Double Subject, Double Nominative Object and Double Accusative Object Constructions in Japanese and Korean

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Abstract

This paper presents a unified account of three kinds of constructions in which more than one NP can show up with the same case in simple sentences in Japanese and Korean: double subject, double nominative object and double accusative constructions. Noting that the second NPs in these constructions are functional or relational, this paper proposes to assign them the category and type different from the first NPs. We show the derivations of these three constructions in a parallel manner, and explain the asymmetries in extractability between possessor and possessed NPs in relativization.

1 Introduction

Much attention has centered on the so-called double (multiple) subject construction (hereafter, DSC) in Japanese and Korean,[1] as illustrated in (1) and (2), in the literature of empirical and theoretical linguistics:

(1) a. Syusyoo-no byooki-ga saikin omo-i.
Prime Minister-GEN illness-NOM recently serious-PRES
'The Prime Minister is seriously ill.'
b. Syusyoo-ga saikin byooki-ga omo-i.
Prime Minister-NOM recently illness-NOM serious-PRES

(2) a. Swunsang-uy pyeng-i choykun simha-ta.
The Prime Minister-Gen illness-NOM recently serious-PRES
b. Swunsang-i choykun peyng-i simha-ta.
The Prime Minister-Nom recently illness-NOM serious-PRES

In the (b) examples of (1) and (2), we insert the adverb *saikin* and *choykun* 'recently' between the two nominative NPs to show that these two nominative NPs do not form a constituent (if the 'possessor' NP shows up with genitive case, adverbs may not intervene between these NPs, as in **syusyoo-no saikin byoojoo* 'lit. *Prime Minister's recently condition'). In the generative grammar framework, it has been argued that the sentence-initial nominative NP (hereafter, we refer to it as 'major subject') raises to a higher position (the targets vary depending on the movement theories the authors adopt) from the possessor position of the following subject by NP-movement in DSC. For example, Hasegawa (1999) proposes the derivation like (3):

(3) $[_{IP}$ Neko-ga$_j$ $[_{IP}$ $[_{NP}$ t_j karada-ga $]_i$ $[_{AP}$ t_i yawaraka-i].
cat-NOM body-NOM soft-PRES

[1] It is well known that more than two NPs marked with nominative or accusative case can appear in simple sentences in Japanese and Korean, but we limit ourselves to those containing just two nominative NPs or accusative NPs in this paper. Our analysis can easily be extended to deal with multiple subject/object constructions in general.

DSC has an IP-adjunction structure generated by NP-movement in (3)[2]. Notice here that the movement in (3) violates the limitation of 'one case per chain' since it involves two case (i.e., genitive and nominative case) positions in the chain formed by the movement of the possessor. Besides, this kind of explanation has ignored a lot of important characteristics of this construction, concentrating only on the multiple assignment/licensing of nominative case to the major and regular subjects.

On the other hand, some Japanese traditional grammarians have proposed a kind of complex structure for DSC. (4) is cited from Sugimoto (1986):

(4) [$_{S2}$ Yamada-san-ga [$_{S1}$ okusan-ga kirei-da]]
Yamada-NOM wife-NOM beautiful-PRES
'Mr. Yamada's wife is beautiful.'

Sugimoto assumes that DSC has a complement sentence structure, in which the S1 is embedded under the matrix sentence S2. This argumentation immediately conflicts with the standard notion of a 'clausal complement', which is assumed to be a clause subcategorized for by a higher predicate. In (4), there is no matrix predicate which would take the clausal complement S1 as argument. He also dubs S1 *BUN-JUTUGO* 'Sentence-Predicate', but he does not give any explanation for the reason WHY this sentence, in which the argument structure of the predicate *kirei-da* 'is beautiful' is fully satisfied, can be predicated of the major subject. I believe that the availability of layers of predication in DSC like (4) is the most important feature of this construction which requires an explanation.

Japanese and Korean also have interesting constructions related to DSC. Consider sentence (5b), where the object and its possessor shows up with nominative case:[3]

(5) a. Hanako-ni(wa) kono hon-no naiyoo-ga yoku wakar-u.
Hanako-DAT(TOP) this book-GEN content-NOM well understand-PRES
'Hanako understands the content of this book well.'
b. Hanako-ni(wa) kono hon-ga yoku naiyoo-ga wakar-u.
Hanako-DAT(TOP) this book-NOM well content-NOM understand-PRES.

It is well-known that both the possessor and possessed NP's can be marked with accusative Case in

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[2] In fact, some generative grammarians do not admit the IP-adjunction structure like (3) and suggest that a major subject move to a specifier position of some functional category. Mihara (1990) and Takezawa (2000), while assuming that DSC have the IP-adjunction structure, argue that a major subject is not raised to the IP adjoined position but base-generated there.

