PHONOLOGICAL ADJACENCY AS A TRIGGER OF MOVEMENT

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This paper investigates wh-movement (more precisely category movement) under Sluicing. Sluicing is the ellipsis by which wh-questions are reduced to wh-phrases. One widely held view has been that remnant wh-phrases move to a clause-initial position (cf. Ross (1969), Merchant (2001)). Furthermore, it has been claimed that the presence of a wh-phrase in this position is required to license Sluicing (cf. Lobeck (1995)). Challenging this standard view, this paper claims based on Agbayani’s (2000, 2006), and Agbayani and Ochi’s (2006) movement theory that wh-phrases usually stay in their underlying positions (though they do move in some cases because of a phonological requirement) and that the presence of a wh-phrase in a clause-initial position is not required as a licensing condition. At the same time, this paper presents novel data which empirically support Agbayani’s (2000, 2006), and Agbayani and Ochi’s (2006) proposal that category movement is driven by a certain adjacency requirement.*

Keywords: Adjacency, Deletion, Category Movement

1. Introduction

A widely held view regarding wh-movement has been that in English one wh-phrase always moves to a clause-initial position. Contra this standard view, Agbayani (2000, 2006), and Agbayani and Ochi (2006) claim based on their examination of string vacuous movement of a subject that wh-phrases do not always move to this position. Adopting their movement mechanism, this paper argues that in most cases of Sluicing, wh-phrases stay in situ and concludes that the presence of a wh-phrase in a clause-initial position is not required to license Sluicing.

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This paper is organized as follows. Section 2 reviews Agbayani and Ochi’s movement theory. Section 3 introduces Kimura’s (2010) analysis of Sluicing, which investigates consequences of Agbayani and Ochi’s movement theory for standard Sluicing. Section 4 examines Sluicing involving a prepositional phrase. It will be demonstrated that some of the cases involve (overt) wh-movement and others do not. Section 5 investigates Multiple Sluicing and further confirms the conclusion that the presence of a wh-phrase in a clause-initial position is not required to license Sluicing. Section 6 considers alternative analyses. Section 7 discusses some residual issues. Section 8 summarizes the whole discussion.

2. Theory of Movement

This section briefly reviews Agbayani’s (2000, 2006), and Agbayani and Ochi’s (2006) proposal. Following Chomsky (1995), they assume that overt movement consists of feature movement and category movement. Our main concern relating to the following discussion is a trigger of the latter operation. Agbayani and Ochi argue that category movement is triggered by a certain adjacency requirement, which I dub the “PF Adjacency Condition.”

(1) The PF Adjacency Condition
   a. F and its category have to be adjacent to each other.
   b. Two elements are adjacent if no elements that are visible at the interface intervene between them.

(based on Agbayani (2000))

This condition states that a formal feature moved by feature movement has to be phonologically adjacent to its category. Let us observe how this movement mechanism works with (2).

(2) What did you buy?
   a. \([\text{CP } C_{[Q]} \ [\text{TP you T buy what}_{[+\text{wh}]}]]\)
      \(\Downarrow\) Feature Movement
   b. \([\text{CP } [+\text{wh}] + C_{[Q]} \ [\text{TP you T buy what}]]\)
      \(\Downarrow\) Category Movement
   c. \([\text{CP what } [C_{[+\text{wh}]} + C_{[Q]} \ [\text{TP you T buy t}]]]\)

(2a) illustrates the stage of the derivation where C with the \(Q\)-feature enters the derivation. In order to check this \(Q\)-feature, the matching wh-feature undergoes feature movement, leaving its category behind. If the derivation stopped at the stage in (2b), where \textit{you} and \textit{buy} intervene between the wh-feature and its category, it would crash because of violating the PF Ad-
adjacency Condition. To avoid this violation, category movement carries the wh-category to Spec-CP, a position adjacent to the wh-feature, as in (2c).

A consequence of this theory of movement is that string vacuous movement does not involve category movement. One concrete case is local movement of wh-subjects, exemplified in (3).

(3) Who will come?
   a. [CP C_{[Q]} [TP who_{[+Wh]} will come]]
      \(\Downarrow\) Feature Movement
   b. [CP [+wh] + C_{[Q]} [TP who will come]]

Even after feature movement strips the wh-feature away from its category, they are still phonologically adjacent to each other. Therefore, the PF Adjacency Condition is satisfied without recourse to category movement. In this case, furthermore, the application of category movement is banned by the economy condition which precludes superfluous steps in derivations. This is how category movement can be suspended.

This section has reviewed Agbayani and Ochi’s movement mechanism. Its gist can be summarized as follows. As long as the PF Adjacency Condition can be satisfied, category movement is suspended. Thus, a wh-phrase does not always move to a clause-initial position even in English.

3. Kimura’s (2010) Non-Movement Analysis of Sluicing

Next let us review Kimura’s (2010) non-movement analysis of standard Sluicing. Kimura (2010) investigates consequences of Agbayani and Ochi’s movement theory for standard Sluicing, exemplified in (4a).

(4) a. He is writing something, but you can’t imagine what.
    (Ross (1969: 252))
   b. He is writing something, but you can’t imagine what he is writhing.

(4a) is synonymous with the non-elided case in (4b). It appears that in (4a), the embedded wh-question is reduced only to the wh-phrase what.

