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

Martin Prinzhorn, Viola Schmitt and Sarah Zobel (eds.):
Proceedings of Sinn und Bedeutung 14, Vienna, pp. 219 – 236

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.[1] 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.[2] Consider the following well-formed sentences:[3]

(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-POSS-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_{poss}-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 compose with a variety of different types of syntactic constituents. In (2a) they combine with an indirect object with dative *ni*, with a PP

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 pragmaic 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 comstrued 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).[4] 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 studetns 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).[5]

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:

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 Engish 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.

(4) a. basu-ga Ginza-iki-mo ko-na-katta.
bus-NOM Ginza-bound-MO come-NEG-PAST
'The bus didn't come, including the Ginza bound one.'

b. [Ginza-iki-mo ko-na-katta]-no-wa basu-da.
Ginza-bound-MO come-NEG-PAST-that-TOP bus-COPULA
'It is the bus that the Ginza bound one also didn't come.'
(densha-de-wa nai.)
train-COPULA-TOP NEG
'Not the train.'

c. * ko-na-katta-no-wa [basu-ga Ginza-iki-mo]-da.
come-NEG-PAST-that-TOP bus-NOM Ginza-bound-MO-COPULA

(5) a. basu-ga Ginza-iki-shika ko-na-katta.
bus-NOM Ginza-bound-SHIKA come-NEG-PAST
'Only the bus to Ginza came.'

b. [Ginza-iki-shika ko-na-katta]-no-wa basu-da.
Ginza-bound-SHIKA come-NEG-PAST-that-TOP bus-COPULA
'It is the bus that only the Ginza bound one came.'
(densha-de-wa nai.)
train-COPULA-TOP NEG
'Not the train.'

c. * ko-na-katta-no-wa [basu-ga Ginza-iki-shika]-da.
come-NEG-PAST-that-TOP student-NOM John-SHIKA-COPULA

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) a. kyooju-ga Suzuki-sensei-mo hashit-ta.
prof.-NOM Suzuki-teacher-MO run-PAST
'The professons ran, including Prof. Suzuki.'
b. # gakusei-ga Suzuki-sensei-mo hashit-ta.
student-NOM Suzuki-teacher-MO run-PAST
(Lit. 'The students ran, including Prof. Suzuki.')

(8) a. kyooju-ga Suzuki-sensei-shika hashira-na-katta.
prof.-NOM Suzuki-teacher-SHIKA run-NEG-PAST
'The professons didn't run, except for Prof. Suzuki.'
b. # gakusei-ga Suzuki-sensei-shika hashira-na-katta.
student-NOM Suzuki-teacher-SHIKA run-NEG-PAST
(Lit. 'The students didn't run, except for Prof. Suzuki.')

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 excpetion 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) b. (gakusei-ga) Taro-shika hashira-nakat-ta.
student-NOM Taro-SHIKA run-NEG-PAST
'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

Japanese, given [. . . X-*shika* P-NEG], X has the negation of the property P-NEG, i.e. has the property P. That is, the exception X does not have predicate membership.

Let us now consider *mo*. Unlike *shika*, it turns out that X of X-*mo* does have predicate membership. Consider the following sentences:

(10) gakusei-ga Taro-mo hashit-ta.
student-NOM Taro-MO run-PAST
'Taro also ran, like the other students.' ('The students ran, including Taro.')

(1) a. (gakusei-ga) Taro-mo hashira-nakat-ta.
student-NOM Taro-MO run-NEG-PAST
'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) gakusei-ga Taro-mo hashit-ta.
student-NOM Taro-MO run-PAST
'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-SHIKA fun-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-SHIKA 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-SHIKA 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-SHIKA 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-SHIKA 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 considier 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*-

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 hashit-ta. which person MO run PAST	'Everybody ran.'	(universal quantificational *mo*)
(ii)	dare-mo hashira-na-katta. who MO run NEG PAST	'Nobody ran.'	(indeterminate NPI *mo*)
(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. [[$\varnothing_{the}$ gakusei]-ga [Taro-mo hashira-nakat-ta]].
student NOM Taro MO run NEG PAST
'The students didn't run, including Taro.'

b.

gakusei (stduent):	λx [stu(x)]	
∅ (the):	λXλY[Y(⊕X)]	
Taro:	λx[taro(x)]	
mo:	λPλRλx [(at(⊕P)⊂at(x))	(arg. mem)
	∧(((at(x)-at(⊕P))∩R)≠∅)	(add)
	∧(at(⊕P)⊂R)]	(pred. mem)
hashiranakatta (didn't run):	λx[non-ran(x)]	

c. (at(⊕taro)⊂at(⊕stu))
∧(((at(⊕stu)-at(⊕taro))∩non-ran)≠∅)
∧(at(⊕taro)⊂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.[8] 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. [[$\varnothing_{the}$ gakusei]-ga [Taro-shika hashira-nakat-ta]].
student NOM Taro SHIKA run NEG PAST
'The students didn't run, except for Taro.'

b.