[3] Note here that, in the sentence in (5), the nominative NP *kono hon-ga* 'this book' is NOT a subject as can be seen from the pair in (i):

(i) a. Taroo-ni jibun$_i$-no koto-ga wakar-u.
Taroo-DAT SELF-GEN thing-NOM understand-PRES
'Taroo understands himself.'
b. * Jibun-ni Taroo-no koto-ga wakar-u.
SELF-DAT Taroo-GEN thing-NOM understand-PRES

In (ia), the nominative *jibun* 'self' can be corefer with the dative NP *Taroo*, whereas in (ib), *Taroo* cannot be the antecedent of the reflexive *zibun* (Notice that the word order is irrelevant, as can be seen in *Jibun no koto-ga Tarooni wakaru* vs **Taroo-no koto-ga jibun-ni wakar-u*). Also, the dative NP, but not the nominative objsect, induces subject-honorification, a kind of subject-agreement in Japanese, as illustrated in (ii):

(ii) Sensei$_i$-ni(wa) imadoki-no seito$_j$-ga o-wakari-ninara$_{i/*j}$-nai.
Teacher-DAT(-TOP) these-days-GEN students-NOM HON-understand-HON-NEG
'The teacher doesn't understand students of today.'

All the tests for subjecthood clearly show that dative (experiencer) NPs are subjects, whereas nominative objects have much in common with normal accusative objects in transitive sentences.

Korean transitive sentences (which are called the Inalienable Possessor Construction or Multiple Accusative Constructions) and these accusative NP's must stand in an inalienable possession relation. Observe the pair in (6) (taken from Cho 1993):

(6) a. Mary-ka John-uy tali-lul cha-ss-ta.
Mary-NOM John-GEN leg-ACC kick-PAST-DEC
'Mary kicked John's leg.'

b. Mary-ka John-ul tali-lul cha-ess-ta.
Mary-NOM John-ACC leg-ACC kick-PAST-DEC

These three kinds of constructions, i.e., DSC, the double (multiple) nominative object construction (hereafter, DNOC) and double (multiple) accusative object construction (hereafter, DAC), surely seem to share some interesting properties: in a simple sentence with only one predicate, more than one NP show up with the identical case. They must stand in a close relationship and the preceding (possessor) NP is NOT an argument of a predicate, but still assigned structural case.

We will address to another similarity these three constructions have in common: possesee NPs resist extraction in relative clauses while possessor NPs can be the heads of relative clauses:

(7) a. byoojoo-ga omoi syusyoo
illness-NOM serious prime minister
'the prime minister who is seriously ill'

b. * syusyoo-ga omoi byoojoo
the prime minister-NOM serious illness

(8) a. Hanako-ni naiyoo-ga wakar-u hon
Hanako-DAT content-NOM understand-PRES book
'the book the content of which Hanako understands'

b. * Hanako-ni kono hon-ga wakar-u naiyoo
Hanako-DAT this book-NOM understand content

(9) a. Thalo-ka meli-lul simhakey ttayli-n Hanakho
Thalo-Nom head-Acc hard hit-PAST Hanakho
'Hanakho whose head Thalo hit hard'

b. * Thalo-ka Hanakho-lul simhakey ttayli-n meli
Thalo-Nom Hanakho-Acc hard hit-PAST head

In this paper, we will argue that these three kinds of constructions (DSC, DNOC and DAC) in which more than one NPs show up with identical cases must be dealt with in a unified manner. The remainder of this article breaks down as follows. Section 2 outlines the framework we will adopt in this paper, the Combinatory Categorial Grammar proposed by Steedman (1996, 2000), and then shows the derivation of DSC in Japanese and Korean. Section 3 deals with DNOC and DAC, showing that these three kinds of constructions can and must be derived in a unified manner. Section 4 discusses consequences of the derivations of these constructions and the constraint on relative clause formation of DSC, DNOC and DAC. Section 5 presents conclusions.

2 Combinatory Categorial Grammar and Derivations of Double Subject Construction

As a descriptive framework, we adopt the Combinatory Categorial Grammar proposed by Steedman (1996, 2000, among others). CCG analyzes only surface strings of natural language, avoiding descriptive devices such as movement or deletion rules, abstract levels of representation, and empty categories. Combinatory rules may only apply to entities which are linguistically realized and adjacent, building up expressions from words to larger expressions. The modes of combination of expressions are entirely determined by lexical syntactic types, which specify semantic valency and canonical constituent order, and nothing else. For example, the verb *eat* in English has the category assignment in (1):

(10) eats := $(S/_LNP)/NP$

A forward slash / means that an argument of the appropriate type must appear to the right of the functor; a backward slash, notated as '$/_L$' in this paper, means that the argument must appear to the left The category of *eats* indicates that it is a function that seeks an NP argument (i.e., an object) on its right to form a verb phrase of category $S/_LNP$, and then seeks an NP argument (i.e., a subject) on its left to form an S. I introduce only three combinatory rules in (11) relevant for the present discussions.

