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Sluicing in Japanese and Logical Form

Taisuke Nishigauchi

Abstract

This paper discusses an elliptical process called Sluicing in Japanese and English, and its theoretical consequences for syntax and logical structure. Assuming the analytical framework of Chung, Ladusaw and McCloskey (1995) (CLM) with some adaptations, we discuss a number of problems related with quantifier scope, the interpretation of indefinite NPs, and the 'functional' nature of *wh* phrases, which are observed in constructions involving Sluicing. It will be shown that the constraint on the scope relation involved in Sluicing, as proposed by CLM, is in conformity with the mapping relation between syntax and logical structure in the sense of Diesing (1992). Further, the analysis making crucial reference to the functional nature of *wh* phrases is shown to be effective for cases of Sluicing related with multiple *wh* constructions in Japanese.

1. Introduction

This paper considers some properties of the process of ellipsis which has been called Sluicing in the literature since Ross (1969). Sentence (1a) is said to be related with a full-fledged sentence (1b) by Sluicing.

(1) a. Mary went out with somebody — guess [who (with)].

   b. Mary went out with somebody — guess [who [she went out with *t*]]

This process has since been studied in a number of works, including Rosen (1976), Levin (1982), and Ginzburg (1992). Takahashi (1994) discusses what he considers to be a Japanese counterpart of Sluicing. 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.

Takahashi (1994) claims that Japanese, a language which lacks overt movement of *wh*, shows a process of ellipsis comparable to Sluicing in English. Consider the following examles.

(2) a. Dare-ka-ga   ki-ta. Boku-wa [dare(-ga) ka] sira-nai
       someone-Nom came I-Top   who-Nom Q   know-not
       'Someone came. I don't know who.

b. Dare-ka-ga   ki-ta. Boku-wa [dare-ga   ki-ta   ka] sira-nai
    someone-Nom came I-Top   who-Nom come-Past Q   know-not
    'Someone came. I don't know who came.

The latter half of sentence (2a) is supposed to be a case of Sluicing, derived, in Takahashi's analysis, from the latter half of (2b) by a deletion rule. If one adopts an LF-Copying anlysis, as we do in what follows, the meaning of (2b) is 'recovered' with (2a) as input to LF.

I try to show in what follows that Sluicing in Japanese, even as a descriptive label, reveals intricate aspects of the logical structure of language, some of which I believe deepen our understanding of phenomena involving *wh*-phrases in Japanese. I would like to show that this consideration sheds light on some asset of the logical structure of language which remains undetected if attention is limited to Sluicing phenomena in English.

Specifically, our attention in the present paper will be focused on the central issue to which CLM's work is addressed: The interaction of this elliptical process with quantifier-scope.

CLM's analysis starts out with the observation that the following sentence is ambiguous with respect to how the indefinite NP is interpreted.

(3) She didn't talk to one student.

The ambiguity of this sentence depends on how the indefinite NP *one student* is interpreted: On one reading, the indefinite is construed as falling outside the scopal domain of the negation, and establishes a discourse referent. On the other reading, the indefinite is inside the scopal domain of the negation. In the latter case, CLM use the term *roofing*: More generally, when an indefinite is within the scope of another scope-inducing element, that indefinite is said to be *roofed* by that element. Now consider the following sentence.

(4) She didn't talk to one student; I wonder who.

This sentence is no longer ambiguous. CLM attribute this fact to the Roofing Constraint: Sluicing is possible only when the indefinite serving as the antecedent for the *wh* in the Sluiced portion is unroofed.

Much of the present paper is devoted to the status of the Roofing Constraint. Building on the relevant data from Japanese, we will reconsider the Roofing effects, and argue that the following two notions are relevant to the present discussion:

(5)   1. The functional interpretation of *wh* phrases.
       2. The cardinal/presuppositional distinction in the interpretation of indefinite NPs.

The relevance of the first of these is acknowledged in CLM (p.259): Our point is that the relevance is more prevalent and far-reaching than they appear to assume. The relevance of the functional interpretation will be highlighted in section 6., where sluicing involving multiple *wh*-constructions as antecedent is discussed at length.

2.   Basic Properties of Sluicing in Japanese

Since the basic properties of Sluicing in English have been described in the aforementioned works, they will be mentioned only to the extent that they will help the understanding of the properties of Sluicing in Japanese. The (a) sentences in the following are representative of what I take to be Japanese counterparts of sentences involving Sluicing. The (b) sentences are their 'source' structures.

(6) 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.'

(7) a. Hanako-ga dare-ka-to   arui-te ita.
        -Nom someone-with walk   was

        Boku-wa [dare-to   ka] sira-nai.
        I-Top   who-with Q   know-not

        'Hanako was walking with someone.
        I don't know who with/with whom.'

    b. Boku-wa [Hanako-ga   dare-to   arui-te ita ka] sira-nai.
        I-Top   Hanako-Nom who-with walk   was Q know-not
        'I don't know who she was walking with.'

These examples indicate that *wh* phrases in all grammatical positions can be left behind in the 'sluiced' portion. In (2a), everything but the *wh* in the subject position is elided. In (6a), the *wh* in the object position is left behind. In (7a), it is the *wh* in the comitative.[1]

To my knowledge, Takahashi (1994) is the first coherent work that focuses on sluicing phenomena in Japanese. Takahashi (1994) claims that there is a syntactic process in Japanese that yields a kind of construction that is intended by this label, where it is literally interpreted as an elliptical process sensitive to agreement, in this case involving the feature [+*wh*].

Nishiyama et al. (1996) argue against Takahashi's (1994) position concerning the syntactic status of Sluicing in Japanese as an elliptical process sensitive to [+*wh*] feature. They argue that what appears to be Sluicing in Japanese is in fact an elliptical construction deriving from a cleft structure, and is driven by focus-related factors, rather than the [+*wh*] feature. Their alternative proposal is essentially to treat the relevant construction as an elliptical construction of the form:

(8) sore-ga *wh* da   ka
    it-Nom   copula Q

Where the pronominal, which may or may not be overtly present, refers to the propositional content of a preceding sentence, and the *wh*-phrase is treated as a focused element, on a par with non-*wh* expressions. In other words, Nishiyama et al.'s analysis treats Sluicing in Japanese as a kind of focus construction.

It is not our purpose in the present discussion to decide whether the process in question is driven by [+ *wh*] feature or by focus-related considerations. Yet, my belief is that this construction involves *wh*-phrases in Spec CP, and that an LF Copying analysis is well-motivated and necessary, as is also acknowledged by Nishiyama et al. (1996), whatever the final syntactic status of 'Sluicing' turns out to be: Nishiyama et al. acknowledge that an LF copying

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[1] Generally, the (actual) occurrence of the nominative and accusative case-markers in ellipsis and topic/focus-related constructions is either prohibited, as in topic constructions with -*wa*, or optional, as in the present cases.

process is necessary to account for the fact that the relevant construction exhibits diagnostics for reconstruction phenomena, such as sloppy identity, when the pronominal subject is covert.

The existence of 'Multiple Sluicing' in Japanese (Takahashi (1994), Nishigauchi (1998b)) is a problem for Nishiyama et al.'s analysis. Takahashi (1994) observes that, while English allows only one displaced *wh*-phrase in the sluiced portion, it is possible in Japanese to have more than one *wh*-phrase in the corresponding portion. The following examples, from Takahashi (1994), indicate this point.[2]

(9) a. John said someone bought something.

   b. *Mary wonders who what.
      cf. Mary wonders who bought what.

