

## A Japanese Grammar according to Chomsky's Theory

SAE YAMADA\* AND JITSUKO IGARASHI\*\*

This is a trial of Japanese Grammar which is written mainly according to the transformational generative theory of Chomsky (1965).

However, we make some interpretations of the general theory in order to give the concrete shapes to several linguistic phenomena. Especially, we make the distinction between the frame elements and modifying elements and we make use a special type of rules for the derivation of the coordinated constructions. Theoretically a generative grammar of Japanese must generate all well-formed sentences. We would like to emphasize that the characteristics of Japanese language must be reflected explicitly on the realized grammar.

Among others the following characteristics will be taken up for the purpose of the explanation of the proposed grammar.

- a) The word order is considerably free in Japanese, though it is not completely free.
- b) The aspect, mood and negation are given either by the addition of one or more suffixes or auxiliary terms to the end of nuclear part of the sentence.
- c) There is a remarkable tendency which makes prolong by adding auxiliary verbs, pseudo-nominals, copulas, particles and their combination to the end part of the sentence.
- d) The predicate complements including subject and object are almost always facultative elements in a sentence.
- e) The sentence may be embedded in another sentence by the intermedium of some particular particles or by the special function of several endings of inflectional words. And an embedded sentence can be treated exactly like a predicate complement or a noun modifier.
- f) A sentence embedded in another sentence in the manner of quotation is much more flexible than the other types of embedded sentences. They may have not only the time, mood and negative markers but also the focus and style markers.

The modifiers of a noun or a noun group come before this noun or noun group. The structure of the noun modification is endocentric.

What is called the "honorific expression" in Japanese is varied in their forms, functions and usages.

---

This paper first appeared in Japanese in *Joho Shori* (the Journal of the Information Processing Society of Japan), Vol. 7, No. 5 (1966), pp. 273-280.

\* The Department of Literature, Risho University.

\*\* Electrotechnical Laboratory.

At the beginning of the branching rules, which compose the first part of the base component of the syntax, we have the rule which is necessary for the later distinction of interrogative and judgement-declarative sentences.

That is :

$$\begin{aligned} S &\rightarrow S' \wedge SM \\ S' &\rightarrow CL \wedge S'M \end{aligned}$$

SM and S'M are isolated from the main part of the sentence in order to extract the informations which are contained in the ending part of any predicate. In this manner, the description of the remaining part of the sentence can be considerably simplified. SM will be developed into the focus element and the style elements. While S'M will be developed into the time, negation and mood elements.

Then we have the rules which introduce the frame elements. A string of frame elements compose the frame work of a sentence. The frame elements which belong to the same string are very often interchangeable except for the verbal element which makes the nucleus of the predicate.

$$\begin{aligned} CL &\rightarrow AD_s \wedge \{J\} \wedge PRED \\ PRED &\rightarrow SUB \wedge VP \\ PRED &\rightarrow SUB \wedge (AD) \wedge V_o \\ VP &\rightarrow (OBJ) \wedge VO \\ VP &\rightarrow (OBJ) \wedge (AD) \wedge V_i \\ VO &\rightarrow COMP_x \wedge (AD) \wedge V_j \end{aligned}$$

J is a symbol which introduces a kind of embedding sentences: i.e. subordinate sentences which are equivalent to predicate complements.

On the other hand, a quoted sentence is developed from  $J_{io}$  of the following rule.

$$PRED \rightarrow SUB \wedge J_{io} \wedge V_{io}$$

$J_{io}$  dominates the initial symbol S, but J dominates only S'.

Other types of sentence embedding are those which prepare for the active, passive, causative, potential, honorific and desirative sentences. Such sentences are constructed of matrix sentences which contain an explicit indicator of passivization, causativization etc. and constituent sentences embedded in the matrix sentences with certain conditions.

The frame elements which carry the function names are developed by the transition rules like the following one and are changed into the category names.

$$COMP_{ni} \rightarrow NO \wedge P_{ni}$$

After the application of such a transition rule, the symbols which designate the grammatical functions are changed into the symbols of grammatical category.

Various modifying constructions may be developed after this transition. Let us take an example of noun modification.

