

Two Types of Complex Predicate Formation: Japanese Passive and Potential Verbs ^{*}

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Abstract. This paper deals with the complex verb formation of passive and potential predicates and syntactic structures projected by these verbs. Though both predicates are formed with the suffix *-rare* which has been assumed to originate from the same stem, they show significantly different syntactic behaviors. We propose two kinds of concatenation of base verbs and auxiliaries; passive verbs are lexically formed with the most restrictive mode of combination, while potential verbs are formed syntactically via more flexible combinatory operations of function composition. The difference in the mode of complex verb formation has significant consequences for their syntactic structures and semantic interpretations, including different combination with the honorific morphemes and subjectivization of arguments/adjuncts of base verbs. We also consider the case alternation phenomena and their implications for scope construals found in potential sentences, which can be accounted for in a unified manner in terms of the optional application of function composition.

Keywords: Complex predicates, passive verb, potential verb, honorification, subjectivization, Combinatory Categorical Grammar.

1. Introduction

Syntax and semantics of complex verbs have long been the focus of attention in Japanese linguistics. This paper proposes a new approach to the formation of passive and potential verbs, both of which include the auxiliary verb *-rare*, and explore the relationship between the complex verb formation and projections of syntactic structures. The auxiliary verb *-rare* has been assumed to be semantically ambiguous among passive, potential, spontaneous and honorific interpretations. We will take up the passive and potential interpretations of the auxiliary verb, and argue that there is a crucial difference between the two use of this verb. First, observe the sentence in (1):

- (1) Kurisumasu-ni-wa takusan-no keeki-ga taber-are-ru.
 Christmas-at-Top a lot of cake-Nom eat-Can/Pass-Pres
 'At Christmas, a lot of cakes are/can be eaten.'

(1) can be interpreted as passive on one reading, i.e., a lot of cakes are eaten at Christmas. On another reading, (1) is taken to be a statement of the possibility; we (or arbitrary people) can eat a lot of cakes at Christmas.

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The multiple usages of the auxiliary verb *-rare* has been assumed to be due to the common origin, sharing the meaning of spontaneity (*get, become, etc.*), though there are different hypotheses concerning which use is original. The interpretations of *-rare* are ambiguous in some cases and it is necessary to take contextual information into account. We will argue, however, that the two complex verbs must be derived in a completely different manner, exploring the interactions between the word formation and honorification or choice of subjects in sentences projected from them. Honorification is a device to indicate that the speaker feels respect for the person referred to by the grammatical subject or object, using the discontinuous honorific morpheme comprising the prefix *o-* and the verb *-ni-nar* (a kind of auxiliary verb). This morpheme combines with (actually wrap) verbal roots (infinitives) without changing the argument structures of the latter. (2) illustrates the subject honorification we address in this paper. Hereafter, HP stands for the honorific prefix (*o-*) and HS the honorific suffix (*-ninar*).

- (2) Sensei-wa keeki-o o-tabe-nina(r)-tta.
 Sensei-Top cake-Acc HP-eat-HS-Past
 'Sensei ate a cake.'

Interestingly, the passive and potential complex verbs, both of which are formed by the concatenation with the auxiliary verb *-rare*, shows different processes of honorification. The honorific morpheme wraps derived complex passive forms, while it wraps only base verbs, and *-rare* follows the derived honorific forms in the potential verb formation. Compare the following examples:

- (3) a. Sensei-wa okusama-ni o-sikar-are-nina(r)-tta.
 teacher-Top wife-BY HP-reproach-Pass-HS-Past
 'The teacher was reproached by his wife.'
- b. Sensei-wa okusama-o/-ga o-sikar-ninar-(ar)e-nai.
 teacher-Top wife-Acc/-Nom HP-reproach-HS-Can-Neg-Pres
 'The teacher cannot reproach his wife.'

This paper provide a new account for the relation between syntactic structures and the complex verb formation, in which passive and potential complex verbs are formed in a completely different manner. We discuss how subjects with a wide variety of semantic relations to base verbs are derived in potential constructions and consider the properties of (major) subjects in stative sentences, the license of which should be distinguished from that of ordinary subjects.

