Relativization and Reflexivization in Japanese*

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0. INTRODUCTION

The interference between two anaphoric binding processes, namely relativization and reflexivization, has been called "anaphoric bleeding," by Akmajian and Kitagawa 1976 (henceforth A & K). In anaphoric bleeding, one anaphoric process, relativization, bleeds another process such as reflexivization when an NP coreferential with the head NP in the relative clause happens to be the reflexive pronoun <u>zibun</u>. A & K further argues that as a natural consequence of anaphoric bleeding, a reflexive pronoun such as <u>zibun</u> is devoid of the reflexive reading. The relevant example of theirs is the following:[1]

(1) a. $[_{NP}\ [_{S}$ Tom$_j$ ga zibun$_{i,*j}$ no imooto to kekkonsi-ta]
NOM SELF GEN sister COM marry-Past
Nancy$_i$] wa zinsei ni zetuboosi-ta
TPC life LOC driven-to-despair-Past
'Nancy$_i$, SELF's (i.e., whose$_i$) sister Tom$_j$ married, lost faith in life.'

b. Tom$_j$ ga zibun$_j$ no imooto to kekkonsi-ta
NOM SELF GEN sister COM marry-Past
'Tom$_j$ married SELF's (i.e., his own) sister.'

In Japanese, the subject NP is, in general, the only possible antecedent of the reflexive in forward reflexivization (cf. Oyakawa 1973, 1974).[2] In (1b), zibun is coreferential with the subject Tom; however, once the same sentence appears in the relative clause as in (1a), the subject cannot be the antecedent of the reflexive insofar as this reflexive is coreferential with the head NP.

The main purpose of this paper is to show that the employment of the framework presented here makes it possible to account for the semantic interference without the necessity of postulating an extra condition on the two anaphoric processes. The present framework is a Generalized Categorial Grammar, which embodies one translation rule for each syntactic rule. Before going into the main topic, in order to provide the grounds for the analysis of the anaphoric interference, I will present a pair of the syntactic rule and the translation rule for relative clause constructions and then introduce a rule for the interpretation of the (intransitive) verb phrase, IVP, containing the reflexive.

1. RELATIVIZATION AND REFLEXIVIZATION

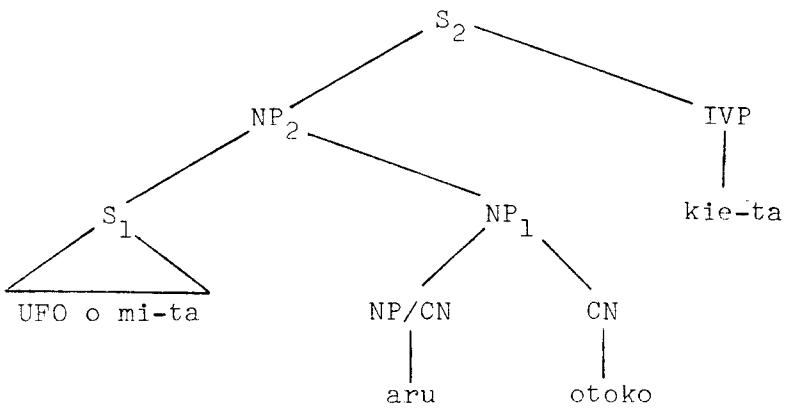
Following Bach and Cooper (1976) (henceforth B & C), I assume that in the relative clause construction, the head NP denotes a set of properties with a property R,

where R is a free property variable whose value is contextually determined. For example, in the higher NP of (2), aru otoko 'a man' denotes the set of properties possessed by a man with the property R, i.e., the property represented by the relative clause. The whole sentence is true just in case it occurred that the set of properties possessed by a man having the property of seeing a UFO contains the property of disappearing.[3]

(2) $[_{NP}\ [_{S}$ UFO o mi-ta] aru otoko] ga kie-ta
ACC see-Past a man NOM disappear-Past
'A man who saw a UFO disappeared.'

The categorial structure of (2) can be represented as the one in (3), where indices are added merely for ease of identification and no theoretical importance is presupposed.

