

Chapter 4. On "Coreference"

4.1. Overview

We examine so-called coreferential readings in this chapter, which is informally characterized as in (1).

- (1) Any anaphoric relation between α and β is called "coreference" in the following, if
- (i) α is an expression which seems to refer to a specific individual, such as names, and
 - (ii) β is an expression which can be used to refer to various individuals.

I have argued in chapter 3 that a BVA reading can be yielded not only in terms of FD but also in terms of ID, and that these are the only sources for a BVA reading in principle.¹

- (2) The sources of a BVA reading:
- (i) FD
 - (ii) ID
- (3) Formal Dependency (FD):
- a. Structural condition:
*FD(α, β) if α does not c-command β at LF.
 - b. Lexical condition:
*FD(α, β) if β is a ^{large}NP.
- (4) Indexical Dependency (ID):
- a. Structural condition:
*ID(α, β) if α does not precede β at PF.
 - b. Lexical condition:
*ID(α, β) if α is an A-type QP.

One may consider that neither FD nor ID should be relevant to the availability of a coreferential reading because both (5a) and (5b) allow a coreferential reading, in contrast to the BVA cases such as in (6).

- (5) "Coreference":
- a. His mother loves John.
 - b. [A special evaluation of that linguist]₁, Noam Chomsky insisted that

¹ Appendix D discusses some apparent counterexamples to this generalization.

John had demanded t_1 .

- (6) BVA:
- a. *His mother loves even John.
 - b. ?*[A special evaluation of that linguist]₁, every linguist insisted that John had demanded t_1 .

However, there are configurations in Japanese in which a coreferential reading is not available, as shown below. I will claim that any of (7-i,ii,iii) can yield a coreferential reading, and that they are the only sources for it:

- (7) The sources of an apparent coreferential reading (*to be rephrased*):²
- (i) FD
 - (ii) ID
 - (iii) (genuine) "coreference" (*i.e.* cases in which the referents of the two NPs which are independently "referential" happen to coincide with each other)

According to the claim in (7), (8) is predicted.

- (8) Provided that β is not independently "referential," a coreferential reading should not obtain between α and β if neither FD(α, β) nor ID(α, β) is established.

It is the primary aim of this chapter to show that the prediction in (8) is borne out.

One may wonder how the prediction in (8) can be verified: it would not be verifiable unless we can identify the NPs that are *not independently referential*." It seems that pronouns in English, for example, can always be independently "referential" in principle, hence it seems impossible in English to identify those NPs that are *not independently referential*.³ In Japanese, on the other hand, it is possible to identify such NPs, as shown in section 4.2. This means that we can verify the prediction in (8) by using those NPs.

After introducing some notations for independently "referential" NPs in section 4.3, I will demonstrate in section 4.4 that the prediction in (8) is in fact borne out. Section 4.5 summarizes the claims made in this chapter, comparing them with the theory of anaphora presented in Reinhart 1983ab.

² (7-ii) will be restated later on the basis of the consideration in the next chapter, and (7-iii) will be rephrased in terms of the notion to be introduced later in section 4.3.1.

³ A reflexive pronoun in English can be regarded as *not independently referential* in the relevant sense, but this lexical item is not suitable for the examination of (8), since (i) its distribution is too strictly constrained, and (ii) it cannot be a ^{large}NP. I thank Hajime Hoji for indicating the possible relevance of this item to the current discussion.

4.2. Demonstratives in Japanese

As briefly introduced in section 1.4.2, there are two series of expressions in Japanese which roughly correspond to *that NP* in English.⁴ A few examples are given in (9):

- (9) a. a-re / so-re 'that thing/it'
 b. a-itu / so-itu 'that guy/he'
 c. a-soko / so-ko 'that institution/it'
 d. a-no hito / so-no hito 'that person'
 e. a-no daigaku / so-no daigaku 'that university'

The following subsections illustrate the properties of their non-deictic use along the lines of Takubo & Kinsui 1996 and Kuroda 1979.⁵ It will be shown that *a*-words are always used to refer to an individual independently of other linguistic expression, while *so*-words must have some linguistic antecedent.

4.2.1. A-words must be "referential"⁶

As shown in (10)-(12), *a*-words can be used non-deictically, even at the very beginning of a discourse:

- (10) (*Situation*: The detective is looking for a man. He somehow believes that the man should be hiding in a certain room. He breaks into the room and asks the people there.)

[A-itu]-wa do-ko-da?
 that-guy-TOP which-place-COPULA

'Where is [he]?'

- (11) (*Situation*: The speaker (Mr.A) gave some cookies to the addressee (Mr.B). Mr.A really wants to know how Mr.B finds it, and asks him at the very beginning of their conversation.)

[A-re] tabeta?

⁴ I put aside *ko*-words in this work, which roughly correspond to *this NP* in English. Discussion on non-deictic use(s) of *ko*-words is found in Kinsui & Takubo 1990, Kinsui 1998 and the references therein.

⁵ As mentioned in section 1.4.2, I use the term *non-deictic use* to refer to a case in which the target individual is not visible to the speaker.

⁶ As noted just above, the description in this subsection is largely based on Takubo & Kinsui 1996 and Kuroda 1979.

that-thing ate

'Have you tried [that]?'

- (12) (*Situation*: The speaker tries to recall who he met the day before. He calls his secretary and asks:)

[Kinoo kita a-no gakusei], namae nan datta?
 yesterday came that-GEN student name what was

'What is the name of [that student who came yesterday]?'

It appears that *a*-words can also refer to an individual that has been mentioned in the preceding discourse.

- (13) A: Kinoo Yamada-ni atta yo.
 yesterday Yamada-DAT met PARTICLE

'I met Yamada yesterday.'

B: Soo. A-itu genki datta?
 yes that-guy fine was

'Really? Was he fine?'

- (14) A: Kondo banana keeki yaiteageru ne.
 next.time banana cake bake.for:you PARTICLE

'I will bake some banana cake for you next time.'

B: A-re daikoobutuna n da
 that-thing favorite COMP COPULA

'That is my favorite.'

- (15) A: Kinoo-mo gakusei-san-ga mattemasita yo.
 yesterday-also student-Mr-NOM waiting PARTICLE

'The student was waiting for you yesterday again.'

B: A-no gakusei kyoo-mo kuru to omou?
 that-GEN student today-also come COMP think

'Do you think he will come again today?'

However, even if the target individual has been introduced in the discourse, *a*-words cannot be used if the speaker does not know him/her/it through direct experience.

- (16) (*Situation*: A wife told her husband on the phone that someone had

called him. He has no idea who the person is. He asks her:)

#A-itu-wa nante itteta?
that-guy-TOP what said

'What did he say?'

- (17) (*Situation*: Mary told John about the movie she just saw. John did not know about it, but he got interested.)

#A-re-wa omosiro-sooda ne.
that-thing-TOP interesting-sound PARTICLE

'That sounds interesting.'

- (18) (*Situation*: The secretary told the professor that a student waited for him for an hour at the door the day before. The professor has no idea who the student is, but he feels sorry for him and tells the secretary:)

#Kinoo kita a-no gakusei-ga mooitido ki-tara, sugu
yesterday came that-GEN student-NOM again come-if soon

osietekure.
tell:me

'Please tell me immediately if that student who came yesterday comes again.'

The observation in (16)-(18) indicates that *a*-words cannot be really "anaphoric" to another linguistic expression in the discourse: namely, although *a*-words appear to have an anaphoric relation with another linguistic expression in (13)-(15), they are in fact "referential" themselves, just in the cases in (10)-(12). The fact that *a*-word can never be bound, as shown in (19), naturally follows from the generalization that an *a*-word is always "referential" just as names.

- (19) *do-no kaisya-mo a-soko-no bengosi-o uttaeta
which-GEN company-NOM that-place-GEN attorney-ACC sued

'every company sued its attorney'
 $\forall x(\text{company})(x \text{ sued } x\text{'s attorney})$

4.2.2. Non-deictic *so*-words cannot be "referential"

Unlike *a*-words, non-deictic *so*-words cannot be used at the very beginning of the discourse, even if the speaker knows the target individual well. Compare (20)-(22) with (10)-(12) above, respectively, where the identical situations are

postulated.

- (20) (*Situation*: The detective is looking for a man. He somehow believes that the man should be hiding in a certain room. He breaks into the room and asks the people there.)

#[So-itu]-wa do-ko-da?
that-guy-TOP which-place-COPULA

'Where is [he]?''

- (21) (*Situation*: The speaker (Mr.A) gave some cookies to the addressee (Mr.B). Mr.A really wants to know how Mr.B finds it, and asks him at the very beginning of their conversation.)

#[So-re] tabeta?
that-thing ate

'Have you tried [that]?''

- (22) (*Situation*: The speaker tries to recall who he met the day before. He calls his secretary and asks:)

#[Kinoo kita so-no gakusei], namae nan datta?
yesterday came that-GEN student name what was

'What is the name of [that student who came yesterday]?''

These examples are anomalous whether or not the addressee understands who/what the target individual is.

On the other hand, *so*-words can "anaphorically" refer to an individual introduced in the discourse, whether or not the speaker knows the target individual. The examples in (23)-(25) are to be compared with those in (16)-(18), respectively.

- (23) (*Situation*: A wife told her husband on the phone that someone had called him. He has no idea who the person is. He asks her:)

So-itu-wa nante itteta?
that-guy-TOP what said

'What did he say?'

- (24) (*Situation*: Mary told John about the movie she just saw. John did not know about it, but he got interested.)

So-re-wa omosiro-sooda ne.
that-thing-TOP interesting-sound PARTICLE

That sounds interesting.'

- (25) (*Situation*: The secretary told the professor that a student waited for him for an hour at the door the day before. The professor has no idea who the student is, but he feels sorry for him and tells the secretary:)

Kinoo kita so-no gakusei-ga mooitido ki-tara, sugu
yesterday came that-GEN student-NOM again come-if soon

osietekure.
tell:me

'Please tell me immediately if that student who came yesterday comes again.'

The observation given in this subsection indicates that non-deictic *so*-words must have some linguistic antecedent: namely, they are always dependent to some other linguistic expression.⁷

4.2.3. Summary

We have seen that *a*-words are always "referential" while non-deictic *so*-words cannot be independently "referential."⁸ In the next section I will introduce

⁷ As Hajime Hoji (p.c.; spring 1997) points out to me, there can be some cases in which it is not easy to determine whether the *so*-word is deictic or non-deictic. Consider the example in (i), by which he points out that the *so*-word can refer to something which is not visible to the speaker or the hearer, without the "antecedent" in the preceding discourse.

- (i) A, [so-re] watasi tabetyatta.
oh that-thing I have:eaten
'Oh, I have eaten [it].'

I agree with him that (i) is more or less acceptable under the situation given in (ii):

- (ii) *Situation*: John has hurried back home, desiring to eat a piece of cake he has kept for this moment. But when he opens the refrigerator door, he finds nothing there. He is shocked and cannot say a word, staring at the place it used to be. Looking at him, Mary says:

I maintain that a non-deictic *so*-word cannot be "referential" and that such examples as in (i)-(ii) should be regarded as an extended case of deictic use, although the target individual is not visible any more. For me, it is crucial that John is staring at the place it used to be, in a sense "pointing" at something which does not exist any more. Hence, (i) seems to me to become quite unacceptable under the scenario described in (iii), which minimally differs from (ii) but involves no "pointing" at the target individual:

- (iii) *Situation*: John has hurried back home, desiring to eat a piece of cake he has kept for this moment. But when he opens the refrigerator door, he finds nothing there. He is shocked and cannot say a word, staring at Mary, who has been at home all day. Looking at him, Mary says:

⁸ For now I limit the discussion to the cases in which a *so*-word is individual-denoting.

some notations for independently "referential" NPs, in order to facilitate the following discussion.

4.3. D-indexed NPs

4.3.1. D-indices and σ^D

The observation in section 4.2.1, which is along the lines of Takubo & Kinsui 1996 and Kuroda 1979, indicates that *a*-words must be connected to individuals that the speaker knows through his direct experience. Let us assume that an independently "referential" NP, such as *a*-words and names, is interpretable only by being related to one of those individuals.

