# Surface and Deep Anaphora, Sloppy Identity, and Experiments in Syntax

Hajime Hoji
University of Southern California
hoji@usc.edu

## 1. Introduction

If "the aim of science is, on the one hand, a comprehension, as *complete* as possible, of the connection between the sense experiences in their totality, and, on the other hand, the accomplishment of this aim *by the use of a minimum of primary concepts and relations*," as Einstein (1936, p. 293) puts it, and if generative grammar is that part of science whose aim consists in part of a comprehension of the connection between the sense experiences as reflections of the language faculty, it follows that one of the tasks in generative grammar is to identify what the relevant sense experiences are. Since our sense experiences, such as introspective judgments about a given sentence in a given language in a given context, are no doubt reflections of more than the language faculty proper, such a task necessarily involves hypotheses about the nature of the relevant sense experiences. The postulation, evaluation and modification of such hypotheses have in fact constituted a major portion of the studies in generative grammar.

I understand that the goal of generative grammar is to discover the properties of the human mind that are ascribable to the language faculty, and only to the language faculty. This is obviously based on the familiar assumption—the working hypothesis in generative grammar—that the language faculty is self-contained and is not affected by factors outside it. This of course is not to deny that factors outside the language faculty may affect our sense experiences. Given a certain sense experience, we do not know a priori what aspects of it are due to the language faculty and what others are due to factors outside it. The present study is an attempt to illustrate how one might proceed to tease them apart, using ellipsis and other related phenomena in Japanese and English as examples.

Natural language possesses means of expressing certain ideas without utilizing fully articulated linguistic expressions. VP ellipsis (VPE) and *do it* in English are two such examples. (1) and (2) are taken from Hankamer & Sag 1976:392.[1]

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[1] In what follows, examples prefixed by A and B as in (1), rather than by a, b, c, and

(1) A: I'm going to [$_{VP}$ stuff this ball through this hoop].
B: It's not clear that you'll be able to [$_{VP}$ ].
(2) A: I'm going to [$_{VP}$ stuff this ball through this hoop].
B: It's not clear that you'll be able to [$_{VP}$ do it].

The missing VP in (1B) and *do it* in (2B) are both felt to correspond to [$_{VP}$ *stuff this ball through this hoop*]. One might thus say that the sentence forms in (3) can all invoke a similar sense experience.

(3) a. You'll be able to stuff this ball through this hoop.
b. You'll be able to.
c. You'll be able to do it.

It is generally assumed that the language faculty relates sounds and meanings. The way it is hypothesized to do so is by generating and relating two abstract representations—one corresponding to sounds and the other to meanings—in terms of primitive concepts and relations. The representations generated by the language faculty that correspond to meanings are called LF representations. The relevant question in regard to (3) is thus whether the similar sense experiences invoked by the sentence forms in (3) can all be based on the same LF representations. The thesis that I would like to defend is that (3b) can have the same LF representation as (3a), but (3c) cannot.[2]

Hankamer & Sag (1976) point out, attributing the general observations to Mark Liberman, that the distribution of VPE and that of *do it* are constrained differently. As indicated in (4), taken from Hankamer & Sag 1976:392, the use of VPE requires a linguistic antecedent while that of *do it* does not.[3]

(4) [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop]
Sag: #It's not clear that you'll be able to.
Sag: It's not clear that you'll be able to do it.

Mainly on the basis of the contrast in (4), Hankamer & Sag (1976) classify 'anaphora' into two types and argue that *surface anaphora* such as VPE in English is not pragmatically licensable and needs a linguistic antecedent, while

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so on, are meant to be part of a discourse.

[2] This is essentially what is proposed in Hankamer & Sag 1976.

[3] The # indicates that the utterance to which it is prefixed is infelicitous. Dalrymple 1991 discusses examples of VPE in English without linguistic antecedents; cf. footnote 62 below. We will return to the relevant issues later.

*deep anaphora* such as *do it* is pragmatically licensable and does not need a linguistic antecedent. The linguistic antecedent requirement for VPE can be considered as an immediate consequence if we assume (i) that the 'missing VP' is fully represented at LF, as indicated in (5), and (ii) that, as argued in Williams 1977, the relevant LF representation for the 'missing VP' is obtained by copying the lexically realized VP, as indicated in (5).[4]

(5) a. The surface form of (1B):
It's not clear that you'll be able to [$_{VP}$ ].
b. The LF representation for (1B):
It's not clear that you'll be able to [$_{VP}$ stuff this ball through this hoop].

The absence of the linguistic antecedent requirement in the case of *do it* suggests that the LF representation for (3c) can obtain without the copying operation and the LF representation for (2B) can be identical to its surface form, as indicated in (6).

(6) a. The surface form of (2B):
It's not clear that you'll be able to [$_{VP}$ do it].
b. The LF representation for (2B):
It's not clear that you'll be able to [$_{VP}$ do it].

Under Hankamer & Sag's (1976) proposal, the intuition concerning the relation between [$_{VP}$ *stuff this ball through this hoop*] in (1A) and the missing VP in (1B) is thus expressed in terms of the identical LF representation of the two VPs, while the intuition concerning the relation between [$_{VP}$ *stuff this ball through this hoop*] in (2A) and *do it* in (2B) is not. Hankamer & Sag's (1976) discussion suggests that the 'LF object' (that corresponds to) *it* in *do it* can be understood as corresponding to some concept that can be formed in the mind in some way, not necessarily on the basis of any linguistic expressions.[5] The relevant concept for *it* in (4) may be the act of stuffing the 9-inch ball through the 6-inch hoop or the act of stuffing a 9-inch ball through a 6-inch hoop, which can be 'formed' presumably on the basis of some visual information.

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[4] Under the deletion approach in Sag 1976, the deletion of a VP is contingent upon the existence of another VP that is 'identical to it' in terms of their LF representations.

[5] In the terms of Chomsky 1975:105, the LF representations in (5b) and (6b) both will be given—or "associated with" (Chomsky 1976:195-196)—"fuller representations of meaning," when they undergo "further interpretation by other semantic rules (SR-2) interacting with other cognitive structures," and at that point, the two representations of "meaning" may not be distinguishable.

As first discussed in Ross 1967, (7B) can be understood as corresponding to either (7B-i) or (7B-ii), given that (7A) is intended as "John will vote for John's father," as indicated informally by the coindexation.

(7) A: John$_1$ will vote for his$_1$ father.
B: Bill will, too.
(i) <vote for John's father>
(ii) <vote for Bill's father>

Readings such as (7B-i) have been referred to, since Ross 1967, as a strict identity reading and readings such as (7B-ii) as a sloppy identity reading. The sloppy identity reading in examples like (7) is accounted for in Sag 1976 and Williams 1977 by assuming that the relevant pronoun is represented as a bound variable. According to their proposals, the VPs in the first and the second conjuncts in (8) are represented identically at LF, as in (9a) or (9b).[6]

(8) John$_1$ will [$_{VP}$ praise his$_1$ father], and Bill$_2$ will [$_{VP}$ ], too.
(9) a. John$_1$ will [$\lambda x$ [$x$ praise his$_1$ father]], and Bill$_2$ will [$\lambda x$ [$x$ praise his$_1$ father]], too.
b. John$_1$ will [$\lambda x$ [$x$ praise $x$'s father]], and Bill$_2$ will [$\lambda x$ [$x$ praise $x$'s father]], too.

(9a) corresponds to the strict identity reading, and (9b) to the sloppy identity reading. Note that in (9b) the pronoun *his* is represented as a variable bound by the $\lambda$ operator. In the Sag/Williams type approach, the strict/sloppy ambiguity is thus ascribed to the ambiguity in regard to the LF representation of the relevant VP.

Although the strict/sloppy ambiguity has been generally understood as a hallmark of surface anaphora, it is pointed out in Dalrymple 1991 that "[i]t is ... possible to produce a strict/sloppy ambiguity by nonlinguistic means using 'do it' anaphora."

(10) (Dalrymple 1991:(21))
[John touches his finger to his nose. To Bill:] Now you do it.
(a) sloppy: Bill touches his own nose.
(b) strict: Bill touches John's nose.

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[6] While Sag (1976) adopts a deletion approach and Williams (1977) an LF copying approach, both approaches share the view that at the level of LF, the two VPs in the two conjuncts are represented identically; cf. footnote 4.

The example in (10) involves the illocutionary force of an imperative and one may object that the strict/sloppy ambiguity is more difficult to obtain in examples like (11).[7]

(11) [Observing John touch his own nose]
Bill did it too.

To avoid such an objection, we can use other instances of deep anaphora in support of Dalrymple's (1991) claim that deep anaphora can give rise to a strict/sloppy ambiguity. As illustrated in (12), *do the same thing* in English need not have a linguistic antecedent.

(12) [Observing someone put soy sauce on a hamburger]
My brother does the same thing.

As indicated in (13), *do the same thing* gives rise to a strict/sloppy ambiguity.

(13) (Cf. (10) (= Dalrymple 1991:(21)).)
A: John washed his car on that rainy day.
B: Bill did the same thing.
(i) <washed John's car on that rainy day> (strict)
(ii) <washed his own car on that rainy day> (sloppy)

Notice that *do the same thing* in (14) gives rise to a strict/sloppy ambiguity without a linguistic antecedent, very much in the way that *do it* in (10) is understood in Dalrymple 1991 to exhibit the relevant ambiguity without a linguistic antecedent.

(14) [Observing John touch his finger to his nose]
Bill did the same thing.

As in the case of *it* of *do it* in (4), the relevant concept corresponding to *the same thing* in (14) can be understood as something like "the same thing as the speaker just observed, namely the act of touching one's finger to one's nose, or the act of touching one's finger to John's nose."

Dalrymple (1991:8) concludes that "[t]he existence of examples such as [(10)] indicates that the basis of the strict/sloppy ambiguity is semantic and does not rely on a difference in the syntactic representation of the source clause." In

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[7] The form *Bill did that, too* seems to be preferred over the form in (11), independently of the issue of the sloppy/strict ambiguity.

the terms of the present discussion, Dalrymple 1991 can be understood as proposing that the strict/sloppy ambiguity (and hence the availability of the sloppy identity reading) is not to be attributed to the language faculty proper.[8]

As stated earlier, the general goal of this article is to provide an illustration of how one might proceed to tease apart the contributions of the language faculty and those of the factors outside it. A specific empirical goal of this article, on the other hand, is to argue that the nature of the sloppy identity reading in surface anaphora is distinct from that in deep anaphora. In particular, I maintain, following Hankamer & Sag 1976, that the ellipsis site in surface anaphora, such as an empty VP in VPE in English (and an empty IP in one type of comparative in Japanese, to be discussed below), is fully represented at LF, in such a way that the necessary conditions for the availability of a sloppy identity reading in surface anaphora are satisfied. I further maintain that deep anaphora, more precisely, the categories or elements that are considered to exhibit properties as such is not fully represented at LF in the way surface anaphora is.

In section 2, I will state the necessary conditions on sloppy identity readings, drawing from Lasnik 1976:Appendix and especially Reinhart 1983:chap. 7. The discussion there also draws from Ueyama 1998 concerning the type of bound variable anaphora that is subject to the relevant conditions. In sections 3-7, I will present a series of syntactic experiments that are designed to confirm that the sloppy identity reading in surface anaphora and that in deep anaphora are quite distinct in nature. One of the implications of the present study is that while certain 'concepts' can be 'formed' without the aid of the language faculty, certain other 'concepts' can be expressed only by means of the language faculty, thereby providing support for the working hypothesis in generative grammar that the language faculty is autonomous.

## 2. Sloppy Identity and Bound Variable Anaphora

Given the analysis of the sloppy identity reading in surface anaphora as presented in Sag 1976 and Williams 1977, it is reasonable to entertain the hypothesis in (15), suggested in Lasnik 1976:Appendix and Reinhart 1983:ch. 7.[9]

(15) The distribution of a sloppy identity reading in surface anaphora is

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[8] We can therefore understand Dalrymple 1991 as claiming that VPE in English can be an instance of deep anaphora in the terms of Hankamer & Sag 1976. Section 7 provides independent evidence for this conclusion as well as some means of differentiating surface anaphora instances and deep anaphora instances of VPE.

[9] Different structural conditions are argued to be relevant to the availability of sloppy identity readings in Lasnik 1976:Appendix and in Reinhart 1983:ch. 7; *precede and kommand* in the former, and *c-command* in the latter.

constrained in the same way as that of bound variable anaphora.

Adopting the hypothesis in (15) as a starting point, I will present in this section a specific formulation of the necessary conditions for bound variable anaphora, as a basis for the ensuing discussion.

**2.1. Bound variable anaphora**

I assume that the bound variable anaphora (BVA) as schematized in (16), and as illustrated in (17), is possible only if there is a formal relation established between the trace of the QP and the NP.[10, 11]

(16) $QP_1$ ... $NP_1$ ...

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[10] For the purpose of the present study, NPs and DPs are interchangeable.

[11] The bound variable reading for (17b), as schematized in (i-a), must be contrasted with the reading in (i-b).

(i) a. ONLY *x*, *x* =you, *x* voted for *x*'s husband
b. ONLY *x*, *x* =you, *x* voted for your husband

(i-a) is true only if no one else other than the hearer voted for her own husband. The truth of (i-a) is not affected even if there are individuals other than the hearer who voted for the hearer's husband. But it does get affected if someone other than the hearer voted for her own husband. (i-b), on the other hand, is not true if there are individuals other than the hearer who voted for the hearer's husband (since (i-b) is true only if no one other than the hearer voted for the hearer's husband). The truth of (i-b) thus does not get affected even if someone other than the hearer voted for her own husband.

A brief remark is in order as to what is intended by (16). We are concerned with the condition under which two expressions α, β can stand in a relation of bound variable anaphora (BVA(α, β)). We can observe BVA(α, β) most clearly when β is a singular-denoting NP and α is not. If α itself is not singular-denoting, however, there arises a mismatch of some sort. I assume that the relevant mismatch is dissolved by the operator-variable structure as indicated in (ii), and further assume that the trace left by the movement of α at LF gets mapped to the variable bound by the operator in SR (Semantic Representation), both of which are fairly commonly adopted assumptions in the literature.

(ii) a. LF: [$\alpha_1$ [ ... $t_1$ … β …]]
b. SR: α (λ*x* ( … *x* … *x* …))

The relevant identity relation therefore holds between β and the trace of α rather than between α and β. What is meant by *QP* in (16) is not an quantifier expression as it is commonly understood in the field of semantics, but is instead an expression that is not singular-denoting itself but can be α of BVA(α, β) with β being singular-denoting. It is precisely for this reason that NPs such as *even John* count as α in (ii), despite the fact that *even* is not a quantifier in the normal sense of the term. The notion BVA(α, β) will be used when it seems useful in the ensuing discussion.

(17) a. [even John]$_1$ $t_1$ voted for his$_1$ father
'EVEN *x*, *x*=John, *x* voted for *x*'s father'
b. [only you]$_1$ voted for your$_1$ husband
'ONLY *x*, *x*=you, *x* voted for *x*'s husband'

I assume, without discussion in this article, that the relevant relation is not coindexation—although coindexation is used for expository purposes here—but is an asymmetrical relation of dependency, which I call Formal Dependency (FD). The relevant FD in (17a), for example, is FD(*t*, *his*). I assume that an FD can be established at LF only if the following three conditions are satisfied.[12]

(18) The three necessary conditions for FD(A, B), where A and B are in argument positions:
a. B is [+β].
b. A c-commands B.
c. A is not in the local domain of B.

In what follows, I briefly illustrate each condition in (18).

The property of being [+β]—i.e., being a β-occurrence, rather than an α-occurrence, in the terms of Fiengo & May 1994—is what makes a nominal expression a dependent term, in that the determination of its value is dependent upon that of another; but see footnote 12. In what follows, a *β-occurrence* is interchangeable with *an nominal expression that is [+β]*, and an *α-occurrence* with *a nominal expression that is not [+β]*. Given FD(A, B), the value of B is to be determined on the basis of that of A, i.e., as being identical to that of A.

Personal pronouns in English can be construed as a bound variable, as indicated in (17) and (19).

(19) a. [every boy]$_1$ will praise his$_1$ father
b. [only I]$_1$ voted for my$_1$ father
c. [only John]$_1$ thinks that we will support him$_1$

We take this fact as indicating that personal pronouns in English can be [+β] . Names on the other hand cannot be construed as a bound variable.

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[12] See Ueyama 1998:section 5.3.2, Hoji et al. 1999, and Hoji to appear for a more comprehensive discussion of FD and related issues in the terms of the general theory of anaphoric relations proposed in Ueyama 1998, according to which (i) (18b) is the only condition on the establishment of an FD, and (ii) the property that is represented here as being [+β] is distinct from being a *β-occurrence* in the sense of Fiengo & May 1994.

(20) *[only John]$_1$ voted for John$_1$'s father

In other words, (20) cannot be construed as (21).

(21) ONLY *x*, *x* =John, *x* voted for *x*'s father

We take this as indicating that Names (in English) cannot be [+β], which is consistent with the intuition that the values of Names such as *John* are determined independently of grammar.

The unavailability of the BVA in (22), in contrast to (23), indicates that Names in Japanese cannot be [+β] either.

(22) *[Toyota-sae]$_1$-ga Toyota$_1$-no sitauke-o hihansi-(tara)
Toyota-even-NOM Toyota-GEN subsidiary-ACC criticize-if
'(if) [even Toyota]$_1$ criticizes its$_1$ subsidiaries, ...'

(23) [Toyota-sae]$_1$-ga soko$_1$-no sitauke-o hihansi-(tara)
Toyota-even-NOM it-GEN subsidiary-ACC criticize
'(if) [even Toyota]$_1$ criticizes its$_1$ subsidiaries, ...'

It is not just Names that cannot be [+β]. *A*-words (i.e., NPs with the *a*-demonstrative) in Japanese cannot be [+β], in sharp contrast to *so*-words (i.e., NPs with the *so*-demonstrative), as pointed out, for example, in Hoji 1991, 1995:sec. 3.[13] This is illustrated in (24), in which BVA(*Toyota-sae*, *asoko*) is not possible; cf. (23), in which BVA(*Toyota-sae*, *soko*) is possible.

(24) *[Toyota-sae]$_1$-ga asoko$_1$-no sitauke-o hihansi-(tara)

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[13] The Japanese demonstrative paradigms, which have been extensively discussed by traditional grammarians, including Sakuma and Mikami, are provided in (i).

