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The effect of inherent characteristics of nouns on co-reference

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Key words: indirect co-reference, degree of relatedness (DOR), one-place noun, zero-place noun, lexical cohesion

0. Introduction

In comparison to the study of Japanese verbs, research on nouns has received far less attention. Although Teramura (1968) and Takubo (1984) have provided pioneering accounts of the syntactic behavior of nouns and the consequences it carries for our categorization of the outer world, little work has been done on issues such as the definiteness of noun phrases. This may derive from the fact that unlike in West European languages, such as English¹, the determiner in Japanese is not a syntactic category. However, definiteness can (and must) be studied independently of the syntactic status of the determiner because it is indispensable to the investigation of some other syntactic phenomena. In this paper, I focus on one of such phenomena, indirect co-reference, and show how inherent characteristics of nouns affect its acceptability.

1. Problems to be discussed

There are two types of co-reference: direct co-reference (*tyokusetu syoooo*), the case where an antecedent explicitly exists in the linguistic context, and indirect co-reference (*kansetu syoooo*), when no antecedent is present². (1) and (2) are examples of direct and (3) - (5) of indirect co-reference.

(1) Erizabesu Teeraa ga mata kekkon si- ta.

Elizabeth Tailor NOM again marry do PST³

Erizabesu Teeraa / Kanozyo ga kekkon su-ru no wa kore de 7
kaime da.

Elizabeth Tailor / she NOM marry do FUT COMP TOP this 7
time is

"Elizabeth Tailor got married again. It is for the seventh time for
Elizabeth Tailor / her to get married."

- (2) Kaisya kara no kaerimiti ni kooen o tooru to otokonohito ga taore tei
-ta.

office from of back in park ACC go through man NOM lie
PROG PST

Sono otokonohito / otokonohito wa atama kara ti o nagasi tei
-ta.

the man / man TOP head from blood ACC flow PROG
PST

"On my way home from the office, I found, in a park, a man lying on
the ground. The man was bleeding from his head."

- (3) Kinoo seikyoo de zenzai o tabe-ta ga, sono azi / azi wa saiaku
da-tta.

yesterday Coop at zenzai ACC eat PST but its taste / taste TOP worst
be PST

"I ate a bowl of zenzai at Coop yesterday, but its taste was terrible."

- (4) Senzitu ketuekikensa o si-ta ga, sono kekka / kekka wa mada
wakar-anai.

the other day blood test ACC do PST but the result / result TOP yet
know not

"I took a blood test the other day, but I don't know the result yet."

- (5) Hanako ga naki-nagara ie ni kake-konde ki-ta. Sono huku / huku
ni wa dorogata bettori tui tei -ta.

Hanako NOM cry -ing home to run into come PST the dress/dress on
TOP mud NOM thickly attach PROG PST

"Hanako ran back home crying. Her dress was thickly covered with
mud."

While antecedents are recoverable in the surface structure in the case of direct co-reference, this is not true of indirect co-reference and most authors maintain that inference is needed to identify the antecedent (cf. Yamanashi 1992). However, I wish to suggest that indirect co-reference can be described using syntactic / semantic concepts rather than pragmatic categories such as inference. Consider the following sentences. (# indicates incohesiveness of discourse .)

(6) Siba Ryootaroo-san ga nakuna-tta. Zannenda ga, sono tyosyo /
tyosyo / # kono tyosyo wa zutto yom-are-tuzukeru daroo.
Siba Ryootaroo Mr.NOM pass away PST Regrettable but the book-of /
book-of this book-of TOP forever read PASS will probably
"Mr. Ryootaroo Siba passed away. This is regrettable, but his writings
will be read forever."

(7) Siba Ryootaroo-san ga nakuna-tta. Zannenda ga, sono hon /
hon / # kono hon wa zutto yom-are-tuzukeru daroo.
Siba Ryootaroo Mr. NOM pass away PST regrettable but the book /
book / this book TOP forever read PASS will probably
"Mr. Ryootaroo Siba passed away. This is regrettable, but his books
will be read forever."

(8) Keiaisuru A Kyoozyu ga nakuna-tta. Zannenda ga, ??sono
gakuzyutusyo / # gakuzyutusyo / # kono gakuzyutusyo wa zutto
yom-are-tuzukeru daroo.
respect A Prof. NOM pass away PST regrettable but the scientific
book / scientific book/this scientific book TOP forever read PASS will
propably
"Prof. A, whom I have highly respected, passed away. This is

regrettable, but his scientific books will be read forever."

