E-type Pronouns, Pied-Piping, and Reconstruction

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1 Introduction

The present paper will inquire into the question of which interpretive operations should be applied in which grammatical components. I will argue that there is large scale pied-piping LF movement (in the syntax) in Japanese and that the operation of reconstruction must not be applied in the syntax, but is rather a part of the semantics.

To show this, I will argue, to begin with, that what von Stechow (1996) calls Higginbotham's readings exist in Japanese, contrary to what von Stechow (1996) himself claims. This means that there are E-type pronouns in Japanese and that they are functionally interpreted.

Next, we will see that the fact that Higginbotham's readings exist in Japanese provides indirect evidence for the position that there is LF piped-piping in Japanese interrogatives and reconstruction must not be applied in the syntax.

Finally, we will examine the claim that reconstruction must be applied in the syntax and conclude that the arguments for that position are not conclusive.

This can be seen as indirect support for the position that reconstruction is a part of semantics.

2 Higginbotham's readings

According to von Stechow (1996), Higginbotham (p.c. to Heim) pointed out that the following sentences are grammatical.

(1) a. Which man$_i$ said that her$_j$ father spoils [his$_i$ wife]$_j$?

   b. Each man$_i$ said that her$_j$ friends accompanied [his$_i$ mother]$_j$ to church

These sentences, as Higginbotham shows, have the following interpretations (2a) and (2b), respectively. Following von Stechow, we will call these Higginbotham's readings.

(2) a. $\lambda p \exists x[man(x)\ \&\ p=$^$[say(x,\ $^$[spoil(x's\ wife's\ father,\ x's\ wife)])]]$

   b. $\forall x[man(x) \rightarrow say(x,\ $^$[accompany(x's\ mother's\ friends,\ x's\ mother)])]$

One may ask what LF representations the sentences in (1a, b) have in order to get the interpretations in (2a, b) respectively. At first glance, the pronouns 'her' in (1) would seem to be interpreted as bound variable pronouns. Thus, we assume the standard method, i.e., Quantifier Raising (QR) and the direct object, then, is quantifier-raised (adjoined) to IP at LF to bind the pronoun 'her.' Then, we get the LF representations in (3).

(3) a. [which man]$_i$ [t$_i$ said [$_{IP}$[his$_i$ wife]$_j$ [$_{IP}$ her$_j$ father spoils t$_j$]]]

   b. [each man]$_i$ [t$_i$ said that [$_{IP}$[his$_i$ mother]$_j$ [$_{IP}$ her$_j$ friend accompanied t$_j$ to church]]]

The above LF representations, however, are not well-formed. They exhibit weak-crossover configurations as follows.[1]

(4) *... α_i ...[... pron$_i$ ...] ... t$_i$ ...

Therefore, the LF representations in (3) must be excluded. The QR approach cannot account for the grammaticality of (1).

3 Heim's proposal

Heim (1990) proposed that the pronoun 'her' in (1) be considered an E-type pronoun. Based on the devices proposed by Engdahl (1986), she proposed an E-type pronoun should be interpreted functionally. On her analysis, the sentences in (1) have the following LF representations.

(5) a. [which man]$_i$ [t$_i$ said [her$_{f(i)}$ father spoils [his$_i$ wife]$_{f(i)}$]]

   b. [each man]$_i$ [t$_i$ said that [her$_{f(i)}$ friend accompanied [his$_i$ mother]$_{f(i)}$ to church]]

The value of the function f in (5) is determined by the linguistic context. That is, the function f in (5a) is a function which maps any man i onto the wife of i. And the function f in (5b) is a function which maps any man i onto the mother of i. Note that the LF representations in (5) are not excluded by any constraints at LF. The interpretations of the LF representations in (5a) and (5b) are rendered as (6a) and (6b), respectively.

(6) a. $\lambda p[\exists x[man(x) \ \& \ p=\wedge[say(x, \wedge[spoil(f(x)\text{'s father}, f(x))])]]]]$

   where $f = \iota g[\forall x(x\text{'s wife}(g(x)))]$

   b. $\forall x[man(x) \rightarrow say(x, \wedge[accompany(f(x)\text{'s friends}, f(x))])]$

   where $f = \iota g[\forall x(x\text{'s mother}(g(x)))]$

The interpretations represented in (6) are equivalent to the ones we have seen before (i.e., (2)).

