

언어 제 7 권 제 2 호 (1982)

A Study of Japanese Adverbial Particles in Montague Grammar

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0. The Aim

The aim of this paper is not to present a new theory for the description of a natural language but to give a support for the versatility of Karttunen and Peters' (1975, 1979) analysis of conventional implicatures by presenting a formal analysis of Japanese adverbial particles such as *sae*, *sura*, *made*, *mo*, *dake*, *nomi*, *shika*, and *bakari*.

This paper is organized as follows: In Section 1, I shall discuss the issue of *conventional-implicatureness*, i.e., the properties by which an implicature is identified as a conventional one. There, two properties such as *detachability* and *noncancelability* are considered, following Grice(1975) and Karttunen and Peters(1979). In Section 2, Karttunen and Peters' analysis of *even* shall be presented for the sake of the exposition of the framework in which sentences with Japanese adverbial particles (henceforce, Japanese delimiters) shall be described. In Section 3, an analysis of Japanese delimiters shall be presented in the following order: 1. the observation and the description of the syntactic characteristics of Japanese delimiters, 2. the identification and the formulation of those delimiters. Summary and conclusion are given in section 4.

* In finishing up this paper, I am much indebted to many scholars. Especially, I am grateful to Professors Ik-Hwan Lee and Kiyong Lee for their valuable comments and suggestions. I would like to express my hearty gratitude to Professor In-Seok Yang and other members of the Linguistic Society of Korea for inviting me and giving me a chance to talk in the promising workshop at Seoul.

In this paper, I will adopt PTQ framework and Karttunen and Peters' semantics.

1. Conventional-implicatureness

Before going into our discussion, let us briefly look at a crucial issue concerning conventional implicatures. That is the issue of *conventional-implicatureness*, i.e., the set of properties by which we can identify an implicature as conventional one. These properties enable us to sort out conventional implicatures out of the set of implicatures including conventional and non-conventional ones. Without being able to make a distinction between conventional and conversational implicatures, or without restricting the kind of well-motivated implicatures by the help of these properties, we shall easily fall into the pitfall in which we are just enumerating plausible implications without showing any reasons why those implications can be regarded as conventional implicatures.²⁾ Following Grice(1975), Karttunen and Peters (1979) uses two tests to identify conventional implicatures. They are *detachability-test* and *noncancelability-test*.³⁾ Unlike nonconventional implicatures, conventional implicatures are required to pass both of these tests. In other words, an implicature is conventional iff it satisfies both *detachability* and *noncancelability*. Thus, these properties represent conventional-implicatureness and can be defined as follows:

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- 1) We use the term conventional-implicatureness as the set of properties that all conventional implicatures share and no non-conventional implicature shares. We consider that detachability and non-cancelability constitute the properties and the necessary and sufficient conditions of conventional implicatureness. For further information, see Karttunen and Peters (1979:2, fn. 3).
 - 2) Loc. cit.
 - 3) Sadock(1979) claims that *non-detachability* and *cancelability* are neither necessary nor sufficient conditions for determining conversational implicatures. His claims, however, do not affect the validity of the two tests we are discussing, namely detachability test and noncancelability test for the determination of conventional implicatures. For the detailed arguments, see Sadock (1979).

- (1) a. detachability: an implicature of an expression x is DETACHABLE iff there is another way of expressing the same thing which does not give rise to the implicature,
 b. noncancelability: an implicature of an expression x is NONCANCELABLE iff it is contradictory to deny something that is implicated by the expression x.

For instance, the implicatures of the sentence in (2) are detachable, since its truth-conditional meaning can be expressed by another sentence in (3) without giving rise to the implicatures.

- (2) Bill likes even Mary.
 (3) Bill likes Mary.