2. Framework: Combinatory Categorical Grammar

In this paper we adopt a mildly context-sensitive grammar, Combinatory Categorical Grammar (henceforce, CCG; see Steedman 1996, 2000, Baldridge 2002, among others) as a descriptive framework. 'Mildly context-sensitive' means that this grammar formalism allows associativity (rebracketing) and permutativity (reordering) among the modes of combination, in addition to the standard context-free concatenation (application). The combinatory rules allowing such flexible combinations are often said to be too strong in generative capacity, and quite often derive illicit strings in some languages. For example, it has been pointed out that the non-associative and permutative mode (for the mixed composition rules) is not necessary for English grammar, but necessary to derive some constructions in Dutch. To constrain the applicability of rules, Baldridge (2002) and Steedman & Baldridge (2007) propose to use modalized slashes in combinatory rules, so that the applicability of rules can be lexically controlled. The Multi-modal CCG defines the hierarchy of modes as in (6):

- (4)
-
- * non-permutative/non-associative
 - ◊ associative/non-permutative
 - x non-associative/permutative
 - associative/permutative

The * modality is the most restricted and allows only functional application. The ◊ modality permits order-preserving associativity in derivation. The mode • is placed at the bottom of hierarchy, which indicates that it is the most permissive one, inheriting the properties of all the others. Then we have the following list of combinatory rules:

- (5) a. (>) $X/Y \quad Y \Rightarrow X$
 (<) $Y \quad X \backslash Y \Rightarrow X$
 b. (>B) $X / \diamond Y \quad Y / \diamond Z \Rightarrow X / \diamond Z$
 (<B) $Y \backslash \diamond Z \quad X \backslash \diamond Y \Rightarrow X \backslash \diamond Z$
 c. (>B_x) $X / \times Y \quad Y \backslash \times Z \Rightarrow X \backslash \times Z$
 (<B_x) $Y \backslash \times Z \quad X \backslash \times Y \Rightarrow X \backslash \times Z$
 d. (>T) $X \Rightarrow Y /_i (Y \backslash_i X)$
 (<T) $X \Rightarrow Y \backslash_i (Y /_i X)$
 e. LWRAP: $Y \quad X \downarrow \diamond Y \Rightarrow X$

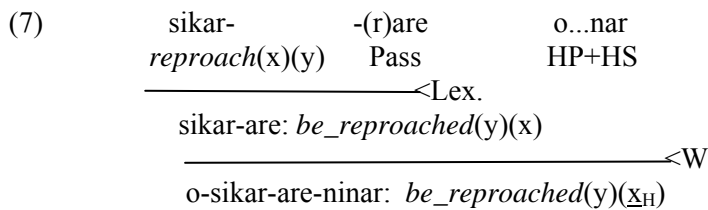
We will simply omit the symbol '*' in the derivations hereafter. The harmonic composition rules in (5b) allows associativity, while the disharmonic, mixed composition rules in (5c) allow permutation of elements in input strings. The input to the type-raising in (5d) does not make reference to any slashes, but the slashes in the output category must have the same mode, and the subscript *i* stands for a variable over modes. CCG has no (left) wrap rules as in (5e) but we will use the wrapping rule as in (5e) only for expository purposes when the honorific morpheme combines with verbs, and assume that it may participate in harmonic composition.

3. Derivations of Passive and Potential Complex Verbs

In this section, let us consider how to derive the two complex verbs, especially addressing the interaction with honorification. We also examine the subject selection in sentences projected from these complex predicates (especially in potential constructions), which is proved to be a direct consequence of the concatenation we propose shortly. First let us start with the fact that the discontinuous honorific form wraps the complex passive verbs, whereas it wraps only the base infinitive of potential verbs.