In order to express this idea, I assume (i) that an independently "referential" NP carries an index when it enters into numeration,⁹ and (ii) that outside Grammar there is a set of ordered pairs of a natural number (index) and an individual, basically following Tarski.¹⁰ I prefix an index mentioned in (i) with 'D-' and call it *D-index*, in order to distinguish it from an index for variables;¹¹ in addition, I call the set mentioned in (ii) as σ^D . (26) is an instance of σ^D , and (27) illustrates the representation of an independently "referential" NP.

$$(26) \quad \sigma^D = \{ \langle 1, \text{John} \rangle, \langle 2, \text{Mary} \rangle, \langle 3, \text{Bill} \rangle, \dots \}$$

$$(27) \quad \text{a. } [_{\text{NP}} \text{John}]_{\text{D-1}}$$

Although I consider that the *so*-words in the examples given above are individual-denoting, the distinction between individual-denoting and non-individual-denoting is not so straightforward as it may look, as will be considered in Appendix D.

⁹ I assume that an X^0 optionally brings with it an index when it enters into a numeration, just as it brings other features (such as [+plural]) with it, and that the index projects up to XP as the operation Merge applies to an indexed X^0 , so that the resultant XP carries the index. In the case of expressions such as *that student*, it may be *that* or *student* that brings with it the D-index into the numeration, but I leave the issue open here. See Larson & Segal 1995: section 6.4 for some relevant discussion.

¹⁰ One might instead postulate a lexical interpretation rule such as (i):

- (i) *John* (as a name) \implies John (as a person)

To express the connection between an NP and an individual as an interpretive rule would mean that one considers that the correspondence is a linguistic issue. However, it does not seem to me an issue of linguistic knowledge whether one knows which individual to be paired with which name. (I thank Robert May for making me think of this distinction during his course given at USC in Spring 1997.) In addition, it is impossible to write a rule such as (i) for an expression such as *that man* anyway. Therefore, I adopt the idea of σ^D as presented in the text.

¹¹ The indices for variables will be called 'I-indices', as will be introduced in section 5.1.2. See the remark in footnote 6 in section 5.1.2 for the origin of the prefixes 'D-' and 'I-'.

- b. [NP that guy]_{D-1}
- c. [NP he]_{D-1}
- d. [NP he]_{D-3}

Let us use the notation $\sigma^D(n)$ to refer to the individual paired with the number n in σ^D . I claim that a D-indexed NP is replaced by an expression $\sigma^D(n)$ in its semantic representation (henceforth SR).

$$(28) \quad \text{NP}_{D-n} \implies \sigma^D(n)$$

Thus, different NPs may be replaced by an identical expression at SR, as long as they carry the same D-index (cf. (29a,b,c)), while occurrences of the same expression may be represented differently at SR if they carry distinct D-indices (cf. (29c,d)).

- (29) a. [NP John]_{D-1} $\implies \sigma^D(1)$
 b. [NP that guy]_{D-1} $\implies \sigma^D(1)$
 c. [NP he]_{D-1} $\implies \sigma^D(1)$
 d. [NP he]_{D-3} $\implies \sigma^D(3)$

If an expression *John* carries a D-index *D-1*, Grammar should state that the expression is used to refer to an individual which is paired by index 1 in σ^D , but it is an issue outside Grammar who/what the individual is, or if the individual really exists or not. In other words, it is not a linguistic issue how σ^D is constructed, strictly speaking. Notice that while the ultimate value of a D-indexed NP is dependent on σ^D , an expression $\sigma^D(n)$ itself is a constant from the viewpoint of Grammar, in the sense that no elements in Grammar can affect its value.¹² Thus, one can consider that a D-index is a feature which indicates that the NP carrying it is mapped to a constant at SR.

Instead of having D-indices specially reserved for independently "referential" NPs, thus representing constants differently from variables at SR, one might argue that every individual-denoting element at SR is a variable but it ends up having a fixed value when it is not bound.¹³ While such a theory

¹² If we use the terminology in Kripke 1972, D-indexed NPs are "rigid designators." I owe Yukinori Takubo (personal communication; August 1997) for making me aware of the relevance of the concept "rigid designators" to D-indexed NPs. (See Larson & Segal 1995: section 5.3.1 for the discussion of the concept of "rigid designator.")

¹³ Fiengo & May 1994 distinguishes two types of pronouns: α -occurrences such as *he* ^{α} , which can be used independently to refer to an individual, and β -occurrences such as *he* ^{β} , which must have some linguistic antecedent. Although the distinction may thus appear to correspond to that between *a*-words and *so*-words in Japanese, both α -occurrences and β -occurrences are in effect interpreted in the same way: *i.e.*, every individual-denoting element is treated as a variable in their theory.

may seem to dispense with D-indices, it then has to be explained independently why certain lexical items cannot be bound. Recall that not only names but also *a*-words in Japanese cannot be bound. One could of course postulate a special syntactic structure for *a*-words so that they might have some structural property in common with names but not with *so*-words. But this is merely another way of expressing the notion 'constant', and I do not see any empirical advantage that may be brought by this approach. Considering the fact that *a*-words and *so*-words appear to have the parallel structures, I assume that an independently "referential" NP has a D-index and this is the feature that distinguishes *a*-words from *so*-words in the syntactic representation.

4.3.2. Co-D-indexation

Now that we have postulated D-indices, one type of anaphoric relation can be represented by *co-D-indexation*, so to speak.¹⁴

- (30) a. John_{D-1} likes his_{D-1} camera.
 b. [Every teacher who taught John_{D-1}] praises him_{D-1} a lot.
 c. His_{D-1} teachers always praise John_{D-1}.
 d. John_{D-1} came. He_{D-1} is diligent.

Note that co-D-indexation is an anaphoric relation between two NPs that are already fully interpretable, and hence the interpretation does not require the establishment of a linguistic relation.¹⁵

The claim in (7) and its prediction in (8), previewed in section 4.1, can now be rephrased as in (7') and (8'), respectively, using the terms D-index and co-D-indexation.

- (7') The sources of a coreferential reading (*to be rephrased*):¹⁶
 (i) FD
 (ii) ID
 (iii) co-D-indexation

Chierchia 1992:appendix, on the other hand, postulates two series of sequence, one of which is for discourse referents, and hence, the idea is similar to having σ^D . However, the sequence for discourse referents is also different from σ^D , since not every discourse referents are necessarily an individual which is known to the speaker through direct experience.

¹⁴ Although I use the term 'co-D-indexation', note that no procedure of coindexation is assumed here, since we consider an D-index to be one of the features which a lexical item carries into numeration, hence into the representation in which it occurs.

¹⁵ But see a remark in section C.3.

¹⁶ (7'-ii) will still be restated later on the basis of the consideration in the next chapter.

- (8') Provided that β is not D-indexed, a coreferential reading should not obtain between α and β if neither $FD(\alpha, \beta)$ nor $ID(\alpha, \beta)$ is established.

As mentioned in section 4.1, it is difficult in English to tell apart the cases of co-D-indexation from the others, since a pronoun in English can be either independently "referential" or dependent on another expression, in principle, and hence, it may or may not be D-indexed in our terms. For example, it is hard to demonstrate in English if the anaphoric relations in (31) are available because (i) the two NPs can be co-D-indexed, or (ii) some linguistic relation can be established between them.

- (31) a. John likes his camera.
 b. [Every teacher who taught John] praises him a lot.
 c. His teachers always praise John.
 d. John came. He is diligent.

It is sometimes argued that not only a definite NP but also an indefinite NP can be independently "referential." Consider an anaphoric relation such as in (32):

- (32) A student came. He is diligent.

According to Heim 1982:ch.1, Strawson 1952 and Chastain 1975 claim that indefinite NPs can sometimes be "referential," and Kripke 1977 in effect argues that a pronoun in an example such as (32) refers to the "speaker's reference" of an antecedent indefinite NP (which is to be distinguished from the "semantic reference").¹⁷ The idea under discussion is in our terms that an indefinite NP in English can sometimes have a D-index. Thus, whenever the referent is a single individual, there is a possibility that the anaphoric relation is based on co-D-indexation in English.

As presented in section 4.2.2, on the other hand, non-deictic *so*-words in Japanese cannot have a D-index, while *a*-words must have a D-index. Therefore, as long as a non-deictic *so*-word is used as β , the anaphoric relation cannot be based on co-D-indexation. This therefore enables us to examine if the prediction in (8') is borne out. For example, the anaphoric relation in (33a) cannot be based on co-D-indexation (provided that the situation does not allow us to point *Toyota* deictically), while the one in (33b) has to be so.

- (33) a. Toyota-ga [so-ko-no ko-gaisya]-o suisensita.
 Toyota-NOM that-place-GEN child-company-ACC recommended

¹⁷ This is not to say, of course, that an indefinite NP is always D-indexed. See Heim 1982:17 for examples in which an indefinite NP cannot be considered as carrying a D-index.

Toyota recommended [its subsidiary].'

- b. Toyota-ga [a-soko-no ko-gaisya]-o suisensita.
 Toyota-NOM that-place-GEN child-company-ACC recommended

Toyota recommended [its subsidiary].'

Similarly, while a bare NP in Japanese usually enters into an anaphoric relation with a *so*-word, as shown in (34), there are some cases in which it appears to be anaphorically related with an *a*-word; (35) is cited from Kuroda 1979:section 8.¹⁸

- (34) Tabata toyuu kaisya-ga [so-ko-ga mukasi uttaeta koto-ga
 Tabata COMP company-NOM that-place-NOM before sued fact-NOM
 aru bengosi]-o mata uttaeta rasii.
 exist attorney-ACC again sued they:say

'They say that a company named Tabata has sued [the attorney whom it sued before] again.'

- (35) Boku-wa Oosaka-de-wa Yamada Taroo toyuu sensei-ni
 I-TOP Osaka-in-TOP Yamada Taro COMP teacher-DAT

osowatta ndakedo, kimi-mo a-no sensei-ni tuku-to
 be:taught CONJ you-also that-GEN teacher-DAT study:under-if

kitto nantomoiennai yuumorasuna hitogara-ni miserareru
 certainly undescrivable humorous character-DAT be:attracted

yo.
 PARTICLE

'When I was in Osaka, I was taught by a teacher named Yamada Taroo; you will surely be attracted by his "humorous" character if you study under him.'

It would require further research to reveal under what conditions a bare NP in Japanese or an indefinite NP in English can be D-indexed, but as far as the examination of (8') is concerned, we do not need to discuss this issue, since we can identify the anaphoric relations that are not based on co-D-indexation in terms of the form of a demonstrative NP in Japanese. Thus, the use of Japanese examples is of critical importance in our examination of the properties of anaphoric relations. We will see in the following section how the prediction in (8') are verified in Japanese, on the basis of the considerations

¹⁸ Takubo & Kinsui 1997:section 5.1 also contains discussion regarding anaphoric relations such as in (35).

given so far.

4.4. FD and ID in Apparent Coreference Cases

4.4.1. Predictions

The aim of this section is to demonstrate that the prediction in (8') is verified in Japanese.

- (8') Provided that β is not D-indexed, a coreferential reading should not obtain between α and β if neither $FD(\alpha, \beta)$ nor $ID(\alpha, \beta)$ is established.

Recall that each of FD and ID has two conditions on its establishment, as repeated here.

- (3) Formal Dependency (FD):
- Structural condition:
* $FD(\alpha, \beta)$ if α does not c-command β at LF.
 - Lexical condition:
* $FD(\alpha, \beta)$ if β is a ^{large}NP.
- (4) Indexical Dependency (ID):
- Structural condition:
* $ID(\alpha, \beta)$ if α does not precede β at PF.
 - Lexical condition:
* $ID(\alpha, \beta)$ if α is an A-type QP.

