SYNTACTIC CATEGORIES IN JAPANESE*

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1. Introduction

Several distinct principles are considered to work together when syntactic categories like NP, VP, PP, etc. are assigned to words and phrases. The most important of them are listed in (1).

(1) Criteria of syntactic categorization

a. Function (or distribution)

b. Morphology

c. Internal structure

One of them is "function" or "distribution" of the syntactic unit. For example, what can be the subject of a sentence, the object of a transitive verb or a preposition is most likely to be an NP. It classifies words/phrases according to their function in a larger phrase/sentence in which they occur. Another principle of classification is "morphology". Certain words in Japanese are "adjectives" rather than "verbs" because of their inflectional pattern even though adjectives and verbs are functionally equivalent in that they both can serve as the predicate of a sentence. A third principle is the "internal structure" of the expression. For example, (2) and (3) are considered to be NP and PP respectively becuase of their internal structure in whatever context they occur or even when they are presented in isolation.

(2) a. my two friends who are studying linguistics

b. John no hahaoya

'John's mother'

(3) in the box

It is true that the results of classification by these distinct principles often converge into a single classification, and thus support the syntactic categories and the principles of classification, as long as we work with only typical NP's, typical VP's, etc. There are, however, a number of irregular cases with respect to which the criteria of (1) would contradict with each other.

According to Ross (1973), what are called "nouns" only exhibit some of the properties of typical nouns. "Noun" is then not a syntactic category but a bundle of properties. Some expressions have more of such properties and are said to be more "nouny" than others. Because of irregular cases, syntactic categories convey little information about the syntactic properties of expressions. So, they have to be supplemented by syntactic features. One might argue that notions like "typical NP's", "typical nouns", "typical verbs", etc. are linguistic universals (or psychological realities), and that an explanatory theory should try to explain atypical cases in terms of typical cases. But though it may be natural and effective to describe neutral tints in terms of typical red, typical yellow, etc., it is not obvious that the same applies in syntax which tries to describe structures of discrete units.

In order to develop an explanatory theory of syntax, an effective method of description is needed that can adequately distinguish all kinds of syntactic categories. Characterization of typical nouns, verbs, etc. is made possible only by such powerful descriptive techniques. Montague Grammar (MG) and Generalized Phrase Structure Grammar (GPSG) seem to offer such a technique. Its most important features are given in (4).

(4) a. A new syntactic category can be produced by combining two or more syntactic categories.

b. S is not the only recursive symbol.

c. S is not the only category that undergoes transformation.

d. Transformation may change the meaning and/or syntactic category.

(4) lifts most of the important constraints of the Standard Theory, and makes the MG syntax a powerful theory. But at the same time, as will be made clear below, (4a) will make strict subcategorization superfluous, and (4b) eliminates Equi NP Deletion (or empty categories).

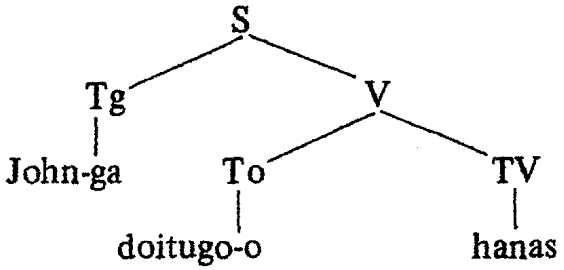
In this paper, we propose a system of syntactic categories that classifies words and phrases based strictly on their syntactic behavior. It is a revised version of the categorial system of MG applied to Japanese.(1) Though simple semantic representations are given, no special claim about semantic representations is intended. It only argues for a system of representing the syntactic properties of words and phrases which we believe is more efficient and consistent than that of transformational generative grammar.