4 Higginbotham's readings in Japanese: An argument against von Stechow (1996)

Von Stechow (1996) claims, from the following observation, that Higginbotham's readings do not exist in Japanese.

(7) *[sorezore-no otoko]$_i$-ga kanozyo$_j$-no yuuzin-ga [kare$_i$-no hahaoya]$_j$-o

   each GEN man NOM her   friend NOM his   mother ACC

5

byooin-ni   tureteitta to itta

hospital to take   COMP said

'Each man$_i$ said that her$_j$ friends took [his$_i$ mother]$_j$ to the hospital.'

(7), however, is not conclusive evidence against the existence of Higginbotham's readings in Japanese. It is impossible to interpret the DPs - 'kanozyo-no yuuzin (her friend)' and 'kare-no hahaoya (his friend)' - as distributive only because pronouns 'kare' and 'kanozyo' are not inherently construable as bound pronouns. The examples in (8) show that pronouns 'kare' and 'kanozyo' cannot be interpreted as bound pronouns.

(8) a. *daremo$_i$-ga [kare$_i$-no hahaoya]-ga byooin-ni   itta to omotteiru

everyone NOM his   mother NOM hospital to went COMP think

lit. 'Everyone$_i$ thinks that his$_i$ mother went to the hospital.'

b. *[dono onnanoko]$_i$-mo John-ga [kanozyo$_i$-no yuuzin]-o sinzite-inai

every girl   NOM her   friend ACC believe not

to omotteiru

COMP think

lit. '[Every girl]$_i$ thinks that John does not believe her$_i$ friend.'

There are, however, pronouns which can be construed as bound pronouns in Japanese. In literature, zero pronouns, 'sore (– human),' and 'soitu (+ human)' are considered bound pronouns. Thus, for example, in (9), these pronouns can be interpreted as bound.[3]

(9) a. daremo$_i$-ga   [pro$_i$ hahaoya]-ga byooin-ni   itta to omotteiru

everyone NOM pro   mother NOM hospital to went COMP think

'Everyone$_i$ thinks that his$_i$ mother went to the hospital.'

b. [dono otoko]$_i$-mo John-ga [soitu$_i$-no yuuzin]-o sinzite-inai to omotteiru

every man   NOM his   friend ACC believe not COMP think

'[Every man]$_i$ thinks that John does not believe his$_i$ friend.'

Now, we will reconsider whether or not Higginbotham's readings exist in Japanese by using pronouns which can be construed as bound pronouns.

(10) a. ?dare$_i$-ga [sore$_j$-o/pro$_j$ azukatta yuuzin]-ga [soitu$_i$-no ronbun]$_j$-o nakusite

      who NOM it/pro kept friend NOM his paper ACC lost

      simatta to itta no

     has COMP said Q

     lit. 'Who$_i$ said that a friend who kept it$_j$ has lost [his$_i$ paper]$_j$?'

   b. ?[dono otoko]$_i$-mo [sore$_j$-o/pro$_j$ uketotta yuuzin]-ga [soitu$_i$-no kogitte]$_j$-o

     every man it/pro receive friend NOM his check ACC

    ginkoo-e motteitta to itta

    bank to took COMP said

    lit. 'Every man$_i$ said that a friend who received it$_j$ took [his$_i$ check]$_j$ to the bank.'

(11) a. *John-wa [sore$_i$-o/pro$_i$ uketotta yuuzin]-ga [dono kogitte]$_i$-mo ginkoo-e

      TOP it/pro receive friend NOM every check bank to

    motteitta to itta

    took COMP said

    '*John said that a friend who received it$_i$ took [every check]$_i$ to the bank.'

   b. *John-wa [$_{IP}$[dono kogitte]$_i$-mo [$_{IP}$[sore$_i$-o/pro$_i$ uketotta yuuzin]-ga t$_i$
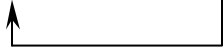
    ginkoo-e motteitta]] to itta

There is a clear-cut difference between the grammaticality of (10a, b) and that of (11a). This shows the existence of Higginbotham's readings in Japanese.

  Now, what we have to consider is what LF representations (10a, b) have. Before we tackle the question, let's see how (11a) is excluded at LF. In (11a), by QR, the direct object 'dono kogitte-mo (every check)' is adjoined to IP at LF to bind the bound pronoun 'sore/pro.' Thus, the LF representation of it is (11b). (11b) exhibits the weak crossover configuration and is excluded at LF (LF output condition). If the direct object is not quantifier-raised, the bound pronoun 'sore/pro' is not bound; the LF

representation is thus excluded in this case as well.