Adopting Agbayani and Ochi’s movement theory, I claim in Kimura (2010) that remnant wh-phrases in Sluicing can stay in situ. Thus, (4a) is analyzed as in (5).

(5) a. [CP C_{[Q]} [TP he is writing what_{[+Wh]}]]
      \(\Downarrow\) Feature Movement
   b. [CP [+wh] + C_{[Q]} [TP he is writing what]]
      \(\Downarrow\) Sluicing
   c. [CP [+wh] + C_{[Q]} [TP he is writing what]]
After feature movement, the string of words *he is writing* intervenes between the wh-feature and its category, as in (5b). If nothing happened, this derivation would crash as a violation of the PF Adjacency Condition. In Kimura (2010), I claim that deletion rescues this situation, supposing with Den Dikken, Meinunger and Wilder (2000) that deletion eliminates all the recoverable elements except a focused phrase. In the case at hand, deletion takes place as in (5c), where the wh-phrase, a focused phrase, survives deletion. Crucially, this operation eliminates all the overt interveners between the wh-feature and its category, so that the PF Adjacency Condition is satisfied without recourse to category movement of the wh-phrase. In this way, the remnant wh-phrase stays in situ.

This non-movement analysis is empirically supported by the distribution of *the hell*. One outstanding property of *the hell* is that it can modify moved wh-phrases but not wh-phrases in situ (cf. Lasnik and Saito (1992), Huang and Ochi (2004)). (6) illustrates this point.

(6) a. Who the hell did you persuade to buy what?
   b. *Who did you persuade to buy what the hell?  

(Huang and Ochi (2004: 207))

With this property in mind, let us consider the crucial data given in (7).

(7) I know Pat wanted to buy something,
   a. … but I don’t know what.
   b. *… but I don’t know what the hell.  

(López (2000: 185))

(7) indicates that *the hell* cannot modify remnant wh-phrases in standard Sluicing. In this respect, the remnant wh-phrases pattern with wh-phrases in situ. This is exactly what the non-movement analysis predicts. In relation to the above discussion, anonymous EL reviewers wonder why *the hell* cannot modify wh-phrases in situ. This issue is addressed in section 7.

This section has reviewed Kimura’s (2010) non-movement analysis of standard Sluicing: since the PF Adjacency Condition can be satisfied via deletion, category movement of a wh-phrase is suspended under Sluicing. The following sections seek further consequences of Agbayani and Ochi’s movement theory by considering more complicated cases of Sluicing.

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1 For a detailed definition of non-constituent deletion, see Den Dikken, Meinunger and Wilder (2000).

2 I assume with Tsai (1994) that wh-phrases in situ are interpreted via unselective binding. Thus, remnant wh-phrases in Sluicing, which stay in situ, are also interpreted in this way.
4. Sluicing Involving a Prepositional Phrase

This section examines Sluicing involving a prepositional phrase. When a remnant wh-phrase is an object of a preposition, Sluicing takes one of the following three forms.

(8) a. **PP-Sluicing**

They’re jealous, but it’s unclear of who.  
(Chung (2005: 79))

b. **Swiping**

She has a date tonight, but she won’t tell me who with.  
(Hartman and Ai (2007: 5))

c. **P-less Sluicing**

They’re jealous of someone, but it’s unclear who.  
(Chung (2005: 84))

(8a) exhibits the canonical word order: the preposition precedes its object. Let us dub this type “PP-Sluicing.” In (8b), the preposition inverts with its object. Merchant (2001) named this inversion “Swiping.” In (8c), the preposition is omitted and only its object wh-phrase survives deletion. Let us call this type “P-less Sluicing.” Examining these cases, we will conclude that (category) movement of a wh-phrase is suspended in some cases but not in others.

To set the stage for the examination of these cases, I clarify the mechanism of deletion. Following den Dikken, Meinunger and Wilder (2000), we have assumed that deletion eliminates all the recoverable elements except a focused phrase. More specifically, I define Sluicing as (9).

(9) **Sluicing**

Delete all the recoverable elements except a focused phrase inside a TP constituent.

Moreover, let us assume with Chung (2005) that recoverability is determined based on lexico-syntactic identity (as well as semantic identity). Chung (2005) claims based on the following examples that deletion takes place under lexico-syntactic identity.

(10) They’re jealous, but it’s unclear

a. … of who.

b. *… who(m).  
(Chung (2005: 79–80))

Our main concern here is the deletion of the preposition *of*. As Chung points out, the preposition *of* is devoid of semantic content, and hence this contrast cannot be reduced to any semantic reason. Instead, Chung explains it by the lexico-syntactic identity condition given in (11).
Chung’s (2005) Lexico-Syntactic Identity Condition
Every lexical item in the numeration of the sluice that ends up (only) in the elided IP must be identical to an item in the numeration of the antecedent CP. (Chung (2005: 83))

(10b) is ruled out as a violation of this condition, because the sluice contains the preposition of, which is not contained in the numeration of the antecedent CP. (10a), on the other hand, is ruled in because all the elements eliminated by deletion are contained in the numeration of the antecedent CP.

With these assumptions about deletion in mind, let us consider PP-Sluicing, Swiping and P-less Sluicing.

4.1. Analysis
Let us start with Swiping. One crucial property is that Swiping occurs only when an antecedent clause contains no overt correlate corresponding to the remnant (cf. Rosen (1976), Hartman and Ai (2007)).