Then, the implicatures of the same sentence are noncancelable, since this sentence can not cooccur with those expressions which negate the implicatures of the sentence. (4a) shows that the sentence implicates that there are other people besides Mary that Bill likes and the implicature cannot be negated. In the same way, (4b) shows that the sentence implicates that Mary is most unlikely to be cared for by Bill and the implicature cannot be negated.

- (4) a. Bill likes even Mary, { and he likes
 *but he doesn't like } other people besides Mary.
 b. Bill likes even Mary, and he likes
 { *Mary more than other people }
 { other people more than Mary }.

The former implicature is called *existential implicature* and shall be represented informally as in (5a), and the latter is named *scalar implicature* and shall be represented informally as in (5b).⁴⁾

- (5) a. Existential implicature: There are other x under consideration besides Mary such that Bill likes x.

4) For the relevant formal characterization of scalar implicature, see Gazdar (1979:57-59).

- b. Scalar implicature: For all x under consideration besides Mary, the likelihood that Bill likes x is greater than the likelihood that Bill likes Mary.

In general, NP-expressions which follow *besides* are named FOCUS, so in (5a) and (5b) *Mary* is the focused expression. Open sentences are named SCOPE, so in (5a) and (5b) *Bill likes x* and *the likelihood that Bill likes x is greater than the likelihood that Bill likes Mary* are scope's, respectively.

The formal representation of (5a) and (5b) can be found in (6). In (6), the former conjunct of the conjunction which starts with existential quantifier represents (5a), and the latter conjunct which starts with universal quantifier represents (5b).⁵⁾

$$(6) \text{ even}^1(^{\wedge}\text{Mary}^e, \hat{x}_0, \text{Bill-likes-him}_s) \equiv [\vee x[*\{x\} \wedge \neg[\forall x=x=m] \wedge \text{like}_*^e(b, \forall x)] \\ \wedge \wedge x[[*\{x\} \wedge \neg[\forall x=x=m]] \rightarrow \text{exceed}^e(\text{likelihood}^e(^{\wedge}\text{like}_*^e(b, \forall x)), \\ \text{likelihood}^e(^{\wedge}\text{like}_*^e(b, m)))]]$$

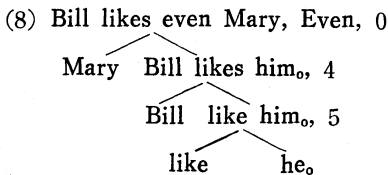
2. Analysis of *Even*

In this section, Karttunen and Peters' analysis of *even* shall be presented solely for the sake of the exposition of the framework in which sentences with Japanese delimiters shall be analysed. In order to describe sentences with delimiter *even*, Karttunen and Peters (1979) introduces a rule, named *Even Rule* which is a kind of quantification rule and whose main effect is to prefix *even* to the focused NP and to substitute the result for the first subscripted pronoun in the scope sentence. *Even Rule* is shown in (7).

5) Following Karttunen and Peters(1979), we use following symbols and notations: (i) $*$ is a constant of type $\langle s, \langle \langle s, e \rangle, t \rangle \rangle$ which ranges over properties of individual concepts and represents the contextual restriction on things that are being quantified over, (ii) likelihood^e is a constant of type $\langle \langle s, t \rangle, t \rangle$ which ranges over set of propositions and denotes a context-dependent function from propositions to real numbers from 0 to 1, (iii) exceed^e is a constant of type $\langle \langle t, t \rangle, t \rangle$ which ranges over set of set of truth values. The meaning postulate of *even* is quite the same as that of *mo* in non-enumerative use. See (35).

- (7) *Even* Rule: If α is a T-phrase and ϕ is a t-phrase containing an occurrence of HE_n (he_n , him_n , or his_n), then $F_{even,n}(\alpha, \phi)$ is a t-phrase and is derived from ϕ by replacing the first occurrence of HE_n by *even* α and each of its subsequent occurrences by the corresponding unsubscripted pronoun whose gender matches the gender of α .