(6)-(8) are sentence sequences that essentially share the same construction but their acceptability differs. The only difference between them lies in the doubly-underlined nouns and we can, therefore, assume that their acceptability is connected with some inherent characteristics of the nouns. This is the topic I propose to discuss in this paper.

Incidentally, in the following discussion, I shall consider Japanese determiners, but since *kono* "this" consistently causes unacceptability⁴, my discussion will be limited to *sono* "that" and zero.

2. Relatedness of noun (DOR)

I suggest that the reason for differential acceptability in (6)-(8) derives from the following condition (I).

- (I) The more an anaphoric noun depends on another noun phrase in order to determine its referent, the more acceptable the indirect co-reference becomes.

For example, the degree of dependence of the noun *tyosyo* "book-of" is high because its extension cannot be determined unless the information corresponding to *dare no* "whose" is specified. In this paper, we call this degree, the degree to which a noun depends on another noun phrase for its extension, the degree of relatedness (henceforth DOR for short). The DOR is a concept which refines that of lexical cohesion (cf. Halliday & Hasan 1976).

Condition (I) parallels (II), the definition of cohesion by Halliday & Hasan (1976).

- (II) Cohesion occurs where the INTERPRETATION of some element in the discourse is dependent on that of another. The one RRESUPPOSES the other, in the sense that it cannot be effectively decoded except by recourse to it. When this happens, a relation of

cohesion is set up, and the two elements, the presupposing and the presupposed, are thereby at least potentially integrated into a text.

(Halliday & Hasan 1976:4 Emphasis are original.)

That is, when the interpretation (in the case of (I), the determination of extension) of an element in a sentence depends on another part of the linguistic context, that dependency creates cohesion. In this sense, some nouns can function as cohesive devices, in the same way as typical cohesive devices such as demonstratives.

In the following, I shall list factors concerning DOR.

2-1. One-place noun and zero-place noun

Let us first examine the distinction between one-place nouns and zero-place nouns. Consider the following exchanges. (In (9) to (11), A is the initial sentence of the discourse unit.)

(9) A: Kono aida, omosiroi hon o yon-da n desu yo.
 this interval interesting book ACC read PST COMP is FIN

"I read an interesting book the other day."

B1: Aa, soo desu ka. B2: E, dare no?
 oh so is Q oh whose

"Oh, is that so." "Oh, whose book?"

(10) A: Kono aida, omosiroi tyosyo o yon-da n desu-yo.
 this interval interesting book-of ACC read COMP is FIN

"I read an interesting book the other day."

B1: #Aa, soo desu ka. B2: E, dare no?
 oh so is Q oh whose

"Oh, is that so." "Oh, whose book?"

(11) A: Kinoo, tabe-masi-ta yo.

yesterday eat PST FIN

"I ate yesterday."

B1: #Aa, soo desu ka.	B2: E, <u>nani</u> o?
oh so is Q	oh what ACC
"Oh, is that so."	"Oh, what?"

While it is possible, though not necessarily 'natural', to use (9)B1 as a reply to (9)A, it is impossible to reply to 10(A) by using (10)B1. (10)A always evokes an interrogative such as (10)B2. The reason is the same as in the (11)A-(11)B1 exchange, which is odd because the obligatory argument of *taberu* "eat", the theme role (marked by *o*), is absent in (11)A. Note that the interrogative elicited in this case corresponds to the missing obligatory argument in (11)A (cf. Teramura 1982). It is reasonable, therefore, to assume that the oddness of the (10)A-(10)B1 exchange, too, is caused by the lack of an obligatory argument. Moreover, (9)A, which is the same as (10)A except for the underlined nouns, is acceptable. So we can consider that *tyosyo* "book-of" takes a *syntactic* argument.

By this way of reasoning, we can say that nouns are classified (at least in Japanese) into two types: one-place nouns, which take a *no*-marked noun phrase as their obligatory argument, and zero-place nouns, which do not require such an argument. (For further discussion, see Iori 1995b⁵.)

Examples of zero- and one-place nouns are the following.

(12) Zero-place noun: huku "dress", dansei "man", gakusei "student", sakka "novelist", e "picture", kane "money", sinbun "newspaper", sake "liquor"...