(12)  

a. She has a date tonight, but she won’t tell me who with.  
b. *She has a date with some guy, but she won’t tell me who with.  

(Hartman and Ai (2007: 5))

The grammatical case in (12a) does not contain an overt correlate corresponding to the remnant whereas the ungrammatical case in (12b) does involve such a correlate (with some guy). This property means that remnant prepositions in Swiping are always lexically unrecoverable. Then they can never be eliminated without violating Chung’s lexico-syntactic identity condition. With this in mind, let us examine (13). If the remnant wh-phrase stayed in situ, we would have a derivation like (14).

(13) She has a date tonight, but she won’t tell me who with.

(14)  
a. [TP she has a date [PP with [DP [wh] who]] tonight]  

Feature Movement  
b. [CP [wh] + C[Q] [TP she has a date [PP with [DP who]] tonight]]  

Sluicing  
c. [CP [wh] + C[Q] [TP she has a date [PP with [DP who]] tonight]]

Since the remnant preposition with is unrecoverable, it cannot be eliminated via deletion. Crucially, it intervenes between the wh-feature and its category, so that this derivation crashes as a violation of the PF Adjacency Condition. In order for this condition to be satisfied, category movement is required. Such a derivation is given in (15).
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(15) a. \[[TP \text{ she has a date } [PP \text{ with } [DP [wh] \text{ who}]] \text{ tonight}\]  
   \hspace{1em} \bigcirc \hspace{1em} \text{Feature Movement}

b. \[[CP [wh] + C_{[Q]} [TP \text{ she has a date } [PP \text{ with } [DP \text{ who}]] \text{ tonight}\]]  
   \hspace{1em} \bigcirc \hspace{1em} \text{Category Movement}

c. \[[CP \text{ who } [CP [wh] + C_{[Q]} [TP \text{ she has a date } [PP \text{ with } \ldots \text{ tonight}]]]  
   \hspace{1em} \bigcirc \hspace{1em} \text{Sluicing}

d. \[[CP \text{ who } [CP [wh] + C_{[Q]} [TP \text{ she has a date } [PP \text{ with } \ldots \text{ tonight}]]]

Category movement carries the wh-phrase to Spec-CP, a position adjacent to the wh-feature, so that the PF Adjacency Condition is satisfied.\(^3\) This category movement derives the inverted word order dubbed Swiping. Put differently, Swiping is an epi-phenomenon of category movement regulated by the PF Adjacency Condition.\(^4\)

Next let us consider P-less Sluicing. It differs from Swiping in the recoverability of the preposition. P-less Sluicing always requires an overt PP correlate (cf. Chung (2005)). (16) illustrates this point.

(16) a. They’re jealous of someone, but it’s unclear who.
   b. *They’re jealous, but it’s unclear who(m). (Chung (2005: 80))

The grammatical case in (16a) contains the overt correlate of someone whereas the ungrammatical case in (16b) does not. This property indicates that the elided prepositions in P-less Sluicing are always recoverable. With this in mind, let us consider (17), which is derived as in (18).

(17) They’re jealous of someone, but it’s unclear who.

(18) a. \[[TP \text{ they’re jealous } [PP \text{ of } [DP [wh] \text{ who}]]]  
   \hspace{1em} \bigcirc \hspace{1em} \text{Feature Movement}

b. \[[CP [wh] + C_{[Q]} [TP \text{ they’re jealous } [PP \text{ of } \text{who}]]]  
   \hspace{1em} \bigcirc \hspace{1em} \text{Sluicing}

c. \[[CP [wh] + C_{[Q]} [TP \text{ they’re jealous } [PP \text{ of } \text{who}]]]

\(^3\) An anonymous EL reviewer asks why the landing site of the wh-phrase is Spec-CP but not some other specifier position. For instance, even if the wh-phrase moved to Spec-PP, the PF Adjacency Condition could be satisfied. However, the following example indicates that the remnant wh-phrase undergoes long distance movement in Swiping.

   (i) *Sandy was trying to work out which students would speak, but she refused to say who to. (Chung, Ladusaw and McCloskey (1995: 279))

According to Chung, Ladusaw and McCloskey (1995), (i) is ungrammatical due to a violation of an island constraint. Facing this fact, we need to conclude that the remnant wh-phrases in Swiping undergo long distance movement and we tentatively assume that the landing site of the remnant wh-phrase in Swiping is Spec-CP.

\(^4\) The current analysis is similar to the preposition stranding analyses put forth by Ross (1969) and Hasegawa (2006, 2008). They also claim that swiping is derived via wh-movement with preposition stranding. See their papers for further arguments in favor of the preposition stranding analyses.
The preposition as well as the other recoverable elements is eliminated by deletion without violating Chung’s lexico-syntactic identity condition. As a result of deletion, the PF Adjacency Condition is satisfied without recourse to category movement. Since category movement is suspended, the remnant wh-phrase stays in situ.

Finally, let us examine PP-Sluicing. This type of Sluicing optionally involves an overt correlate, as shown in (19).

(19)  
(a) They’re jealous, but it’s unclear of who. (Chung (2005: 79))  
(b) Peter was talking with someone, but I don’t know with who. (Merchant (2001: 92))

(19a) does not contain an overt correlate corresponding to the remnant. In (19b), on the other hand, with someone is the correlate. I assume that no matter whether the remnant preposition is recoverable, it always survives deletion as a result of feature percolation. Thus, (20) is analyzed as (21).