(11) a. $X/Y{:}f \quad Y{:}a \Rightarrow X{:}fa \qquad Y{:}a \quad X/_LY{:}f \Rightarrow X{:}fa$

b. $X/Y{:}g \quad Y/Z{:}f \Rightarrow_B X/Z{:}gf \quad Y/_LZ{:}f \quad X/_LY{:}g \Rightarrow_B X/_LZ{:}gf$

c. $X{:}a \Rightarrow_T T/_L(T/X) \qquad$ or $T/(T/_LX)$: $\lambda f.fa$

(11a) is the rule of function application. A function of category X/Y combines with an adjacent argument of category Y to yield a result of category X and interpretation *fa*, the result of applying *f* to *a*. This rule, for example, combines a transitive verb with an object to yield the verb phrase, and then combines the verb phrase with a subject to produce the sentence. The rule of function composition (11b) allows the main function of category X/Y to combine with the subordinate function of category Y/Z to yield a function of category X/Z. (11c) is the rule of type-raising, which is the process of reanalyzing an argument category as a new function which takes as its argument the function that would have applied to it before type raising. For example, this operation converts a subject NP, which would normally be an argument to a verb phrase of category $NP/_LS$, into a function looking forward for a verb phrase on the right, $S/(S/_LNP)$. We will see how these combinatory rules work to derive the surface constituents and their interpretations immediately below. Observing a close parallel traditionally maintained between syntax and semantics, we spell out semantic interpretations using italics following a colon, as in *eat* := $(S/_LNP)/NP$: $\lambda x.\lambda y.eat'(x)(y)$.

Assuming this simple apparatus, let us turn to the analysis of double subject sentences. As mentioned before, the most important property of these construction is that a simple sentence involves the layers of predication in that for each subject, the rest of the sentence denotes the property of its referent. To derive the structure involving the layers of predication in a sentence, we must address the syntactic and semantic properties of the second subject. For concreteness' sake, observe the contrast in grammaticality in (12):

(12) a. Tanaka-san-ga okusan-ga bijin-des-u.
Tanaka-Mr.-NOM wife-NOM beautiful-woman-BE-PRES
'Mr. Tanaka's wife is beautiful.'

b. * Tanaka-san-ga Hanako-san-ga bijin-des-u.
Tanaka-Mr.-NOM Hanako-Ms.-NOM beautiful-woman-BE-PRES

(13) a. Yamaguti-san-ga motikabu-ga kyuuraku-s-ita.
Yamaguti-Mr.-NOM shares-NOM sudden-drop-DO-PAST
'The price of Mr. Yamaguti's shares fell suddenly.'

b.??Tanaka-san-ga kabu-ga kyuuraku-s-ita.
Yamaguti-Mr.-NOM stock-NOM sudden-drop-DO-PAST

Cf. Yamaguti-san-no kabu-ga kyuuraku-s-ta.
Yamaguti-Mr.-GEN stock-NOM sudden-drop-DO-PAST

Even if *Hanako* in (12b) is Tanaka's wife, this sentence is completely unacceptable. Namely, in DSC, the second subject must be semantically (referentially) dependent upon the preceding (major) subject. The degraded status of (13b) seems to be due to the difficulty in getting a relational reading with *kabu*

'stock' (note that it is grammatical when the possessor *Yamaguti-san* is marked with genitive case as in *Yamaguti-san no kabu*, whereas (13b) is good because *motikabu* 'stock holdings' always requires to be construed relationally. In other words, the second subject in DSC does not denote an independent individual or individuals by itself, but denotes a part of the individual(s) denoted by the first subject, or some independent individual(s) standing in a certain close relations with its referent(s). In fact, some double subject sentences cannot appear without the major subjects, as illustrated in (14):

(14) a. * Se-ga taka-i.
height-NOM tall-PRES.
b.?? Okusan-ga bijin-des-u.
wife-NOM beautiful woman-BE-PRES

