

Abstract

Japanese has two exclusive particles *shika* and *dake*. Although traditionally, both particles were considered to be exclusive particles like *only*, a recent proposal claims that *shika* is an exceptive particle like *everyone except* to account for the necessary co-occurrence of the negative suffix *na* and *shika*. We show that this negative suffix lacks two critical semantic properties of ordinary logical negation: It is not downward entailing, nor does it license negative polarity items. We show that both *shika* and *dake* are exclusive particles, but that *shika* encodes an additional secondary meaning. The negative suffix only contributes to the sentence’s secondary meaning when it co-occurs with *shika*. We present an HPSG and LRS analysis that models the co-occurrence of *shika* and the negative suffix *na*, and their contribution to the sentence’s secondary meaning.

It is widely believed that the information conveyed by sentences or utterances of sentences does not have a uniform status. Until recently, that information could be part of the “ordinary” meaning of sentences, it could be presupposed (Frege, 1891; Strawson 1950), it could be a conventional implicature (Grice, 1975), or it could be part of conversational implicatures associated with the utterances of sentences (Grice, 1975). In the last decade, there has been a flurry of ever more fine-grained distinctions in the status of information conveyed by sentences or utterances of sentences, e.g., implicatures (Bach 1994), conventional implicatures (in the sense of Potts, 2005, which is distinct from Grice’s), secondary meanings (Bach, 1999; Potts, 2005), or assertorically inert propositions (Horn, 2002). In this paper, we show how HPSG and Lexical Resource Semantics (Richter and Sailer, 2004) can help model the semantic difference between two Japanese focus particles roughly paraphraseable as *only* in English, *shika* and *dake*, as well as help solve an apparent non-compositional aspect of the semantics of sentences containing *shika*. Our paper thus both solves a long-standing descriptive difficulty in Japanese lexical semantics and serves as a case study in the benefits of HPSG and LRS in modeling difficult aspects of the syntax/semantics interface. Our paper is organized as follows. Section 1 briefly describes the two particles *shika* and *dake* and the descriptive challenge that *shika* poses. Section 2 argues that a previous attempt at a solution is inadequate. Section 3 presents our analysis of the semantic difference between *shika* and *dake*. Section 4 shows that the semantic contribution that distinguishes *shika* from *dake* has the status of a secondary meaning in the sense of Bach (1999). Section 5 proposes an LRS model of the semantics of *shika*. Section 6 concludes the paper.

1 Introduction

Japanese has two exclusive particles *shika* and *dake*, which are roughly equivalent to English *only*. One important difference between them is that *shika* must co-occur with the negative verbal suffix *na*. Sentences in (1) illustrate the fact that *shika* requires the negative verbal suffix *na*. Sentence (1a), in which *shika* occurs

without the negative verbal suffix, is not grammatical. *Dake*, on the other hand, can occur in either positive or negative sentences as shown in (2).

- (1) a. *Yuna-shika ki-ta.
Yuna-SHIKA come-PAST
- b. Yuna-shika ko-na-katta.
Yuna-SHIKA come-NEG-PAST
'Only Yuna came.'
- (2) a. Yuna-dake ki-ta.
Yuna-DAKE come-PAST
'Only Yuna came.'
- b. Yuna-dake ko-na-katta.
Yuna-DAKE come-NEG-PAST
'Only Yuna didn't come.'

Typically, *shika* and *dake* are both translated in English as *only*. However, if one assumes that the phrase *Yuna-shika* corresponds to the exclusive phrase only Yuna, the rest of the sentence, *ko-na-katta* does not seem to be explained straightforwardly: It forces one to say that *ko-na-katta* means *came* and thus leaves the presence of the negative verbal suffix *na* unexplained. This is one motivation for Yoshimura's (2006) proposal that *shika* is a universal exceptive marker like English *everyone except*. According to the exceptive analysis of *shika*, *Yuna-shika* in (1b) is an exceptive phrase equivalent to English *everyone except Yuna*, and *ko-na-katta* means *did not come*, thus explaining the presence of the negative verbal suffix. Although *shika* is traditionally considered to be an exclusive marker, the fact that it must co-occur with the negative verbal suffix *na* seems to favor an analysis that assumes it is an exceptive particle. However, as we show in the next section, several semantic properties remain unexplained if one assumes that *shika* is an exceptive particle *stricto sensu*.

2 Is *shika* an exclusive or an exceptive particle?

2.1 What are exclusive and exceptive expressions

Exclusive particles like *only* express two propositions, a prejacent proposition and what we call for lack of a better term *a restrictive proposition*. For example, (3) expresses the prejacent proposition that John came and the restrictive proposition that nobody except John came, as shown in (4) and (5). Although the discussion about the status of the prejacent proposition is still controversial, there seems to be agreement that both the prejacent and restrictive propositions are entailed by a sentence containing *only* (see Atlas, 1996 and Horn, 2002, among others).

- (3) Only John came.

- (4) *Prejacent proposition*: came (j).
 (5) *Restrictive proposition*: $\neg \exists x (x \neq j \wedge \text{came}(x))$

Exceptive particles like *everyone except* also express two propositions. Thus, (6) expresses the (positive) proposition that John came as well as the (negative) proposition that all individuals distinct from John did not come, as represented in (7) and (8) (*D* stands for the domain of discourse).

