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Sluicing with LF Pied-Piping

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This note discusses the cases of what has been termed Sluicing in the literature involving complex NPs containing a *wh*-phrase, or an indefinite NP which purports to serve as the inner antecedent for the *wh*-phrase left behind in a sluiced clause.

The observation is that an indefinite NP contained in a complex NP is unable to serve as the inner antecedent for the *wh*-phrase in a sluiced clause. This is shown to be a case of the Roofing effect, which states that an indefinite NP whose scope is 'roofed' by another operator taking wide scope is unable to serve as the inner antecedent for a *wh*-phrase in a sluiced clause. On the other hand, a complex NP containing a *wh*-phrase is able to be left behind in a sluiced clause, which is another case indicating that a complex NP containing a *wh*-phrase behaves the same way as a regular simple *wh*-phrase.

1. Introduction

One of the important features of *wh*-constructions in Japanese is that sentences like the following are perfectly grammatical.

- (1) Kimi-wa [dare-o egai-ta hon]-o yomi masi-ta ka?
you-Top who-Acc described book-Acc read Hon-Past Q
'You read a book such that it described who?' or

lit. '*Who did you read a book that described?'

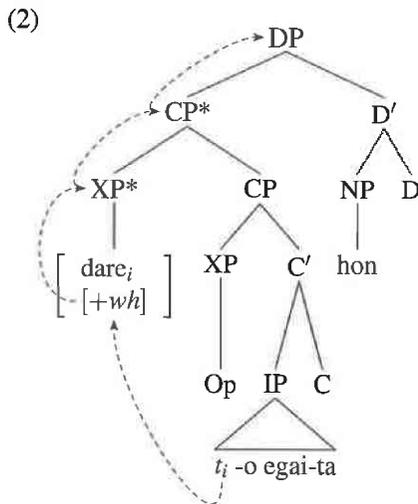
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As the ungrammaticality of the (literal) English translation indicates, overt *wh*-movement out of a complex NP, such as a relative clause as in this case, is generally prohibited in English. This constraint, first discussed in detail by Ross (1967), has been called the Complex NP Constraint (CNPC). Later, Chomsky (1973) proposed that both the CNPC and the *Wh*-Island Condition are to be reformulated under a unified notion of Subjacency, defined on the notion of ‘bounding nodes’, or ‘barriers’ (Chomsky 1986).

Thus, the *wh*-construction in Japanese exhibits a sharp contrast, if it is supposed that it involves covert movement of *wh*-phrases in the derivation of LF, with overt *wh*-movement in English, in that it appears to allow movement of a *wh*-phrase out of a complex NP, in violation of Subjacency.

2. The Pied-Piping Analysis

Nishigauchi (1990) proposed that sentences involving apparent violations of the CNPC effect of Subjacency should be analyzed in such a way that they do not involve a movement of *wh*-phrases out of complex NPs. How is such an analysis possible? Nishigauchi’s suggestion is that movement of the *wh*-phrase occurs only inside the relative clause, and that this movement has the effect of making the entire complex NP identified as a *wh*-phrase. The device which makes this possible is *feature percolation*: The *wh*-feature is percolated through the Spec positions.



Since the entire DP is now identified as a *wh*-phrase, it can now move to Spec CP of the matrix clause. Its LF-representation is something like the following in essentials.

- (3) [_{CP}[what_i [bought *t_i]* person]_j [you met *t_j]*Q]
- 

This analysis makes it possible to say that the LF-derivation of sentences like (1) does not (necessarily) mean that it involves real violations of Subjacency. The theory of LF-syntax which posits representations like (3) for sentences involving apparent violations of CNPC is referred to as the (large-scale) Pied-Piping analysis.

In this article I am going to discuss two topics related to the LF Pied-Piping analysis.

3. Sluicing

In this section, I am going to discuss an elliptical process referred to in the literature as Sluicing, which can be exemplified by the following sentences.

- (4) a. Mary went out with somebody — guess [who (with)].
 b. Mary went out with somebody — guess [who [she went out with *t*]]

This phenomenon was first discussed by Ross (1969). It has since been studied in a number of works. Latest work by Chung, Ladusaw and McCloskey (1995) (hereafter CLM) reveals a number of interesting properties of the logical structure of language as exhibited by this process.

Nishigauchi (1999a) discusses the Japanese counterpart of (4a), viz. sentences like the following.