(20) They’re jealous, but it’s unclear of who.

(21)  
(a) \[TP\] they’re jealous \[PP\] of \[DP\] who]]  
  \(\Downarrow\) Feature Percolation  

(b) \[TP\] they’re jealous \[PP\] of \[DP\] who]]  
  \(\Downarrow\) Feature Movement  

(c) \[CP\] [+wh] + C\[Q\] [TP] they’re jealous \[PP\] of \[DP\] who]]  
  \(\Downarrow\) Sluicing  

(d) \[CP\] [+wh] + C\[Q\] [TP they’re jealous \[PP\] of \[DP\] who]]

The wh-feature percolates up to PP, so that the entire PP is considered to be a wh-phrase. This PP survives deletion as a focused wh-phrase. Moreover, this wh-phrase of who is phonologically adjacent to its wh-feature, and hence the PF Adjacency Condition is satisfied without recourse to category movement. In this way, the remnant wh-phrase stays in situ.

The current analysis is summarized as follows. If feature percolation takes place, PP-Sluicing is derived. If not, we obtain either P-less Sluicing or Swiping. Moreover, the latter two differ in the recoverability of a preposition: in P-less Sluicing, the eliminated preposition is recoverable whereas in Swiping the remnant preposition is unrecoverable. Another main conclusion is that wh-phrases move to Spec-CP in Swiping but not in the other two cases.

4.2. Language Variation

Having introduced my analysis, I move on to consider consequences of the current analysis. I have claimed that if feature percolation does not take place, Swiping or P-less Sluicing can be derived. A natural predic-
tion is that when feature percolation takes place obligatorily, these two cases should never be obtained. In what follows, I will show that this prediction is in fact borne out from the fact of language variation.

Lasnik (2008) claims based on the observation regarding the (im)possibility of preposition stranding that feature percolation is optional in some languages but not in others. A well-known fact is that some languages allow preposition stranding whereas others do not. Lasnik’s explanation of this language variation is as follows. In languages which allow preposition stranding, like English, feature percolation is optional. If a wh-feature percolates up to PP, this whole PP moves via wh-movement, deriving a pied-piping case like (22a). If percolation does not take place, only the wh-phrase moves, stranding a preposition, as in (22b).

(22) a. \[ \text{CP} [\text{PP[wh]} \text{With whom}] \text{was he talking t}]? : \text{Pied-Piping}  
   b. \[ \text{CP} [\text{DP[wh]} \text{Who}] \text{was he talking with t}]? : \text{P-stranding}  

In contrast with English, some languages disallow preposition stranding. One concrete case is Greek, as shown in (23).

(23) *Pjon milise me? (Merchant (2001: 94))
 who she.spoke with

Lasnik reduces this fact to the obligatoriness of feature percolation; in languages which disallow preposition stranding, like Greek, feature percolation obligatorily takes place, so that the preposition stranding case can never be derived. As long as Lasnik’s claim is on the right track, the optionality of feature percolation is directly related to the possibility of preposition stranding.

With this in mind, let us return to Sluicing. We have claimed that Swiping and P-less Sluicing are obtainable when feature percolation does not take place. Then, a natural prediction is that Swiping and P-less Sluicing are possible in languages which allow preposition stranding but not in languages which disallow preposition stranding. This prediction is in fact borne out. As for Swiping, Merchant (2002) observes that Swiping is allowed only in languages which have the option of preposition stranding. As for P-less Sluicing, furthermore, Merchant (2001) points out in the form of the Preposition Stranding Generalization that P-less Sluicing is obtained only in languages which allow preposition stranding in ordinary wh-questions.

(24) The Preposition Stranding Generalization
A language L will allow preposition stranding under Sluicing iff
L allows preposition stranding under regular wh-movement.  
(Merchant (2001: 92))
In (24), preposition stranding under Sluicing means P-less Sluicing in this paper. As long as preposition stranding is a result of the optionality of feature percolation, as Lasnik (2008) claims, Merchant’s observations indicate that Swiping and P-less Sluicing are available only when feature percolation is optional.

4.3. The Hell

The current analysis also makes a prediction regarding the distribution of the hell. As noticed in section 3, the hell can modify moved wh-phrases but not wh-phrases in situ. Examining PP-Sluicing, Swiping and P-less Sluicing, I have claimed that remnant wh-phrases move in Swiping but not in the others. Then, a natural prediction is that the hell can modify remnant wh-phrases in Swiping but not in the other two cases. This prediction is in fact borne out.

(25)  
a. They were arguing, but I don’t know what the hell about.  
(Sprouse (2005: 349))

  b. *They were arguing about something, but I don’t know what the hell.  
(Sprouse (2005: 349))

  c. *They are arguing about something. I wonder about what the hell.  
(Sprouse (2005: 349))

The hell can modify remnant wh-phrases in Swiping. On the other hand, it cannot modify remnant wh-phrases of P-less Sluicing nor those of PP-Sluicing.

4.4. Interim Summary

Examining Sluicing involving a prepositional phrase, this section has drawn the conclusion that wh-phrases do not always move to Spec-CP. This indicates that the presence of a wh-phrase in this position is not required to license Sluicing.

5. Multiple Sluicing

This section examines Multiple Sluicing exemplified in (26).