2. Nominative subjects and dative subjects

Japanese has two types of sentences, those with a nominative subject and those with a dative subject. (5a) is a sentence with a nominative subject. (5b) shows its syntactic structure, and (5c) its semantic representation.(2)

(5) a. John ga doitugo o hanas u.
'John speaks German.'

b.



where:

Tg: NP in the nominative case

V: VP that can form an S together with the preceding Tg

To: NP in the accusative case

TV: Transitive verb (phrase) that forms a V together with the preceding To

c. hanas (j, d) where: d: doitugo 'German'

d. *doitugo o hanas* V ⇒ λx (hanas (x, d)) 'x speaks German'

e. *hanas* TV ⇒ λyλx (hanas (x, y)) 'x speaks y'

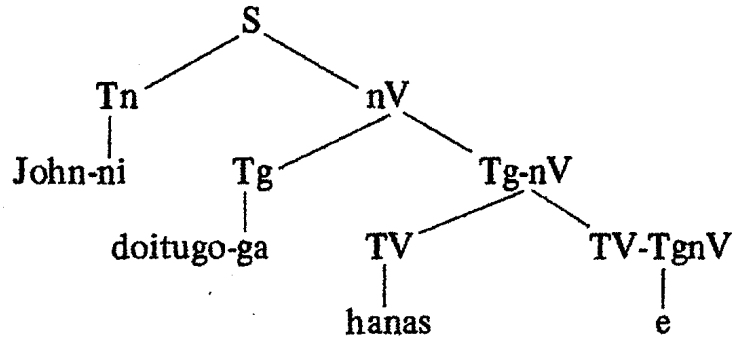
(5b) concisely represents the syntactic knowledge that is needed to construct the sentence. Each constituent has a syntactic category that tells you what it can be combined with and what syntactic category the resultant phrase will be. For example, since *hanas* 'speak' is a TV, it may be combined with a To like *doitugo o* 'German' to form a V *doitugo o hanas* 'speak German'. By using variables, we could get the semantic representations (5d) (5e).

(6a) is a sentence with a dative subject, whose syntactic structure is (6b).

(6) a. John ni doitugo ga hanas e ru.

'John can speak German.'

b.



where:

Tn: NP in the dative case

nV: VP that takes a Tn as its subject

Tg-nV (also TgnV): Transitive verb (phrase) that takes a nominative object Tg and forms an nV

TV-TgnV: Auxiliary verb that may be combined with the preceding TV and form a Tg-nV

c. *hanas e* Tg-nV ⇒ λyλx (e(x, hanas(x, y)))

d. *e* TV-TgnV ⇒ λβλyλx (e(x, β (x, y)))

where: β ranges over the set of two-place predicates.

Sentences like (5) (6) imply existence of phrase-structure rules (PS rules)

(7), but, excepting (7a) and (7b), these rules need not be stated in the grammar because they are predictable from the shapes of category symbols.[3]

(7) a. S → Tg V

b. S → Tn nV

c. V → To TV

d. nV → Tg Tg-nV

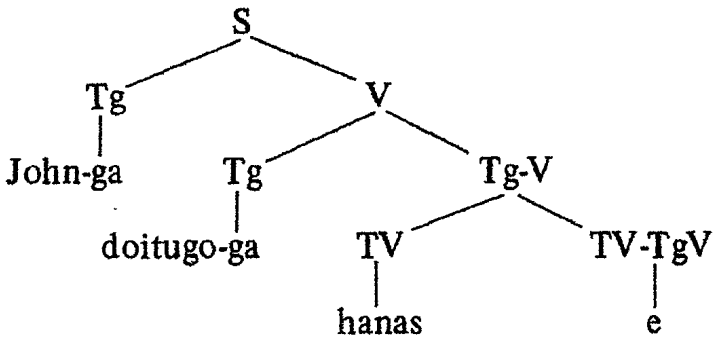
e. Tg-nV → TV TV-TgnV

For each sentence with a dative subject, there is a sentence with a nominative subject. (8) is also possible along with (6).

(8) a. John ga doitugo ga hanas e ru.

'John can speak German.'

b.



In other words, all nV's also function as a V. This is captured by redundancy rule (9).

(9) [+nV] → [+V]

(9) is a one-way implication since there are V's that cannot function as an nV. The V of (5) cannot take a dative subject as in (10).

(10) *John ni doitugo o hanas e ru.

'John can speak German.'

Similarly, all Tg-nV's can also be used as Tg-V's (e.g. *hanas e* 'can speak'), and all TV-TgnV's as TV-TgV's (e.g. potential *e* 'be able to') as in (11).

(11) a. [+Tg-nV] → [+Tg-V]

b. [+TV-TgnV] → [+TV-TgV]

However, (11) need not be stated in the grammar since principle (12) can predict (11) from (9).