- (6) Everyone except John didn't come.
 (7) *Positive proposition*: came (j)
 (8) *Negative proposition*: $\forall x ((x \in D - \{j\}) \rightarrow \neg \text{came}(x))$

Logically, the propositions expressed by sentences containing exclusive particles like *only* and corresponding sentences containing exceptive phrases like *everyone except* may be identical, but exclusive and exceptive expressions differ in a crucial way for our purposes, namely the polarity of the expression that they do not focus on (i.e., *came* in (3) and *did not come* in (6)). Superficially, Japanese *dake* resembles *only* in that the non-focused expression is not negated, while *shika* resembles *everyone except* in that the non-focused expression is negated. But, appearances are misleading. To show that the negative suffix that co-occurs with *shika* is not an ordinary negation, we will compare *shika* with another very similar particle, *igai*. *Igai* also expresses a positive and a negative proposition, when occurring with a negation as shown in (9).

- (9) Yuna-igai ko-na-katta.
 Yuna-IGAI come-NEG-PAST
 'Everyone other than Yuna didn't come.'

Sentences (9) and (1b) contain the same negative verbal suffix *na*. However, the negative suffix occurring with *igai* expresses ordinary logical negation while the negative suffix co-occurring with *shika* does not.

2.2 The status of the negative verbal suffix co-occurring with *shika*

Yoshimura (2006) argues that in sentence (1b), the phrase *Yuna-shika*, and the negated predicate *ko-na-katta*, correspond to *everyone except Yuna* and *did not come*, respectively. Under such an analysis, the presence of the negative morpheme *na* receives a straightforward explanation. However, there are several semantic properties which cannot be explained if one assumes that the negative verbal suffix co-occurring with *shika* participates in the meaning of the sentence as ordinary negation would. One difference between the negative suffix co-occurring with *shika* and ordinary negation concerns entailment patterns. Negation is a downward entailing operator. As expected, the negation in sentences containing *except* or *other than* is downward entailing. (10a), for example, entails (10b).

- (10) a. Everyone except/other than Yuna didn't come.
 b. Everyone except/other than Yuna didn't come late.

The negative suffix present in sentences containing Japanese *igai* is also downward entailing. When sentence (11a) is true, so is (11b).

- (11) a. Yuna-igai ko-na-katta.
 Yuna-IGAI come-NEG-PAST
 'Everyone other than Yuna didn't come.'
 b. Yuna-igai okurete ko-na-katta.
 Yuna-IGAI late come-NEG-PAST
 'Everyone other than Yuna didn't come late.'

If the negative suffix co-occurring with *shika* functions as ordinary negation, one expects that it too is downward entailing. However, this is not the case. (12a) does not entail (12b).

- (12) a. Yuna-shika ko-na-katta.
 Yuna-SHIKA come-NEG-PAST
 'Only Yuna came.' or 'Everyone except Yuna didn't come' (Yoshimura, 2006).
 b. Yuna-shika okurete ko-na-katta.
 Yuna-SHIKA late come-NEG-PAST
 'Only Yuna came late.' or 'Everyone except Yuna didn't come late.'
 (Yoshimura 2006)

Exclusive markers such as English *only* and Japanese *dake* behave similarly to *shika* in that they are not downward entailing. (13a) and (14a) do not entail (13b) and (14b), respectively.

- (13) a. Only Yuna came.
 b. Only Yuna came late.
 (14) a. Yuna-dake ki-ta.
 Yuna-DAKE come-PAST
 'Only Yuna came.'
 b. Yuna-dake okurete ki-ta.
 Yuna-DAKE late come-PAST
 'Only Yuna came late.'

Another difference between the negative suffix co-occurring with *shika* and ordinary negation pertains to the negative polarity item (NPI) licensing properties of negation. *Igai*, when occurring with the negative suffix can license an NPI, as shown in (15). This is presumably because the negative suffix in (15) functions as ordinary negation.

- (15) Yuna-igai nanimo tabe-na-katta.
 Yuna-IGAI anything eat-NEG-PAST
 ‘Everyone other than Yuna didn’t eat at all.’

If the negative suffix co-occurring with *shika* is ordinary negation, we would expect it to license NPIs too, just as the negative suffix in (15). However, as Aoyagi and Ishii (1994) point out, *shika* cannot appear with *nanimo*, as shown in (16).

- (16) #Yuna-shika nanimo tabe-na-katta.
 Yuna-SHIKA anything eat-NEG-PAST

The Japanese exclusive particle *dake* cannot license the NPI *nanimo*, either, as shown in (17).

- (17) #Yuna-dake nanimo tabe-ta.
 Yuna-DAKE anything eat-PAST

Although the negative suffix co-occurring with *shika* can otherwise license NPIs, it does not license NPIs in sentences containing *shika*. *Shika* with the negative suffix behaves again similarly to *dake* with respect to NPI licensing: Neither *shika* with its co-occurring negative suffix nor *dake* license NPIs.

In this section, we examined the semantic behavior of the negative suffix co-occurring with *shika*. Although *shika* must co-occur with a negative suffix, this negative suffix is not downward entailing nor does it license NPIs, in contrast with ordinary negation uses of the negative suffix. In both respects, *shika* behaves like the exclusive particle *dake*, and unlike *igai* or English *everyone except* and *other than*. We conclude that *shika* behaves just as one would expect if it were an exclusive particle and if the negative suffix co-occurring with *shika* did not function as an ordinary negation.

3 The contextual meaning of *shika*

We have shown that *shika* is not an exceptive marker. However, if we assume that *shika* is an exclusive marker like English *only*, the presence of the negative verbal suffix *na* does not seem to make any semantic contribution to the exclusive meaning of the sentence containing *shika*: The Japanese sentence in (1b) contains a negative verbal suffix while the English translation does not contain a negation.

Probably because of the necessary co-occurrence of a negative verbal suffix, Japanese speakers have the intuition that contexts in which *shika* is appropriate are more negative than contexts in which *dake* occurs. There have been several proposals about the differences between *shika* and *dake*, and Kuno (1999), for example, argues that a (negative) restrictive proposition is contextually more prominent for *shika* than *dake*. In this section, after briefly reviewing Kuno (1999)’s proposal, we propose an analysis of the meaning of *shika* that models native speakers’ intuitions about the negative character of the contextual meaning of *shika*.