The analysis tree in (8) shows that this rule treats the particle *even* as non-constituent phrase and introduces it syncategorematically.⁶⁾



The corresponding translation rule of (7) is shown in (9) as an ordered pair of formulas, <extension expression; implicature expression>.

- (9) Translation: $\langle \alpha^e(\hat{x}_n \phi^e); [[\alpha^i(\hat{x}_n \phi^e) \wedge \alpha^h(\hat{x}_n \phi^i)] \wedge even^i(\wedge \alpha^e, \hat{x}_n \phi^e)] \rangle$

So long as the extension of the sentence with *even* is equivalent to the sentence without *even*, the extension expression of the sentence with *even* is the same as that of the sentence without *even*, thus can be shown as

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- 6) *Even* can take any expressions of any categories as its focussed items as given in (a-f), thus can not be assigned to a specific category:
- a. Even BILL likes Mary. (NP-focus)
 - b. Bill likes even MARY. (NP-focus)
 - c. Mary even ADMIRES Bill. (TV-focus)
 - d. Bill even DRINK BEER. (VP-focus)
 - e. Even INFERIOR coffee is expensive. (ADJ-focus)
 - f. Even IF SHE DOESN'T COME there will be too many people. (ADV-focus)

Thus, *even* has to be either introduced syncategorematically or assigned to the cross-categorical category (i.e. A/A, $A \in \text{Cat}$). Neither approach complicates the formation rule(s) in syntax. The latter treatment is somewhat new in the Montague syntax and seems to me more promising than Karttunen and Peters' quantificational treatment, since rules of translation are simpler than those Karttunen and Peters(1979) can predict if proper meaning postulate of *even* is given.

the left hand side of the semi-colon. The implicature of the sentence with *even* is the conjunction of the implicature expression of the sentence without *even* and the implicature expression of *even*, since *even* is syncategorematically introduced. Thus, the implicature expression of the sentence with *even* can be shown as the right hand side of the semi-colon.⁷⁾ For instance, the sentence in (2) has the extension expression as shown in (10a), and implicature expression as shown in (10b).

- (10) a. Bill-likes-even-Mary^e=Mary^e(\hat{x} , Bill-likes-him₀) \equiv
 Bill-likes-Mary^e \equiv like_{*}^e(b, m)
 b. Bill-likes-even-Maryⁱ=(\hat{x} , Bill-likes-him₀)
 \wedge Mary^h(\hat{x} , Bill-likes-him₀)
 \wedge evenⁱ(^aMary^e, \hat{x} , Bill-likes-him₀)]

3. Japanese Delimiters

In this section, we would like at first to observe some of the simple sentences with Japanese delimiters such as *sae*, *sura*, *made*, *mo*, *dake*, *nomi*, *shika*, and *bakari*, and find out some of their characteristics.

Let us look at sentences in (11), (12), (13) and (14).⁸⁾

- (11) a. Taroo *sae* kuru. (=Even Taroo comes.)
 even come
 b. Taroo *sura* kuru. (=Even Taroo comes.)
 even
 c. Taroo *made* kuru. (=Even Taroo comes.)
 even
 d. Taroo *mo* kuru. (=Even Taroo comes.)
 even
 e. Taroo *dake* kuru. (=Only Taroo comes.)
 only

7) In general, implicature expressions take the form of $\alpha^i(^a\beta^e) \wedge \alpha^h(^a\beta^i)$ or the form of $\hat{x}[\alpha^i(x, ^a\beta^e) \wedge \alpha^h(x, ^a\beta^i)]$. See Karttunen and Peters(1979:49-52).

8) Here, *mo* and *bakari* are in non-enumerative and non-iterative uses, respectively. Enumerative *mo* and iterative *bakari* shall be treated separately in the latter part of this paper.