The condition (4b) is irrelevant to the current issue, since the so-called coreferential cases do not involve an A-type QP. Thus, the table in (36) summarizes the predictions of the theory proposed in this work with respect to the availability of a coreferential reading.¹⁹

¹⁹ Needless to say, the possibility of a coreferential reading is also governed by non-syntactic (*i.e.*, pragmatic) factors, and hence it is fairly likely that one can find an example in which a coreferential reading is not available despite the fact that the sentence satisfies the necessary syntactic condition(s). Strictly speaking, (i-a) and (i-b) state what is predicted by a theory in general.

- (i)
- If one say that a theory predicts that a reading R is available in a configuration C, it means that there should be an instance of C which allows R.
 - If one say that a theory predicts that a reading R is unavailable in a configuration C, it means that there should be no instance of C which allows R.

(36)

LF c-command	PF precedence	β	FD	ID	co-D-indexation	coreferential reading
yes	yes	^{small} <i>so-</i>	FD	ID	*	ok
		^{large} <i>so-</i>	*	ID	*	ok
		<i>a-</i>	*	*	co-D	ok
no	no	^{small} <i>so-</i>	*	*	*	*
		^{large} <i>so-</i>	*	*	*	*
		<i>a-</i>	*	*	co-D	ok
no	yes	^{small} <i>so-</i>	*	ID	*	ok
		^{large} <i>so-</i>	*	ID	*	ok
		<i>a-</i>	*	*	co-D	ok
yes	no	^{small} <i>so-</i>	FD	*	*	ok
		^{large} <i>so-</i>	*	*	*	*
		<i>a-</i>	*	*	co-D	ok

The following subsection illustrates that the prediction in (36) is verified in Japanese.

4.4.2. Verification

Let us examine each of the four configurations in (36), just as we have done in chapter 3.

First, in a configuration in which α commands β at LF and precedes it at PF, a coreferential reading is available, irrespective of what expression is used for β .

- (37) a. ^{small}*so-*:
 [α Kyozin]-ga [mukasi [β so-ko]-ni tutometeita hito]-o uttaeta
 Giants-NOM before that-place-at worked person-ACC sued

rasii.
they:say

'They say that [α the Giants] has sued [a person who once worked for [β it]].'

- b. ^{large}*so-*:
 [α Kyozin]-ga [mukasi [β so-no kyuudan]-ni tutometeita
 Giants-NOM before that-GEN baseball:team-at worked

hito]-o uttaeta rasii.
person-ACC sued they:say

'They say that [α the Giants] has sued [a person who once worked for [β that baseball team]].'

c. *a-*:

[α Kyozin]-ga [mukasi [β a-soko]-ni tutometeita hito]-o uttaeta
Giants-NOM before that-place-at worked person-ACC sued

rasii.

they:say

'They say that [α the Giants] has sued [a person who once worked for [β it]].'

Second, if α does not command β at LF and does not precede it at PF, a coreferential reading is available if an *a*-word is used, but not if a *so*-word is used for β .²⁰

(38) a. small_{so-}:

?*[Kyonen [β so-ko]-ga kaikosita hito]-ga [α Kyozin]-o uttaeta
last:year that-place-NOM fired person-NOM Giants-ACC sued

rasii.

they:say

'They say that [a person whom [β it] fired last year] has sued [α the Giants].'

b. large_{so-}:

?*[Kyonen [β so-no kyuudan]-ga kaikosita hito]-ga
last:year that-GEN baseball:team-NOM fired person-NOM

[α Kyozin]-o uttaeta rasii.

Giants-ACC sued they:say

'They say that [a person whom [β that baseball team] fired last year] has sued [α the Giants].'

c. *a-*:

[Kyonen [β a-soko]-ga kaikosita hito]-ga [α Kyozin]-o uttaeta
last:year that-place-NOM fired person-NOM Giants-ACC sued

rasii.

they:say

'They say that [a person whom [β it] fired last year] has sued [α the

²⁰ One might come up with some examples which appear not to follow from the generalization presented here. Relevant remarks are found in Appendix D below.

Giants].'

If α does not c-command β at LF, an FD is not established between them; but if α precedes β at PF, an ID can be established. Therefore, it is expected that a coreferential reading is available, irrespective of what expression is used as β in such a configuration.

(39) a. small_{so-}:

[[α Tabata toyuu booeeki-gaisya]-no syatyoo]-ga [[β so-ko]-no
Tabata COMP trading-company-GEN president-NOM that-place-GEN

datuzei-mondai]-o kabunusi-sookai-de toriageta.
tax:evasion-issue-ACC stockholder-general:meeting-at took:up

'[The president of [α a trading company named Tabata]] took up [[β its] tax evasion issue] at the general meeting of stockholders.'

b. large_{so-}:

[[α Tabata toyuu booeeki-gaisya]-no syatyoo]-ga [[β so-no
Tabata COMP trading-company-GEN president-NOM that-GEN

booeeki-gaisya]-no datuzei-mondai]-o kabunusi-sookai-de
trading-company-GEN tax:evasion-issue-ACC stockholder-general:meeting-at

toriageta.

took:up

'[The president of [α a trading company named Tabata]] took up [[β that trading company]'s tax evasion issue] at the general meeting of stockholders.'

c. *a-*:

[[α Tabata toyuu booeeki-gaisya]-no syatyoo / [α Kyozin]-no-
Tabata COMP trading-company-GEN president Giants-GEN-

oonaa]-ga [[β a-soko]-no datuzei-mondai]-o kabunusi-
owner-NOM that-place-GEN tax:evasion-issue-ACC stockholder-

sookai-de toriageta.

general:meeting-at took:up

'[The president of [α a trading company named Tabata] / The owner of [α the Giants]] took up [[β its] tax evasion issue] at the general meeting of stockholders.'

Recall that it is argued in section 2.4.2 that the DL2 is most likely to be a Surface DL. Then, if α is the second DL and β is contained in NP-NOM, α does not c-command β at LF but α precedes β at PF. Since ID can be

established between α and β , just as the cases in (39), it is expected that a coreferential reading is also available in this configuration irrespective of what expression is used as β . (40) illustrates that this prediction is borne out.

- (40) a. so-:
 Toyota-o [α Tabata toyuu boeeki-gaisya]-ni [[β so-ko]-no
 Toyota-ACC Tabata COMP trading-company-DAT that-place-GEN
 torihikisaki]-ga *t* syookaisita.
 business:partner-NOM introduced
 '[[β Its] business partner] introduced Toyota to [α a trading company named Tabata].'
- b. so-:
 Toyota-o [α Tabata toyuu boeeki-gaisya]-ni [[β so-no boeeki-
 Toyota-ACC Tabata COMP trading-company-DAT that-GEN trading-
gaisya]-no torihikisaki]-ga *t* syookaisita.
 company-GEN business:partner-NOM introduced
 '[[β That trading company]'s business partner] introduced Toyota to [α a trading company named Tabata].'
- c. *a-*:
 Tabata toyuu boeeki-gaisya-o [α Toyota]-ni [[β a-soko]-no
 Tabata COMP trading-company-ACC Toyota-DAT that-place-GEN
 torihikisaki]-ga *t* syookaisita.
 business:partner-NOM introduced
 '[[β Its] business partner] introduced a trading company named Tabata to [α Toyota].'

If α does not precede β at PF, an ID is not established between them; but if α c-commands β at LF, an FD may be established. Therefore, it is expected that a coreferential reading is available in such a configuration, unless a *so*-marked largeNP is used as β . We can verify this prediction by using the Surface OS-type, since it has the representations as given in (41)

- (41) Surface OS-type:
 PF: [... β ...]-ACC α -NOM ... V
 LF: α -NOM [... β ...]-ACC ... V

(42) demonstrates that the prediction in question is borne out.

- (42) a. small so-:
 [[β So-ko]-ga mukasi uttaeta koto-ga aru bengosi]-o
 that-place-NOM before sued fact-NOM exist attorney-ACC
 [α Tabata toyuu boeeki-gaisya]-ga *t* mata uttaeta rasii.
 Tabata COMP trading-company-NOM again sued they:say
 'They say that [α a trading company named Tabata] has sued [an attorney whom [β it] sued before] again.'
- b. large so-:
 ?*[[β So-no boeeki-gaisya]-ga mukasi uttaeta koto-ga aru
 that-GEN trading-company-NOM before sued fact-NOM exist
 bengosi]-o [α Tabata toyuu boeeki-gaisya]-ga mata uttaeta rasii.
 attorney-ACC Tabata COMP trading-company-NOM again sued they:say
 'They say that [α a trading company named Tabata] has sued [an attorney whom [β that trading company] sued before] again.'
- c. *a-*:
 ?[A-no kyuudan-ga mukasi uttaeta koto-ga aru
 that-GEN baseball-team-NOM before sued fact-NOM exist
 bengosi]-o Kyozin-ga mata uttaeta rasii.
 attorney-ACC Giants-NOM again sued they:say
 'They say that Giants has sued [an attorney whom that baseball team sued before] again.'

I have shown that the prediction in (8') is verified in Japanese, by utilizing the distinction between *so*-words and *a*-words.

- (8) Provided that β is not D-indexed, a coreferential reading should not obtain between α and β if neither FD(α, β) nor ID(α, β) is established.

While co-D-indexation is not restricted by a structural condition in principle, FD and ID are constrained by the structural conditions as we have discussed in chapter 3.²¹

- (3) Formal Dependency (FD):
 a. Structural condition:
 *FD(α, β) if α does not c-command β at LF.
 b. Lexical condition:

²¹ But see the remarks in Appendix C.

*FD(α, β) if β is a ^{large}NP.

- (4) Indexical Dependency (ID):
- a. Structural condition:
*ID(α, β) if α does not precede β at PF.
 - b. Lexical condition:
*ID(α, β) if α is an A-type QP.

The rest of this section is devoted to the demonstration that the claim that (7') exhausts the source of a coreferential reading is further supported by the so-called referential circularity sentences.

- (7') The sources of a coreferential reading (*to be rephrased*):
- (i) FD
 - (ii) ID
 - (iii) co-D-indexation

4.4.3. On the referential circularity

This section examines sentences of *referential circularity* in Japanese to support the claim that a coreferential reading has to be based on either (i) FD, (ii) ID, or (iii) co-D-indexation. It is demonstrated that this claim straightforwardly accounts for the relevant paradigm. It is further shown that a prediction made by the analyses in Higginbotham 1983 or in Fiengo & May 1994 turns out to be incorrect, based on the observation of the relevant sentences in Japanese.

(43) is the typical example of referential circularity.²²

- (43) [NP1 [NP2 His] wife] loves [NP3 [NP4 her] husband].

The issue is whether and how it is possible with respect to the construction in (43) that NP4 is coreferential with NP1 and NP2 is coreferential with NP3 at the same time. In the following discussion, I use a slightly more complex configuration in which NP1 does not c-command NP3, in order to eliminate the possible Condition C/D effects.²³

- (44) [CP... [NP1 [NP2 his] wife] ...] ... [NP3 [NP4 her] husband] ...

This in effect also excludes the possibility of the involvement of an FD in the relevant coreferential reading. In addition, it is expected from our theory that ID([NP3 her husband], [NP2 his]) cannot be established, because NP3 does not

²² According to Fiengo & May 1994:58, this sentence is first discussed in Jacobson 1977.

²³ See Appendix C for some remarks on the Condition C/D effects.

precede NP2 at PF, while ID([NP1 his wife], [NP4 her]) is possible, because NP1 precedes NP4 at PF. Then, it is predicted that the referential circularity reading is available in (44) only if the coreferential reading between NP3 and NP2 is based on co-D-indexation.

Let us examine if this prediction is borne out. The following four cases are relevant to the current discussion, and it is predicted from our theory that the referential circularity reading is not available in (45b) and (45c).

- (45) a. NP2 = *a*-word & NP4 = *a*-word
The anaphoric relation between NP3 and NP2 is to be based on co-D-indexation
The anaphoric relation between NP1 and NP4 is to be based on co-D-indexation
- b. NP2 = *so*-word & NP4 = *so*-word
The anaphoric relation between NP3 and NP2 is to be based on ID
The anaphoric relation between NP1 and NP4 is to be based on ID
- c. NP2 = *so*-word & NP4 = *a*-word
The anaphoric relation between NP3 and NP2 is to be based on ID
The anaphoric relation between NP1 and NP4 is to be based on co-D-indexation
- d. NP2 = *a*-word & NP4 = *so*-word
The anaphoric relation between NP3 and NP2 is to be based on co-D-indexation
The anaphoric relation between NP1 and NP4 is to be based on ID

(45a) is illustrated by (46), and indeed it is not impossible to accept the intended reading of the sentence.