3.1 Kuno (1999)

Kuno (1999) suggests that *shika* and *dake* introduce two propositions with distinct assertoric status. Those two propositions are defined in (19) for the Japanese sentences in (18). According to Kuno (1999), a sentence in which *shika* occurs primarily asserts the restrictive proposition or what Kuno (1999) calls the negative proposition, and secondarily asserts the prejacent proposition, or what Kuno (1999) calls the affirmative proposition, while a sentence in which *dake* occurs primarily asserts the affirmative proposition and secondarily asserts the negative proposition, as shown in (20), although what he means by ‘primarily’ and ‘secondarily’ is not clear.

- (18) a. Eigo to hurasugo -dake hanas-e-ru.
English and French only speak-can-PR.
‘I can speak only English and French.’
b. Eigo to hurasugo -shika hanas-e-na-i.
English and French only speak-can-NEG-PR.
‘I can speak only English and French.’
- (19) Propositions associated with the “W X-dake Y” and “W Xshika Ynai” Constructions
A. Affirmative Proposition: WXY E.g. The affirmative proposition of (1a, b) = “I can speak English and French.”
B. Negative Proposition: not(WZY) where Z = V-X, V being the set of elements under discussion. E.g. The negative proposition of (1a, b) = “I cannot speak any other language.” (Kuno 1999: 147)
- (20) The semantics of *dake* and *shika*:
Dake primarily asserts its affirmative proposition, and only secondarily asserts its negative proposition.
Shika primarily asserts its negative proposition, and only secondarily asserts its affirmative proposition. (Kuno 1999: 148)

3.2 The “negative meaning” of *shika*

We agree with Kuno (1999) that the two Japanese exclusive particles, *shika* and *dake* differ in the contexts in which they occur. (21) and (22) are two constructed examples which illustrate that contexts in which *shika* and *dake* are acceptable differ.

- (21) Hottokeeki-o tsukuri-ta-katta-n-dakedo,
pancake-ACC make-want-PAST-COMP-although
‘Although I wanted to make pancakes,’
a. hutatsu-shika tamago-o kawa-na-katta.
two-SHIKA egg-ACC buy-NEG-PAST
‘I only bought two eggs.’

- b. (#)hutatsu-dake tamago-o kat-ta.
two-DAKE egg-ACC buy-PAST
'I only bought two eggs.'
- (22) Hottokeeki-ga tsukur-e-ru-youni,
pancake-NOM make-can-NONPAST-in.order.to
'In order to make pancakes,'
a. #hutatsu-shika tamago-o kawa-na-katta.
two-SHIKA egg-ACC buy-NEG-PAST
'I only bought two eggs.'
- b. hutatsu-dake tamago-o kat-ta.
two-DAKE egg-ACC buy-PAST
'I only bought two eggs.'

Because of the presence of the adversative suffix *dakedo* 'although' in (21), *shika* is more natural than *dake*, since the adversative suffix suggests that the speaker believes that buying only two eggs is not sufficient to make pancakes. Conversely, because of the presence of the purposive suffix *youni* 'in order to' in (22), *dake* is more natural than *shika*, since the purposive suffix suggests that the speaker believes that buying only two eggs is sufficient to make pancakes. (23) characterizes a common ground compatible with (21).

- (23) Buying two eggs and no more implies that one cannot make pancakes.

More generally, contexts in which *shika* is appropriate must include a contextually determined proposition which does not hold. The contextually determined proposition for (21) is that one can make pancakes, which should have held if she bought more than two eggs but does not hold since she bought two eggs and no more. (24) is an attested newspaper example of *shika*. The context proposition which the sentence containing *shika* negates is that research on microorganisms is not interesting.

- (24) a. 翠星高校は白山市にあり、生徒全員が農業クラブ員。出口さんは総合グリーン科学科で微生物を学んでいる。「イースト菌、こうじカビなど人の役に立つものもあれば、健康を害するものもある。それでもまだ全体の1%しか分かっていないところに興味がある。大学に進んで、さらに研究したい」と話す。(2009年12月15日)
- b. The high school is located in Shirayama city, and all students at the high school belong to the agriculture club. She studies microorganisms. She said 'some microorganisms such as yeast fungus and aspergillus, are useful for humans, but others are harmful. It is interesting because we know only 1% of all microorganisms. I will go to a college and continue the research.' (Mainichi Shinbun 12/15/2009)

What (24) expresses pragmatically implies the negation of the contextually determined proposition that research on microorganisms is not interesting. If we already know a lot about microorganisms, research about microorganisms might

not be interesting, but the fact that we know only 1% of microorganisms and no more implies that research on microorganisms is interesting. The proposition that research on microorganisms is interesting, is explicitly stated in the text, and would be one of the more salient candidates for a contextually determined proposition that the sentence containing *shika* negates. However, this does not mean that this proposition is the only candidate, a point we return to shortly.

We just saw that *shika* requires the availability of a context proposition which the exclusive meaning it contributes negates. Contexts in which *dake* are acceptable might also contain a proposition whose truth is negated by the exclusive meaning *dake* contributes, but the presence of such a proposition is not required. *Dake* is thus the unmarked member of the pair, as it can occur in more contexts than *shika*. (22) illustrates a context in which only *dake* is acceptable: The speaker would be able to make pancakes if she bought more than two eggs, but she can still make pancakes even when she bought two eggs and no more.