(i) The *ko*/*so*/*a*/*do* demonstrative paradigms:
a. {*ko*/*so*/*a*/*do*}+re '{this thing/that thing/that thing over there/which thing}
b. {*ko*/*so*/*a(so)*/*do*}+ko '{this place/that place/that place over there/which place}
c. {*ko*/*so*/*a*/*do*}+itu '{this guy/that guy/that guy over there/which guy}
d. {*ko*/*so*/*a*/*do*}+tira '{this area/that area/that area over there/which area}
e. {*ko*/*so*/*a*/*do*}+o '{in this manner/in that manner/in that manner/in which manner (how)} (*ao* => *aa*)

Hoji 1991:287-290 contains a brief illustration of the Japanese demonstrative paradigms, and some relevant references. Kinsui & Takubo 1992 is an impressive collection of past works on Japanese demonstratives, and offers extensive references as well as their own critical discussion on the topic.

Toyota-even-NOM it-GEN subsidiary-ACC criticize-if
'(if) [even Toyota]$_1$ criticizes its$_1$ subsidiaries, ...'

It must be noted that (25) allows coreference between *Toyota* and *asoko*.

(25) Toyota$_1$-ga asoko$_1$-no sitauke-o hihansi-(tara)
Toyota-NOM it-GEN subsidiary-ACC criticize-if
'(if) Toyota$_1$ criticizes its$_1$ subsidiaries, ...'

This indicates that the condition in (18a) is relevant to BVA but not to coreference.

While the concept of FD is clearly inspired by works by Higginbotham (1983, 1985) (see also Evans 1980), the c-command requirement on the establishment of an FD in (18b) distinguishes FD from Higginbotham's Linking, the latter of which is not contingent upon c-command. The condition in (18b) is the familiar c-command condition for BVA, motivated by the contrast in (26), for example.[14]

(26) a. [even John]$_1$ praised his$_1$ father
b. *his$_1$ father praised [even John]$_1$

The status of the Japanese example (27b), in contrast to (27a), also illustrates the

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[14] Partee (1978) states (i).

(i) (Partee 1978:80)
With few exceptions, it appears that bound variables must be *in construction with their antecedents* (the observation is made by Evans (1977); the notion "in construction with" comes from Klima (1964): a constituent A is in construction with a constituent B if and only if A is dominated by the first branching node which dominates B. The term c-command is a more recent alternative name for the same notion.)

Reinhart (1983) gives the condition on bound variable anaphora in terms of c-command as in (ii), noting in her footnote 5 that "[a] similar condition, using *in construction with*, has been proposed by Evans (1977, 1980)."

(ii) (Reinhart 1983:122)
Quantified NPs and *wh*-traces can have anaphoric relations only with pronouns (including reflexive and reciprocal anaphors, HH) in their c-command syntactic domain.

Until section 7, I do not address cases of so-called Spec-binding such as (ii); cf. Higginbotham 1980:691 and Reinhart 1983:177-179, 1987.

(iii) Every linguist$_1$'s parents think that [he or she]$_1$ has chosen a wrong field.

effects of (18b).[15]

(27) a. (=(23))
[Toyota-sae]$_1$-ga soko$_1$-no sitauke-o hihansi-(tara)
Toyota-even-NOM it-GEN subsidiary-ACC criticize-if
'(if) [even Toyota]$_1$ criticizes its$_1$ subsidiaries, ...'
b. *soko$_1$-no sitauke-ga [Toyota-sae]$_1$-o hihansi-(tara)
if it-GEN subsidiary-NOM Toyota-even-ACC criticize-if
'(if) its$_1$ subsidiaries criticize [even Toyota]$_1$, ...'

As the status of (28) suggests, the coreference possibility is not subject to the c-command condition in (18b).

(28) a. soko$_1$-no sitauke-ga Toyota$_1$-o hihansi-(tara) ...
it-GEN subsidiary-NOM Toyota-ACC criticize-if
'(if) its$_1$ subsidiaries criticize Toyota$_1$, ...'
b. asoko$_1$-no sitauke-ga Toyota$_1$-o hihansi-(tara)
it-GEN subsidiary-NOM Toyota-ACC criticize-if
'(if) its$_1$ subsidiaries criticize Toyota$_1$, ...'

Note that *soko/asoko* is not c-commanded by *Toyota* in (28), yet the coreference is possible.[16]

The local domain mentioned in (18c) is the same as that referred to by (Principle B of) Binding Theory; hence we can take the local domain of B to be the smallest complete functional complex containing B in the sense of Chomsky 1986:169.[17] The effects of the condition in (18c) are illustrated by the contrast in

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[15] The contrast in (27) as well as that in (26) can be accounted for by making reference to linear precedence rather than to LF c-command. Chomsky (1976:105) in fact proposes a precedence-based condition on the availability of BVA, while Reinhart (1976, 1983), addressing the general issue of how to define syntactic domains that grammatical operations are sensitive to, proposes a c-command-based condition; see footnote 14. As extensively discussed in Ueyama 1998: chapter 3, there seem to be two types of BVA, one sensitive to PF precedence and the other to LF c-command, and we are here concerned only with the BVA that is based solely on LF c-command; cf. section 2.2 below. See also Hoji to appear for further discussion.

[16] According to Ueyama 1998: chapter 4, the coreference in (28b) is not the same nature as, and in fact more obscure than, that for the coreference in (28b). Due to space considerations, however, the relevant discussion is not provided here.

[17] For the purpose of the present discussion, it suffices to assume that the local domain

(29).

(29) a. [only I]$_1$ $t_1$ voted for my$_1$ father
'ONLY *x*, *x*=me, *x* voted for *x*'s father'
b. *[only I]$_1$ $t_1$ voted for me$_1$
'ONLY *x*, *x*=me, *x* voted for *x*'

(29b) should be compared with (30), where coreference rather than BVA is at stake.

(30) I voted for me

The examples in (31) and (32) also illustrate the effects of (18c).[18]

(31) (Hoji 1995:(48) and (49), adapted in regard to the notations.)
a. [no linguist]$_1$ recommended HIS$_1$ student for that lucrative position

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of B is the minimal NP/DP or IP that dominates B.

[18] One might object, on the basis of the status of (i-b), in contrast to (i-a), that the condition in (18c) is not restricted to BVA.
(i) a. Toyota$_1$ praised its$_1$ subsidiaries
b. *Toyota$_1$ praised it$_1$
Given the so-called referential use of personal pronouns as in (ii), it must be possible for *it* to have its value determined independently of grammar.
(ii) Mary praised it.
The acceptability of (iii) under the coreferential reading confirms that the coreference possibility (between *it* and *Toyota*) is not contingent upon the establishment of FD.
(iii) its$_1$ subsidiaries praised Toyota$_1$
If the value of *it* in (i-b) happens to be Toyota, the coreference in (i-b) is expected to be possible, since the establishment of FD should not be required.
It is argued in Hoji 1997b, 1998b, however, that the status of (i-b) is due to a condition that is independent of (18c). According to the proposal suggested there, the examples in (31b), (i-b) and (iv-b) are ruled out in three distinct ways, and only the unavailability of BVA in (31b) is attributed to the condition on the establishment of FD given in (18c).
(iv) a. I consoled my father
b. */*?I consoled me
As pointed out in Hoji 1998b, this account misses the generalization that the local domain plays a crucial role in all of the three cases. In more recent works, including Hoji to appear, I propose to eliminate the relevant redundancy, dispensing with the (18c) as a condition on the establishment of an FD. The effects of (18c), however, still remain to be expected under that proposal, and I will continue to assume (18c) in the following discussion. The readers are referred to Hoji 1997b, 1998b, to appear for further discussion.

b. *[no linguist]$_1$ recommended HIM$_1$ for that lucrative position
(32) John$_1$ recommended HIM$_1$ for that lucrative position

It is pointed out in Hoji 1990, 1995 that the relevant local disjointness effects can be observed in Japanese examples such as (33), in contrast to (34).[19]

(33) *[Toyota-sae]$_1$-ga kondo-no kaigoo-de soko$_1$-o suisensi-(tara) ...
Toyota-even-NOM upcoming-GEN meeting-at it-ACC recommend-if
'(if) [even Toyota]$_1$ recommends it$_1$ at the upcoming meeting, ...'

(34) a. [Toyota-sae]$_1$-ga kondo-no kaigoo-de soko$_1$-no sitauke-o
Toyota-even-NOM upcoming-GEN meeting-at it-GEN subsidiary-ACC
suisensi-(tara) ...
recommend-if
'(if) [even Toyota]$_1$ recommends its$_1$ subsidiaries at the upcoming meeting, ...'
b. [Toyota-sae]$_1$-ga [soko$_1$-o tekitaisisiteiru kaisya]-o suisensi-(tara) ...
Toyota-even-NOM it-ACC be:hostile:to company-ACC recommend-if
'(if) [even Toyota]$_1$ recommends [the company that has been hostile to it$_1$], ...'

**2.2. Types of BVA**

Most of the QPs in the examples above are of the form *even NP*, *only NP* and their Japanese counterparts, rather than QPs such as *every N* (and its Japanese counterpart *subete-no N*) or *which N* (and its Japanese counterpart *dono N*). The reason for this choice is that the distribution of BVA with QPs such as *every N* or *which N* (and their Japanese counterparts) does not seem to be constrained by the conditions (18b) or (18c) as clearly as that of BVA with QPs such as *even NP* and *only NP* (and their Japanese counterparts).

It is pointed out in Ueyama 1998:Appendix D that examples like (35) are acceptable to many speakers with the intended interpretation.

(35) ?*Soko*-no bengosi-ga *subete-no zidoosya-gaisya*-o
it-GEN attorney-NOM every-GEN automobile-company-ACC

---

[19] There are some complications in the demonstration of the relevant local disjointness effects in Japanese; cf. footnote 56.

uttaeteiru (node, zidoosya-gyookai-wa daikonran-ni otiitteiru).
sued because automobile-industry-TOP disorder-DAT be:thrown:into
'(Since) *its* attorney has sued *every automobile company* (, the automobile industry has been thrown into a state of disorder).'

This is in sharp contrast with examples with *NP-sae* 'even NP', such as (27b), repeated here.

(27) a. [Toyota-sae]$_1$-ga soko$_1$-no sitauke-o hihansi-(tara)
Toyota-even-NOM it-GEN subsidiary-ACC criticize-if
'(if) [even Toyota]$_1$ criticizes its$_1$ subsidiaries, ...'
b. *soko$_1$-no sitauke-ga [Toyota-sae]$_1$-o hihansi-(tara)
it-GEN subsidiary-NOM Toyota-even-ACC criticize-if
'(if) its$_1$ subsidiaries criticizes [even Toyota]$_1$, ...'

It is also reported in Pica & Snyder 1995 that the BVA(*everyone, his*) is fairly acceptable in examples like (36).

(36) (Pica & Snyder 1995:337 (6b)-(7b))
a. ??His$_1$ mother likes everyone$_1$.
b. ?Mary gave his$_1$ paycheck to everyone$_1$.

There seems to be a significant contrast between the examples in (36) on the one hand and examples with *even NP* such as (26b), repeated here, and (37b), on the other.

(26) a. [even John]$_1$ praised his$_1$ father
b. *his$_1$ father praised [even John]$_1$
(37) a. [even John]$_1$ gave his$_1$ paycheck to Mary
b. ?*Mary gave his$_1$ paycheck {to [even John]$_1$ / [even to John]$_1$}

It thus seems that the effects of the condition in (18b) are most clearly observed with QPs such as *even NP* and *only NP*, rather than with QPs such as *every N*.[20]

In regard to the effects of the condition in (18c), it is observed in Hoji 1995 that examples like (38) readily allow the BVA reading.

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[20] The relevant empirical demonstration is possible also with NPs such as *55% izyoo-no NP* '55% or more NP', *doredake-no kazu-no NP* 'how many NP', etc. The relevant data are not, however, provided here for reasons of space; see Ueyama 1998: Appendix D for further discussion.

(38) dono daigaku$_1$-ga kondo-no kaigoo-de soko$_1$-o suisensi-(tara) ...?
which university-NOM upcoming-GEN meeting-at it-ACC recommend-if
'(if) which univeristy$_1$ recommends it$_1$ at the upcoming meeting, ...?

This contrasts with examples like (33), repeated here, in which the relevant QP is *Toyota-sae* 'even Toyota'.

(33) *[Toyota-sae]$_1$-ga kondo-no kaigoo-de soko$_1$-o suisensi-(tara) ...
Toyota-even-NOM upcoming-GEN meeting-at it-ACC recommend-if
'(if) [even Toyota]$_1$ recommends it$_1$ at the upcoming meeting, ...'

The effects of the condition in (18c) are thus much more clearly observed with *NP-sae* 'even NP' than with *dono N* 'which N'.

**2.3. Sloppy identity readings in surface and deep anaphora**

I have illustrated the three necessary conditions for the establishment of FD, which is assumed to be necessary for BVA. Given the hypothesis in (15), we expect that the availability of a sloppy identity reading in surface anaphora is subject to the conditions in (18). (15) and (18) are repeated for convenience.

(15) The distribution of a sloppy identity reading in surface anaphora is constrained in the same way as that of bound variable anaphora.

(18) The three necessary conditions for an FD (A, B), where A and B are in argument positions:
a. B is [+β].
b. A c-commands B.
c. A is not in the local domain of B.

Recall that the sloppy identity reading in surface anaphora, as in (8), is accounted for in Sag 1976 and Williams 1977 by analyzing the VPs in the first and the second conjuncts as being represented identically at LF, with the pronoun *his* being represented as a bound variable, as indicated in (9b). (8) and (9b) are repeated here.

(8) John$_1$ will [$_{VP}$ praise his$_1$ father], and Bill$_2$ will [$_{VP}$ ], too.
(9) b. John$_1$ will [λ*x* [*x* praise *x*'s father]], and Bill$_2$ will [λ*x* [*x* praise *x*'s

father]], too.

Given the preceding discussion, it seems reasonable to propose that FD(*t*, *his*) must be established in both conjuncts in (8) at the point of derivation where (8) is represented as in (39), for example.[21, 22]

(39) $John_1$ $t_1$ will [$_{VP}$ praise his father], and $Bill_2$ $t_2$ will [$_{VP}$ praise his father], too.
FD($t_1$, his) FD($t_2$ his)

We are now in a position to conduct a series of experiments to verify the main thesis of this article that the sloppy identity reading in deep anaphora is not of the same nature as that in surface anaphora. We can for instance construct an example which does not satisfy one or more of the conditions in (18). Using such an example as the first conjunct, we can then have an instance of surface anaphora as the second conjunct. The prediction is that the sloppy identity reading is unavailable, since the FD cannot be established in such cases. Suppose that the prediction turns out to be correct, as we will observe shortly. We can then proceed to use an instance of deep anaphora as the second conjunct. If the nature of the sloppy identity reading in deep anaphora were identical to that in surface anaphora, the sloppy identity reading would be predicted to be unavailable here as well. As will be demonstrated in sections 3 and 4, the sloppy identity reading does not necessarily become unavailable in such cases, thereby providing confirmation that the sloppy identity reading in deep anaphora is distinct in nature from that in surface anaphora.

The experiments in sections 3-7 will confirm that the sloppy identity reading in surface anaphora and that in deep anaphora are quite distinct in nature. It will be demonstrated in sections 3 and 4 that the sloppy identity reading in surface anaphora becomes unavailable if the conditions in (18) are not satisfied.

---

[21] In (39) *John* and *Bill* have been raised by the generalized Quantifier Raising, which I will call *Constituent Raising*, following Reinhart's work in the late 1980s (a draft of Reinhart 1991). (Reinhart (1987:139) calls it *NP Raising*, attributing the rule to Heim 1982.) I assume, following Ueyama 1998: chapter 5, that FD(A, B) results in uninterpretability unless B is generated without an index.

[22] Alternatively, one can assume, somewhat more along the lines of Fiengo & May 1994, that (8) is represented at LF as in (i) and that FD(*John*, *his*) and FD(*Bill*, *his*) are established in the first conjunct and in the second conjunct, respectively.

(i) $John_1$ will [$_{VP}$ praise his father], and $Bill_2$ will [$_{VP}$ praise his father] too.
FD(John, his) FD(Bill, his)

The relevant VPs are represented identically in both conjuncts in (i), just as in the case of (9b) and (39).

In section 3 I will also introduce a comparative construction in Japanese that seems to exhibit the properties of surface anaphora. Section 5 presents experiments that are designed to show that certain interpretations are clearly possible in surface anaphora but not in deep anaphora. Sections 6 and 7 present somewhat more complicated experiments, clarifying some issues including the relevance of the conditions in (18), in particular that in (18b).[23]

## 3. Experiment 1: The β-occurrence Test

One of the necessary conditions for the establishment of an FD is repeated in (40).

(40) FD(A, B) only if B is [+β].

Recall that the establishment of an FD is assumed to be necessary for BVA.[24] Given the hypothesis that the distribution of a sloppy identity reading in surface anaphora is constrained in the same way as that of BVA, it is predicted that the sloppy identity reading in surface anaphora is unavailable if the relevant NP is not a β-occurrence. In this section, I will present some experiments that confirm this prediction. The sloppy identity reading in deep anaphora on the other hand is not affected by the use of an α-occurrence in place of a β-occurrence in the way the sloppy identity reading in surface anaphora is. The results of the experiments in this section thus provide support for the thesis that the nature of the sloppy identity reading in deep anaphora is distinct from that in surface anaphora.

### 3.1. An α-occurrence and surface anaphora in English

VPE in English gives rise to a sloppy identity reading, as illustrated again in (41).

(41) John$_1$ will [$_{VP}$ vote for his$_1$ father];
I want Bill to [$_{VP}$ *ec* ] too.
(i) <vote for John's father> (strict)
(ii) <vote for Bill's father> (sloppy)

---

[23] The arguments to be presented below were originally constructed largely based on Japanese data, and most of the generalizations in English below came to be uncovered on the basis of the Japanese generalizations. Among the exceptions to this are (85) and (86) (i.e., the Dahl examples), (99) (i.e., Fox's paradigm), and (119). Due to the space considerations, however, only a small portion of the relevant Japanese data will be presented in this paper; cf. Fukaya & Hoji 1999 for additional paradigms.

[24] More precisely, we are referring here to a certain type of BVA; see section 2.2.

The phonetically unrealized VP or the missing VP in (41) is represented as [$_{VP}$ *ec* ] (*ec* = empty category). Let us now use an α-occurrence in place of the β-occurrence *his* in (41), as in (42).[25]

(42) John will [$_{VP}$ vote for John's father];
I want Bill to [$_{VP}$ *ec* ] too.
(i) <vote for John's father> (strict)
(ii) *<vote for Bill's father> (sloppy)

As indicated, the sloppy identity reading is unavailable in (42). This observation thus confirms the prediction that the sloppy identity reading in surface anaphora becomes unavailable if the condition in (40) is not satisfied.