Though (14b) is not ungrammatical, it cannot denote truth values because it must be specified as to whose wife *okusan-ga* refers to in the context. The sentences in (14) should be taken to be open propositions denoting properties of some persons. The nouns like *okusan* 'wife' are argued to involve 'variables' in them as in 'wife-of-x' (Engdahl 1988, Jacobsen 1999, Baldridge 2000, Kruijff and Vasishth 2001). Many authors refer to this kind of nouns as 'relational nouns.' Let us assume that relational nouns have the category $NP/_{L}NP$, which look for possessors on the left and returns a concatenated NP, and the type <e,e>, i.e., functions from individuals to individuals (see Jacobson 1999, 2000, among others). We indicate the morphological case and semantic role on categories by subscripts for expository convenience, as in (15):

(15) *okusan* := $NP_{Nom}/_{L}NP_{Gen.Pos}$: $\lambda x.wife'\text{-}of(x)$

(15) states that *okusan* 'wife' is a functional expression looking leftward for a possessor marked with genitive case to return 'his wife' as a derived expression. Given this category and type for relational nouns, we can show the derivation of sentence (1a) with the possessor marked with genitive case:

(16)

syusyoo-no	byojo-ga	omoi
NP_{Gen}: *prime minister'*	$NP_{Nom}/_{L}NP_{Pos.Gen}$: $\lambda x.illness'$-of(x)	$S/_{L}NP_{Nom}$: $\lambda y.serious'(y)$
NP_{Nom}: *illness-of(prime-minister')*		< Predication
S: *serious'(illness'*-of(*prime-minister'*))		

The derivation in (16) requires no explanation. *Syusyo-no* 'prime minister' is concatenated to *byojo-ga* 'illness' by usual function application to yield the subject NP. Before proceeding to the derivation of the double subject sentences, let us assume the very simple definition of subject and object following Dowty (1997:7).

(17) a. A SUBJECT is any NP that combines with S/NP (or $S/_{L}NP$) to form S.

b. A DIRECT OBJECT (DO) is any NP that combines with (S/NP)/NP (or $(S/_{L}NP)/NP$)) to form $S/_{L}NP$.

Let us turn to the derivation of double subject sentences like (1b):

(18)

syusyoo-ga	byojo-ga	omoi
NP_{Nom}: *prime minister'*	$NP_{Nom}/_{L}NP_{Pos.Gen}$: $\lambda x.illness'$-of(x)	$S/_{L}NP_{Nom}$: $\lambda y.serious'(y)$
*	$S/NP_{Pos.Gen}$: $\lambda x.serious'(illness'\text{-}of(x))$	

Since CCG allows flexible constituency, the relational NP *byojo-ga* 'illness-of-x' can combines with the adjectival predicate *omoi* 'serious' first via function composition, yielding the derived predicate *byojo-ga omoi* 'is seriously ill'. However, this complex predicate cannot be concatenated to the

nominative NP *syusyoo-ga* 'prime minister' because it is an expression of category $S/_{L}NP_{Gen.Pos}$ which look leftward for a possessor marked with GENITIVE case. When the major subject *syushoo-ga* combines with this derived predicate, case conflict immediately arises.

We have to introduce another lexical rule which inserts a gap into an expression of functional category in order to avoid case conflict in DSC. According to Jacobson (1999), this rule changes an argument of a functional category into a gap and encodes the information of the unrealized argument on the result as a feature. Let us call this rule the 'category shift.' The expression which undergoes this rule becomes a gap-containing category.

(19) the Category Shift (CS): Let us indicate an argument of a functional category by '|'. Any expression of category (A/B)/...C can shift to (A|C)/B.

(19) is a unary rule mapping an expression into a new expression. (19), for instance, change the category of relational expressions like *okusan* 'wife', as in (20):

(20)

	category	type	interpretation
okusan :=	$TP_{Nom}/_{L}TP_{Pos.Gen}$	<e,e>	λx.*wife'*-of(x)
$==>_{CS}$	$TP_{Nom}\|TP_{Pos}$	<e,e>	λx.*wife'*-of(x)

In (20), the category shift rule changes the expression of category $TP_{Nom}/_{L}TP_{Pos.Gen}$ to the expression containing a gap in its possessor position of category $TP_{Nom}|TP_{Pos}$, in which the case feature of the gap is deleted because it will not combine with a phonologically realized argument. The information of the missing argument $|TP_{Pos}$ should be taken as a kind of feature encoded on the result category (Jacobson 1999:150).