- (5) a. Taro-ga nani-ka-o kat-ta. Boku-wa [nani(-o) ka] sira-nai
 -Nom something-Acc buy-Past I-Top what-Acc Q know-not
 'Taro bought something. I don't know what.'
 b. Boku-wa [Taro-ga nani-o katta ka] sira-nai
 I-Top -Nom what-Acc buy-Past Q know-not
 'I don't know what Taro bought.'

The latter half of example (5a) is considered to be related with (5b) either by deletion, with the portion of the clause except the *wh*-phrase being deleted, or by copying, where the clause of (5b) is copied to the elided site in (5a).

3.1 The Roofing Effect

Now, what is relevant to the present discussion is the behavior of scope in connection with Sluicing. Consider the following examples from CLM.

- (6) a. She always reads *a book* at dinnertime. We can't figure out what / which one.

- b. Everyone relies on *someone*. It's unclear who.
- c. Both dogs were barking at *something*, but she didn't know at what / what at.
- d. Each student wrote a paper on *a Mayan language*, but I don't remember which one.

CLM's judgments about these examples are that the indefinites in the respective antecedent clauses should not be 'roofed' by another quantifier.

CLM's claim is that "when the potential inner antecedent has a binder or scopal 'roof' within the antecedent IP, it should be unable to support Sluicing.."(p.255) What this means essentially is that the inner antecedent (i.e. the antecedent for the *wh*-phrase left behind in a sluiced clause) must have wide scope in the clause that serves as the 'outer' antecedent for the IP portion to be elided by Sluicing.

Thus, the first sentence of (6a) is ambiguous:

- (7) She always reads *a book* at dinnertime.

where on one reading the indefinite *a book* has wide scope, on which she reads the same book at dinnertime, and on the other the indefinite has narrow scope, on which she reads a different book each time.

The point about (6a) is that it is only the first reading that is available in the sentence in which Sluicing is involved.

The conceptual basis for this generalization that CLM propose is the Bijection Principle: If the indefinite NP takes scope inside some other quantifier, it must be bound by the existential quantifier within the scope of the other quantifier.

- (8) ... Q ... $\exists x$... *x* ...

In the event this portion is copied to a clause with a *wh*-phrase remaining, the variable *x* in the above representation must also be bound the *wh*-operator.

- (9) $WH_x[\dots Q \dots \exists x \dots x \dots]$

This is in violation of the Bijection Principle, which in effect prohibits a variable from being bound by more than one operator.

Nishigauchi (1999a) points out two sets of systematic exceptions to this generalization. One set has to do with the functional interpretation, as in the following:

- (10) a. Everyone relies on someone. I know who — his or her mother-in-law.
- b. Everyone invited someone. I know who — his or her favorite math teacher.

In these examples, the sluiced *wh* and the indefinite NP that serves as its direct antecedent behave as functional elements. In these cases, what takes the widest scope is in fact the quantification over functions, in keeping with the characterization of the relevant phenomenon by Chierchia (1991, 1992–3). Yet, notice that the quantificational force associated with the indefinite, viz. the existential quantification on the individual level, is not what takes the widest scope in these cases. Thus, the most sensible understanding of (10a) is that each person is dependent on a different individual, although in each case the description of the relation holding each pair is the same.

The other set of exceptions involve the important distinction between the two interpretations associated with indefinite NPs: as suggested by Diesing (1992), an indefinite NP may be used in the *cardinal* use or in the *presuppositional* use. The cardinal use simply asserts the presence of an individual, while the presuppositional use of *a book* has the presupposition that there is a class of books (relevant to the discourse) and the presence of at least one of them is asserted.

The point made by Nishigauchi (1999a) is that if an indefinite NP which is forced to have the cardinal interpretation in the above sense is the inner antecedent for the remaining *wh*-phrase in a sluiced clause, the interpretation is available in which the indefinite has narrow scope in the antecedent clause.

While it is not easy to conceive of a situation in which an indefinite NP is forced to have the cardinal interpretation in English, it is possible to obtain such a situation in Japanese, making use of Quantifier Float: an indefinite NP which has undergone Quantifier Float is forced to have the cardinal interpretation (Nishigauchi and Uchibori 1992). Now consider the following example.