To model the difference between *shika* and *dake* and the necessary presence of a proposition negated by the exclusive meaning contributed by *shika*, we hypothesize that *shika* contributes to two contents, an ordinary exclusive content of the kind English *only* and Japanese *dake* contribute and a secondary negative content (see Section 4 for a justification of these terms). The exclusive content, like that contributed by exclusive markers such as *only*, consists of the conjunction of a prejacent and restrictive proposition, as shown in (25a). (25b) is the secondary negative content, which distinguishes *shika* from *dake*. In (25), P is the meaning contributed by the sentence in which *shika* occurs minus the constituent on which *shika* focuses; f is the meaning contributed by the constituent on which *shika* focuses and Q is the contextually available proposition which the exclusive content pragmatically negates (i.e., the exclusive proposition pragmatically implies its negation). The negative suffix co-occurring with *shika* contributes to the secondary negative content and negates the proposition Q. The secondary negative content says that if the primary exclusive content holds, the contextually determined proposition does not. We assume that Q is a free variable whose value must be filled in pragmatically.

- (25) a. *Primary exclusive content*: $P(f) \wedge \neg \exists x (x \neq f \wedge P(x))$
b. *Secondary negative content*: $(P(f) \wedge \neg \exists x (x \neq f \wedge P(x))) > \neg Q$

The secondary negative content is somewhat weak, as J. Bohnemeyer and N. Asher have pointed out to us. Many propositions can be pragmatically implied by the primary exclusive content. We agree, but we believe *shika* is no different in that respect from other similarly ‘pragmatically laden’ particles, as a comparison between the secondary meaning of *shika* to the somewhat similar meaning of *but* suggests (we thank N. Asher for this suggestion). According to Anscombe and Ducrot’s (1977) analysis of French *mais* or English *but*, the first conjunct of (26) expresses a proposition that pragmatically implies a proposition whose negation is pragmatically implied by the proposition expressed by the second conjunct (e.g.,

that the speaker is willing to accept an offer to go out for a walk). As is the case with *shika*, the pragmatic implication that is part of the secondary meaning of *but* is weak: There are many propositions which can be pragmatically implied by the first conjunct of (26) and whose negation can be pragmatically implied by the second conjunct. The indeterminacy of the proposition pragmatically implied by sentences containing *shika* or *but* is similar to that of the state-property contributed by the English perfect, according to Nishiyama and Koenig (2010). In all three cases, the value of the relevant pragmatic value must be determined contextually through inferences of the kind familiar in neo-Gricean work (e.g., Levinson (2001)) and there are potentially several contextually appropriate values.

(26) The weather is nice, but my feet are hurting.

To support our claim that sentences containing *shika* express the secondary negative content, we conducted a corpus study. We sampled one hundred example discourses in which *shika* occurs from two Japanese newspapers, the Mainichi Shinbun and Nikkei Shinbun. We searched through the website of the newspaper, and selected one hundred discourses in which *shika* occurred. In the selected discourses, *dake*, if it replaced *shika*, would not have been completely unacceptable. We examined these one hundred discourses and confirmed the presence of a contextually determined proposition which does not hold.

4 The multi-dimensionality of the meaning of *shika*

We have proposed that the more restricted contexts in which *shika* is acceptable is the result of its secondary negative content, and supported this hypothesis through a corpus study. This negative content, however, does not seem to have the same semantic status as the exclusive content. We show in this section that the negative content expressed by *shika* is akin to the secondary meaning expressed by English *but* or *even* in the sense of Bach (1999) and Potts (2005). Traditionally, the meanings of *but* and *even* in (27c) and (28c), respectively, were considered to be conventional implicatures. (Gx in (27c) stands for a generic quantifier roughly paraphraseable as ‘It is generally true of x that’.)

- (27) a. Shaq is huge but he is agile.
- b. *Primary entailment*: $\text{huge}(\text{shaq}) \wedge \text{agile}(\text{shaq})$
- c. *Secondary meaning*: $Gx [\text{huge}(x) \rightarrow \neg \text{agile}(x)]$ (Bach 1999: 347)
- (28) a. Even Emma came.
- b. *Primary entailment*: $\text{came}(\text{emma}) \wedge \neg \exists x (x \neq \text{emma} \wedge \text{came}(x))$
- c. *Secondary meaning*: it is less likely that Emma would come than other individuals would come

Grice deemed (27c) and (28c) implicatures because they do not seem part of ‘what is said’, as the falsity of their meanings does not affect the primary purpose

of an utterance. Grice deemed (27c) and (28c) to be conventional because they are not derived through inferences based on conversational principles, but stem from properties of specific lexical items. Bach (1999), however, argues that the meanings in (27c) and (28c) are part of ‘what is said’ because these meanings can be under the scope of propositional attitude verbs like *say*. Potts (2005) also distinguishes the meanings of *but* and *even* in (27c) and (28c) from conventional implicatures, and calls them secondary meanings. In this section, we argue that the negative content contributed by *shika* is similar to the secondary meaning of *even* or *but*.

4.1 Presupposition holes

Strawson (1950) treated presuppositions as backgrounded assumptions for foregrounded assertions and defined them so that sentences are neither true nor false when they are not satisfied. It follows from this approach to presuppositions that even if the negation of a statement A is true, its presupposition B is true. This property of presuppositions to survive when a statement is negated is used as a test for identifying presuppositions. Other environments in which presuppositions survive, such as antecedents of conditionals, modal contexts, and questions, are called presupposition holes. Importantly for us, the secondary meaning of *even* or *but* escapes from the scope of these presupposition holes. For example, what is negated in (29a) is not the secondary meaning in (27c), but the primary entailment in (27b). Similarly, the secondary meaning in (27c) survives in antecedents of conditionals, modal contexts, and (marginally) questions, as shown in (29b) -(29d).

- (29) a. It is not the case that Shaq is huge but he is agile.
- b. If Shaq is huge but he is agile, he could be a basketball player.
- c. It might be the case that Shaq is huge but he is agile.
- d. ?Is Shaq huge but agile?