   The fact that (10a, b) are much better than (11a) proves that (10a, b) do not have the LF representations such as (11a) has (i.e., (11b)). Rather, (10a, b) should be analyzed in term of Heim's approach.

That is, the relevant pronouns in (10a, b) should be regarded as E-type pronouns and construed functionally from their context. Schematically, for example, the LF representation of (10) is not as in (12a), but as in (12b).[4]

(12) a. *QP_i ... [... bp_i ...]$_j$ ... [... bp_j ...] ... t_j ...

   b. QP_i ... [... E-$p_{f(i)}$ ...] ... [... bp_i ...]$_{f(i)}$ ...

Therefore, (10b), for example, has the following LF representation and is interpreted correctly as (13b) shows.

(13) a. ?[dono otoko]$_i$-mo [[sore$_{f(i)}$-o/pro$_{f(i)}$ uketotta yuuzin]-ga [soitsui-no kogitte]$_{f(i)}$-o ginkoo-e motteitta to] itta

   b. $\forall x[man(x) \rightarrow say(x, {}^{\wedge}[take(a\_friend\ who\ received\ f(x), f(x), a\_bank)])]$
       where $f = \iota g[\forall x(x\text{'s check}(g(x)))]$

In summary, the examples adduced by von Stechow do not constitute evidence for whether or not Higginbotham's readings exist in Japanese. In fact, contrary to his claim, Higginbotham's readings do exist in Japanese, and they are accounted by Heim's analysis.

5 Heim's proposal and LF pied-piping

In the previous section, we argued that Higginbotham's readings in fact exist in Japanese and that a pronoun which looks like a bound pronoun and is not c-commanded by its antecedent at the surface (and LF) is interpreted functionally according to the linguistic context. If so, the following sentence, (14a), raises a problem.

(14) a. John-wa [Mary-ga *sore$_j$-o/?*pro$_j$ kau mae]-ni [[darei-ga kaita] hon]$_j$-o

     TOP   NOM it/pro buy before DAT   who NOM wrote book ACC

   yonda no

   read Q

    lit. '*Before Mary bought it, John read a/the book that who wrote.'

  b. [$_{CP}$ dare$_i$-ga [$_{IP}$ John-wa [Mary-ga sore$_{j=f(i)}$-o/pro$_{j=f(i)}$ kau mae]-ni [[t$_i$ kaita]

    hon]$_{j=f(i)}$-o yonda] no]

In (14a), the constituent which has a wh-feature is assumed to move covertly to Spec CP at LF. Thus, the LF representation of (14a) is (14b). The structure of (14b) is schematically represented in (15), which is the same structure as (10). (i.e., (12b).)

(15) wh$_i$ ...[... E-p$_{f(i)}$ ...] ... [... bp$_i$ ...]$_{f(i)}$ ...

If the LF representation of (14a) is (14b)(= (15)), we predict that (14a) can be correctly interpreted (= grammatical), contrary to the fact.

This observation suggests that the wh-element 'dare-ga (who)' does not move alone.[5] Rather, a large scale constituent which includes one (or more) wh-elements moves to Spec CP and stays there until LF, as Nishigauchi (1990) argues.

In (14a), for example, the constituent '[[dare-ga kaita] hon]' is moved to Spec CP position and stays there until LF. Thus, the LF representation of (14a) is not (14b), but (16).

(16) [$_{CP}$[[dare-ga kaita] hon]$_i$-o [$_{IP}$ John-wa [Mary-ga sore$_i$-o/pro$_i$ kau mae]-ni t$_i$

  yonda] no]

Clearly, (16) exhibits a weak crossover violation and is, therefore, excluded correctly at LF.[6]

  We summarize as follows: as Nishigauchi (1990) argues, in Japanese, a

large scale constituent including wh-elements moves (or must move) to Spec CP and stays there until LF. This mechanism correctly excludes sentences such as (14a).

6 Syntactic reconstruction

In the previous section, we argued the following:

1. In Japanese, a large scale constituent which includes wh-elements moves covertly to the Spec CP position. (Pied-piping)
2. The moved constituent stays in Spec CP until LF.