Given the CS rule in (19) and the category and type of relational NPs, we can show the desired derivation of sentence (1b) as in (21):

(21)

syusyo-ga	byoojoo-ga	omoi	
NP_{Nom}: *prime_minister'*	$NP_{Nom}/_{L}NP_{Pos.Gen}$: λx.*condition'-of*(x)	$S/_{L}TP_{Nom}$: λy.*is-serious'*(y)	
	$=>_{CS}$ $NP_{Nom}\|NP_{Pos}$: λx.*condition'-of*(x)	B<	Predication I
	$S\|TP_{Pos}$: λx.*is-serious'*(*condition'*-of(x))	<	Predication II
S:*is-serious'*(*condition'*-of(*prime minister'*))			

In (21), *byoojoo* 'condition' cannot directly combine with the overt possessor because it has undergone the category shift and become a gap containing expression. Therefore, it composes with the predicate *omoi* 'serious', saturating its θ-grid and resulting in the 'sentence' with a gap in the possessor position. In fact, expressions which have undergone the category shift or inherited gaps from shifted expressions via function composition are simply open expressions containing free variables. The derived expression *byojo-ga omoi* 'seriously ill' in (21), for example, is an open proposition with an unbound variable in the possessor position of the second subject. This open proposition can be a predicate by the standard lambda abstraction over a free variable, defined as in (22).

(22) If *F* is a formula and *x* is a variable, then $\lambda x.Fx$ is a predicate.

For the sake of simplicity, we will omit the steps of lambda abstraction from the derivations shown below. It should be noticed here that the category of propositions in (20) is not of S or IP, as has been assumed in the literature of generative or traditional grammars, but of S|TP, which indicates that these derived (open) propositions are property denoting expressions of type <e,t>, exactly as normal VPs. In the framework assuming the tight syntax-semantics relation in the theory of grammar, derived propositions with gaps can never have the category of sentence which denotes truth-values, not

properties.

Consequently, the category of major subjects must also be changed. The category of the derived predicate in (21) is $S|NP_{Pos}$ (an open sentence containing a possessor gap), but the category of the gap, |NP, cannot be cancelled by the NP category of the major subject because |NP only indicates that the possessor is not phonologically realized. Let us assume that languages like Japanese or Korean have another kind of type raising rule, which raises (major) subject NPs to the category taking an open proposition as an argument to return a (fully saturated) proposition in (23b):

(23) Type raising of subjects in Japanese and Korean (Lexical rule)

		category	type	interpretation
a.	normal subject	$S/(S/_{L}TP_{Nom})$	<<e,t>,t>	$\lambda P.Pa$
b.	major subject	S/(S|TP)	<<e,t>,t>	$\lambda P.Pa$

Steedman (2000) proposes to associate the rules of type raising with case assignment. Kruijff and Vasishth (2001:18) also uses the type raising to generate a noun in the subject position. That is, the raised category $S/(S/_{L}NP)$ specifies the noun as nominative case. If this speculation is correct, we may have the type-raised category (23b) for major subjects in addition to the standard raised category (23a) for normal subjects. (23b) assigns the interpretation as a generalized quantifier to major subjects in the same way as (23a). Normal subjects must be (external) arguments taken by predicates whereas major subjects are not arguments of predicates at all. The category in (23b) intuitively states that a major subject can be licensed by an open sentence with a gap, which can occur anywhere in the open sentence in principle. In the derivation (21), the category of the major subject *syusyoo-ga* 'prime minister' should be type-raised over the open proposition *byoojoo-ga omoi* 'x's condition is serious' and assigned the category of S/(S|TP).[4] Then it can combine with the derived predicate (roughly, λx.x's condition is serious) without causing case conflict.

3 Double Nominative Objects and Double Accusative Objects

Given the category and type for relational nouns and the category shift in (19), our analysis of the DSC proposed in Section 2 can be straightforwardly extended to the constructions with more than one nominative object or accusative object in Japanese and Korean. DNOC and DAC share the same syntactic and semantic properties with DSC (in fact, it seems that the semantic relationship between the possessors and possesses in these constructions is much more restricted and they must stand in a so-called inalienable possession relation or the whole-part relation[5]). It is clear that the preceding

[4] Chierchia (1985:437) suggests the following rule of nominative case assignment:
(i) Propositional functions assign case.
In this sense, it is not surprising that open propositions, as well as normal VPs, can assign nominative case to major subjects in DSC.

[5] We should classify relational nouns into two subgroup: reflexive relational nouns and pronominal relational nouns. The former refers to parts of individuals, whereas the latter refers to independent individuals standing in some close relation, e.g., a kinship relation, with individuals denoted by possessors. Reflexive relational nouns are similar to standard reflexives in that the order of an antecedent and a reflexive or relational noun cannot be reversed, as shown in (i):

(i) a. John-ga jibun-o seme-ta.
John-NOM self-ACC blame-PAST
'John blamed himself.'
b. * Jibun-ga John-ni semer-are-ta.
SELF-NOM John-BY blame-PASS-PAST

(ii) a. John-ga asi-o ot-ta.
John-NOM leg-ACC brake-PAST
'John broke his leg.'
b. * Asi-ga John-ni or-are-ta.
leg-NOM John-BY break-PASS-PAST

nominative and accusative objects are NOT arguments subcategorized by predicates though they seem to be assigned structural cases. We will argue that these possessor objects are licensed by certain constituents derived in a way similar to open propositions in DSC.