- (46) ?Bill-ga [NP1 [NP2 a-itu]_{D-1}-no okusan]_{D-2}-o sasotta
Bill-NOM that-guy-GEN wife-ACC seduced
- tositemo, Bill-ga [NP3 [NP4 a-no hito]_{D-2}-no gosyuzin]_{D-1}-o
even:if Bill-NOM that-GEN person-GEN husband-ACC
- nikundeiru to-wa kagiranai.
hate COMP-TOP not:necessary
- 'Even if Bill has seduced [NP1 [NP2 his]_{D-1} wife]_{D-2}, it does not mean that Bill hates [NP3 [NP4 her]_{D-2} husband]_{D-1}.'

(46) may sound awkward in the sense that we do not use such a sentence in everyday speech. What is unusual is that the two individuals are referred to by a description and yet the second description does not add any new information to the discourse: the fact that *A is B's husband* is entailed by the first description expressing that *B is A's wife*. Therefore, (46) tends to sound 'unnatural', unless there is an obvious reason why the speaker has decided to

use more descriptions than necessary, instead of saying simply: 'even if Bill has seduced her₂, it does not mean that Bill hates [her₂ husband]₁', for example. Notice, however, that this is an issue of how to describe the world by means of language, rather than an issue of language itself. On the basis of the sharp contrast between (46) and the ill-formed cases in (47) and (48), to be given below, I maintain that the sentence in (46) can be regarded as acceptable in principle.

Compare now (46) with (47), which is an instance of (45b).

- (47) a. *Bill-ga [NP1 [NP2 so-itu]-no okusan]₂-o sasotta
 Bill-NOM that-guy-GEN wife-ACC seduced
 tositemo, Bill-ga [NP3 [NP4 so-no hito]-no gosyuzin]₁-o
 even:if Bill-NOM that-GEN person-GEN husband-ACC
 nikundeiru to-wa kagiranai.
 hate COMP-TOP not:necessary
 'Even if Bill has seduced [NP1 [NP2 his] wife]₂, it does not mean that Bill hates [NP3 [NP4 her] husband]₁.'
- b. *FD([NP1 *his wife*], [NP4 *her*])
 ID([NP1 *his wife*], [NP4 *her*])
- c. *FD([NP3 *her husband*], [NP2 *his*])
 *ID([NP3 *her husband*], [NP2 *his*])

As shown in (47c), no source for a coreferential reading is available between NP3 and NP2, and hence it is accounted for that the referential circularity reading is not acceptable in (47). (48) is the case of (45c), which is also unacceptable because the coreferential reading between NP3 and NP2 is not available.

- (48) *Bill-ga [NP1 [NP2 so-itu]-no okusan]₂-o sasotta
 Bill-NOM that-guy-GEN wife-ACC seduced
 tositemo, Bill-ga [NP3 [NP4 a-no hito]₂-no gosyuzin]₁-o
 even:if Bill-NOM that-GEN person-GEN husband-ACC
 nikundeiru to-wa kagiranai.
 hate COMP-TOP not:necessary
 'Even if Bill has seduced [NP1 [NP2 his] wife]₂, it does not mean that Bill hates [NP3 [NP4 her]₂ husband]₁.'
- b. *FD([NP3 *her husband*], [NP2 *his*])
 *ID([NP3 *her husband*], [NP2 *his*])

Finally, (49) is an instance of (45d), and it is shown that it is as acceptable as (46).

- (49) ?Bill-ga [NP1 [NP2 a-itu]₁-no okusan]₂-o sasotta
 Bill-NOM that-guy-GEN wife-ACC seduced
 tositemo, Bill-ga [NP3 [NP4 so-no hito]-no gosyuzin]₁-o
 even:if Bill-NOM that-GEN person-GEN husband-ACC
 nikundeiru to-wa kagiranai.
 hate COMP-TOP not:necessary
 'Even if Bill has seduced [NP1 [NP2 his]₁ wife]₂, it does not mean that Bill hates [NP3 [NP4 her] husband]₁.'
- b. *FD([NP1 *his wife*], [NP4 *her*])
 ID([NP1 *his wife*], [NP4 *her*])

The paradigm illustrated by (46)-(49) and summarized in (45) is thus completely accounted for by our claim that (7') exhausts the source of a coreferential reading.²⁴

- (7') The sources of a coreferential reading (*to be rephrased*):
 (i) FD
 (ii) ID
 (iii) co-D-indexation

Therefore, under our analysis we do not need to postulate any special condition regarding the referential circularity reading. This contrasts sharply with the previous analyses of referential circularity that we review briefly in the following. It is argued that our analysis is more appropriate than the previous ones, not only because ours does not require additional assumptions, but also because the previous analyses make an incorrect prediction about the unacceptability of (48).

We begin with Higginbotham 1983. Higginbotham 1983 claims that the syntactic basis for an anaphoric relation results from the operation in (50).

- (50) Link X to Y.
 (Higginbotham 1983:(21))

He assumes that (50) applies freely between argument positions at S-structure,

²⁴ One remaining problem is how to exclude ID([NP2 *his*], [NP3 *the woman's husband*]). This might be a legitimate ID, as far as the PF precedence requirement is concerned, but it is highly counter-intuitive to say that [NP3 *the woman's husband*] is dependent on [NP2 *his*]. Suppose that an NP with more content cannot depend on another NP with less content, which I consider is not an unnatural assumption.

and automatically in the case of movement rules. Neither the c-command requirement nor the precedence requirement is relevant to (50) in his theory as long as it yields a coreferential reading (not a BVA reading). He further defines the following two derivative relations:

- (51) Y is an *antecedent* of X if X is linked to Y or, for some Z, X is linked to Z and Y is an antecedent of Z.
(Higginbotham 1983:(32))
- (52) X is *dependent* on Y if (i) Y is contained in an antecedent of X or (ii) for some Z, X is dependent on Z, and Z is dependent on Y.
(Higginbotham 1983:(34))

Now consider the sentence of referential circularity in (53), with *his* being linked to *her husband* and *her* to *his wife*.²⁵

- (53) His wife loves her husband.
His is linked to *her husband*.
Her is linked to *his wife*.

By (51), *his wife* is an antecedent of *her*, and *her husband* is an antecedent of *his*. By (52-i), *her* is dependent on *his*, and *his* is dependent on *her*. Then, by (52-ii), it follows that *her* is dependent on *her*. Higginbotham 1983 considers that this 'self-dependence' of *her* to itself is the reason for the anomalous status of the sentence, and in effect states the following condition in order to account for the unacceptability of the sentence of referential circularity.

- (54) X should not be dependent on X.
(cf. Higginbotham 1983:(35))

Notice that this analysis predicts that the sentence of referential circularity is ungrammatical only if both of the two anaphoric relations are based on linking. Suppose that a *so*-word in Japanese, unlike an *a*-word, has a property that it must be linked to some other expression, in order to account for the observation that a *so*-word has to have a linguistic antecedent.²⁶ Then Higginbotham's theory successfully accounts for the unavailability of the

²⁵ Higginbotham 1983 does not explicitly address the possibilities in which an anaphoric relation obtains without being based on linking resulted from (50).

²⁶ Strictly speaking, the notion 'linking' cannot express the distinction between *so*-words and *a*-words properly. The following footnote 27 and section 5.2.1 contain a relevant discussion. But I consider that this restatement will do with respect to the examples discussed in this chapter.

referential circularity reading in (47), in which the two anaphoric relations have to be based on linking. However, this theory does not provide an account for the unavailability of the referential circularity reading in (48), in which only one of the anaphoric relations is based on linking.

Let us now move on to the analysis proposed in Fiengo & May 1994. Fiengo & May 1994 distinguishes two types of pronouns: roughly speaking, an NP^α (*i.e.*, an α-occurrence) corresponds to a "referential" NP, and an NP^β (*i.e.*, a β-occurrence) to a dependent term. Let us say tentatively that an *a*-word in Japanese is necessarily an NP^α, while a non-deictic *so*-word is an NP^β.²⁷

Fiengo & May 1994 takes over the core insights of Higginbotham 1983: the syntactic basis for an anaphoric relation is not constrained by the c-command requirement or the precedence requirement in principle.²⁸ But, instead of defining notions *antecedence* and *dependence*, Fiengo & May 1994 develops a notion of *realization* of dependency. Let us describe their idea by an illustration, instead of going into the technical definition of this notion.²⁹

Consider again the familiar referential circularity sentence, which is represented in (55).

- (55) [his₁ wife]₂ loves [her₂ husband]₁
His is dependent on *her husband*.
Her is dependent on *his wife*.

They assume that a dependency must be realized, and a dependency is said to be realized only under a particular way of "derivation" (in the technical sense explicated in Chomsky 1955/1975: ch.7). For example, each of the two dependencies in (55) would require the "derivations" as marked by brackets in (56a,b):

- (56) a. [NP his] [N wife] [v loves] [NP her husband]
The dependency of *his* on *her husband* is realized by this "derivation."
b. [NP his wife] [v loves] [NP her] [N husband]
The dependency of *her* on *his wife* is realized by this "derivation."

²⁷ This characterization does not cause a serious problem as far as the examples in this section are concerned, but in fact, not every occurrence of a non-deictic *so*-word qualifies as an NP^β, as will be pointed out in section 5.2.1. Thus, the distinction between *a*-words and *so*-words in Japanese cannot be expressed in Fiengo & May's theory, strictly speaking.

²⁸ Fiengo & May 1994 notes the possible relevance of the precedence requirement in footnotes. Compare footnote 3 in p.53 (chapter 2) and footnote 22 in p.158 (chapter 4) in Fiengo & May 1994.

²⁹ See Fiengo & May 1994: section 2.2 for the conditions on the dependency under their theory. The discussion on the referentially circular reading is found in pp.58-60.

However, neither of the bracketing comprises the other in (56), and therefore, it is said that there is no single "derivation" which realizes both dependencies. Fiengo & May 1994 claims that each dependency in (55) could be properly realized by itself, but that the sentence is ungrammatical because there is no single "derivation" of this sentence which realizes both dependencies at the same time.

Although this analysis is based on an insight different from the one in Higginbotham 1983, it also makes crucial reference to the fact that the sentence involves two dependencies at the same time. Therefore, this analysis predicts that the referential circularity reading is unavailable when both anaphoric relations are dependencies, but that the sentence is (more or less) acceptable if one of them is not a dependency.

Fiengo & May 1994:59 in fact discusses an example of the latter case, which can be represented roughly as in (57).

- (57) [his₁ wife]₂ loves [her₂ husband]₁
Her is dependent on his wife.

They state that (57) is acceptable in the following situation: "[s]uppose that someone is describing the sorry state of modern marriage and utters the following discourse: (23) Virtually all marriages end in failure these days, but there are some exceptions. For instance, his wife loves her husband. This is most natural if *his* is stressed and perhaps accompanied by ostension — indicators, we assume, of a nondependent -occurrence."

Notice, incidentally, that the factual claim made by Fiengo & May 1994 (that (57) is acceptable while (55) is not) is hardly verifiable objectively in English, since (55) and (57) are identical as to the sound strings. In contrast, this claim is easily examined in Japanese: the representation in (57) corresponds to (49) in Japanese, in which an *a*-word is used for NP and a *so*-word is used for NP, and it is shown in (49) that the referential circularity reading is available. Thus, the Japanese example in (49) explicitly verifies the claim made by Fiengo & May 1994 in this respect.

Notice, however, that their analysis makes a further prediction that (58) should be also acceptable, since it involves only one dependency, just like (57).

- (58) [his₁ wife]₂ loves [her₂ husband]₁
His is dependent on her husband.