In this section, we will observe two cases in which a pied-piped constituent seems to be reconstructed obligatorily in the syntax. This seems to conflict with the proposal of the previous section.

6.1 Compositional semantics

Von Stechow (1996) claims that a moved constituent (except for minimal wh-elements) must be reconstructed by LF to get a correct interpretation if a large scale constituent moves to Spec CP. His argument mainly concerns Japanese, but extends to other languages (e.g., English). Now, let us assume the Hamblin (1976) / Karttunen (1977) semantics for questions and consider (17a, b). The LF representations of (17a, b) are (18a, b) respectively if large scale constituents in (17a, b) are pied-piped to Spec CP and stay there until LF. Von Stechow suggests that (18a, b) are compositionally interpreted as in (19).[7]

(17) a. Whose book did you read t ?

   b. kimi-wa   [[dare-ga   kaita] hon]-o   yonda no
    you TOP   who NOM wrote book ACC read Q
     lit. '*Who$_i$ did you read [a book [which$_j$ t$_i$ wrote t$_j$]]?'

(18) a. [$_{CP}$[whose book]$_i$ did [$_{IP}$ you read t$_i$]]

   b. [$_{CP}$[[dare-ga kaita] hon]$_i$-o [$_{IP}$ kimi-wa t$_i$ yonda] no]

(19) λp∃x∃y[man(x) & book(y) & wrote(x,y) & p=^[read(you,y)]]

In (19), the variable in the scope ranges over books. That is, the interpretation of (19) is the set of all propositions of the form 'you read x such that x is a book that was written by someone.' (cf. Rullmann 1997) Thus, the answer in (20) should be appropriate for (16), but it is not.

(20) *Pride and Prejudice*

What we want to get as the interpretation of (17a, b) is not (19) but rather (21). It is the set of all propositions of the form 'you read a book which x wrote.'

(21) λp∃x[man(x) & p=^[read(you, ιy[book(y) & wrote(x,y)])]]

(21) shows that the pied-piped material is located in the scope. Based on this fact, von Stechow assumes that the operation of reconstruction must be applied before semantic interpretation. That is, reconstruction rule must be applied in the syntax. Assuming a syntactic reconstruction rule, the LF representations of (17a, b) are (22a, b), not (18a,b), respectively. The LF representations in (22) are correctly construed as (21) because the variables in the scopes vary over persons.

(22) a. [$_{CP}$ whose$_i$ did [$_{IP}$ you read [t$_i$ book]]]
    b. [$_{CP}$ dare$_i$-ga [$_{IP}$ kimi-wa [[t$_i$ kaita] hon]-o yonda] no]

6.2 Strong crossover
Strong crossover phenomena constitute the other example which appears to require the operation of syntactic reconstruction. Let us consider the ungrammaticality of the following sentence, (23a), for example.

(23) a. *Whose$_i$ mother did he$_i$ like t ?
    b. *[$_{CP}$ whose$_i$ did [$_{IP}$ he$_i$ like [t$_i$ mother]]]

11

(23a) is assumed to be excluded at LF by the following way: A syntactic reconstruction rule is applied to (23a) and yields (23b) as the LF representation of (23a). Since the variable is c-commanded by a (bound) pronoun, (23b) exhibits a strong crossover violation. The strong crossover condition is stated as follows.[8]

(24) A bound variable must not bind a (true) variable (at LF).

It is assumed that (24) is an LF output condition and, thus, that (23b) is correctly excluded. Therefore, strong crossover appears to suggest the existence of syntactic reconstruction.

6.3 Summary

We will summarize the arguments so far. In section 5, we suggest the following syntactic operations:

1. A large scale constituent moves to Spec CP overtly or covertly, depending on the language. (i.e., pied-piping)
2. A pied-piped constituent stays in Spec CP until LF.

However, the data of this section seem to suggest that reconstruction is syntactic. Here, we are faced with a dilemma. That is, if we assume the syntactic reconstruction rule, we can account for the data in this section, but cannot account for the ungrammaticality of (14a). If we assume there is no reconstruction operation, we can account for the ungrammaticality of (14a), but not for the data of this section.

   In the next section, we will discuss some possible ways to solve this dilemma.