The examples involving multiple occurrence of nominative and accusative objects are repeated here for convenience as (24) and (25).

(24) a. Hanako-ni kono hon-no naiyoo-ga yoku wakar-u.
Hanako-DAT this book-GEN content-NOM well understand-PRES
'Hanako understands the content of this book well.'

b. Hanako-ni kono hon-ga yoku naiyoo-ga wakar-u.
Hanako-DAT this book-NOM well content-NOM understand-PRES.

(25) a. Thalo-nun Hanakho-uy meli-lul simhakey ttayly-essta.
Thalo-NOM Hanakho-GEN head-ACC hard hit-PAST
'Taroo hit Hanako's head hard.'

b. Thalo-nun Hanakho-lul simhakey meli-lul ttayly-essta.
Thalo-NOM Hanakho-ACC hard head-ACC hit-PAST

(26) illustrates the derivation of double nominative object sentence (24b):

(26)

Hanako-ni	kono hon-ga	yoku	naiyoo-ga	wakar-u.
$NP_{Exp.Dat}$	$NP_{Pos.Nom.}$	S$/S$	$NP_{Nom}/_{L}NP_{Pos.Gen}$	$(S/_{L}NP_{Dat})/_{L}NP_{Nom}$
: *hanako'*	: *this-book'*		: $\lambda x.$*content-of'*(x)	: $\lambda x.$*understand'*(x)

$$\Rightarrow_{CS} \frac{NP_{Nom} \quad | NP_{Pos} : \lambda x.\textit{content-of'}(x)}{(S/_{L}NP_{Dat})|NP_{Pos} : \lambda x.\lambda y.\textit{understand'}(\textit{content-of'}(x))(y)} <B$$

$S/_{L}NP_{Exp.Dat}$: $\lambda y.$*understand'*$($*content-of*$($*this-book'*$))(y)$

As mentioned in foot note 3, let us assume that the dative NP *Hanako* is the subject and the nominative NP *naiyoo-ga* 'content' is the object in this sentence. Also assume that this case array is lexically specified for a set of psych-predicates which are subcategorized for experiencer and theme arguments. In derivation (26), the relational noun *naiyoo-ga* must undergo the category shift and get a gap inserted into its possessor position. This shifted nominative object combine with the transitive verb *wakaru* 'understand' to yield an open predicate *naiyoo-ga wakaru* 'understand the content-of-x', which still has an <e,<e,t>> interpretation. Since, according to our definition of the object in (17b), an object is any NP that combines with (S/NP)/NP (or $(S/_{L}NP)/NP$)) to form $S/_{L}NP$, this open predicate can take another OBJECT to form a predicate phrase, and the additional nominative object *kono hon-ga* 'this book' is licensed, as desired.

This derivation holds for DAC in Korean, as we can see the derivation of (25) in (27):

In contrast, pronominal relational nouns denote certain (close) relations between independent individuals, and can be easily passivised.

(iii) a. John-ga hahaoya-o korosi-ta.
John-NOM mother-ACC kill-PAST
'John killed his mother.'

b. Hahaoya-ga John-ni koros-are-ta.
mother-NOM John-BY kill-PASS-PAST
'His mother was killed by John.'

In (iiib), *hahaoya-ga* 'mother' can naturally be construed as John's mother.

Descriptively, we can circumvent this kind of semantic restriction by stating that only possessors of reflxive relational nouns (that is, nouns denoting inalienable possession relations) can be assigned the same case as the possessee in DNOC and DAC.

(27) Thalo-nun Hanakho-lul simhakey meli-lul ttayly-essta.

NP_{Nom} NP_{Acc} S$/S$ $NP_{Acc}/_{L}NP_{Pos.Gen}$ $(S/_{L}NP_{Nom})/_{L}NP_{Acc}$

: *Thalo'* : *Hanakho'* : λx.*head-of*(x) : λx.λy.*hit'*(x)(y)

$=>_{CS}$ $NP_{Acc}|NP_{Pos}$:λx.*head'*-of(x) <B

$(S/_{L}NP)|NP_{Pos}$:λx.λy.*hit'*(*head-of*(x))(y) <

$S/_{L}NP$:λy.*hit'*(*head-of*(*Hanakho'*))(y)

The derivation of DAC in (27) is identical to that of DNOC in (26) except for the case on object NPs. Note here that the constituent derived by function composition, *meli-lul ttaylyessta* 'hit the-head-of(x)' is NOT a one-place predicate but still a two-place predicate. My informants suggest that a pause is required to intervene between two accusative NPs in (27). In addition to this intuition, the fact that adverbials may intervene between them gives a strong support for the derivation shown in (27) (cf. **hanakho-uy simhakey meli-lul* 'Hanako's hard head'). When the possessor shows up with accusative case, it obligatorily composes with the transitive verb first and the constituency of the possessor and possessee must be disrupted.