- f. Taroo *nomi* kuru. (=Only Taroo comes.)
only
- g. *Taroo *shika* kuru.
only
- h. *Taroo *bakari* kuru.
only
- (12) a. Taroo *sae* ko-nai. (=Even Taroo does not come.)
come not
- b. Taroo *sura* ko-nai. (=Even Taroo does not come.)
- c. Taroo *made* ko-nai. (=Even Taroo does not come.)
- d. Taroo *mo* ko-nai. (=Even Taroo does not come.)
- e. Taroo *dake* ko-nai. (=Only Taroo does not come.)
- f. Taroo *nomi* ko-nai. (=Only Taroo does not come.)
- g. Taroo *shika* ko-nai. (=Only Taroo comes.)
- h. *Taroo *bakari* ko-nai.
- (13) a. Gakusei *sae* kuru. (=Even students come.)
student(s)
- b. Gakusei *sura* kuru. (=Even students come.)
- c. Gakusei *made* kuru. (=Even students come.)
- d. Gakusei *no* kuru. (=Even students come.)
- e. Gakusei *dake* kuru. (=Only students come.)
- f. Gakusei *nomi* kuru. (=Only students come.)
- g. *Gakusei *shika* kuru.
- h. Gakusei *bakari* kuru. (=Only students come.)
- (14) a. Gakusei *sae* ko-nai. (=Even students do not come.)
- b. Gakusei *sura* ko-nai. (=Even students do not come.)
- c. Gakusei *made* ko-nai. (=Even students do not come.)
- d. Gakusei *mo* ko-nai. (=Even students do not come.)
- e. Gakusei *dake* ko-nai. (=Only students do not come.)
- f. Gakusei *nomi* ko-nai. (=Only students do not come.)
- g. Gakusei *shika* ko-nai. (=Only students come.)
- h. *Gakusei *bakari* ko-nai.

From these sentences in (11), (12), (13), and (14), we can see the syntactic

restrictions to the last two delimiters, *shika* and *bakari*: *shika* can be used only in negative and *bakari* in this use only in affirmative sentences. Thus, for a while, *shika-nai* shall be treated as a delimiter in place of *shika* for convenience. Moreover, we shall notice that the focused NP of *bakari* can not be a proper noun. In addition to these syntactic observation, we can get the following semantic one: Japanese delimiters play no role in determining their truth conditions, since the well-formed sentences with delimiters in (11), (12), (13) and (14) have the same truth-conditional meanings as those of sentences without delimiters, such as shown in (15).

- (15) a. Taroo-ga kuru. (=Taroo comes.)
 ga: nominative case marking particle
 b. Gakusei-ga kuru. (=Students come.)

Sentences in (15) do not give rise to any implicatures that their corresponding sentences have. Thus, the implicatures of the well-formed sentences in (11), (12), (13) and (14) are detachable.

In what follows, we shall explicate that the implicatures of the well-formed sentences in (11), (12), (13) and (14) are noncancelable. Observe the following sentences in (16), (17), (18), (19), (20), and (21).

- (16) Taroo igai-no mono-wa minna kuru. Soshite, (=All other people
 other people besides all and
 besides Taroo come. And, ...)
 a. Taroo *sae* kuru.
 b. Taroo *sura* kuru.
 c. Taroo *made* kuru.
 d. Taroo *mo* kuru.
 e. *Taroo *dake* kuru.
 f. *Taroo *nomi* kuru.
- (17) Taroo igai-no mono-wa dare-mo ko-nai. Soshite, (=None of the
 dare-mo...nai: none of
 other people besides Taroo comes. And, ...)
 a. *Taroo *sae* kuru.
 b. *Taroo *sura* kuru.