Except for the modification by a simple modifier, there are two types of noun modification.

$$\begin{aligned} \text{NO} &\rightarrow \text{N} \\ \text{NO} &\rightarrow \text{S}' \frown \text{NO} \\ \text{NO} &\rightarrow \text{S}' \frown \text{NOM} \end{aligned}$$

The second one of the above rules is for the modification of a noun or noun group by a sentence and the third one is for the nominalization. NOM denotes the nominalization markers  $\phi$ , no, koto, yoo, soo etc..

The subcategorization rules are applied after the branching rules in order to analyse the category symbols into the complex symbols.

According to Chomsky, strict subcategorization rules and selectional rules are used. For the moment, we make use only one type of the rules of the former type :

$$V_1 \rightarrow \text{CS}/\text{OBJ}$$

Maybe we can write such rules for some other predicate complements, though it is not very economical in comparison with the object case.

The application of the subcategorization rules is slightly modified. Since the predicate complements are always facultative in Japanese, it is natural to give a part of the contextual features to the complement elements according to the features of the verb (or the adjective or the head of copulative expression) which makes the nucleus of the predicate rather than in the reverse order.

After the application of the subcategorization rules which subcategorize the verbs according to the contextual features of an object case, we introduce the rules which develop CS of V. It is done before the application of the selectional rules to N.

The lexicon is a set of the lexical units of the form (D,C), of which D is a phonological expression and C is a collection of specified syntactic features.

In order to facilitate the procedure of phoneticization, some indications for the inflective ending are put in the C. These indications in connection with SM and/or S'M give the correct inflective endings. The features concerning the politeness of each lexical formative are also put in the C.

As for the coordinative constructions, we consider it necessary to provide some schema in the base component in addition to the rewriting rules. It concerns with the infinite generative capacity of the grammar. The rules which we propose are of the form :

$$X \rightarrow X (\oplus X)^n$$

The transformation has mainly the function of the local revision. Main operations of the transformation are the deletion of an element by means of identity (for instance in the cases of noun modification by a sentence, causativization, passivization etc.), the filtering of ill-formed strings (for instance, the filtering of the string #hana ga akai #kutu), the change of the order among the frame elements or

among the modifying elements, for example, ootoo to gakko e itta.→gakko e ootoo to itta.), the replacement of particles in the embedding sentences (for example # taroo ga # jiroo ga saburoo o naguru # seru # → # taroo ga # jiroo ni . . . .) etc.

The structures given by the application of at least one coordinative rule are also subjects of the transformation. In this case, the deletion is an operation which erases the right hand branches from all subtrees except for the last subtree which have the top nodes expanded by the coordination rule, if these branches are identical.

In conclusion, the distinction of the frame strings and the modification strings, the special treatment of the end part of the sentences and the introduction of the coordination rules into the base component characterize especially the actual grammar.

The distinction of two kinds of strings requires the explicit indication of the grammatical notions like Subject, Object, Complement etc. in the phrase marker in addition to the category names like NP, VP, NO, V, etc. Because, the interrelation among the frame elements is entirely different from that of the modifying elements.

Finally, we consider that the introduction of a peculiar device for the coordinative structures is necessary for any grammar of the natural language.

The efficiency of proposed device of coordination will be examined later (especially in comparison with the other device).

### References

- [1] Bach, E., An introduction to transformational grammars, Holt, Rinehart and Winston, Inc., (1964).
- [2] Chomsky, N., Aspects of the theory of Syntax. *MIT Press* (1965).
- [3] ——— : Syntactic Structure, Mouton (1957).
- [4] ——— : On the notion "Rules of grammar". *Proceedings of Symposia in applied mathematics, XII* (1961).
- [5] HASEGAWA, K, A Trial of Japanese Grammar. *A Meeting of Linguistic Society of Japan* (1962).
- [6] Harmann, G.H., Generative grammars without transformational rules. *Language, 39* (1963).
- [7] IGARASHI AND YAMADA : a Generative Grammar for the German Sentences, *J. Information proceeding Society of Japan, 7* (1967).
- [8] The national Language Research Institute. Research of Sentence patterns in Colloquial Japanese (2), Shuueishuppan (1963).
- [9] KURODA S., Ga, O, and Ni, *Kokugogaku, 63*, (1965).
- [10] Schachter, P., Kernel and non-kernel sentences in transformational grammar. *Proceedings of the ninth international congress of linguists, Mouton (1964)*.
- [11] YAMADA S., A Japanese Grammar by P-S Theory. *Kokugogaku, 63* (1963).