Japanese *Mo* ‘Also/Even’ and *Shika* ‘Except for/Only’

Mana Kobuchi-Philip
Uil-OTS
Utrecht University

m.kobuchi@uu.nl

Abstract

This paper discusses Japanese particles *mo* ‘also/even’ and *shika* ‘except for/only’ that follow a noun X as [X-mo/shika]. Syntactically, X-mo and X-shika are argued to be predicate modifiers. Semantically, the conditions of the exception construction noted in the literature are relevant for both mo- and shika-sentences: They both express (i) the relationship between X and the argument construed with X, and (ii) the relationship between X and the predicate (von Fintel 1993, Moltmann 1995). The minimal difference with respect to condition (ii) gives rise to an inclusion interpretation (mo) or an exclusion interpretation (shika). In addition, I argue that they both require the presence of another element which has the properties of the argument and the predicate, though it is a semantic condition for *mo*, while it is a pragmatic condition for *shika*.

1 Introduction

Japanese particles *mo* ‘also/even’ and *shika* ‘except for/only’ are, in the simplest form, postposed to a DP, as shown in (1). The overt subjects in these sentences are optional, but the referent is provided from the context when they are phonetically null:

(1) a. (gakusei-ga) Taro-mo hashira-nakat-ta.
   student-NOM Taro-MO run-NEG-PAST
   ‘Taro also didn’t run (as is the case for other students as well).’
   ‘Even Taro didn’t run (contrary to expectation, he behaved like the other students),’

b. (gakusei-ga) Taro-shika hashira-nakat-ta.
   student-NOM Taro-SHIKA run-NEG-PAST
   ‘Only Taro ran (other students did not).’

*Mo* and *shika* are both complex lexical elements. They are semantically quantificational and pragmatically presuppositional. Their linguistic significance has naturally led to much controversy in the syntax, semantics and pragmatics literature. However, although there has been much written about each of these particles, they have generally been discussed separately. For example, in the semantics literature, a number of linguists have investigated
mo (e.g. Ohno 1989, Nishigauchi 1990, Shimoyama 2001, 2006) and shika (e.g. Fukukawa 2006, Kinuhata 2007, Yoshimura 2007), but they all concentrate either on one or the other particle. In this paper, we examine the two particles in a comparative manner and argue that they are parallel in the sense that they have the same well-formedness criteria. In the next section we will first discuss their syntax, in pursuit of a strictly compositional semantic analysis. We will see that X-mo and X-shika are best analyzed as predicate modifiers. On the basis of this syntactic assumption, a semantic analysis will be constructed in section 3. Here, the three conditions will be the focus. These concern (i) the relationship between X of X-mo/X-shika and the argument of the predicate it is construed with, (ii) the relationship between X and the predicate itself, and (iii) the obligatory presence in the context of an object which has the property of the argument of the predicate and the predicate at the same time. It will be argued in section 4 that the third condition applies in different modules of the language faculty for mo and shika.

2 Syntax

At first let us establish what the syntax of the mo- and shika-phrases is, since this will be the basis for a compositionally adequate semantic analysis. One of the complications in analyzing mo and shika is that what these particles combine with is not monocategorial. Consider the following well-formed sentences:

(2)  
   a. [Taro-ni]-mo/shika hanasa-na-i.  
       Taro-to-MO/SHIKA tell-NEG-PRES  
       ‘I won’t tell Taro, either. / I will tell only Taro.’  
   b. [Tokyo-kara]-mo/shika ko-na-i.  
       Tokyo-from-MO/SHIKA come-NEG-PRES  
       ‘It won’t come from Tokyo, either. / It will come only from Tokyo.’  
   c. kore-wa [kasetsu-de]-mo/shika na-i.  
       this-TOP hypothesis-COPULA-MO/SHIKA NEG-PRES  
       ‘This is not a hypothesis, either. / This is only a hypothesis.’  
   d. [aruite]-mo/shika ik-e-na-i.  
       walking-MO/SHIKA go-POSSESS-NEG-PAST  
       ‘We can’t go there on foot, either. / We can go there only on foot.’  
   e. [shachoo-ga kite-kara]-mo/shika kanpai-ga deki-na-i.  
       president-NOM come-from-MO/SHIKA toast-NOM do-POSSESS-NEG-PRES  
       ‘We cannot make a toast after the president arrives, either. / We can make a toast only after the president arrives.’

Moreover, (2) is not an exhaustive list of all the syntactic categories that mo and shika can combine with. Clearly, both particles can combine with a variety of different types of syntactic constituents. In (2a) they combine with an indirect object with dative ni, with a PP

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1 English even and only are discussed together by Horn (1969), with respect to the presuppositional property.
2 This property is shared with English even and only, which roughly correspond to Japanese mo and shika, respectively, though syntactically English even and only are independent words, while Japanese mo and shika appear to be bound morphemes.
3 In order to construct minimal pairs for mo and shika, I present both sentences in (2) in the negative. This is because shika requires a negative context, though this does not apply to mo. In section 4 this negative polarity constraint of shika will be shown to be a pragmatic constraint.
in (2b), with a nominal predicate in (2c), with a verb in (2d), and with an adjunct clause in (2e). This distribution might be an indication of a type-flexibility of mo/shika’s. In any event, such data make our task of formulating a syntactic generalization quite difficult. Although this itself is an important issue, in this paper, I will concentrate on the simplest case such as (1), in which mo/shika combines with a DP.