(3)



The rule for relative clause constructions (cf. B & C) is represented as (4):

(4) NP = S NP

O' = $\lambda R[2'](\hat{}\lambda x_n[1'])$

The translation of (3) is indicated in (5), where aru is translated as an existential quantifier.

(5) NP_1: $\lambda P\exists x[[otoko'(x) \wedge R(x)] \wedge P(x)]$

S_1: $\lambda y[mi\text{-}ta'(\hat{}UFO')(y)]$

NP_2: $\lambda R[\lambda P\exists x[[otoko'(x) \wedge R(x)] \wedge P(x)](\hat{}\lambda y[mi\text{-}ta'(\hat{}UFO')(y)])$

$\lambda P\exists x[[otoko'(x) \wedge \lambda y[mi\text{-}ta'(\hat{}UFO')(y)](x)] \wedge P(x)]$

$\lambda P\exists x[[otoko'(x) \wedge [mi\text{-}ta'(\hat{}UFO')(x)]] \wedge P(x)]$

S_2: $\lambda P\exists x[[otoko'(x) \wedge [mi\text{-}ta'(\hat{}UFO')(x)]] \wedge P(x)](\hat{}kie\text{-}ta')$

$\exists x[[otoko'(x) \wedge [mi\text{-}ta'(\hat{}UFO')(x)]] \wedge kie\text{-}ta'(x)]$

We may paraphrase the reduced form in (5) as 'There is an individual x, such that x is a man, x saw a UFO, and x disappeared.'

Let z, x_1, x_2, x_n be the particular variables $\underline{v}_0$, <s,e>, $\underline{v}_1$, <s, e>, $\underline{v}_n$, <s, e>. Thus, z is also a subscripted variable, x_0, and is used merely for mnemonic purposes. Following Gazdar and Sag (1980), zibun is treated as uniquely designating the particular individual concept variable z and its translation is $\hat{P}P\{z\}$ of the same type as NP, where P is a variable ranging over properties of individual concepts. In rule (4), the translation of element 1, i.e., relative clause, may contain a variable z (or x_0), which may get bound in the process of relative clause binding. In Miyara (1983), I proposed a subject-controlled reflexive rule, whose simplified form is represented as in the following:[4]

(6) $\underset{[-refl]}{IVP} = \underset{[+refl]}{IVP}$

$O' = \lambda z[1'(z)]$

This rule has no syntactic effect, but is semantically abstracts on each variable z that is free in the IVP. The rule is optional and when applied, the designated variable z, free within the IVP, is bound in the occurrence of the subject. The reflexive zibun is taken here as having a syntactic feature [+refl].

We now consider the interpretation of the reflexive within the relative clause. In (7) below, within the relative clause, the IVP does not have the reflexive and thus rule (6) does not apply. Therefore, the variable z, translated for the reflexive appearing as the subject NP within the relative clause, remains free within the matrix IVP till it is bound in the occurrence of the subject John.

(7) John$_i$ wa [$_{IVP}$[$_{NP}$[$_S$ zibun$_i$ ga ___ kai-ta] hon] o
SELF NOM write-Past book ACC
Mary ni okut-ta]
send-Past
'John sent Mary the book which SELF (=he) wrote.'

If, however, the sentence contains the reflexive, zibun, in the IVP of the relative clause, the interpretation of a free variable z rests on where it is bound, i.e., at the encounter of either the subject NP of the relative

clause or that of the matrix sentence, yielding the ambiguous interpretation of zibun. This syntactically means that whenever, in the relative clause, the IVP contains a syntactic feature [+refl], there is a larger IVP, i.e., the matrix IVP, containing the relative clause with this particular feature. This syntactic fact of the two IVPs containing [+refl] conditions the application of rule (6), yielding the ambiguous interpretation of the reflexive. However, in (7), the reflexive appears as the subject in the relative clause; thus, it is only the matrix IVP that contains [+refl], thereby yielding the nonambiguous reading of the reflexive. We will observe two cases in which the reflexive appears in the nonsubject position of the relative clause and thus gives the ambiguous reading of the reflexive.

When, as in (8), z is bound in the occurrence of its immediate subject by rule (6) and this empty subject with the reflexive reading is relativized by rule (4), we obtain a meaning in which it is coreferential with okoto 'man'.