The negative content contributed by *shika* also escapes from the scope of presupposition holes. What is under the scope of negation, question, modal and conditional operators are the exclusive content: The negative content escapes from the scope of these operators. In (30b), for example, what is negated is just the exclusive content. Since there is no specific context for examples in this section, we assume a general proposition that the denotation of the constituent being focused on is sufficient (the milk in (30a)) as the contextual proposition Q. For example, the secondary content for examples in (30a) is (31). The negative content that drinking milk and nothing other than milk is not sufficient is the same in (30b) and in the corresponding affirmative sentence in (30a).

- (30) a. Miruku-shika noma-na-katta.
milk-SHIKA drink-NEG-PAST
‘S/he drank only milk’

- b. Miruku-shika noma-na-katta wake-jana-i.
 milk-SHIKA drink-NEG-PAST COMP-NEG-NONPAST
 ‘It’s not the case that s/he drank only milk’

(31) $(\text{drink}(m) \wedge \neg \exists x(x \neq m \wedge \text{drink}(x))) > \neg(\text{sufficient}(m))$

The fact that the negative content contributed by *shika* is not under the scope of presupposition holes suggest that it is not part of the primary asserted content, because primary asserted contents are what operators like negation, modal verbs, or question markers take as semantic arguments.

4.2 Independence of truth values

Secondary meanings and presuppositions, although they both escape from the scope of presupposition holes, differ in their relationship with at-issue entailments. Potts (2005) characterizes at-issue entailments as controversial propositions or the main theme of a discourse. Presuppositions are not the primary purpose of an utterance, but background assumptions for at-issue meanings. If a presupposition is false, the truth value of the at-issue proposition is undefined. The propositions in (27b) and (27c) are both at-issue entailments of the utterance in (27a). However, there is no dependency between the primary and secondary asserted contents in (27b) and (27c), respectively. The truth or falsity of (27c) does not affect the truth of (27b).

- (32) A: Shaq is huge but he is agile
 B: Yes, but being huge doesn’t necessarily indicate being not agile.

In (32), speaker B agrees with the primary proposition conveyed by A’s utterance, but disagrees with its secondary proposition. B’s utterance indicates that the primary proposition and secondary propositions conveyed by *but* can be assigned truth values independently of each other. The independence of the primary and secondary propositions’ truth values is one of the reasons why we need a multi-dimensional analysis of meanings to represent secondary contents: The two meanings cannot be represented as a conjunction of the two meanings since otherwise each of the two propositions would have to be true in order for the sentence to be truthfully uttered. Like for *but*, there is no dependency between the exclusive and negative contents expressed by sentences containing *shika*. The falsity of the negative content does not affect the truth of the primary exclusive content.

- (33) A: A-wa hutatsu-shika to-re-na-katta.
 A-TOP two-SHIKA get-can-NEG-PAST
 ‘I could get only two As.’
 B: Un, demo, hutatu to-r-eba juubunn-da-yo.
 yes but two get-NONPAST-if enough-COPULA-DM
 ‘Yes, but it’s enough to get two As.’

In (33), speaker A expresses that she has two As and no more and that two As are not sufficient for a contextually available proposition Q. Speaker B replies to A's utterance by *un* 'yes' and agrees with the exclusive content, but at the same time disagrees with the secondary content. The truth of the exclusive and negative contents conveyed by sentences containing *shika* are thus separable, as one can agree with the exclusive content and disagree with the negative content.

4.3 Cancellability

A property which distinguishes secondary meanings from conversational implicatures is cancellability. Conversational implicatures can be cancelled without contradiction, while secondary meanings are not cancellable. In (34), the conversational implicature of the first sentence that Emma drunk no more than two glasses of milk, is cancelled by the following phrase. The secondary content expressed by *but* in (35), on the other hand, cannot be cancelled.

(34) Emma drunk two glasses of milk, and maybe more.

(35) #Shaq is huge but he is agile, and being huge may not necessarily indicate being not agile.

However, in contrast to the secondary content of *but*, the negative content expressed by sentences containing *shika* appears to be cancellable.

- (36) a. A-ga hutatsu-shika to-re-na-katta
 A-NOM two-SHIKA get-can-NEG-PAST
 'I got only two As,'
 b. demo hutatsu-de juubunna-n-da-yo.
 but two-with enough-COMP-COPULA-DM
 'but, two As are enough.'

In (36), the secondary negative content of *shika* in (36a) that two As are not sufficient, appears to be cancelled by the following sentence in (36b). However, since the secondary negative content is context dependent, one can view the context from various perspectives, and think of more than one contextual proposition. For example, in (36), the speaker has a secondary negative content in her mind that two As are not sufficient for receiving a scholarship when uttering (36a), and then, she changes her perspective to utter (36b), implying that two As are sufficient to make her mom happy. In (36), it is not necessarily the case that the secondary negative content of *shika* is cancelled, rather, there is a shift in the speaker's perspective about whether two As are sufficient.

4.4 Anti-backgrounding

The semantic properties examined in previous sections do not characterize only secondary meanings, they also characterize conventional implicatures in Potts'

(2005) sense of the term. Both secondary meanings and conventional implicatures escape from the scope of presupposition holes, are assigned truth values independently of that of primary meanings, and are not cancellable. In this section and the next we examine two other properties of conventional implicatures to see if they hold of the negative content expressed by sentences containing *shika*. The first property pertains to the newness of the information conveyed.

It is intuitively very difficult to decide whether the negative content expressed by sentences containing *shika* is shared between the speaker and listeners or is new information. In the following conversation, for example, it is not clear if the negative content expressed by B's response is shared between the speaker and listener.