(12) If A, B, C are categories, and [+A] → [+B] is a redundancy rule, then [+C-A] → [+C-B] is also a redundancy rule.

(12) is a redundancy rule of redundancy rules. Existence of rules like (12) shows that the grammar does not have just a bundle of redundancy rules but a system of them.

3. Manner adverbs

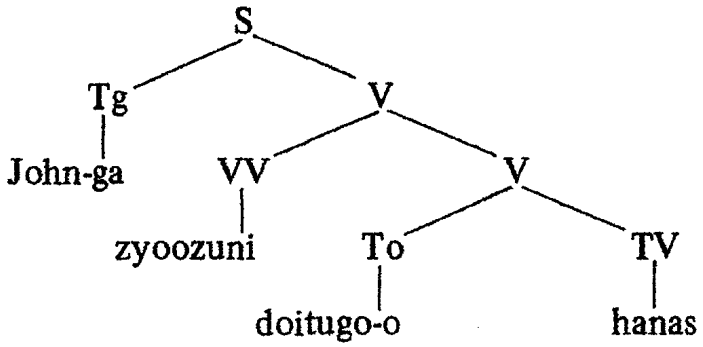
(13a) and (13b) are equally acceptable, and it is hard to tell which word-order is more basic than the other.

(13) a. John ga zyoozuni doitugo o hanas u.
'John speaks German fluently.'

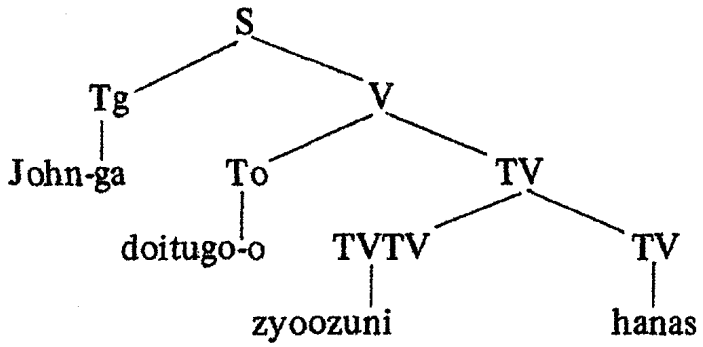
b. John ga doitugo o zyoozuni hanas u.

If transformation is to derive either of (13) from the other, an arbitrary decision has to be made as to which of them is to derive from the other. Much more natural is an analysis which treats *zyoozuni* 'well, fluently' as a TV-modifier as well as a VP-modifier as in (14).

(14) a.



b.



where: TVTV is an adverbial that modifies a TV. It combines with

a TV to form another TV.

In (14b), *zyoozuni hanas* 'speak well' is a TV, and that reflects the intuition that it is a constituent. (14a) and (14b) are synonymous, but the meaning of *zyoozuni* TVTV belongs to a semantic type different from that of *zyoozuni* VV as in (15).

(15) a. *zyoozuni* VV $\Rightarrow \lambda P \lambda x$ (zyoozuni(x, P(x)))

where: P is a variable ranging over the set of one-place predicates.

b. *zyoozuni* TVTV $\Rightarrow \lambda\beta\lambda y\lambda x$ (zyoozuni(x, β(x, y)))

c. *zyoozuni hanas* TV $\Rightarrow \lambda y \lambda x$ (zyoozuni(x, hanas(x, y)))

d. *zyoozuni doitugo o hanas* V $\Rightarrow \lambda x$ (zyoozuni(x, hanas(x, d)))

VP-modifiers are normally also used as TV-modifiers, and vice versa, and this is captured by redundancy rule (16).

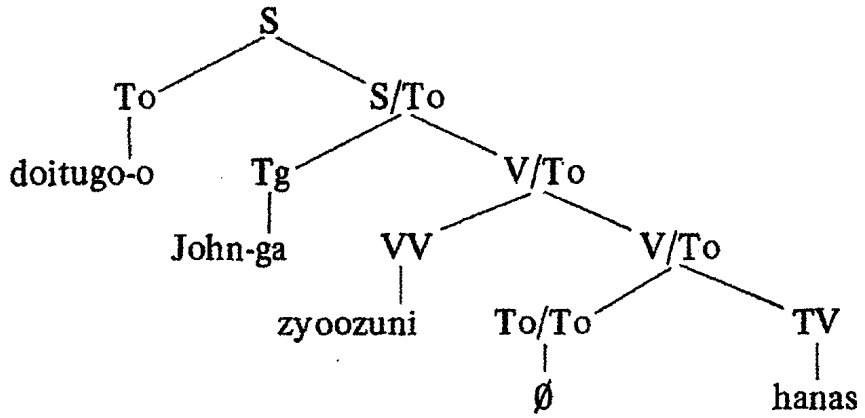
(16) [+VV] $\leftrightarrow$ [+TVTV]