One-place noun: asi "leg", musuko "son", ue "upside", saigen "replay", seito "pupil", sakusya "author", sakuhin "work", sikin "funds"...

Typical one-place nouns are those of body parts (such as *asi* "leg"), kinship nouns (such as *musuko* "son"), relative nouns (such as *ue* "upside") and gerunds (such as *saigen* "replay") (cf. Kageyama 1993).

My discussion so far can be summarized in (III).

- (III) Referents of one-place nouns cannot be determined unless the nouns are related to other noun phrases, so the DOR of one-place nouns are extremely high.

If we regard the DOR as a scalar relation whose value ranges from 0 (completely independent of other noun phrases) to 1 (completely dependent on other noun phrases), the DOR of one-place nouns is 1.

2-2. The DOR of 0-place nouns

In section 2-1 we observed that the DOR (Degree of Relatedness) of one-place nouns is 1. The reason why one-place nouns are related to other noun phrases derives from the fact that they take syntactic argument. On the other hand, the DOR of zero-place nouns is a semantic concept and the degree of relatedness differs in accordance with the semantic property of the noun. In this section I shall discuss this matter.

The zero-place nouns are complementary in their distribution to the one-place nouns, in other words, zero-place nouns are nouns which can have their own referents independently, while they remain unrelated to any other noun phrases. We can see, from the following examples, that zero-place nouns can have their own referents, that is, while the one-place noun *tyosyo* "book-of" in (13)a is interpreted as "his book"⁶, *hon* "book" in (13)b and *gakuzyutusyo* "scientific book" in (13)c do not mean "the teacher's book / scientific book". They are interpreted as indefinite noun phrases.

- (13) a. Senjitu sensei ga gakkai no kaizyoo de tyosyo o
the other day teacher NOM conference GEN hall in book-of ACC
yon deorare -ta.
read PROG-HON PST
"Our teacher was reading his book in the conference hall the other day."
- b. Senzitu sensei ga gakkai no kaizyoo de hon o

the other day teacher NOM conference GEN hall in book ACC
 yon deorare -ta.
 read PROG·HON PST

"Our teacher was reading a book at the conference hall the other day."

c. Senzitu sensei ga gakkai no kaizyoo de gakuzyutusyo o
 the other day teacher NOM conference GEN hall in scientific
 book ACC
 yon deorare -ta.
 read PROG·HON PAST

"Our teacher was reading a scientific book in the conference hall the other day."

As we see in the above examples, zero-place nouns are interpreted as indefinite in unmarked, non-embedding transitive sentences. However, when we put them into indirect passive sentences, which have an embedding structure, their behavior in respect to definiteness changes:

(14)a. Taroo wa sensei ni tyosyo o homer-are -te yoroko-nda.

Taroo TOP teacher by book-of ACC praise PASS and glad was
 "Taroo was pleased when his teacher's praised his book."

b. Taroo wa sensei ni hon o homer-are -te yoroko-nda.

Taroo TOP teacher by book ACC praise PASS and glad was
 "Taroo was pleased when his teacher's praised his book."

c. ??Taroo wa sensei ni gakuzyutusyo o homer-are -te
 yoroko-nda.

Taroo TOP teacher by scientific book ACC praise PASS and glad
 was

"Taroo was pleased when his teacher's praised a scientific book."

That is, while *hon* "book" in (14) b means, unlike in (13) b, "Taro's book," (14) c does not mean, like (13) c, "Taro's scientific book" and the acceptability of this

sentence is quite low. Note that in sentences that contain *tyosyo* "book-of", a one-place noun, *tyosyo* means, irrespective of the differences in structure, "Taro's book". Also note that the acceptability of *gakuziyutuso* "scientific book" increases if we add a relative clause such as *hajime-te kai-ta* "(he/she) wrote for the first time", which contains an argument. This syntactic change parallels (14) a, a case where cohesion is guaranteed by a syntactic argument contained in the noun.

The above-observed facts can be interpreted as the DOR of *hon* "book" being increased by using it in the passive structure *A ga (B ni) C o homer-are-ru* "A is affected by B's praising C". This structure is useful as a test frame to measure DOR. If C in the structure is an indefinite noun phrase, and therefore is not related to A, the sentence becomes less acceptable because it is pragmatically odd to praise such an indefinite noun phrase, which is unrelated to A. It cannot be interpreted as A's benefit. So, in order for this structure to be judged as well-formed, C must be a "controlled" noun phrase (on "controlled" noun phrases see footnote 6). Therefore, we can use this structure as a test frame of the DOR of nouns⁷.