- c. *Taroo *made* kuru.
 d. *Taroo *mo* kuru.
 e. Taroo *dake* kuru.
 f. Taroo *nomi* kuru.
- (18) Taroo igai-no mono-wa minna kuru. Soshite,
 a. *Taroo *sae* ko-nai.
 b. *Taroo *sura* ko-nai.
 c. *Taroo *made* ko-nai.
 d. *Taroo *mo* ko-nai.
 e. Taroo *dake* ko-nai.
 f. Taroo *nomi* ko-nai.
 g. *Taroo *shika* ko-nai.
- (19) Taroo igai-no mono-wa dare-mo ko-nai. Soshite,
 a. Taroo *sae* ko-nai.
 b. Taroo *sura* ko-nai.
 c. Taroo *made* ko-nai.
 d. Taroo *mo* ko-nai.
 e. *Taroo *dake* ko-nai.
 f. *Taroo *nomi* ko-nai.
 g. Taroo *shika* ko-nai.
- (20) Gakusei igai-no mono-wa minna kuru. Soshite,
 h. *Gakusei *bakari* kuru.
- (21) Gakusei igai-no mono-wa dare-mo ko-nai. Soshite,
 h. Gakusei *bakari* kuru.

Here, we have to note that sentences with delimiters such as *sae*, *sura*, *made*, and *mo* can be used in the contexts which do not cancel their implicatures such as (16) and (19), but can not be used in the contexts which cancel their implicatures such as (17) and (18). In the same way, sentences with delimiters such as *dake* and *nomi* can be used in the context such as (17) and (18), but can not be used in the contexts such as (16) and (19). Sentences with *shika* and *bakari*, as well, have their corresponding contexts in which they can be used and their implicatures shall not be

canceled. Moreover, sentences with those delimiters shall not be used in the contexts which cancel their implicatures.

Thus, the implicatures of those well-formed sentences contributed by those delimiters in the contexts shown in (16), (17), (18), (19), (20) and (21) are considered noncancelable. Therefore, they are conventional and shall be represented roughly as shown in (22).⁹⁾

(22) a. *sae/sura/made/mo*:

There are other *x* under consideration besides *Taroo* such that

x-ga { *kuru*
ko-nai }.

b. *dake/nomi*:

There are no other *x* under consideration besides *Taroo* such

that *x-ga* { *kuru*
ko-nai }.

c. *shika-nai*:

There are no other *x* under consideration besides *Taroo* such that *x-ga kuru*.

d. *bakari*:

There are no other *x* under consideration besides those who are *gakusei* such that *x-ga kuru*.

Now, let us observe the implicatures of the well-formed sentences in (11), (12), (13) and (14) in other contexts such as shown in (23), (24), (25), (26), (27) and (28).

(23) *Kuru kanoosei-ga mottomo hikui Taroo*
likeliness most low

a. *sae kuru*.

b. *sura kuru*.

c. *made kuru*.

d. *mo kuru*.

(=Even *Taroo* who is most unlikely to come comes.)

9) Professor Ik-Hwan Lee pointed out to me that the conventional implicature of *dake/nomi* in my analysis is equivalent to the assertion of *only* in Horn (1972). I don't know any way to explain this discrepancy at present. I need further consideration of this issue.

h. *bakari* kuru (=Only students who are most likely to come come.)

Here, examples from (23) through (26) show that delimiters like *dake*, *nomi*, *shika-nai*, and *bakari* can be used irrespective of the likelihood as to Taroo's coming or students' coming. They also show that other delimiters such as *sae*, *sura*, *made*, and *mo* can not be used in the contexts which cancel their implicatures: *tae* implicature *kuru kanoosei-ga mottomo hikui* (=who is most unlikely to come) contributed by those delimiters shall be negated by the relative clause *kuru kanoosei-ga mottomo takai* (=who is most likely to come) in (24), and the other implicature *kuru kanoosei-ga mottomo takai* contributed by the same delimiters shall be canceled by the relative clause *kuru kanoosei-ga mottomo hikui*. Thus, the implicatures of the delimiters such as *dake*, *nomi*, *shika-nai*, and *bakari* are cancelable and those of the delimiters such as *sae*, *sura*, *made*, and *mo* are noncancelable. Therefore, the implicatures of the latter delimiters are conventional and shall be represented roughly as in (29).