Compared with (14), forms like (17), (18) show a "marked" word-order.

(17) a. Doitugo o John ga zyoozuni hanas u.

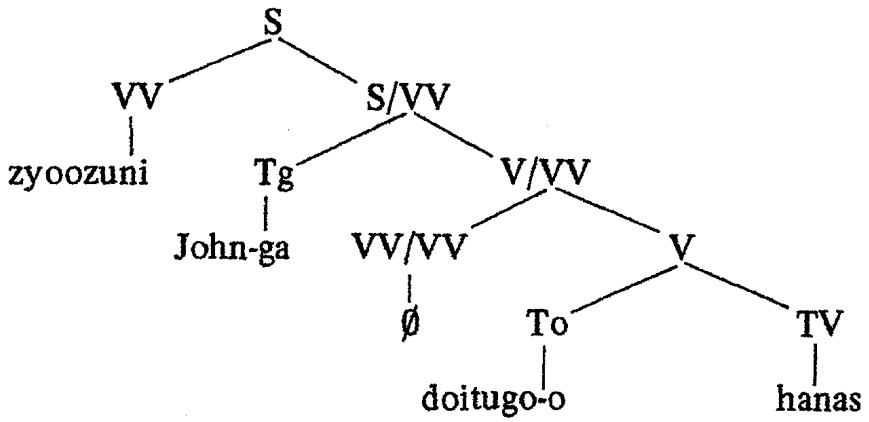
'John speaks Geman fluently.'

b.



(18) a. Zyoozuni John ga doitugo o hanas u.
'John speaks German fluently.'

b.



(17b), (18b) assume existence of PS rules like (19), but these PS rules are predictable by meta-rule (21), which will be discussed in Section 4.

(19) a. S → To S/To
b. S/To → Tg V/To
c. V/To → VV V/To
d. To/To → Ø
e. V/To → To/To TV

S/To is a syntactic category which is the same as S except that it has a gap of category To (equivalent to an empty NP in the accusative case). The empty To is indicated by To/To. Similarly, V/To is a category of V in which a To is empty. Gapped clauses like S/To are also used in thematized sentences and relative clause constructions, and are not ad hoc makeshift categories. A gapped clause is a psychological reality that every speaker knows how to use.

4. Two meta-rules of syntactic categories

Among the syntactic categories used in the discussion above, there are categories (e.g. S) that are basic, and categories that are created by meta-rules (20) and/or (21).

(20) a. If A and B are categories, then A-B is also a possible category.

b. If x is an A (i.e. x belongs to category A), and y is an A-B, then x properly combined with y is a B.(4)

(21) If A, B, C are categories, and A → X B Y is a PS rule, then

a. A/C, B/C are possible categories.

b. The following are possible PS rules.

i. A → C A/C

ii. A → A/C C

iii. A/C → X B/C Y

c. C/C may be empty (i.e. may dominate nothing).

(20a) may apply recursively so that A-(B-C), (A-(B-C))-D, etc. are possible categories if A, B, C, D are categories. TV-TV of (14b) of Section 3 should, strictly speaking, be represented as (T-V)-(T-V), but as long as there is no danger of confusion, hyphens and parentheses will be omitted. It is not clear whether (21) is also recursive, and if so, to what extent (cf. Chung and McCloskey 1983). In any case, recursive application of (21) seems to be severely restricted.