(8) John_i ga $[_{NP}\ [_S\ [_{NP}\text{\_\_\_}]\ [_{IVP}\ \text{zibun}_j$ o home-ta]]
NOM SELF ACC praise-Past
$\text{otoko}_j]$ o nagut-ta
man ACC hit-Past
'John hit the man who praised SELF (=himself).'

In (8), the simple common noun otoko in Japanese contextually refers to a particular male individual. As Gunji (1981) suggested, I employ the iota operator 'ι' for the interpretation of a particular individual. The translation of the relative clause in (8) comes out via rule (6) and that of the higher NP reduces to (9c).

(9) a. $\lambda R[\lambda PP\{\iota x_1[otoko'(x_1) \wedge R(x_1)]\}](\hat{}\lambda z[home\text{-}ta'(\hat{PP}\{z\})(z)])$

b. $\lambda PP\{\iota x_1[otoko'(x_1) \wedge \lambda z[home\text{-}ta'(\hat{PP}\{z\})(z)](x_1)]\}$

c. $\lambda PP\{\iota x_1[otoko'(x_1) \wedge [home\text{-}ta'(\hat{PP}\{x_1\})\ (x_1)]]\}$

(9c) denotes the set of properties possessed by a particular male individual having the property of praising himself.

On the other hand, when z remains free in the relative clause and is bound in the occurrence of the matrix subject John, as in (10), the free variable is interpreted as coreferential with John.

(10) $[_{NP}$ John$_i$] ga $[_{IVP}$ $[_{NP}$ $[_S$ ___ $[_{IVP}$ zibun$_i$ o
NOM SELF ACC
home-ta]] otoko$_j$] o nagut-ta]
praise-Past man ACC hit-Past
'John hit the man who praised SELF (=him).'

The step-by-step translation of the higher NP in (10) is shown in (11a-c) and rule (6) is applied to the IVP containing [+refl], changing from (11d) to (11e). (11f) is the translation of the whole sentence, which is converted into (11g) and then into (11h) by the application

of lambda conversion. The reduced logical form is roughly paraphrased as 'John hit a particular male individual having the property of praising him.'

(11) a. $\lambda R[\lambda PP\{\iota x_2[otoko'(x_2) \wedge R(x_2)]\}](\hat{}\lambda x_5[home\text{-}ta'(\hat{PP}\{z\})(x_5)])$

b. $\lambda PP\{\iota x_2[otoko'(x_2) \wedge \lambda x_5[home\text{-}ta'(\hat{PP}\{z\})(x_5)]]\}$

c. $\lambda PP\{\iota x_2[otoko'(x_2) \wedge [home\text{-}ta'(\hat{PP}\{z\})(x_2)]]\}$

d. $nagut\text{-}ta'(\hat{PP}\{\iota x_2[otoko'(x_2) \wedge [home\text{-}ta'(\hat{PP}\{z\})(x_2)]]\})$

e. $\lambda z[nagut\text{-}ta'(\hat{PP}\{\iota x_2[otoko'(x_2) \wedge [home\text{-}ta'(\hat{PP}\{z\})(x_2)]]\})(z)]$

f. $\lambda PP\{j\}(\hat{}\lambda z[nagut\text{-}ta'(\hat{PP}\{\iota x_2[otoko'(x_2) \wedge [home\text{-}ta'(\hat{PP}\{z\})(x_2)]]\})(z)]$

g. $\lambda z[nagut\text{-}ta'(\hat{PP}\{\iota x_2[otoko'(x_2) \wedge [home\text{-}ta'(\hat{PP}\{z\})(x_2)]]\})(z)]\ (j)$

h. $nagut\text{-}ta'(\hat{PP}\{\iota x_2[otoko'(x_2) \wedge [home\text{-}ta'(\hat{PP}\{j\})(x_2)]]\})(j)$

The ambiguous reading of <u>zibun</u>, indicated in (12a-b), receives precizely the same explanation as we had for (8) and (10).