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

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

Extending the analysis proposed above to Multiple Sluicing, I further confirm the conclusion that the presence of a wh-phrase in a clause-initial position is not required to license Sluicing.
5.1. Analysis
The current analysis derives (26) as in (27).\footnote{I assume with van Craenenbroeck and den Dikken (2006) that the EPP requirement is nullified by deletion. This is why the subject wh-phrase stays in Spec-VP. Following Chomsky (2000), moreover, I assume that head movement takes place in the phonological component.}

\begin{align*}
\text{(27) } & \quad \text{a. } [TP [VP [DP[+Wh] which] got something [PP from [DP[+Wh] which]]]}
\quad \text{\hspace{0.5cm} \textit{Feature Percolation}} \\
& \quad \text{b. } [CP C[Q] [TP [VP [DP[+Wh] which] got something [PP[+Wh] from [DP which]]]]] \\
& \quad \text{\hspace{0.5cm} \textit{Feature Movement}} \\
& \quad \text{c. } [CP [+wh] + C[Q] [TP [VP [DP which] got something [PP[+Wh] from [DP which]]]]] \\
& \quad \text{\hspace{0.5cm} \textit{Sluicing}} \\
& \quad \text{d. } [CP [+wh] + C[Q] [TP [VP [DP which] got something [PP[+Wh] from [DP which]]]]]
\end{align*}

Feature percolation takes place in the second remnant, so that the whole PP is considered to be a focused wh-phrase. Then, feature movement applies only to the wh-feature of the subject wh-phrase, in accordance with the Superiority Condition (cf. Chomsky (1973)). Finally, deletion takes place. Notice that the PF Adjacency Condition is satisfied without recourse to category movement. As for the first remnant, the wh-feature and its category are phonologically adjacent to each other. As for the second remnant, this condition is vacuously satisfied, since the wh-feature is not stripped away from its category. This is how both the remnants stay in situ.

5.2. Island Insensitivity
One nice consequence of this non-movement analysis comes from island effects. Takaki (2012) observes that Multiple Sluicing does not exhibit island effects. (28) illustrates this point.

\begin{align*}
\text{(28) } & \quad \text{She kissed a man who told something to one of my friends, but Tom does not know} \\
& \quad \text{a. } *\ldots \text{ what to which (one of my friends) she kissed the man who told.} \\
& \quad \text{b. } ?\ldots \text{ what to which (one of my friends).} \quad \text{(Takaki (2012: 176))}
\end{align*}

The ungrammaticality of the non-elided case in (28a) has been explained as a violation of the Complex NP Constraint. In contrast, its Sluicing counterpart in (28b) is just slightly degraded. The contrast can be straightfor-
wardly accounted for. I analyze (28) as (29).

(29)  
   a. \( [\text{CP what} \to \text{which}_{ij} [C_+ \text{wh} + C_{[Q]} \text{TP she kissed a man who told } t_i \ t_j]] \)
   b. \( [\text{CP } +\text{wh} + C_{[Q]} \text{TP she kissed a man who told } [\text{DP what} [PP^{+\text{wh}} \to \text{which}]]] \)

*What* and *to which* move out of the island in the non-elided case, as shown in (29a) whereas they stay inside the island in the case of sluicing, as illustrated in (29b). Since Huang (1982), it has been widely assumed that island conditions restrict overt movement, which can be restated as category movement in this paper. Then, the lack of island effects indicates that remnant wh-phrases do not move in multiple sluicing.⁶

5.3. Swiping

Next let us consider Swiping in Multiple Sluicing. I have claimed that Swiping is an epi-phenomenon of category movement driven by the PF Adjacency Condition. This claim is further supported by a certain asymmetry in Multiple Sluicing: Swiping is limited to the first remnant (cf. Richards (1997) and Larson (2012)).

(30) Ivan was talking, but I can’t remember
    a. … who to about what.
    b. *… who to what about.
    c. *… to who what about. (Larson (2012: 5))

As an anonymous EL reviewer points out, Sluicing exhibits an argument-adjunct asymmetry regarding island effects (cf. Lasnik (2005), Nakao and Yoshida (2006)).

(i) a. John wants to hire someone who fixes cars with something, but I don’t know what.
    b. *John wants to hire someone who fixes cars for a certain reason, but I don’t know why. (Nakao and Yoshida (2006: 323))

(ii) a. \( [\text{CP } +\text{wh} + C_{[Q]} \text{TP he wants to hire someone who fixes cars with what}]] \)
    b. \( [\text{CP } +\text{wh} + C_{[Q]} \text{TP he wants to hire someone who fixes cars why}]] \)

Here, the wh-phrases do not move out of the island. Therefore, we cannot explain the ungrammaticality in (ib) by a violation of an island constraint. Why then is (ib) ungrammatical? Following Nakao and Yoshida (2006), I reduce the asymmetry to the ECP: an empty category must be properly governed. This principle is originally proposed as a constraint on covert movement at LF (cf. Huang (1982)). We have supposed with Tsai (1994) that argument wh-phrases in situ can be interpreted via unselective binding, whereas adjunct wh-phrases in situ move at LF. In (ib), the trace created by covert wh-movement is not properly governed, so that (ib) violates the ECP. On the other hand, (ia) does not violate the ECP, because the wh-phrase does not move at all.
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(30a), where Swiping occurs in the first remnant, is grammatical. In contrast, (30b) and (30c), where the second remnant undergoes Swiping, are ungrammatical. Let us consider the following derivation of (30a).