- (6)a. o- sikar- are- nina(r)-tta. (Passive)
 HP- scold- PASS- HS-PAST
-
- b. o- sikari- ni_nar- (ar)e- ru. (Potential)
 HP- scold- HS- CAN-PRES
-

The dependency relations between corresponding morphemes can be shown respectively as in (6). We should notice the change in argument structures through the concatenation. In (6a), the honorific expressions mark the derived external argument of the passive verb *sikar-are* 'reproached', which was originally the theme argument of the base verb, as the person the speaker has respect for. Since this change of argument structure is not derived syntactically, the derivation of passive verbs must be treated in the lexicon. In examples and derivations, the respected referents are indicated with underlines annotated with H if necessary. In (6b), the relation between discontinuous honorific expressions and that between the base and potential verbs may be said to show crossing dependencies. The base verb is wrapped by the honorifics first and the derived form *o-sikari-ninar*, is followed by the potential auxiliary verb. We assume that the original external argument of infinitive is suppressed/demoted and the original theme is promoted to the outermost argument in the argument structure of a passive, whereas such argument change does not occur in that of a potential verb. The derivation of a passive verb with honorifics can be shown as in (7) where the passive complex verb is formed by a lexical operation, and honorification may apply to it in syntax.



The subject of a potential construction is often difficult to distinguish from that of passive, as illustrated in (1), where the theme of the original base verb is the subject in both readings, but we can see a significant difference in subject selection between two constructions. In potential sentences, any argument or adjunct can be subjectivized, as illustrated in (8), the derivation of which will be explored in the following section.

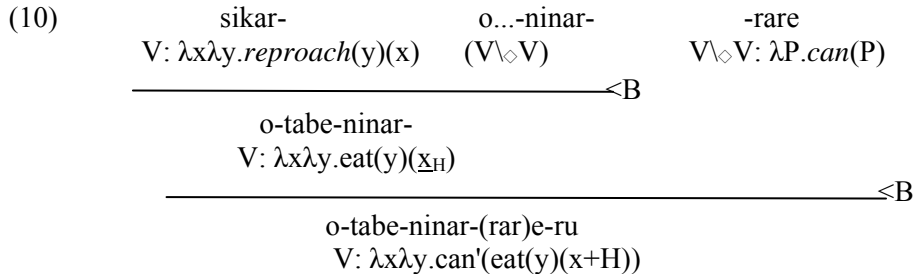
- (8) a. Kono resutoran-ga/-de oisii keeki-o/-ga taber-are-ru.
 this restaurant-Nom/-Loc delicious cake-Acc/-Nom eat-Can-Pres
 'This restaurant is such that people can eat delicious cakes there.'
- b. Kono naifu-ga/-de katai niku-o/-ga kantan-ni kir-(rar)e-ru.
 this-knife-Nom/-By leathery meat-Nom/-Acc easily cut-Can-Pres
 'This knife is such that people can cut leathery meat easily with it.'

It should be noticed that adjuncts cannot be subjectivized in passive sentences. The examples in (8) remind us of the missing object constructions in English. In fact, any argument/adjunct can become a subject in tough-type sentences in Japanese. The only candidate for the syntactic structure of these sentences can be derived by via null operator movement in the government-binding theory, as shown in (9). Here let us assume that adjuncts are optional arguments to the verb following Marten (2002), McConnell-Ginet (1982), Steedman (1996).

- (9) [Kono naifu-ga [_{CP} OP_i [_{IP} PRO_{arb} katai-niku-o t_i kir] -(ar)e-ru].
 this knife-Nom leathery meat-Acc cut- Can-Pres

The direct movement of the adjunct to the subject position is not allowed in the theory, so the null operator must be posited in its base position and be moved up to associate the matrix subject with the proper semantic role (i.e., instrumental). Because the null operator movement is a kind of *wh*-movement, adjuncts as well as arguments can be moved to the [Spec, CP] position. It is not clear, however, how the structure like (9) can provide a proper interpretation

compositionally, which is considered in section 4. Sentences like (8) suggest that the argument structures are not changed as seen in the passive case (7), so we can infer that the potential complex verb is derived syntactically. Observe the formation of the potential verb with honorifics in (10).