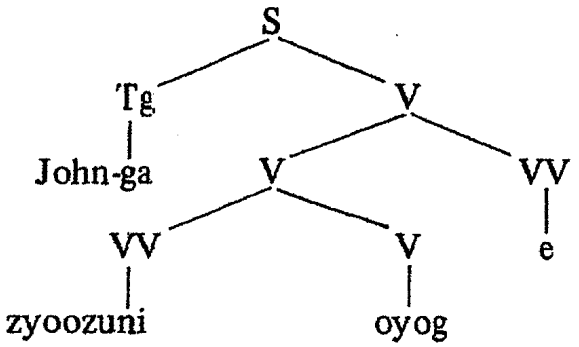
5. Potentials and Equi NP Deletion

It has been an important assumption of generative grammar that S is the only recursive symbol, and that makes it necessary to use Equi NP Deletion or abstract elements like PRO. In MG and GPSG (Gazdar 1982), on which our grammar is based, V (equivalent to VP) can be recursive, and that makes Equi NP Deletion and empty categories superfluous. Equi NP Deletion is a semantic phenomenon as is clear from examples like (22).

(22) a. John ga zyoozuni oyog e ru.

'John can swim well.'

b.



c. *e* VV ⇒ λPλx (e(x, P(x)))[5]

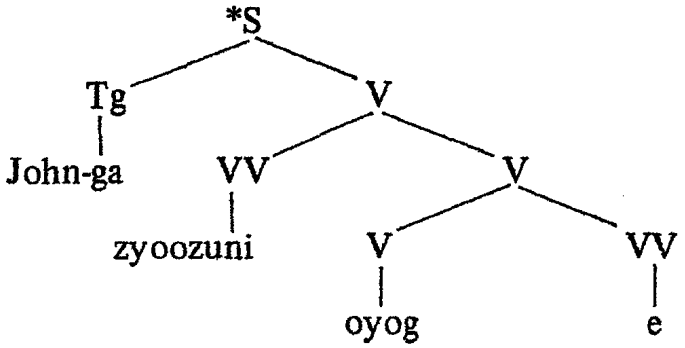
d. *zyoozuni oyog* V ⇒ λx (zyoozuni (x, oyog(x)))

e. *zyoozuni oyog e* ⇒ λx (e(x, zyoozuni(x, oyog(x))))

Potential *e* (*rare* after a stem-final vowel) of (22a) takes a V as its complement, but its semantic representations (22c)-(22e) show that it is an Equi verb.

Though (23a) is syntactically a possible phrase-marker, it is semantically anomalous because *zyoozuni* 'well' modifies *oyog e* 'be able to swim'.

(23) a.



b. *zyoozuni (j, e(j, oyog(j)))

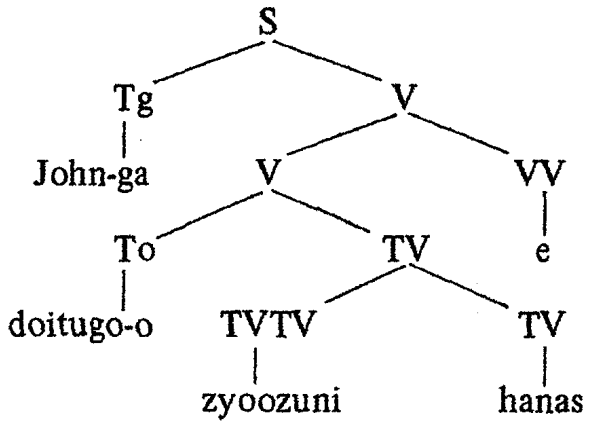
Its semantic representation would be (23b), which would mean, "John is good at being able to swim". (23a) does not correctly represent the scope of *zyoozuni* or that of potential *e* of the intended reading of (22a). It is not necessary to reject forms like (23a) by syntax since it is rejected by semantics.

(24a) and (24b) are synonymous, but they are considered to have distinct structures. While potential *e* of (24a) is a VV, that of (24b) is a TV-TgV as in (25).[6]