(31) a. \[
\begin{array}{l}
[CP \ C_{[Q]} \ [TP \ Ivan \ was \ talking \ [PP \ to \ [DP[+Wh] \ who]] \ [PP \ about \ [DP[+Wh] \ what]]]] \\
\downarrow Feature \ Percolation
\end{array}
\]

b. \[
\begin{array}{l}
[CP \ C_{[Q]} \ [TP \ Ivan \ was \ talking \ [PP \ to \ [DP[+Wh] \ who]] \ [PP[+Wh] \ about \ [DP \ what]]]] \\
\downarrow Feature \ Movement
\end{array}
\]

c. \[
\begin{array}{l}
[CP[+wh] \ + \ C_{[Q]} \ [TP \ Ivan \ was \ talking \ [PP \ to \ [DP \ who]] \ [PP[+Wh] \ about \ [DP[+Wh] \ what]]]] \\
\downarrow Category \ Movement
\end{array}
\]

d. \[
\begin{array}{l}
[CP \ who \ [C^+ \ [+wh]] \ + \ C_{[Q]} \ [TP \ Ivan \ was \ talking \ [PP \ to \ t] \ [PP[+Wh] \ about \ [DP \ what]]]] \\
\downarrow Sluicing
\end{array}
\]

e. \[
\begin{array}{l}
[CP \ who \ [C^+ \ [+wh]] \ + \ C_{[Q]} \ [TP \ Ivan \ was \ talking \ [PP \ to \ t] \ [PP[+Wh] \ about \ [DP[+Wh] \ what]]]] \\
\downarrow Sluicing
\end{array}
\]

We have assumed that when a whole prepositional phrase survives deletion, a wh-feature percolates up to the prepositional phrase. In the case at hand, then, feature percolation takes place in the second remnant. Next, feature movement applies only to the first wh-phrase in accordance with the Superiority Condition. Then, category movement carries this superior wh-phrase to Spec-CP; otherwise the presence of the preposition to would cause a violation of the PF Adjacency Condition. Finally deletion takes place as in (31e). Deletion does not eliminate the preposition to because it is unrecoverable. The second remnant about what also survives deletion because it is a focused wh-phrase.

With this derivation in mind, let us return to the question of why Swiping occurs only in the first remnant. In accordance with the Superiority Condition, feature movement applies only to the formal feature of the superior wh-phrase. Then, the wh-feature of the second wh-phrase is never stripped away from its category. This means that the second wh-phrase has no motivation to undergo category movement which derives the inverted word order. This is why Swiping occurs only in the first remnant.

5.4. Interim Summary

This section has investigated Multiple Sluicing and proposed the non-
movement analysis in which more than one remnant can stay in situ. As long as this analysis is on the right track, the data of Multiple Sluicing support the claim that the presence of a wh-phrase in a clause-initial position is not required to license Sluicing.

6. Alternative Analyses

This section considers two alternative analyses. One is the movement analysis (cf. Ross (1969) and Merchant (2001, 2002)). The other is the Phase-Based Deletion analysis presented in Goto (this volume).

6.1. Movement Analysis

Although the current analysis takes the deletion approach, it differs from previous deletion analyses (cf. Ross (1969), Merchant (2001, 2002)). According to these, remnant wh-phrases always move to a clause-initial position. Thus, (4a), reproduced as (32), is analyzed as in (33).

(32) He is writing something, but you can’t imagine what.

(33) … but you can’t imagine [what [he is writing]]

The remnant wh-phrase moves out of the ellipsis site via wh-movement and then deletion takes place. This movement analysis seems to be superior to the current analysis in that it does not resort to non-constituent deletion. However, it faces some difficulties in explaining some of the data discussed in this paper.

First, the previous movement analyses fail to explain the distribution of the hell: this modifier can occur in Swiping but not in the other cases. Since the movement analysis assumes that wh-phrases always undergo movement, the contrasts regarding the distribution of the hell require some special explanation.

Another problematic case is Swiping. For instance, Merchant’s (2002) movement analysis derives (8b), reproduced as (34), as in (35).

7 An anonymous EL reviewer asks the implication of the current analysis for Multiple Sluicing in Japanese. Since Japanese is a wh-in-situ language, it appears that the current non-movement analysis can be extended to Japanese (Multiple) Sluicing. However, there are pieces of evidence that Japanese Sluicing is not derived from a wh-question. For instance, Japanese Sluicing allows the optional occurrence of a copula, which never occurs in regular wh-questions (cf. Kizu (2005)). Given this fact, the current analysis seems not to be directly extended to Japanese (Multiple) Sluicing.
(34) She has a date tonight, but she won’t tell me who with.
(35) a. \([_{TP} \text{she has a date with who}]\)
    \(\circ WH\)-movement
b. \([_{CP} \text{[PP with who];}_{TP} \text{she has a date } ti]\)
    \(\circ Sluicing\)
c. \([_{CP} \text{[PP with who];}_{TP} \text{she has a date } ti]\)
    \(\circ Head\ \text{Movement}\)
d. \([_{CP} \text{[PP who; + with } ti\text{] }_{TP} \text{she has a date } ti]\)

After wh-movement and Sluicing take place, head movement carries the wh-phrase and attaches it to the front of the preposition, deriving the inverted word order.8

This head movement analysis raises some questions. For instance, it is unclear what triggers the head movement. Given that the inverted word order is never allowed in non-elided wh-questions, a question which arises here is why the head movement in question takes place in Sluicing but not in regular wh-questions. Merchant (2002) suggests that Sluicing is a prerequisite to applying the head movement which derives the inverted word order. Even if we adopt this suggestion, Merchant’s analysis fails to explain why Swiping occurs only in the first remnant of Multiple Sluicing.

