t_j]]]] ($\forall > \exists$) (Obligatory QR)

b. [$_{CP}$ a girl$_j$ [$_{TP}$ Every boy$_i$ [$_{v*P}$ t_j [t_i [$_{VP}$ loves t_j]]]]] ($\exists > \forall$) (Optional QR)[10]

Under this analysis, (18) and (20), repeated as (23) and (24) respectively is illustrated as below. (I use bold types to show phases.)

(23) a. He likes ABBY, but I don't know who else (he likes t)?

b. [$_{CP}$ ABYY$_j$ [$_{TP}$ He$_i$ [$_{v*P}$ t_j [t_i [$_{VP}$ likes t_j]]]]]

(24) a. Max will believe anything that *someone* will tell him, ⋯.

b. [$_{CP}$ someone$_j$ C [$_{TP}$ Max will [$_{v*P}$ t_j v^* [$_{VP}$ believe anything [$_{CP}$ t_j [that [$_{TP}$ t_j will tell him]]]]]]]]

Note that the argument for cyclic QR can be supported by facts that strong quantifiers and focalization obey island conditions as discussed above. Recall that as seen above, Sluicing requires an element which will establish an operator-variable-like dependency, and it should be formed without recourse to the (global) LF representation. By assuming cyclic QR movement as in (22), the expected dependency is obtained.[11]

Next, we have to clarify what Parallelism is like. Since the parallel dependency seems to be essential to license not only Sluicing but also other constructions with ellipsis, as discussed in the literature, it is important to formulate Parallelism precisely. Here, let's take Fox's (2000) Parallelism. As is well-known, Parallelism is an essential concept for other structures with ellipsis. Consider (25).

(25) a. A boy admires every teacher, and Many girls do (every teacher), too.

($\forall > \exists$) ($\exists > \forall$)

b. Some boy admires every teacher, and Mary does (every teacher), too.

*($\forall > \exists$) ($\exists > \forall$)

(adapted from (Fox (2000: 91))

The sentences in (25) are examples of VP deletion. However, their interpretation is restricted. Fox explains this fact in terms of Parallelism. According to his analysis, in (25a), both clauses are scopally ambiguous because the scope inversion is possible in the first and second clause. However, in (25b), the universal quantifier cannot scope over the existential quantifier even in the first clause. That is, (25b) with VPE is only possible with the interpretation of ($\exists > \forall$). Under his analysis, inverted scope is only possible when it provides new interpretation. This prohibits the universal quantifier in the second from moving before *Mary*. From these facts above, the following generalization can be obtained.

Parallelism

Deletion is licensed only if the LF of a sentence that contains the elided material is structurally isomorphic to a sentence that contains the antecedent. (Fox (2000))

I will assume this concept holds and applies to Sluicing, too, and would like to explain how Sluicing is generated under this condition.

Next question to consider is that island violation is canceled if deleted in the second clause.

This question has been the most familiar property and the center of our interests, but has been hard to solve. I will show that this problem is overcome if we assume PF movement and LF movement of a *wh*-phrase.

(26)   a．but Tom doesn't realize $[_{CP}$ [which one of my friends]$_i$ $[_{c'}\varphi$ (*[she kissed [a man [who bit t_i]]])]].

      b．but she wouldn't tell us $[_{CP}$ [which one]$_i$ $[_{c'}\varphi$ (*? [she was trying to work out $[_{CP}$ [which students]$_j$ $[_{c'}\varphi$ $[_{TP}$ t_j [would be able to $[_{v*P}$ t_i [solve t_i]]]]]]]])]].[12]

Under the theory we are discussing, *wh*-movement found in the sluiced clause should not be possible if it keeps to derivation based on phases. In (26a), where an relative clause island is involved, the *wh*-phrase, *which one of my friends* cannot possibly be moved to the embedded Spec-CP because the *wh*-feature and edge (EPP‐) feature on the embedded C in the relative clause cannot access *which one of my friends*. Similarly, in (26b), where there is a *wh*-island, the *wh*-phrase, *which one* should not be allowed to be moved to the embedded CP because the Superiority condition prefers to access the closer subject, *which students*, barring further access to *which one* in the intermediate position CP from the embedded C (if *which one* is tacked in after *which student* in terms of Richards (1997)). This problem would also found even if *which one* cannot land on the Spec-CP because of non-existence of the edge (EPP-feature) on the C.