2.1 Modifier status of mo/shika-phrase

It has been proposed that the mo-phrase is a quantificational DP when it is in construction with an NP (e.g. Shimoyama 2001, 2006, Yatsushiro 2009). However, as I have argued elsewhere (Kobuchi-Philip 2008a, 2009), when we take into account the empirical observations of Aoyagi (1994), it is clear that the mo-phrase is an adjunct in the verbal domain, even when it is combined with an NP. Note that in (1a) above, the sentence can optionally be associated with an overt subject with nominative ga, and the sentence is perfectly grammatical. This indicates that the mo-phrase in (1a) is not the subject, given the assumption that a sentence can have only one logical subject (e.g. Heycock 1993). It is well-known that Japanese is one of the languages which allow null arguments. Thus, the reasonable assumption is that, even though the subject is not overtly present, the sentence does have a subject, only covertly.

Furthermore, consider the following sentences, which contain more than one mo-phrase:

(3)  a. gakusei-ga Taro-mo Jiro-mo hashi-tta.
     student-NOM Taro-MO Jiro-MO run-PAST
     ‘The students ran, including Taro and Jiro.’

b. Taro-wa LI-o kyonenno-mo kotoshino-mo yon-da.
   Taro-TOP LI-ACC last year’s-MO this year’s-MO read-PAST
   ‘Taro has read LI including last year’s and this year’s.’

The fact that more than one mo-phrase can co-occur in a single clause strongly suggests that it is not an argument but an adjunct.

Turning to shika, it can be seen that the adjunct status of mo also applies to shika. In (1b), just like (1a), an overt subject can be inserted without loss of grammaticality. This suggests that the shika-phrase is not a quantificational argument DP, contra Yoshimura (2007).

2.2 Predicate modifier status of mo/shika-phrase

Given that mo- and shika-phrases are both adjuncts, the next question is whether they occur in the nominal domain or the verbal domain. The following data demonstrate that they are adjuncts in the verbal domain:

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4 Native speakers of Japanese might feel the sentences in (1) slightly awkward if the subject is overtly inserted. I assume that this awkwardness is due to the general pragmatic principle of Japanese that known or contextually understood arguments are generally referred by means of a phonetically null pronoun.

5 Due to its meaning, it is impossible to construct sentences like (3) that contain several instances of shika. For the same reason an English sentence having more than one instance of [except for NP] gives rise to a semantic anomaly:

(i) # Every boy left, except for John, except for Bill.
As in (4b) and (5b), both the mo-phrase and the shika-phrase can be moved together with the predicate to form a cleft construction from the non-cleft construction (4a) and (5a). However, they cannot move together with the preceding DP to form a pseudo-cleft construction, as shown in (4c) and (5c). From this set of data, it is clear that mo- and shika-phrases belong to the verbal domain. In light of this, we can conclude that they are predicate modifiers, like an adverb. If so, it is also reasonable to hypothesize that their semantic type is \(<<e,t>,<e,t>>\).

3 Semantics

Having outlined the syntactic assumptions, I will now discuss three conditions which are common in the interpretations of sentences with a mo-phrase and sentences with a shika-phrase.

3.1 Argument membership

The first semantic condition is what Moltmann (1995) calls the ‘condition of inclusion’ in her analysis of English exception construction involving except for/but. Consider the following sentences:

(6) a. Every boy except for/but John ran.
    b. # Every boy except for/but Mary ran.
The well-formedness of such sentences is determined by whether the exceptional object is included in the quantified domain of individuals. In (6a), John is a boy and this can be a member of the set of individuals referred to by every boy. For this reason, (6a) is well-formed. On the other hand, because Mary in (6b) is a girl, the sentence ill-formed. Mary cannot be in the presupposition set of every boy.

This condition turns out also to be applicable to Japanese sentences with mo or shika. Consider the following set of data:

\[(7)\]
\[
\begin{align*}
\text{a.} & \quad \text{kyooju-ga} \quad \text{Suzuki-sensei-mo} \quad \text{hashit-ta.} \\
& \quad \text{prof.-NOM} \quad \text{Suzuki-teacher-MO} \quad \text{run-PAST} \\
& \quad \text{‘The professors ran, including Prof. Suzuki.’} \\
\text{b.} & \quad \# \quad \text{gakusei-ga} \quad \text{Suzuki-sensei-mo} \quad \text{hashit-ta.} \\
& \quad \text{student-NOM} \quad \text{Suzuki-teacher-MO} \quad \text{run-PAST} \\
& \quad \text{(Lit. ‘The students ran, including Prof. Suzuki.’)}
\end{align*}
\]

\[(8)\]
\[
\begin{align*}
\text{a.} & \quad \text{kyooju-ga} \quad \text{Suzuki-sensei-shika} \quad \text{hashira-na-katta.} \\
& \quad \text{prof.-NOM} \quad \text{Suzuki-teacher-SHKA} \quad \text{run-NEG-PAST} \\
& \quad \text{‘The professors didn’t run, except for Prof. Suzuki.’} \\
\text{b.} & \quad \# \quad \text{gakusei-ga} \quad \text{Suzuki-sensei-shika} \quad \text{hashira-na-katta.} \\
& \quad \text{student-NOM} \quad \text{Suzuki-teacher-SHKA} \quad \text{run-NEG-PAST} \\
& \quad \text{(Lit. ‘The students didn’t run, except for Prof. Suzuki.’)}
\end{align*}
\]

Sentences (7a) and (8a) are well-formed, since Prof. Suzuki can readily be taken as a member of the set of professors denoted by the subject DP. On the other hand, (7b) and (8b) are ill-formed, because Prof. Suzuki is not a student. Thus, X of X-mo or X-shika must be a member of the set denoted by the argument DP which is construed with the mo- or shika-phrase. I will call this condition the ‘Argument Membership’ condition.