The derived verb phrases in (26) and (27) are open predicates (predicate functions) involving variables in the possessor positions of the objects. The category of open predicates $(S/NP)|NP_{Pos}$ cannot be reduced to give predicates by combining with the overt possessor objects because |NP category simply indicates gaps in the possessor position. We need another type raising for possessor objects which combine with open predicates in DNOC and DAC. The rule of type-raising for (first) object NPs would be written as in (28), where the symbol 'VP' is used as an abbreviation for $S/_{L}NP$:

(28) NP_{Obj} => VP/(VP|NP)

The raised category for objects states that the objects are the expressions that combines with open verb phrases to yield verb phrases. The type raising rule (28) might be disallowed under standard categorical grammars in the Montague tradition because the raised object NPs can not easily be associated with the interpretation as generalized quantifiers. But if we extend the proposal of relating type raising and positioning of nouns in Steedman (2000) and Kruijff and Vasishth (2001), we can posit (28) for possessor objects in DNOC and DAC as an additional type raising in Japanese and Korean. Let us leave open the question of whether this kind of special type raising rule should be required in our theory of grammar or not.

Under the analysis proposed here, we can explain the syntactic derivations and semantic interpretations of DSC, DNOC and DAC in a unified manner. In languages like English, NPs marked with structural cases strictly correspond to external or internal arguments of predicates. On the other hand, in languages like Japanese and Korean which does not exhibit morphological agreement, NPs which are not licensed by the theta-grids of predicates can show up with structural cases. We propose that relational nouns contain variables inherently and that they are different in category and type from ordinary nouns denoting individuals.[6] We also argue that some subjects and objects are licensed by open expressions in Japanese and Korean. The simple framework of CCG with function composition allows flexible constituency in derivations of expressions and gives a unified account to the phenomena of multiple occurrence of subjects and objects in simple sentences in these two languages.

4 Double Subject and Double Object Constructions and Relativization

So far, we have dealt with the derivations of DSC, DNOC, and DAC in a unified manner. If our discussions centers only around the multiple assignment of an identical case to the possessor and

[6] We do not have to posit phonologically null elements corresponding to variables in our semantic representations. In fact, our approach is variable-free in the sense of Jacobson (1999, 2000). Note that we use variables in the derivations throughout this paper only for ease of exposition.

possessee NPs, ignoring syntactic and semantic characteristics shared by all the possesees in the three kinds of constructions, the contrasts between possessors and possesees in extractability in (7)-(9) (repeated here as (29)-(31)) must be treated separately. In sentences (29)-(31), it is only possessor NP's that can be extracted from relative clauses, regardless of surface case-marking.

(29) a. byoojoo-ga omoi syusyoo
illness-NOM serious prime minister
'the prime minister who is seriously ill'

b. * syusyoo-ga omoi byoojoo
the prime minister-NOM serious illness

(30) a. Hanako-ni naiyoo-ga wakar-u hon
Hanako-DAT content-NOM understand-PRES book
'the book the content of which Hanako understands'

b. * Hanako-ni kono hon-ga wakar-u naiyoo
Hanako-DAT this book-NOM understand content

(31) a. Thalo-ka meli-lul simhakey ttayli-n Hanakho
Thalo-Nom head-Acc hard hit-PAST Hanakho
'Hanakho whose head Thalo hit hard'

b. * Thalo-ka Hanakho-lul simhakey ttayli-n meli
Thalo-Nom Hanakho-Acc hard hit-PAST head

Here, let us limit our selvesto the so-called head-external (standard) relative clauses which contain gaps corresponding to the heads. In this kind of relative clause, an open proposition containing a gap (i.e., a relative clause) modifies a head noun. Let us analyze the noun-modifying form of predicates as the verb stem plus the noun modifying suffix of category (N/N)/(S/$_L$NP). First, let us look at the asymmetries in extractability between possessor and possessee NPs in DSC. The derivations of (29a) and (29b) can be shown as in (32a) and (32b):

(32) a.