(10) a. John-ga [dareka-ga   nanika-o   katta to] it-ta.
          -Nom someone-Nom something-Acc bought that said
       'John said someone bought something.'

   b. Mary-wa [dare-ga   nani-o   ka] siri-tagat-te iru.
          -Top who-Nom what-Acc Q   know-want is
       'lit. Mary wants to know who what.'

Example (10b) is a case of 'Multiple Sluicing'. 'Multiple sluicing' offers a number of interesting issues related with syntax and logical structure of Japanese, and deserves a separate article to deal with it. Notice that Nishiyama et al.'s (1996) analysis predicts that 'Multiple Sluicing' cannot exist, for sentences with multiple foci are generally excluded. Thus, they mark their example (23e), a fine sentence of 'Multiple Sluicing' as far as my judgment is concerned, as ungrammatical.

Thus, we do not adopt Nishiyama et al.'s analysis of Sluicing as a focus construction, and continue to work on the assumption that the *wh*-phrases seen in 'Sluicing' sentences in Japanese are located in Spec CP. The absence of 'Multiple Sluicing' in English, if sentences like (ii) in note 2 do not exemplify it, should be due to the restriction against multiple occurrences of *wh* in Spec CP prior to LF, while Japanese does not have such a restriction — Japanese does not either require a *wh*-phrase to be in Spec CP or prohibit more than one *wh*-phrase from being in Spec CP prior to LF.

See Nishigauchi (1998b) for detailed discussion, where it is shown that the functional nature of *wh*-phrases, which will be discussed in the next section, plays crucial roles in the analysis of 'Multiple Sluicing'.

3.   The Functional Interpretation of *wh*-phrases

One of the key notions in the present discussion is the *functional interpretation* of *wh* phrases in constructions with quantifiers and multiple *wh* phrases.

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[2]Nishigauchi (1998b) discusses sentences like the following, taken from Bolinger (1978, p.109).

   (i) I know that in each instance one of the girls got something from one of the boys. But which from which?

The last portion of this example may be replaced, with equal acceptability, by a clausal chunk with a governing verb:

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

While sentences like these have the appearance of 'Multiple Sluicing', Nishigauchi (1998b) presents three arguments to show that these sentences in English have distinct properties from 'Multiple Sluicing' sentences in Japanese.

Engdahl (1986, 1988) and Chierchia (1991, 1992–3) observe that the following question can be answered in a number of different ways.

(11) Which book did every author recommend? [from Engdahl (1988)]

Engdahl and Chierchia observe that the answers to (11) can be classified into the three types exemplified in the following.

(12) a. **Individual answer:** *War and Peace.*

b. **Pair-list answer:** Bellow recommended *Herzog*, Heller *Catch-22* ...

c. **Functional (relational) answer:** *His* most recent book.

The *individual* answer provides the title of the book that every author mentioned. Of particular relevance to the present discussion are the *pair-list* answer and the *functional (relational)* answer. The pair-list answer often takes the form of a list of pairs related by the predicate of the sentence, as in (12b). The functional (relational) answer supplies the value of *wh* as a *function* with the value of the other quantifier as its argument. Thus, the answer *his most recent book* is thought of as a function mapping from an individual (an author) to an individual (his book).[3]

On the syntactic side, Chierchia (1991, 1992–3) considers a *wh*-phrase (or its trace) as consisting of a function and an argument, where the value of the argument may be determined by a quantifier that c-commands it. Cast in the framework of Chomsky (1993), where at LF elements which have undergone movement are 'reconstructed' in their original positions, coupled with the idea that *wh*-phrases are 'indeterminate' expressions, serving essentially as variables (cf. Nishigauchi (1990), Berman (1991), Lahiri (1991), etc.), this idea can be illustrated by (13), which I suggest as an LF for (11).[4]

(11) Which book did every author recommend? [from Engdahl (1988)]

(13) [Which book]$_1$ did [every author]$_2$ recommend [e_2 N]$_1$

This is essentially the position of Hornstein (1995). Here, the 'trace' of the moved *wh*-phrase contains an empty NP *e* which is bound by the quantifier in the subject position, together with the nominal content, which I assume is empty. Chierchia (1991, 1992–3) refers to the index assigned to the inner empty category as the *a-index*, distinguishing it from the *f-index* assigned to the entire element, now viewed as a function.

Hornstein (1995) extends this line of analysis to multiple WH questions, exemplified by the following.

(14) Who bought what?
   John bought a bicycle, Mary a motorcycle, ...

As this example indicates, a multiple *wh* question normally expects a list of pairs related by the predicate as its answer, a pair-list answer, which, according to Engdahl (1986, 1988) and Chierchia (1991, 1992–3), is a special case of functional answers. Pursuing this idea, Hornstein

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[3] Engdahl (1986, 1988) uses the term *relational* because the function in this sense serves to specify the relation between individuals.

[4] Kuroda (1965) suggested that a *wh* phrase should be analyzed as *wh* + *some N*, where the latter half is considered an indeterminate NP.

(1995) proposes to treat the *wh*-in-situ as a functional *wh* element, the *wh* in Spec CP being a quantifier generating the set of pairs (the generator). Thus, the LF that Hornstein proposes for (14) is the following.

(15) $[Who_1 [t_1 \text{ bought } [e_1 \text{ N}]]]$

Hornstein (1995) attributes the fact that multiple *wh* questions expect pair-list answers to his observation that multiple WH questions require exhaustiveness: a full list of pairs must be provided in a felicitous answer to a multiple *wh* question. Hornstein claims that this exhaustiveness requirement underlies the pair-list interpretation of multiple *wh* questions, which normally is available only when universal quantification is involved.[5]

4. The Copying Analysis of Sluicing

In this subsection, we will briefly sketch the theory of Sluicing developed by CLM. CLM's theory of Sluicing adopts a copying analysis of ellipsis, in the tradition of Wasow (1972), Williams (1977), Chao (1987). They hold that the sluiced portion, which they assume is CP, is based generated as such, with the displaced WH element in Spec CP, and C^0 (which bears feature +Q) and IP being null.

(16) $[_{CP} wh \text{ C } [_{IP} e]]$

CLM (p. 246) state that if this structure is left as is in LF, it would be defective in at least two ways: firstly, the displaced *wh* does not bind anything in IP, which is a violation of Full Interpretation. Secondly, IP provides no content for the nuclear scope of the Q-operator, a violation of the ban on vacuous variable binding.[6]

CLM propose a small set of operations which they claim apply in the derivation of LF. These operations constitute the core machinery of their copying analysis of sluicing, and are motivated on the grounds that they remedy the defects of the structure of a sluiced fragment. The operations they propose are the following:

IP Recycling: copies the structural content of the discourse-available IP (antecedent IP) into the empty IP position of the sluiced portion.

Sprouting: creates a syntactic position necessary for the displaced *wh* to bind, in case the 'inner antecedent' is (overtly) unavailable, due to such factors as implicit arguments.

Merger: ensures the 'matching' between the inner antecedent and the displaced *wh*-phrase.

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[5]Although the point is well-taken, reference to exhaustiveness as a requirement is an overstatement. I find the following discourse quite tolerable.