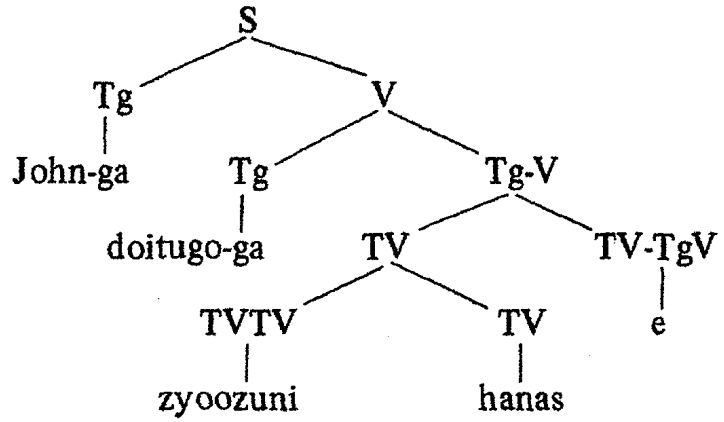
(24) a. John ga doitugo o zyoozuni hanas e ru.
'John can speak German fluently.'

b. John ga doitugo ga zyoozuni hanas e ru.

(25) a.



b.

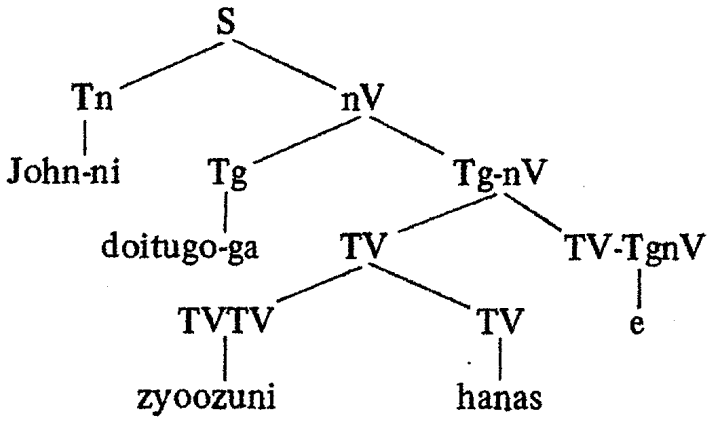


c. *e* TV-TgV $\Rightarrow \lambda\beta\lambda y\lambda x\ (e(x, \beta(x, y)))$

Ga-ni Conversion is not needed if potential *e* also belongs to category TV-TgnV as in (6) (26). The semantic representation of *e* TV-TgnV is the same as that of *e* TV-TgV.(7)

(26) a. John ni doitugo ga zyoozuni hanas e ru.
'John can speak German fluently.'

b.



Unacceptable forms like (27a) show that potential *e* is not a V-nV nor a TV-(T-nV).

(27) a. *John ni doitugo o zyoozuni hanas e ru.

b. *John ni $(_{nV}$ $(_{V}$ doitugo o zyoozuni hanas) $(_{*V\text{-}nV}$ e))

c. *John ni $(_{nV}$ doitugo o $(_{*T\text{-}nV}$ $(_{TV}$ zyoozuni hanas) $(_{*TV\text{-}(T\text{-}nV)}{}^{e})))$

No Japanese sentence has a dative subject unless it also has a nominative object (i.e. object with case-marker *ga*). That means that Japanese has constraint (28).

(28) Japanese does not have any form of category *V-nV, *T-nV, or *TV-(T-nV).

Note that constraint *T-nV predicts existence of constraint *TV-(T-nV) by redundancy rule (29), which says that if expressions of category A are prohibited, so are expressions of category B-A for any category B.

(29) *A → *B-A

The above analysis is equivalent to, but much simpler than the transformational analysis that uses Ga-Ni Conversion, which optionally changes the nominative subject into a dative subject when it is followed by a nominative object. But Ga-Ni Conversion has to be a lexically governed rule as is clear from examples like (30).

(30) a. John ga bungaku ga sukida.

'John likes literature.'

b. *John ni bungaku ga sukida.

6. Dative Shaft

(31) and (32) are equally acceptable and are often related by transformation Dative Shift, but it is not quite clear which of the two should underly the other. Note that TnV of (31) is an abbreviation of Tn-V, and must be distinguished from *T-nV of (28).

(31) a. John ga Mary ni hon o watasi ta.
'John gave the book to Mary'.