(29) *sae/sura/made/mo*:

- a. For all x under consideration besides Taroo, the likelihood that *x-ga kuru* is greater than the likelihood that *Taroo-ga kuru*.
- b. For all x under consideration besides Taroo, the likelihood that *x-ga ko-nai* is not greater than the likelihood that *Taroo-ga ko-nai*.

Here, (29a) and (29b) correspond to the implicatures of those delimiters used in affirmative sentences and in negative sentences, respectively.

Based on these observations, we can conclude that implicatures of Japanese delimiters are conventional, that delimiters such as *sae*, *sura*, *made*, and *mo* have both existential and scalar implicatures, and that delimiters such as *dake*, *nomi*, *shika-nai*, and *bakari* have existential implicatures, but do not have scalar implicatures. In (30), tentative partial meaning postulates of those delimiters are presented.

- (30) a. ${}^{\wedge}\text{sae}^{\wedge} = {}^{\wedge}\text{sura}^{\wedge} = {}^{\wedge}\text{made}^{\wedge} = {}^{\wedge}\text{mo}^{\wedge} = {}^{\wedge}\text{even}^{\wedge}$
 b. ${}^{\wedge}\text{dake}^{\wedge} = {}^{\wedge}\text{nomi}^{\wedge} = {}^{\wedge}\text{shika-nai}^{\wedge} = {}^{\wedge}\text{bakari}^{\wedge}$

(=Taroo comes, and Hanako who is most $\left\{ \begin{array}{l} \text{likely} \\ \text{unlikely} \end{array} \right\}$ to come comes, too.)

- f. Taroo mo ko-nai ga, kuru kanoosei-ga mottomo $\left\{ \begin{array}{l} \text{takai} \\ \text{hikui} \end{array} \right\}$ Hanako
mo ko-nai.
 /enumerative/

(=Taroo does not come, and Hanako who is most $\left\{ \begin{array}{l} \text{likely} \\ \text{unlikely} \end{array} \right\}$ to come does not come, either.)

- (33) a. Hanako igai-no mono-wa dare-mo ko-nai. Soshite, Hanako
bakari kuru.
 /iterative/

(=None of the other people besides Hanako comes, and only Hanako comes over and over again.)

- b. *Hanako igai-no mono-wa minna kuru. Soshite, Hanako *bakari*
 /iterative/
 kuru.

- c. *Hanako igai-no mono-wa dare-mo ko-nai. Soshite, Hanako
bakari ko-nai.
 /iterative/

- d. Hanako igai-no mono-wa minna kuru. Soshite, Hanako *bakari*
 /iterative/
 ko-nai.

(=All other people besides Hanako come, and only Hanako does not come over and over again.)

- e. Kuru kanoosei-ga mottomo $\left\{ \begin{array}{l} \text{takai} \\ \text{hikui} \end{array} \right\}$ Taroo *bakari* kuru.
 /iterative/

(=Only Taroo who is most $\left\{ \begin{array}{l} \text{likely} \\ \text{unlikely} \end{array} \right\}$ to come comes over and over again.)

- f. Kuru kanoosei-ga mottomo $\left\{ \begin{array}{l} \text{takai} \\ \text{hikui} \end{array} \right\}$ Taroo *bakari* ko-nai.
 /iterative/

(=Only Taroo who is most $\left\{ \begin{array}{l} \text{likely} \\ \text{unlikely} \end{array} \right\}$ to come comes over and over again.)

Like other Japanese delimiters, enumerative *mo* and iterative *bakari* can not

be used in the contexts in which their implicatures shall be canceled, when their implicatures are related to the existence of other individuals besides the focused NP who may or may not show the same behavior. But, both particles can be used irrespective of the likelihood as to the focused NP's behavior. Thus, they have existential implicatures but do not have scalar implicatures. Their existential implicatures are shown roughly in (34).

