

On the Role of Logical Concepts in Japanese Syntax

Takao Gunji (Osaka University)

1. Subject

It is widely known that there have been some controversies over the status of "subject" in Japanese grammar. Mikami (1953, 1972), for example, strongly advocates the position which denies the existence of the subject, or he at least denies any important role played by the subject. In his conception, a noun phrase marked by the nominative case marker *ga* is simply a nominative modifier of the verb. In this sense, it is not much different from a noun phrase marked by the locative case marker *ni*, which is a locative modifier of the verb. Shibatani (1978), on the other hand, argues that there are at least two phenomena in Japanese in which one type of noun phrase, which he claims should be identified with the subject, behaves in a distinguished manner. His argument is based on reflexivization and honorific marking of the verb. For example, in Japanese, the antecedent of the reflexive *zibun* is usually the subject of the sentence (the so-called *subject-antecedent condition*); the object cannot usually be the antecedent:

- (1) Ken-ga Naomi-wo zibun-no kuruma-ni nose-ta.
NOM ACC self-GEN car-LOC load-PAST
'Ken took Naomi in his car.'

In (1), the antecedent of *zibun* 'self' can only be the subject *Ken*; the object *Naomi* cannot be the antecedent. Likewise, the honorific marking of the verb occurs only when the subject is recognized as a person to be honored.

If this is the only case of reflexivization, the concept of subject is all we need. However, there are systematic counterexamples for this generalization; the object can also be the antecedent of the reflexive in a restricted range of constructions. For example, in causative sentences, in which the verb is followed by the causative suffix *sase*, the antecedent of *zibun* can be ambiguous:

- (2) Ken-ga Naomi-wo zibun-no kuruma-ni nor-ase-ta.
NOM ACC self-GEN car-LOC ride-CAUS-PAST
'Ken made Naomi ride on his/her car.'

Though (2) seems almost identical to (1), the crucial difference is that, while *nose* in (1) is a lexical transitive verb, *nor-ase* in (2) is a complex causative verb morphologically derived from *nor* 'ride' and *sase* 'cause.'¹

Traditional transformational grammar more or less within the framework of the "standard theory" coped with this kind of difficulty by assuming separate syntactic structures ("deep" and "surface" structures) and transformational rules which apply cyclically and in a fixed (and quite often extrinsic) order. Thus, (2) would be syntactically "derived" from a "deep" structure like the following:²

- (3) Ken-ga Naomi-ni [_S Naomi-ga Ken/Naomi-no kuruma-ni nor] sase-ta.
NOM DAT NOM GEN car-LOC ride CAUS-PAST

Note that there are two subjects in (3): one (*Naomi*) in the embedded sentence and the other (*Ken*) in the matrix sentence. In the

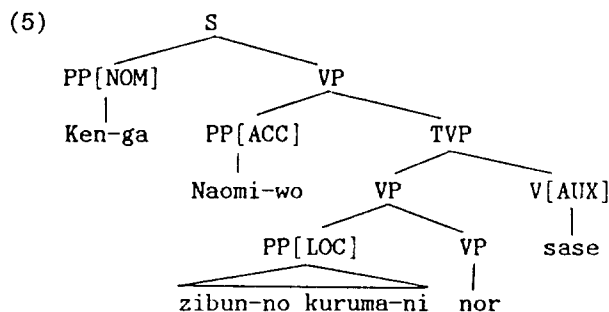
transformational analysis of reflexivization, the cyclic rule of reflexivization rewrites a noun phrase to *zibun* under identity with the subject. Thus, if it applies in the lower cycle, *Naomi-no* in the embedded sentence will become *zibun-no*. On the other hand, if it applies in the upper cycle, *Ken-no* will become *zibun-no*. This has been considered to be the "explanation" of ambiguity.

More recent transformational grammar assumes a phonologically null subject (a PRO) in the embedded sentence. The subject in the "deep" structure need no longer be "deleted" or be "raised." Moreover, *zibun* is assumed to be base-generated and its interpretation is determined by an interpretive rule which generally obeys the subject-antecedent condition. Thus, we would have an "S"-structure like (4):

- (4) Ken-ga Naomi-ni [_S PRO zibun-no kuruma-ni nor] sase-ta.
 NOM DAT self-GEN car-LOC ride CAUS-PAST

In this case, the PRO in the embedded sentence is supposed to be related (coindexed) with the object of the matrix sentence. Thus, the interpretation of *zibun* is still ambiguous, since there are two subjects and hence two possible antecedents: *Ken-ga* and PRO, the later being coreferential with *Naomi*.