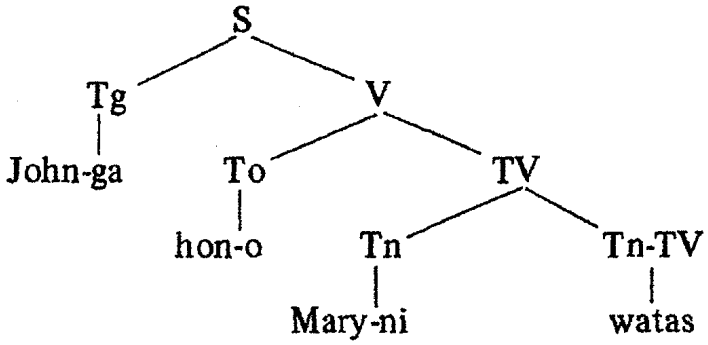
b. John ga ($_{V}$ Mary ni ($_{TnV}$ hon o ($_{T\text{-}TnV}$ watas)))

c. *watas* T-TnV ⇒ λzλyλx (watas(x, y, z))[8]

d. *hon o watas* TnV ⇒ λyλx (watas(x, y, h))
where: h: *hon* 'book'

(32) a. John ga hon o Mary ni watasi ta.
'John gave the book to Mary.'

b.



c. *watas* Tn-TV ⇒ λyλzλx (watas(x, y, z))[9]

d. *Mary ni watas* TV ⇒ λzλx (watas(x, m, z))

Thus, instead of Dative Shift, dative verbs are given two syntatic categories T-TnV and Tn-TV. Redundancy rule (33) will make it unnecessary to specify every dative verb as both [+T-TnV] and [+Tn-TV].

(33) [+T-TnV] ↔ [+Tn-TV]

7. Conclusion

We have proposed above a theory of syntactic categories that is based on the categorial grammar of MG, and that classifies words/phrases efficiently according to their syntactic behavior. Instead of a set of PS rules, we propose a simple set of meta-rules that would generate all the necessary PS rules and a set of constraints that would check over-generation of P-markers. We applied it to the syntactic analysis of Japanese sentences and discussed dative subjects, nominative objects, manner adverbs, Dative Shift, potential constructions, and have argued that our analysis makes Equi NP Deletion unnecessary, and that natural word-order can be properly distinguished from "marked" word-order by positing two types of categories, i.e. hyphenated categories and slashed categories. It reveals inadequacy of traditional syntactic categories like NP, VP, PP, etc., and reveals that the grammar does not have just a set of redundancy rules and/or constraints, but a system of redundancy-rules/constraints controlled by certain meta-rules. There are many problems that remain unsolved but we believe that our analysis has some potentiality.

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Notes

*This is a revised version of Muraki 1984, which is based on the paper read at the symposium of the Logico-Linguistic Society of Japan held at Sophia University on March 31, 1984. This study was supported by 1983 Monbusho Special Research Grant "Clear and logical expressions in Japanese" (chief researcher: Dr. Kazuko Inoue).

(1) There are several different versions of MG, but we feel that our analysis is closest to the transformational MG of Partee 1979. We also owe to Gazdar's works such as Gazdar (1982).

(2) Tense elements are ignored in the present paper as long as it does not affect the discussion. They require a separate study. X ⇒ Y (cf. (5d) (5e)) means that Y is the semantic representation of X. In MG, the meaning of a T (i.e. term phrase, equivalent to NP) is a set of properties (or the property of a set of properties) instead of an individual element. But in this paper, Tg, To, etc. are often treated as if they refer to individuals where confusion is not expected.

(3) If V and nV of (7a) (7b) are replaced by Tg-S and Tn-S, respectively, as in (i) (ii), then none of (7) need to be stated in the grammar.

(i) S → Tg Tg-S

(ii) S → Tn Tn-S

(4) "Properly" of (20b) means "in the proper order". If we use (i) instead of (20a), we could simplify (20b) into (ii).

(i) If A and B are categories, then, A-B-, -A-B, B-A-, -B-A are also possible syntactic categories.

(ii) If x is an A, and y is an -A-B, then the sequence x y is a B, but if y is an A-B-, then the sequence y x is a B.

(ii) implies PS rules (iii) and (iv).