- (11) a. Daremo-ga hitori-no sensei-o syootai-si-ta.
 everyone-Nom one-Cl-Gen teacher-Acc invite-did
 ‘Everyone invited one teacher.’
- b. Daremo-ga sensei-o hitori syootai-si-ta.
 everyone-Nom teacher-Acc one-Cl invite-did
 ‘Everyone invited one teacher.’

Now suppose these sentences are followed by the following sluicing sentence.

- (12) Boku-wa dare-o ka oboe-te i-nai.
 I-Top who-Acc Q remember not
 ‘I don’t remember who.’

While the dominant interpretation of (12) as a continuation of (11a) is the wide-scope reading of the *wh*-phrase, so that the likely interpretation is that on which a certain teacher was invited by the group, the dominant interpretation of the same sentence as

a continuation of (11b) is that each person invited a different teacher and the speaker doesn't remember who each person invited.

After observing these facts about the relation between scope and Sluicing, Nishigauchi (1999a) concludes that these apparent exceptions to the Roofing Effect can in fact be subsumed under the same generalization underlying the Roofing Effect. For the detail of the analysis, see Nishigauchi (1999a, chapter 7).

3.2 CNPC and Roofing Effects

Now let us get back to the issues relating more directly to LF Pied-Piping. Our concern in this subsection will be on sentences like the following.

- (13) a. John-wa [nanika-o sagasite-iru hito]-ni aw-ta.
 -Top something-Acc search-is person-Dat meet-Past
 'John met a person who was looking for something.'
- b. Mary-wa nani(-o) ka oboete i-nai.
 -wa what-Acc Q remember is not
 'Mary doesn't remember what.'

Sentence (13b), which exhibits what we take to be a case of Sluicing, can only be interpreted as (14a), and not as (14b).

- (14) a. Mary doesn't remember what the person was looking for.
 b. Mary doesn't remember what x John met a person who was looking for x .

In what follows, we are going to argue that this is precisely what is predicted by the LF Pied-Piping analysis in tandem with the Roofing Effect.

The fact that (14b) is unavailable as an interpretation for (13b) can be accounted for in terms of the LF-representation which must be posited if such an interpretation were available, contrary to the facts. Such an LF-representation would be derived in the following manner, assuming the LF-Copying analysis of CLM. The relevant portion of (13b) as an input to LF is the following.

- (15) ... [CP nani(-o) [IP e] ka] ...
 what-Acc Q

The empty IP portion is filled by the clause of (13a) being copied to this site. By this, we get the following LF-representation.

- (16) ... [CP nani(-o) [IP John-wa [*nanika-o* sagasite-iru
 what-Acc -Top something-Acc search-is
 hito]-ni aw-ta] ka] ...
 person-Dat meet-Past Q
 ... what [John met [a person who was looking for something]] ...

Now suppose the indefinite NP in the complex NP is rewritten as a variable bound by the *wh*-operator, by means of what CLM call Merger.

- (17) ... [CP nani(-o)_{*i*} [IP John-wa [*e_i* sagasite-iru
 what-Acc -Top search-is
 hito]-ni aw-ta] ka] ...
 person-Dat meet-Past Q
 ... *what_i* [John met [a person who was looking for *e_i*]] ...

This is the LF-representation that we would get for sentences like (18) if we assumed that *wh*-phrases could be freely moved out of a complex NP island.

- (18) John-wa [nani(-o) sagasite-iru hito]-ni aw-ta no?
 -Top what-Acc search-is person-Dat meet-Past Q
 'Who *x* John met a person who was looking for *x*?'

The fact that the Sluicing sentence (13b) does not allow the interpretation which should otherwise be represented by (17) indicates that the dependency between a *wh*-phrase and a variable across a complex NP is prohibited even when that dependency is not created by movement.

Now, there are reasons to suppose that (16) cannot be mapped to (17) by Merger. Suppose the following IP structure waits to be copied to the Sluiced site.

- (19) ... [IP John-wa [*nanika-o* sagasite-iru hito]-ni aw-ta] ...
 -Top something-Acc search-is person-Dat meet-Past
 ... [John met [a person who was looking for something]] ...

This is inappropriate as a copying site, if the indefinite NP *nanika-o* 'something-Acc' were to serve as the inner antecedent for the *wh*-phrase remaining in the Sluiced clause, since it does not have the widest scope in this clause, being 'roofed' by the complex NP containing it — a Roofing effect. Thus, the Roofing effect predicts that (17) cannot be derived from (16) at least directly.