If the discussion here is correct, as long as PIC and locality conditions hold, movement of a *wh*-phrase to the position in Sluicing is inapplicable at overt Syntax. In short, the point is attributed to conditions on locality or PIC. Therefore, it is necessary to move the remnant at other components.

To solve this, suppose that a remnant *wh*-phrase, which is spelled out in situ, moves to the final position at PF after other categories including islands are deleted as a Sluicing operation. If so, a *wh*-phrase in a sluiced clause moves to the position at PF when the relevant phase-head spelled out just the way that covert movement is induced. This is not quite odd if we take into account the assumption that every movement is feature-driven by phase-heads, and even covert movement is carried out to an appropriate position by them at LF. PF movement over islands is not problematic at all because the relevant islands are deleted before movement of a remnant *wh*-phrase. Due to the deletion of islands, an attracting head can access to a remnant *wh*-phrase, and allows it to go a clear way with no congestion. The deletion of the other categories including islands is exactly a special operation of Sluicing. This is illustrated as in (27).

(27) but Tom doesn't realize $[_{CP}$ [which one of my friends]$_i$ $[_{c'}\varphi$ [(*she kissed [a man [who bit t_i)]]]]].

    a．$[_{v*P}$ v^* $[_{VP}$ bit [which one of my friends]]] (Spell out)

    b．$[_{v*P}$ [which one of my friends]$_i$ v^* $[_{VP}$ bit t_i]]

    c．[a man $[_{CP}$ who$_j$ $[_C$ φ $[_{TP}$ t_j $[_{v*P}$ [which one of my friends]$_i$ v^* $[_{VP}$ bit t_i]]]]]]

    d．~~[a man [CP who$_j$~~ $[_{CP}$ [which one of my friends]$_i$ ~~[C φ [TP t_j [v*P t_i v^* [VP bit~~

t_i]]]]]]]]

e. [$_{v*P}$ [which one of my friends]$_i$ v^* [kissed [a man [$_{CP}$ who$_j$ [$_{CP}$ t_i [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i v^* [$_{VP}$ bit t_i]]]]]]]]

f. [$_{CP}$ [which one of my friends]$_i$ C [she [$_{v*P}$ t_i v^* [kissed [a man [$_{CP}$ who$_j$ [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i v^* [$_{VP}$ bit t_i]]]]]]]]]]]

g. but Tom doesn't realize [$_{CP}$ [which one of my friends]$_i$ C [she [$_{v*P}$ t_i v^* [kissed [a man [$_{CP}$ who$_j$ [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i v^* [$_{VP}$ bit t_i]]]]]]]]]]]$^{13)}$]

(All movement of *which one of my friends* above is at PF.)

When the derivation reaches (27a), the *wh*-phrase, *which one of my friends*, is spelled out in situ. Then, the derivation continues. Then, when it reaches (27c), the *wh*-phrase is moved to the CP as in (27d). Then, right after the relative island [*a man* [*who* ···]] has been formed, it is deleted. After the deletion of the island, the next higher phase head attracts the *wh*-phrase and finally moves it to the specifier position at PF.

Note that the remnant is interpreted as LF movement just like *wh*-in-situ. As is well-known, *wh*-in-situ is free from island-violation. Consider (28).

(28) a. Who read the book that criticized who?

　　 b. Who wonders where you bought what?

　　 c. Who left before you read what?　　(Okuno and Ogawa (2002: 133-134))

Although the sentences in (28) include islands, the backmost *wh*-phrase can take wide scope over *who* in the matrix. In fact, the sentence in (29) is the possible answer to (28a).

(29) John read the book that criticized Chomsky, Bill read the book that criticized Hornstein, and Tom read the book that criticized Lasnik.

(Okuno and Ogawa (2002: 133-134))

Although a relative clause island is involved in the question (28a), *who* in the object can be questioned as in (29). This means that in Sluicing, a *wh*-phrase in situ can moves to the matrix Spec-CP somehow, and then it can be questioned.$^{14)}$

Now let's analyze a normal Sluicing of (2a) for example, repeated as (30) under the assumption I have just provided: the operator-variable dependency, Parallelism in Fox (2000), and deletion of islands at PF.

(30) 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).　　(Fox and Lasnik (2003: 144))

First, the indefinite DP, *one of my friends* undergoes QR movement at LF. Since, as seen above, QR doesn't obey conditions on island violation, the DP somehow covertly moves to the foremost position through every phase head. This is illustrated as in (31).