The relatedness of a noun, Y, to another noun phrase, X, has a close relationship with the semantic structure of the expression *X no Y*, which belongs to several semantic types. Suzuki (1978), who describes the semantic types in detail, classifies them into three groups: A) relational combination (*kankeiteki na musubituki*), B) situational combination (*zyoookyooteki na musubituki*) and C) characteristic combination (*kiteiteki na musubituki*).

Type B can be exemplified in *kesa no misosiru* "today's miso soup" or *tyooba no tokei* "clock on the counter", where *X no* modifies Y spatio-temporally and corresponds to secondary arguments of the verb. In this case the relationship between X and Y cannot be intrinsic. C is the case, like *kootetu no gyosen* "steel fish boat" or *hitorimono no kyooosi* "bachelor teacher", where *X no* modifies Y qualitatively. In this case *X no* functions like an adjective as we can see from the

fact that *kootetu no gyosen* can be reworded by *kootetu de dekita gyosen* "fish boat made of steel" and *hitorimono no kyoosi* by *hitorimono dearu kyoosi* "teacher who is a bachelor". Here Y cannot be said to be related to X. So in order to consider DOR, the only case which remains to be considered is the case A (relational combination). If we examine Suzuki's (1978) classification again, the relational relationship can be classified into five types: 1) connective combination (*kuttukiteki na musubituki*), 2) possessive combination (*motinusiteki na musubituki*), 3) combination based on human relation (*ningenkankei no musubituki*), 4) agentive combination (*syutaiteki na musubituki*) and 5) objective combination (*taisyooteiki na musubituki*). Type 1 represents a whole-part relation, type 3 that of belonging, and in both 4 and 5 Y is a gerund. Y in these cases are one-place nouns, so the only semantic type we can postulate for zero-place nouns is the case 2 "possessive combination". The relations which belong under 2 are those where Y is X's a) products, b) clothes (including whatever we wear) and c) possessed things (including pets). When we measure the DOR of nouns using the structure *A ga (B ni) C o homer-are -ru* "lit. A is praised B by C", we can observe the following facts:

- (IV) a. The DOR of Clothes and Products is consistently high.
- b. The DOR of Clothes is higher than that of Products.
- c. The DOR of Possessed things has no internal consistency.
- d. The DOR of Products is higher than that of Possessed things.

(IV) a can be confirmed if we consider the level of acceptability in cases where C is occupied either by a noun describing clothes (like in (15) a) or by that a noun describing an object produced only by agentive activities (like in (15) b).

- (15) a. Hanako wa tomodati ni huku / sukaato / kooto / kutu / boosi / yubiwa / kamigata o homer-are -te yoroko-nda.

Hanako TOP friend by dress skirt coat shoes hat ring
hair style ACC praise PASS and glad was

"Hanako was pleased when her friends' praised her dress / skirt / coat

/ shoes / hat / ring / hair style.

b. Taroo wa sensei ni hon / si / (hai)ku / e / syoosetu / tyookoku /
uta / kyoku / siba*i* o homer-are -te yoroko-nda.

Taroo TOP teacher by book / poem / *haiku* / picture / novel /
carving / song / composition / play ACC praise PASS and glad
was

"Taroo was pleased when his teacher's praised his book / poem /
haiku / picture / novel / carving / song / composition / play.

The high level of DOR of Clothes may be related to the fact that Clothes are closely tied with those who wear them. On the other hand, the high level of DOR of Products should be attributed to the fact that Products are what cannot exist without the producer's productive activities and therefore the producer's existence is easier to be implied in the meaning of nouns.

(IV) b can be observed in the following.

(16) a. (?)Hanako wa tomodati ni {minku-no kotoo / akai kutu} o
Hanako TOP friend by {mink-of coat / red shoes} ACC
homer-are -te yoroko-nda
praise PASS and glad was

"Hanako was pleased when her friends' praised her {mink coat / red shoes}."

b. ??Taroo wa sensei ni {tyoohen-syoosetu / nagai si /
kayookyoku} o homer-are -te yoroko-nda
Taroo TOP teacher by { long novel / long poem / pop music} ACC
praise PASS and glad was

"Taroo was pleased when his teacher's praised his {long novel / long poem / pop music}."