The representation in (58) corresponds to (48) in Japanese, but as we have seen, the intended reading is not available in (48). Therefore, the prediction made by Fiengo & May 1994 is falsified by examining the corresponding construction in Japanese.

To summarize: both Higginbotham 1983 and Fiengo & May 1994

consider that the sentence of referential circularity is anomalous if and only if it involves two dependencies at the same time, and postulate additional concepts and conditions to account for the anomaly. The observation of the corresponding facts in Japanese, however, reveals that the anomaly of the sentence of referential circularity is not related to the fact that the sentence involves two dependencies at the same time: it has turned out instead that the referential circularity reading is not available if it requires an anaphoric relation which cannot be based on either (i) FD, (ii) ID, or (iii) co-D-indexation. This is a direct consequence from the claim made in (7').

- (7') The sources of a coreferential reading (*to be rephrased*):
 (i) FD
 (ii) ID
 (iii) co-D-indexation

The paradigm of the sentences of referential circularity in Japanese thus provides striking confirmation for the theory of anaphoric relations proposed in this work.

4.5. Summary and Discussion

In this chapter, I have claimed that a coreferential reading can be yielded by the three ways given in (7'), and that they are the only sources for a coreferential reading.

- (7) The sources of a coreferential reading (*to be rephrased*):
 (i) FD
 (ii) ID
 (iii) co-D-indexation
- (3) Formal Dependency (FD):
 a. Structural condition:
 *FD(α, β) if α does not c-command β at LF.
 b. Lexical condition:
 *FD(α, β) if β is a ^{large}NP.
- (4) Indexical Dependency (ID):
 a. Structural condition:
 *ID(α, β) if α does not precede β at PF.
 b. Lexical condition:
 *ID(α, β) if α is an A-type QP.

The claim in (7'), together with the characterizations of FD and ID in (3) and (4), respectively, makes a prediction in (8').

- (8) Provided that β is not D-indexed, a coreferential reading should not obtain between α and β if neither FD(α, β) nor ID(α, β) is established.

The primary aim of this chapter has been to demonstrate by examining the sentences in Japanese that the prediction in (8) is borne out. I have first shown in section 4.2 that non-deictic *so*-words in Japanese cannot be D-indexed (in contrast with *a*-words, which have to be D-indexed). Then in section 4.4, I have confirmed by using a *so*-word as β that the prediction in (8) is in fact verified. The table in summarizes the conditions on the availability of a coreferential reading between α and β .

(36)

LF c-command	PF precedence	β	FD	ID	co-D-indexation	coreferential reading
yes	yes	small <i>so</i> -	FD	ID	*	ok
		large <i>so</i> -	*	ID	*	ok
		<i>a</i> -	*	*	co-D	ok
no	no	small <i>so</i> -	*	*	*	*
		large <i>so</i> -	*	*	*	*
		<i>a</i> -	*	*	co-D	ok
no	yes	small <i>so</i> -	*	ID	*	ok
		large <i>so</i> -	*	ID	*	ok
		<i>a</i> -	*	*	co-D	ok
yes	no	small <i>so</i> -	FD	*	*	ok
		large <i>so</i> -	*	*	*	*
		<i>a</i> -	*	*	co-D	ok

This work thus claims that there are three types of anaphoric relations.

- (7) The three sources of anaphoric relations (*to be rephrased*):
- (i) FD
 - (ii) ID
 - (iii) co-D-indexation

I consider that either (7'-i) or (7'-ii) can yield a BVA reading, and that either (7'-i), (7'-ii) or (7'-iii) can yield a coreferential reading. In concluding this chapter, let us briefly compare this proposal with the theory of anaphora which is presented in Reinhart 1983ab, and adopted in Hoji 1995a, 1997a with some modification.

Reinhart 1983ab proposes that the coindexation procedure given in (59) provides the syntactic basis for an anaphoric relation.

- (59) Coindex a pronoun P with a c-commanding NP α (α not immediately dominated by COMP or S').³⁰
(cf. Reinhart 1983a:158 (34); Reinhart 1983b:71 (54))

Since the coindexation procedure in Reinhart's theory is contingent upon the c-command relation, it can be replaced by FD in our terms: more precisely, FD is a notion that has been proposed in Hoji 1995a, 1997a in order to express the core idea underlying the coindexation procedure in Reinhart 1983ab as an asymmetrical relation.³¹ Under this reinterpretation, Reinhart 1983ab in effect claims that there are (at least) two types of anaphoric relations, as given in (60):³²

- (60) The sources of anaphoric relations (in effect) claimed in Reinhart 1983ab:
- (i) FD (*or* coindexation in the sense of (59))
 - (ii) others

It is assumed in Reinhart 1983ab (and in Hoji 1995a, 1997a as well) that a BVA reading is yielded only by (60-i) while a coreferential reading can be yielded by either (60-i) or (60-ii).

Assuming that (60-i) is not distinct from (7'-i), our (7') in effect claims that Reinhart's (60-ii) be divided into (7'-ii) and (7'-iii). Reinhart 1983ab considers that an anaphoric relation of type (60-ii) is much affected by

³⁰ The coindexation procedure proposed in Reinhart 1983ab is accompanied by the conditions in (i):

- (i) conditions:
- (a) If P is an R-pronoun α must be in its minimal governing category.
 - (b) If P is [a] non-R-pronoun, α must be outside its minimal governing categories.

I have omitted the conditions in (i) from (59), since they are not directly related to the issue discussed in this work.

³¹ Hoji forthcoming:ch.2 section 4 discusses on Reinhart's coindexation in comparison with his FD. It is also pointed out there that Reinhart 1983a alludes to the notion 'dependency' in the last paragraph of chapter 7.

³² Note that Reinhart 1983ab uses coindexation only to mark the anaphoric relation of type (60-i), and that the anaphoric relation of type (60-ii) does not involve coindexation. In the literature, on the other hand, coindexation is widely employed as a syntactic device to mark the anaphoric relation in general, as if (i) is assumed.

(i) If A and B are in an anaphoric relation, then A and B are coindexed.
See Evans 1980, Higginbotham 1983, Reinhart 1983ab, Fiengo & May 1994, and Hoji 1997a, among others, for arguments against constructing Binding Theory under the assumption in (i).

"semantic and pragmatic considerations outside the syntax" (Reinhart 1983b:80) and that (60-i) "is the only type of 'referential dependency' we need to assume" (Reinhart 1983b:62) in Grammar. Thus, she does not consider that the nature of the anaphoric relation of type (60-ii) needs to be characterized in theoretical terms, and as a result, no definite predictions are to be made regarding this type of anaphoric relations.

In contrast, I have shown that the establishment of ID (7'-ii) is structurally constrained, and hence, it is necessarily a relation represented in Grammar. Although co-D-indexation (7'-iii) may not be represented as a 'relation', D-indices are assumed to be one of the formal objects in Grammar, and hence, if two NPs are co-D-indexed, this fact is explicitly expressed in a linguistic representation. In our theory, therefore, all the anaphoric relations in (7') are 'read off' from the representations, so to speak. In addition, it is assumed that only an expression which does not require a linguistic antecedent can be D-indexed, and hence, a D-index is not an arbitrary feature but a realization of some property of the item independently determined. My theory in (7') is thus much more restricted than Reinhart's theory in (60), and hence, it can make falsifiable predictions regarding the anaphoric relations of type (7'-ii,iii), which have been verified in this chapter. At the same time, it is also expected in my theory that an anaphoric relation based on co-D-indexation be affected by some considerations outside Grammar, since the value of a D-indexed NP is ultimately determined by σ^D , an object outside Grammar.

In the remainder of this chapter, I point out two phenomena which seem relevant to our theory of the anaphoric relation. In my opinion, whatever analysis required for them should not be regarded as constituting the core part of the theory, but yet, more understanding of those phenomena will be necessary for obtaining the overall picture of the anaphoric relation in general. I can only lay out some aspects of them in this work; the complete analyses and the incorporation of them into the entire system of Grammar will be left for the future research.

Appendix C: On Condition C/D Effects

C.1. Condition D

One of the main concerns in Lasnik 1976, Reinhart 1981, Evans 1980, Lasnik 1991 is a phenomenon which Lasnik 1976 describes in terms of the rule in (61):

- (61) If NP₁ precedes and kommands NP₂ and NP₂ is not a pronoun, then NP₁ and NP₂ are disjoint in reference.
(Lasnik 1976:16 (38))

Here "NP₁ and NP₂ are disjoint in reference" is intended to mean that the individual referred to in terms of NP₁ is distinct from the individual referred to in terms of NP₂. Later Lasnik 1991 has proposed that the rule (61) should be divided into two parts, on the basis of the observation that the effects which are described by (62) seem to be subject to variation among languages while the phenomenon which is expressed in terms of (63) seem to obtain even in a language in which the effects of (62) are not exhibited.

- (62) Condition C:
An r-expression must be free.³³
(Chomsky 1986a:79 (45))

- (63) A less referential expression may not bind a more referential one.
(Lasnik 1991:19 (51))

Japanese is among the languages in which the effects of (62) are absent. Nevertheless it seems that the effects of the rule (63) can be observed, as Lasnik 1991 claims and Hoji 1990b:ch.2 shows convincingly on the basis of the extensive examination with respect to various expressions in Japanese. Let us call the phenomenon depicted by (63) as *Condition D effects*.³⁴

In order to clarify what is meant by (63), let us tentatively state Condition D as in (64), using the notion ' $\alpha < \beta$ ' characterized as in (65).

- (64) Condition D:
Nominal expressions α and β must be disjoint in reference, if $\alpha < \beta$ and α c-commands β .³⁵
- (65) Nominal expressions α and β stand in the relation of $\alpha < \beta$, iff
- (i) for every x , x an individual which can be expressed by β , x can be expressed by α , and,
 - (ii) for some y , y an individual which can be expressed by α , y cannot be expressed by β .

According to the characterization of the concept ' $\alpha < \beta$ ' in (65), the relations in (66) hold, for example, and we expect that those pairs of expressions should

³³ (62) is intended to mean that an r-expression (such as names) NP₁ must not be c-commanded by NP₂, if the individual referred to in terms of NP₁ is the same with the individual referred to in terms of NP₂.

³⁴ The rule in (63) is not given a name in Lasnik 1991. According to Hoji 1990b, Huang 1988 has named it as Condition D.

³⁵ Hajime Hoji (p.c.; Spring 1998) suggested to me that I should cite Keenan 1974 and Reinhart 1983a:ch.1 (p.26) as a predecessor of such a characterization of the relevant condition.

exhibit the Condition D effects.

- (66) a. [he]<[John]
 b. [linguists]<[syntacticians]
 c. [so-ko]<[daikigyo] ('it' < 'giant company')

We should note that Condition D cannot be stated without referring to a notion outside Grammar, namely, 'individuals'. This is one of the reasons why I consider that Condition D cannot be a purely linguistic condition, and hence, the Condition D effects need not be accounted for by the core portion of Grammar.³⁶ Nevertheless, the consideration of the nature of this phenomenon raises some interesting problems which are relevant to the theory of anaphoric relations. This section briefly discusses some of them.

C.2. Accidental coreference vs. intended coreference

Evans 1980:359-360 points out that three distinct notions, which are listed in (67), are confusingly associated with the term *coreference* in the discussion presented in Lasnik 1976.³⁷

- (67) (i) accidental coreference
 (ii) intended coreference
 (iii) referential dependency

It seems that Evans 1980 roughly characterizes the three notions, as in (68):

- (68) (i) An anaphoric relation is said to be *accidental coreference* if the speaker assumes (*or* pretends to assume) that there are two individuals each of which corresponds to NP₁ and NP₂ but the fact is that the two individuals coincide.
 (ii) An anaphoric relation is said to be *intended coreference* if the speaker knows (*and* intends to convey) that both NP₁ and NP₂ refers to the same individual.
 (iii) An anaphoric relation is said to be *referential dependency* if the two NPs refer to the same individual because of some linguistic relation.

³⁶ I owe this remark to Hajime Hoji (p.c.; 1995-1998).