- (34) a. *mo*: There are other *x* under consideration besides
/enumerative/
Hanako such that *x-ga* { *kuru*
ko-nai }.
- b. *bakari*: There are no other *x* under consideration besides
/iterative/
Hanako such that *x-ga* { *kuru*
ko-nai }.

Here, you shall notice that the implicatures shown in (34a) and (34b) are equivalent to those of (22a) and (22b), respectively. Thus, their meaning postulates are presented in (35).

- (35)¹⁰ a. [^]mo = [^]λ₁∫^Q∫ {[^]∫[V_x[* {*x*} ∧ ¬[^vx=^vy] ∧ Q {*x*}]]}
/enumerative/ = [^]too=[^]either
≠ [^]mo
/non-enumerative/

10) In (10. b), *bakari* in iterative use and *bakari* in non-iterative use are given the same meaning postulate. But, it is not the total but a partial representation of the meanings of both uses of *bakari*. There are at least two semantic differences between iterative and non-iterative *bakari*: First, unlike non-iterative *bakari*, iterative *bakari* has a sort of frequentative implicature. This is a unique property of this particle, since other delimiters such as *dake*, *nomi* can be used and *sae*, *sura*, *mo/enumerative/*, *mo/non-enumerative/* can not be used in the contexts given in (a-b). Observe the following sentences.

- a. *Gakusei igai-no mono-wa ichido-mo ko-nai. Shikashi, once.*
Gakusei { **bakari/iterative/*
bakari/non-iterative/ } *ichido-dake kita.*
(=None of the other people besides students comes even once. But,
{ **it was students and only students who*
{ *only students* } came once.)
- b. *Gakusei igai-no mono-wa ichido-mo ko-nai. Shikashi, Gakusei*
{ *bakari/iterative/*
bakari/non-iterative/ } *nando-mo kita.*
again and again

- cf. [^]mo
 /non-enumerative/
 $=^{\wedge}\lambda\beta\hat{Q}\beta\{\hat{y}[\vee x[*\{x\} \wedge \neg[\vee x=\vee y] \wedge Q\{x\}]$
 $\wedge \Lambda x[[*\{x\} \wedge \neg[\vee x=\vee y] \rightarrow \text{exceed}^e(\text{likelihood}^e(^{\wedge}Q\{x\})),$
 $\text{likelihood}^e(^{\wedge}Q\{y\})]]\}$
- b. [^]bakari = [^]bakari
 /iterative/ /non-iterative/
 $=^{\wedge}\text{dake} = ^{\wedge}\text{nomi}$
 $=^{\wedge}\lambda\beta\hat{Q}\beta\{\hat{y}[\neg\vee x[*\{x\} \wedge \neg[\vee x=\vee y] \wedge Q\{x\}]]\}$

Lastly, let us look at some of the syntactic rules of Japanese delimiters by which they are syncategorematically introduced into sentence-expressions and their corresponding translation rules by which meanings of sentence-expressions and those of delimiters are combined. See rules in (36), (37), (38), (39), and (40).

- (36)¹¹⁾ *Sae/Sura/Made/Mo** Rule: if α is a T-phrase and ϕ is a t-phrase containing an occurrence of $\text{KE}_n(\text{kare-ga}_n, \text{kare-o}_n)$, then

(= { It was students and only students who } came again and again.)
 (= Only students

Second, the sentence with iterative *bakari* semantically presupposes a sentence which denotes events which happened prior to the time of utterance. This is also a unique property of iterative *bakari* since no sentence with other delimiters shall have the same semantic relation. Observe the following relations between two sentences.

- a. Taroo *bakari*/iterative/*shikarareta*. (=It was Taroo and only was scolded Taroo who was scolded again and again.) \gg
 Taroo-wa izen-ni shikarareta koto-ga aru. (=Taroo has experience before experience of being scolded./Taroo has ever been scolded.)
- *b. Taroo *bakari*/non-iterative/*shikarareta*. \gg
 Taroo-wa izen-ni shikarareta koto-ga aru. (where: $P \gg Q = P$ presupposes Q .)