The DOR of the underlined nouns in (16)b can only be high if the nouns are used without modifying elements, as can be seen in (15)b. However, the acceptability of the sentence remarkably decreases when they are parts of

compounds or when modifying elements are attached to them. This may be because the noun phrases as a whole are interpreted as objective elements when such *objective* elements are attached to them, and that makes it difficult to recognize the existence of their implied producers. In the cases of Clothes, however, we cannot see any phenomena corresponding to those of Product. (The acceptability of (16) a might be a little lower than that of (15) a, but the difference in acceptability is far less remarkable than in the case of (16) b and (15) b.) Noun phrases of Clothes, too, should also show an inclination to be interpreted as objective elements when modified by such *objective* elements, just as in the cases of Products. The acceptability of indirect co-reference should then decrease accordingly. So we can conclude that the high level of acceptability of (16) a indicates the potential high level of DOR of Clothes.

The case (IV) c can be exemplified as follows.

(17) Hanako wa tomodati ni ie / piano / inu / ?pasokon / ??reezooko o

Hanako TOP friend by house / piano / dog / pc / refrigerator ACC

homer-are -te yoroko-nda

praise PASS and glad was

"Hanako was pleased when her friends' praised her house / piano / dog / pc (personal computer) / refrigerator.

The semantic type of the underlined nouns in (17) is Possessed things, but the acceptability of the sentences differ; the DOR of buildings (e.g. *ie* "house"), musical instruments (e.g. *piano* "piano") or pets (e.g. *inu* "dog") is high, while that of electrical appliances (e.g. *pasokon* "personal computer", *reezooko* "refrigerator") is low. This should be because while buildings, musical instruments or pets are easily related to those who possess them as they reflect the taste of their possessors, electrical appliances are difficult to be interpreted in that way*8.

Finally, the following examples suggest the existence of (IV) d.

(18) a. Taroo wa e / aburae / (?) suisaiiga / ??ukiyoe o

Taroo TOP picture /oil painting / watercolor /ukiyoe ACC
 homer-are -te yoroko-nda
 praise PASS and glad was

"Taroo was pleased by the praise of his picture / oil painting /
 watercolor / ukiyoe."

b. Gizyutusya wa pasokon / reezooko o homer-are -te yoroko-nda
 engineer TOP pc / refrigerator ACC praise PASS and glad was
 "Engineers were pleased by the praise of their pc / refrigerator."

c. Sono kasyu wa CD o homer-are -te yoroko-nda
 that singer TOP CD ACC praise PASS and glad was

"That singer was pleased by the praise of his / her (songs in the) CD."

In (18) a, the acceptability of the sentence which contains *e* "painting", *aburae* "oil painting" or *suisaiga* "watercolor" is high while that of *ukiyoe* "ukiyoe" is low. This can be explained by the fact that the former can easily be interpreted as Products while the latter cannot receive this interpretation because no present painter draws *ukiyoe* ; this latter case can only be interpreted as Possessed things. On the other hand, the acceptability of (18) b and (18) c is high contrary to (17). This may be because in these examples, *gizyutusya* "engineer" or *sono kasyu* "that singer" are easier to be interpreted as the producer of *pasokon* "personal computer", *reizooko* "refrigerator" or (the songs in the) CD. So we can conclude that the DOR of Product is higher than that of Possessed things.

As we observed above, some types of nouns cannot be used in the indirect passive construction, *A ga (B ni) C o homer-are-ru*, but even such nouns can felicitously be used in the construction when other verbs are employed:

(19) Taroo wa doroboo ni gakuzyusyo / pasokon / reezooko / CD /
 ukiyoe o nusum-are -ta.

Taroo TOP robber by scientific book / pc / refrigerator / CD / *ukiyoe*
 ACC steal PASS PST

"Taroo had his scientific book / pc / refrigerator / CD / ukiyoe stolen.

However, some nouns cannot be related to another noun phrases even in constructions like (19).

One type of such nouns are proper names. For example, (20) a and (21) a are hard to be employed even when we know that Ken is Taro's younger brother.

(20) a. ??Taroo wa sensei ni Ken o homer-are -te yoroko-nda.

Taroo TOP teacher by Ken ACC praise PASS and glad was

"Taroo was pleased when his teacher's praised Ken."

b. Taroo wa sensei ni otooto o homer-are -te yoroko-nda.