### 3.2 Predicate membership

The next semantic condition is what von Fintel (1993) calls ‘domain subtraction’ and what Moltmann (1995) calls the ‘negation condition’ in their respective analyses of the English exception construction. This condition concerns the contrast between the exceptional and the non-exceptional objects. Consider the following example sentence:

\[(9)\] No boy except for John ran.

In the interpretation of this sentence, John is the exception and he is a runner. The rest of the boys in the context have the property that they are not runners, or lack the property of being a runner.

This condition is also applicable to the shika-phrase. Recall the following sentence:

\[(1)\] (gakusei-ga) Taro-shika hashira-nakat-ta. \\
\text{student-NOM} \quad \text{Taro-SHIKA} \quad \text{run-NEG-PAST} \\
\text{‘Only Taro ran (the other students did not).’}

In this sentence, Taro is the exceptional entity and he is a runner. The rest of the students must all be non-runners; if not, Taro looses its exceptionality. Thus, in the shika-sentence in
Let us now consider *mo*. Unlike *shika*, it turns out that *X* of *X-mo* does have predicate membership. Consider the following sentences:

(10) \(\text{gakusei-ga Taro-mo hashit-ta.} \)
\(\text{student-NOM Taro-MO run-PAST} \)
\(\text{‘Taro also ran, like the other students.’ (‘The students ran, including Taro.’)} \)

(1) a. \(\text{(gakusei-ga) Taro-mo hashira-nakat-ta.} \)
\(\text{student-NOM Taro-MO run-NEG-PAST} \)
\(\text{‘Taro also didn’t run (among the students).’} \)

The affirmative sentence in (10) gives rise to the interpretation that the relevant set of students ran, and Taro is one of them, satisfying the property denoted by the affirmative predicate *hashitta* ‘ran’. Turning to the negative context in (1a), the students relevant in the context did not run, and Taro is again one of them, this time satisfying the property denoted by the negative predicate *hashiranakatta* ‘didn’t run’. Thus, regardless whether the predicate is affirmative or negative, *X* of *X-mo* must be a member of the set denoted by this predicate. In sum, *mo* and *shika* contrast in this respect. In the *shika*-sentence *X* of *X-shika* must not be a member of the predicate denotation, while in the *mo*-sentence *X* of *X-mo* must be a member of the predicate denotation. I will call this the ‘Predicate Membership’ condition.

### 3.3 Additivity

There is another condition to consider. This has to do with the obligatory presence of an additional individual, other than *X* of *X-mo* and *X-shika*. First, consider the following sentence with *mo*:

(10) \(\text{gakusei-ga Taro-mo hashit-ta.} \)
\(\text{student-NOM Taro-MO run-PAST} \)
\(\text{‘The students, including Taro, ran.’} \)

In the interpretation of this sentence, Taro is a student runner. In order for the sentence to be true, there must be another student runner aside from Taro. Thus, if there are some students other than Taro, but none of them ran, then (10) is not well-formed. Obviously, if there is no student other than Taro, i.e. if Taro is the only student, (10) is not well-formed either. Therefore, the presence of some element which satisfies the argument membership condition and the predicate membership condition at the same time is a necessary part of the truth conditions of *mo*.

This condition seems to be applicable to English as well. Consider the following sentences:

(11) a. John also submitted the homework.
    b. John submitted the homework, too.
    c. John submitted the homework as well.

When the lexical elements *also*, *too*, and *as well* are construed with *John*, these sentences are
ill-formed if John is the only individual who submitted the homework. Thus, an additional individual other than John who has the property indicated by the predicate must be assumed to be in the context. I will call this third condition the ‘Additivity’ condition.

Now, what about shika? Consider the following sentences:

(12) a. gakusei-ga Taro-shika hashira-na-katta. (=1b)  
student-NOM Taro-SHKA run-NEG-PAST  
‘The students didn’t run, except for Taro.’

b. ? Taro-no okusan-ga Mariko-shika hashira-na-katta  
Taro-GEN wife-NOM Mariko-SHKA run-NEG-PAST  
‘No wife of Taro ran, except for Mary.’

In the interpretation of (12a), Taro is a student runner, and he is the exception. The rest of the students relevant in the context are all non-runners. That is, it is most natural to assume that there is at least one other student who did not run. Thus, the presence of some individual who has argument membership and predicate membership is assumed, just as we have seen in (10) with mo. For the sentence in (12b), we take that Mariko to be Taro’s wife and to be exceptional in that she is a runner. That is, we assume that there are some unexceptional wives of Taro’s who are not runners. In a monogamous society, this sentence sounds odd (hence the ‘?’ judgment). The effect here shows how strong the additivity condition is in a shika-sentences.