To sum up, the movement approach faces difficulties in accounting for some of the data discussed in this paper.

6.2. Phase-Based Deletion Analysis

Next let us consider the non-movement analysis proposed in Goto (this volume), which analyzes (4a), reproduced in (36), as in (37).

(36) He is writing something, but you can’t imagine he is writing what.
(37) \([_{CP} \text{C }_{[TP \text{[Delete]}]} \text{he is }_{[VP \text{v+writing}]}_{[VP ti_{DP D [NP what]]}]])\)

(Goto (this volume))

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8 Merchant (2002) points out that Swiping is limited to bare wh-phrases. Thus, (i), which involves a phrasal wh-element what town, is ungrammatical.

(i) *She is driving, but God knows what town to.
(Merchant (2002: 6))

This fact can be straightforwardly explained by Merchant’s head movement analysis, because only bare wh-elements can undergo head movement which derives the inverted word order. However, Hartman and Ai (2007) present the following grammatical example, where the wh-element is not bare.

(ii) He fought in the civil war, but I don’t know which side for.
(Hartman and Ai (2007: 15))

This example poses another problem to Merchant’s head movement analysis.
Here, CP, vP and DP are supposed to be phases. Deletion optionally applies to the complement of a phase head. In (37), deletion applies to TP, the complement of C, but not to NP, the complement of D, nor to VP, the complement of v. As a result of this optional deletion, apparent non-constituent deletion is obtained.

Although Goto’s (this volume) analysis is similar to the current analysis, it is unclear in the former analysis why wh-movement can be suspended in Sluicing. Unless this point is clarified, a number of questions arise. One is why wh-movement cannot be suspended in other contexts such as VP-Ellipsis. Another is how this analysis derives Swiping. Especially, it is unclear how it accounts for the distribution of the hell: the hell can occur in Swiping but not in the other cases of Sluicing.

In short, Goto’s (this volume) analysis needs to be refined to explain some of the data discussed in this paper.

7. Remaining Issues

This section considers three residual issues pointed out by anonymous EL reviewers: the so-called look-ahead problem, the global economy problem, and the licensing of the hell.

7.1. The Look-Ahead Problem

Let us start with the look-ahead problem. The current analysis has assumed that deletion, an operation in the phonological component, can be an alternative to category movement, a syntactic operation. How can we decide on the suspension of category movement based on the information attained in the phonological component, without being confronted by a look-ahead problem? One possible solution is to postulate the [E]-feature proposed by Merchant (2001) or the [Delete]-feature put forth in Goto (this volume). These features enable us to know the information on deletion before reaching the phonological component.9 Once we adopt one of them as a trigger of deletion, we can avoid the look-ahead problem.

9 Merchant (2001) claims that the [E]-feature instructs PF not to parse the complement of the head that has this feature. Since this paper has assumed that deletion can affect non-constituents, I revise this PF instruction as follows: not to parse all the recoverable elements except a focused phrase inside the complement of the head that has the [E]-feature.
7.2. The Economy Problem

The second problem is global economy. Comparing derivations involving category movement (as well as deletion) and those not involving category movement, the current analysis chooses the latter as derivations of Sluicing. This comparison requires a global-economy-based computation. As an anonymous EL reviewer points out, global economy may be problematic. The recent literature has presented a number of arguments against global economy (cf. Collins (1997)). However, it is true that global economy has played a certain role in the development of linguistic studies. The current proposal may constitute a novel piece of evidence for the global economy principle being part of our grammar. I will leave the validity of global economy for future research. As a part of this research, Kimura (2013) claims that global economy works well to explain the contrasts between Sluicing and VP-Ellipsis in terms of Max Elide.

7.3. The Licensing of THE HELL

Finally, let us consider the licensing problem of the hell. The analysis proposed in this paper is empirically supported by the distribution of the hell. The relevant examples are reproduced below.

(38) a. Regular Sluicing
   *I know Pat wanted to buy something, but I don’t know what the hell.  (=7b))

   b. Swiping
   They were arguing, but I don’t know what the hell about. (=25a))

   c. P-less Sluicing
   *They were arguing about something, but I don’t know what the hell.  (=25b))

   d. PP-Sluicing
   *They are arguing about something. I wonder about what the hell.  (=25c))

(38) indicates that the hell can attach to remnant wh-phrases in Swiping but not to those in the other cases. One crucial property of the hell is that it can modify moved wh-phrases but not wh-phrases in situ (cf. Lasnik and Saito (1992), Huang and Ochi (2004)). This supports our claim that wh-phrases move in Swiping whereas they stay in situ in the other cases.