    (i)   a. Who is bringing what?

            b. John, a guitar, Mary, a banjo, . . . I don't know about the others.

Further, it is probably incorrect to assume pair-list answers as the sole type of possible answer to multiple *wh*-questions. The answer in the following discourse may well be considered a functional answer.

    (ii)   a. Who is bringing what?

            b. My students, their favorite video games.

[6]One NLLT reviewer suggests that the ban on vacuous quantification excludes both a *wh* that does not bind anything in IP and an IP which doesn't rpovide content for the nuclear scope of the Q-operator.

We will be mostly concerned with *IP Recycling* and *Merger*, for we do not have much to say about the cases with implicit inner antecedents. This is mainly because, as far as my observation is concerned, Japanese does not offer much to add to the understanding of the relevant cases, beyond those in English discussed in the past literature.

To make the idea more concrete, let us discuss the operations by means of an illustration. Let us take one of CLM's examples (their (25) on p.250).[7]

(17) Joan ate dinner with someone but I don't know who (with).

IP Recycling copies the entire IP content of the first conjunct, its result being the following.

(18) $[_{CP}$ [with whom^x]$_1$ C^x[+Q] $[_{IP}$Joan ate dinner [with someone^y]$_1$]]

They distinguish between *syntactic binding* created by movement, indicated by the numerical subscripts, and *semantic binding* by the Q-operator, indicated by the superscripts.

By the operation *Merger*, pairs of elements involved in the binding at LF will be matched. In the case of (18), those that must be matched are: *with* and *with*, and *whom* and *someone*. How can the latter pair be matched? CLM follow the Kamp/Heim theory of indefinite NPs, in which they are interpreted as 'restricted free variables', available for discourse-level assignment of a referent or for binding by some other operator (Heim (1982), Kamp (1994)). Further, they assume the idea that *wh* phrases and all NP's with 'weak determiners' (Milsark (1974)) are interpreted the same way (Kuroda (1965), Nishigauchi (1990), Berman (1991)). Merger is a process whereby the conditions on the semantic variable bound by the Q–operator are inherited from the content of two phrases, the *wh*-phrase and (the relevant subportions of) the inner antecedent. The merger between *whom* and *someone* is legitimatized, they claim, because the interpretive procedure does not distinguish between the parameters which interpret indefinites. Thus the merging of indefinites in (18) is 'recorded' by means of co-superscripting the two indefinites, as in:

(19) $[_{CP}$ [with whom^x]$_1$ C^x[+Q] $[_{IP}$Joan ate dinner [with someone^x]$_1$]]

As far as my observation of the data presented by CLM is concerned, it is not obvious to me that the distinction between the two types of binding, effected by two types of indexing, is of much importance. If we pursue the theory of LF-reconstruction, as developed by Chomsky (1993), Hornstein (1995), where movement is identified as copying and deletion, together with Kuroda's (1965) insight that a *wh* phrase should be treated as *wh + some* N in LF, (19) can just as well be thought of as a representation at LF of a sentence with pied-piping.

(20) (I wonder) with whom Joan ate dinner.

Reconstruction, motivated by a requirement for Form Chain, applies to (19), yielding the following LF representation.

(21) $[_{CP}$ [whom$_1$] C[+Q] $[_{IP}$Joan ate dinner [with someone$_1$]]]

In the following subsections, we will develop an analysis of Sluicing in Japanese, armed with the theoretical machinery described in this subsection.

[7]CLM give a brief history of the analyses of the inverted P in their footnote 1. They claim that the complement of P may be optionally moved to a spec position of PP (or a higher functional projection), which is a productive process in Germanic languages. They do not discuss, though, whether this inversion applies prior to SPELL-OUT or at PF. Optional deletion of P occurs probably at PF, contingent on the movement of the complement and the presence of an overt antecedent.

5. Sluicing and Scope

5.1 Quantifier Scope

We will start our discussion in this subsection by looking at the following sentence.

(22) a. Dono-gakusei-mo   dareka-ni   toohyoo-si-ta.
          everyone-student(Nom) someone-dat vote-did
          'Every student voted for someone.'

      b. *Yamada-sensei-wa dare-ga   ka kiroku-sita.
               -Prof.-Top who-Nom Q record-did
          'Prof. Yamada recorded who (did).'

      c. Yamada-sensei-wa dare-ni   ka kiroku-sita.
               -Prof.-Top who-dat Q record-did
          'Prof. Yamada recorded for whom.'

There is a clear contrast in acceptability between (22b), where the displaced *wh* refers to the subject, and (22c), in which the displaced *wh* is related with the dative object. The ungrammaticality of (22b) follows directly from CLM's observation that it is only NPs with weak determiners that can participate in Merger.

(23) Joan ate dinner with
      {someone / several students in her class / a woman from San Jose / *them / *most first year students / *every student in her class / *John / *nobody}
      and we're all wondering with whom. (CLM's (33))

CLM's account for this is that, on the assumption that strong (quantificational) NPs involve their own variable-binding relations, if the potential inner antecedent were to introduce a variable that was already bound, then such a variable should not be available for binding by the Q-operator, otherwise the variable would be bound by two distinctive operators.

The dominant reading of the first conjunct, (22a) is that on which the universal quantifier in the subject position takes wide scope. The second conjunct (22b) has a parallel interpretation, which may be paraphrased as:

(24) Prof. Yamada recorded each of the voter-votee pairs.

If the reader finds (22c) awkward on this reading, addition of an adverb of quantification, such as *hotondo* 'almost' might help.

(25) Yamada-sensei-wa dare-ni   ka hotondo kiroku-sita.
           -Prof.-Top who-dat Q almost   record-did
      'Prof. Yamada mostly recorded for whom.'

This is related with the issue of quantificational variability (QV) involving embedded questions as complement to Vs such as *know, remember* etc., which semantically define the relation between the subject and the *answer* of the embedded question (as opposed to Vs like *wonder*, which define the relation with the question itself), discussed in detail by Berman (1991), Lahiri (1991). What has been observed along this thread is that the felicitous utterance of sentences

like *John remembers who came to the party* is normally taken as meaning that John remembers *all* the people who came to the party. Use of an adverb of quantification modifying the main V affects the quantificational force of the *wh* phrase, so that *John mostly remembers who came to the party* means John remembers most of the participants. Now consider the following sentences.

(26) a. John mostly remembers who everyone voted for.

      b. John mostly remembers who voted for everyone.

In (26a), where the pair-list reading of the *wh* phrase is possible, the domain of quantification over which the Q-adverb applies is available internal to the complement clause, so it is possible to interpret it as John remembers most of the voter–votee pairs. Sentence (26b) does not allow such a reading, and it is necessary for us to imagine a situation in which there were several people who voted for everyone, an unnatural situation with elections, in order for us to obtain a QV reading for the *wh*-phrase, paraphrased as: John remembers most of the people who voted for everyone.

Now, the point of our discussion is that (25) has an interpretation parallel to (26a), which indicates that (22c) has a pair-list interpretation. Thus, our analysis of (22c) proceeds as follows. IP Recycling and Merger apply to the sluiced portion of (22c), which yields the following representation.