(12) a. $Bill_i$ ga $[_{NP}\ [_S\ [_{NP}\ \_\_\_]\ [_{IVP}$ $zibun_j$ o hihansi-ta]]
NOM SELF ACC criticize-Past
$otoko_j]$ o hinansi-ta
man ACC accuse-Past
'Bill accused the man who criticized himself.'

b. $[_{NP}$ Bill$_i$] ga $[_{IVP}$ $[_S$ ___ zibun$_i$ o hihansi-ta]
NOM SELF ACC criticize-Past

otoko$_j$ o hinansi-ta
man ACC accuse-Past

'Bill accused the man who criticized him.'

Let us now consider some complex cases of relative clause binding. In (13a), there are two gaps in the lower relative clause and one of the NP gaps is related to the head NP which is in construction with the higher relative clause. If relativization were taken as involving movement in Japanese, (13a) violates "subjacency" (Chomsky 1980). On the other hand, in (13b), there occur both relativization, in which the object NP is relativized, and backward reflexivization between the head NP (antecedent) and the subject NP of the relative clause. In (7) and (13b), zibun receives the unambiguous reading since it appears as the subject in the relative clause; it is coreferential with the matrix subject in (7), but coreferential with the head NP in (13b). (13a) and (13b) mean more or less the same.

(13) a. $[_{NP_2}$ $[_{S_2}$ $[_{NP_1}$ $[_{S_1}$ $[$___$]_j$ $[$___$]_k$ kai-ta]
write-Past

subete-no hon$_k$] ga 'best seller' ni nat-ta]
all book NOM become-Past

aru sakka$_j$] ga sin-da
a writer NOM die-Past

'A writer, all of whose books that he wrote became best sellers, died.'

b. $[_{NP_2}\ [_{S_2}\ [_{NP_1}\ [_{S_1}\ [\text{zibun}]_j$ ga $[\ \_\_\_]_k$ kai-ta]
SELF

subete-no hon$_k$] ga 'best seller' ni nat-ta]

aru sakka$_j$] ga sin-da

'A writer, all of whose books that SELF wrote became best sellers, died.'

We will now see the translations of (13a) and (13b). The basic expressions subete and aru are translated below as a universal quantifier and an existential quantifier, respectively. The translation of (13b) is shown in (15), where the reflexive zibun is first translated as $\hat{P}P\{z\}$ and, as shown in the underlined parts, is eventually interpreted as being coreferential with a writer by virtue of lambda conversion. This permits the successful treatment of the fact that in the relative clause, the reflexive coreferential with the head NP is devoid of the reflexive reading. Both reduced logical expressions are roughly paraphrased as 'There is an individual x such that x is a writer and that for every y, it holds that y is a book and x wrote y and y became a best seller, and that x died.'

(14) subete-no hon: $\lambda Q \forall x_9[[hon'(x_9) \wedge R(x_9)] \rightarrow Q(x_9)]$

S_1: kai-ta'($\hat{P}P\{x_3\}$) (x_6)

NP_1: $\lambda R \lambda Q \forall x_9[[hon'(x_9) \wedge R(x_9)] \rightarrow Q(x_9)]$ ($\hat{}\lambda x_3$[kai-ta'($\hat{P}P\{x_3\}$) (x_6)])

$\lambda Q \forall x_9[[hon'(x_9) \wedge \lambda x_3[kai\text{-}ta'(\hat{P}P\{x_3\})(x_6)]\ (x_9)] \rightarrow Q(x_9)]$

$\lambda Q \forall x_9[[hon'(x_9) \wedge [kai\text{-}ta'(\hat{P}P\{x_9\})(x_6)]] \rightarrow Q(x_9)]$

S_2: $\lambda Q \forall x_9[[hon'(x_9) \wedge [kai\text{-}ta'(\hat{P}P\{x_9\})\ (x_6)]] \rightarrow Q(x_9)]$ (^b.s. ni nat-ta')

$\forall x_9[[hon'(x_9) \wedge [kai\text{-}ta'(\hat{P}P\{x_9\})(x_6)]] \rightarrow$ b.s. ni nat-ta'(x_9)]

aru sakka: $\lambda P \exists x_1[[sakka'(x_1) \wedge R(x_1)] \wedge P(x_1)]$

NP_2: $\lambda R \lambda P \exists x_1[[sakka'(x_1) \wedge R(x_1)] \wedge P(x_1)]$ ($\hat{}\lambda x_6 \forall x_9[[hon'(x_9) \wedge [kai\text{-}ta'(\hat{P}P\{x_9\})\ (x_6)]]$