In a way, the additivity condition is quite logical. By definition, an exception is something abnormal or deviating from some norm. Such a concept can only arise if there exists a norm or ordinary state of affairs in the first place. If one focussed on a single entity without comparing it with anything else, there could be no talk of what is normal nor of what is exceptional. From this point of view, the additivity condition seems to be a logical consequence of the very meaning of ‘except’.

In light of these considerations, the following data are puzzling at first:

(13) a. gakusei-ga Taro-shika hashira-na-katta. (=1b)  
student-NOM Taro-SHKA run-NEG-PAST  
‘The students didn’t run, except for Taro.’  
nazenara, gakusei-wa Taro-dake-dakara-da.  
because student-TOP Taro-only-from-COPULA  
‘Because Taro is the only student.’

b. Taro-no okusan-ga Mariko-shika hashira-na-katta  
Taro-GEN wife-NOM Mariko-SHKA run-NEG-PAST  
‘No wife of Taro ran, except for Mary.’  
nazenara, Taro-no okusan-wa Mariko-dake-dakara-da.  
because Taro-GEN wife-TOP Mariko-only-from-COPULA  
‘Because Taro’s wife is only Mariko.’

c. kono gakubu-wa ichinensei-ga Taro-shika i-nai.  
this department-TOP 1st year student-NOM Taro-SHKA be-NEG  
‘In this department, there is no 1st year student except for Taro.’

In (13a), the first sentence invites the presupposition that there exists some student who is a student but is not a runner. However, in the continuing second sentence, this presupposition
is immediately cancelled: Actually, there is no student other than Taro, meaning that there is not any student who is not a runner. Yet, surprisingly, the sequence of these two sentences is not at all ill-formed. It is only slightly humorous. Likewise, in (13b), the first sentence invites the presupposition that there is someone else other than Mariko who is a wife of Taro’s and who did not run. Again, in the second sentence this is straightforwardly corrected. The second sentence asserts that there is no other wife of Taro, entailing that there is not any non-runner who is Taro’s wife. However, again, the sequence of these sentences is well-formed. Finally, (13c) is an existential sentence and asserts that Taro is the only first year student. This sentence is especially peculiar. *Shika* focuses on Taro and thus it should trigger a presupposition that there is at least another first year student who does not exist. This last proposition itself seems to be a contradiction. But this sentence is perfectly well-formed and acceptable. In sum, what data in (13) shows is that the additivity condition is actually not part of the truth conditions of *shika*. Truth conditions cannot be cancelled, only implicatures can be cancelled. Thus, we seem forced to conclude that the additivity condition lies outside the formal semantics of *shika*.

Let us consider English exception construction. Consider the following fragments:

(14) (John submitted the homework.)
    No student except for John did.
    Because John is the only student.

Sentence (14) sounds humorous. But this is precisely because the third sentence in these fragments makes use of the implicature of the second sentence with *except for* and cancels it. However, these fragments are not exactly considered contradictions. Thus, here, too, we can see that the additivity condition is the implicature rather than a truth condition.6

Thus, although the additivity condition is applicable to both *mo* and *shika*, the component of the language faculty where this condition applies to differs for the two particles. In the case of *mo*-sentences, it applies as a truth condition in the semantic component, and in the case of *shika*-sentences, it applies in the pragmatic component, i.e. as an interface condition.

### 3.4 Formal analyses

In this section we will attempt to formalize the semantics of *mo* and *shika*. First let us look at the *mo*-construction. The analysis here follows Kobuchi-Philip (2009), which proposes a unified analysis of Japanese *mo*.7 In order to make the comparison with the *shika-*

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6 The same does not hold in the following instance of an exception construction in an affirmative context:
   (i) (John did not submit the homework.)
       Every student except for John did.
       #Actually John is the only student.
   The ill-formedness here seems to derive from the semantics of *every*.

7 Kobuchi-Philip (2009) proposes a unified analysis of Japanese *mo* which covers (i) the universal quantificational use of *mo* with an indeterminate; (ii) *mo* within a negative polarity item containing an indeterminate; (iii) *mo* within a negative polarity item functioning as a minimizer, and (iv) additive *mo*. An example for each type of *mo* is shown below:

(i) dono hito-mo hashita-ta. ‘Everybody ran.’ (universal quantificational *mo*)
    which person *mo* RUN PAST

(ii) dare-mo hashira-na-katta. ‘Nobody ran.’ (indeterminate NPI *mo*)
    who *mo* RUN NEG PAST

(iii) hito-ri-mo hashira-na-katta. ‘Not one person ran.’ (minimizer NPI *mo*)
construction more perspicuous, we will focus on negative mo-sentences. For the syntactic analysis of the mo-sentence in (15a), the semantic values of the lexical entries can be analyzed as shown in (15b), and the outcome of the compositional derivation of sentential meaning as shown in (15c):