(27) ... [$_{CP}$ dare$_1$-ni [$_{IP}$ dono-gakusei-mo
          who-dat   everyone-student(Nom)

      dareka$_1$-ni   toohyoo-si-ta] ka] ...
      someone-dat   vote-did   Q

      ' ... [for whom [every-student voted for someone]] ... '

This structure can further be submitted to the processes of Reconstruction along the lines of Chomsky (1993) and Hornstein (1995). Firstly, one of the coindexed pair *who–someone* must delete. If we take the option of deleting the *wh* element in Spec CP, the indefinite NP in the object position has an option of being converted to a functional element with an a-index within it:

(28) ... [$_{CP}$ (dare$_1$-ni) [$_{IP}$ dono-gakusei-mo$_2$
          who-dat   everyone-student(Nom)

      [e_2 N]$_1$-ni toohyoo-si-ta] ka] ...
          -dat vote-did   Q

      ' ... [(for whom) [every-student$_2$ voted for [e_2 N]$_1$]] ... '

Here, parentheses indicate the deletion site. This successfully provides the representation for a functional interpretation that (22c) was supposed to possess, for the index in the functional indefinite is c-commanded by the universal quantifier.

In this approach, I have supposed that the conversion of the indefinite into a functional element takes place after Recycling and Merger have applied. This is based on the assumption that the functional interpretation is most commonly obtained in environments with *wh*-interrogatives. This approach requires that parallel operations must occur not only in the

sluiced portion, but also in the first conjunct that contains the antecedent IP. Although this latter point may not be of grave difficulty, for it is likely that the parallelism requirement will be subsumed under general principles of interpretation. Even so, it will be desirable if such a parallelism requirement can be dispensed with, which will be possible if conversion takes place prior to Recycling. What this means is that the conversion into a functional element takes place *in the antecedent clause*. In fact, Engdahl (1988) observes that functional (relational) interpretations are not restricted to interrogative environments, citing the following example (quoted in CLM as well).

(29) John has problems with *a certain relative*, everybody else has problems with *a certain relative*, too.

The relevant reading here is that everybody has problems with a relative who stands in the same relation as John's difficult relative stands to John (mother-in-law, for example). Although Engdahl notes that it is not clear whether this interpretation should be truth-conditionally distinguished, to which she suggests a negative answer (p.68), the relevant interpretation of (29) does point to the generality of the functional treatment of indefinites. Further, it would be a very peculiar restriction indeed if the functional treatment were to be restricted to interrogative environments. It would be more natural to assume that any indefinite can potentially be converted into a functional element, subject to binding conditions etc., which in turn means that nothing prevents the inner antecedent for sluicing from being converted prior to Recycling.

My observation and judgment concerning (22) appear to go against CLM's judgments about comparable cases of English, where it is said 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). Thus, they suggest that merger can succeed 'only when the antecedent IP is interpreted in such a way that the inner antecedent is unroofed' (p.255), where 'roofing' essentially includes a case in which the indefinite is within the scope of another quantificational element.

(30) 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.

However, at least some speakers allow an interpretation on which the indefinite takes narrow scope, if not in all the examples in (30), contrary to CLM's observations.[8]

CLM do acknowledge the existence of sentences in which the inner antecedent for the sluiced *wh* takes narrow scope, citing the following example which they ascribe to Donka Farkas (their (47)):

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[8]One NLLT reviewer observes that while his/her judgements for the examples in (30) tend to fall in with CLMS, the narrow scope of the indefinites can be forced by including a quantificational element in the consequent clauses:

(i) a. She always reads a book at dinnertime. (But) wen can rarely figure out which one.

b. Everyone relies on someone. (But) it's often unclear who.

c. Each student wrote a paper on a Mayan language, but I always forgot which one.

We will turn to this matter later on. (in section ??)

(31) Everybody gets on well with a certain relative, but often only his therapist knows which one.

CLM observe that this example marginally allows an interpretation on which different people get on well with different people and only therapists know for a given individual who he or she gets on well with. By means of this example, they emphasize the relevance of the functional interpretation, noting also that such examples are only marginally available (p.257).

In fact, the relevance of the functional interpretation is quite prevalent. In the following type of examples, the interpretation in which the direct antecedent for the sluiced *wh* can take narrow scope is systematically available.[9]

(32)   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 (32a) 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.

5.2   Does the Roofing Effect Exist?

In the above discussion, we have not taken into consideration a very important aspect of 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. This distinction of the two uses of indefinites is close in its implications to the distinction between the specific and the nonspecific NPs in the sense of Enç (1991).[10]

With this distinction in mind, let us consider CLM's examples (30) one more time.

(30)   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.

Sentence (30c) obviously favors a wide scope interpretation for the indefinite due to the nature of the other quantifier *both*, which strongly restricts the range over which the choice of *something* may vary: It has to be one of the two things, which necessarily makes the indefinite

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[9]One NLLT reviewer reminds me that similar examples are discussed by Hintikka (1986). Hintikka's discussion is focused on the semantics of *certain*, so it is relevant to examples like (31) as well.

[10]Unpublished work by Nishigauchi and Uchibori (1992) discusses the relevance of this distinction to bare NPs, mostly subjects, in Japanese.

interpreted presuppositionally. Similarly for (30d). The prevalence of the wide-scope interpre-
tation for the indefinite in this example is dependent on the factual knowledge that the number
of Mayan languages is not great, so the choice is highly restricted, which forces the presup-
positional interpretation on the indefinite. This accounts for the strength of the wide-scope
interpretation of the indefinites in these examples.

Sentence (30b) can be shown to have a narrow-scope interpretation of the indefinite by
changing the continuation slightly.

(33) Everyone relies on *someone*. — I know who; his or her mother-in-law.

That is to say, this sentence has the narrow-scope interpretation for the indefinite to the extent
that the functional interpretation is contextually available.

The status of (30a) is neutral and is more open to various ways of interpretation than the
others. The intuition shared by a number of speakers that this sentence has a narrow scope
interpretation for the indefinite *a book* is crucially related with the cardinal interpretation of
this NP. Let us consider a contextual setting where the indefinite NP can only be interpreted
presuppositionally. Such a context may be one where Mary is assigned a reading list for her
literature seminar. In this context, consider:

(34) Out of this reading list, she always reads *a book* at dinnertime. I can't figure out what /
    which one.

This sentence has only the wide-scope interpretation for the indefinite NP and the sluiced *wh*.

Something similar can be said about the Japanese example (22) that we considered in the
previous subsection. If we consider a discourse like the following, which has been adapted to
force the presuppositional interpretation for *dareka* 'someone', a similar result obtains.

(35) a. Kono kooho-sya-no   naka-kara
       these candidates-Gen among-from

       dono-gakusei-mo   dareka-ni   toohyoo-si-ta.
       every-student(Nom) someone-dat vote-did

       'From among these candidates, every student voted for someone.'

    b. Yamada-sensei-wa dare-ni ka sira-nai.
            -Prof.-Top who-dat Q know-not
       'Prof. Yamada doesn't know to whom.'

The presuppositional interpretation for *dareka* 'someone' is forced here, because the expres-
sion meaning 'from among these candidates' establishes the presupposition about the range of
people from which the indefinite NP may pick up its value. Given this contextual setting, (35b)
can only be interpreted in such a way that *dareka* 'someone' or the *wh* related to it has wide
scope.