(31) a. [she kissed [a man [$_{CP}$ who$_j$ [$_{CP}$ [one of my friends]$_i$ [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i [$_{VP}$ bit t_i]]]]]]]].

　　 b. [$_{CP}$ [one of my friends]$_i$ [C [she [$_{v*P}$ t_i [kissed [a man [$_{CP}$ who$_j$ [$_{CP}$ t_i [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i [$_{VP}$ bit t_i]]]]]]]]]]]]].　　(The LF structure of the antecedent)

Second, the *wh*-phrase moves at PF after deleting syntactic islands as just discussed. This is

schematized again as in (32), where the final representation is shown.

(32)   but Tom doesn't realize [$_{CP}$ [which one of my friends]$_i$ [C [she [$_{v*P}$ t_i [kissed [a
       man [$_{CP}$ who$_j$ [$_{CP}$ t_i [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i [$_{VP}$ bit t_i]]]]]]]]]]]]]]]

Finally, for Sluicing to be licensed, the derivation must satisfy the Parallelism in Fox (2001),
repeated below.

   Parallelism

   Deletion is licensed only if the LF of a sentence that contains the elided material is
   structurally isomorphic to a sentence that contains the antecedent.   (Fox (2000))

Let's see how this condition is met by this case. The relevant structures of the second and
the antecedent conjunct are represented in (33) and (34), respectively.

(33)   The sluiced (second) clause

       but Tom doesn't realize [$_{CP}$ [which one of my friends]$_i$

       [C [she [$_{v*P}$ t_i [kissed [a man [$_{CP}$ who$_j$ [$_{CP}$ t_i [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i [$_{VP}$ bit
       t_i]]]]]]]]]]]]]]

(34)   The antecedent clause

       [$_{CP}$ [one of my friends]$_i$

       [C [she [$_{v*P}$ t_i [kissed [a man [$_{CP}$ who$_j$ [$_{CP}$ t_i [$_C$ φ [$_{TP}$ t_j [$_{v*P}$ t_i [$_{VP}$ bit
       t_i]]]]]]]]]]]]]]

The structure with Sluicing (33) is exactly structurally isomorphic to (34). Consequently, Para-
llelism is satisfied without any serious problems.[15]

   By assuming this way, derivation of Sluicing can be accounted for under the current mini-
malist framework.[16]

4. Consequences

   Let's consider what other empirical evidence we can account for under this analysis. Now
let's consider about case of control infinitives. As is pointed in Matsuyama (1998), pseudo-
gapping is possible with some verbs taking a subject control infinitive.[16]

(35)   a. I didn't expect to like a play, but I did φ a novel.   (φ=expect to like)

       b. I didn't try/want to write a play, but I did φ a novel.   (φ=try/want to write)

                                                                        (Matuyama (1998 : 102))

Jayaseelan (1990) assumes that a pseudo-gapping is derived by deleting the VP after the DP
a novel undergoes A-Movement, adjoining to the VP (Incomplete VP Deletion). In (36), after
the DPs in both the antecedent and the pseudo-gapped clauses are adjoined to the VP just
like Heavy DP Shift, the inner VP in the second is deleted.

(36)   a. Mary hasn't dated Bill, but she has Hary.

       b. Mary hasn't [$_{VP}$ [$_{VP}$ dated t_i] Bill$_i$], but she has [$_{VP}$ [$_{VP}$ dated t_j] Haryj].

                                                                        (Jayaseelan (1990 : 65))

Taking this deletion under the current theory, the deleted constituents in (35) are supposed to

be the (inner) matrix v^*P as illustrated in (37).[17]

(37) a. but I [$_{TP}$ did [$_{v^*P}$ ~~[$_{v^*P}$ [$_{v^*}$ [$_{VP}$ expect [$_{CP}$ [$_C$ [$_{TP}$ PRO [$_{T'}$ to [$_{v^*P}$ [$_v$ [$_{VP}$ like~~

t_i]] t_i]]]]]]]] a novel]]. (φ=expect to like)

b. I [$_{TP}$ did [$_{v^*P}$ ~~[$_{v^*P}$ [$_{v^*}$ [$_{VP}$ try/want [$_{CP}$ [$_C$ [$_{TP}$ PRO [$_{T'}$ to [$_{v^*P}$ [$_v$ [$_{VP}$ like~~

t_i]] t_i]]]]]]]]] a novel]]. (φ=try/want to like)

If the remnant DP moves to an A-position, this deletion is problematic. Although an intermediate landing site is required in the embedded CP to obey the PIC, movement through the embedded CP to the matrix v^*P ruled out because it will be so-called sandwiched A-A' - A movement (Nakajima (1984, 1986) and Nishikawa (1990)). Even if landed, it will causes vacuous movement since no φ - features are present on C. Thus, the infinitival clause is a kind of island.