gakusei (stduent):	λx [stu(x)]
∅ (the):	λXλY[Y(⊕X)]

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

(ii) 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:	λx[taro(x)]	
	shika:	λPλRλx [(at(⊕P)⊂at(x))	(arg. mem)
		∧(at(⊕P)⊄R)	(pred. mem)
		∧((at(x)-at(⊕P))⊆R))]	(pred. mem)
	hashiranakatta (didn't run):	λx[non-ran(x)]	

c. (at(⊕taro)⊂at(⊕stu))
∧(at(⊕taro)⊄non-ran)
∧((at(⊕stu)-at(⊕john))⊆non-ran)

(16a) differs minimally from (15a) in that *mo* in (15a) is replaced with *shika* in (16a). The predicate *hashiranakatta* 'did not run' is analyzed as internal negation as before.[9]

Note that the denotation of *shika* in (16b) differs from the denotation of *mo* in (15b) with respect to predicate membership and also with respect to additivity. First, the predicate membership condition of *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 *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 *mo*, but part of the pragmatics of *shika*. Thus, the denotation of *shika* does not include the additivity condition.

Given this contrast with *mo*, the *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 *mo* and *shika* is the predicate membership condition. The *mo*-construction gives rise to an 'inclusion' meaning, while the *shika*-construction gives rise to an 'exclusion' meaning. Aside from the additivity condition, then, Japanese *mo* and *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 *mo* is part of its truth conditions, while that for *shika* is pragmatic.[10] In the pragmatic component, however, the additivity condition of *shika* is a crucial part of the well-formed condition. In the next section, we will discuss pragmatics of *mo* and *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.

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

10 A justification for the claim that the additivity condition of *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 argment 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. (20>expectation)
student-NOM 20-CL-MO run-PAST
'As many as 20 students ran.'

c. gakusei-ga 20-nin-shika hashira-na-katta. (expectation>20)
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) *Mo*

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 omottteita-ga
student-NOM 20-CL run-COMP was thinking-but
10-nin-shika hashira-na-katta.
10-CL-SHIKA run-NEG-PAST
'I assumed 20 students would run, but only 10 students ran.'

b. # gakusei-ga 20-nin hashiru-to omottteita-ga
student-NOM 20-CL run-COMP was thinking-but
30-nin-shika hashira-na-katta.
30-CL-SHIKA 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.[11] 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):[12]

(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.

b. Positive inference: Mary smokes. ('prejacent'[13])

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*.

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.

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.
'No students other than Taro ran.'

(ii) * gakusei-ga Taro hashiranakatta.

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

(iv) gakusei-ga 20-nin hashiranakatta.
'20 students didn't run.'

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.[14] 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. (=18c)
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.

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

(24) a. gakusei-ga 20-nin-mo hashit-ta. (=18b)
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 obsevation 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.'

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:

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

(23) a. gakusei-ga 20-nin-shika hashira-na-katta. (=18c)
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 thatn 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.
tudent-NOM Taro-SHIKA run-PAST

This yields a contradition. (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 contradition. 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*.

Acknowledgements

I would like to thank the audience of SuB14 for critical and constructive comments, especially Gennaro Chierchia, Uli Sauerland, and Ede Zimmermann. Most of all, I thank Sarah Zobel for the brilliant technical support which made my powerpoint presentation possible at the last minute. All shortcomings in the present paper are mine.

References

Aoyagi, Hiroshi (1994) "On Association with Focus and Scope of Focus Particles in Japanese", in M. Koizumi and H. Ura (eds.), *Formal Approaches to Japanese Linguistics* **1**, MITWPL, 23-44.

Aoyagi, Hiroshi and Toru Ishii (1994) "On NPI Licensing in Japanese", in N. Akatsuka (ed.) *Japanese/Korean Linguistics* 4, 295-311.

Beaver, David. and Brady Clark (2008) *Sense and Sensitivity*, Wiley-Blackwell.

Furukawa, Yukio (2006) "It's Time to Say Goodbye to Syntactic Analyses of the *Shika-nai* Construction", in T. Vance and K. Jones (eds.) *Japaense/Korean Linguistics* 14, 189-200.

Giannakidou, Anastasia (2005) "N-words and Negative Concord", The Blackwell Comparison to Syntax. Volume III, in H. van Riemsdijk, R. Goedemans et al. (eds.) Blackwell, Oxford.

Heycock, Carolyn (1993) "Syntactic Predication in Japanese", *Journal of East Asian Linguistics* **2**. 167-211.

Horn, Laurence (1969) "A Presuppositional Analysis of *Only* and *Even*", in *NELS* 24. 157-171.

Horn, Laurence (1989) *A Natural History of Negation*, University of Chicago Press, Chicago.

Horn, Laurence (2002) "Assertoric Inertia and NPI Licensing", in *CLS* 38. 55-82.

Ippolito, Michela (2008) "On the Meaning of *Only*", *Journal of Semantics* **25**, 45-91.