It should be noted that (35a) itself allows scope ambiguity, so that it is possible to interpret
it in such a way that everybody voted for some different candidate. Thus, the absence of
ambiguity of (35b) is a specific property of Sluicing which any adequate theory has to capture.

Nishigauchi and Uchibori (1992) discuss a number of issues related with bare NPs in
Japanese, connected with the cardinal/presuppositional distinction. Among the observations
presented by them is that the distinction in question can be elucidated by means of Quantifier

Floating (QF). While, as in (36a), an NP with a numeral quantifier in the prenominal position may be interpreted either cardinally or presuppositionally, which may give rise to a (three-way) ambiguity with respect to the construal of the relevant NPs, sentence (36b), where QF has taken place on the object NP, has only the cardinal interpretation on that NP, and hence only the narrow scope interpretation of it.[11]

(36) 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.

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

The prediction, if my discussion is on the right track, is that while (37) as a continuation to (36a) may be scopally ambiguous, having both the wide-scope and narrow-scope interpretations for the displaced WH, the displaced *wh* in (37) can only be read in its narrow-scope reading as a continuation to (36b), where QF has taken place, for here only the cardinal interpretation is available for the inner antecedent. That this prediction is in fact borne out confirms the correctness of our claim that the cardinal/presuppositional distinction of indefinite NPs is related to the issue in an important way.[12]

Now, Diesing (1992) claims that a cardinal interpretation of an indefinite NP arises from Existential Closure, which she argues applies in the domain of VP, while the presuppositional interpretation of an indefinite NP is obtained when the indefinite behaves as a quantificational NP, where the domain of quantification in this latter case is IP. Further, Diesing claims that the domain of quantification for a quantificational phrase is always IP. Then, we have the following three possible IP structures involving an occurrence of a quantificational phrase (QP) and an indefinite NP, the latter being designated by NP.[13]

(38) a. $[_{IP}$ QP $[_{VP} \ldots$ NP $\ldots]]$ Cardinal reading

      b. $[_{IP}$ NP QP $[_{VP} \ldots]]$ Presuppositional reading, wide scope NP

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[11]Similar observations have been made by Homma et al. (1992) with reference to the interaction with opacity-inducing predicates.

[12]There are complications here, because the dominant interpretation of (36a) is the narrow-scope reading for the indefinite object, whether it be read cardinally or presuppositionally, because of the configuration (cf. Hoji (1985)). However, in the first place, I believe that (36a) still has a scope ambiguity if the object is read presuppositionally. Second, as has been observed since Hoji (1985), the application of scrambling to make the relative order of the relevant NPs reversed (more readily) induces scope ambiguity. Still, it is important to note that even when scrambling applies to (36b), the result is unaffected as far as scope is concerned.

[13]In this discussion, my position concerning the existence of QR in the derivation of LF is left open. I am tentatively assuming that QP is interpreted in IP in the position where it has its Case checked, while an indefinite NP may be interpreted in its VP-internal position, essentially following Hornstein(1995).

    c. [$_{IP}$ QP NP [$_{VP}$ ...]] Presuppositional reading, narrow scope NP

The foregoing discussion indicates that, of these three possible IP structures, only (38a) and (38b) are legitimate sites for recycling in the sense of CLM.

    Thus, the conclusion to be drawn from this discussion is that the roofing effect for recycling does exist, despite the varying judgments about the examples in (30). The presence of a narrow-scope interpretation for the indefinite NP, which the roofing restriction apparently excludes, is due to the position of that NP, namely in the VP. The amendment that the present discussion suggests is that the roofing effect applies in the domain of IP.

5.3 Whence the Roofing?

Having observed that the roofing effect as a restriction on IP Recycling is empirically real, let us consider the conceptual grounds for this effect. CLM (p.255) claim that it should be attributed to the Bijection Principle:

> When the antecedent IP is recycled, it is crucial that the indefinite in the inner antecedent be free. If the indefinite is already bound, then it could not simultaneously be bound by the Q-operator without violating the Bijection Principle (see Koopman and Sportiche 1982).

One way to interpret the effect of IP Recycling, be it a somewhat informal way, is to think of it as an LF procedure of reconstruction, whose effect is to contribute the *nuclear scope* of a tripartite logical representation from preceding discourse, where the *wh* phrase left behind in a sluiced portion contributes the *operator* and the *restrictive clause*. Being a nuclear scope, an IP to be recycled must be an open sentence, with no closure by a quantifier or an operator. Thus the only way a quantifier can figure in a portion to be recycled would be for it to appear as part of a recursively constructed nuclear scope, which would end up taking narrow scope with respect to the *wh* in the event of reconstruction. If it should take wide scope with respect to a weak NP within a recycled portion, it implies that the weak NP should also be bound by the existential operator, which fails to make the recycled portion qualify as a nuclear scope. Such a representation, after recycling, is also in violation of the Bijection Principle as well.

    Then, why does (38a), where the indefinite NP receives the cardinal interpretation, qualify as a recycling site? We repeat the skeletal structure here.

(39) [$_{IP}$ QP [$_{VP}$ ... NP ...]]

In the first place, it is necessary, and in fact possible to regard this structure as an open sentence, with the NP in VP left uninterpreted quantificationally.

    At this point, we entertain the following two hypotheses.

(40)   a. A *wh* phrase is decomposed into a *wh*-operator and an indefinite NP (which may further function as a functional element) at LF

       b. Definite NPs and quantifiers must be interpreted outside VP at LF (Hornstein 1995).

Point (40a) has played a vital part throughout the discussion so far. Point (40b) was mentioned briefly in the last section.

    Now that (39) qualifies as a recycling site, the following representation obtains at the point IP Recycling and Merger have applied. Further, in keeping with (40a), the *wh* phrase has been

decomposed into a *wh* operator, which is a function from proposition to a question, and an indefinite NP.

(41) $[_{CP}$ *wh* NP_i $[_{IP}$ QP $[_{VP} \ldots NP_i \ldots]]]$

Here, NP in CP Spec and NP in VP form a chain, so that one chain link may be deleted, the other remaining one being interpreted at LF. If the one in VP is deleted, it serves as a variable, the resulting representation being identical as one in which the *wh* phrase takes scope over the QP in IP. There is another option, in which the indefinite NP in CP Spec is deleted, as in:

(42) $[_{CP}$ *wh* (NP_i) $[_{IP}$ QP $[_{VP} \ldots NP_i \ldots]]]$

Here, the indefinite NP in VP has yet to be given its quantificational force. Following Diesing (1992), Existential Closure can apply with the internal VP as its domain, yielding the following representation.

(43) $[_{CP}$ *wh* (NP_i) $[_{IP}$ QP $[_{VP} \exists x \ldots x \ldots]]]$

Since the scope of the existential quantifier is restricted to VP, the QP that has its domain in IP is shown to have scope over the former in this representation.

To recap, the discussion in this section has confirmed the conceptual grounds for the Roofing Effect in the sense of CLM, demonstrating at the same time that the indefinite NP with the cardinal interpretation can receive a narrow scope relative to a QP, backed by the hypothesis that Existential Closure takes place with the internal VP as its domain.

6. Another Case of Anti-Superiority

6.1 The Facts

The following sentence poses an intriguing aspect of the logical properties of Sluicing.