Taroo TOP teacher by younger brother ACC praise PASS and glad was

"Taroo was pleased when his teacher's praised his younger brother."

(21) a. ??Taroo wa toorima ni Ken o koros-are -ta.

Taroo TOP phantom killer by Ken ACC kill PASS PST

"Taroo was affected by a phantom killer's killing Ken."

b. Taroo wa toorima ni otooto o koros-are -ta.

Taroo TOP phantom killer by younger brother ACC kill PASS PST

"Taroo was affected by a phantom killer's killing his younger brother."

Moreover, the DOR of nouns of human beings is, in general, low as we see from the following examples".

(22) a. *Taroo wa sensei ni zyosei / daigakusei o

Taroo TOP teacher by woman / university student ACC

homer-are -te yorokon-da.

praise PASS and glad was

"Taroo was pleased when his teacher's praised the woman / university student."

b. *Taroo wa toorima ni zyosei / daigakusei o

Taroo TOP phantom killer by woman/university student ACC

koros- are -ta.

kill PASS PST

"Taroo was affected by a phantom killer's killing the woman / university student."

As these examples show, human nouns are not related to other nouns unless they are one-place nouns. This is because human beings are most salient in human recognition and therefore cannot be related to other noun phrases unless a social relationships as kinship or that of belonging is explicitly coded as an argument of one-place nouns.

Finally, complex nouns such as *tyoohen-syoosetu* "long novel", *gendai-si* "contemporary poem" or *kayookyoku* "popular music" seem not to depend on other noun phrases for their extension.

We summarize DOR as follows.

(V) The range of DOR

1 ... one-place noun	↑ [syntactically motivated]
zero-place noun	↓ [semantically motivated]
high ... Clothes	
Products, Possessed things (buildings, musical instruments, pets etc.)	
low ... Possessed thing (electrical appliances etc.)	
0 ... proper names, human nouns, Products with objective modifiers	

3. Degree of relatedness (DOR) and indirect co-reference

I discussed in section 2 the degree of relatedness of nouns (DOR) and argued that a hierarchical relationship as represented in (V) exists. On the other hand, as pointed out in (1) the higher DOR becomes, the easier indirect co-reference. Here I shall further comment on this matter. First let us reexamine (3)-(8).

(3) (4) (6) are examples of one-place nouns, (5) is that of Clothes, (7) of

Products, (8) of Products with objective modifying elements¹⁰.

- (3) Kinoo seikyoo de zenzai o tabe-ta ga, sono azi / azi wa saiaku da-tta.

yesterday Coop at zenzai ACC eat PST but its taste / taste TOP worst be PST

"I ate a bowl of zenzai at Coop yesterday, but its taste was terrible."

- (4) Senzitu ketuekikensa o si-ta ga, sono kekka / kekka wa mada wakar-anai.

the other day blood test ACC do PST but the result / result TOP yet know not

"I took a blood test the other day, but I don't know the result yet."

- (5) Hanako ga naki-nagara ie ni kake-konde ki-ta. Sono huku / huku ni wa doro ga bettori tui tei -ta.

Hanako NOM cry -ing home to run into come PST the dress / dress on TOP mud NOM thickly attach PROG PST

"Hanako ran into back home crying. Her dress was thickly covered with mud."

- (6) Siba Ryootaroo-san ga nakuna -tta. Zannenda ga, sono tyosyo / tyosyo wa zutto yom-are-tuzukeru daroo.

Siba Ryootaroo Mr. NOM pass away PST Regrettable but the book-of/ book-of TOP forever read PASS will probably

"Mr. Ryootaroo Siba passed away. This is regrettable, but his writings will be read forever."

- (7) Siba Ryootaroo-san ga nakuna-tta. Zannenda ga, sono hon / # hon wa zutto yom-are-tuzukeru daroo.

Siba Ryootaroo Mr. NOM pass away PST regrettable but the book / book TOP forever read PASS will probably

"Mr. Ryootaroo Siba passed away. This is regrettable, but his books will be read forever."

- (8) Keiai-suru A Kyoozyu ga nakuna-tta. Zannenda ga, ??sono gakuzyutusyo / # gakuzyutusyo wa zutto yom-are-tuzukeru daroo.
 respect A Prof. NOM pass away PST regrettable but the scientific book / scientific book TOP forever read PASS will probably
 "Prof. A, whom I have highly respected, passed away. This is regrettable, but his scientific books will be read forever."