**3.2. An α-occurrence and deep anaphora in English**

Recall that we have observed that *do the same thing*, an instance of deep anaphora, also gives rise to a sloppy identity reading. This is illustrated in (43).

(43) A: John washed his car on that rainy day.
B: Bill did the same thing.
(i) <washed John's car on that rainy day> (strict)
(ii) <washed Bill's car on that rainy day> (sloppy)

If the sloppy identity reading in deep anaphora were of the same nature as that in surface anaphora, we would expect that the use of an α-occurrence in place of *his* in (43) would make the sloppy identity reading unavailable, just as in the case of the surface anaphora in (42). As illustrated below, the sloppy identity reading seems to be available in (44) despite the use of an α-occurrence, i.e., a Name in place of *his*.

---

[25] In conducting this experiment and the one in section 3.2, some care must be taken. Some speakers find the coreference in the first conjunct in (42) to be only marginally possible or simply impossible. Such effects, which have often been attributed to so-called Condition C of Binding Theory, are rather weak for (many) other speakers; see Bach & Partee 1980:25 footnote 11, Haïk 1984:204 footnote 21, and Milner 1990, for example. The experiment in this section concerns how the availability of a sloppy identity reading gets affected by the use of an α-occurrence, independently of how strong the 'Condition C effects' may be for a given speaker. For those speakers who readily accept the coreference in the first conjunct of (42), the contrast between the (42-i) reading and the (42-ii) reading seems quite sharp. Those who accept the coreference in (42) only marginally, on the other hand, find the contrast in (42) to be more difficult to detect; but they do seem to find the contrast.

(44) A: John washed John's car on that rainy day.
B: Bill did the same thing.
(i) <washed John's car on that rainy day> (strict)
(ii) <washed Bill's car on that rainy day> (sloppy)

This observation thus provides confirmation that the sloppy identity reading in deep anaphora is distinct in nature from that in surface anaphora.

### 3.3. An α-occurrence and deep anaphora in Japanese

In this subsection, we will observe that deep anaphora in Japanese can give rise to a sloppy identity reading even with an α-occurrence, just as deep anaphora in English can.

#### 3.3.1. Deep anaphora in Japanese

The use of the forms in (45) is felicitous without a linguistic antecedent.

(45) a. Null Object Construction[26]
Bill-mo [$_{NP}$ *ec* ] katta.
'Bill also bought *ec* .'
b. Stripping without case-markers
Bill-mo da.
'Bill, too.'
c. *Soo su* 'do in that way'
. Bill-mo soo sita.
'Bill also did so.'

Thus they are (or at least can be) instances of deep anaphora.

#### 3.3.2. The Null Object Construction in Japanese

As pointed out in Hoji 1998a, the use of an α-occurrence does not seem to affect the availability of a sloppy identity reading in the Null Object Construction (NOC). This is illustrated in (46) and (47).[27, 28]

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[26] It is not entirely clear that (45a) contains [$_{NP}$ *ec* ] as part of its LF representation, despite the almost unanimous agreement in the generative field that it does. The discussion of the relevant empirical and theoretical issues, however, is beyond the scope of this work and I keep to the familiar assumption in this article.

[27] As is well-known (e.g., Oshima 1979 and Kuno 1986), the effects of so-called Condition C of Binding Theory are very weak in Japanese, if not simply non-existent. The first conjunct in (46) and (47) readily allows the coreference. This makes the

(46) John-ga John-no kuruma-o aratta; Bill-mo [$_{NP}$ *ec* ] aratta.
John-NOM John-GEN car-ACC washed Bill-also washed
'John washed John's car; Bill also washed [$_{NP}$ *ec* ]'
(i) <washed John's car> (strict)
(ii) <washed Bill's car> (sloppy)

(47) John-ga John-no kuruma-o aratta; hoka-no subete no hito-mo [$_{NP}$ *ec* ] aratta.
John-NOM John-GEN car-ACC washed other-GEN all-GEN person-also washed
'John washed John's car; everyone else also washed [$_{NP}$ *ec* ]'
(i) <washed John's car> (strict)
(ii) <washed his own car> (sloppy)

**3.3.3. Stripping without case-markers (Non-CM Stripping)**

Given the observation above that the availability of a sloppy identity reading is not affected by the use of an α-occurrence in deep anaphora in the way it is in surface anaphora, the availability of the sloppy identity reading in Stripping without case-markers (Non-CM Stripping) in (48) is not unexpected; see footnote 30.

(48) a. John-ga John-no kuruma-o aratta; Bill-mo da.
John-NOM John-GEN car-ACC washed Bill-also BE
'John washed John's car; Bill too.'
(i) <washed John's car> (strict)
(ii) <washed Bill's car> (sloppy)

b. John-ga John-no kuruma-o aratta; hoka-no subete no hito-mo da.
John-NOM John-GEN car-ACC washed other-GEN all-GEN person-also BE
'John washed John's car; everyone else too'
(i) <washed John's car> (strict)
(ii) <washed his own car> (sloppy)

---

relevant experiment slightly easier to conduct in Japanese than in English; see footnote 25.

[28] As pointed out in Hoji 1998a, the second conjunct in (46) and (47) can be understood also as corresponding to <washed a car>.

### 3.3.4. *Soo su* 'do in that way'

As in the case of the NOC and Non-CM stripping, *soo su* can give rise to a sloppy identity reading, with an α-occurrence.

(49) a. John-ga John-no kuruma-o aratta; Bill-mo soo sita.
John-NOM John-GEN car-ACC washed Bill-also that:way did
'John washed John's car; Bill did (it) in the same way too.'
(i) <washed John's car> (strict)
(ii) <washed Bill's car> (sloppy)

b. John-ga John-no kuruma-o aratta;
John-NOM John-GEN car-ACC washed
hoka-no subete-no hito-mo soo sita.
other-GEN all-GEN person-also that:way did
'John washed John's car; everyone else did (it) in the same way too'
(i) <washed John's car> (strict)
(ii) <washed his own car> (sloppy)

### 3.3.5. Summary

In this subsection, we have observed that deep anaphora in Japanese can give rise to a sloppy identity reading even with an α-occurrence, just as in the case of deep anaphora in English.[29]

## 3.4. Comparatives in Japanese

### 3.4.1. CM-comparatives

We will now consider the Japanese comparative construction in (50) as an instance of surface anaphora, and conduct the relevant experiment concerning the β-occurrence requirement for FD, and hence for the sloppy identity reading in surface anaphora.[30] As discussed in Hoji 1998a, the comparative construction

---

[29] Although only Names are used as the α-occurrence in the relevant examples in this subsection, a strict/sloppy ambiguity also arises in deep anaphora in Japanese with an *a*-word as the α-occurrence; the relevant examples are not, however, supplied here for reasons of space.

[30] The stripping with a case-marker (=CM-stripping) as in (i-B) and (ii) is discussed in some depth in Hoji 1990:chap. 5; cf. the Non-CM-stripping examples in (48) above.

(i) A: John-ni-wa huransugo-ga totemo zyoozuni hanas-eru.
John-DAT-TOP French-NOM very well speak-can
'John can speak French very well.'
B: Watasi-no musuko-ni mo da.
I-GEN son-DAT also be-nonpast

in (50) gives rise to a sloppy/strict ambiguity.

(50) [kono kaisya$_2$-ni yorimo sakini] seihu-wa ano kaisya$_1$-ni
this company-DAT than earlier government-TOP that company-DAT
soko$_1$-no Arizona koozyoo-o hihans-aseta
it-GEN Arizona factory-ACC criticize-made
'The government made that company criticize its (=*soko*'s) Arizona factory earlier than this company-DAT.'
(i) <the government made this company$_2$ criticize that company$_1$'s Arizona factory> (strict)
(ii) <the government made this company$_2$ criticize this company$_2$'s Arizona factory> (sloppy)

If we replace the β-occurrence in (50) *soko* with an α-occurrence *asoko*, the sloppy identity reading seems to become unavailable, as indicated in (51).

(51) [kono kaisya$_2$-ni yorimo sakini] seihu-wa ano kaisya$_1$-ni
this company-DAT than earlier government-TOP that company-DAT
asoko$_1$-no Arizona koozyoo-o hihans-aseta
it-GEN Arizona factory-ACC criticize-made
'The government made that company criticize its (=*asoko*'s) Arizona factory earlier than this company-DAT.'
(i) <the government made this company$_2$ criticize that company$_1$'s Arizona factory> (strict)
(ii) *?<the government made this company$_2$ criticize this company$_2$'s Arizona factory> (sloppy)

---

'My son, too.'
'My son can speak French very well, too.'

(ii) [Observing John speak French fluently, someone says]
#Watasi-no musuko-ni mo da.
I-GEN son-DAT also be-nonpast
'My son, too.'

The linguistic antecedent requirement on the use of the CM-stripping, as indicated here, suggests that the CM-stripping is an instance of surface anaphora. Given this, we predict that it does not give rise to a sloppy/strict ambiguity, if the relevant NP is an α-occurrence. Due to space considerations, the relevant data are not provided here; cf. Fukaya & Hoji 1999 for discussion.

Let us refer to this type of comparative construction as a *CM-comparative*.[31]

As pointed out in Hoji 1997a, we observe the strict/sloppy ambiguity in the CM-comparative (52), even with *kare* as the relevant NP.

(52) [John-ni yorimo sakini] sensei-wa Bill-ni [$_{CP}$ Mary-ga kare-o butta to]
John-DAT than earlier teacher-TOP Bill-DAT Mary-NOM he-ACC hit COMP
iw-aseta
say-made
'The teacher made Bill say that Mary had hit him earlier than John-DAT.'
(i) <the teacher made John say that Mary had hit Bill> (strict)
(ii) <the teacher made John say that Mary had hit John> (sloppy)

As in the case of (51), the use of α-occurrence in place of *kare* makes the sloppy identity reading highly marginal to impossible.[32]

(53) [John-ni yorimo sakini] sensei-wa Bill-ni [$_{CP}$ Mary-ga Bill-o

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[31] This type of comparative in Japanese is called *Comparative Ellipsis*, in Hoji 1997a, 1997b, and 1998a; see Hoji 1998a:footnote 9.

[32] Given the assumption that the CM-comparative is unambiguously an instance of surface anaphora, the availability of the sloppy identity reading in (52) indicates that *kare* can be [+β], i.e., a β-occurrence. As pointed out in Hoji 1997a, 1997b, this is an interesting discovery in the context of the widely-held view that *kare* cannot be construed as a bound variable. While there are a number of systematic counterexamples to the generalization that *kare* cannot be construed as a bound variable, it remains to be the case that the BVA in examples like (i) is highly marginal if not simply impossible, in sharp contrast with those like (ii); cf. Hoji et al. 1999 and Hoji to appear for relevant discussion.

(i) a. ?*[John-sae]$_1$-ga kare$_1$-no bengosi-o hihansita
John-even-NOM he-GEN attorney-ACC criticized
'[Even John]$_1$ criticized his$_1$ attorney.'
b. ?*[John to Bill]$_1$-ga [Mary-ga kare$_1$-o hihansita to] happyoosita
John and Bill-NOM Mary-NOM he-ACC criticized COMP announced
'[John and Bill]$_1$ announced that Mary criticized him$_1$.'

(ii) a. [Toyota-sae]$_1$-ga soko$_1$-no bengosi-o hihansita
Toyota-even-NOM it-GEN attorney-ACC criticized
'[Even Toyota]$_1$ criticized its$_1$ attorney.'
b. [Toyota to Nissan]$_1$-ga [GM-ga soko$_1$-o hihansita to] happyoosita
Toyota and Nissan-NOM GM-NOM it-ACC criticized COMP announced
'[Toyota and Nissan]$_1$ announced that GM criticized it$_1$.'

butta
John-DAT than earlier teacher-TOP Bill-DAT Mary-NOM Bill-ACC hit
to] iw-aseta
COMP say-made
'The teacher made Bill say that Mary had hit Bill earlier than John-DAT.'
(i) <the teacher made John say that Mary had hit Bill> (strict)
(ii) */*?<the teacher made John say that Mary had hit John> (sloppy)

**3.4.2. Non-CM-comparatives**

There are two other comparative constructions in Japanese. Consider (54).

(54) [kono kaisya$_2$ yorimo sakini] seihu-wa ano kaisya$_1$-ni
this company than earlier government-TOP that company-DAT
soko$_1$-no Arizona koozyoo-o hihans-aseta
it-GEN Arizona factory-ACC criticize-made
'The government made that company criticize its (=*soko*'s) Arizona factory earlier than this company.'
(i) <the government made this company$_2$ criticize that company$_1$'s Arizona factory> (strict)
(ii) <the government made this company$_2$ criticize this company$_2$'s Arizona factory> (sloppy)

(54) differs minimally from the CM-comparative (50) in regard to the absence in the former, and the presence in the latter, of the case-marker on *kono kaisya* 'this company'. Let us refer to the comparative of the sort in (54) as *Non-CM-comparatives*. Non-CM-comparatives, like CM-comparatives, give rise to a strict/sloppy ambiguity, as indicated in (54).

Unlike CM-comparatives, Non-CM-comparatives yield a strict/sloppy ambiguity even with an α-occurrence. This is illustrated in (55a) and (55b), to be compared with (51) and (53), respectively.

(55) a. [kono kaisya$_2$ yorimo sakini] seihu-wa ano kaisya$_1$-ni
this company than earlier government-TOP that company-DAT
asoko$_1$-no Arizona koozyoo-o hihans-aseta
it-GEN Arizona factory-ACC criticize-made
'The government made that company criticize its (=*asoko*'s) Arizona factory earlier than this company.'
(i) <the government made this company$_2$ criticize that company$_1$'s Arizona factory> (strict)

(ii) <the government made this company$_2$ criticize this company$_2$'s Arizona factory> (sloppy)

b. [John yorimo sakini] sensei-wa Bill-ni [$_{CP}$ Mary-ga Bill-o butta to]
John than earlier teacher-TOP Bill-DAT Mary-NOM Bill-ACC hit COMP
iw-aseta
say-made
'The teacher made Bill say that Mary had hit Bill earlier than John.'
(i) <the teacher made John say that Mary had hit Bill> (strict)
(ii) <the teacher made John say that Mary had hit John> (sloppy)

The sloppy identity reading in the Non-CM-comparatives in (55a) and (55b) seems to have the status analogous to that in the Non-CM-stripping in (56B) and (57B).

(56) A: Seihu-wa ano kaisya$_1$-ni asoko$_1$-no Arizona koozyoo-o
government-TOP that company-DAT it-GEN Arizona factory-ACC
hihans-aseta
criticize-made
'The government made that company criticize its (=*asoko*'s) Arizona factory.'
B: kono kaisya$_2$ mo da
this company also be-nonpast
'This company, too.'
(i) <the government also made this company$_2$ criticize that company$_1$'s Arizona factory> (strict)
(ii) <the government made this company$_2$ criticize this company$_2$'s Arizona factory> (sloppy)

(57) A: sensei-wa Bill-ni [$_{CP}$ Mary-ga Bill-o butta to] iw-aseta
teacher-TOP Bill-DAT Mary-NOM Bill-ACC hit COMP say-made
'The teacher made Bill say that Mary had hit Bill.'
B: John mo da
John also be-nonpast
'John, too.'
(i) <the teacher made John say that Mary had hit Bill> (strict)
(ii) <the teacher made John say that Mary had hit John> (sloppy)

**3.4.3. The Non-elliptical comparative**

The third type of comparative construction in Japanese, referred to here as

*Non-elliptical comparative*, is illustrated in (58), to be compared with the CM-comparative in (59).[33]

(58) Non-elliptical comparative:
[John-ni *ec* hihans-aseru yorimo sakini] sensei-wa
John-DAT criticize-make than earlier teacher-TOP
Bill-ni Mary-o hihans-aseta
Bill-DAT Mary-ACC criticize-made
'The teacher made Bill criticize Mary earlier than he made John criticize *ec* .'

(59) CM-comparative:
[John-ni yorimo sakini] sensei-wa Bill-ni Mary-o hihans-aseta
John-DAT than earlier teacher-TOP Bill-DAT Mary-ACC criticize-made
'The teacher made Bill criticize Mary earlier than John-DAT.'

Note that (58) contains the predicate *hihans-aseru* 'criticize-make' inside the *yori(mo)* 'than' clause/phrase (or, as it is represented above, inside the *yorimo sakini* 'earlier than' clause) while (59) does not. The relevant difference is schematized in (60).

(60) a. Non-elliptical comparative:
[NP-ni *ec* V-INFL yori]
NP-DAT *ec* V-INFL than
b. CM-comparative:
[NP-ni yori]
NP-DAT than

It thus seems reasonable to understand that the *yori(mo)* 'than' clause/phrase in the Non-elliptical comparative contains an instance of NOC.

Given our earlier conclusion that NOC in Japanese is an instance of deep anaphora, we now predict that the availability of the sloppy identity reading in Non-elliptical comparatives is not affected by the use of an α-occurrence in the way it is in CM-comparatives. This in fact seems to be a correct prediction, as pointed out in Hoji 1998a. Consider the Non-elliptical comparatives in (61).

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[33] This type of comparative in Japanese is called *Comparative Deletion* in Hoji 1997a, 1997b, and 1998a; see Hoji 1998a:footnote 9.

(61) a. [kono kaisya$_2$-ni *ec* hihans-aseru yorimo sakini] seihu-wa ano
this company-DAT criticize-make than earlier government-TOP that
kaisya$_1$-ni *soko*-no Arizona koozyoo-o hihans-aseta
company-DAT it-GEN Arizona factory-ACC criticize-made
'The government made that company criticize its (=*soko*'s) Arizona factory earlier than (it) made this company-DAT criticize *ec*.'
(i) <the government made this company$_2$ criticize that company$_1$'s Arizona factory> (strict)
(ii) <the government made this company$_2$ criticize this company$_2$'s Arizona factory> (sloppy)

b. [kono kaisya$_2$-ni *ec* hihans-aseru yorimo sakini] seihu-wa ano
this company-DAT criticize-make than earlier government-TOP that
kaisya$_1$-ni *asoko*-no Arizona koozyoo-o hihans-aseta
company-DAT it-GEN Arizona factory-ACC criticize-made
'The government made that company criticize its (=*asoko*'s) Arizona factory earlier than (it) made this company-DAT criticize *ec*.'
(i) <the government made this company$_2$ criticize that company$_2$'s Arizona factory> (strict)
(ii) <the government made this company$_2$ criticize this company$_2$'s Arizona factory> (sloppy)

(61a) and (61b) are the Non-elliptical comparative counterparts of the CM-comparatives in (50) and (51), respectively. In (61b) an α-occurrence *asoko* is used. While the use of *asoko* in the CM-comparative in (51) results in the unavailability of the sloppy identity reading, the use of *asoko* in the Non-elliptical comparative in (61b) does not, just as predicted.