byoojoo-ga	omo-	i	syusyoo
NP|NP$_{Pos}$: x.*illness*'of(x)	S|NP: λx.*serious*''(x)$_B$	(N/N)/(S|NP)	N: *prime-minister'*
S|NP$_{Pos}$: λx.*serious*''(*illness*'-of(x))			
N/N: λP.λx.*serious*'(*illness*''-of(x)) & P'(x)			
N: λx.*serious*'(*illness*'(x)) & *prime-minister*'(x)			

b.*

syusyoo-ga	omo-	i	byoojoo
NP: *prime-minister'*	S|NP: λx.*serious*''(x)	(N/N)/(S|NP)	N: *illness'*
S: *serious*'(*prime-minister'*) *			

In (32a) where the major subject is extracted, though the argument structure of the predicate *omoi* 'serious' in the relative clause is saturated, a gap remains in the possessor position of the subject. The relative clause *byoojoo-ga omoi* 'whose condition is serious' is, therefore, an open sentence of category S\|TP and type <e,t>, and denotes a property of an individual corresponding to the head noun *syusyoo* 'Prime Minister'. On the contrary, the relational noun is extracted in ungrammatical (32b) and the relative clause will be construed as a complete proposition, which cannot modify a head noun and denote its property.[7]

[7] It should be noted here that the ungrammatical status of (32b) cannot simply be attributed to some semantic or pragmatic reason. We can easily come up with a DSC examples, in which relational nouns can be omitted and still grammatical. Consider:
(i)a. Kono hebi-ga doo-ga naga-i.

This line of argument immediately holds for the asymmetries in extractability in DNOC and DAC. Let us look at the contrast in extractability between the possessor and possesee in relativization of DAC:

(33) a. [Thalo-ka meli-lul simhakey ttayl -in] Hanakho
NP: NP/NP: S$/S$: $(S/_L NP)/_L NP$: $(N/N)/_L(S|NP)$ N:
Thalo' $\lambda x.$*head-of*'(x) hard' $\lambda x.\lambda y.$*hit*'x)(y) *Hanakho'*

S|NP: $\lambda x.$*hit*'(*head-of*'(x))(*Thalo'*)

N/N: $\lambda P.\lambda x.$*hit*'(*head-of*'(x),(*Thalo'*)) & P(x)

b.*[Thalo-ka Hanakho-lul simhakey ttayl- in] meli
NP: NP: S$/S$: $(S/_L NP)/_L NP$: $(N/N)/_L(S|NP)$ N:
Thalo' *Hanakho'* *hard'* $\lambda x.\lambda y.$*hit*'(x)(y) *head'*

* S:*hit*'(*Hanakho'*)(*Thalo'*)

In the grammatical (33a), in which the possessor is extracted, the gap in the possessor position of the relational obbject *meli-lul* 'head' is passed up to the relative clause, even though the theta-grid of the transitive verb is saturated. Thus, the relative clause *Thalo-ka meli-lul simhakey ttayl-in* 'Taroo hit x's head' is an open expression of category S|NP and type <e,t>, and can modify the head noun, denoting a property of *Hanakho*. In (33b) where the relational noun is extracted, the relative clause is a complete sentence with no gap and cannot become a property denoting expression.

The category and type of relational nouns and relative clause formation using function composition can give a unified account to the asymmetries in extractability between possessors and possesees in DSC, DNOC and DAC in Japanese and Korean.

5 Conclusion

In the literature, double/multiple subject and object constructions have been treated as separate phenomena because the discussions have centered around the multiple assignment (licensing) of identical cases to more than one NP in simple sentences. This approach can not derive DSC, DNOC, and DAC and explain the asymmetries in extractability in relative clauses uniformly. On the other hand, we have shown that these constructions share many important characteristics in addition to multiple case assignment. We argue that the possessors and possessees are different in categories and types in these constructions, and that the possessees are syntactically and semantically functional, taking possessors as arguments. We also propose a rule inserting a gap into a possessor position, which is encoded on the functional category as a feature and passed up to derived constituents. It is also argued that the possessor subjects and objects are not licensed by the theta-grids of predicates but by constituents like open propositions or open predicates containing free variables in these constructions. The flexible constituency assumed in CCG can give an unified account to a wide

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this snake-NOM body-NOM long-PRES
'This snake's body is long.'

b. Kono hebi-ga naga-i.
'This snake is long.'

However, we have asymmetries between the possessor and possessee in extractability with relative clause formation.

(ii) a. doo-ga naga-i hebi
body-NOM long-REL snake
'the snake whose body is long'

b.* kono hebi-ga naga-i doo
this snake-NOM long-REL body

In the ungrammatical (iib), *kono hebi-ga nagai* is semantically and/or pragmatically fine, but this clause does not contain any gap and cannot modify the head noun *doo* 'body'.

range of phenomena involving multiple subject and object constructions and the asymmetries in extraction with relative clause formation, reflecting native speakers' intuition about syntactic constituency and semantic interpretations of these constructions.

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