Generalized Phrase Structure Grammar (GPSG) (cf. Gazdar, Klein, Pullum, and Sag (1985)) is unlike other recent frameworks of grammar, such as the Government and Binding Theory and Lexical Functional Grammar, in that it assumes only one level of syntactic structure. This structure is believed to be sufficient and contain all the necessary information for the explanation of both syntactic and semantic phenomena. The determination of the antecedent of the reflexive *zibun* is no exception, which implies that the subject-antecedent condition isn't general enough in this framework. Thus, for such constructions as causatives, we are at a position in which we have to determine the antecedent of *zibun* based on a more straightforward structure like the following:



We cannot and should not rely on the concept of subject to determine the antecedent of the reflexive, since there is no longer an embedded sentence. What, then, other concept can be helpful? In the following, I will investigate a concept based on a logical relationship.

2. Control

The fact that GPSG is equipped with semantics based on that developed by Montague (1973) is helpful in offering an alternative concept. Note that, due to Fregean principle, each syntactic constituent is in one-to-one

relationship to a semantic unit. Thus, following the convenient tradition to use a translation into logic as a mediator between syntax and semantics, a definition of a grammatical concept in terms of logical translation is equivalent to that in terms of, say, phrase structure tree. In this sense, a very useful concept is that of *control*, which Klein and Sag (to appear) define in their treatment of those English verbs which have traditionally been analyzed in terms of such transformations as "Equi NP deletion" and "Raising." Their definition is based on the semantic relationship induced by the syntactic structure, which could be summarized in the following way:

- (6) Let A and B be some constituents of type NP and VP, respectively, dominated by a node C . Let A' , B' , and C' be their semantic translations, respectively. Then, A controls B if
- (i) $C' = B'(A')$ or
 - (ii) there is some D' such that $C' = D'(B')(A')$.

In short, a VP is controlled by the NP argument of the VP or by that of the "complex predicate" which contains the VP.³

Assuming the following ID rules in (7) for Japanese sentences and verb phrases (cf. Gunji 1983a), with their semantic translations (simple functional applications) supplied, the translations of the top-most S node and the highest VP node in (5) become (8a) and (8b), respectively.

- (7) a. $\langle 1; S \rightarrow PP, VP; VP'(PP') \rangle^4$
 b. $\langle 2; VP \rightarrow PP, TVP; TVP'(PP') \rangle^5$
 c. $\langle 3; TVP \rightarrow VP, V[AUX]; V'(VP') \rangle$
- (8) a. Naomi-wo-zibun-no-kuruma-ni-nor-ase-ta'(Ken-ga')
 --- $VP'(PP') = S'$
 b. sase'(zibun-no-kuruma-ni-nor')(Naomi-wo')
 --- $V'(VP')(PP') = VP'$

Note that, given (8a), the PP: *Ken-ga* controls the VP: *Naomi-wo zibun-no kuruma-ni nor-ase-ta* by virtue of condition (i) of the definition (6); that is, the PP' is the argument of the VP'. Also, given (8b), the PP: *Naomi-wo* controls the VP: *zibun-no kuruma-ni nor* by virtue of condition (ii) of (6); in this case, the PP' is the argument of the complex predicate $V'(VP')$. Thus, we can state the following generalization concerning reflexivization:

- (9) The antecedent of *zibun* must control the VP which dominates the reflexive.⁶

In this way, we have a general formulation of Japanese reflexivization. Note that this formulation doesn't depend on how the concept of subject is defined. The subject is simply a special case in which condition (i) of (6) is fulfilled, since the subject is, semantically, the argument of its sister VP and hence it controls the VP.

Thus, by using the concept based on the logical relationship (the function-argument relationship between the translations of constituents), we can have a general explanation of reflexivization using only a single syntactic structure. The framework adopted here is not only simpler in the sense that it relies on smaller set of concepts (i.e., there is no need for the concept of subject, a "deep" structure with an embedded sentence, a phonologically null entity, or a cyclic transformational rule), but it also gives a more general characterization as to the antecedent of the reflexive covering both subject and object antecedents: it is the PP argument of the

VP (or the complex predicate containing the VP) that dominates *zibun*. We are going to see how general this characterization is by considering some other constructions in the following sections.