The example in (62) is the Non-elliptical comparative counterpart of (53).

(62) [John-ni *ec* iw-ase-ru yorimo sakini] sensei-wa Bill-ni [$_{CP}$ Mary-ga
John-DAT say-make-INFL than earlier teacher-TOP Bill-DAT Mary-NOM
Bill-o butta to] iw-ase-ta
Bill-ACC hit COMP say-make-INFL
'The teacher made Bill say that Mary had hit Bill earlier than (the teacher) made John-DAT say *ec*.'
(i) <the teacher made John say that Mary had hit Bill> (strict)
(ii) <the teacher made John say that Mary had hit John> (sloppy)

As indicated, the sloppy identity reading is possible in (62), despite the use of an α-occurrence (*Bill*), in contrast to the CM-comparative example in (53).

### 3.5. Summary

The sloppy identity reading in VPE and CM-comparatives requires the use of a β-occurrence, while the sloppy identity reading in NOC, *do the same thing*, Non-CM-stripping, *soo su*, Non-CM comparatives, and Non-elliptical comparatives does not. Provided that the CM-comparative is an instance of surface anaphora, these observations provide confirmation that the sloppy identity reading in surface anaphora requires the use of a β-occurrence, while that in deep anaphora does not, thereby lending support for the thesis that the sloppy identity reading in deep anaphora is distinct in nature from that in surface anaphora.

## 4. Experiment 2: The Local Disjointness Test

In section 3, we have considered the [+β] requirement for the establishment of an FD, and examined the effects of the use of α-occurrence on the availability of the sloppy identity in surface anaphora and deep anaphora. In this section, we will consider how the locality alluded to in (63) affects the availability of the sloppy identity reading.

(63) ((18c) slightly restated)
FD(A, B) only if A is not in the local domain of B.

We have observed that the effects of (63) are clearly observed in (29b), in contrast to (29a).

(29) a. [only I]$_1$ $t_1$ voted for my$_1$ father
'ONLY *x*, *x*=me, *x* voted for *x*'s father'

b. *[only I]$_1$ $t_1$ voted for me$_1$
'ONLY *x*, *x*=me, *x* voted for *x*'

While FD(*t*, *me*) cannot be established in (29b), FD(*t*, *my*) can in (29a).

Given the hypothesis that the establishment of FD is required for the sloppy identity reading in surface anaphora but not in deep anaphora, we predict that surface anaphora does, but deep anaphora does not, exhibit local disjointness effects due to (63). The experiments to be presented below confirm these predictions.

### 4.1. Sloppy identity in English and local disjointness

#### 4.1.1. Surface anaphora in English and local disjointness

Consider (64).

(64) I voted for my husband, and I wanted you to [$_{VP}$ *ec* ] (too).
(i) <vote for my husband> (strict)
(ii) <vote for your husband> (sloppy)

In the first conjunct of (64), *I* is not in the local domain of *my*; hence the relevant FD—FD(*I*, *my*) or FD(*t*, *my*), with *t* being the trace of *I*—can be established. The availability of the sloppy identity reading in (64) is thus as expected. In the examples in (65) and (66) below, on the other hand, *I* (in the first conjunct) is in the local domain of *me*, hence the relevant FD—FD(*I*, *me*) or FD(*t*, *me*), with *t* being the trace of *I*—cannot be established.

(65) I voted for me, and I wanted you to [$_{VP}$ *ec* ] (too).
(i) <vote for me> (strict)
(ii) *<vote for you> (sloppy)

(66) I voted for me, and I wanted Mary to [$_{VP}$ *ec* ] (too).
(i) <vote for me> (strict)
(ii) *<vote for Mary> (sloppy)

As predicted, the sloppy identity reading is not available in (65) or (66), confirming that the availability of the sloppy identity reading in surface anaphora is sensitive to the local disjointness condition in (63).[34]

#### 4.1.2. Deep anaphora in English and local disjointness

Recall that we have concluded above that the sloppy identity reading in deep anaphora is not based on FD. Its availability is thus predicted not to be constrained by the condition in (63) in the way the availability of the sloppy identity reading in surface anaphora is. We have observed earlier that the sloppy

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[34] Recall that (i-a) and (i-b) are both acceptable.
(i) a. I voted for my husband.
b. I voted for me.
Given (63), it follows that FD(*I*, *me*) cannot be established in (i-b), while FD(*I*, *my*) can in (i-a). (If *I* gets raised by Constituent Raising, the relevant difference will be between FD(*t*, *my*) in (i-a) and *FD(*t*, *me*) in (i-b), with *t* being the trace of *I*.) Note that the relevant anaphoric relation can be that of coreference in (i), unlike in (29). Since coreference does not require the establishment of an FD, the effects of the condition in (63) cannot be detected in (i-b), despite *I* being in the local domain of *me*.

identity reading is available in examples like (67).

(67) I voted for my husband, and I wanted you to do the same thing.
(i) <vote for my husband> (strict)
(ii) <vote for your husband> (sloppy)

In (67) *I* is not in the local domain of *my*, hence, FD(*I, my*), or FD(*t, my*), with *t* being the trace of *I*, can be established.[35]

Now consider the examples in (68) and (69).

(68) I voted for me, and I wanted you to do the same thing.
(i) <vote for me> (strict)
(ii) <vote for you> (sloppy)

(69) I voted for me, and I wanted Mary to do the same thing.
(i) <vote for me> (strict)
(ii) <vote for Mary> (sloppy)

Here *I* (in the first conjunct) is in the local domain of *me*; hence FD(*I, me*), or FD(*t, my*), with *t* being the trace of *I*, cannot be established. The sloppy identity reading, however, is still available in (68) and (69). This is in sharp contrast with the instances of surface anaphora in (65) and (66).

**4.1.3. Summary**

We have observed that the availability of the sloppy reading in surface anaphora is sensitive to the condition in (63), but that in deep anaphora is not. This result is as expected, given the hypothesis that the sloppy reading in the former is based on FD, while the sloppy reading in the latter is not.

**4.2. Sloppy identity in Japanese and local disjointness**

In this subsection, we will observe that surface anaphora and deep anaphora in Japanese display the same type of difference as was observed in English in the preceding subsection in regard to their sensitivity to the condition in (63).

**4.2.1. Surface anaphora in Japanese and local disjointness**

Consider the example in (70), which is based on Hoji 1997b.

(70) [Ataka sangyoo-ni yorimo sakini] seihu-ga Bandoo

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[35] Note that the other two necessary conditions for FD—the [+β] and the c-command requirements—are satisfied here.

koogyoo$_1$-ni
Ataka company-DAT than earlier government-NOM Bando company-DAT
[soko$_1$-no bengosi]-o suisens-aseta (koto)
it-GEN attorney-ACC recommend-made
'the government made Company B$_1$ recommend its$_1$ attorney earlier than Company A-DAT'

(i) <the government made Company A recommend Company B's attorney>
(strict)

(ii) <the government made Company A recommend Company A's attorney>
(sloppy)

In (70) *Bandoo koogyoo* 'Bando Company' is not in the local domain of *soko*, and FD(*Bandoo koogyoo*, *soko*) can be established.[36] The availability of the sloppy identity reading in (70) is therefore as expected.

Consider now the examples in (71).

(71) a. [Ataka sangyoo-ni yorimo sakini] seihu-ga Bandoo koogyoo$_1$-
Ataka company-DAT than earlier government-NOM Bando company-
ni soko$_1$-o suisens-ase-(tara)
DAT it-ACC recommend-make-if
'(if) the government makes Bando Company$_1$ recommend it$_1$ earlier than Ataka Company-DAT'

(i) <the government makes Ataka Company recommend Bando Company> (strict)

(ii) */*?/??<the government makes Ataka Company recommend Ataka Company> (sloppy)

b. [A-sya-ni yorimo sakini] seihu-ga B-sya$_1$-ni
A-company-DAT than earlier government-NOM B-company-DAT
soko$_1$-o suisensi-(tara)
it-ACC recommend-if
'(if) the government recommends Company B$_1$-DAT it$_1$-ACC earlier than Company A-DAT'

---

[36] For the ease of exposition, we will, from here on, suppress the possibility that the relevant FD is FD(*t*, *soko*) (with *t* being the trace of *Bandoo koogyoo*).

(i) <(the government) recommends to Company A Company B> (strict)
(ii) */*?/??<(the government) recommends to Company A Company A> (sloppy)

In contrast to (70), the sloppy identity reading is highly marginal to impossible in (71).

The contrast in (72), and in particular the status of (72b), suggests that the *ni*-marked NP in the causative construction in question is in the local domain of the *o*-marked NP.[37]

(72) a. seihu-ga {[Toyota-sae]$_1$-ni/[Toyota-ni-sae]$_1$} soko$_1$-no
government-NOM Toyota even-DAT Toyota-DAT-even it-GEN
sitauke-o hihans-ase-(tara)
subsidiary-ACC criticize-make(-if)
'(if) the government made [even Toyota]$_1$ criticize its$_1$ subsidiary, ...'

b. *?seihu-ga {[Toyota-sae]$_1$-ni/[Toyota-ni-sae]$_1$} soko$_1$-o
government-NOM Toyota even-DAT Toyota-DAT-even it-ACC
hihans-ase-(tara)
criticize-make(-if)
'(if) the government made [even Toyota]$_1$ criticize it$_1$, ...'

It is therefore reasonable to assume that in (71a) *Bandoo koogyoo* 'Bando Company' (or the empty NP that it controls—see footnote 37) is in the local domain of *soko*. We can then attribute the status of the sloppy identity reading in (71) to the failure of the establishment of the relevant FD due to (63). The status of the sloppy identity reading in (71b) can be similarly accounted for.

The examples in (73) and (74) exhibit a contrast of the same nature.

(73) a. [John-ni yorimo sakini] Mary-ga Bill$_1$-ni [kare$_1$-no hon]-o erab-aseta (koto)
John-DAT than earlier Mary-NOM Bill-DAT he-GEN book-ACC choose-made
'Mary made Bill$_1$-DAT choose his$_1$ book earlier than John-DAT'
(i) <Mary made John choose Bill's book> (strict)
(ii) <Mary made John choose John's book> (sloppy)

b. [John-ni yorimo sakini] Mary-ga Bill$_1$-ni [kare$_1$-no TA]-o suisensita (koto)
John-DAT than earlier Mary-NOM Bill-DAT he-GEN TA-ACC

---

[37] What is in the local domain of the *o*-marked NP in (72) may be an empty NP that is controlled by the *ni*-marked NP. The choice does not affect the following argument.

recommended
'Mary made Bill$_1$-DAT choose his$_1$ book earlier than John-DAT'
(i) <Mary recommended to John Bill's TA> (strict)
(ii) <Mary recommended to John John's TA> (sloppy)

(74) a. [John-ni yorimo sakini] Mary-ga Bill$_1$-ni kare$_1$-o erab-ase-(tara)
John-DAT than earlier Mary-NOM Bill-DAT he-ACC choose-make-if
'(if) Mary makes Bill$_1$-DAT choose (elect) him$_1$(-ACC)
earlier than John-DAT'
(i) <Mary makes John choose Bill> (strict)
(ii) */*?<Mary makes John choose John> (sloppy)

b. [John-ni yorimo sakini] Mary-ga Bill$_1$-ni kare$_1$-o suisensita (koto)
John-DAT than earlier Mary-NOM Bill-DAT he-ACC recommended
'Mary recommended to Bill$_1$-DAT him$_1$ earlier than John-DAT'
(i) <Mary recommended to John Bill> (strict)
(ii) */*?<Mary recommended to John John> (sloppy)

Recall that the examples in (75) all allow the coreferential interpretation, despite the *ni*-marked NP being in the local domain of the *o*-marked NP *soko*.[38]

(75) a. seihu-ga Bandoo koogyoo$_1$-ni soko$_1$-o suisens-aseta (koto)
government-NOM Bando company-DAT it-ACC recommend-made
'the government made Company B$_1$ recommend it$_1$'

b. seihu-ga Bandoo koogyoo$_1$-ni soko$_1$-o suisensita (koto)
government-NOM Bando company-DAT it-ACC recommended
'the government recommend it$_1$ to Company B$_1$'

c. Mary-ga Bill$_1$-ni kare$_1$-o erab-aseta (koto)
Mary-NOM Bill-DAT he-ACC choose-made
'Mary made Bill$_1$ elect him$_1$'

d. Mary-ga Bill$_1$-ni kare$_1$-o suisensita (koto)
Mary-NOM Bill-DAT he-ACC recommended
'Mary recommended him$_1$ to Bill$_1$'

---

[38] In the light of the discussion in Ueyama 1998:chapter 4, it is not entirely clear whether the grammatical basis for the coreference is the same in (75a,b) and in (75c,d), as mentioned in footnote 16.

Given that coreference does not require the establishment of an FD, the possibility of coreference in (75) is not unexpected. In the 'sloppy identity context' as in (71) and (74), however, the establishment of the relevant FD is necessary by hypothesis. Thus the contrast between (75) on the one hand and (71) and (74) on the other constitutes further evidence not only for the thesis that the sloppy identity reading in surface anaphora is contingent upon the establishment of FD—which in turn is subject to the local disjointness condition in (63)—but also for the view that the relevant local disjointness condition is on dependency—here called Formal Dependency (FD)—rather than on coindexation, the point made in Hoji 1997b, 1998b.

**4.2.2. Deep anaphora in Japanese and local disjointness**

The thesis that the sloppy identity reading in deep anaphora is not based on FD has been supported by the results of the experiments in section 3. It would not be surprising therefore to observe a strict/sloppy ambiguity in deep anaphora even in the local context. In this subsection, we will examine the four instances of deep anaphora in Japanese discussed earlier, in regard to the strict/sloppy ambiguity in the local context, and observe that deep anaphora, unlike surface anaphora, can in fact give rise to a strict/sloppy ambiguity even in the local context. The observation in this subsection thus provides confirming evidence for the main thesis of this article that the sloppy identity reading in deep anaphora is distinct in nature from that in surface anaphora.

The examples in (76) are the Non-elliptical comparative counterparts of the CM-comparatives in (71). (71) and (76) differ minimally, as schematized in (60), repeated below, with slight adaptation.

(76) a. [Ataka sangyoo-ni *ec* suisens-aseru yorimo sakini] seihu-ga
Ataka company-DAT recommend-make than earlier government-NOM
Bandoo koogyoo$_1$-ni soko$_1$-o suisens-aseta (koto)
Bando company-DAT it-ACC recommend-made
'the government made Company B$_1$ recommend it$_1$ earlier than (the government) made Company A-DAT recommend *ec* '
(i) <recommend Company B> (strict)
(ii) <recommend Company A> (sloppy)

b. [A-sya-ni *ec* suisensuru yorimo sakini] seihu-ga
A-company-DAT recommend than earlier government-NOM
B-sya$_1$-ni soko$_1$-o suisensita (koto)
B-company-DAT it-ACC recommended
'the government recommended to Company B$_1$-DAT it$_1$-ACC earlier than (the government) recommended to Company A-DAT *ec* '

(i) <(the government) recommended to Company A Company B> (strict)
(ii) <(the government) recommended to Company A Company A> (sloppy)

(60) a. Non-elliptical comparatives (e.g., (76)):
[NP-ni *ec* V-INFL yori]
NP-DAT *ec* V-INFL than
b. CM-comparatives (e.g., (71)):
[NP-ni yori]
NP-DAT than

Despite the fact that the difference is minimal, (76) and (71) contrast with each other sharply; the sloppy identity reading is possible in (76) but not (71).[39]

Similarly, the sloppy identity reading is readily available in the Non-elliptical comparatives in (77), in contrast to the CM-comparatives in (74).[40]

(77) a. [John-ni *ec* erab-aseru yorimo sakini]
John-DAT choose-make than earlier
Mary-ga $Bill_1$-ni $kare_1$-o erab-aseta (koto)
Mary-NOM Bill-DAT he-ACC choose-made
'Mary made $Bill_1$-DAT choose (elect) $him_1$(-ACC)
earlier than (she) made John-DAT choose (elect) *ec* '
(i) <Mary made John choose Bill> (strict)

---

[39] The sloppy identity reading in (76a) and (76b) is attributed in Hoji 1998a—where the relevant reading is called a *sloppy-like reading*—to the referential *ec* having the value of *Ataka sangyoo* 'Ataka Company' and *A-sya* 'Company A', respectively. Although it is assumed in Hoji 1998a, as it is here, that the empty argument is projected in the embedded object position in (77), it is not entirely clear that the projection of such an empty argument is obligatory; cf. footnote 26,. If the relevant projection is not obligatory, the source of the sloppy identity reading in examples like (76) might turn out to be different from what is suggested in Hoji 1998a. The issue in question seems to relate directly to one of the fundamental properties of Japanese grammar and its consequences, possibly quite far-reaching, should be addressed in a separate work.

[40] The Non-CM-comparatives also give rise to a sloppy identity reading in the local context. That is to say, if we eliminate the dative *ni*-marking in *John-ni* in (74), thereby changing the CM-comparatives into Non-CM-comparatives, the sloppy identity reading becomes available, very much in the way their Non-CM-stripping counterparts give rise to the sloppy identity reading. The relevant examples are not provided here for reasons of space.

(ii) <Mary made John choose John> (sloppy)

b. [John-ni *ec* suisensuru yorimo sakini] Mary-ga
John-DAT recommend than earlier Mary-NOM
$Bill_1$-ni $kare_1$-o suisensita (koto)
Bill-DAT he-ACC recommended
'Mary recommended to $Bill_1$ $him_1$
earlier than (she) recommended to John *ec* '
(i) <Mary recommended to John Bill> (strict)
(ii) <Mary recommended to John John> (sloppy)

As pointed out in Hoji 1998a, the null object construction (NOC) in Japanese can also give rise to a strict/sloppy ambiguity even in the local context. This is illustrated in (78) and (79).