I am sure that these conventional implicatures are helpful to make a semantic distinction between two uses of *bakari*. It is, however, unclear at present to me whether these implicatures should be treated separately or in the framework of existential or scalar implicatures. So, for the time being, I will leave this issue open.

11) *Mo** is non-enumerative *mo*.

$F_{sae/sura/made/mo;n}(\alpha, \phi)$ is a t-phrase and is derived from ϕ by replacing the first occurrence of KE_n by α *sae/sura/made/mo* and each of its subsequent occurrence by the corresponding unsubscripted pronoun whose gender matches the gender of α .

Translation: $\langle \alpha^e(\hat{x}_n \phi^e); [[\alpha^i(\hat{x}_n \phi^e) \wedge \alpha^h(\hat{x}_n \phi^i) \wedge sae/sura/made/mo^i (^{\wedge}\alpha^e, \hat{x}_n \phi^e)]] \rangle$

(37) *Dake/Nomi* Rule: $\dots F_{dake/nomi;n}(\alpha, \phi) \dots \alpha$ *dake/nomi*....

Translation: $\langle \dots; \dots dake^i(\dots) \rangle$

(38) *Shika* Rule: if α is a T-phrase and ϕ is a *negative* t-phrase..., then

$F_{shika;n}(\alpha, \phi)$ is a t-phrase...by α *shika* and...

Translation: $\langle \dots; \dots shika^i(\dots) \rangle$

(39) *Bakari* Rule: if α is a T-phrase which is generic and ϕ is an

affirmative t-phrase..., then $F_{bakari;n}(\alpha, \phi)$ is a t-phrase...by α *bakari*....

Translation: $\langle \dots; \dots bakari^i(\dots) \rangle$

(40) *Mo/enumerative/*Rule: $\dots F_{mo/enumerative;n}(\alpha, \phi) \dots \alpha_{mo/enumerative/}$

Translation: $\langle \dots; \dots mo^i/enumerative/(\dots) \rangle$

Here, we have to note that only negative t-phrase shall be qualified as the t-phrase in (38) and only affirmative t-phrase in (39). Moreover, (39) specifies that the T-phrase which shall be combined with a t-phrase by the rule must be generic. This specification is based on the observation of the following sentences which show that the delimiter *bakari* can cooccur only with generic NP-expressions.

(41) a. *Taroo bakari kuru. (=Only Taroo comes.)

$\begin{bmatrix} -\text{generic} \\ +\text{definite} \end{bmatrix}$

b. *Sono otoko bakari kuru. (=Only that man comes.)

$\begin{bmatrix} -\text{generic} \\ +\text{definite} \end{bmatrix}$

c. *Ookuno otoko bakari kuru. (=Only many men come.)

$\begin{bmatrix} -\text{generic} \\ -\text{definite} \end{bmatrix}$

d. Otoko bakari kuru. (=Only men come.)

$\begin{bmatrix} +\text{generic} \\ -\text{definite} \end{bmatrix}$

These specifications in the syntactic rules prohibit the generation of ill-formed sentences found in (11), (12), (13) and (14).

4. Concluding Remarks

In this paper, we have claimed that Japanese delimiters play no role in determining their truth conditions by showing that well-formed sentences with delimiters have the same truth-conditional meanings as those of sentences without delimiters, then have shown that those delimiters bear existential implicatures and/or scalar implicatures as their non-truth-conditional meanings. In the course of discussion, we have also shown that Karttunen and Peters' device can properly formulate the non-truth conditional meanings of Japanese delimiters. Here, we are convinced that Karttunen and Peters' framework is helpful for the analysis of non-truth-conditional aspects of meaning of natural languages.

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