(15)  
  a. \[ [ \varnothing_{\text{the gakusei}}\text{-ga} \ [ \text{Taro-mo hashira-nakat-ta} ] ] \].
      student NOM Taro MO run NEG PAST
      ‘The students didn’t run, including Taro.’
  b. gakusei (student):
      \( \lambda x [stu(x)] \)
      \( \emptyset \) (the):
      \( \lambda x \lambda y [y(\oplus x)] \)
      Taro:
      \( \lambda x [taro(x)] \)
      mo:
      \( \lambda p \lambda r \lambda x [(at(\oplus p)\subseteq at(x)) \land ((at(x)-at(\oplus p))\cap R) \neq \emptyset) \land (at(\oplus p)\subseteq R)] \) (arg. mem)
      \( \Lambda (((at(x)-at(\oplus p))\cap R)\neq \emptyset)) \) (add)
      hashiranakatta (didn’t run):
      \( \lambda x [\text{non-ran}(x)] \)
  c. (at(\oplus \text{taro})\subseteq (\oplus \text{stu}))
      \( \Lambda (((at(\oplus \text{stu})-at(\oplus \text{taro}))\cap \text{non-ran})\neq \emptyset) \land (at(\oplus \text{taro})\subseteq \text{non-ran}) \)

For the analysis in (15a), I assume that there is a null determiner, in the Japanese DP, which can be interpreted either as definite or indefinite. The justification for this assumption, discussed in Kobuchi-Philip (2006), is that it yields empirical and theoretical advantages when taken in conjunction with the plurality theory of Link (1983) and Landman (2000), which I assume here as well. Following Partee (1987), I assume the proper name Taro is of type \(<e,t>\). Adopting the internal negation of Horn (1989), I assume a verb with the negative morpheme as a single word. This is because a mo-phrase takes scope over negation in the universal quantificational use of mo (all>not, rather than not>all). Now, the outcome of the computation of sentential meaning consists of three propositions, as shown in (15c). (15a) asserts (i) that Taro is a student, (ii) that there is some student who did not run, and (iii) that Taro did not run.

Next, let us consider the shika-construction. For the syntactic analysis of the shika-sentence in (16a), the lexical entries can be analyzed as shown in (16b), and the outcome of the derivation of sentential meaning as shown in (16c):

(16)  
  a. \[ [ \varnothing_{\text{the gakusei}}\text{-ga} \ [ \text{Taro-shika hashira-nakat-ta} ] ] \].
      student NOM Taro SHIKA run NEG PAST
      ‘The students didn’t run, except for Taro.’
  b. gakusei (student):
      \( \lambda x [stu(x)] \)
      \( \emptyset \) (the):
      \( \lambda x \lambda y [y(\oplus x)] \)
  c. (at(\oplus \text{taro})\subseteq (\oplus \text{stu}))
      \( \Lambda (((at(\oplus \text{stu})-at(\oplus \text{taro}))\cap \text{non-ran})\neq \emptyset) \land (at(\oplus \text{taro})\subseteq \text{non-ran}) \)

1 CL MO RUN NEG PAST
(iv) John-mo hashit-ta.
     ‘John also ran.’ (additive mo)
John MO RUN PAST

8 In Japanese, a bare NP such as gakusei ‘student’, as exemplified in (i), can be interpreted as definite or as indefinite and as either singular or plural, as shown in (ii):

(i) gakusei-ga kaet-ta.
    student-NOM leave-PAST
    The student left.
    The students left.
    A student left.
    Some students left.

The four-way ambiguity here can be accounted for straightforwardly if we assume the presence of an indefinite determiner or a definite determiner.
Taro: \( \lambda x [\text{taro}(x)] \)
shika: \( \lambda P \Box R \lambda x [(\text{at}(\bigoplus P) \subseteq \text{at}(x))] \) (arg. mem)
\( \lambda (\text{at}(\bigoplus P) \notin R) \) (pred. mem)
\( \lambda (\text{at}(x) - \text{at}(\bigoplus P)) \subseteq R) \) (pred. mem)

hashiranakatta (didn’t run): \( \lambda x [\text{non-ran}(x)] \)

(16a) differs minimally from (15a) in that \textit{mo} in (15a) is replaced with \textit{shika} in (16a). The predicate \textit{hashiranakatta ‘did not run’} is analyzed as internal negation as before.\(^9\)

Note that the denotation of \textit{shika} in (16b) differs from the denotation of \textit{mo} in (15b) with respect to predicate membership and also with respect to additivity. First, the predicate membership condition of \textit{mo} in (15a) determines that Taro is a member of the predicate denotation, i.e. that Taro is included in the set of non-runners. However, in the case of \textit{shika} in (16a), Taro is excluded from the predicate denotation, i.e. Taro is not a non-runner but rather a runner. Here, Taro is contrasted with the rest of the students, i.e. the other students who are non-runners. Hence, the predicate membership condition is expressed by two propositions, as indicated on the right in (16b). Second, as discussed above, additivity was part of the truth conditions of \textit{mo}, but part of the pragmatics of \textit{shika}. Thus, the denotation of \textit{shika} does not include the additivity condition.

Given this contrast with \textit{mo}, the \textit{shika}-sentence (16a) yields the meaning shown in (16c), which expresses (i) that Taro is a student, (ii) that Taro is a runner, and (iii) that the rest of the students did not run.