³⁷ As briefly reviewed in section 4.5 above, Reinhart 1983ab shares an idea with Evans 1980 that some instances of the coreferential reading are based on a linguistic relation while the others are not. However, she does not consider that (61) is a condition on the linguistic relation (*i.e.*, coindexation in her sense), unlike Evans 1980. Instead, she attributes the Condition C/D effects to the 'pragmatic strategies', which I do not reproduce here. See Reinhart 1983b:section 2.3 for her claim. Fiengo & May 1994 and Hoji 1997c contain some critical remarks for her approach in this respect.

Let us use the term 'intended coreference' excluding the cases of 'referential dependency' for the sake of discussion. Contrary to Lasnik 1976, who in effect claims that (61) applies to any kind of 'coreference', Evans 1980 argues that (61) should be regarded as a condition on (67-iii) referential dependency, rather than on coreference in general, thus excluding the cases of (67-i) accidental coreference and (67-ii) intended coreference.

On the basis of the characterizations in (68), it seems that both accidental coreference and intended coreference are instances of co-D-indexation in our terms. Therefore, under this reinterpretation, Evans' claim that (61) is not a condition on accidental coreference and intended coreference expects that an anaphoric relation based on co-D-indexation is not subject to (61). However, as shown in Hoji 1990b:ch.2, the Condition D effects are observed not only with *so*-words but also with *a*-words,:

- (69) a. ?*So-ko-ga [Toyota-no ko-gaisya]-o suisensita.
 that-place-NOM Toyota-GEN child-company-ACC recommended
 'It recommended [Toyota's subsidiary].'
 b. ?*A-soko-ga [Toyota-no ko-gaisya]-o suisensita.
 that-place-NOM Toyota-GEN child-company-ACC recommended
 'It recommended [Toyota's subsidiary].'

Thus, in order to account for the general unavailability of the designated anaphoric relation in (69b), we cannot maintain the claim that Condition D should only apply to referential dependency.

One should notice, however, that the anaphoric relation is in fact available in (69b) once it is put in a context that forces it to be accidental coreference. For example, (69b) would be acceptable if the speaker points at something as a referent of *a-soko* 'that place' without knowing that it happens to be *Toyota*, there will be no problem with uttering (69b) to describe the situation. Thus, the Condition D effects are not observed in case the speaker does not know the fact that the two NPs are eventually connected to the identical individual, which means that the distinction has to be made between accidental coreference and intended coreference, if we are to describe the range of anaphoric relations which (61) applies to.

The distinction between accidental coreference and intended coreference is not linguistic in nature: this is an issue how the speaker recognizes the world, rather than an issue how he describes the world in terms of language. One of the possible ways to express the discrepancy between the real world and the world recognized by the speaker is to postulate an internal *cognitive world* (CW) which is created by some cognitive system in our mind based on our recognition of the external actual world. Thus, if a person knows an individual *John*, it is most likely that the person has a psychological entity

corresponding to *John* in his CW, but it is also possible that, for some reason, the person has created two psychological entities corresponding to *John*, one for *John* on TV and another for *John* on the street, for example; or a person may have created a psychological entity in a CW which does not correspond to any individual in the actual world (e.g. Santa Claus). The correspondence between the actual world and a CW is so complicated that it does not look plausible that we can construct a theory of how a CW is created. But once the reference to CW is allowed, we can easily express the difference between accidental coreference and intended coreference. In the case of accidental coreference, it is not a coreferential relation with respect to the CW; it is only coreferential with respect to the real world. In the case of intended coreference, on the other hand, it is a coreferential relation with respect to both the CW and the actual world. Thus, if Condition D is stated as in (64'), referring to CW individuals, it successfully applies to intended coreference but not to accidental coreference.

(64') Condition D:

For nominal expressions α and β , if $\alpha < \beta$ and α c-commands β , the CW individual(s) connected to α should be disjoint with the CW individual(s) connected to β .

The idea of CW seems quite plausible to me, but the incorporation of it into my theory would certainly invoke various kinds of philosophical discussions which I do not intend to enter into in this work. Therefore, I simply note this idea as one of the possibilities here. At any rate, this is an issue outside Grammar, and hence, the postulation of a CW does not affect the other linguistic issues so much.

C.3. Condition D on co-D-indexation

Let us suppose following the conclusion in the preceding subsection that intended coreference and referential dependency in Evans' terms are subject to Condition D. We have seen in (69b) that even an *a*-word induces the effects in question. This means in our terms that co-D-indexation is sensitive to Condition D. But we have regarded D-indexed NPs as independently "referential" and hence fully interpretable by themselves. Then it seems that there is no need from an interpretive point of view for co-D-indexed NPs to form a linguistic relation, which is to be checked with respect to Condition D.

Therefore, in order to express the observation that co-D-indexation is constrained by Condition D, we are forced to assume that a linguistic relation is obligatorily formed in this case irrespective of the interpretability of each element. One possibility is to postulate a rule such as in (70).³⁸

³⁸ Although one may find (70) rather implausible at first sight, we will see in section

(70) In case there are co-D-indexed NPs in a sentence, a syntactic relation (say *R*, tentatively) has to be established between them.

Then we can state the relevant condition as follows:

(71) * $R(\alpha, \beta)$, if $\alpha < \beta$ and α c-commands β , where $\alpha < \beta$ is defined as in (65).

There are many remaining issues; for example, it has yet to be stated what level of representation (71) should apply at. This is clearly an empirical issue.³⁹ However, I leave this question for future research, since the

5.3.3.1 another instance of this kind of a rule, and I consider that the existence of another similar case increases the plausibility of this proposal, since it implies a possibility that the two rules might be reflecting some deep property in Grammar. I thank Hajime Hoji (p.c.; summer 1997) for mentioning the possibility that the other instance of this kind of a rule, to be presented in section 5.3.3.1, may extend to the case of the Condition C/D effects here.

³⁹ It is also not stated clearly in (70) as to whether all the co-D-indexed NPs in a sentence have to belong to the same relation. I suppose that this should be determined on the basis of the empirical examination of the so-called 'suspension' effects of Condition D, which is discussed in Hoji 1990b:ch.3.

- (i) a. ??John thinks that he should fix John's car (rather Bill's)
(Hoji 1990b:ch.3 (96a))
- b. (?)John-wa [doosite a-itu-ga [Mary-ga John-o sonkeisiteiru
John-TOP why that-guy-NOM Mary-NOM John-ACC respects
to] omotteita ka] dare-ni-mo iwanakatta
that thought Q who-DAT-also did:not:say
John did not tell anyone why that guy thought Mary respected John
(Hoji 1990b:ch.3 (12a))

Note that the rule in (72) in effect claims that the 'suspension' effects can be observed only within a sentence boundary. In fact, Hoji 1990b:ch.3 cites an example which supports this claim.

- (ii) A: John-nituite nanika atarasii koto sittemasu ka?
John-regarding something new fact know Q
'Do you know anything new about John?'
- B: *Soo desu nee, karu-wa kondo John-no ronbun-o LI-ni
Well he-TOP recently John-GEN paper-ACC LI-ni
okutta ndesuyo
sent PARTICLE
'Well, he has sent John's paper to LI recently.
(Hoji 1990b:ch.3 (249))

On the other hand, Evans 1980 suggests in the discussion regarding (iii) that the pronoun *he* in the second sentence is *referentially dependent* upon the *Oscar* in the first sentence, and hence the second sentence does not violate the relevant condition.

- (iii) Everyone has finally realized that Oscar is incompetent.
Even he has realized that Oscar is incompetent.
Evans (1980:(52))

If Evans' analysis is correct, we are forced to assume that the 'suspension' of the Condition

Condition D effects turn out to be much more murky and inconsistent than it may look, suggesting that we need to better understand the nature of the unacceptability involved in this phenomenon before we proceed to refine the condition in (71).

Appendix D: On Non-individual-denoting *So*-words⁴⁰

D.1. Non-individual-denoting *so*-words

I have argued in this chapter that a non-deictic *so*-word can enter into an anaphoric relation only in terms of FD or ID. It follows that an anaphoric relation should not be available if the antecedent does not c-command the *so*-word at LF and not precede it at PF. However, one might come up with some examples which appear to go against this generalization, such as (72) or (73).

(72) a. (?)*So-ko-no* bengosi-ga *Toyota-o* uttaeta.
that-place-GEN attorney-NOM Toyota-ACC sued

'Its attorney sued Toyota.'

b. (?)*So-ko* syussin-no hito-ga *so-no daigaku-no*
that-place source-GEN person-NOM that-GEN university-GEN

naizyoo-o bakurocita.
inside:story-ACC exposed

'Its {graduate/former employee} exposed the inside story of that university.'

(73) [*So-ko-no* ko-gaisya-to torihiki-o siteiru kaisya]-ga
that-place-GEN child-company-with business-ACC do company-NOM

Toyota-o uttaeta.
Toyota-ACC sued

'[A company which is doing business with its subsidiary] sued Toyota.'

C/D effects cannot be derived from the analysis hinted at here. I leave the examination of the relevant facts to future research.

⁴⁰ Just before the completion of this thesis, I was informed that the forthcoming work by J.-R. Hayashishita on scope interaction may include some articulation of an idea relevant to the topic in this Appendix. It is not yet clear if the operation responsible for the phenomena reported in this Appendix is to be completely identical with what he argues for: there is a possibility that one is a subcase of the other, or that they are distinct operations which yield similar effects. I hope that the nature of the phenomena reported in this Appendix will be revealed in the near future.

I maintain that these are not really counterexamples to my claim, for the reason that the relation between *so-ko-no bengosi* and *Toyota* that we understand in (72a), for example, does not seem to me to be yielded in terms of an anaphoric relation between *so-ko* and *Toyota*. In other words, I claim that the sentences in (72) and (73) are more or less comparable with those in (74), rather than those in (75).

(74) a. A/The (retained) attorney sued Toyota.
b. A {graduate/former employee} exposed the inside story of that university.
c. [A company which is doing business with a subsidiary] sued Toyota.

(75) a. Its attorney sued Toyota.
b. Its {graduate/former employee} exposed the inside story of that university.
c. [A company which is doing business with its subsidiary] sued Toyota.

When the expression *so-ko-no bengosi* is interpreted as something like 'a retained attorney' (*i.e.*, when *so-ko-no* is interpreted as a modifier meaning 'attached', roughly speaking) as in (72a), the affiliation of the attorney is left simply vague as far as the linguistic expression is concerned, and hence, *so-ko* does not require an "antecedent" because there is no need to specify the value of *so-ko* in this case. Similarly, *so-ko syussin-no hito* ((Lit.) people from that place) in (72b) can mean either 'local people', 'a former employee' or 'a graduate', depending on the context.

Exactly because these *so*-words need not be individual-denoting, they can be used in a generic statement, as in (76).

(76) a. ?[*So-ko-no* bengosi] toyuu mono-wa sin'yoosi-nai hoo-ga ii.
that-place-GEN attorney COMP thing-TOP trust-not way-NOM good

'It is better not to trust (the word of) [a retained attorney] in general.'

b. ?[*So-ko* syussin-no hito] toyuu mono-wa koohyoo deki-nai
that-place source-GEN person COMP thing-TOP disclose can-not

hanasi-o sitteiru mono da.
story-ACC know thing COPULA

'It is generally the case that [people who once were inside] know some story which cannot be made public.'

Compare (76) with unacceptable sentences in (77), in which an obligatorily individual-denoting expression (*i.e.*, *its*) is used in a generic statement.

- (77) a. *It is better not to trust (the word of) [its attorney] in general.'
 b. *It is generally the case that [its former employees] know some story which cannot be made public.'

The sentences in (76) may sound a little awkward as generic statements, but the examples in (78) show that a *so*-word can be clearly non-individual-denoting in some cases.