(78) A: Seihu-wa [B-sya$_1$-ni soko$_1$-o suisens]-aseta
government-TOP B-company-DAT it-ACC recommend-made
'The government made [company $B_1$ recommend $it_1$].'
B: (Seihu-wa) [A-sya-ni mo [$_{NP}$ *ec* ] suisen]-aseta
government-TOP A-company-DAT also recommend-made
'(The government) also made company A recommend *ec*.'
(i) <recommend Company B> (strict)
(ii) <recommend Company A> (sloppy)

(79) A: Seihu-wa B-sya$_1$-ni soko$_1$-o suisensi-ta
government-TOP B-company-DAT it-ACC recommended
'The government recommended to company $B_1$ $it_1$.'
B: (Seihu-wa) A-sya-ni mo [$_{NP}$ *ec* ] suisensita
government-TOP A-company-DAT also recommended
'(The government) also recommended to Company A *ec* .'
(i) <recommended to Company A Company B> (strict)
(ii) <recommended to Company A Company A> (sloppy)

The strict/sloppy ambiguity can be observed in the local context also with *soo su*.

(80) A: Seihu-wa [B-sya$_1$-ni soko$_1$-o suisens]-aseta
government-TOP B-company-DAT it-ACC recommend-made
'The government made [company $B_1$ recommend $it_1$].'
B: (Seihu-wa) [A-sya-ni mo soo s]-aseta
government-TOP A-company-DAT also that:way do-made
'(The government) also made Company A do in that way.'

(i) <recommend Company B> (strict)
(ii) <recommend Company A> (sloppy)

Similarly, Non-CM-stripping allows a strict/sloppy ambiguity in the local context, as illustrated in (81).

(81) A: John$_1$-wa kare$_1$-o eranda
John-TOP him-ACC chose
'John$_1$ chose/elected him$_1$].'
B: Bill-mo da.
'Bill, too.'
(i) <Bill chose/elected John > (strict)
(ii) <Bill chose/elected Bill> (sloppy)

We have thus observed that in Japanese, as in the case of English, the sloppy identity reading in surface anaphora is subject to the local disjointness condition in (63), but that in deep anaphora is not.

### 4.3. Summary

In this section, we have conducted experiments in order to answer the question whether the sloppy identity in surface anaphora and that in deep anaphora show local disjointness effects. The results of the experiments indicate that the former does but the latter does not. These results thus provide further confirmation for the main thesis of this article that the sloppy identity reading in deep anaphora is distinct in nature from that in surface anaphora. Given that the relevant local disjointness effects are understood as being due to a condition on the establishment of an FD, these results also provide further support for the claim that the sloppy identity reading in surface anaphora is based on the establishment of an FD, but that in deep anaphora is not.

## 5. Experiment 3: The Mix Reading Test

### 5.1. Mix readings

Consider the discourses in (82) and (83).

(82) A: [$_X$ John will [$_{VP}$ wash his car]]
B: [$_Y$ Bill will [$_{VP}$ *ec* ] too]
(83) A: [$_X$ John will [$_{VP}$ wash his car]]
B: [$_Y$ Bill will [$_{VP}$ do the same thing]]

We have sometimes referred to (82A)/(83A) as 'the first conjunct', and (82B)/(83B) as 'the second conjunct', respectively. Although these terms are useful in discussing stripping, NOC and *soo su*, as well as VPE and *do the same*

*thing*, they are not quite appropriate in discussing comparatives, such as (84).

(84) [[$_Y$ John(-ni) ] yorimo sakini] [$_X$ Mary-ga Bill-ni hana-o okutta] (koto)
John-DAT than early Mary-NOM Bill-DAT flower-ACC sent fact
'Mary sent flowers to Bill earlier than to John'

Note, for example, that the linear order of X and Y in comparatives as in (84) is the reverse of that in (82)/(83). For the purpose of exposition, I will now refer to X and Y in (82), (83), and (84) as *the source site* and *the anaphora site*, respectively.

The anaphora site contains the relevant anaphoric expression, including a phonetically empty category, and the source site contains an expression that is related to it (in some way). I have assumed, following Sag 1976 and Williams 1977, that the sloppy identity reading in surface anaphora is possible only if the relevant anaphoric expression is fully represented at LF as being identical to the relevant expression in the source site. We have observed in sections 3 and 4 that the sloppy identity reading is not possible in surface anaphora if the relevant FD cannot be established in the source site, due to the [+β] condition (18a) or the local disjointness condition (18c). The availability of the sloppy identity reading when these conditions are not satisfied in the anaphora site has been regarded as an indication that the sloppy identity reading in question is not based on FD and the relevant 'anaphoric expression' is an instance of deep anaphora, rather than surface anaphora.

In this section, I will present experiments that are designed to show that certain interpretations are possible only in surface anaphora but not in deep anaphora. It will be argued that this difference follows directly from our assumptions concerning how surface anaphora and deep anaphora are represented at LF.

Fiengo & May (1994) (henceforth F&M) provide a detailed account of the following observations made in Dahl 1974 and discussed in Sag 1976 and Dalrymple, Shieber, & Pereira 1991: (85) allows the readings in (87a,b,c) but not the one in (87d), while (86) allows all of the four readings in (88).

(85) Max said he saw his mother; Oscar did too.
(86) Max said his mother saw him; Oscar did too.
(87) The interpretive possibilities for (85):
a. $Max_1$ said $he_1$ saw $his_1$ mother; $Oscar_2$ said $he_1$ saw $his_1$ mother.
b. $Max_1$ said $he_1$ saw $his_1$ mother; $Oscar_2$ said $he_2$ saw $his_2$ mother.
c. $Max_1$ said $he_1$ saw $his_1$ mother; $Oscar_2$ said $he_2$ saw $his_1$ mother. (Mix 1)

d. *$Max_1$ said $he_1$ saw $his_1$ mother; $Oscar_2$ said $he_1$ saw $his_2$ mother. (Mix 2)

(88) The interpretive possibilities for (86):

a. $Max_1$ said $his_1$ mother saw $him_1$; $Oscar_2$ said $his_1$ mother saw $him_1$.

b. $Max_1$ said $his_1$ mother saw $him_1$; $Oscar_2$ said $his_2$ mother saw $him_2$.

c. $Max_1$ said $his_1$ mother saw $him_1$; $Oscar_2$ said $his_2$ mother saw $him_1$. (Mix 1)

d. $Max_1$ said $his_1$ mother saw $him_1$; $Oscar_2$ said $his_1$ mother saw $him_2$. (Mix 2)

As in Hoji 1997a, 1997b, I will call readings in (87c) and (88c) *Mix 1 readings*, and those in (87d) and (88d) *Mix 2 readings*.

F&M argue that the interpretive possibilities for (85) and (86) as indicated in (87) and (88) follow from their Dependency Theory. The aspect of their Dependency Theory that is relevant to the present discussion is that a necessary condition for a sloppy identity reading in (85) and (86) is the use of a β-occurrence.[41] Following the lead of F&M, I would like to propose that Mix readings are possible only if a relevant NP is B in FD(A, B). Given that B in FD(A, B) must be a β-occurrence, it follows that *he* in (85) on the (87c) reading must be a β-occurrence, so as to be a 'sloppy pronoun', so to speak. Likewise, *his* and *him* in (86) must be a β-occurrence on the (88c) and (88d) readings, respectively.

To see the point more clearly, consider the schematic LF representations given in (89a), (89b), (89c) and (89d), corresponding to (87c), (87d), (88c) and (88d), respectively, where the anaphora site is fully represented. Note that the two VPs in question are identical in each of (89).[42]

(89) a. (for (87c))
$Max^{\alpha}_1$ [$_{VP}$ said $he^{\beta}$ saw $his^{\alpha}_1$ mother]; $Oscar^{\alpha}_2$ [$_{VP}$ said $he^{\beta}$ saw $his^{\alpha}_1$ mother].
$FD(Max_1, he)$ $FD(Oscar_2, he)$
(Mix 1 possible)

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[41] One crucial difference between F&M's Dependency Theory and Formal Dependency proposed here is that while a β-occurrence need not be c-commanded by its 'antecedent' in F&M, it must be in the theory of Formal Dependency proposed here. An empirical consequence of this difference will be addressed in section 7.

[42] In (89), the distinction between α and β-occurrences is marked by means of a superscripts, following F&M. This notation is only for convenience. Recall that it is assumed here, following Ueyama 1998: chapter 5, that B in FD(A, B) is to be generated without an index.

b. (for (87d))
Max$^{\alpha}{}_{1}$ [$_{VP}$ said he$^{\alpha}{}_{1}$ saw his$^{\beta}$ mother]; Oscar$^{\alpha}{}_{2}$ [$_{VP}$ said he$^{\alpha}{}_{1}$ saw his$^{\beta}$ mother].
The intended FDs are:
FD(Max$_1$, his) FD(Oscar$_2$, his) (Mix 2 not possible)

c. (for (88c))
Max$^{\alpha}{}_{1}$ [$_{VP}$ said his$^{\beta}$ mother saw him$^{\alpha}{}_{1}$]; Oscar$^{\alpha}{}_{2}$ [$_{VP}$ said his$^{\beta}$ mother saw him$^{\alpha}{}_{1}$].
FD(Max$_1$, his) FD(Oscar$_2$, his) (Mix 1 possible)

d. (for (88d))
Max$^{\alpha}{}_{1}$ [$_{VP}$ said his$^{\alpha}{}_{1}$ mother saw him$^{\beta}$]; Oscar$^{\alpha}{}_{2}$ [$_{VP}$ said his$^{\alpha}{}_{1}$ mother saw him$^{\beta}$].
FD(Max$_1$, him) FD(Oscar$_2$, him) (Mix 2 possible)

The FD in the source site and the one in the anaphora site are provided for (89a, c, d), and so are the 'intended FDs' for (89b).

Given that the Mix 2 reading is not possible for (85), it seems reasonable to hypothesize that at least one of the two 'intended FDs' for (89b) cannot be established. Note that it must be possible to establish the FD in the anaphora site in (89b), i.e., FD(*Oscar*, *his*), since FD(*t*, *his*) can be established in (90) and the structure of the anaphora site in (89b) is no different from (90) in the relevant respect.

(90) [Even John]$_1$ $t_1$ said Mary saw his$^{\beta}$ mother
FD($t_1$, his)

Just as *Mary* has its value independently of (the trace of) *even John* and *his* in (90), so *he*$^{\alpha}{}_{1}$ in (89b) has its value independently of *Oscar* and *his*. In fact, the establishment of the FD in the anaphora site must be possible in all of (89) essentially for the same reason. This suggests that it is the FD in the source site that cannot be established in (89b).

The fact that the Mix readings in (89a, c, d) are possible, on the other hand, suggests that it must be possible to establish the relevant FDs in the source site in (89a, c, d). The relevant source sites and the FDs therein are given in (91) and (92) for convenience.

(91) (for (89b))
Max$^{\alpha}{}_{1}$ [$_{VP}$ said he$^{\alpha}{}_{1}$ saw his$^{\beta}$ mother]
*FD(Max$_1$, his)

(92) a. (for (89a))
$Max^{\alpha}_{1}$ [$_{VP}$ said $he^{\beta}$ saw $his^{\alpha}_{1}$ mother]
FD($Max_1$, he)
b. (for (89c))
$Max^{\alpha}_{1}$ [$_{VP}$ said $his^{\beta}$ mother saw $him^{\alpha}_{1}$]
FD($Max_1$, his)
c. (for (89d))
$Max^{\alpha}_{1}$ [$_{VP}$ said $his^{\alpha}_{1}$ mother saw $him^{\beta}$]
FD($Max_1$, him)

(91), (92a), (92b), and (92c) can be schematized as in (93), (94a), (94b), and (94c), respectively.

(93) [$\underline{\underline{NP}}^{\alpha}_{1}$ [ $NP^{\alpha}_{1}$ [ ... $NP^{\beta}$ ...]]]
*FD($\underline{\underline{NP}}^{\alpha}_{1}$, $NP^{\beta}$)

(94) a. [$\underline{\underline{NP}}^{\alpha}_{1}$ [ $NP^{\beta}$ [ ... $NP^{\alpha}_{1}$ ...]]]
FD($\underline{\underline{NP}}^{\alpha}_{1}$, $NP^{\beta}$)
b. [$\underline{\underline{NP}}^{\alpha}_{1}$ [ [ ... $NP^{\beta}$ ...] [ ... $NP^{\alpha}_{1}$ ...]]]
FD($\underline{\underline{NP}}^{\alpha}_{1}$, $NP^{\beta}$)
c. [$\underline{\underline{NP}}^{\alpha}_{1}$ [ [ ... $NP^{\alpha}_{1}$ ...] [ ... $NP^{\beta}$ ...]]]
FD($\underline{\underline{NP}}^{\alpha}_{1}$, $NP^{\beta}$)

The generalization therefore seems to be as in (95).[43]

(95) *FD(A, B) if B is c-commanded by an NP C, where A and C have the same indexical value and C does not c-command A.

Although it is not clear how the generalization (95) can be derived in a principled manner, there are two pieces of evidence in support of its validity.[44]

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[43] Note that it is possible to establish FD($he_1$, *his*) in (91). With this FD, however, the relevant LF representation for (85) would be as in (i).

(i) $Max^{\alpha}_{1}$ [$_{VP}$ said $he^{\alpha}_{1}$ saw $his^{\beta}$ mother]; $Oscar^{\alpha}_{2}$ [$_{VP}$ said $he^{\alpha}_{1}$ saw $his^{\beta}$ mother].
FD($Max_1$, his) FD($he_1$, his)

In (i) the members of the FD in the source site have a structural relation distinct from those of the FD in the anaphora site. I assume, following the essentials of F&M, that the absence of structural parallelism of this sort results in the infelicitous use of surface anaphora.

[44] F&M's (sec. 4.2) account of the relevant generalization is in terms of linear factorization, rather than in terms of c-command. Fox (1998) accounts for the relevant effects based on (i), which he attributes to Heim 1993, and (ii).

First, consider the Japanese examples in (96).[45]

(96) a. *[subete-no gakusei]$_1$-ga $t_1$ [ naze aitu-tati$^{\alpha}{}_1$-ga soitu$^{\beta}$-no
every-GEN student-NOM why that:guy-and:others-NOM that:guy-GEN
kenkyuu-o hihansuru hameninatta ka] kangaeteita
project-ACC criticize ended:up:doing Q was:thinking
The intended FD is: FD($t_1$, soitu$^{\beta}$)
'every student$_1$ was thinking about [why they$^{\alpha}{}_1$ ended up criticizing his$^{\beta}$ project]'

b. [subete-no gakusei]$_1$-ga $t_1$ [ naze soitu$^{\beta}$-ga aitu-tati$^{\alpha}{}_1$-no
every-GEN student-NOM why that:guy-NOM that:guy-and:others-GEN
(kyoodoo) kenkyuu-o hihansuru hameninatta ka] kangaeteita
(joint) project-ACC criticize ended:up:doing Q was:thinking
FD($t_1$, soitu$^{\beta}$)
'every student$_1$ was thinking about [why he$^{\beta}$ ended up criticizing their$^{\alpha}{}_1$ joint project]'

In (96) *aitu-tati* 'those guys' is meant to 'refer to' the group of students under discussion. It seems that while BVA(*subete-no gakusei*, *soitu*) is possible in (96b) but not in (96a).[46] Note that in (96a) *aitu-tati* c-commands *soitu*. If *aitu-*

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(i) (Fox 1998:129)
[A] variable, *x*, cannot be bound by an antecedent, α, in cases where a more local antecedent, β, could bind *x* and yield the same semantic interpretation.

(ii) (Fox 1998:(9))
NPs in the elided and antecedent VP must either
(a) have the same referential value (henceforth, referential-parallelism), or
(b) be linked by identical dependencies (henceforth, structural-parallelism).

[45] The bound variable use of *soitu* is marginal for some speakers, as pointed out in Hoji 1995:footnote 21, leading us to expect some judgmental fluctuation in regard to the status of (96b) and (97). Hoji et al. 1999 and Hoji to appear discuss the judgmental fluctuation concerning the availability of BVA that is due to the choice of the 'dependent term' and suggest a theoretical characterization of it, drawing from Ueyama 1998: section 5.3.2.

[46] One might wonder why (96a) does not allow the interpretation that is based on FD involving the trace of *aitu-tati* and *soitu*. It seems that the anaphoric relation of this sort is not possible, for an independent reason, as indicated in (i).

*tati* does not c-command *soitu*, BVA(*subete-no gakusei*, *soitu*) seems to become possible, as indicated in (97).

(97) [subete-no gakusei]$_1$-ga $t_1$ [ naze aitu-tati$^{\alpha}{}_1$-no sensei-ga
every-GEN student-NOM why that:guy-and:others-GEN teacher-NOM
soitu$^{\beta}$-no kenkyuu-o hihansuru yooninatta ka] kangaeteita
that:guy-GEN project-ACC criticize came:to:(do) Q was:thinking
'every student$_1$ was thinking about [why their$^{\alpha}{}_1$ teacher came to criticize his$^{\beta}$ project]'

(96a), (96b), and (97) can be roughly schematized as in (98a), (98b), and (98c), respectively.

(98) a. $QP_1$ [ $t_1$ [ $NP_1{}^{\alpha}$ [ ... $NP^{\beta}$ ...]]]
*FD($t_1$, $NP^{\beta}$)
b. $QP_1$ [ $t_1$ [ $NP^{\beta}$ [ ... $NP_1{}^{\alpha}$ ...]]]
FD($t_1$, $NP^{\beta}$)
c. $QP_1$ [ $t_1$ [ [ ... $NP_1{}^{\alpha}$ ...] [ ... $NP^{\beta}$ ...]]]
FD($t_1$, $NP^{\beta}$)

The parallelism between (98) and (93)/(94) seems clear. I wish to suggest that the contrasts among (96a), (96b), and (97) (as schematized in (98a), (98b), and (98c)) are of the same nature as the contrasts among (89b), (89a), and (89c/d) (as schematized in (93), (94a), and (94b/c)), i.e., the status of (98a) and the unavailability of the Mix 2 reading in (89b) are both due to (95).

For the second piece of evidence in support of the validity of the generalization in (95), consider the examples in (99), discussed in Fox 1998; see footnote 44.[47]

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(i) *Wareware-wa [ naze aitu-tati$_1$-ga soitu$_1$-no kenkyuu-o
we-TOP why that:guy-and:others-NOM that:guy-GEN project-ACC
hihansuru hameninatta ka] kangaeteita
criticize ended:up:doing Q was:thinking
'We were thinking about [why they$^{\alpha}{}_1$ ended up criticizing his$^{\beta}$ project].'

Incidentally, the status of (i) cannot simply be attributed to the incompatibility between the *a*-demonstrative and the *so*-demonstrative since (ii) is acceptable.