The crucial truth-conditional difference between \textit{mo} and \textit{shika} is the predicate membership condition. The \textit{mo}-construction gives rise to an ‘inclusion’ meaning, while the \textit{shika}-construction gives rise to an ‘exclusion’ meaning. Aside from the additivity condition, then, Japanese \textit{mo} and \textit{shika} are parallel. To make this parallelism more perspicuous, consider the following paraphrasing of (15a) and (16a):

(17) a. The students didn’t run, including Taro.
b. The student didn’t run, excluding Taro.

As we discussed above, the additivity condition for \textit{mo} is part of its truth conditions, while that for \textit{shika} is pragmatic.\(^{10}\) In the pragmatic component, however, the additivity condition of \textit{shika} is a crucial part of the well-formed condition. In the next section, we will discuss pragmatics of \textit{mo} and \textit{shika} and see how this is so.

### 4 Pragmatics

In this section, we shift our perspective and explore the pragmatic domain. This part of the paper is somewhat tentative.

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\(^9\) This is also justified in the literature: Kataoka (2006) convincingly argues that \textit{shika}-phrase always scopes over negation.

\(^{10}\) A justification for the claim that the additivity condition of \textit{mo} is part of its semantic value, see Kobuchi-Philip (2009).
In the discussion of the formal semantics in section 3, we have seen that *mo* and *shika* have at least the same two truth conditional criteria, namely, the argument membership condition and the predicate membership condition, and we showed the contrastive nature of *mo* and *shika*: They are opposite in the sense of inclusion vs. exclusion as regards the predicate membership condition.

The third condition, i.e. the additivity condition, is included in the formal semantics of *mo*. However, for *shika*, we concluded that it was outside of the formal semantics on the basis of empirical data including an existential sentence. Yet, the consideration of pragmatics of *mo* and *shika* reveals that the additivity condition is in fact a necessary condition for them in the pragmatic component. At the same time, this leads to an account of the well-known fact that a *shika*-sentence requires a negative predicate.

### 4.1 Truth conditions and expectation

Consider the following set of sentences, each of which contain a numeral quantifier (NQ), which has the form [numeral+classifier]:

(18)  
- a. gakusei-ga 20-nin hashit-ta.
  student-NOM 20-CL run-PAST
  ‘20 students ran.’
- b. gakusei-ga 20-nin-mo hashit-ta.  
  student-NOM 20-CL-MO run-PAST
  ‘As many as 20 students ran.’
- c. gakusei-ga 20-nin-shika hashira-na-katta. 
  student-NOM 20-CL-SHIKA run-NEG-PAST
  ‘Only 20 students ran.’

In (18a), the NQ stands by itself and the sentence simply reports the fact that 20 students ran. In contrast, in (18b) and (18c), the NQ is associated with *mo* and *shika*, respectively, and, as seen in the English gloss, these particles contribute to the interpretation of the sentences in a significant manner. In (18b), the sentence asserts that the number expressed in the sentence, namely 20, is higher than what the speaker expected. On the other hand, in (18c) it is the opposite. This sentence asserts that 20 is lower than what the speaker expected. Thus, we observe here that the presence of the expectation is an important element in the interpretation of these sentences. Furthermore, the data in (19) and (20) more explicitly show the contrastive relationship between the expectation and the truth condition in determining the well-formedness of the *mo*- and *shika*-sentences:

(19)  
- a. #gakusei-ga 20-nin hashiru-to omotteita-ga 10-nin-mo hashit-ta.
  student-NOM 20-CL run-COMP was thinking-but 10-CL-MO run-PAST
  ‘I assumed 20 students would run, but as many as 10 students ran.’
- b. gakusei-ga 20-nin hashiru-to omotteita-ga 30-nin-mo hashit-ta.
  student-NOM 20-CL run-COMP was thinking-but 30-CL-MO run-PAST
  ‘I assumed 20 students would run, but as many as 30 students ran.’
(20) Shika

  a. gakusei-ga 20-nin hashiru-to omotteita-ga
     student-NOM 20-CL run-IMP was thinking-but
     10-nin-shika hashira-na-katta.
     10-CL-SHOKUNI run-NEG-PAST
     'I assumed 20 students would run, but only 10 students ran.'

  b. # gakusei-ga 20-nin hashiru-to omotteita-ga
     student-NOM 20-CL run-IMP was thinking-but
     30-nin-shika hashira-na-katta.
     30-CL-SHOKUNI run-NEG-PAST
     'I assumed 20 students would run, but only 30 students ran.'

In (19) and (20), the expectation is expressed by the first clause before ga ‘but’, and the
second (main) clause expresses the actual state of affairs. In the mo-sentences in (19), only (19b) is well-formed, since only (19b) expresses the relationship between the two propositions correctly with respect to mo. Likewise, in the shika-sentences in (20), only (20a) is well-formed.

The function of mo and shika is to express a discrepancy between expectation and actual state of affairs (observation). The sentence with mo/shika asserts the observation relative to the expectation.

Now, the expectation and the observation of (19) and (20) can be represented in terms of the scalar implicature, as shown in (21):

(21) Expectation  20 students run

   low---------------------20-------------------------high

   Observation  10 students run  30 students run

   Particle  shika  mo

The presence of the expectation and the observation behind a surface sentence, especially with respect to a shika-sentence, might remind the reader of the (positive and negative) inferences of an English sentence with only, as exemplified below (e.g. Bever and Clark 2008):

(22)  a. Only Mary smokes.