In contrast with these examples, in (23), where a human noun (whose DOR is 0) is used, only *kono* is appropriate as a marker of a co-referential relation.

- (23) Erizabesu Teeraa ga kekkon si-ta. Kono zyoyuu / # Sono zyoyuu / ?? zyoyuu ga kekkon su-ru no wa kore de 7 kaime da soo -da.
 Elizabeth Tailor NOM marry do PST this actress / the actress / actress NOM marriage do FUT COMP TOP this 7 times is they-say is
 "Elizabeth Tailor got married again. It is for the seventh time for this actress / the actress / actress to get married."

This is because nouns of such low degree of DOR have little ability to create cohesive relation by themselves and therefore such nouns can only be interpreted as "rewording (*iikae*)" of their antecedents. (For further discussion on this matter see Iori 1995a.) However, this type of co-reference cannot be indirect one.

We summarize the relationships between DOR and indirect co-reference as follows.

(VI) DOR and indirect co-reference

		DOR	indirect co-reference	<i>sono</i>	zero
one-place noun [syntactic]		1			
zero-place noun [semantic]	Clothes	(higher)	○	○	○
	Products	high			
	Possessed things	[high] [low] low	×	×	×
	Others	0			

As we see from (VI), DOR and indirect co-reference correlate with each other, and when indirect co-reference is possible *sono* can be used and, especially, when the value of DOR is high, "zero co-reference", which is based on more intrinsic relationship, becomes possible.

4. Summary

In this paper, I discussed indirect co-reference, which has not received extensive attention so far, from the viewpoint of inherent (syntactic / semantic) characteristics of nouns and found out that the acceptability of indirect co-reference has a close relationship with the degree of dependence of nouns on other noun phrases (DOR). That is, basically the higher DOR becomes, the more acceptable indirect co-reference¹¹.

The characteristics of nouns which I discussed in this paper are probably universal, and cross-linguistic studies will be needed to further clarify this point. In such studies, whether the determiner is a syntactic category or not in the language will become relevant.

Notes:

* 1 This can be shown by examples like the following (cf. Fukui 1995):

(a) Senzitu gengogaku no hon o yon-da. Sono hon / hon wa
nakanaka omosiro-katta.

the other day linguistics on book ACC read PST the book/
book TOP quite interesting was

(b) I read a book on linguistics the other day. The book / *book was quite
interesting.

As we can see from (a), a definite noun phrase which becomes definite by being used twice in a text can be marked with zero in Japanese, a language in which the determiner is not a syntactic category. However, that is impossible in English, a language in which it is a syntactic category (i.e. they must be marked syntactically), as we can see in examples such as (b).

* 2 I realize that there is a number of distinctions concerning co-reference: distinction between "endophora", the case where antecedents exist in linguistic contexts, and "exophora", the case where they exist in non-linguistic contexts, or, a distinction between "anaphora", the case where antecedents precede co-referential noun phrases and "cataphora", the case where they follow co-referential noun phrases (cf. Halliday & Hasan 1976). However, I shall confine my discussion to endophoric anaphoric noun phrases excluding verb phrases such as (c).

(c) Taroo ga Hanako o nagut-ta. Jiroo-mo soosi -ta.
Taroo NOM Hanako ACC hit PST Jiroo also do so PST
"Taroo hit Hanako. Jiroo did so, too."

* 3 The abbreviations used in this paper are as follows:

ACC: Accusative, COMP: Complementizer, FIN: Final particle, FUT: Future,
GEN: Genitive, HON: Honorific, NOM: Nominative, PASS: Passive,
PROG: Progressive, PST: Past, Q: Question particle, TOP: Topic

* 4 The reason why *kono* is not used in indirect co-reference is that indirect co-reference is "substitution" (cf. Iori 1996, Halliday & Hasan 1976) and that *ko*-series demonstratives are not used in substitution.

* 5 The distinction between "one-place noun" and "zero-place noun" is similar to that between "non-saturated noun" and "saturated noun" in Nishiyama (1990). But Nishiyama discusses only the distinction and not the classification of saturated nouns. What I propose to discuss in this paper is that, in Japanese, the sub-classification of nouns which have no arguments or which are not semantically saturated is important. Equally important is whether nouns take or do not take arguments and whether noun phrases are semantically

saturated or not.