Karttunen, Lauri and Steven Peters (1979) "Conventional Implicature", in C.-K. Oh and D.A. Dinnen (eds.), *Syntax and Semantics 11: Presuppositions*, 1-56, Academic Press, New York.

Kataoka, Kiyoko (2006) *Nihongo hiteibun-no koozoo.* (The structure of Japanese negative sentences.) Tokyo: Kuroshio.

Kato, Yasuhiko (1985) *Negative Sentences in Japanese*. Sophia University.

Kinuhata, Tomohide (2007) "Rekishitekikanten kara mita hitei no sayooiki (The scope of negation from the historical perspective)", *Proceedings of the 135th meeting of Linguistic Society of Japan*. 356-361.

Kobuchi-Philip, Mana (2006) "Identity of the Domain of Quantification for the Numeral", In L. Tasmowski and S. Vogeleer (eds.), *Non-Definiteness and Plurality*. Amsterdam: John Benjamins. 267-290.

Kobuchi-Philip, Mana (2008a) "A Modifier Hypothesis on the Japanese Indeterminate Quantifier Phrase", In K. Satoh, A. Inokuchi, K. Nagao and T. Kawamura (eds.) *New Frontiers in Artificial Intelligence*. Berlin/Heidelberg: Springer 201-213.

Kobuchi-Philip, Mana (2008b) "Presuppositional Compositionality with Japanese *Mo*", in T. Friedman and S. Ito. (eds.) *SALT* 18. Ithaca, NY: Cornell University. 496-509.

Kobuchi-Philip, Mana (2009) "Japanese *Mo*: Universal, Additive, and NPI", *Journal of Cognitive Science* **10**, 173-194.

Kobuchi-Philip (in press) "*Shika* no imironri to hitei (Semantics of *shika* and negation)", in Y. Kato, A. Yoshimura and I. Imani (eds.) *Hitei to gengoriron* (Negation and Linguistic Theory). Tokyo: Kaitakusha.

Konomi, Keiji (2000) "On Licensing of SIKA-NPIs in Japanese", in K. Takami, A. Kamio and J. Whitman (eds.), *Syntactic and Functional Explorations: In Honor of Susumu Kuno*, 51-82, Kuroshio, Tokyo.

Kuno, Susumu (1999) "The Syntax and Semantics of the *Dake* and *Sika* Constructions", *Harvard Working Papers in Linguistics* 7, 144-172.

Landman, Fred (2000) *Events and Plurality*, Kluwer, Dordrecht.

Link, Godehard (1983) "The Logical Analysis of Plural and Mass Terms: A Lattice-theoretical Approach", in R. Bäuerle, C. Schwarze, and A. von Stechow (eds.), *Meaning, Use, and Interpretation of Language*, 303-323, De Gruyter, Berlin.

Moltmann, F. (1995) "Exception Sentences and Polyadic Quantification", *Linguistics and Philosophy* **18**, 223-280.

Miuraki, Masatake (1978) "The Sika nai Construction and Predicate Restructuring", in J. Hinds and J. Howard (eds.), *Problems in Japanese Syntax and Semantics*, 155-177, Kaitakusha, Tokyo.

Nakanishi, Kimiko (2007) "Scope of *Even*: A Cross-Linguistic Perspective", *NELS* 38.

Nishigauchi, Taisuke (1990) *Quantification in the Theory of Grammar*. Dordrecht: Kluwer.

Numata, Yoshiko (1991) *Mo, dake, sae nado –toritate–* (*mo*, *dake*, *sae*, etc. –Focus–), Kuroshio, Tokyo.

Ohno, Yuyaka (1989) "*Mo*", in E. Bach, A. Kratzer, & B. H. Partee (eds.) *Papers on Quantification. NSF Grant Report.* Department of Linguistics, University of Massachusetts, Amherst. Amherst, MA: GLSA. 224-250.

Partee, Barbara (1987) “Noun Phrase Interpretation and Type-Shifting Principles”, in J. Groenendijk, D. de Jongh and M. Stokhof (eds.), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, 115-143, Foris, Dordrecht.

Tanaka, Hidekazu (1997) “Invisible Movement in *Sika-nai* and the Linear Crossing Constraint”, *Journal of East Asian Linguistics* **6**, 143-188.

Teramura, Hideo (1991) *Nihongo no shintakkusu to imi* (Syntax and meaning of Japanese) III. Kuroshio, Tokyo.

von Fintel, K (1993) “Exceptive Constructions”, *Natural Language Semantics* **1**, 123-148.

Shimoyama, Junko (2001) *Wh-constructions in Japanese*. Ph.D. Diss. University of Massachusetts, Amherst.

Shimoyama, Junko (2006) “Indeterminate Phrase Quantification in Japanese”, *Natural Language Semantics* **14**. 139-173.

Yatsushiro, Kazuko (2009) “The Distribution of Quantificational Suffixes in Japanese”, *Natural Language Semantics* **17**. 141-173.

Yoshimura, Keiko (2007) “The Semantics of Focus Particle -Shika ‘*Only*’ in Japanese”, WECOL 2006, 499-512.