       Positive inference: Mary smokes. ('prejacent'\textsuperscript{13})

\textsuperscript{11} Japanese particle ga is perhaps most often seen in the linguistics literature as a nominative case marker (without semantic content), which is postposed on a DP. Another particle ga, which is relevant here, is postposed on a clause, having the same semantic content as English but.

\textsuperscript{12} X of X-mo is associated with a less-likelihood in the sense of Karttunen and Peters (1979) just like X of even X in English. Generally, a higher number corresponds to a lesser-likelihood with respect to mo ‘even’ associated with a numeral. See Nakanishi (2007) and Kobuchi-Philip (2008b) for this correspondence.

\textsuperscript{13} In the literature ‘prejacent’ generally refers to the English sentence containing only minus only. (von Fintel 1993, Horn 2002, Ippolito 2008, Beaver and Clark 2008, etc.). In Japanese, however, determining the prejacent of a shika-sentence is not this simple, since a shika-sentence does not imply the same sentence without shika, if it is at all grammatical. Compare (i) vs. (ii) and (iii) vs. (iv):

(i) gakusei-ga Taro-shika hashiranakatta.  (ii) * gakusei-ga Taro hashiranakatta.
   'No students other than Taro ran.'

(iii) gakusei-ga 20-nin-shika hashiranakatta.  (iv) gakusei-ga 20-nin hashiranakatta.
   'Only 20 students ran.'

If shika is associated with an ordinary DP such as Taro, as in (i), then the shika-less version in (ii) is totally
c. Negative inference: Nobody other than Mary smokes.

Note, however, what we see in (22) does not exactly map to (21). In the present paper, the positive inference and the negative inference of Japanese shika-sentence are both included in the formal semantics as the truth condition, as discussed in the previous section. Furthermore, (22) does not include the expectation in (21). In the view taken in the current paper, the presence of the expectation is a crucial part of the well-formedness of the sentence with focussed mo and shika.

For shika, then, we might represent what is relevant in our discussion as shown in (23):

(23) a. gakusei-ga 20-nin-shika hashira-na-katta. 
   student-NOM 20-CL-SHIZA run-NEG-PAST
   ‘Only 20 students ran.’

b. Expectation: More than 20 students run.

c. Truth condition: 20 students ran but it is not that more than 20 students ran.

Similarly, we obtain the following representation for the mo-sentence in (18b):

(24) a. gakusei-ga 20-nin-mo hashit-ta. 
   student-NOM 20-CL-MO run-PAST
   ‘As many as 20 students ran.’

b. Expectation: Less than 20 students run.

c. Truth condition: 20 students ran.

As mentioned above, since the function of mo and shika is to express the discrepancy between the expectation and the observation, these particles are obviously not licensed without an expectation. Furthermore, what is important here is the relationship between the proposition which refers to the observation and the proposition which refers to the expectation. As shown in the diagram in (21), in the case of shika, the expectation is higher than the observation on the scalar implicature, i.e. the former entails the latter, while in the case of mo, it is the other way around.

4.2 Pragmatic application of the additivity condition to shika

The necessary presence of an expectation supports the presence of the additivity condition of shika in the pragmatics component. Consider the following sentence again, together with the two propositions:

ungrammatical for Case reasons. If shika is associated with an NQ (ex. iii) or some other phrase, and if the shika-less sentence is grammatical (ex. iv), then the meaning of the two sentences are quite different from each other, as seen in the English gloss of (iii) and (iv). If (i) and (iii) are true, (v) and (vi) below are true of the focussed element, respectively. Kinuhata (2007) identifies prejacent of a Japanese shika-sentence in this manner:

(v) Taro-ga hashitta. 
   ‘Taro ran.’

(vi) gakusei-ga 20-nin hashitta. 
   ‘20 students ran.’

In the literature, one of the most discussed issues in terms of only is the status of the positive inference and the negative inference. The question is whether these are entailment, presupposition, or conversational implicature (see Ippolito 2008 and references in it). The current paper does not directly address this issue in terms of Japanese shika. Rather, I simply assume that both positive and negative inferences are entailments of the shika-sentence, as formalized in section 3.

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14 In the literature, one of the most discussed issues in terms of only is the status of the positive inference and the negative inference. The question is whether these are entailment, presupposition, or conversational implicature (see Ippolito 2008 and references in it). The current paper does not directly address this issue in terms of Japanese shika. Rather, I simply assume that both positive and negative inferences are entailments of the shika-sentence, as formalized in section 3.
(25) a. gakusei-ga Taro-shika hashira-na-katta. (=12a=1b)  
    student-NOM Taro-SHIKA fun-NEG=PAST  
    ‘The students didn’t run, except for Taro.’  

b. Truth condition: Taro ran and no student other than Taro ran.  
c. Expectation: Someone other than Taro (e.g. Jiro) will run.