$\rightarrow$b.s. ni nat-ta'(x_9)]

$\lambda P \exists x_1[[sakka'(x_1) \wedge \lambda x_6 \forall x_9[[hon'(x_9) \wedge [kai\text{-}ta'(\hat{P}P\{x_9\})\ (x_6)]]$

$\rightarrow$b.s. ni nat-ta'(x_9)] (x_1)] $\wedge P(x_1)]$

$\lambda P \exists x_1[[sakka'(x_1) \wedge \forall x_9[[hon'(x_9) \wedge [kai\text{-}ta'(\hat{P}P\{x_9\})\ (x_1)]] \rightarrow$ b.s. ni nat-ta'(x_9)]] $\wedge P(x_1)]$

NP_2 ga sin-da:

$\exists x_1[[sakka'(x_1) \wedge \forall x_9[[hon'(x_9) \wedge [kai\text{-}ta'(\hat{P}P\{x_9\})\ (x_1)]] \rightarrow$ b.s. ni nat-ta'(x_9)]] $\wedge$ sin-da'(x_1)]

(15) subete-no hon: $\lambda Q \forall x_9[[\text{hon}'(x_9) \wedge R(x_9)] \rightarrow Q(x_9)]$

S_1: $\text{kai-ta}'(\hat{P}P\{x_6\})(z)$

NP_1: $\lambda Q \forall x_9[[\text{hon}'(x_9) \wedge [\text{kai-ta}'(\hat{P}P\{x_9\})(z)]] \rightarrow Q(x_9)]$

S_2: $\forall x_9[[\text{hon}'(x_9) \wedge [\text{kai-ta}'(\hat{P}P\{x_9\})(z)]] \rightarrow \text{b.s. ni nat-ta}'(x_9)]$

NP_2: $\lambda P \exists x_1[[\text{sakka}'(x_1) \wedge \lambda z \forall x_9[[\text{hon}'(x_9) \wedge [\text{kai-ta}'(\hat{P}P\{x_9\})(z)]] \rightarrow \text{b.s. ni nat-ta}'(x_9)](x_1)] \wedge P(x_1)]$

$\lambda P \exists x_1[[\text{sakka}'(x_1) \wedge \forall x_9[[\text{hon}'(x_9) \wedge [\text{kai-ta}'(\hat{P}P\{x_9\})(x_1)]] \rightarrow \text{b.s. ni nat-ta}'(x_9)]] \wedge P(x_1)]$

NP_2 ga sin-da:

$\exists x_1[[\text{sakka}'(x_1) \wedge \forall x_9[[\text{hon}'(x_9) \wedge [\text{kai-ta}'(\hat{P}P\{x_9\})(x_1)]] \rightarrow \text{b.s. ni nat-ta}'(x_9)]] \wedge \text{sin-da}'(x_1)]$

2. ANAPHORIC BLEEDING

In the last example (13b) of the preceding section, we considered a case where the reflexive in the subject position of the relative clause is coreferential with the head NP, i.e., the head NP is the 'antecedent' of the reflexive. In this section, I deal with a case in which although, in the relative clause, the reflexive in the nonsubject position should be able to be coreferential with the subject, the only possible interpretation is that the reflexive is coreferential with the head NP. A & K treat such a semantic conflict as the interference among two anaphoric processes, namely relativization and reflexivization.

In (16), although yuuzin 'friend' should be a possible antecedent of the reflexive, the relative clause never allows such an interpretation; since it is the reflexive itself that is coreferential with the head NP, the relative clause has no expected NP gap. As A & K suggested, this may indicate that there is a predominance of relativization over reflexivization under the assumption that relativization is a deep structure condition and that reflexivization is a rule at a post-deep-structure level.