Rather, (16) should be mapped to a representation like the following, in which the indefinite in the complex NP is bound by the existential within that complex NP.

- (20) ... [CP nani(-o) [IP John-wa [$\exists x[x(-o)$ sagasite-iru]
 what-Acc -Top search-is
 hito]-ni aw-ta] ka] ...
 person-Dat meet-Past Q
 ... what [John met [a person who was looking for something]] ...

If, at this point, *Merger* applies in such a way as to insure the identity relation between the *wh*-phrase in the left periphery and something, what could that something be? It can only be the variable in the complex NP, but that variable is already bound by the existential, so if the *wh*-phrase purports to bind this already-bound variable, it would be in violation of the Bijection Principle. (In fact, CLM's claim is that the conceptual basis of the Roofing Effect lies with the Bijection Principle.)

Suppose, on the other hand, that the indefinite NP in question takes wide scope, being adjoined to the entire IP to be copied, in which case we obtain the following IP structure.

- (21) ... [IP *nanika-o*_i [IP John-wa [*t*_i sagasite-iru hito]-ni aw-ta]] ...
 something-Acc -Top search-is person-Dat meet-Past
 ... something_i [John met [a person who was looking for *t*_i]] ...

This is appropriate as a Copying site in light of the Roofing effect, but such a representation cannot be derived since it would involve a CNPC violation.

Thus, the present analysis accounts for the fact that (13b) can be interpreted as (22a), but not as (22b), in terms of the Roofing Effect, in tandem with the CNPC effect.

- (22) a. Mary doesn't remember what the person was looking for.
 b. Mary doesn't remember what *x* John met a person who was looking for *x*.

The fact that (22a) is available as an interpretation of (13b) should be accounted for in terms of the copying of the IP-portion within the complex NP together with the elaboration in such a way that the subject of this IP is re-written as a discourse referent established by the mention of the complex NP in (13a).

3.3 Pied-Piped and/or Sluiced?

Before closing the section, let us consider the following dialogue involving what I take to be a case of Sluicing.

- (23) a. John-wa [nanika-o sagasite-iru hito]-ni aw-ta.
 -Top something-Acc search-is person-Dat meet-Past
 'John met a person who was looking for something.'

- b. Mary-wa [nani-o sagasite-iru hito]-ni ka oboete i-nai.
 -wa what-Acc search-is person-Dat Q remember is not
 lit. 'Mary doesn't remember [(a) person searching for what].'

Sentence (23b) has a portion which consists of a complex NP containing a *wh*-phrase, and this has the interpretation which was lacking in (13b), which is:

- (24) Mary doesn't remember what x John met a person who was looking for x .

or probably more precisely:

- (25) Mary doesn't remember for what x, y : x a person looking for y , John met x .

Here, the complex NP containing a *wh*-phrase is found in a position where a simple *wh*-phrase is left behind in a Sluiced clause.

This fact can be seen as another case in which a complex NP containing a *wh*-phrase behaves in the same way that a regular, simple *wh*-phrase behaves. Specifically, if one hypothesizes that Sluicing is derived by deletion (as in Takahashi 1994), the complex NP containing a *wh*-phrase should have been moved by Spell-out, which means that this type of movement takes place in overt syntax. If, on the other hand, one pursues the LF-Copying analysis of Sluicing, the complex NP containing a *wh*-phrase must occupy the position occupied by a regular simple *wh*-phrase, which we take to be Spec of CP, prior to LF.

4. Conclusion

This note has discussed the cases of what has been termed Sluicing in the literature involving complex NPs containing a *wh*-phrase, or an indefinite NP which purports to serve as the inner antecedent for the *wh*-phrase left behind in a sluiced clause.

The observation has been that an indefinite NP contained in a complex NP is unable to serve as the inner antecedent for the *wh*-phrase in a sluiced clause. This has been shown to be a case of the Roofing effect, which states that an indefinite NP whose scope is 'roofed' by another operator taking wide scope is unable to serve as the inner antecedent for a *wh*-phrase in a sluiced clause. On the other hand, a complex NP containing a *wh*-phrase is able to be left behind in a sluiced clause, which is another case indicating that a complex NP containing a *wh*-phrase behaves the same way as a regular simple *wh*-phrase.

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