I will show that the fact in (35) also be explained easily under the analysis just discussed above. The same questions as Sluicing exist in (35). Since the matrix v^*P is supposed to be deleted for pseudo-gapping, the remnant DP must be at least above the matrix v^*P. The movement, however, is ruled out because it crosses an island; specifically it violates either the PIC or vacuous movement. This problem is solved by the analysis provided for Sluicing: PF movement after deleting islands.

Suppose that the remnant DP and the corresponding DP moves to v^*P just like Object Shift (OS), but at PF. As discussed in Chomsky (2001a), in languages such as Icelandic an object moves to v^*P to derive interpretive complex such as new/old information, specificity-definiteness, focus or topic, as shown in (38).

(38) John T [that$_i$ [read t_i]]

Since the remnant DP in pseudo-gapping is considered to be semantically ("informationally") heavy just like Heavy DP because it is compared with that in the antecedent, it is possible to assume that the remnant DP is moved to the matrix v^*P.[18] This movement is carried out by moving the DP after deleting the relevant categories and embedded island CP at PF. Since the edge (EPP -) feature and φ - features in the matrix v^*P, as in the case of Sluicing, disappear before the interface, the derivation doesn't crush. The lowest phase is transferred with the remnant DP in situ as in (39).

(39) a. [$_{v^*P}$ [$_v$ [$_{VP}$ like a novel]]] (Spell-Out)

b. [$_{v^*P}$ a novel ~~[$_v$ [$_{VP}$ like t_i]]~~]

c. [v^* ~~[$_{VP}$ expect [$_{CP}$ [$_C$ [$_{TP}$ PRO [$_{T'}$ to~~ [$_{v^*P}$ a novel ~~[$_v$ [$_{VP}$ like t_i]]]]]]]]]

d. but I did [$_{v^*P}$ a novel ~~[$_{v^*P}$ [v^* [$_{VP}$ expect [$_{CP}$ [$_C$ [$_{TP}$ PRO [$_{T'}$ to [$_{v^*P}$ t_i [$_v$~~

~~[$_{VP}$ like t_i]]]]]]]]]]]]

Note that it is not problematic to assume the φ - features on the matrix v^* that agree with the embedded object. Support for this comes from Object Agreeing Climbing in Hungarian. In Hungarian, verbs in control infinitives assign accusative Case to their objects but do not carry object agreement morphology. The matrix verb, however, agrees with the embedded object in the subject control constructions.

(40) Mari látni akarta ezt.

Mari see-Inf. wanted-3SG+def. this acc.

'Mari wanted to see this.'   (Koopman and Szabolcsi (2000 : 121))

This means that a matrix v^* can enter into a φ - feature agreement relation with an embedded object, which is not morphologically realized in English. If so, it is plausible to assume that the embedded object is moved to the domain of the matrix v^*.

Next task is to make sure that isomorphic structures have been established to Parallelism. This seems to be hard to establish. Nevertheless, we can find that they are easily obtained if we see other evidence. As is discussed above, strong QR and phonologically stressed elements obey conditions on islands. If so, LF movement out of control infinitives seems to be ruled out. In fact, wide scope is not possible in contexts as in (41).

(41) a. Someone met the child that talked everyone. $^*(\forall > \exists)$

b. Someone wondered whether I talked to everyone. $^*(\forall > \exists)$

(Okuno and Ogawa (2002 : 133-134))

However, according to Hornstein (1995), when matrix verbs are ones shown in (35), even strong QR out of control infinitives is possible. Consider (42).

(42) Someone wants/expects/hopes [PRO to marry everyone]. $(\forall > \exists)\ (\exists > \forall)$

Thus, we can assume that the control infinitives selected by these kinds of verbs are insensitive to island violation by LF movement and doesn't block LF movement to the matrix v^*P. The corresponding DP in the antecedent is allowed to move covertly to the matrix v^*P over the embedded CP. The LF structure of the antecedent is considered to be (43a).