3. Dative Antecedents

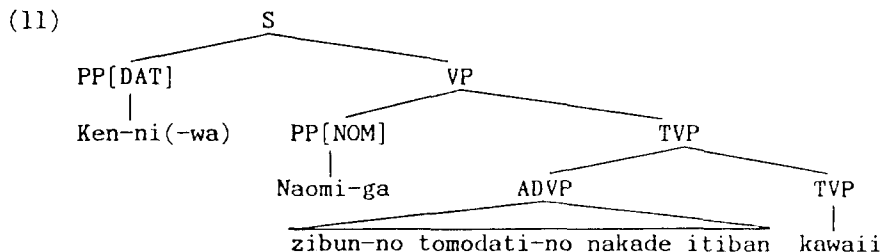
The characterization discussed above also gives a unitary explanation to the problem of determining the antecedent of *zibun* in sentences with different case patterns. There are sentences where the case marking pattern is considerably different from ordinary sentences with transitive verbs, where the subject is marked by the nominative case marker *ga* and the object by the accusative case marker *wo*. As Shibatani (1977, 1978) argues, the concept of subject and that of nominative PP don't always coincide. For example, a nominative PP doesn't always behave as the antecedent of the reflexive. Moreover, it is often the case that an PP with a case marker other than *ga* is the antecedent. The following sentence illustrates this:

- (10) Ken-ni(-wa) Naomi-ga zibun-no tomodati-no nakade itiban kawaii.
 DAT-(TOP) NOM self-GEN friends-GEN among most pretty
 'For Ken, Naomi is the prettiest among his friends.'

In (10), the antecedent of *zibun* can only be *Ken*, which is marked by the dative case marker *ni*.⁷ *Naomi*, even though it is marked by the nominative case marker *ga*, cannot be the antecedent of *zibun*.

If we choose to maintain the subject-antecedent condition of the reflexive in such sentences as (10), we would have to extend the concept of subject so that it also covers a PP like *Ken-ni* in (10). This is the approach taken by Shibatani (1977, 1978). He warns against the confusion of the case markers in PPs and the grammatical relations played by such PPs, and argues that what is more important in determining the status of subject is its role generally played in such grammatical phenomena as reflexivization and honorification. In this view, *Ken-ni* in (10) is naturally the subject.

We don't need such an extension of the concept of subject in order to give a general account to grammatical phenomena such as reflexivization. We can give a straightforward explanation why *Ken-ni*, and not *Naomi-ga*, can be the antecedent of *zibun*. The phrase structure of (10) will become as follows:^{8, 9}



Given the semantic translations given for the ID rules above, the translations of the S and the VP in (11) become (12a) and (12b), respectively:

- (12) a. Naomi-ga-zibun-no-tomodati-no-nakade-itiban-kawaii'(Ken-ni')
 --- VP'(PP') = S'

- b. zibun-no-tomodati-no-nadade-itiban'(kawaii')(Naomi-ga')
 --- ADVP'(TVP')(PP') = VP'

By virtue of the logical relationship exhibited in (12a), the PP: *Ken-ni* controls the VP: *Naomi-ga zibun-no tomodati-no nakade itiban kawaii*, since the PP' is the argument of the VP'. On the other hand, given (12b), the PP: *Naomi-ga* doesn't control a VP, since there is no VP' in (12b). (Note that there is only one VP in (11) and *kawaii'* in (12b) is a TVP'.)

4. Easy/Tough Sentences

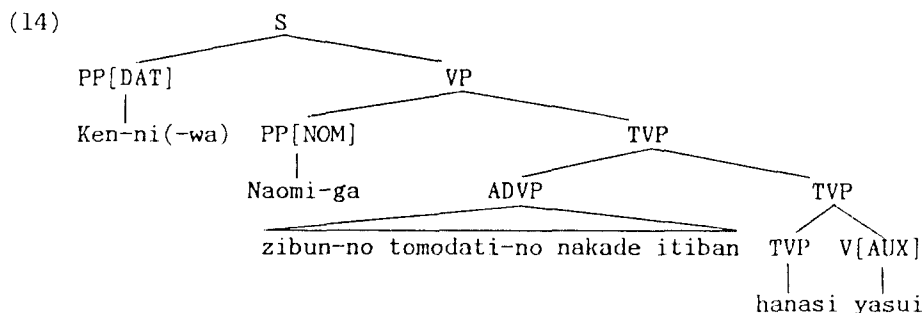
The so-called *easy/tough* (*yasui/nikui*) sentences in Japanese can be explained in a way which is quite similar to that for the case of dative antecedents. The canonical sentence pattern of the *easy/tough* sentence is shown in (13) below, which is just like the one in (10):

- (13) Ken-ni(-wa) Naomi-ga zibun-no tomodati-no nakade itiban hanasi-yasui.
 DAT(-TOP) NOM self-GEN friends-GEN among most speak-easy
 'For Ken, Naomi is the easiest to speak to among his friends.'