In derivation (10), the base verb *-tabe* combines with/wrapped by the honorific morpheme first, postponing the concatenation with arguments/adjuncts lexically or optionally specified. The information of arguments/adjuncts can be passed along to the resulting complex form. Then the honorific base verb combines with the potential auxiliary verb by composition. The complex potential verb with the honorific morpheme actually conveys information of arguments or adjuncts which were not consumed throughout the formation. This will explain the occurrence of multiple nominative terms in potential constructions, which is not allowed in passive sentences. Notice that any absorption of arguments or externalization of internal arguments does not occur here. The information of semantic roles of a base verb are simply passed up via a device like the slash-feature passing mechanism. This operation must be carried out in syntax.

Here let us consider the examples of case alternation like (11).

- (11) a. Taroo-ga eigo-o hanas-(ar)e-ru.
 Taroo-Nom English-Acc speak-Can-Pres
 'Taroo can speak English.'
- b. Taroo-ga eigo-o hanas-(ar)e-ru.
 Taroo-Nom English-Acc speak-Can-Pres
 ibid.

There is no semantic difference between (11a) and (11b) (but we will see a difference in scope interpretation in the next section). In (11a) with the accusative object, the arguments combine with the base verb in the order lexically specified. On the other hand, in (11b) with the nominative object, the base verb 'speak' combines with the potential verb, which assigns the nominative case to the object as a stative verb (because stative verbs has no ability to assign accusative case). This alternation is not allowed in passive sentences because passive verbs are lexically specified to consume arguments by the most restrictive mode of operation, which results in obligatory case absorption. The * modality in the category of passive verbs allows only the applicative rule. On the other hand, the potential verb are lexically specified as having less restrictive modality. Naturally, we can conclude that the potential suffix are allowed to concatenate in both the * and \diamond mode, exactly as in the tough-sentences in (12).

- (12) a. It is easy to play the sonata with the violin.
 b. This violin is easy to play the sonata with.

- (13) a. It seems to need repainting this wall.
 b. This wall seems to need repainting e.

In (a) sentences, the accusative case is assigned to the object in situ by the infinitive. In (b) sentences, the information of missing objects is passed up to the top of complement clauses. It should be noticed that the matrix subjects are licensed by the embedded clauses with missing objects (i.e., open propositions, ignoring agent arguments of infinitives). The point is the optionality of the application of function composition/slash-feature passing operation. This optionality is not available for the passive verb formation which is lexically specified to undergo the most restrictive combination. The hierarchy for slash modalities can account for the difference in availability of case alternation between passive and potential verbs.

4. Selection of Subjects and its Implications

In this section let us extend the analysis proposed in the previous section and derive potential sentences including subjects with various semantic roles. We proposed that passives are formed only by application while potentials are formed by application or composition. Therefore, only the theme arguments of base verbs can be subjects in passive sentences, as expected. So the problem may happen only if the base verbs have more than one objects like ditransitive verbs. On the other hand, any argument or adjunct can be subjectivized in potential sentences, which we want to explain. Let us take a look at derivation (14) as a first approximation:

$$\begin{array}{cccc}
 (14) & \text{kono naifu-ga} & \text{yasai-o} & \text{kantan-ni} & \text{o-kiri-ninar-(ar)e-ru} \\
 & \text{this knife} & \text{vegetables} & \text{easily} & \text{HP-cut-HS-Can-Pres} \\
 & N_{\text{Nom}} & N_{\text{Acc}} & VP \backslash VP & (((S \backslash N_{\text{PRO}}) \backslash \diamond N_{\text{Inst}}) \backslash N_{\text{Acc}} \\
 & & & & \lambda x. \lambda y. \text{can}'(\text{cut}'(y)(\text{PRO}_H)(\text{with}_x)) \\
 & & & & \text{---} <B \\
 & & & & S \backslash NP_{\text{Inst}}: \lambda x. \text{can}'(\text{cut}'(\text{vegetables})(\text{PRO}_H)(\text{with}_x))
 \end{array}$$

As mentioned above, we take adjuncts to be of *e*-type as optional arguments to base verbs, not of $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ type, which is assigned to typical verb phrase modifiers. Notice that the accusative object can be marked with nominative if function composition is applied before it is consumed by application. Composition rule can be generalized as (15), so that we can easily transmit any number of arguments/adjuncts to the resulting category. Then the features of missing instrumental and theme arguments may be inherited to the predicate phrase.