(43) a. I didn't [$_{v^*P}$ a play [$_{v^*P}$ [v^* [$_{VP}$ expect [$_{CP}$ [$_C$ [$_{TP}$ PRO [$_{T'}$ to [$_{v^*P}$ t_i [v [$_{VP}$ like t_i]]]]]]]]]]]]

b. but I did [$_{v^*P}$ a novel ~~[$_{v^*P}$ [v^* [$_{VP}$ expect [$_{CP}$ [$_C$ [$_{TP}$ PRO [$_{T'}$ to [$_{v^*P}$ t_i [v [$_{VP}$ like t_i]]]]]]]]]]]]~~

The structure of the antecedent in (43a) is exactly isomorphic to that of the deleted clause in (43b), satisfying Parallelism. Note that for specific interpretation, the remnant DP in the second covertly moves to the matrix v^*P since it is spelled-out in situ before pseudo-gapping just like cases of Sluicing. The discussion here shows that the apparent mystery in (35) is also accounted for straightforwardly under my analysis provided for Sluicing.

5. Conclusion

In this paper, I have examined three previous analyses of Sluicing, and have shown that none of them fit within the current minimalist framework. Instead, I have proposed an alternative analysis and have argued that as a Sluicing operation, harmful islands are deleted at PF before a wh-phrase moves, and the deletion of islands allow a wh-phrase to move as PF movement successive cyclically under the phase-based theory without violating any conditions on islands. I also claimed that in order to license Sluicing, Parallelism which captures

a wide variety of deletion must be satisfied, and this requirement is only satisfied when the dependency created as a result of PF movement is structurally isomorphic to the dependency in the antecedent which is established as a result of cyclic LF (QR) movement. In addition, I have also shown the possibility that my analysis of Sluicing can explain another empirical evidence of pseudo-gapping with control infinitives. One of the remaining issues is why feature-driven movement is possible at PF. Although this is very important and must be answered with reasonable explanation, my analysis here doesn't need any further assumption or speculation, but it fits well in the minimalist framework more naturally.

NOTES

* I would like to thank anonymous reviewers for invaluable comments. I'm also grateful to Karen McAllister and Harry Dauer for judging the examples in this paper. Needless to say, all remaining errors are my own.

1) Originally, from Ross (1969 : 276, 277). For more examples, see Chung, Ladusaw, and McCloskey (1995), Fox and Lasnik (2003), and Merchant (2001). All the examples provided in each paper include various kinds of islands, which are all repaired by deleting islands. The phenomena in question are pervasive.

2) Following Merchant (2001), I will assume that the syntactic category of the object in the second clause is CP, instead of DP, and its sluiced complement is TP as in (i). For further discussion of its categorial status, see Merchant (2001). Since all operations must apply to maximal projections, I also assume that TP is deleted in this case. I will return to this point in 2.1.

   (i) She kissed a man who bit one of my friends, but Tom doesn't realize [$_{CP}$ which one of my friends [C $_{TP}$ *she kissed a man who bit]]].

3) For more detailed version of the logical form, see CLM (p. 244).

4) For an analysis of the fact in (8) without late-merge, see Chomsky (2001b).

5) In addition, this movement needs an unexpected "look-ahead" computation that anticipates that harmful categories will be deleted at the end of the derivation. Moreover, these construction-specific operations or conditions should not be involved in the linguistic theory. Thus, this kind of exception is not welcome, either.

6) In a point, their solution is tempting to believe since their account easily explains ungrammaticality of VPE as (i).

   (i) *Fred said that I talked to a certain girl, but I don't know which g girl $\lambda g'$ [$_{TP}$ Fred T [$_{ASP-P}$ did [t [$_{VP}$ say that I talked to g'(girl)]]]]

                                                      (adapted from Fox and Lasnik (2003: 149-150))

   As in (i) if there was a possible landing site between ASP-P and VP, a moved element would have to land onto the position to obey locality. Since the position is not deleted, violation is not canceled. This intermediate trace will make the chain formation of the elided clause differ from that of the antecedent. Consequently, the derivation cannot satisfy Parallelism, ruling out VP deletion as expected. However, it is still controversial why computation can determine whether a

moved element should go through landing sites well before deletion. With respect to more detailed discussion and explanation of the contrast between sluicing and VPE, I would like to leave it for further study.

7） See also Reinhart (2006).

8） This assumption seems to be problematic for sentences as (i), where no islands are present, but they are ungrammatical. For a possible solution, see Reinhart (2006).

　　(i) *We invited everyone you know to the party, so stop asking me who.

9） As Nissenbaum (2000) suggests, LF movement such as QR and focalization still exists even in the probe-goal based theory. For possible problems and solutions, see Nissenbaum (2000).