7 Semantic reconstruction and functional indexing
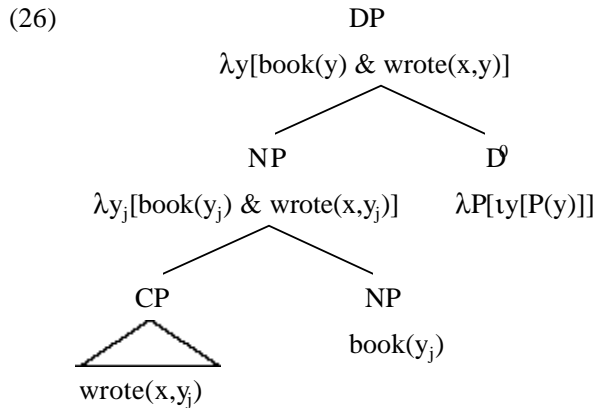
7.1 Semantic reconstruction

In this section, we will argue that the operation of reconstruction can be

applied semantically, not syntactically.[9] Thus, for example, (17b) can receive its correct interpretation (21) from its assumed LF representation (18b), to which syntactic reconstruction does not apply. Therefore, von Stechow's claim that syntactic reconstruction is necessary (cf. 6.1) cannot be maintained.

Let us consider how the operation of reconstruction can be applied in the semantics. To begin with, we will assume that a pied-piped constituent that includes a wh-phrase is decomposed into the element and a residue. This is accomplished by raising the wh-phrase out of Spec CP and adjoining it to CP. For example, the pied-piped constituent '[[dare-ga kaita] hon]' in (18b) is decomposed into '[dare]$_i$-ga' and '[[t$_i$ kaita] hon]' and the former is raised covertly out of Spec CP and adjoined to CP. Thus, we get the following LF representation of (17b), schematically.[10]

(25) [$_{CP}$ dare$_i$-ga [$_{CP}$[$_{DP}$[t$_i$ kaita] hon]-o [$_{IP}$ . . .]]]

'[[t$_i$ kaita] hon]' in (25) is compositionally translated as follows.[11]

(26)   DP
              $\lambda y[book(y) \ \& \ wrote(x,y)]$
                      /   \
                   NP   D'[9]
         $\lambda y_j[book(y_j) \ \& \ wrote(x,y_j)]$ $\lambda P[\iota y[P(y)]]$
                 /   \
               CP   NP
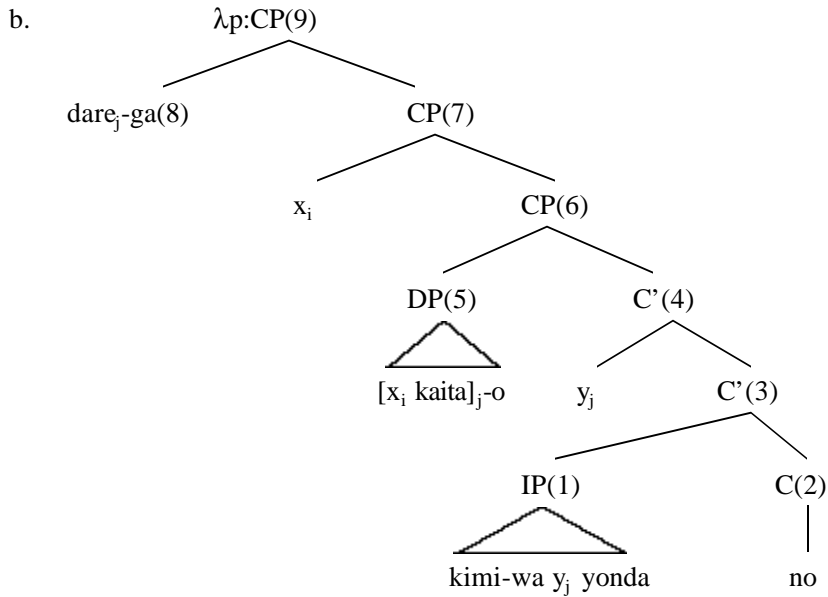   /‾‾\ $book(y_j)$
          $wrote(x,y_j)$

Second, we will assume that 'dare' is translated as an ordinary existential quantifier (in (27)). So, its semantic type is $<<s,<e,t>>,t>$.

(27) dare ⇨ $\lambda P \exists x[person(x) \ \& \ {}^\lor P(x)]$

In addition, following Cresti (1995), we assume that movement structures are interpreted by means of λ-abstraction. (hence, λx and λy adjoined to CP and C', respectively.) Thus, the LF representation of (17b) (repeated in (28a)) is (28b). And, the step-by-step translation of (28b) is shown in (28c).