10 Goto (this volume) proposes a non-constituent deletion analysis based on local economy.
One question pointed out by anonymous EL reviewers is why the hell cannot modify wh-phrases in situ. A possible answer is presented by Huang and Ochi’s (2004) licensing theory; the hell must be licensed in some high position such as a sub-layer of TP, which they dub an “Attitude Phrase.” This licensing is implemented by movement. According to Huang and Ochi, the hell is first merged with a wh-phrase and then they move together to the specifier position of the Attitude Phrase, where the hell is licensed.11 With this licensing mechanism in mind, let us reconsider (38).

(39)  a. Regular Sluicing
    \[ CP [+wh] + C_{Q} [TP \text{AttitudeP} [VP he wanted to buy what the hell]] \]

b. Swiping
    \[ CP \text{what the hell} [C_{r} [+wh] + C_{Q} [TP \text{AttitudeP} [VP they were arguing about t]]]] \]

c. P-less Sluicing
    \[ CP [+wh] + C_{Q} [TP \text{AttitudeP} [VP they were arguing about what the hell]]] \]

d. PP-Sluicing
    \[ CP [+wh] + C_{Q} [TP \text{AttitudeP} [VP they are arguing about what the hell]]] \]

In Swiping, the wh-phrase plus the hell moves successive-cyclically to Spec-CP, via the specifier position of Attitude Phrase, where the hell is licensed. In the other cases, the hell stays in situ, so that the hell fails to be licensed.12

In relation to this discussion, an anonymous EL reviewer points out one important fact: the hell can modify wh-subjects in cases of string vacuous movement, as illustrated in (40).

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11 Huang and Ochi (2004) point out a parallelism between wh-phrases with the hell and wh-adjuncts. I leave it for future research.

12 An anonymous EL reviewer correctly points out that assuming the Attitude Phrase in the elided clause may cause a violation of the parallelism condition on ellipsis; the antecedent clause does not have the Attitude Phrase layer, whereas the elided clause needs this layer to license the hell. We have to assume that the parallelism in question is semantic identity based on mutual entailment (cf. Merchant (2001)), not structural identity.

In relation to this issue, Ochi (2004) makes one noteworthy proposal; the impossibility of the modification of the hell in (standard) Sluicing is due to a violation of the structural parallelism condition. However, this account based on the structural parallelism condition faces a difficulty in explaining the possibility of the hell in Swiping; it is unclear how the structural parallelism can be satisfied when the hell modifies the remnant wh-phrase in Swiping.
PHONOLOGICAL ADJACENCY AS A TRIGGER OF MOVEMENT

(40) Who the hell saw what?  
(Huang and Ochi (2004))

We have assumed with Agbayani and Ochi (2006) that such wh-phrases do not undergo category movement to Spec-CP, as remnant wh-phrases in Regular Sluicing. Another noteworthy fact is that the hell cannot modify wh-subjects in Sluicing.

(41) *Someone dented my car last night.—I wish I knew who the hell!  
(Merchant (2001: 122))

In order to account for these facts, I adopt van Craenenbroeck and den Dikken’s (2006) proposal that Sluicing can nullify the EPP requirement, analyzing (40) and (41) as in (42).

(42) a. \[ CP [+wh] + C[Q] [TP who the hell [T[EPP] [AttitudeP t [VP t saw what]]]] \]

b. \[ CP [+wh] + C[Q] [TP [EPP] [AttitudeP [VP who the hell dented my car]] last night]] \]

The subject wh-phrase is base-generated in Spec-VP in accordance with the VP-internal Subject Hypothesis (Kitagawa (1986)). In the non-elided case, the subject wh-phrase plus the hell move to Spec-TP to satisfy the EPP requirement, as Agbayani and Ochi assume. Before reaching this position, it moves to the specifier position of Attitude Phrase, where the hell is licensed. In Sluicing, on the other hand, the EPP requirement is nullified, as van Craenenbroeck and den Dikken (2006) claim.\(^{13, 14}\) As a result of this nullification, wh-subjects plus the hell stay in Spec-VP, so that the hell fails to be licensed in a sub-layer of TP.

Another question which anonymous EL reviewers point out is why the wh-phrase plus the hell does not move to the specifier position of Attitude Phrase for the licensing requirement of the hell in (39a), (39c), (39d) and (42b). I tentatively assume that the licensing requirement of the hell in itself is not a trigger of movement. I will leave the issue of the licensing of the hell for future research.

\(^{13}\) Refer to van Craenenbroeck and den Dikken (2006) for a concrete discussion of the suspension of the EPP requirement.

\(^{14}\) An anonymous EL reviewer questions whether Sluicing nullify successive cyclic movement. We assume that Sluicing nullifies the traditional EPP requirement, which is a trigger of subject movement to Spec-TP, but not the generalized EPP requirement, which causes successive cyclic movement. If deletion suspended successive cyclic movement, then the wh-phrase plus the hell could not move to the specifier position of the Attitude Phrase in Swiping.
8. Conclusion

This paper has considered consequences of Agbayani and Ochi’s movement theory from a viewpoint of Sluicing; I have claimed that category movement can be suspended in most cases of Sluicing. Moreover, I have argued that the inversion dubbed Swiping is an epi-phenomenon of category movement motivated by the PF Adjacency Condition.

The proposal that remnant wh-phrases do not always move requires reconsideration of the widely-held licensing condition on Sluicing: Sluicing is licensed by C with a lexical wh-phrase in its specifier position. Instead, the current analysis indicates that feature checking or agreement regarding an interrogative [+wh]-feature is enough to license Sluicing.

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