- (37) A: Tamago ikutsu ka-tta?
 egg how.many buy-PAST
 'How many eggs did you buy?'
 B: Hutatsu-shika kawa-na-katta.
 two-SHIKA buy-NEG-PAST
 'I bought only two eggs.'
 A: Daijoubu, hutatsu a-r-eba juubunn-da-yo.
 ok two have-NONPAST-if enough-COPULA-DM
 'It's ok, two is enough.'

In (37), speaker B expresses that two eggs is not sufficient with a sentence containing *shika*. The negative content that buying two eggs is not sufficient appears to be new information to speaker A, who says that two eggs are enough. However, we could also say that speaker B simply assumed, wrongly, that the negative proposition was shared. It is thus not clear whether the secondary negative proposition associated with an occurrence of *shika* must be part of the common ground. Note that it is equally difficult to ascertain if the secondary meanings of English *even* or *but* are shared between speakers and hearers or constitute new information.

- (38) A: Shaq is huge but he is agile.
 B: Well, most basketball players are huge and agile.

In (38), although speaker B disagrees with speaker A about the secondary meaning of *but*, one could say that speaker A just assumed, wrongly, that it was shared information. However, there is a clear difference between presuppositions, and conventional implicatures or secondary meanings. While presuppositions must be accommodated, secondary meanings do not have to be accommodated since the truth of the primary and secondary contents are independent from each other. Although in (37), it is not clear whether *shika*'s secondary meaning is part of the common ground, it does not have to be accommodated and can be considered to be new information when it is not part of the common ground.

4.5 Widest scope

Conventional implicatures by default take widest scope and are speaker-oriented (in some restricted contexts, conventional implicatures can be non-speaker-oriented; see Harris and Potts, 2009)). Conventional implicatures cannot, for example, be under the scope of propositional attitude verbs such as *say*, which are known to prevent the inheritance of a presupposition conveyed by their complement.

In contrast to conventional implicatures, secondary meanings do not typically take widest scope, as Bach (1999) argued.

- (39) Ed said that Shaq is huge but he is agile. But I think hugeness is not necessarily an indicator of not being agile.

In (39), the secondary meaning of *but* is under the scope of *say*. The secondary meaning is what Ed believes, not necessarily what the speaker believes. The secondary meaning associated with *shika* behaves like that of *but*, and does not typically have scope over a propositional attitude verb.

- (40) a. Sensei-wa ronbunn-wo itsutsu-shika happyounasara-na-katta
teacher-TOP article-ACC five-SHIKA publish(honorific)-NEG-PAST
to ossyat-tei-ta-yo.
COMP say-PERF-PAST-DM
'The teacher said that she published only five articles.'
- b. Itsutsu-mo su-r-eba juubunn-da-yone.
five-as.much.as do-NONPAST-if enough-COPULA-DM
'Publishing five articles is enough, isn't it?'

Let us suppose that (40) is an utterance in a conversation about how many articles are needed to apply for a promotion. In (40a), the secondary meaning of *shika* that the teacher cannot apply for a promotion, is not necessarily the belief held by the speaker. The speaker uttering (40a) can continue the utterance by saying (40b). In the sequence in (40), the negative content contributed by *shika* is relativized to the teacher's beliefs, and is not ascribed to the speaker. Bach (1999) and Potts (2005) argue that the non-conjunctive part of the meaning of expressions such as *but* is not a conventional implicature, because it can be under the scope of propositional attitude verbs like *say*. As we have just seen, the negative content associated with *shika* satisfies every criterion in Potts' (2005) definition of conventional implicatures except for anti-backgrounding and non-widest scope. The negative content expressed by sentences containing *shika* has therefore all the same semantic properties as the secondary meanings of *but* and *even*.

5 An LRS model of the meaning of *shika*

In this section, we outline a model of the behavior of *shika*. We show that a combination of HPSG and LRS makes it relatively easy to account for the two most

important properties of the syntax and semantics of *shika*:

- (41) a. If *shika* is attached to a dependent of the verb, the predicate negation *na* must be suffixed to the verb;
- b. The predicate negation that co-occurs with *shika* only contributes a secondary meaning to the sentence's meaning.

A full model of the syntax/semantics of *shika* would require incorporating within HPSG the semantics of focus particles (à la Rooth, 1985 or Krifka, 1993). This is beyond the scope of this paper (see Kubota (2003) for an early proposal). The purpose of this section is more modest: Show how HPSG and LRS affords us the descriptive tools for a straightforward model of the semantic contribution *shika* and *na* make to the meaning of sentences.

Our analysis makes the assumption that focus particles contribute a particular kind of content encoded as the value a FOC-CONT attribute, as shown in (42). We also assume that the content of sentences contains both a primary semantic content (the value of the attribute ECONT, see Richter and Sailer, 2004, for the distinction between internal and external contents) and a secondary semantic content (encoded as the value of a SEC-CONT attribute), the kind of content that *but*, *even*, or *shika*'s negative proposition contribute. There are several reasons, some practical, for these choices. First, the meaning of a sentence containing a focus particle always entails the meaning of that sentence minus the focus particle, as illustrated in (43). Thus (44) holds for all models M and assignment functions g (α and β are variables over (possibly empty) strings and F designates an arbitrary focus particle). Thus, the presence of a focus particle does not seem to affect semantic composition. By separating into two components the semantic content of sentences, semantic composition rules for the “ordinary” semantic content, which remains unaffected by the presence of focus particles, need not be altered (see Krifka, 1993, for a detailed proposal along these lines). In the absence of a complete HPSG/LRS model of the syntax and semantics of focus particles, this conservative approach is best. Second, although the additional semantic contribution brought about by the presence of focus particles is in some cases a secondary meaning (this is the case with *even*), this is not the case with *only*. We therefore cannot treat the semantic content contributed by focus particles as simply secondary content. This is why we distinguish between the focal and non-focal primary (external) contents of sentences and their secondary contents. When the additional semantic contribution of a focus particle is a secondary meaning, as it is for *even*, the focal and secondary contents are identified.