(ii) ano kaisya$_1$-ga soko$_1$-no sitauke-o hihansita (koto)
that company-NOM that:place-GEN subsidiary-ACC criticized
'that company criticized its subsidiaries'

[47] The Japanese analogues of (99) and (104), involving CM-stripping, seem to show the same contrasts; the relevant examples are not provided here, however, for reasons of

(99) (Fox 1998:(10), adapted in regard to the notations)

a. Every boy [said that $Mary_1$ liked $her_1$ dog].
   Well, $Mary_1$ did too.
   <said that $she_1$ liked $her_1$ dog>

b. Every $boy_1$ [said that $he_1$ liked $his_1$ dog].
   Well, $Mary_2$ did too.
   <said that $she_2$ liked $her_2$ dog>

c. Every $boy_1$ [said that $he_1$ liked $Mary_2$'s dog].
   Well, $Mary_2$ did too.
   <said that $she_2$ liked $her_2$ dog>

d. *Every $boy_1$ [said that $Mary_2$ liked $his_1$ dog].
   Well, $Mary_2$ did too.
   <said that $she_2$ liked $her_2$ dog>

Consider (99c) first. With the intended interpretation, *he* in (99c) must be a β-occurrence and the intended FD in the source site must be FD($t_1$, $he^{\beta}$), as in (100).

(100) Source site in (99c):
Every $boy_1$ $t_1$ [$_{VP}$ said that $he^{\beta}$ liked $Mary^{\alpha}{}_2$'s dog]
FD($t_1$, $he^{\beta}$)

Given that the relevant part of the anaphora site must be represented identically to that of the source site in surface anaphora, the LF representation of the anaphora site in (99c) must be as indicated in (101).

(101) Anaphora site in (99c):
$Mary^{\alpha}{}_2$ [$_{VP}$ said that $he^{\beta}$ liked $her^{\alpha}{}_2$ dog]
FD($Mary_2$, $he^{\beta}$)

Recall that B in FD(A, B) is to be interpreted as having the same value as that of A. Hence *he* in (100) is interpreted as having the same value as the trace of *every boy*, i.e., as the variable bound by *every boy*. Similarly, in (101) *he* is interpreted as having the same value as *Mary*.[48] The interpretation in (99c) is

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space.

[48] Obviously, the pronoun *he*, for example, is a convenient way of representing the relevant feature bundles. The gender, number, and person feature values can thus be neutralized in the case of a β-occurrence, at least in the anaphora site. Otherwise, the sloppy identity reading in examples like (i) would not be possible.

(i) John fed his dog; and Mary did too.

thus analogous to Mix 1 reading in (89a), repeated below.

(89) a. (for (87c))
Max$^{\alpha}{}_{1}$ [$_{VP}$ said he$^{\beta}$ saw his$^{\alpha}{}_{1}$ mother]; Oscar$^{\alpha}{}_{2}$ [$_{VP}$ said he$^{\beta}$ saw his$^{\alpha}{}_{1}$ mother].
FD(Max$_1$, he) FD(Oscar$_2$, he)
(Mix 1 possible)

The anaphora site in (99c), given in (101), corresponds to the source site in (89a), i.e., the VP in the first conjunct, while the source site in (99c), given in (100)) corresponds to the anaphora site in (89a), i.e., the VP in the second conjunct.[49]

What is of special interest here is the status of (99d). Note that, in (99d), *his* must be a β-occurrence and the intended FD in the source site must be FD(*t*, *his*), with *t* being the trace of *every boy*, as indicated in (102).

(102) Source site in (99d):
[Every boy]$_1$ $t_1$ [$_{VP}$ said that Mary$^{\alpha}{}_{2}$ liked his$^{\beta}$ dog]
FD($t_1$, his$^{\beta}$)

Under the intended reading, the LF representation of the anaphora site in (99d) would be as in (103); see footnote 48.

(103) Anaphora site in (99d):
Mary$^{\alpha}{}_{2}$ [$_{VP}$ said that Mary$^{\alpha}{}_{2}$ liked his$^{\beta}$ dog]
FD(Mary$_2$, his$^{\beta}$)

Note that ***Mary*** in FD(***Mary***, *his*) in (103) is the matrix ***Mary***; otherwise, the identity of the two VPs in (99d) would not be achieved; see footnote 43.

The availability of BVA(*every boy*, *his*) in the source site in (99d) suggests that it must be possible to establish the FD in (102). It thus seems reasonable to attribute the status of (99d) to the failure of the establishment of the FD in the anaphora site in (99d), as given in (103). Note that the reading indicated in (99d) corresponds to Mix 2 reading in (89b), repeated here, with the addition of the * on the FD in the source site, i.e., the VP in the first conjunct.

(89) b. (for (87d))

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Such neutralization of these and other (in particular, binding-theoretic) features is extensively discussed in F&M as instances of *vehicle change*.

[49] The correspondence might become more transparent if we exchange the 'indexical values' (1 and 2) in (89a).

Max$^{\alpha}{}_{1}$ [$_{VP}$ said he$^{\alpha}{}_{1}$ saw his$^{\beta}$ mother]; Oscar$^{\alpha}{}_{2}$ [$_{VP}$ said he$^{\alpha}{}_{1}$ saw his$^{\beta}$ mother].
The intended FDs are:
*FD(Max$_1$, his$^{\beta}$) FD(Oscar$_2$, his$^{\beta}$) (Mix 2 not possible)

Recall that the impossibility of FD(*Max*$_1$, *his*$^{\beta}$) in the source site in (89b) has led to the generalization in (95), also repeated here.

(95) *FD(A, B) if B is c-commanded by an NP C, where A and C have the same indexical value and C does not c-command A.

Notice that the anaphora site in (99d), given in (103), has the identical structure as the source site in (89b). In accordance with (95), the FD cannot be established in (103) or (89b); not only the status of (99d) but also the unavailability of Mix 2 reading in (89b) are thus accounted for.

Given this account of the status of (99d), we predict that (99d) becomes acceptable if the embedded *Mary* fails to c-command *his*, just as Mix 2 reading becomes available when the relevant c-command relation is removed, as in (88d). The schematic LF representation of (88d), i.e., (89d), is repeated here.

(89) d. (for (88d))
Max$^{\alpha}{}_{1}$ [$_{VP}$ said his$^{\alpha}{}_{1}$ mother saw him$^{\beta}$]; Oscar$^{\alpha}{}_{2}$ [$_{VP}$ said his$^{\alpha}{}_{1}$ mother saw him$^{\beta}$].
FD(Max$_1$, him$^{\beta}$) FD(Oscar$_2$, him$^{\beta}$)
(Mix 2 possible)

This prediction indeed seems to be borne out, as pointed out in Fox 1998:148.[50]

(104) Every boy$_1$ said that Mary$_2$'s mother liked his$_1$ dog.
Well, Mary$_2$ did too.
<said that Mary$^{\alpha}{}_{2}$' mother liked her$_2$ dog>

The relevant aspects of the LF representations of (99c,d) and (104), including the relevant FDs, are provided below, for ease of reference.[51]

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[50] Fox's example (his (39b)) is slightly different from (104), but has the same structural property as (104) in the relevant respects.

[51] The across-the-board strict reading for (99a) can be based on (i-a) or (i-b), and the across-the-board sloppy reading for (99b) on (ii).

(105) a. (for (99c))
Every boy$_1$ $t_1$ said that he$^{\beta}$ liked Mary$^{\alpha}{}_2$'s dog. FD($t_1$, he$^{\beta}$)
Well, Mary$_2$ did too.
<said that he$^{\beta}$ liked Mary$^{\alpha}{}_2$'s dog> FD(Mary$_2$, he$^{\beta}$)

b. (for (99d)
*Every boy$_1$ $t_1$ said that Mary$^{\alpha}{}_2$ liked his$^{\beta}$ dog. FD($t_1$, his$^{\beta}$)
Well, Mary$_2$ did too.
<said that Mary$^{\alpha}{}_2$ liked his$^{\beta}$ dog> *FD(Mary$_2$, his$^{\beta}$)

c. (for (104))
Every boy$_1$ $t_1$ said that Mary$^{\alpha}{}_2$'s mother liked his$^{\beta}$ dog. FD($t_1$, his$^{\beta}$)
Well, Mary$_2$ did too.
<said that Mary$^{\alpha}{}_2$' mother liked his$^{\beta}$ dog> FD(Mary$_2$, his$^{\beta}$)

We have seen two pieces of evidence in support of the validity of the generalization in (95), repeated here.

(95) *FD(A, B) if B is c-commanded by an NP C, where A and C have the same indexical value and C does not c-command A.

Although it is not clear why (95) should hold, I take it to be a descriptive generalization at this point and proceed with the experiments designed to further verify the main claim of this article that the sloppy identity reading in surface anaphora is distinct in nature from that in deep anaphora.

**5.2. Mix readings and surface anaphora in Japanese**

As in the case of English VPE, Mix readings are possible in CM-comparatives in Japanese. Due to space considerations, however, the relevant examples are not provided here and the readers are referred to Hoji 1997b and Fukaya & Hoji 1999.

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(i) a. Every boy$_1$ $t_1$ said that Mary$^{\alpha}{}_2$ liked her$^{\beta}$ dog. FD(Mary$_2$, her$^{\beta}$)
Well, Mary$_2$ did too.
<said that Mary$^{\alpha}{}_2$ liked her$^{\beta}$ dog> FD(Mary$_2$, her$^{\beta}$)

b. Every boy$_1$ $t_1$ said that Mary$^{\alpha}{}_2$ liked her$^{\alpha}{}_2$ dog. No FD
Well, Mary$_2$ did too.
<said that Mary$^{\alpha}{}_2$ liked her$^{\alpha}{}_2$ dog> No FD

(ii) Every boy$_1$ $t_1$ said that he$^{\beta}$ liked his$^{\beta}$ dog. FD($t_1$, he$^{\beta}$), FD($t_1$, his$^{\beta}$)
Well, Mary$_2$ did too.
<said that he$^{\beta}$ liked his$^{\beta}$ dog> FD(Mary$_2$, he$^{\beta}$), FD(Mary$_2$, his$^{\beta}$)

**5.3. Mix readings and deep anaphora**

Not only the availability of Mix readings but also their complex distributional patterns in surface anaphora such as VPE in English and CM-comparatives in Japanese can be accounted for under the assumption that there are two identical LF representations in the source and the anaphora sites in the relevant constructions. The experimental results in sections 3 and 4 indicate that the anaphora site in deep anaphora need not be identical to the source site at LF; they do not however show that it cannot. In other words, the relevant observations are compatible with the possibility that (what has been regarded as) deep anaphora can optionally be surface anaphora.

Given the Mix reading considerations above, we are now in a position to conduct a set of experiments so as to determine whether the anaphora site in deep anaphora can be represented fully at LF as being identical to the source site. If it could, it should exhibit the same interpretive patterns as surface anaphora, in regard to Mix readings. As the paradigms in (106)-(111) indicate, deep anaphora fails to exhibit the relevant interpretive patterns of Mix readings, leading us to conclude that deep anaphora *cannot* be represented in the same way as surface anaphora.

Consider the examples in (106) and (107).

(106) a. John said/declared (before the class) that he had hit his roommate, and Bill did the same thing.
b. John said/declared (before the class) that his roommate had hit him, and Bill did the same thing.

(107) a. John said/declared (before the class) that he had hit his roommate, and Bill did that, too.
b. John said/declared (before the class) that his roommate had hit him, and Bill did that, too.

It seems that (106) and (107) allow only the across-the-board strict reading and the across-the-board sloppy reading, and fail to yield Mix 1 or Mix 2 readings.

Similarly, the *soo su* example in (108) does not seem to allow Mix readings in (109); it seems to allow only the across-the board strict and sloppy readings.

(108) Sensei-wa Bill-ni [kare-ga kare-no roommate-o nagutta to]
teacher-TOP Bill-DAT he-NOM he-GEN roommate-ACC hit COMP
iw-ase-ta;
say-make-INFL
John-ni mo soo s-ase-ta.
John-DAT also that:way do-make-INFL
'The teacher made Bill say [that he had hit his roommate]; (the

teacher) made John do so too.' (Mix readings not possible)

(109) (for (108))
a. *Mix 1 reading
The teacher made $Bill_1$ say that $he_1$ had hit $his_1$ roommate; the teacher made $John_2$ say that $he_2$ had hit $his_1$ roommate.
b. *Mix 2 reading
The teacher made $Bill_1$ say that $he_1$ had hit $his_1$ roommate; the teacher made $John_2$ say that $he_1$ had hit $his_2$ roommate.

Non-elliptical comparatives seem to behave in the same way, not allowing Mix readings, as illustrated in (110).

(110) John-ni *ec* iw-ase-ru yorimo sakini sensei-wa
John-DAT say-make-INFL than earlier teacher-TOP
Bill-ni [kare-ga kare-no ruumumeito-o nagutta to] iw-ase-ta
Bill-DAT he-NOM he-GEN roommate-ACC hit COMP say-make-INFL
'The teacher made Bill say [that he had hit his roommate] earlier than (the teacher) made John(-DAT) say *ec* '

Finally, the examples of Non-CM-stripping also show the same interpretive pattern as the other instances of deep anaphora, not allowing Mix readings.

(111) A: Sensei-wa Bill-ni [kare-ga kare-no ruumumeito-o nagutta to]
teacher-TOP Bill-DAT he-NOM he-GEN roommate-ACC hit COMP
iw-ase-ta.
say-make-INFL
'The teacher made Bill say [that he had hit his roommate].
B: John-mo da
John-also be-nonpast
'John too.' (Mix readings not possible)

Given (i) the assumption that what underlies Mix readings and their distributional patterns is the establishment of an FD in the anaphora site and (ii) the generalization in (95), the observations in this subsection lead us to conclude that deep anaphora *cannot* be represented in the same way as surface anaphora.[52]

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[52] Given that surface anaphora is, but deep anaphora is not, represented fully at LF as being identical to the relevant part of the source site, we make a further prediction: any interpretive possibility available in the source site will be available also in the anaphora site in the case of surface anaphora, but not in the case of deep anaphora. This seems to be a correct prediction, as the following considerations suggest.

The source site in (i) allows the interpretation in which for each Japanese couple, the husband and the wife bought fish at different markets (although there may be only two markets involved).

(i) Every Japanese couple bought fish at different markets; every Italian couple did too.

The anaphora site also allows the same type of interpretation: for each Italian couple, the husband and the wife bought fish at different markets (although there may be only two markets involved).

In the CM-comparative example in (ii), the source site as well as the anaphora site allows such an interpretation.

(ii) [subete-no itariazin huuhu-ni yorimo sakini] sono otoko-ga
every-GEN Italian couple-DAT than earlier that man-NOM
subete-no nihonzin huuhu-ni tigau mise-de sakana-o kaw-aseta (koto)
every-GEN Japanese couple-DAT different market-at fish-ACC buy-caused
'That man made every Japanese couple buy fish at different markets [earlier than some Italian couples-DAT].'

In the NOC example in (iii), on the other hand, the anaphora site does not allow such an interpretation, despite the fact that the source site does.

(iii) Subete-no nihonzin huuhu-ga tigau mise-de sakana-o katta;
every-GEN Japanese couple-NOM different market-at fish-ACC bought
subete-no itariazin huuhu-mo *ec* katta
every-GEN Italian couple-also bought
'Every Japanese couple bought fish at different markets; every Italian couple also bought *ec* .'

Non-elliptical comparatives, as in (iv), seem to pattern like NOC.

(iv) [nankumika-no itariazin huuhu-ni *ec* yame-ase-ru yorimo sakini] sono otoko-ga
some-GEN Italian couple-DAT quit-make-INFL than earlier that man-NOM
subete-no nihonzin huuhu-ni tigau riyuu-de sigoto-o yame-sase-ta (koto)
every-GEN Japanese couple-DAT different reason-for work-ACC quit-make-INFL
'That man made every Japanese couple quit work for different reasons [earlier than (he) made some Italian couples-DAT quit *ec* ].'

The non-elliptical comparative in (iv) contrasts with the CM-comparative in (v).

(v) [nankumika-no itariazin huuhu-ni yorimo sakini] sono otoko-ga
some-GEN Italian couple-DAT than earlier that man-NOM
subete-no nihonzin huuhu-ni tigau riyuu-de sigoto-o yame-saseta (koto)
every-GEN Japanese couple-DAT different reason-for work-ACC quit-caused
'That man made every Japanese couple quit work for different reasons [earlier than (he) made some Italian couples-DAT].'

In other words, (v) yields the interpretation analogous to (vi) but (iv) does not.

### 5.4. Summary

While sloppy identity readings can obtain in surface anaphora only if the lexical and structural conditions in (18) are satisfied, their availability in deep anaphora is not contingent upon these conditions. The empirical materials up to the end of section 4 indicate that any 'concept' that can be expressed by surface anaphora can also be expressed by deep anaphora. The discussion in this section indicates that certain interpretive possibilities can be expressed only by means of surface anaphora but not by means of deep anaphora. We have observed in particular that Mix readings and their distributional pattern obtain only in surface anaphora. This once again provides confirming evidence for the proposed distinction between the sloppy identity reading in surface anaphora and that in deep anaphora.

## 6. Experiment 4: Mix Readings and Local Disjointness[53]

As discussed in section 4, local disjointness effects are observed in surface anaphora but not in deep anaphora. Thus, while (112a) disallows the sloppy identity reading, in contrast to (112b), the deep anaphora counterpart of (112a), as in (113) allows the sloppy identity reading.

(112) a. (Cf. (65).)
I voted for me, and I wanted you to [$_{VP}$ *ec* ] (too).

b. (Cf. (64).)
I voted for my husband, and I wanted you to [$_{VP}$ *ec* ] (too).

(113) (Cf. (68).)
I voted for me, and I wanted you to do the same thing.

The contrast between surface anaphora and deep anaphora is quite analogous to BVA and coreference; local disjointness effects are clearly observed in (29b), but not in (114).

(29) a. [only I]$_1$ $t_1$ voted for my$_1$ father
'ONLY *x*, *x*=me, *x* voted for *x*'s father'

b. *[only I]$_1$ $t_1$ voted for me$_1$
'ONLY *x*, *x*=me, *x* voted for *x*'

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(vi) Every Japanese couple quit work for different reasons earlier than some Italian couple did.

53 This section is based on section 3 of Hoji 1997b.

(114) I voted for me.

Recall that I have reported in section 3 that we observe local disjointness effects in regard to the sloppy identity reading in the CM-comparative in Japanese, an instance of surface anaphora, in contrast to instances of deep anaphora in Japanese. It is noted there that the sloppy identity reading in examples like (71) and (74a) is highly marginal to impossible; cf. also their 'non-local counterparts', which allow the sloppy identity reading, such as (70) and (73) in section 3. I only repeat (74a) here.