(44) a. Hanako-ga [dare-ga   nani-o   mot-te kuru-ka] kime-ta.
           -Nom who-Nom what-Acc bring   come Q   decide-Past
         'Hanako determined who should bring in what.'

   b. *Taro-wa dare-ga   ka wasure-ta.
           -Top who-Nom Q forgot
       'Taro forgot who.'

   c. Taro-wa nani-o   ka wasure-ta.
           -Top what-Acc Q forgot
       'Taro forgot what.'

There is a clear contrast between (44b) and (44c), to the same extent as what we saw in (22): As we saw there, (44b), in which the displaced *wh* is the subject, is much worse than (44c), in which the displaced *wh* is the object—another case which reminds us of 'anti-superiority'.

Some factual remarks are in order here. In the first place, (44c) is not perfectly acceptable, and is worth a marginal status to many speakers. This is understandable, for at least two reasons. One is that (44c) does not follow the generally-accepted constraint on pragmatic ellipsis, which requires that ellipsis should be optimal, or maximal in its domain. In this particular case, the speaker of (44c) might as well have chosen to elide the entire complement clause, in which case, we could have obtained something like:

(45) Taro-wa wasure-ta.
      -Top forgot
   'Taro forgot.'

A second reason that comes to mind, similar in spirit to the first, is that Japanese allows yet another way to convey the same information (though, as we will see shortly, not exactly the same). That is, the speaker might as well have used a sentence with 'Multiple Sluicing' (cf. Takahashi 1994, Nishigauchi 1998), which would have resulted in:

(46) Taro-wa dare-ga   nani-o   ka wasure-ta.
      -Top who-Nom what-Acc Q forgot
   Lit. 'Taro forgot who what.'

Thus, the marginal status of (44c), even for some speakers, can be accounted for on the basis of the available other options. Nevertheless, the difference in acceptability between (44b) and (44c) is of sufficient clarity and is worthy of investigation. Furthermore, continuation (44c) is significantly improved when the first *wh* of (44a) is made explicitly d-linked, as in:

(47) Hanako-ga [gakusei-tati-no dare-ga   nani-o   mot-te kuru-ka]
      -Nom students-Gen   who-Nom what-Acc bring   come Q
   kime-ta.
   decide-Past
   'Hanako determined who of the students should bring in what.'

The same contrast as (44) is observed in the following Spanish example as well.

(48)   a. Pepe dijo quién traería   qué, pero
         Pepe said who   would-bring what, but

       b. *no recuerdo quién.
         not I-know   who

       c. ??no recuerdo qué.
         not I-know   what

Further, (44c) is open to more than one interpretation, though it is not clear whether we can call it (multiply) ambiguous.[14]

(50) A. Taro forgot who should bring what.

     B. Taro$_i$ forgot what he$_i$ should bring.

Before proceeding to the analysis, the following preliminary observation is in order. The subject *wh* in an embedded question is not generally prohibited from serving as the inner antecedent:

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[14]In an earlier version of this paper, I proceeded on the judgment that (44c) has yet two other interpretation:

(49)   C. Taro forgot what was x such that Mary had determined who should bring x.

       D. Taro$_i$ forgot what was x such that Mary had determined that he$_i$ should bring x.

As one reader observes, this judgment may be misguided by the near-factivity of the embedded verb.

(51) a. Hanako-wa [dare-ga   himitu-o   morasi-ta ka]
           -Top who-Nom secret-Acc let-out   Q

     sit-te iru ga,
     know be but

     'Hanako knows who let out the secret, but ... '

     b. Taro-wa dare-ga   ka sira-nai.
        -Top who-Nom Q know-not
        'Taro doesn't know who.'

So the facts in (44) point to another case in which multiple *wh* questions have different properties from simplex *wh* questions.[15]

6.2   Resolving the Ambiguity

Now, let us see how (44c), which we saw was both marginal and ambiguous, can be accounted for. Suppose, as in the usual procedures following Hornstein (1995), that the first conjunct of (44) undergoes reconstruction at LF.

(52) $[_{CP} [_{IP}$ dare$_1$-ga $[e_1$ N$]_2$-o mot-te kuru] ka]
            -Nom   -Acc bring   come Q

Now, one interpretation of (44c) follows from the present analysis quite straightforwardly. All that is necessary is to copy the IP portion of (52) to the sluiced slot, which, via merger, results in the following.

(53) $[_{CP}$ nani$_2$-o $[_{IP}$ dare$_1$-ga $[e_1$ N$]_2$-o mot-te kuru] ka]
        what-Acc   who-Nom   -Acc bring   come Q

With the *wh*-phrase in Spec CP deleted, we obtain essentially the same LF as (52), which yields the functional interpretation, as desired. This is reading A of (44c).

What about reading B? This reading is available only on the understanding that Taro is among the people each of whom is to contribute something to the party. This derives from the semantic function of the first *wh* phrase in multiple *wh* constructions, where it serves as the *generator*, which has the universal force, as has been argued by Hornstein (1995), Comorovski (1996), among others. Being a universal quantifier, the first *wh* in a multiple *wh* construction can establish a discourse set, of which Taro can be a member. Since reading B can be derived from the universal nature of the first *wh* phrase appearing in reading A, my conclusion is that they need not be given separate representations of their own.

A Spanish informant suggests the following example, which (s)he intends as an English translation of the Spanish example that (s)he has in mind. (The bracketed portion indicates the ellipsis site.)

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[15]I have been unable to decide whether there is a comparable contrast in English:

(i)   a. Mary had determined who should bring what, but

      b. John forgot who.

      c. John forgot what.

My observation so far has been that speakers of English generally accept neither (ib) nor (ic). Though (ic) appears to be favored slightly over (ib), the judgment is so unclear that I am unable to draw any conclusion.

(54) They decided who should bring what, but my partner forgot to tell me what [each of him and me should bring].

My interpretation of this fact is that it supports the claim of the present analysis, on which the first *wh* in a multiple *wh* construction is a universal quantifier, which establishes a discourse set, of which my partner and I constitute a subset. This particular example shows further the relevance of the individual interpretation with respect to the discourse set.

6.3 A Semantic Solution

In the present analysis, we relate the ungrammaticality of (44b) to the semantic nature of the first *wh* phrase in a multiple *wh* question — if we suppose, with Hornstein (1995) and Comorovski (1996), that the first *wh* itself serves as a *generator* which defines the domain of binding for the functional *wh*, its nature turns out to be identical with the universal quantifier. If we pursue this latter reasoning, the ungrammaticality of (44b) will be explained on a par with that of (22b), a case involving a strong NP subject, for now the first *wh* is considered an instance of strong NP. That the first *wh* phrase in a multiple *wh* construction has a universal force is confirmed by Comorovski's (1996) observation that a multiple *wh* question can be answered functionally, with a universal quantifier matching the first *wh* phrase. The following examples are from Comorovski (1996, p.46).

(55) a. Q: Which student turned in which paper?
         A: *Every student* turned in his syntax paper.

     b. Q: Which guest will bring what dish?
         A: *Every guest* will bring a dish from his home country.

Comorovski (1996) observes further that the first *wh* in a multiple *wh*-construction is d-linked, citing the following examples from Bolinger (1978).

(56) a. It's nice to have all those times scheduled, but when are you doing what? (#But what are you doing when?)

     b. It's nice to have all those activities ahead of you, but what are you doing when? (#But when are you doing what?)