(15) Backward Composition (<B):¹

$$Y \backslash Z \$ X \backslash Y \Rightarrow X \backslash Z \$$$

where the symbol $Z \$$ stands for Z and all leftward-looking functor categories into Z .

In derivation (14) we encounter another problem. The derived predicate phrase is the functor looking leftward for the adjunct which seems to convey oblique case, but the corresponding subject is marked with nominative case, so case conflict arises here. This is a very important point to be accounted for to deal with the notion of subject in stative sentences in languages like Japanese. In the generative grammar tradition, the notion of major subject has been appealed to, which is not directly licensed by the argument structure of a verb, but by a whole predicate phrase containing some gap. Typical example of a sentence containing the major subject can be shown in (16), which has been referred to as a so-called multiple subject construction.

¹ The $\$$ -convention is defined as in (i)

(i) The $\$$ convention

For a category α , $\{\alpha \$\}$, (respectively, $\{\alpha/\$\}$, $\{\alpha/L \$\}$) denotes the set containing α and all functions (respectively, leftward functions, rightward functions) into a category in $\{\alpha \$\}$ (respectively, $\{\alpha/\$\}$, $\{\alpha/L \$\}$). (Steedman 2000:42)

- (16) Souru-ga jinkoo-ga ooi.
 Seoul-Nom population-Nom many-Pres
 'Seoul is such that its population is large.'

The argument structure of the predicate *ooi* 'be many' is saturated by the second subject. The hearer, however, takes the leftmost nominative phrase *Souru-ga* to be a kind of subject which denotes a property of Seoul. As the interpretation of (16), Seoul is a member of the set denoted by the clause 'jinkoo-ga ooi' (a set of cities with a large population). Suppose that *jinkoo* 'population' is a relational noun, and, roughly, it is of type $\langle e, e \rangle$, a function from individuals to individuals. It takes some individual (a city/country/area) and returns its population as a value. Therefore, (16) has the structure as illustrated in (17):

- (17) [Seoul-ga [_{<e,t>} [e's jinkoo-ga] ooi]]
 S/(S\NP_{-Case}): S\NP_{Gen}:
 λP:P(*Seoul*) λx.be_many (population_of_x)
 _____> inferential application
 S: be_many(population_of(*Seoul*))

We assign the special lifted category, S/(S\NP_{-Case}) to the major subject like *Souru-ga* in (17), which is licensed by an open proposition containing at least one gap inside. This category ignores or circumvents case mismatch, which is caused by and inherited from a missing argument/adjunct. So the application of the major subject with the typed-up category to the open proposition is not purely grammatical, but inferential (subjects should have the property denoted by the remaining phrases). This application is licensed by inference or the set-inclusion relation, something like that Seoul (denoting a set of sets) should include a set of individuals with a large population. This category for major subjects as in (17) can be assigned only to the subjects of stative sentences in languages like Japanese.

Potential constructions are stative in that they denote some potentials/abilities belonging to the referents of subjects, and their subjects can or must be lifted as S/(S\NP) by definition. On the other hand, since passives usually denotes events, they are not stative and their subjects are not allowed to have this category for the subjects. We conclude the derivation of (14) as shown in (18):

- (18) kono naifu-ga yasai-o kantan-ni o-kiri-ninar-(ar)e-ru

 S/(S\NP_{-Case}): S\NP_{Inst}: λx.can'(cut'(vegetables)(PRO_H)(with_x)
 λP:P(*this_knife*)
 _____>
 S: λx.can'(cut'(vegetables)(PRO_H)(with_this_knife)

The sentence means that this knife has the property that arbitrary people can cut vegetables easily with it. The flexibility of subject selection in potential constructions can be accounted for in terms of more general property of subjects in stative sentences. Their subjects are lifted to denote a set of properties, and simply licensed by open propositions syntactically and semantically.