For this sentence to be pragmatically well-formed, there must be some student other than Taro who was expected to run, as shown in (25c). Furthermore, consider the following problematic sentence we have seen earlier:

(26) a. kono gakubu-wa ichinensei-ga Taro-shika i-nai. (=13c)  
    this department-TOP 1st year student-NOM Taro-SHIKA be-NEG  
    ‘In this department, there is no 1st year student except for Taro.’  

b. Truth condition: Taro exists as 1st year student and no 1st year  
    student other than Taro exists.  
c. Expectation: There is some 1st year student other than Taro exists.

Here, too, the expectation is that there is at least one person, other than Taro, who is a first year student. If this expectation is not present in the speaker’s mind (or context), then the sentence (26a) is pointless. Therefore, even if there is no actual existence of another element specified in the additivity condition, this must apply to shika as well, at least pragmatically.

4.3 Negation requirement of shika

As is well-known, shika requires a negative predicate. This has attracted a lot of attention in Japanese linguistics (e.g. Muraki 1978, Kato 1985, Konomi 2000, Teramura 1991, Numata 1991, Aoyagi and Ishii 1994, Tanaka 1997, Kuno 1999, Kataoka 2006). However, none of the research has a formal pragmatic discussion.

In the formal semantic analyses of shika (e.g. Furukawa 2006, Yoshimura 2007, Kinuhata 2007), the explanation of why shika requires a negative predicate remains unclear. For example, Furukawa (2006) treats X-shika as semantically equivalent to English except for/but X, and, as these elements do not require a negative predicate, he does not particularly address the question as to why Japanese shika does. Yoshimura (2007) assumes that X-shika is an NPI and argues that, just like NPIs in other languages, shika must be under the scope of negation, closely following Giannakidou’s (2005) treatment of NPIs. However, this conflicts with Kataoka’s (2006) demonstration that X-shika regularly takes scope over negation. Kinuhata (2007) hypothesizes that shika is equivalent to another Japanese focus particle dake ‘only’, which also denotes exclusion but does not require negation. He argues that, while dake contains negation as its lexical semantic content, shika does not, and thus, shika must be associated with an overt negation. However, both the hypothesis and the formal mechanisms he proposes raise many questions.15

On the other hand, our discussion above provides a possible account for the negation requirement of shika. Consider (23), repeated here:

Kobuchi-Philip (in press) briefly reviews these works and points out that there is a compositional problem in each.

15
JAPANESE *Mo ‘ALSO/EVEN’ AND SHIKA ‘EXCEPT FOR/ONLY’

(23) a. gakusei-ga 20-nin-shika hashira-na-katta.
    student-NOM 20-CL-SHIKA run-NEG-PAST ‘Only 20 students ran.’

b. Expectation: More than 20 students run.
c. Truth condition: 20 students ran but it is not that more than 20 students ran.

Semantically, the meaning calculation of (23a) yields the proposition that 20 students ran and no more, as in (23c). In addition, as we discussed in 4.1 above, given [ . . . X-shika P-NEG ], X satisfies the property P, and whatever entails X satisfies the property P-NEG, as indicated in (21). Given this, consider the following ill-formed sentence with an affirmative predicate:

(27) * gakusei-ga 20-nin-shika hashit-ta.
    student-NOM 20-CL-SHIKA run-PAST

Here, if we follow the same logic as above, the X of [ . . . X-shika P-NEG ] would be ‘20 people’ (students), and P would be ‘not run’. This is a negated predicate since the surface predicate is affirmative. Thus, (27) asserts that it is not the case that 20 students ran. That is, if there are any, less than 20 students ran. Now, because of the pragmatics of shika, more than 20 students would end up being asserted to have run. However, this is obviously an illogical state of affairs. There is no possible situation in which less than 20 students ran and yet more than 20 students ran.

The same thing can be said for the following sentence:

(28) * gakusei-ga Taro-shika hashit-ta.
    student-NOM Taro-SHIKA run-PAST

This yields a contradiction. (28) asserts that Taro did not run, yet a set of students containing Taro (e.g. Taro and Jiro) did run. Thus, when we have an affirmative predicate, the sentence always gives rise to a contradiction. That is, only the negative predicate can yield a logical interpretation for a shika-sentence. Note that such contradictions could never arise in a mo-sentence, since it has the opposite value regarding the predicate membership.

5 Summary and further tasks

In this paper, I first showed that Japanese X-mo and X-shika are both predicate modifiers. Semantically, I argued that the two particles are similar in the sense that they encode both the argument membership condition and the predicate membership condition. The latter gives rise to the meaning of inclusion for mo and the meaning of exclusion for shika. In addition, I argued that there is a third condition, namely the additivity condition. This is included in the truth conditions for the mo-sentence, and systematically yields the additive meaning. We have seen that this is not necessarily applicable for shika semantically. However, I showed that this is in fact a crucial element in pragmatic component.

As the present paper is an interim report of an on-going research, there are a number of tasks ahead of us. First, the pragmatic part of our discussion needs to be formalized, so that it is possible to examine the validity of this mechanism in an objective manner. Second, in this paper the meaning component that the additivity condition applies to was argued to be
different for *mo* and *shika*. It might be yet possible to pursue a unified analysis, if we employ intensionality (for *shika*, an additional entity must exist in the speaker’s expectation, which could be argued to be a possible world accessible to the speaker). Third, if the line of thought in this paper is correct, then the next question is to investigate what is going on in English exclusives such as *only* and *except for*, in comparison with inclusives such as *also* and *too*.

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