10） It has been assumed that QR is to TP as is also suggested in Fox (2000). However, in this paper, following the idea that all operations are carried out by a phase head, I assume that it is to CP.

11） In a normal Sluicing, even an indefinite DP in the antecedent clause seems to have a wide scope. Thus, I assume that an indefinite DP moves to the foremost position covertly. See CLM, Reinhart (2006) among others.

12） For simplicity, irrelevant projections are omitted. As is widely accepted, the trace of *which students* is in the Spec-v^*P as the internal subject.

13） in terms of Richards (1997). However, there is a possibility that the *wh*-phrase skips this position because of non-existence of attracting features. I would like to leave this point for further study.

14） Higginbotham and May (1981) explains these phenomena under *wh*-absorption without recourse to LF movement. Contrary to their accounts, I assume here that this is by LF movement like interpretation of indefinite DPs.

15） The conclusion here is not affected by the examples in (i) and (ii).

　　(i) A : Janet saw something.

　　　　B : I wonder what.

　　(ii) A : John was eating (something).

　　　　B : I wonder what.

Reviewers point out that since the analysis here depends mainly on the fact that both the antecedent clause and its sluiced clause are in the same sentence, examples like (i) and (ii) would be problematic. However, Hasegawa (2006) claims that English trancated Wh-questions (TWQ) are also island-insensitive, and their structures are just like those of sluicing with a *wh*-phrase in Spec-CP as shown in (iii) and (iv).

　　(iii) A : Mary bought something.

　　　　B : Really ? What ?   (Hasegawa (2006 : 77))

　　(iv) A : Ben will be mad if Abby talks to one of the teachers.

　　　　B : Oh, yeah ? Which teacher ?   (Hasegawa (2006 : 79))

If TWQs are licensed as in (iii) and (iv), the examples in (i) and (ii) don't cause any problems ; Parallelism can be satisfied by the parallel structures of the first and second sentence.

　　As well-known, other examples of Sluicing includes other types of condition-violating sentences. I would like to leave for further study questions of how the conclusion here can account

for these types of Sluicing.

16) As is pointed out in Matsuyama (1998), some matrix verbs cannot admit pseudo-gapping as in (i).

(i) a. *I didn't claim to like a play, but I did φ a novel. (φ=claim to like)

b. *I didn't agree/promise to write a play, but I did φ a novel. (φ = agree/promise to write)   (Matsuyama (1998: 102))

For detailed discussion about this difference and their transparency, see Hirai (2001, 2004) and Matsuyama (1998).

17) For arguments that a remnant DP in pseudo-gapping undergoes A-movement, see Hirai (2004) and Jayaseelan (1990).

18) For a possibility that semantically heavy elements undergo OS-like movement, see Hirai (2004).

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スルーシングに関する極小主義的分析

平　井　大　輔

要　　約

　本論では，生成文法理論の初期より多くの関心を集めてきた(1)のようなスルーシングの派生
に関して，主に Chomsky（1995）をはじめとする極小主義理論に基づいて，より妥当性のあ
る説明および分析を行う。

(1)　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 she kissed a man who bit.

現代英語では，（1b）のように統語的島が可視的になると非文となり，（1a）のように削除さ
れると適格文となるスルーシングと呼ばれる現象が存在する。この文がいかに派生されるかと
いう問題に関しては，これまで多くの分析が行われてきたが，生成文法理論の発展に伴い，そ
れらの分析には多くの問題が発見され，妥当な分析は未だ出されていない。

　本論では，これまでに提案された分析を再検証し，スルーシングでは問題となる統語的島が，
残余 *wh* 句の移動前に削除され，その結果残余句は PF で連続循環的移動を受けることによっ
て派生されると分析し，この移動前の島の削除がスルーシング操作であると主張する。さらに，
スルーシングの認可条件として，多くの削除文で見られるパラレリズム条件を満たす必要があ
り，その条件は先行節と削除節において，それぞれに異なる解釈的要請（前者は不定名詞の意
味解釈，後者は *wh* 句の意味解釈）で形成された演算子・変項の依存関係の構造的同一性の
確立でもって満たされることを議論する。

　また，スルーシングに対して行われた提案は，主語コントロール不定詞節に見られる擬似空
所化の事実も説明できることを示し，この提案が理論的により優れていることを主張する。

キーワード：極小主義理論，スルーシング，パラレリズム，PF 移動，循環的派生