- (78) a. Watasi-no dezain-no mottoo-wa [so-no hito rasi-sa]-o
 I-GEN design-GEN motto-TOP that-GEN person like-hood-ACC
 ensyutusu koto desu.
 direct fact COPULA
 'The motto of my design is to amplify [the personality/characteristics (*literally*: being like that person)].'
- b. Kyoo-wa [so-no miti-no senmonka] to yobareru kata
 today-TOP that-GEN way-GEN specialist COMP be:called person
 zyuunin-ni atumatte itadakimasita.
 ten-DAT gather we:asked
 'Today, we have invited ten people who are regarded as [a specialist of the subject/field].'
- c. Saikin-no aidoru-kasyu-wa [so-no hen-ni iru] onnanoko-to
 recent-GEN idol-singer-TOP that-GEN area-at exist girl-with
 kawaranai.
 indistinguishable
 'Pop-stars these days are not different from girls [in the neighborhood].'
 (Takubo & Kinsui 1996 (46))
- d. John-wa itumo [so-no ba kagiri]-no iiwake-o suru.
 John-TOP always that-GEN situation only-GEN excuse-ACC do
 'John always makes [glib (*literally*: only for that situation)] excuses.'
- e. Hito-o yatou karaniwa [so-re soooo]-no kyuuryoo-o
 person-ACC hire in:case that-thing suitable-GEN salary-ACC
 yuusi-nakerebanaranai.
 prepare-must
 'If you are going to hire a person, you must prepare for [reasonable (*literally*: suitable for it)] salary.'

Therefore I assume that in principle a *so*-word can be either individual-denoting or non-individual-denoting to a varying degree.⁴¹

So-ko-no ko-gaisya in (73) may require another account, since in this case *so-ko-no* barely contributes to the meaning of the whole phrase because every subsidiary is in nature 'attached' to the parent company. I consider that (73) is not distinct from (79) in its LF representation, roughly speaking.

- (79) [Ko-gaisya-to torihiki-o siteiru kaisya]-ga Toyota-o uttaeta.
 child-company-with business-ACC do company-NOM Toyota-ACC sued
 '[A company which is doing business with a/the subsidiary] sued Toyota.'

In sum, I suppose that the *so*-words in (72) and (73) do not enter into an anaphoric relation because they are not individual-denoting: that is to say that a linguistic antecedent is necessary for a non-deictic individual-denoting *so*-word, but not for a non-individual-denoting *so*-word. I consider that an expression such as *so-ko* is in principle ambiguous between individual-denoting and non-individual-denoting, presumably unlike an expression such as *it* or *he* that are necessarily individual-denoting.⁴²

⁴¹ I consider that the fact that a *so*-word can be non-individual-denoting should be ultimately attributed to some inherent property of *so*-, as has been (explicitly or implicitly) suggested in various works on Japanese. For example, Kuroda 1979 states that a *so*-word is to be connected to "conceptual knowledge" (while an *a*-word is to be connected to "knowledge obtained through direct experience"). Under this characterization, one can say, as Takubo & Kinsui 1996 and Kinsui 1998 do, that the non-individual-denoting usage of a *so*-word is a realization of its "concept-denoting" property, assuming that 'concept' covers both individuals and non-individual concepts. Readers are referred to Kinsui & Takubo 1992, which is an anthology of the relevant works, including ones by traditional grammarians.

⁴² Hajime Hoji (class lecture; spring 1998) has noted another non-individual-denoting expression in Japanese, which may have something to do with the discussion in this section. Japanese has expressions *maikaa* and *maihoomu*, that are apparently "loan" words from English, corresponding to the expressions *my car* and *my home*, respectively. But *maikaa* means 'a personally-owned car', in contrast to a rented car, for example, and *maihoomu* means 'an owned house', in contrast to a leased apartment, for example. Thus, one could say that the expression *mai* is non-individual-denoting in these cases. The Japanese expressions for the first person, such as *watasi*, *boku*, *ore* and so on, normally cannot be non-individual-denoting, however. There is an expression such as *watakusi-goto* 'personal affairs ((Lit.) my things)', but I suppose that such a usage is to be attributed to the fact that the Chinese character for *watakusi* (often pronounced as *si*-) means 'personal/private' in contrast to 'official' (e.g. *si-zyoo* 'personal considerations', *si-butu* 'personal belongings', *si-sin* 'personal letters', *si-huku* 'plain clothes (in contrast to 'uniform)', *si-ritu-gakkoo* 'private school'), which may be independent of the non-individual-denoting usage of an expression designating the speaker.

The possible ambiguity of *so*-words between individual-denoting and non-individual-denoting would bring about a serious problem in regard to the verifiability of the theory of anaphoric relations proposed in this work, unless we can distinguish the cases of non-individual-denoting from those of individual-denoting on an independent ground. While more investigation is certainly necessary to fully understand under what conditions a *so*-word can (*or* must) be non-individual-denoting in general, Ueyama 1997 points out several ways to force a BVA reading to be yielded based on an anaphoric relation (rather than in terms of a non-individual-denoting *so*-word). In fact the relevant examples in the foregoing discussion have been constructed with as much care as possible according to the results obtained in Ueyama 1997. In what follows, I will go over the relevant factors, basically drawing from Ueyama 1997.⁴³

D.2. Quirky binding

Ueyama 1997 discusses some murky cases where a *so*-word appears to be involved in BVA without being c-commanded by an apparent QP at LF, and calls such cases *quirky binding*. (80) shows some examples.⁴⁴

- (80) a. ?So-ko-no bengosi-ga Toyota to Nissan-o suisensita
 that-place-GEN attorney-NOM Toyota and Nissan-ACC recommended
 (node, ato-wa dareka-ni Mazda-o suisensite-moraw-eba
 because rest-TOP someone-DAT Mazda-ACC recommend-ask-if
 ii dake da).
 good only COPULA
 '(Since) {its/a retained} attorney recommended Toyota and Nissan (
 now we have only to ask someone to recommend Mazda).'
- b. ?So-ko-no bengosi-ga subete-no zidoosya-gaisya-o
 that-place-GEN attorney-NOM every-GEN automobile-company-ACC
 uttaeteiru (node, zidoosya-gyookai-wa daikonran-ni
 otiitteiru).
 sued because automobile-industry-TOP disorder-DAT be:thrown:into
 '(Since) {its/a retained} attorney has sued every automobile
 company (
 the automobile industry has been thrown into a state of

⁴³ Ueyama 1997 claims that the type of *so*-word in question enters into an FD with some empty category, but I do not take this assumption any more.

⁴⁴ As noted in Ueyama 1997, the availability of quirky binding tends to vary a great deal among speakers: some speakers tend to accept it rather easily, while others seem to firmly reject it.

disorder).'

Informally speaking, quirky binding is possible only if the apparent QP can be understood as some kind of a 'topic' and the *so*-word is non-individual-denoting:⁴⁵ neither FD nor ID is involved precisely because the *so*-word in this case is not a dependent term. The conditions of the availability of quirky binding can be described as follows:

- (81) a. The apparent QP must "refer" to a specific group of individuals.
 b. The construction must not be the Deep OS-type.
 c. There should not be other quirky binding in the relevant clause.
 d. The apparent QP must be in a position which is salient enough to be a "topic" of a sentence.
 e. The *so*-word must be non-individual-denoting.

Among these conditions, (81a,b,c) can be shown relatively explicitly, but (81d,e) are subjective in nature and less clear at least at this stage. I make some remarks for each condition in (81) in the following subsections.

D.2.1. The apparent QP must be D-indexed

First, in order for quirky binding to be available, the apparent QP must be used to refer to a specific group of individuals: in other words, it has to be D-indexed.

For example, *Toyota to Nissan* 'Toyota and Nissan' can refer to a specific group consisting of *Toyota* and *Nissan*. One may suspect that *so-ko* in quirky binding, such as in (80a), simply stands in a coreferential relation with *Toyota to Nissan*. However, recall from section 1.4.2 that *so-ko* cannot be plural-denoting and hence cannot be coreferential with a plural-denoting NP, such as *Toyota to Nissan* 'Toyota and Nissan'.

As shown in (80b), *subete-no gakusei* 'every student' also induces quirky binding relatively easily: it should be understood to refer to the whole group of students in this case. In contrast to such D-indexed (apparent) QPs, other QPs, such as *A ka B ka* 'either A or B,' *55%-no NP* '55% of NP,' *do-no gakusei* 'which student' or *John-sae* 'even John', cannot induce quirky binding.

- (82) a. ?*So-ko-no bengosi-ga Toyota ka Nissan ka-o
 that-place-GEN attorney-NOM Toyota or Nissan or-ACC

⁴⁵ Chierchia 1992:section 3.5 mentions that some kind of 'topicalization' should be involved in the asymmetrical reading of an adverb of quantification in conditional sentences. I suppose that this phenomenon shares some properties with quirky binding, but I have to leave the concrete analysis open for the future research. The forthcoming work by J.-R. Hayashishita will also be relevant to this issue.

suisensita (node, ato-wa dareka-ni Mazda-o suisensite-
recommended because rest-TOP someone-DAT Mazda-ACC recommend-

mora(w)-eba ii dake da).
ask-if good only COPULA

'(Since) {its/a retained} attorney recommended either Toyota or Nissan (, now we have only to ask someone to recommend Mazda).'

- b. ?*So-ko-no bengosi-ga 55%-no zidoosya-gaisya-o
that-place-GEN attorney-NOM 55%-GEN automobile-company-ACC

uttaeteiru (node, zidoosya-gyookai-wa daikonran-ni
otitteiru).
sued because automobile-industry-TOP disorder-DAT be:thrown:into

'(Since) {its/a retained} attorney has sued 55% of the automobile companies (, the automobile industry has been thrown into a state of disorder).'

D.2.2. No Deep OS-type

Second, quirky binding does not obtain if an NP-ACC/DAT is base-generated outside the θ -domain of the predicate: *i.e.*, quirky binding is not available if the construction is the Deep OS-type, which we have discussed in chapter 2. Recall from chapter 3 that a BVA reading is possible in (83) only if it is the Deep OS-type.

- (83) Deep OS-type:
A-type QP-ACC/DAT [... NP ...]-NOM V

Thus, (81b) states that QP1 and NP1 in (84) cannot be related in terms of the quirky binding.

- (84) Deep OS-type:
A-type QP-DAT [... NP ... NP1 ...]-NOM QP1-ACC V

This is illustrated by (85):

- (85) Deep OS-type:
?*[55%-no gakusei]-ni [so-itu-o sitteiru so-ko-no sensei]-
55%-GEN student-DAT that-guy-ACC know that-place-GEN professor-
ga USC to UCLA-o suisen-saseta.
NOM USC and UCLA-ACC recommend-made

Intended (but unavailable) meaning: '[A (USC) professor and a (UCLA) professor who know him] made [55% of the students]

recommend (each of) USC and UCLA.'

Compare (85) with an SO-type construction (86), in which *so-ko* and *USC to UCLA* can be related in terms of quirky binding.

- (86) SO-type construction:
?[Chomsky-o sitteiru so-ko-no sensei]-ga USC to UCLA-o
Chomsky-ACC know that-place-GEN professor-NOM USC and UCLA-ACC
kare-ni suisen-saseta.
he-DAT recommend-made

Intended meaning: '[A (USC) professor and a (UCLA) professor who know Chomsky] made him recommend (each of) USC and UCLA.'

In addition, it is expected that quirky binding between QP1 and NP1 fails even if QP1 precedes NP2 as in (87), since the construction is necessarily the Deep OS-type.

- (87) Deep OS-type:
A-type QP-DAT QP1-ACC [... NP ... NP1 ...]-NOM V

(88) shows that this prediction is borne out.

- (88) Deep OS-type:
?*55%-no gakusei-ni USC to UCLA-o [so-itu-o sitteiru
55%-GEN student-DAT USC and UCLA-ACC that-guy-ACC know
so-ko-no sensei]-ga suisen-saseta.
that-place-GEN professor-NOM recommend-made

Intended (but unavailable) meaning: '[A (USC) professor and a (UCLA) professor who know him] made 55% of the students recommend (each of) USC and UCLA.'

In contrast, the quirky binding between QP1 and NP1 is available if it is the SO-type construction as illustrated in (89) or the Surface OS-type as in (90).