$$(42) \quad \left[\text{LF} \begin{bmatrix} \text{ECONT} & me \\ \text{FOC-CONT} & me \\ \text{SEC-CONT} & me \end{bmatrix} \right]$$

$$(43) \quad \text{Only three people showed up} \models \text{Three people showed up.}$$

$$(44) \quad \llbracket \alpha F \beta \rrbracket^{M,g} \models \llbracket \alpha \beta \rrbracket^{M,g}$$

A simplified entry for *shika* is given in (45). This entry treats *shika* as a clitic that takes as complement the constituent it cliticizes onto.

$$(45) \quad a. \quad shika \Rightarrow \left[\begin{array}{l} \text{HEAD} \quad \left[\begin{array}{l} \text{FPART } shika \\ \text{CLITIC +} \end{array} \right] \\ \text{COMPS} \quad \left\langle \left[\begin{array}{l} \text{LF} \left[\begin{array}{l} \text{ICONT } [3] \\ \text{ECONT } [1] \end{array} \right] \end{array} \right] \right\rangle \\ \text{INC} \quad [2] \\ \text{FOC-CONT} [2] (only'([4], \beta)) \\ \text{ECONT} \quad [1] \end{array} \right]$$

$[3] \triangleleft [4]$

Semantically, *shika* introduces as both its internal and focal content a proposition of the form *only* (α, β). We assume that a proposition of the form *only* (α, β) is true in a model if and only if there is nothing except α that would satisfy β . In other words, *only* (α, β) corresponds to the restrictive proposition. The preajacent corresponds to the external content of the sentence, as per the entailment in (44) and our decision to let semantic composition of the sentence minus the focus particle work as it would if no focus particle were present. The first argument of the restrictive proposition includes the internal content of the constituent *shika* selects and cliticizes onto.¹ The second argument of this proposition is not determined within the constituent that contains *shika*.

Given this entry for *shika*, two constraints on verbs suffice to model the descriptive generalizations we listed in (41). The first constraint (46) ensures that whenever *shika* occurs, the verb is what we call a *secondary-neg-verb*. This constraint models the necessary co-occurrence of *shika* and a *na* suffixed verb. In stating this constraint, we make use of Bouma, Malouf and Sag's (2001) notion of dependents which includes not only members of the ARG-ST list, but also various adjuncts. This is necessary as *shika* can attach to adjuncts as well as arguments of the secondary negative verb it co-occurs with.

- (46) a. If the focus particle *shika* is cliticized to a dependent of the verb, the verb must belong to the category of secondary negative verbs;
b. $\left[\text{DEPS} \left\langle \dots \left[\text{HEAD} [\text{FPART } shika] \right] \dots \right\rangle \right] \Leftrightarrow \text{secondary-neg-verb}$

The second constraint, given in (47), defines the class of secondary negative verbs.

- (47) a. If a verb is a secondary negative verb, its polarity is negative and its secondary meaning consists of a (defeasible) implication between the focal content of its *shika* marked dependent and the negation of a free propositional variable (Q below).

¹We require the first argument of the *only* proposition to *include* the internal content of its modified constituent rather than *be equal to* the external content of that constituent to allow the focus of *shika* to be less than the meaning of the entire constituent onto which it cliticizes.

$$\begin{array}{l}
\text{b. } \textit{secondary-neg-verb} \Rightarrow \left[\begin{array}{ll} \text{HEAD} & [\text{POLARITY-}] \\ \text{ICONT} & \boxed{4} \\ \text{SEC-CONT} & \boxed{1} \rightsquigarrow \boxed{2} \neg Q \\ \text{DEPS} & \langle \dots [\text{FOC-CONT} \boxed{1} (\textit{only}'(\alpha, \boxed{3}))] \dots \rangle \\ \text{PARTS} & \langle \dots \boxed{2} \neg \dots \rangle \end{array} \right] \\
& \& \boxed{4} \triangleleft \boxed{3}
\end{array}$$

Morphologically, secondary negative verbs are required to include the suffix *na*, which means they must be marked as being of negative polarity. The rest of the definition of *secondary-neg-verb* models the two semantic effects of the co-occurrence of *shika* and a *secondary-neg-verb*.

The first semantic effect pertains to the *scope* of *shika*. The definition of secondary negative verbs in (47) simply says that the internal content of the main verb is part of the second argument of the restrictive proposition introduced by *shika*. The need to underspecify the scope of *shika* (and therefore the weak constraint that the internal content of the verb be, again, *included* in the second argument of the *only* proposition rather than *equal to* it), is best illustrated by the English sentences in (48).

- (48) a. Mary also drinks GREEN TEA very rarely.
b. Very rarely does Mary also drink GREEN TEA.

The most salient interpretation of (48a) is one which is supported by situations in which Mary drinks at least two liquids very rarely, green tea and some other alternative liquid. In other words, the scope of *also* includes the adverbial phrase *very rarely* in the most salient interpretation of (48a) and the alternatives to green tea (in Rooth's sense) are the liquids Mary drinks very rarely. The most salient interpretation of (48b), on the other hand, is one which is supported by situations in which it is rare for Mary to drink two liquids. In this case, *very rarely* is not within the scope of *also* and the alternatives to green tea are the set of liquids Mary drinks. The range of operators that lead to distinct possible scopes for focus particles includes not only adverbial phrases like *very rarely*, but also propositional attitude verbs (when focus particles occur within their complement clauses). We know of no systematic study of the range of scope possibilities of the kind illustrated in (48). Our analysis therefore merely requires the second argument of the restrictive proposition to include the internal content of the main verb. Since the existence of various possible scopes is not a property specific to *shika*, but is part and parcel of the semantics of focus particles, the constraint $\boxed{4} \triangleleft \boxed{3}$ would not be included in the definition of *secondary-neg-verb* in a more comprehensive treatment of focus particles in Japanese.