* 6 One of the most famous and important distinctions concerning semantic categories of noun phrases is that between "definite" and "indefinite". This is a distinction from the hearer's point of view: a noun phrase is definite if the referent is identifiable for the hearer (more precisely, the speaker assumes that the hearer can identify it), and it is indefinite if the referent is not identifiable for the hearer (the speaker assumes that the hearer cannot identify it. cf. Givón 1984). *Sensei no tyosyo* type of nouns have, on the other hand, characteristics of definite nouns and those of indefinite nouns simultaneously. They are definite because their referents are identifiable at the *type* level while they are indefinite because their referents are not identifiable at the *token* level. We consider these characteristics important and postulate a third meaning type for noun phrases: "controlled". In this type the producer or possessor, which corresponds to X in the structure "X no Y", can be specified at the *type* level but not at the *token* level. In general, noun phrases must be coded either as definite or indefinite in languages where the determiner is a syntactic category. However, since it is not a syntactic category in Japanese, we believe it possible to postulate a semantic category other than definite or indefinite.

* 7 Tsunoda's (1991) "possessive cline (*syoyuukeisya*)" is an attempt, which is similar to DOR, of arranging nouns according to their semantic characteristics. This cline is formulated as (d) based on the acceptability of the possessive honorific (*syoyuusyua keigo*).

- (d) Body-part > Property > Clothes > (Relatives) > Pets >
Works > Other possessed things

Although this cline shares some properties with DOR, for example Clothes is located in a high position both in the possessive cline and DOR, they are different concepts. While the possessive cline can be considered as a reflection of the identity of nouns and their antecedents (the low value of Pets or Works on the cline can be explained if we assume such identity, because respect in honorific sentences is essentially directed to human beings even in cases where no human beings exist in the surface structure, and therefore the acceptability of possessive honorifics is relatively low in the case of Pets or Works, whose identity with their antecedents is weak, are in the subject position in the honorific sentence), DOR is a degree nouns depend on other noun phrases to determine their extension and as such its degree is independent of the identity of nouns and their antecedents.

* 8 Some of the examples whose acceptability is low in (17) become acceptable in sentence like (e).

- (e) Hanako wa tomodati ni saisingata no {pasokon / reezooko} o homer-
are - te yoroko-nda
Hanako TOP friend by up-to-date GEN { pc / refrigerator} ACC praise
PASS glad was

"Hanako was pleased when her friends' praised her up-to-date
(pc / refrigerator)."

This may be because possessing "up-to-date" electrical appliances is easy to be interpreted as the property of the person because it shows his/her sensitivity to fashion.

*⁹ *Gakusei* "student" in (f) appears to be a counter example to this generalization, but its meaning is similar to *osiego* "pupil", which is a one-place noun. So we should treat *gakusei* in (f) and that in (g) as different lexical items.

(f) Taroo wa onsi ni gakusei o homer-are -te yoroko- nda.

Taroo TOP teacher by pupil ACC praise PASS and glad was

"Taroo was pleased when his teacher's praised his (= Taroo's) pupil."

(g) Kinoo ekimae de gakusei ga kenka o si tei -ta.

yesterday in front of station at student NOM fight ACC do PROG PST

"There were students fighting in front of the station yesterday."

*¹⁰ Indirect co-reference seems to be difficult in the case of Possessed thing even when the DOR is high, and piano "piano" in (h) and (i) interpreted as Product.

(h) Horobittu ga nakun -atta. Zannenda ga, sono piano / # piano
wa zutto ais -are- tuzukeru daroo.

Horowitz NOM pass away PST regrettable but the piano / piano

TOP forever love PASS will probably

"Horowitz passed away. It is regrettable, but his piano /piano will be loved forever."

(i) A-Sya wa ii seihin o tuku-ru. Sono pasokon / ??pasokon
mo totemo hyooban ga yoi.

A Company TOP good product ACC make FUT the pc / pc
also very reputation NOM good

"A Company produces good products. Its pcs / Pcs get reputations, too."

*¹¹ Yamanashi (1992) argues that "inference" is the main factor concerning the acceptability of indirect co-reference. The analysis I presented in this paper is an attempt to make it as manipulatable as possible. However, that does not mean that no pragmatic factors are relevant to the acceptability of indirect co-reference.

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