- (89) SO-type construction:
a. A-type QP-NOM [[... NP ... NP1 ...]-NOM QP1-ACC V COMP] V
b. ?55%-no gakusei-ga [[so-itu-ga sitteiru so-ko-no sensei]-ga
55%-GEN student-NOM that-guy-NOM know that-place-GEN professor-NOM
USC to UCLA-o uttaeta to] omotteiru.
USC and UCLA-ACC sued COMP think

Intended meaning: '55% of the students thinks [that a (USC)

professor and a (UCLA) professor who he knows] sued (each of) USC and UCLA.'

(90) Surface OS-type:

- a. B-type QP-DAT [... NP ... NP1 ...]-NOM QP1-ACC V
- b. ?Do-no gakusei-ni [so-no gakusei-o sitteiru so-ko-no
which-GEN student-DAT that-GEN student-ACC know that-place-GEN

sensei]-ga USC to UCLA-o suisen-saseta no?
professor-NOM USC and UCLA-ACC recommend-made COMP

Intended meaning: 'As for which student, [a (USC) professor and a (UCLA) professor who know him] made him recommend (each of) USC and UCLA.'

D.2.3. No other quirky binding

Furthermore, even if it is not the Deep OS-type, two pairs of quirky binding cannot obtain at the same time.⁴⁶ Thus, in the schematic representations in (91), the quirky binding between QP1 and NP1 is not available if QP2 and NP2 are also related in terms of quirky binding.

- (91) a. [... NP2 ... NP1 ...]-NOM QP2-CM QP1-CM ... V
b. [... NP2 ... NP1 ...]-NOM QP1-CM QP2-CM ... V

(91) is exemplified in (92), which are to be compared with (93) that demonstrates that one pair of quirky binding is available:

- (92) a. ?*[So-no hito]-tantoo-no so-ko-no syokuin-ga
that-GEN person-in:charge-GEN that-place-GEN staff-NOM
[subete-no giin]-ni USC to UCLA-o suisen-saseta.
all-GEN senator-DAT USC and UCLA-ACC recommend-made

Intended (but unavailable) meaning: '[A (USC) staff and a (UCLA) staff who are in charge of that man] made all the senators recommend (each of) USC and UCLA.'

- b. ?*[So-no hito]-tantoo-no so-ko-no syokuin-ga
that-GEN person-in:charge-GEN that-place-GEN staff-NOM
USC to UCLA-o [subete-no giin]-ni suisen-saseta.
USC and UCLA-ACC all-GEN senator-DAT recommend-made

⁴⁶ This used to be one of the consequences of the analysis of quirky binding proposed in Ueyama 1997, and I owe Hajime Hoji (p.c.; 1997) for making me realize that this should hold according to the analysis.

Intended (but unavailable) meaning: '[A (USC) staff and a (UCLA) staff who are in charge of that man] made all the senators recommend (each of) USC and UCLA.'

- (93) a. ?[So-no hito]-tantoo-no syokuin-ga [subete-no giin]-ni
that-GEN person-in:charge-GEN lstaff-NOM all-GEN senator-DAT
USC-o suisen-saseta.
USC-ACC recommend-made

Intended meaning: '[A staff who is in charge of that man] made all the senators recommend USC.'

- b. ?So-ko-no syokuin-ga [subete-no giin]-ni USC to UCLA-o
that-place-GEN staff-NOM all-GEN senator-DAT USC and UCLA-ACC
suisen-saseta.
recommend-made

Intended meaning: '[A (USC) staff and a (UCLA) staff] made all the senators recommend (each of) USC and UCLA.'

D.2.4. The apparent QP must be 'salient'

Next, quirky binding is easier when the apparent QP is in a position which is salient enough to be a 'topic' of a sentence.⁴⁷ Compare (94) with (80), repeated below.

- (94) a. ?*So-ko-no bengosi-ga [Toyota to Nissan-to torihiki-ga
that-place-GEN attorney-NOM Toyota and Nissan-with business-NOM
aru kaisya]-o suisensita (node, ato-wa dareka-ni
exist company-ACC recommended because rest-TOP someone-DAT
Mazda-o suisensite-mora(w)-eba ii dake da).
Mazda-ACC recommend-ask-if good only COPULA

Intended (but unavailable) meaning: '(Since) a retained attorney recommended [the company which is doing business with Toyota and Nissan] (, now we have only to ask someone to recommend Mazda).'

- b. ?*So-ko-no bengosi-ga [subete-no zidoosya-gaisya-no
that-place-GEN attorney-NOM every-GEN automobile-company-GEN
raibaru-gaisya]-o uttaeteiru (node, zidoosya-gyookai-wa

⁴⁷ Reinhart 1986 and references therein contain some discussions relevant to the notion 'saliency' in this sense.

rival-company-ACC sued because automobile-industry-TOP

daikonran-ni otiitteiru).
disorder-DAT be:thrown:into

Intended (but unavailable) meaning: '(Since) a retained attorney has sued [the rival company of each automobile company] (, the automobile industry has been thrown into a state of disorder).'

- (80) a. ?So-ko-no bengosi-ga Toyota to Nissan-o suisensita
that-place-GEN attorney-NOM Toyota and Nissan-ACC recommended
(node, ato-wa dareka-ni Mazda-o suisensite-moraw-eba
because rest-TOP someone-DAT Mazda-ACC recommend-ask-if
ii dake da).
good only COPULA
'(Since) {its/a retained} attorney recommended Toyota and Nissan (,
now we have only to ask someone to recommend Mazda).'
- b. ?So-ko-no bengosi-ga subete-no zidoosya-gaisya-o
that-place-GEN attorney-NOM every-GEN automobile-company-ACC
uttaeteiru (node, zidoosya-gyookai-wa daikonran-ni
otiitteiru).
sued because automobile-industry-TOP disorder-DAT be:thrown:into
'(Since) {its/a retained} attorney has sued every automobile
company (, the automobile industry has been thrown into a state of
disorder).'

As noted in Ueyama 1997, not only the depth of embedding but also the choice of the matrix verb may affect the 'saliency' of the apparent QP, although the acceptability of each sentence is expected to vary still more among the speakers.

- (95) a. ?So-ko-no bengosi-ga subete-no kaisya-o uttaeteiru.
that-place-GEN attorney-NOM every-GEN company-ACC sued
'A retained attorney has sued every company.'
- b. ?So-ko-no bengosi-ga subete-no kaisya-o suisensita.
that-place-GEN attorney-NOM every-GEN company-ACC recommended
'A retained attorney has recommended every company.'
- c. ?So-ko-no bengosi-ga subete-no kaisya-o tubusita.
that-place-GEN attorney-NOM every-GEN company-ACC bankrupted

'A retained attorney has bankrupted every company.'

- d. ?*So-ko-no bengosi-ga subete-no kaisya-o ooensiteiru.
that-place-GEN attorney-NOM every-GEN company-ACC support
'A retained attorney supports every company.'
- e. ?*So-ko-no bengosi-ga subete-no kaisya-o keibetusiteiru.
that-place-GEN attorney-NOM every-GEN company-ACC despise
'A retained attorney despises every company.'
- f. ?*So-ko-no bengosi-ga subete-no kaisya-ni ayamatta.
that-place-GEN attorney-NOM every-GEN company-DAT apologized
'A retained attorney has apologized to every company.'
- g. ?*So-ko-no bengosi-ga subete-no kaisya-to arasotteiru.
that-place-GEN attorney-NOM every-GEN company-with contend
'A retained attorney is contending with every company.'

Since the 'saliency' in this sense is a property determined in pragmatics in nature, it is impossible to state a formal/syntactic condition regarding this aspect of the availability of quirky binding.

D.2.5. The *so*-word must be non-individual-denoting

Finally, among various kinds of *so*-words, *so-ko* 'that place/institution', *so-re* 'that thing' and *so-no hito* 'that person' allow non-individual-denoting reading relatively easily, while expressions such as *so-itu* 'that guy' and *so-no booekei-gaisya* 'that trading company' tend to be individual-denoting, for whatever reason.⁴⁸

- (96) a. ???So-itu-no bengosi-ga Tabata toyuu otoko-o uttaeta
that-guy-GEN attorney-NOM Tabata COMP man-ACC sued
rasii.
they:say
'They say that a retained attorney sued a man named Tabata.'

⁴⁸ *Kare* 'he', a so-called overt pronoun in Japanese, also hardly allows a non-individual-denoting reading.

(i) ?*Kare-no bengosi-ga Tabata toyuu otoko-o uttaeta rasii.
he-GEN attorney-NOM Tabata COMP man-ACC sued they:say
'They say that a retained attorney sued a man named Tabata.'

See footnote 18 in section 1.4.2 for some remarks about this lexical item.

- b. ?*So-no bookeki-gaisya-no bengosi-ga Tabata toyuu bookeki-
 that-GEN trading-company-GEN attorney-NOM Tabata COMP trading-
gaisya-o uttaeta rasio.
 company-ACC sued they:say

'They say that a retained attorney sued a trading company named Tabata.'

D.2.6. Summary

Quirky binding is an instance of an apparent anaphoric relation yielding an apparent BVA reading. I have suggested in this section that there are several conditions for quirky binding to obtain, as summarized in (81).

- (81) a. The apparent QP must "refer" to a specific group of individuals.
 b. The construction must not be the Deep OS-type.
 c. There should not be other quirky binding in the relevant clause.
 d. The apparent QP must be in a position which is salient enough to be a "topic" of a sentence.
 e. The *so*-word must be non-individual-denoting.

It is yet to be investigated how the apparent BVA reading is yielded in quirky binding without any anaphoric relations, but for the purpose of revealing the nature of anaphoric relations, it is sufficient if we can properly eliminate the irrelevant cases, and we have argued that quirky binding can be avoided by not satisfying the conditions in (81), among which (81a) yields the clearest result.

At this stage, we lack conclusive method to eliminate the cases which yield an apparent coreferential reading without involving an anaphoric relation. Therefore, although the conclusion in this chapter is based on the examples constructed as carefully as possible according to the current understanding of the relevant facts, there is a possibility that we will have to reconsider some part of our claim after the nature of non-individual-denoting *so*-words is revealed more.

D.3. Implicit variable binding in English

I suspect that the 'implicit variable binding' discussed in Partee 1989 should be an instance which yields an apparent BVA reading without being based on an anaphoric relation.⁴⁹

- (97) a. Every sports fan in the country was at a local bar watching the playoffs.

⁴⁹ I thank Hajime Hoji for bringing Partee 1989 to my attention and making me aware of its relevance to this issue.

- b. Every participant had to confront and defeat an enemy.
 c. Every traveler who stops for the night imagines that there is a more comfortable place to stay a few miles farther on.

Partee 1989 reports that 'implicit variable binding' shows the WCO effects, on the basis of the observation in (98).

- (98) a. #?From five feet away I tried to toss a peanut to every pigeon.
 b. #?The leader of the local union wrote a letter to every untenured professor in the state.
 c. #?Only the nearest photographer got a good picture of every senator.

If the sentences in (98) are instances of the WCO effects, *i.e.*, if the sentences in (98) are excluded for the syntactic reason that the QP does not *c*-command the 'implicit variable', one should assume that the 'implicit variable binding' be based on FD, and then it is expected that the 'implicit variable binding' is not available in any configuration which violates the LF *c*-command requirement. However, I have been informed that at least (99) can correspond to a situation in which every company is complained to by its own customer.

- (99) A customer complains to every company.

If (99) is an instance of 'implicit variable binding', it becomes dubious that 'implicit variable binding' should be based on FD. The contrast between (98) and (99) can be accounted for, on the other hand, if we regard 'implicit variable binding' as an instance similar to quirky binding. Notice that the apparent QP is in the dative argument of a ditransitive predicate in (98a,b) and it is embedded in another NP in (98c). As mentioned in (81c), quirky binding hardly occurs in such cases. In contrast, the relevant NP in (99) is placed in a configuration in which quirky-binding is more readily available. I leave open how to analyze the 'implicit variable binding' in this work, especially for the reason that we need to know more about the syntactic functions of *the* and *a(n)* in order to discuss this issue.