(74) a. [John-ni yorimo sakini] Mary-ga $Bill_1$-ni $kare_1$-o erab-ase-(tara)
John-DAT than earlier Mary-NOM Bill-DAT he-ACC choose-make-if
'(if) Mary makes $Bill_1$-DAT choose (elect) $him_1$(-ACC)
earlier than John-DAT'
(i) <Mary makes John choose Bill> (strict)
(ii) */*?<Mary makes John choose John> (sloppy)

In Hoji 1997b, it is suggested that the marginal availability of the sloppy identity readings in examples like (71) and (74a) is due to the marginal possibility of 'analyzing' a CM-comparative as an instance of a Non-elliptical comparative, despite the absence of the overtly realized predicate in the complement clause of *yorimo* 'than'; cf. (60). In other words, it is suggested there that (74a), for example, when it is felt to give rise to a sloppy identity reading, is 'analyzed' as (77a), repeated here.

(77) a. [John-ni *ec* erab-aseru yorimo sakini]
John-DAT choose-make than earlier
Mary-ga $Bill_1$-ni $kare_1$-o erab-aseta (koto)
Mary-NOM Bill-DAT he-ACC choose-made
'Mary made $Bill_1$-DAT choose (elect) $him_1$(-ACC)
earlier than (she) made John-DAT choose (elect) *ec* '
(i) <Mary made John choose Bill> (strict)
(ii) <Mary made John choose John> (sloppy)

The sloppy identity readings in these Non-elliptical comparative examples can be attributed to the coreference between the *ni*-marked NP and the *ec* in the embedded clause, as suggested in Hoji 1998a.

We have observed that Non-elliptical comparatives—an instance of deep anaphora—do not give rise to Mix readings. Given that the marginal possibility

of the sloppy identity reading in the CM-comparatives such as (74a) is due to its 'reanalysis' as an instance of deep anaphora, as suggested in Hoji 1997b, and given the conclusion in section 5 that Mix readings are possible only in surface anaphora, we make the following prediction. If we impose a Mix reading on these examples and thereby eliminate the possibility of their 'reanalysis' as instances of deep anaphora, the marginal possibility of the sloppy identity reading under discussion will also be eliminated. Recall that Mix readings are argued to be possible only with the establishment of the relevant FD, which in turn is subject to the local disjointness condition in (18b).

The prediction seems to be a correct one, as indicated by (115) and (116) below, which are the CM-comparative counterparts of (71a) (not repeated in this section) and (74a), respectively.

(115) [Ataka sangyoo$_2$-ni yorimo sakini] seihu-ga Bandoo koogyoo$_1$-ni
Ataka-company-DAT than earlier government-NOM Bando company-DAT
soko-o soko-no syatyoo-no siyuubutu-da to happyoos-ase-(tara)
it-ACC it-GEN president-GEN private:possession-be COMP announce-make-if
'(if) the government made Bando Company$_1$ announce it$_1$ to be its$_1$ president's private possession earlier than Ataka Company-DAT'
*<Ataka Company$_2$ announce it$_2$ to be its$_1$ president's private possession>
(Mix 1)

(116) [John$_2$-ni yorimo sakini] Mary-ga Bill$_1$-ni
John-DAT than earlier Mary-NOM Bill-DAT
kare-o kare-no titioya-no kookeisya-da to iw-ase-(tara)
he-ACC he-GEN father-GEN successor-be COMP say-make-if
'Mary made Bill$_1$ declare him$_1$ to be his$_1$ father's successor earlier than John$_2$(-DAT)'
*<John$_2$ declare him$_2$ to be his$_1$ father's successor> (Mix 1)

Mix readings are not available in these examples, as predicted. The unavailability of the Mix 1 reading must be due to the local disjointness condition (18b). In order for (115) and (116) to yield the Mix 1 reading, *soko-o* and *kare-o* must be B in FD(*Bandoo koogyoo*, B) and FD(*Bill*, B), respectively. These FDs, however, cannot be established since one of the necessary conditions for the establishment of FD (i.e. the locality disjointness condition in (18b)) is

not satisfied. Hence the Mix 1 reading is unavailable in (115) and (116).[54]

As expected, if the relevant locality is removed, the Mix 1 reading becomes available. Similarly, if we embed the first instance of *soko* in (115) and *kare* in (116), thereby removing the relevant c-command relation, then, again in harmony with the interpretive patterns observed earlier, both Mix 1 and Mix 2 readings become available. For reasons of space, however, the relevant examples are not supplied here.

The unavailability of Mix readings in (115) and (116), in contrast to the examples alluded to in the previous paragraph, thus provides support for the view that the absence of local disjointness effects for some speakers in examples like (71) and (74a) is due to the 'reanalysis' of CM-comparatives as Non-elliptical comparatives.[55, 56]

## 7. Experiment 5: C-command, Mix readings, and Surface/Deep Anaphora

### 7.1. Surface anaphora and deep anaphora

Consider the three conditions on FD in (18), repeated here.

(18) The three necessary conditions for an FD(A, B), where A and B are in argument positions:
a. B is [+β].

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[54] The Mix 2 readings are not available in (115) or (116) due to the condition that is responsible for the generalization in (95).

[55] We have discussed the possibility of the 'reanalysis' of CM-comparative as Non-elliptical comparative. It must be noted, however, that what is crucial is the 'reanalysis' of surface anaphora as deep anaphora. Therefore, the 'reanalysis' of a CM-comparative as a non-CM-comparative, rather than as a Non-elliptical comparative, would have the same effects in regard to the relevant account of the marginal acceptability of (71) and (74a). While the nature of the relevant 'reanalysis' is far from clear, the 'reanalysis' of a CM-comparative as a non-CM-comparative involves the 'deletion' of the case-marker, while the 'reanalysis of a CM-comparative as a Non-elliptical comparative involves the 'addition' of the predicate (possibly other materials) in the process of 'reanalysis'. On the basis of this consideration, it seems preferable to adopt the 'reanalysis' of a CM-comparative as a non-CM-comparative. I owe J.-R. Hayashishita and Ayumi Ueyama (personal communication, summer 1998) for pointing this out to me.

[56] There are additional complications that have been suppressed in the preceding discussion, mostly for reasons of space. Among them is how the local disjointness effects as well as the BVA possibility are affected by the choice of the nominal for the 'dependent term'. The readers are referred to Hoji to appear, Ueyama 1998:section 3.1, and Hoji et al. 1999 for relevant discussion.

b. A c-commands B.
c. A is not in the local domain of B.

The main claim of this article is that the sloppy identity reading in surface anaphora is distinct in nature from that in deep anaphora and, more specifically, the former is based on FD while the latter is not. The sloppy identity reading without satisfying the conditions in (18a) or (18c) has been argued to be the sloppy identity reading in deep anaphora, hence not based on FD. The relevant differences noted in sections 3 and 4 are correlated with the difference between surface and deep anaphora in regard to the linguistic antecedent requirement. The former requires a linguistic antecedent, but the latter does not. In section 5, another difference between surface and deep anaphora was discussed, which concerns the availability of Mix readings; while surface anaphora can give rise to Mix readings, deep anaphora cannot. Thus surface and deep anaphora have been observed to exhibit a distinct clustering of properties as summarized in (117) and (118).

(117) Properties of surface anaphora:
a. It requires a linguistic antecedent.
b. It cannot give rise to a sloppy identity reading with an α-occurrence.
c. It cannot give rise to a sloppy identity reading in the local context.
d. It can give rise to Mix readings.

(118) Properties of deep anaphora:
a. It does not require a linguistic antecedent.
b. It can give rise to a sloppy identity reading with an α-occurrence.
c. It can give rise to a sloppy identity reading in the local context.
d. It cannot give rise to Mix readings.

We have discussed VPE in English and CM-comparatives in Japanese as typical instances of surface anaphora, and *do the same thing* in English, Non-CM-comparatives, Non-elliptical comparatives, *soo su*, Non-CM-stripping, and NOC in Japanese as instances of deep anaphora. While it is generally the case that VPE in English and CM-comparatives in Japanese do exhibit the properties in (117), it has been noted that they can be analyzed marginally as instances of deep anaphora. The discussion in section 6 concerns the CM-comparatives in this regard. We have also noted that there is some evidence, presented in Dalrymple 1991, that VPE in English can be an instance of deep anaphora. Suppose that VPE in English can indeed be analyzed as an instance of deep anaphora. We then expect to find some instances of sloppy readings in English VPE without the conditions in (18) being satisfied, and we will turn to them directly.

**7.2. Sloppy identity readings without satisfying the c-command condition**

The sloppy identity reading is available in (119) despite the fact that neither *him* nor *his* is c-commanded by *John* in the source site.

(119) (Based on F&M 109:(41a), which is based on examples due to M. Wescoat, cited in Dalrymple et. al. 1991.)
The policeman who arrested $John_1$ read $him_1$ $his_1$ rights,
and the one who arrested $Bill_2$ did too.
<read Bill Bill's rights>

Given that c-command is a necessary condition for the establishment of FD, we are led to conclude that the sloppy identity reading in (119) is not based on FD.

**7.3. Sloppy identity readings with an α-occurrence**

Given this, we predict that the use of a β-occurrence is not necessary for the sloppy identity reading in (119). This in fact seems to be a correct prediction, as indicated by the availability of the sloppy identity reading in (120), in which *him* in (119) is replaced by *John*.

(120) The policeman who arrested $John_1$ read $John_1$ $his_1$ rights, and the one who arrested $Bill_2$ did too.
<read $Bill_2$ $Bill_2$'s rights>

Similarly, the sloppy identity reading seems possible not only in (121a), with the β-occurrence (*him*), but also in (121b), with the α-occurrence (*John*).

(121) a. The professor who taught $John_1$ recommended $him_1$ for the Harvard position, and the one who taught $Bill_2$ did too.
<recommended $Bill_2$ for the Harvard position>
b. The professor who taught $John_1$ recommended $John_1$ for the Harvard position, and the one who taught $Bill_2$ did too.
<recommended $Bill_2$ for the Harvard position>

The availability of the sloppy identity reading in (120) and (121) can thus be taken as evidence that what is involved in (119) is not an instance of surface anaphora (at least, of the sort that has been discussed above).[57]

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[57] It seems that the sloppy identity reading in (121b) is not as readily available as that in (121a). In order to account for the contrast, we might suggest the following: (i) while the VPE in (121b) is an instance of deep anaphora (which is possible only marginally),

**7.4. The c-command condition and Mix readings**

We have concluded in section 5 that the establishment of FD is a necessary condition for the availability of Mix readings. We have then observed in section 6 that the failure of the establishment of FD due to the local disjointness condition in (18c) results in the unavailability of Mix readings. Let us now consider the prediction that the failure of the establishment of FD due to the c-command condition on FD in (18b) also results in the unavailability of Mix readings. Specifically, we predict that examples like (119), in which (18b) is not satisfied, fail to yield Mix readings, and this also seems to be a correct prediction, as illustrated in (122).

(122) a. The policeman who arrested $John_1$ said that $he_1$ had hit $his_1$ roommate, and the one who arrested Bill did, too.
b. The policeman who arrested $John_1$ said that $his_1$ roommate had $hit_1$ him, and the one who arrested Bill did, too.

In (122) *John*$_1$ does not c-command either of the two pronouns. (122a) yields the across-the-board strict identity reading (123a) and the across-the-board sloppy identity reading (123b) but not the Mix readings (123c) or (123d).

(123) a. the one who arrested $Bill_2$ said that $he_1$ had hit $his_1$ roommate
b. the one who arrested $Bill_2$ said that $he_2$ had hit $his_2$ roommate
c. the one who arrested $Bill_2$ said that $he_2$ had hit $his_1$ roommate
d. the one who arrested $Bill_2$ said that $he_1$ had hit $his_2$ roommate

Similarly, (122b) allows the readings in (124a) and (124b) but not those in (124c) and (124d).

(124) a. the one who arrested $Bill_2$ said that $his_1$ roommate had hit $him_1$
b. the one who arrested $Bill_2$ said that $his_2$ roommate had hit $him_2$
c. the one who arrested $Bill_2$ said that $his_1$ roommate had hit $him_2$
d. the one who arrested $Bill_2$ said that $his_2$ roommate had hit $him_1$

The unavailability of the Mix readings in the examples in (122) contrasts with the availability of Mix readings in examples in (125), in which *John* c-commands the pronouns.

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the VPE in (121a) is an instance of surface anaphora (which is the unmarked case), and (ii) the sloppy identity reading in (121a) is not based on FD but is based on some other formal relation, as suggested by the discussion in Tomioka 1996. I suspect that the relevant relation is co-I-indexation in the terms of Ueyama 1998.

(125) a. John$_1$ said that he$_1$ had hit his$_1$ roommate, and Bill$_2$ did, too.
<said that he$_2$ had hit his$_1$ roommate>
b. John$_1$ said that his$_1$ roommate had hit him$_1$, and Bill$_2$ did, too.
<said that his$_2$ roommate had hit him$_1$>
<said that his$_1$ roommate had hit him$_2$>

As discussed in section 5, (125a) allows the Mix 1 reading, and (125b) allows both the Mix 1 and the Mix 2 readings.

The availability of Mix readings in (125) and the unavailability of Mix readings in (122) correlate with the availability of BVA in (126) and the unavailability of BVA in (127), respectively.

(126) every gang member$_1$ said that he$_1$ was protecting the boss
(127) *the policeman who arrested [every gang member]$_1$ said that he$_1$ was protecting the boss

On the basis of the availability of the sloppy reading in examples like (119), F&M argue that the condition on BVA and that on sloppy identity readings are not coextensive.[58] We have just observed, however, that the availability of Mix readings is sensitive to the c-command condition (18b), just as in the case of BVA that is based on FD. The observation thus points to the possibility that the distribution of Mix readings and that of BVA are in fact constrained by the same structural condition (that governs the establishment of an FD). In the next subsection, we will observe that the parallelism between the distribution of BVA and that of Mix readings seems to carry over to 'Spec-binding' cases, providing some support for the possibility just noted.

**7.5. 'Spec-binding' and Mix readings**

It has been observed that BVA is possible in examples like (128).[59]

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[58] In section 3.4.1, some discrepancy was pointed out between the possibility of BVA with *kare* and that of a sloppy identity reading in surface anaphora with *kare*. The relevant discrepancy is considered in Hoji 1997a as supporting evidence for F&M's conclusion that the condition on BVA and that on sloppy readings are not coextensive.

[59] Similarly, the BVA seems possible in examples like (i) and (ii).
(i) a. [even John]$_1$'s father accused him$_1$
b. [only John]$_1$'s father praised him$_1$

(128) Every gang member$_1$'s mother said that he$_1$ was protecting the boss.

Just as the BVA is possible in (128), the Mix readings seem possible in (129).[60]

(129) a. John$_1$'s roommate said that he$_1$ had hit his$_1$ roommate, and Bill$_2$'s roommate did, too.
(i) <said that he$_2$ had his his$_1$ roommate> (Mix 1)
(ii) *<said that he$_1$ had his his$_2$ roommate> (Mix 2)
b. John$_1$'s roommate said that his$_1$ roommate had hit him, and Bill$_2$'s roommate did, too.
(i) <said that his$_2$ roommate had hit him$_1$> (Mix 1)
(ii) <said that his$_1$ roommate had hit him$_2$> (Mix 2)

It seems that (129a) allows the Mix 1 reading, but not the Mix 2 reading, while (129b) allows both Mix readings, in harmony with the Mix readings paradigms observed earlier.

The contrasts among (122), (125) and (129), involving 'Spec-binding' can be duplicated in Japanese by using CM-comparatives. The structural conditions for the availability of the Mix readings in the CM-comparatives mirror those for BVA in Japanese, just as in the case of English.[61] The relevant demonstration,

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(ii) a. [even John]$_1$'s father doubted his$_1$ testimony
b. [only John]$_1$'s father supported his$_1$ story
By contrast, the BVA as indicated in (iii) does not seem possible.
(iii) a. *[even [John's father]]$_1$ accused him$_1$
b. *[only [John's father]]$_1$ praised him$_1$

[60] While Lasnik (1976:Appendix) argues that 'Spec-binding' cases fail to yield BVA or a sloppy identity reading, Higginbotham (1980:691) maintains that they can give rise to BVA. Reinhart (1983:177-179), furthermore, argues that "[for] many speakers" BVA is "permitted when the antecedent is the determiner of a possessive NP" (i.e., in the 'Spec-binding' cases) and "for such speakers" sloppy identity readings are also possible in the 'Spec-binding' cases; see Reinhart 1987 for further discussion. F&M also suggest that the 'Spec-binding' cases (and other cases where the 'antecedent' fails to c-command the 'sloppy pronoun' as well) give rise to sloppy identity readings. The discussions in Reinhart 1983:177-179 and F&H, however, do not concern the availability of the Mix readings. See also footnote 61.

[61] Suppose that the reported judgments in regard to the Mix readings and the BVA do reflect the relevant aspects of grammar, and that an FD is indeed involved in the cases under discussion. This would lead us to conclude, given the c-command condition in (18b), that the 'Spec of NP' in the relevant examples occupies a higher position than where it appears to occupy. How we can, or should, achieve this is a nontrivial matter, to say the least, which should involve empirically differentiating 'Spec-binding' from 'Inverse

however, is not provided here for reasons of space.

**7.6. VPE as deep anaphora**

The preceding discussion thus leads us to conclude that the across-the-board sloppy identity reading in (119), repeated here, is a sloppy identity reading in deep anaphora.

(119) The policeman who arrested John$_1$ read him$_1$ his$_1$ rights,
and the one who arrested Bill$_2$ did too.
<read Bill Bill's rights>

Given this conclusion, we expect that the across-the-board sloppy identity reading in (119) continues to obtain even if we replace *did* in (119) with *did the same thing*. That such is indeed the case is illustrated in (130).

(130) The policeman who arrested John$_1$ read him$_1$ his$_1$ rights, and the one who arrested Bill$_2$ did the same thing.

Given the suggestion made earlier in regard to the nature of the sloppy identity reading in deep anaphora, this indicates that we can form the concept of "reading someone$_1$ his$_1$ rights" without the aid of the language faculty, thereby leading us to expect that the across-the-board sloppy reading is possible even without any linguistic context. This prediction too seems to be borne out.

(131) [Observing a policeman who arrested John$_1$ read him$_1$ his$_1$ rights]
The policemen who arrested Bill did the same thing.

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linking' cases of May 1977; see the discussions in Reinhart 1983:177-179 and May 1985:67-72.