(28) a. kimi-wa [[dare-ga kaita] hon]-o   yonda no
     you TOP who NOM wrote book ACC read   Q

     lit. '*Who$_i$ did you read [a book [which$_j$ t$_i$ wrote t$_j$]]?'

b.

λp:CP(9)

dare$_j$-ga(8)

CP(7)

x$_i$

CP(6)

DP(5)

C'(4)

[x$_i$ kaita]$_j$-o

y$_j$

C'(3)

IP(1)

C(2)

kimi-wa y$_j$ yonda

no

c. 1: read(you, y$_j$)

2: $\lambda q[p = {}^\wedge({}^\vee q)]$

3: $\lambda q[p = {}^\wedge({}^\vee q)]({}^\wedge read(you, y_j)) \Rightarrow p = {}^\wedge[read(you, y_j)]$

4: $\lambda y_j[p = {}^\wedge[read(you, y_j)]]$

5: $\iota y[book(y) \ \& \ wrote(x_i, y)]$

6: $\lambda y_j[p = {}^\wedge[read(you, y_j)]](\iota y[book(y) \ \& \ wrote(x_i, y)])$

   $\Rightarrow p = {}^\wedge[read(you, \iota y[book(y) \ \& \ wrote(x_i, y)])]$

7: $\lambda x_i[p = {}^\wedge[read(you, \iota y[book(y) \ \& \ wrote(x_i, y)])]]$

8: $\lambda P \exists x[person(x) \ \& \ {}^\vee P(x)]$

14

9: $\lambda P\exists x[person(x) \& {}^{\vee}P(x)]({}^{\wedge}\lambda x_i[p = {}^{\wedge}[read(you, \iota y[book(y) \&$

$wrote(x_i, y)])]])$

$\Rightarrow \exists x[person(x) \& \lambda x_i[p = {}^{\wedge}[read(you, \iota y[book(y) \&$

$wrote(x_i, y)])]](x)]$

$\Rightarrow \exists x[person(x) \& p = {}^{\wedge}[read(you, \iota y[book(y) \& wrote(x, y)])]]$

$\Rightarrow \lambda p\exists x[person(x) \& p = {}^{\wedge}[read(you, \iota y[book(y) \& wrote(x, y)])]]$

As the translation (9) in (28c) shows, the pied-piped constituent which moves to Spec CP is construed in the scope. So, we get the correct interpretation for (17b) from the LF representation (28b). That means that a pied-piped constituent is correctly interpreted in the semantics, and therefore, we don't have to assume any syntactic reconstruction rule. If we assume semantic reconstruction, then, a part of the dilemma we were faced with in the previous section disappears.

7.2 Chain binding and functional indexing
The other evidence for assuming a syntactic reconstruction rule was the strong crossover phenomenon. In this section, we reconsider whether we must assume a syntactic reconstruction rule in order to account for that phenomenon.

An alternative defined without assuming a syntactic reconstruction rule is proposed by Barss (1986). His proposal is based on the crucial use of chain binding, which is an extended version of ordinary binding. It extends the concept of binding in the following way.

(29) α chain-binds β iff (i) α is coindexed with β; and (ii) α c-commands β or α
c-commands a member of the chain whose head contains β.

We will see how his proposal excludes (23a) (repeated as (30a)), which shows a strong crossover violation. Based on the analysis in the previous subsection, the LF representation (30a) may be considered to be (30b).

(30) a. *Whose$_i$ mother did he$_i$ like t ?

b. *[whose$_i$ [t$_i$ mother]]$_j$ did he$_i$ like t$_j$

In (30b), the bound pronoun 'he' c-commands the trace t$_j$, and thus, from the definition of chain binding, it c-commands the trace of 'whose,' which is included in the moved constituent. The trace t$_i$ is, therefore, c-commanded by a bound pronoun with the same index. So, (30b) is correctly excluded by the strong crossover condition. (See (24).)

   Although we can account for strong crossover phenomena without recourse to a syntactic reconstruction rule if we extend the definition of binding, (i.e., if we assume chain binding,) it is not preferable to extend the definition of binding only to account for strong crossover.[12]   We can, however, redefine chain binding by means of Engdahl's proposal we have seen in section 3. In other words, we can account for strong crossover within our framework even if we do not introduce the concept of chain binding. Below, we will discuss this possibility.