(iii) B → A -A-B

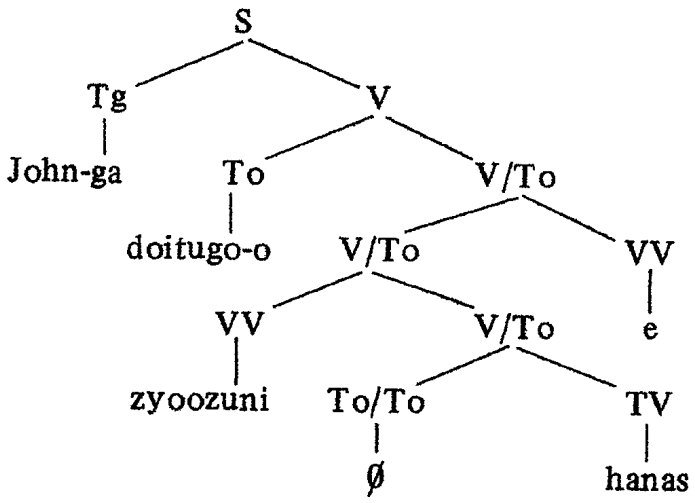
(iv) B → A-B- A

In the present paper, distinction between -A-B and A-B- is ignored where it is not crucial.

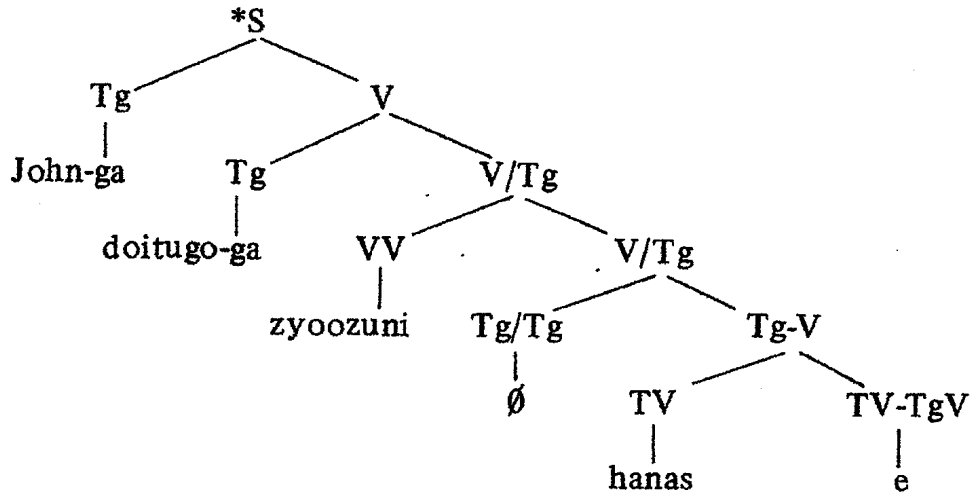
(5) While VP-adverb *zyoozuni* VV 'well' occurs on the left side of a V, potential *e* VV occurs on the right side of a V. Category symbol VV- could be used for VP-adverbs like *zyoozuni* 'well', and -VV for auxiliary verbs like potential *e* to make the distinction. cf. note 4. Though VV- and -VV are distinct syntactic categories, they belong to the same semantic type.

(6) If we use gapped categories V/To and To/To, *zyoozuni* 'well' of (24a) could be a VV (i.e. VP-adverb) as in (i), but note that we could not do the same with *zyoozuni* of (24b).

(i)



(ii)



(ii) is a semantic anomaly like (23). It shows that we have to have *zyoozuni* TV-TV as well as *zyoozuni* VV.

(7) If potential *e* is given the category TV-TgnV, redundancy rule (9) predicts that it is also a TV-TgV.

(8) If the semantic type of T is a set of properties, then (i), instead of (31c), would be the semantic representation of *watas* 'give'.

(i) watas T-TnV ⇒ $\lambda\mathcal{Q}\lambda\mathcal{P}\lambda x[\check{\mathcal{P}}(\hat{}\lambda y[\check{\mathcal{Q}}(\hat{}\lambda z[\text{watas}(x, y^*, z^*)])])]$

hon 'book' is treated like a proper name in (31d), but could be analyzed as a set of properties derived from *hon* N as in (ii) (iii).

(ii) *hon* N ⇒ $\lambda w[\text{hon}(w)]$

(iii) *hon* T ⇒ $\lambda P \exists w[\text{hon}(w) \,\&\, P(w)]$

(9) The same predicate *watas* 'give' (whose second argument refer to the indirect object) is used in the semantic representations of both *watas* T-TnV and *watas* Tn-TV here.