While the question is clearly beyond the scope of this article, it is perhaps worth noting that there seems to be a great deal of judgmental fluctuation/variation in regard to the interpretive possibilities involving $\alpha$ and $\beta$ in (i).

(i) $[_{NP}\ \alpha\text{-}_{GEN}\ N]\ [\ ...\ \beta\ ...]$

The relevant judgmental fluctuation has been observed in regard to (a) the coreference possibility (e.g., *his father loves John* in English, and its Chinese and also Japanese counterparts), (b) BVA in 'Spec-binding', and (c) sloppy identity readings in 'Spec-binding'; see footnote 60 for some references on (b) and (c). (Reinhart 1983:179 contains some remarks relevant to (a).) While the judgmental fluctuation/variation seems to me to be in part due to the failure to recognize the two types of BVA in the terms of Ueyama 1998 (see Higginbotham's (1980:691) (71) and Reinhart's (1983:178) (9), for example), it does not seem to me to be totally implausible that it is, at least in part, due to some structural ambiguity and markedness of some sort. I hope to return to the relevant issues in a separate work.

<read Bill Bill's rights>

Once we accept the possibility that VPE in English can be analyzed marginally as an instance of deep anaphora, we can no longer maintain that any instance of VPE in English has the properties listed in (117). We have in fact noted earlier Dalrymple's (1991) observation that some instances of VPE in English do not require a linguistic antecedent.[62] In this section, we have further observed that VPE in English can give rise to a sloppy identity reading with an α-occurrence. One might then wonder if there are instances of VPE in which the local disjointness effects are not observed, since that would not be unexpected, given that VPE in English can be an instance of deep anaphora.

Recall the example in (65), repeated here.

(65) I voted for me, and I wanted you to [$_{VP}$ *ec* ] (too).
(i) <vote for me> (strict)
(ii) *<vote for you> (sloppy)

I have argued in section 4 that the sloppy identity reading is not possible in (65) because the sloppy identity reading in surface anaphora must be based on FD, which in turn is subject to the local disjointness condition in (18c). One might have wondered why a simpler form such as (132) has not been used.

(132) I voted for me; I am sure you did too.

The reason is that some speakers accept the sloppy identity reading in (132). These speakers however do find the local disjointness effects in (65) fairly clearly. This means, in the context of the preceding discussion, that the VPE in (132) is easier to analyze as an instance of deep anaphora than the VPE in (65), for some reason that we do not (yet) understand.

If VPE in English can be an instance of deep anaphora, we expect that the

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[62] Dalrymple (1991:6) points out, citing Sag 1976 and Dalrymple et al. 1991 that "there is not always a clear syntactic source for the reconstructed VP in cases of ellipsis." (See also (10) in section 1.)

(i) (Dalrymple 1991:(14))
A lot of this material can be presented in a fairly informal and accessible fashion, and often I do. (Chomsky, 1982, page 41)

(ii) (Dalrymple 1991:(15a.b))
a. In March, four fireworks manufacturers asked that the decision be reversed, and on Monday the ICC did. (Rosenthal, 1988)
b. Also, he said, in this type of case, such an order does not have to be hand-delivered but can be mailed, which is what the court did. (AP, 1988)

availability of the sloppy identity reading in such (deep anaphora) instances of VPE in English may not be affected by the use of an α-occurrence in the way it is in the case of surface anaphora. Some speakers in fact have pointed out to me that the strict/sloppy ambiguity is detectable not only in (133) but also in (134), although it is more difficult in (134) than in (133).

(133) John$_1$ [$_{VP}$ voted for his$_1$ father];
(I am pretty sure that) Bill did [$_{VP}$ *ec* ] too.
(i) <voted for John's father> (strict)
(ii) <voted for Bill's father> (sloppy)

(134) John$_1$ [$_{VP}$ voted for John$_1$'s father];
(I am pretty sure that) Bill did [$_{VP}$ *ec* ] too.
(i) <voted for John's father> (strict)
(ii) ??/?<voted for Bill's father> (sloppy)

Even those speakers who accept the sloppy identity reading in (134) seem to find the sloppy identity reading significantly more difficult in (42), repeated here, suggesting again that the VPE in (133) and (134) can be analyzed as an instance of deep anaphora more easily than the VPE in (42).[63]

(42) John will [$_{VP}$ vote for John's father];
I want Bill to [$_{VP}$ *ec* ] too.
(i) <vote for John's father> (strict)
(ii) *<vote for Bill's father> (sloppy)

This in turn suggests that the forms of VPE as in (41) and (42) should be used, rather than those as in (133) and (134), as instances of surface anaphora in our experiments, as they are intended to probe into the properties of surface anaphora—and that is precisely what we have done.

### 7.7. The sloppy identity reading in deep anaphora and the c-command condition

As expected, it is quite easy to construct Japanese examples of deep anaphora, such as Non-CM-stripping, Non-CM-comparatives, Non-elliptical comparatives, and *soo su*, in which the sloppy identity reading is possible

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[63] One might relate the difference in question to the presence of *do* in the former and its absence in the latter. Hence one plausible account of the difference is that *did* in (134), when analyzed as deep anaphora, is an instance of the main verb *do*. Ayumi Ueyama (personal communication, 1998) suggested the possibility that the markedness of the deep anaphora use of *do* in cases like (134) is related to the markedness in English of the use of the null object in such cases, i.e., [$_{VP}$ do [$_{NP}$ *ec* ]].

without the c-command condition (18b) being satisfied. Due to space limitation, however, the relevant Japanese examples are not provided here.

### 7.8. Summary

The most reliable way to identify an instance of surface anaphora at this point is the Mix reading test. By imposing a Mix reading on a structure that tends to be analyzed as an instance of surface anaphora but can be (marginally) analyzed as an instance of deep anaphora, we have succeeded in forcing it to be an instance of surface anaphora. Once we have done so, the effects of each of the three conditions on FD in (18) are clearly observed.[64]

## 8. Concluding Remarks

Given a certain sense experience, we do not know a priori what aspects of it are due to the language faculty and what others are due to factors outside it. In this article, I have discussed the sense experiences having to do with the sloppy identity readings, and argued for the thesis that some instances of the sloppy identity reading are directly and solely attributable to the LF representations of the relevant linguistic expressions, while other instances are due (also) to the resources other than the language faculty. To the extent that the relevant demonstration is valid, I regard it as evidence for the working hypothesis of generative grammar that the language faculty is autonomous.

A crucial distinction is made, drawing from Hankamer and Sag 1977, between surface anaphora and deep anaphora. Roughly speaking, the former is represented 'fully' at LF and its 'interpretation' is based solely on the relevant LF properties, while the latter can be understood as corresponding to some concept formed in some way, not necessarily on the basis of any linguistic expressions. The initial test to distinguish the two has to do with the linguistic antecedent requirement, discussed in Hankamer and Sag 1977. The crucial empirical evidence adduced in support of the thesis noted above, however, comes from the distributional differences between the two types of sloppy identity readings. The sloppy identity reading in surface anaphora is argued to be based on the establishment of an FD, just as in the case of one of the two types of bound variable anaphora (see Ueyama 1998 and Hoji to appear), which in turn is subject to the lexical condition on the 'dependent term' as well as structural conditions (the c-command condition and the anti-locality condition) in (18); cf.

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[64] The demonstration of this type has not been presented in regard to the local disjointness in English VPE, mainly because it seems possible to force VPE to be an instance of surface anaphora without involving a Mix reading. If some speakers accept the sloppy identity reading in examples like (65), the next experiment to design is one that would examine whether examples of VPE would give rise to Mix readings 'in the local context' for those speakers.

footnote 12. The sloppy identity reading in deep anaphora, on the other hand, is not constrained by these conditions.[65]

The sloppy identity reading in surface anaphora and that in deep anaphora seem indistinguishable if we only consider some simple cases, just as surface anaphora and deep anaphora cannot easily be distinguished in terms of their 'meanings'. The difference between the two, however, has been revealed quite clearly, as the result of a series of syntactic tests. The observed correlations and the clustering of properties suggest that the proposed distinction between the sloppy identity reading in surface anaphora and that in deep anaphora is well founded.

The preceding discussion, however, fails to express the "connections among the relevant sense experiences" in terms of theoretical primitives. Although the anti-locality condition plays a crucial role in the proposed account of the distribution of the sloppy identity reading in surface anaphora, the nature of this condition has not been (fully) articulated; cf. footnote 18. Similarly, the condition that is responsible for the Mix reading paradigm, as given in (95), is left as a descriptive generalization. Just as we must aspire to a rigorous theoretical characterization of the connection among the relevant sense experiences, so we must aspire to attain repeatability in regard to the proposed empirical generalization, i.e., the sense experiences (=linguistic judgments) as they are hypothesized to arise on the basis of certain formal properties of grammar. We must do so in each and every step of our argumentation, and when we fail to attain repeatability, we should, at the least, be concerned about the validity of the relevant empirical generalization (and the theoretical proposal that

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[65] Given that the interpretation of deep anaphora is largely determined by pragmatic considerations, as Hankamer & Sag (1976) suggest, it is not surprising to find some judgmental fluctuation (among speakers) in regard to the availability of sloppy readings in deep anaphora, as pointed out in Fukaya & Hoji 1999:footnote 14.

The crucial aspect of the main claim of this article is that the sloppy identity reading in surface anaphora is subject to the lexical and structural conditions in (18), while that in deep anaphora is not. That the sloppy identity reading in deep anaphora is not subject to (18) does not, however, mean that it is available in any linguistic or pragmatic environments. What it means instead is that it can be made available by adjusting the relevant pragmatic context (sometimes by means of the choice of lexical items) in ways that are not possible in the case of the sloppy identity reading in surface anaphora. The foregoing discussion, once fully articulated, will be stated within a general theory of anaphoric relations and ellipsis that will encompass the distribution of sloppy identity readings in surface anaphora; but such a theory will have nothing to say, in principle, about exactly how and when the sloppy identity readings are possible or impossible in deep anaphora. I adopt the general theory of anaphoric relations proposed in Ueyama 1998; for ease of exposition, however, the preceding discussion is formulated in terms of the theory in Ueyama 1998 only very partially.

is based on it).[66] The empirical paradigms given above were originally constructed largely based on Japanese, and most of the English paradigms in this article have been constructed on the basis of the Japanese paradigms; for reasons of space, however, only a small portion of the relevant Japanese data are provided in this paper; see footnote 23. In the absence of a more comprehensive discussion of the relevant empirical paradigms, it is not possible to attain repeatability in regard to the relevant generalizations in Japanese in the sense just noted. A more complete presentation of the relevant materials, empirical as well as conceptual, will have to wait for a separate occasion.

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[66] See Hoji to appear for an attempt to attain a significantly higher level of repeatability than in the 'standard' literature, in the domain of bound variable anaphora and quantifier scope in relation to the postulated structures of the Japanese sentences of the 'unmarked' and 'marked' orders.

**References**

Bach, Emmon and Barbara H. Partee. 1980. Anaphora and Semantic Structure. In *Papers From The Parasession on Pronouns and Anaphora, Chicago Linguistics Society*, ed. Jody Kreiman and Almerindo E. Ojeda, 1-28. Chicago: The University of Chicago.

Chomsky, Noam. 1975. *Reflections on Language*. New York: Pantheon Books.

Chomsky, Noam. 1976. Conditions on Rules of Grammar. *Linguistic Analysis* 2:303-351. [Reprinted in Chomsky 1977:163-210. The page references are to Chomsky 1977.].

Chomsky, Noam. 1982. *Some Concepts and Consequences of the Theory of Government and Binding*. Cambridge: The MIT Press.

Chomsky, Noam. 1986. *Knowledge of Language, its Nature, Origin, and Use*. New York: Praeger.

Dahl, Östen. 1974. How to open a sentence: Abstraction in natural language. *Logical grammar reports*, University of Göteberg.

Dalrymple, Mary. 1991. Against Reconstruction in Ellipsis. *Xerox Technical Report*, Xerox-PARC, Palo Alto, CA.

Dalrymple, Mary, Stuart M. Shieber, and Fernando C. N. Pereira. 1991. Ellipsis and higher-order unification. *Linguistics and Philosophy* 14:399-452.

Einstein, Albert. 1936. Physics and Reality. *The Journal of the Franklin Institute* [Reprinted in *Ideas and Opinions* 1955, Crown Publishers. The pages references are to the 1982 edition, Crown Trade Paper Backs, New York.]

Evans, Gareth. 1977. Pronouns, quantifiers and relative clauses (I). *Canadian Journal of Philosophy* 7:467-536.

Evans, Gareth. 1980. Pronouns. *Linguistic Inquiry* 11:337-362.

Fiengo, Robert, and Robert May. 1994. *Indices and Identity*. Cambridge: MIT Press.

Fox, Danny. 1998. Locality in Variable Binding. In *Is the Best Good Enough? Optimality and Competition in Syntax*, ed. Pilar Barbosa, et al., 129-155. Cambridge: MITWPL & MIT Press.

Fukaya, Teruhiko and Hajime Hoji. 1999. Stripping and Sluicing in Japanese and Some Implications. In *WCCFL 18*, 145-158. Somerville: Cascadilla Press.

Hankamer, Jorge and Ivan Sag. 1976. Deep and Surface Anaphora. *Linguistic Inquiry* 7:391-428.

Haïk, Isabelle. 1984. Indirect Binding. *Linguistic Inquiry* 15: 185-223.

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

Heim, Irene. 1993. Anaphora and Semantic Interpretation: A Reinterpretation of Reinhart's Approach. Ms., MIT.

Higginbotham, James. 1980. Pronouns and Bound Variables. *Linguistic Inquiry* 11:679-708.

Higginbotham, James. 1983. Logical Form, Binding, and Nominals. *Linguistic Inquiry* 14:395-420.

Higginbotham, James. 1985. On Semantics. *Linguistic Inquiry* 16:547-93.

Hoji, Hajime. 1990. Theories of Anaphora and Aspects of Japanese Syntax. Ms., University of Southern California.

Hoji, Hajime. 1991. *KARE*. In *Interdisciplinary Approaches to Language: Essays in Honor of S.-Y. Kuroda*, ed. Carol Georgopoulos, and Roberta Ishihara, 287-304. Dordrecht: Kluwer Academic Publishers.

Hoji, Hajime. 1995. Demonstrative Binding and Principle B. In *NELS 25*, 255-271. Amherst: GLSA.

Hoji, Hajime. 1997a. Sloppy Identity and Formal Dependency. In *WCCFL 15*, 209-223. Stanford: CSLI.

Hoji, Hajime. 1997b. Sloppy Identity and Principle B. In *Atomism and Binding*, ed. H. Bennis, P. Pica, and J. Rooryck, 205-235. Dordrecht: Foris.

Hoji, Hajime. 1998a. Null Object and Sloppy Identity in Japanese. *Linguistic Inquiry* 29:127-152.

Hoji, Hajime. 1998b. Formal Dependency, Organization of Grammar and Japanese Demonstratives. In *Japanese/Korean Linguistics V. 7*, ed. N. Akatsuka, et al., 649-677.Stanford: CSLI.

Hoji, Hajime. To appear. Falsifiability, Repeatability and Grammar of Japanese. *Lingua*.

Hoji, Hajime. Satoshi Kinsui, Yukinori Takubo and Ayumi Ueyama. 1999. Demonstratives, Bound Variables, and Reconstruction Effects. *Proceedings of the Nanzan GLOW*: *The Second GLOW Meeting in Asia, September 19-22, 1999*. 141-158. Nagoya: Nanzan University.

Kinsui, Satoshi and Yukinori Takubo, eds. 1992. *Sizisi (Demonstratives)*. Tokyo: Hituzi Syobo.

Klima, Edward S. 1964. Negation in English. In *The Structure of Language: Readings in the Philosophy of Language*, ed. J. Fodor and J Katz, 246-323. Englewood Cliffs, New Jersey: Prentice-Hall.

Kuno, Susumu. 1986. Anaphora in Japanese. In *Working Papers from the First SDF Workshop in Japanese Syntax*, ed. S.-Y. Kuroda, 11-70. La Jolla: USCD.

Lasnik, Howard. 1976. Remarks on Coreference. *Linguistic Analysis* 2:1-22.

May, Robert. 1977. *The Grammar of Quantification*, Doctoral dissertation, MIT.

May, Robert. 1985. *Logical Form: Its Structure and Derivation*. Cambridge: MIT Press.

Milner, Jean-Claude. 1990. Some Remarks on Principle C. In *Binding in Romance*, ed. A.-M. Di Sciullo and A. Rochette, 41-67. Ottawa: The Canadian Linguistic Association.

Oshima, Shin. 1979. Conditions on Rules: anaphora in Japanese. In *Explorations in Linguistics: Papers in Honor of Kazuko Inoue*, ed. E. Kobayashi and M. Muraki G. Bedell, 423-448. Tokyo: Kenkyuusya.

Partee, Barbara. 1978. Bound Variables and Other Anaphors. *Proceedings of TINLAP* 2, University of Illinois.

Pica, Pierre., and William Snyder. 1995. Weak Crossover, Scope, and Agreement in a Minimalist Framework, *WCCFL 13*, 334-349. Stanford: CSLI.

Reinhart, Tanya. 1976. *The Syntactic Domain of Anaphora*. Doctoral dissertation. MIT.

Reinhart, Tanya. 1983. *Anaphora and Semantic Interpretation*. London: Croom Helm.

Reinhart, Tanya. 1987. Specifier and Operator Binding. In *The Representation of (In)definiteness*, ed. E.J. Reuland, and A. G. B. ter Meulen, 130-167. Cambridge: MIT Press.

Reinhart, Tanya. 1991. Elliptic Conjunctions: Non-Quantificational LF. In *The Chomskyan Turn*, ed. Asa Kasher, 360-384. Cambridge: Basil Blackwell.

Ross, John R. 1967. *Constraints on Variables in Syntax*. Doctoral dissertation, MIT [Published as *Infinite syntax!* (1986) ABLEX Publishing Corporation, Norwood, New Jersey. The page references are to the 1986 publication.].

Sag, Ivan. 1976. *Deletion and Logical Form*. Doctoral dissertation, MIT.

Tomioka, Satoshi 1996. On the Mismatch between Variable Binding and Sloppy Identity. In *WCCFL 14*, 541-556. Stanford: CSLI.

Ueyama, Ayumi. 1998. *Two Types of Dependency*. Doctoral dissertation, University of Southern California, distributed by GSIL Publications, USC, Los Angeles.

Williams, Edwin. 1977. Discourse and Logical Form. *Linguistic Inquiry* 8:101-39.