(16) $[_{NP}\ [_{S}$ yuuzin$_j$ ga zibun$_{i,*j}$ no kako o
friend NOM SELF GEN past ACC
hanasi(te-simaw)-ta] kasyu$_i$] ni wa geinoo-kai
talk -Past singer DAT TPC entertainment-world
kara intaisu-ru sika nakat-ta
SRC retire no-other-than Past
'There is no other way of retiring from the entertainment world for a singer, SELF's (i.e., whose) past her friend talked about.'

In (16), a free variable z should be bound either in the occurrence of the subject in the relative clause or in that of the head NP in the relative clause construction. In what follows, we will see how one possible case is disallowed and the other is permitted.

Once, as in (17a), a variable z gets bound in the occurrence of the subject within the relative clause, i.e., the reflexive pronoun is interpreted as being coreferential with a particular friend of hers, the application of the next relativization rule (i.e., rule (4)) yields the following translation (17b) for the higher NP.

(17) a. hanasi-ta'(^λPP{ιx$_4$[yuuzin'(x$_4$)]} no kako')
(ιx$_4$yuuzin'(x$_4$))

b. λR[λPP{ιx$_7$[kasyu'(x$_7$)∧R(x$_7$)]}](^λx$_j$[hanasi-ta'
(^λPP{ιx$_4$[yuuzin'(x$_4$)]} no kako')(ιx$_4$yuuzin'(x$_4$))])

In the translation for the relative clause, there is no occurrence of a free variable and thus the lambda operator does not bind occurrences of any particular variable represented by x_j in (17b). Thus, (17b) is an ill-formed logical form which cannot lead to the determination of the truth value of sentence (16).

Only when the translation of the relative clause has one or more occurrences of a particular free variable, does lambda conversion become possible in rule (4), as shown in (8b-c).

(18) a. $\lambda R[\lambda PP\{\iota x_7[kasyu'(x_7) \wedge R(x_7)]\}](\hat{}\lambda z[hanasi\text{-}ta'$
$(\hat{}\lambda PP\{z\}\ no\ kako')(\iota x_4 yuuzin'(x_4))])$

b. $\lambda PP\{\iota x_7[kasyu'(x_7) \wedge \lambda z[hanasi\text{-}ta'(\hat{}\lambda PP\{z\}\ no\ kako')$
$(\iota x_4 yuuzin'(x_4))](x_7)]\}$

c. $\lambda PP\{\iota x_7[kasyu'(x_7) \wedge [hanasi\text{-}ta'(\hat{}\lambda PP\{x_7\}\ no\ kako')$
$(\iota x_4 yuuzin'(x_4))]]\}$

(18c) would be paraphrased as 'the set of properties possessed by a singer, whose past a particular friend of hers talked about.'

In Section 1, we saw that the bottom-up application of rule (4) and rule (6) correctly accounts for why the interpretation of the reflexive is unambiguous in (7) and (13b) and why its interpretation is ambiguous in (8)-(11) and (12). In this section, it is shown that, even in the relative clause having no NP gap, the same rules (4) and (6) naturally provide the unambiguous reading of the reflexive in nonsubject position.

3. CONCLUSION

In the transformational theory of relativization and reflexivization (cf. Akmajian and Kitagawa 1976), the two anaphoric processes interfere with each other. Therefore, it is necessary to postulate such a condition on the application of the two operations that one bleeds the other. I have shown that in the theories like a Generalized Categorial Grammar, the two anaphoric processes do not interfere at all and that the proposed translation rules not only capture a generality of each anaphoric process, as shown in Section 1, and discussed in Miyara (1983), but also account for the natural interpretation of the reflexive pronoun of a special usage without the necessity of postulating any extra condition on these operations.

FOOTNOTES

*I would like to express my gratitude to Karen Lupardus for her many stylistic suggestions of this paper.

[1]Abbreviations that appear in this paper are the following:

NOM	Nominative	ACC	Accusative
DAT	Dative	GEN	Genitive
LOC	Locative	SRC	Source
COM	Comitative	TPC	Topic
SELF	Reflexive Pronoun		

[2]For the non-transformational treatment of forward reflexivization, cf. Gunji (1981) and Miyara (1981, 1983).

[3]Throughout this paper, the syntax and semantics of tense are disregarded.

[4]For ease of exposition, I treat the subject NP as taking its IVP as an argument.

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