As with (10), the antecedent of *zibun* is *Ken* even though it is marked by the dative case marker *ni*; *Naomi*, with the nominative case marker *ga*, cannot be the antecedent.

In recent transformational analyses, e.g., Saito (1982) and Tonoike (1984), among others, these sentences are also considered to involve embedded sentences. The dative PP is assumed to be an adverbial phrase and a coindexing mechanism is postulated in order to connect such an adverbial phrase with a PRO in the embedded sentence. Since this PRO behaves as the subject in the embedded sentence, the subject-antecedent condition picks this PRO as the antecedent of *zibun*. It should be noted that this approach is quite similar to the transformational treatment of causative sentences we have seen above. Just as the PRO in causative sentences is coindexed with the object in the matrix sentence, the PRO in *easy/tough* sentences is coindexed with an adverbial phrase in the matrix sentence.

As with causatives, the current framework doesn't have to call for an embedded sentence or a hypothetical abstract entity. The phrase structure of (13) will become something like (14):¹⁰



As with (12), the translations of the S and the VP in (14) become (15a) and (15b), respectively:

- (15) a. Naomi-ga-zibun-no-tomodati-no-nakade-itiban-hanasi-yasui'
 (Ken-ni')
 --- VP'(PP') = S'
- b. zibun-no-tomodati-no-nadade-itiban'(yasui'(hanasi'))(Naomi-ga')
 --- ADVP'(V'(TVP'))(PP') = VP'

Again, given (15a), the PP: *Ken-ni* controls the VP *Naomi-ga zibun-no tomodati-no nakade itiban hanasi-yasui*, while, given (15b), the PP: *Naomi-ga* controls no VP, since both *hanasi'* and *yasui'(hanasi')* are TVP's.

5. Conclusion

We have seen that there are a variety of possible antecedents of the reflexive in Japanese; in addition to the ordinary nominative PP ("subject"), sometimes the object PP can be the antecedent, as well as a dative PP and an "adverbial" PP (in some analyses). The current formalization for determining the antecedent of *zibun* can capture the hidden generalization in the relationship between these diverse kinds of PPs; they share the property of controlling the VP which dominates *zibun*, with the concept of control being defined in terms the logical (function-argument) relationship between a PP (NP) and a VP.

Thus, the GPSG framework, based on the logically defined concept of *control* gives a unified and much simpler characterization of Japanese reflexivization as compared with the characterization based on the concept of subject.

Notes

¹The first consonant of the suffix is deleted if it follows another consonant.

²I will ignore the question of how the case markers are assigned transformationally and assume, rather incorrectly, that they are existent in the deep structure for the sake of clarity.

³I should emphasize here that, in Montague's program, translation into (intensional) logic is a matter of convenience in order to state formal definitions more succinctly. Thus, we could state the definition of *control* directly based on the phrase structure at the cost of intelligibility.

⁴In the translations, the type of PP' is the same as that of NP'. Moreover, the translation of PP is assumed to be the same as that of the NP immediately dominated by the PP, i.e., case markers are assumed not to add any semantic information. I will ignore intensionality throughout the paper.

⁵The PP in Rules 1 and 2 will have their case features instantiated in the phrase structure tree. The possible feature coefficients for the PP in Rule 1 are NOM and DAT, and those for the PP in Rule 2 are NOM, ACC, and DAT. Thus, the phrase structure tree in (5) can be obtained by instantiating NOM to the PP in Rule 1 and ACC to the PP in Rule 2. These features are subject

to the Head Feature Convention (HFC) and the Control Agreement Principle (CAP) (cf. Gazdar, Klein, Pullum, and Sag (1985)); that is, the NOM feature in the PP in Rule 1 will also appear in the sister VP in the same rule by the CAP. In Rule 2, this feature will be passed to the daughter TVP of the VP by the HFC. The ACC feature in the PP in Rule 2 will also be passed to the TVP by the CAP. Thus, the TVP will ultimately have two case features: NOM and ACC. Not all the combinations of the case features are possible in TVP. I will mention one of the feature cooccurrence restrictions below (cf. Note 7). Note also that the logical translations for the ID rules in (7) are actually predictable from a general principle on translation (cf. Klein and Sag (to appear)). They are supplied only for the sake of clarity. .