In both of these examples, the first conjunct introduces the range of value for the first *wh* in the well-formed multiple *wh* question that follows. If the pattern is broken as in the examples in the parentheses, the resulting multiple *wh* question turns out to be bizarre.

A Spanish informant of mine suggests that this latter property of d-linking may be relevant to the 'generator' behavior of the first *wh* in the distribution of facts in (44). The informant provides the following Spanish example to show the point.

(57)   **Scenario:** A literary TV program is starting a series about Borges in a few weeks. Every day there will be a different one of his books commented upon. The commentator may be anybody who previously writes to the program applying for it.

   a. Ya   han   decidido quién presentará qué   libro de Borges,
     already they-have decided who   will-present which book of Borges

    pero aún no quieren   difundir
    but yet not they-want to-spread out

    'They have already decided who will present which one of Borges' books,
    but they don't want to spread out yet ... '

   b. ?(?)quién
       who

   c. *qué libro
     which book

The Spanish speaker's point is that if one considers a context which reverses the normal pattern, so that the second *wh*-phrase may be interpreted as the generator, the resulting pattern with Sluicing is also reversed, so (57b) in which the subject *wh* is left behind sounds better than (57c), in which the object *wh* remains. The same result is obtained in the following Japanese example, with the same scenario in mind.

(58) a. Kare-ra-wa dare-ga   Borges-no dono hon-o   kaisetu-suru ka
       they-Top   who-Nom   -Gen which book-Acc comment-on Q

      sude-ni kime-te iru   ga
      already decided have but

      'They have already decided who will comment on which of Borges' books, but ... '

   b. Dare-ga   ka
     who-Nom Q

   c. *Dono hon-o   ka
     which book-Acc Q

     kare-ra-wa mada sirase   tagara nai.
     they-Top yet   announce want not
     'They don't want to announce yet.'

This constitutes an additional piece of evidence that the *wh*-phrase that serves as the generator, regardless of the position that it occupies, is a strong quantifier, so that it cannot serve as the inner antecedent for the remaining *wh* in the sluiced clause.

6.4 Relevance of the Functional Interpretation

It must be noted that the solution to the problem posed by (44) suggested in the present analysis crucially hinges on the assumption that what is at stake is the nature of the functional interpretation involving *wh* phrases, which derives, on our analysis, from the binding of an empty category within the indefinite element serving as a functional expression.

Now, this line of consideration leads us to the following reasoning. Suppose a multiple *wh* question, with one *wh* in the subject position, does not allow a functional reading. Then, Sluicing with a displaced subject *wh* should be possible with the multiple *wh* question just

described as its antecedent clause. Reason? First, the elided portion, be it IP or TP, does not contain a free empty category, for a functional *wh* is unavailable in the first place. Furthermore, (the antecedent of) the displaced subject *wh* cannot serve as a generator phrase, hence not a strong NP.

In Nishigauchi (1998a,b), I examine the structural conditions on the binding relation involved here, and discuss some of such cases. The following sentence, with a slight adaptation from the example in Nishigauchi (1998a), is an example.

(59) Dare-ga   [Bill-ga nani-o   tabe-ta to]
     who-Nom   -Nom what-Acc eat-Past that
     it-ta no?
     said Q
     'Who said that Bill had eaten what?'

It is difficult to obtain a pair-list interpretation for sentences like these, where the wh's are separated by a clause-boundary. Thus, it is tempting to suppose that functional *wh*'s are 'near-anaphoric'.[16] Now, let us see what would happen if (59) is embedded, so that it serves as the antecedent clause for Sluicing.

(60) a. Hanako-wa [dare-ga   [Bill-ga nani-o   tabe-ta to]
              -Top who-Nom   -Nom what-Acc eat-Past that
          it-ta ka] sit-te-iru ga,
          said Q   know-is but
          'Hanako knows who said that Bill had eaten what, but ...'

      b. Taro-wa dare-ga   ka sira-nai.
              -Top who-Nom Q know-not
          'Taro doesn't know who.'

Sluicing in (60b), with the subject *wh* displaced, is in sharp contrast to (44b). We claim that this is due to the absence of the functional interpretation, so that the antecedent of the displaced *wh* could never be a generator phrase. As a result, (60b) turns out to be acceptable on the interpretation that it depicts a situation with just one pair of person and something eaten.

It is possible to confirm our point about the relevance of the functional interpretation from a different angle. What we have observed so far is that a generator *wh*-phrase, typically the first *wh* in a multiple *wh*-question, cannot be left behind in a sluiced clause, since that would be in violation of the CLM hypothesis that a strong quantifier may not be the inner antecedent for the sluice. Suppose there is a quantifier expression contained in a portion to be elided in sluicing, such as a predicate-internal position. In such a case, the quantifier in a predicate-internal position should be able to serve as the generator for the other *wh* phrase contained in the ellipsis site, which serves as a functional element, so a *wh* in the subject position, if present, does not have to serve as the generator. This situation may be schematized as in the following.

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[16]Sloan (1991) argues that the binding of a-index is anaphoric. However, Nishigauchi (1998a) shows that while Sloan's observations apply in a wide range of data, still there is evidence that the binding relation is pronominal in nature.

(61)   *wh*   QP   *wh*
                Generator   functional element
                         ellipsis site

Now, consider the following.

(62)   a.   Hanako-ga [dare-ga   sorezore-no hon-o   doko-ni
                     -Nom   who-Nom   each   book-Acc where-at

              oku ka] kime-ta.
              put Q   decide-Past

              'Hanako determined who should put each book where.'

        b.   Taro-wa dare-ga   ka oboe-te   iru.
                    -Top who-Nom Q remember be
              'Taro remembers who.'

As expected, Sluicing in (62b) is much better than (44b). This is because the embedded question contains the quantifier expression *each book* in the object position, which can serve as the generator for *where*, which can behave as a functional *wh*. The first *wh*, now being independent of the functional relation, may be filled in by a single object, just as in simple cases of sluicing which does not involve a functional relation, so it may be left behind in the sluice. Thus, it can have an interpretation like the following.

(63)   Taro remembers who — namely, Bill, and that he will put this book here, that book there, etc.

where the ellipsis site in turn contains a list of pairs involving a book and a place where that book should be put.

    The same point can be ascertained by looking at the following, in which there is a *wh* phrase in place of a quantifier in the corresponding position.

(64)   a.   Hanako-ga [dare-ga   dono hon-o   doko-ni
                     -Nom   who-Nom   which book-Acc where-at

              oku ka] kime-ta.
              put Q   decide-Past

              'Hanako determined who should put which book where.'

        b.   Taro-wa dare-ga   ka wasure-ta.
                    -Top who-Nom Q forgot
              'Taro forgot who.'

Actually, my judgment of (64b) is that it is a little worse than (63b). This is understandable, if we suppose that given three *wh* phrases in a sentence, we tend to take the first one, the highest of all, as the generator, while given cases like (64), we are forced to take the second *wh* as the generator against the natural tendency. Nevertheless, it is clear that (64b) is much better than (44b). Thus, everything falls into place under our hypothesis about the relevance of the functional interpretation.

7.   Concluding Remarks

In this article, we have discussed a number of problems related with the elliptical process called Sluicing, and those problems were shown to shed fresh light on the syntax and logical structure of Japanese.