The second semantic effect of the co-occurrence of *shika* and *na* is that the focal content contributed by the *shika*-marked constituent pragmatically implies that a proposition *Q* is false. As mentioned above, we incorporate a multi-dimensional approach to meaning into LRS through the introduction of the attribute SEC-CONT into the logical form of signs and the secondary negative content contributed by

secondary-negative-verb is encoded as the value of this new attribute. It is this secondary meaning which, we claim, distinguishes the meaning of *shika* and *dake*.

Before concluding, let us note that our more complex architecture for semantic contents clearly requires a slight revision to LRS semantic principles to ensure that all of the focal, external, and secondary contents end up being part of the semantic information contributed by sentences. Since this revision is relatively easy and our analysis is preliminary, we leave its precise formulation to another venue. We merely point out that the inclusion of a secondary content in the entry of *secondary-neg-verbs* requires us to reinterpret the EXCONT principle formulated in Richter and Sailer (2004) in (49). Since the external content of sentences consists now of both a primary and secondary content, the EXCONT principle must apply to the *conjunction* of the primary and secondary external contents.

- (49) ‘In every utterance, every subexpression of the EXCONT value of the utterance is an element of its PARTS list, and every element of the utterance’s PARTS list is a subexpression of the EXCONT value.’

A simplified representation of the meaning composition for sentence (1b) is given in Figure 1.

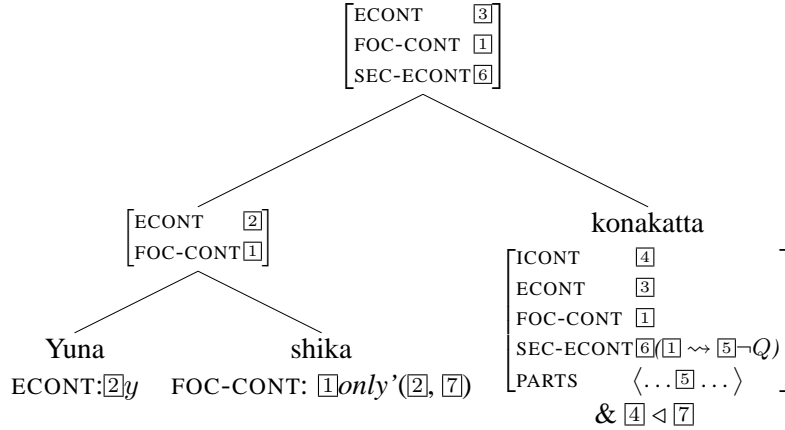


Figure 1: The semantic content of sentence (1b)

6 Conclusion

Recent research has shown that the information conveyed by sentences and utterances is not monolithic; it can include various kinds of semantic content. But, the semantic judgments on which some of these distinctions rest are sometimes subtle and the sheer number of categories raises a further issue: Why is there a need for natural languages to make such subtle distinctions in the status of information our utterances convey? Our paper does not provide an answer to this latter, bigger question. But, it provides an interesting example of the descriptive use of some

of these subtle distinctions. Adequately characterizing the intuitive difference between the two Japanese exclusive particles *shika* and *dake* has proved difficult. So, has explaining the necessarily presence of the negative suffix *na* for the first particle, as the negation does not seem to contribute to its meaning, at least according to a ‘traditional’ exclusive particle analysis. Although Yoshimura’s (2006) analysis of *shika* as an exceptive marker explains the presence of the negative verbal suffix *na*, there are several difficulties with her analysis, as we have shown. Based on previous proposals such as Kuno (1999) that *shika* expresses some negative meaning, we hypothesize that *shika* introduces both a primary meaning (similar to that of English *only* and Japanese *dake*) and a secondary meaning (that the exclusive content pragmatically implies that some contextually determined proposition is false). The secondary negative meaning of *shika* is the source of the intuition that *shika* is acceptable in more negative contexts than *dake* and explains compositionally the presence of the negative suffix. Furthermore, the independence of this negative secondary meaning from the primary meaning expressed by sentences containing *shika* is critical in explaining two apparently incompatible facts, the required presence of *na* and the semantic equivalence of the exclusive meaning carried by *dake* and *shika*. *Dake* and *shika* share the same primary, exclusive meaning, but *shika* carries an additional secondary meaning that the negative suffix *na* contributes solely to.

Our model of the necessary co-occurrence of *shika* and *na* and its semantic effects requires *shika*-marked constituent to be dependents of members of the class of *secondary-neg-verb*. The fact that *na* contributes to the secondary meaning of verbs only when these verbs select for a *shika* dependent is modeled via constraint on the type *secondary-neg-verb*. Finally, the dependency between the primary exclusive meaning and the secondary negative implication of sentences containing *shika* is modeled through token-identity between what we call wordfocal content and the relevant part of the secondary external content of verbs of type *secondary-neg-verb*. Our analysis accounts for the fact that Japanese suffix *na* has two uses, a use that encodes ordinary logical negation of primary meanings and a second use, restricted to sentences in which one of the verb’s dependents contains the clitic *shika*, where the negation is part of the sentence’s secondary meaning. Whereas the presence of an additional secondary meaning is reflected in a different lexical item in English pairs such as *<and, but>*, the presence of an additional secondary meaning is represented by the combination of the contrast between *<dake, shika>* and the two uses of the negative suffix *na* in Japanese.

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