   In section 3, we saw that, when the referent of a DP depends on the referent of another DP which is contained in the former, the index of the former is expressed by a functional complex which takes the index of the latter as an argument. For example, if the indices of the former and the latter are y and x, respectively, y is expressed by f(x). (i.e., y = f(x)) That device is applied to (30a), which shows a strong crossover violation. In (30a), who 'whose mother' denotes depends on who 'whose' denotes. Let us suppose that the index of 'whose' is 'i' then the index of 'whose mother' is expressed by f(i). (f = ιg[$\forall$x[x's mother(g(x))]]) Thus, (30a) has the following LF representation.

(31) *[whose$_i$ [t$_i$ mother]]$_{j=f(i)}$ did he$_i$ like t$_{j=f(i)}$

As (31) shows, the index of 'whose mother''s trace is also expressed by f(i) (= j).
   Here, we will redefine the condition of a strong crossover violation.

16

(32) A bound pronoun α must not c-command a variable whose index includes α's index (i.e., whose index is the index of α itself or a functional complex of the index of α.) (at LF).

Then (31), the LF representation of (30a), is correctly excluded by (32) because the bound pronoun 'he' c-commands the trace indexed with the functional complex f(i). Therefore, assuming the functional indexing proposed in section 3 and (32), we need not extend the notion of binding.

In summary, in section 5, we argued for the existence of pied-piping and against syntactic reconstruction. In order to account for the facts we saw in section 6 without contradicting these arguments, we have introduced the following two proposals:

1. A pied-piped constituent is correctly interpreted by the method of semantic reconstruction.
2. The condition that excludes strong crossover violations is (32). In addition, some indices can be expressed as functional complexes at LF.

If these are on the right track, then, we can solve the dilemma we were faced with in section 6.

8 Conclusion

In this paper, we have argued the following: First, Japanese has E-type pronouns, contrary to von Stechow's claim, and an E-type pronoun has a functional index at LF and is functionally interpreted. The content of the function is determined by the linguistic context. Second, the chain binding proposed by Barss (1986) is replaced with functional indexing, as proposed by Engdahl (1986). Thus, we do not need to extend the notion of binding to account for strong crossover phenomena. Third, a large scale constituent including wh-elements is moved to the Spec CP position (Pied-piping) and stays there until LF. With regard to this proposal, one may ask how large a constituent can move. We will leave this issue open although we can only

say that the answer depends on the particular language (see Rullmann 1997 for relevant discussion). Finally, pied-piped elements can be directly interpreted in the semantics. We suggest that the last two arguments may shed light on which components certain interpretive rules should be applied in.

Notes

1. E-mail: 795b5024@mn.waseda.ac.jp
2. We assume that a weak-crossover configuration is excluded by LF output conditions.
3. However, it is less natural to use 'soitsu.'
4. It is assumed that wh-elements may be regarded as quantifiers.
5. Here, we assume that all of wh-elements must move to Spec CP (at LF) in order to take their scope. Recently, on the other hand, some linguists have proposed that covert wh-movement should be completely eliminated. (See Chomsky 1995, Reinhart 1994, etc.) For now, I will leave this proposal out of consideration.
6. Brent de Chene (p.c.) suggests that an English counterpart for (14a) is somewhat better than an ordinary weak crossover sentence although it is not perfectly grammatical. Compare (i) and (ii) with (iii).

    (i) ??[Whose mother]$_i$ do her$_i$ friends like t$_i$?
    (ii) ?[Whose paper]$_i$ did its$_i$ readers criticize t$_i$?
    (iii) *Who$_i$ does his$_i$ mother like t$_i$?

For now, I have no explanation for this.
7. We tentatively assume that the thematic role of 'whose' is AGENT, not POSSESSOR. Of course, this does not have any effect on the discussion here.
8. Another definition of the strong crossover condition is as follows:

    (i) A variable must not be A-bound (at LF).

9. The semantic reconstruction rule we will discuss here is based on the analyses proposed in Rullmann (1997) and Cresti (1995).
10. The adjunction of 'dare-ga' to CP seems to violate subjacency. So, we must assume that covert movement is not constrained by subjacency, contrary to Nishigauchi (1990).
11. We tentatively assume that a relative clause is adjoined to NP.
12. Barss (1986) proposed chain binding to account for certain binding phenomena of anaphors.

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