Assuming the theoretical machinery of CLM (with some adaptations), we discussed a number of problems related with quantifier scope in constructions involving Sluicing. First we discussed the condition on Merger proposed by CLM which says that the inner antecedent for sluicing must be a weak NP. Second, we discussed some facts related with CLM's claim about the roofing effect, which says that the scope of the inner antecedent may not be 'roofed' by another quantifier phrase having wider scope. Although this generalization has a number of apparent counterexamples, we argued that the essence of CLM's claim can be maintained if we take into account the structural correspondences between syntax and interpretation of indefinite NPs — our claim was that the roofing effect does exist, but its domain of application is restricted to IP. We further investigated the conceptual grounds for the roofing effect, and showed that the proposed analysis, backed by the theory of mapping relations between syntax and logical structure, as proposed by Diesing (1992), supports the rationale of the roofing effect in significant respects. Last but not the least, the 'functional' nature of *wh* phrases has been shown to be relevant to the cases considered throughout the paper. Especially, the cases of Sluicing related with multiple *wh* constructions in Japanese have offered substantial grounds for viewing *wh* phrases as being 'functional'.

References

Baker, C.L. 1970. Note on the description of English questions: The role of an abstract question morpheme, *Foundations of Language* **6**, 197–219.

Berman, Stephen. 1991. *On the Semantics and Logical Form of wh-Clauses*, Ph.D. dissertation, University of Massachusetts.

Chao, Wynn. 1987. *On Ellipsis*, Ph.D. dissertation, University of Massachusetts.

Chierchia, Gennaro. 1991. Functional *wh* and weak crossover, *West Coast Conference on Formal Linguistics* **10**, pp.75–90.

Chierchia, Gennaro. 1992–3. Questions with quantifiers, *Natural Language Semantics* **1**(2), 181–234.

Chomsky, Noam. 1993. A minimalist program for linguistic theory. In K.Hale and J.Keyser (eds.) *The View from Building 20*, MIT Press, Cambridge, pp.1–52. [also in Chomsky (1995).]

Chomsky, Noam. 1995. *The Minimalist Program*, MIT Press, Cambridge.

Chomsky, Noam and Howard Lasnik. 1995. The theory of principles and parameters. In Chomsky (1995), pp. 13–127.

Chung, Sandra, William A. Ladusaw and James McCloskey. 1995. Sluicing and logical form, *Natural Language Semantics* **3**(3), 239–282.

Comorovski, Ileana. 1996. *Interrogative Phrases and the Syntax–Semantics Interface*, Studies in Linguistics and Philosophy, Kluwer, Dordrecht.

Diesing, Molly. 1992. *Indefinites*, MIT Press, Cambridge.

Enç, Mürvet. 1991. The semantics of specificity. *Linguistic Inquiry* **21**(1), 1–25.

Engdahl, Elisabet. 1986. *Constituent Questions*, Kluwer, Dordrecht.

Engdahl, Elisabet. 1988. Relational interpretation. In R. Kempson (ed.) *Mental Representations*, Cambridge University Press, pp. 63–82.

Ginzburg, Jonathan. 1992. *Questions, Queries and Facts: A Semantics and Pragmatics for Interrogatives*, Ph.D. dissertation, Stanford University.

Heim, Irene. 1982. *The Semantics of Definite and Indefinite Noun Phrases*, Ph.D. dissertation, University of Massachusetts.

Higginbotham, James. 1983. Logical form, binding, and nominals. *Linguistic Inquiry* **14**(2), 395–420.

Hoji, Hajime. 1985. *Logical Form Constraints and Configurational Structures in Japanese*, Ph.D. dissertation, University of Washington, Seattle.

Homma, Shinsuke, Nobuhiro Kaga, Keiko Miyagawa, Kazue Takeda and Koichi Takezawa. 1992. Semantic properties of the floated quantifier constructions in Japanese, *Proceedings of the 5th Summer Conference of Tokyo Linguistic Forum*.

Hornstein, Norbert. 1995. *Logical Form: From GB to Minimalism*, Blackwell, Oxford.

Kamp, Hans. 1984. A theory of truth and semantic representation. In J. Groenendijk, T. Janssen, and M. Stokhof (eds.) *Truth, Interpretation and Information*, Foris, Dordrecht, pp. 277–322.

Koopman, Hilda and Dominique Sportiche. 1982. Variables and the bijection principle. *The Linguistic Review* **2**(2), 139–160.

Kuroda, S.-Y. 1965. *Generative Grammatical Studies in the Japanese Language*, Ph.D. dissertation, MIT.

Lahiri, Utpal. 1991. *Embedded Questions and Predicates that Embed Them*, Ph.D. dissertation, MIT.

Levin, Lori. 1982. Sluicing: A lexical interpretation procedure, J. Bresnan (ed.) *The Mental Representation of Grammatical Relations*, MIT Press, Cambridge, pp. 590–654.

Lobeck, Anne. 1991. The phrase structure of ellipsis. In S.D. Rothstein (ed.) *Perspectives on Phrase Structure: Heads and Licensing*, Syntax and Semantics 25, Academic Press, New York, pp. 80–103.

Milsark, Gary. 1974. *Existential Sentences in English*, Ph.D. dissertation, MIT.

Nishigauchi, Taisuke. 1990. *Quantification in the Theory of Grammar*, Studies in Linguistics and Philosophy, Kluwer, Dordrecht.

Nishigauchi, Taisuke. 1998a. 'Multiple sluicing' in Japanese and the functional nature of *wh*-phrases, *Journal of East Asian Linguistics* 7(2),121–152.

Nishigauchi, Taisuke. 1998b. Quantification and *wh*-constructions. In N. Tsujimura (ed.) *A Handbook of Japanese Linguistics*. Blackwell, New York.

Nishigauchi, Taisuke and Asako Uchibori. 1992. Japanese bare NPs and syntax-semantics correspondences in quantification, Ms., Osaka University.

Nishiyama, Kunio, John Whitman, and Eun–Young Yi. 1996. Syntactic movement of overt wh-phrases in Japanese and Korean, *Japanese / Korean Linguistics* 5, 337–351.

Rosen, Carol. 1976. Guess what about? *Northeastern Linguistic Society* 6, 205–211.

Ross, John R. 1969. Guess who? *Chicago Linguistic Society* 3, 252–286.

Saito, Mamoru. 1994. Additional-*wh* effects and the adjunction site theory, *Journal of East Asian Linguistics* 3(2), 195–240.

Sloan, Kelly. 1990. Quantifier–*wh* interaction, *MIT Working Papers in Linguistics* 13.

Takahashi, Daiko. 1994. Sluicing in Japanese, *Journal of East Asian Linguistics* 3(2), 265–300.

Wasow, Thomas. 1972. *Anaphora in Generative Grammar*, Ph.D. dissertation, MIT.

Watanabe, Akira. 1992. Subjacency and S-structure movement of *wh*-in-situ, *Journal of East Asian Linguistics* 1(3), 255–291.

Watanabe, Shin. 1995. *Aspects of Questions in Japanese and Their Theoretical Implications*, Ph.D. dissertation, University of Southern California.

Williams, Edwin. 1977. Discourse and logical form, *Linguistic Inquiry* 8(1),101–139.

Williams, Edwin. 1994. *Thematic Structure in Syntax*, MIT Press, Cambridge.

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