Let us see one consequence of our analysis. Tada (1992) points out that Case alternations in potential sentences result in the difference in quantifier scope. Observe the difference in scope interpretation illustrated by (19a) and (19b):

- (19) a. John-ga migime-dake-o tumur-e-ru-koto
 John-NOM right-eye-only-ACC close-can-fact
 'John can close only his right eye.' (can > only, only > ?*can)

- b. John-ga migime-dake-ga tumur-e-ru-koto
 John-NOM right-eye-only-NOM close-can-fact (only > can, *can > only)

The dominant reading of (19a) with the accusative object is that John can close only his right eye (i.e., he can wink his right eye). When marked with nominative case, the theme argument in (19b) must take scope over the potential verb. Sentence (19b) implies that he cannot close his left eye. He tries to explain the difference in scope in (19) in terms of movement of the object, which cannot apply to the similar difference in (20).

- (20) a. Kono resutoran-dake-de 50-nin-ga suwar-(ar)e-ru.
 this restaurant-only-In 50-Clas-Nom sit-Can-Press
 '50 people can sit in this restaurant.' (can > only, only > ?*can)

- b. Kono resutoran-dake-ga 50-nin-ga suwar-(ar)e-ru.
 this restaurant-only-Nom 50-Clas-Nom sit-Can-Pres
 '50 people can sit in this restaurant' (only > can, *can > only)

(20b) implies that there is no other restaurant which can accommodate 50 people. Tada's analysis cannot account for the difference in interpretation between (20a) and (20b) because NP-movement should not be used to move adjuncts to the Spec-IP position. Our function composition account can easily deal with the contrasts found in (19) and (20) in a unified way because this operation does not distinguish arguments and adjuncts if we take adjuncts to be optional arguments of predicates.

5. Conclusion

We compared the passive and potential verb formation, and explored their implications for the interactions with honorification and subjectivization. Though the same suffix *-rare* is used to derive both the passive and potential constructions, they show completely different syntactic behaviors. We noted the different morphological processes of honorification and proposed that passive predicates are formed by the most restrictive combinatory mode in the lexicon, application, whereas potential verbs are formed by composition, which permits associativity. We discussed some syntactic consequences of our proposed analysis, including subject selection in these constructions and quantifier scope construals in potential constructions. Our analysis of the potential verbs using function composition allows a wider variety of arguments and adjuncts to become the subjects of potential sentences. We have shown that it also accounts for the interaction of case alternations and scope interpretations found only in potential constructions.

References

- Brown, P. F., S. A. Della Pietra, V. J. Della Pietra and R.L. Mercer. 1993. The Mathematics of Machine Translation: Parameter Estimation. *Computational Linguistics*, 19(2), 263-311.
- Baldrige, J. and G-J. Kruijff. 2002. Multi-Modal Combinatory Categorical Grammar. Proceedings of 10th Annual Meeting of the EACL.
- Huck, G. J. 1988. Phrasal Verbs and the Categories of Postponent in Oehrle, R. and E. Back, eds. *Categorical Grammars and Natural Language Structures*, 249-263. D. Reidel.
- Marten, L. 2002. *At the Syntax-Pragmatics Interface: Verbal Underspecification and Concept Formation in Dynamic Syntax*. Oxford University Press.
- McConnell-Ginet, S. 1982. Adverbs and Logical Form: A Linguistically Realistic Theory. *Language* 58, 144-184.
- Mihara, K. and T. Hiraiwa. 2006. *Shin-Nihongo-no Toogo-koozo--Minimarisuto Puroguramu-to*

Sono Ooyoo. Syoohaku-sya.

Steedman, M. 1996. *Surface Structure and Interpretation*. MIT Press.

Steedman, M. 2000. *The Syntactic Process*. MIT Press.

Steedman, M. and J. Baldrige. (to appear) Combinatory Categorical Grammar. In: R. Borsley and K. Borjars eds., *Non-Transformational Syntax*. Blackwell.

Tada, Hiroaki. 1992. Nominative Objects in Japanese. *Journal of Japanese Linguistics* 14, 91-108.