⁶This informal statement of reflexivization can be stated more formally as a principle of giving a translation to a VP. See Gunji (1983a) for details of such formalization in terms of metarule. Since the specific formalization is not important to the discussion here, it will not be included in this paper. Hasegawa (1981) gives a similar generalization based on her concept of "control." However, her "control" is merely defined in terms of c-command relation and it wouldn't be general enough as she indicates in her footnote 23 (p. 115), where she admits that some formal definition of such concepts as "argument" and "predicate" is necessary. We don't suffer from this kind of informality concerning these concepts, since the purpose of logic is exactly to give such formal definitions to these concepts.

⁷The topic marker usually cooccurs in this type of sentence, since it is usually the case that the dative PP is the topic. Since the phenomenon of topicalization doesn't affect the logical relationship of a constituent to the entire sentence, I will ignore the semantic contribution by the topic marker *wa* in the following. See Gunji (1983b) for a discussion of topicalization.

⁸We assume a Feature Cooccurrence Restriction (FCR) that no other case feature than NOM can cooccur with DAT in TVP. Thus, if the subject PP is marked by the dative marker *ni*, the VP in Rule 1 will also have DAT by the CAP. This DAT feature is passed to the daughter TVP of the VP in Rule 2 by the HFC. If this happens, under the FCR mentioned above, the daughter PP in Rule 2 can only have NOM, since the feature of this PP is passed to the TVP by the CAP. This gives us the following as one of the possible instantiations of Rule 2, where the "object" is properly marked by the nominative marker.

(i) <2; VP[DAT] --> PP[NOM], TVP[DAT, NOM]; TVP'(PP')>

Note that the FCR filters out an instantiation like (ii) below:

(ii) *<2; VP[DAT] --> PP[ACC], TVP[DAT, ACC]; TVP'(PP')>

⁹We assume the following adverbial rule for TVPs:

(i) <4; TVP --> ADVP, TVP; ADVP'(TVP')>

¹⁰For *yasui* 'easy' and *nikui* 'tough,' we assume the following ID rule:

(i) <5; TVP --> TVP, V[AUX]; V'(TVP')>

References

- Gazdar, G., Klein, E., Pullum, G.K., and Sag, I.A. (1985), *Generalized Phrase Structure Grammar*, Oxford, Basil Blackwell, 1985 (in press).
- Gunji, T. (1983a), "Generalized phrase structure grammar and Japanese reflexivization," *Linguistics and Philosophy*, 6, (1983), 115-156.
- Gunji, T. (1983b), "Topicalization in Japanese," in *Proceeding of the ICOT Workshop on Non-Transformational Grammars*, Tokyo, Institute for New Generation Computer Technology, 1983, pp. 21-27.
- Hasegawa, N. (1981), "The VP complement and 'control' phenomena: beyond trace theory," *Linguistic Analysis*, 7, (1981), 85-120.
- Klein, E. and Sag, I.A. (to appear), "Type-driven translation," to appear in *Linguistics and Philosophy*.
- Mikami, A. (1953), *Gendai Goho Zyosetu ('Prolegomena to Modern Syntax')* Tokyo, Kuroshio, 1953 (in Japanese).
- Mikami, A. (1972), *Zoku Gendai Goho Zyosetu ('Prolegomena to Modern Syntax, Part II')*, Tokyo, Kuroshio, 1972 (in Japanese).
- Montague, R. (1973), "The proper treatment of quantification in ordinary English," in J. Hintikka, J. Moravcsik, and P. Suppes (eds.) *Approaches to Natural Language: Proceedings of the 1970 Stanford Workshop on Grammar and Semantics*, Dordrecht, D. Reidel, 1973, pp. 221-242.
- Saito, M. (1982), "Case marking in Japanese: preliminary study," unpublished paper, Massachusetts Institute of Technology, 1982.
- Shibatani, M. (1977), "Grammatical relations and surface cases," *Language*, 53, (1977), 789-809.
- Shibatani, M. (1978), "Mikami Akira and the notion of 'subject' in Japanese grammar," in J. Hinds and I. Howard (eds.), *Problems in Japanese Syntax and Semantics*, Tokyo, Kaitakusha, 1978, pp. 52-67.
- Tonoike, S. (1984), "A note on 'tough' sentences in Japanese," *Meiji Gakuin Ronso*, 358-360, (1984), 275-291.