The Semantics of *Even* and Negative Polarity Items in Japanese

Kimiko Nakanishi
University of Calgary

1. Scope Theory vs. Lexical Theory of *Even*

The focus particle *even* introduces an implicature (or a presupposition) that is not available with a corresponding sentence without *even*; (1a) implies that Book A is unlikely to be read (the unlikely reading), although such an implication does not arise with *John read Book A*.[1] It has been argued that this is due to a scalar presupposition of *even* (henceforth, ScalarP) (Karttunen and Peters 1979): assuming that *even* is a sentential operator, as in (1b), *even* presupposes that the relevant proposition p is the least likely proposition among the alternatives in C (a silent restrictor variable), as in (1c).[2,3] The alternatives obtain by replacing the focused element with elements of the same type. For example, in (1b), C denotes a set of propositions obtained by replacing Book A with elements of the same type, e.g., {John read Book A, John read Book B, John read Book C, …}. *Even* evokes the ScalarP that 'that John read Book A' is the least likely proposition in C.

(1) a. John even read [Book A]$_F$.
b. LF: [even C [John read [Book A]$_F$]]
c. $[\![even]\!]^w$(C)(p) is defined only if p is the least likely proposition among the alternatives in C.

The situation is different with *even* in downward-entailing (DE) contexts, that is, contexts where entailments get reversed. Take the sentences *John read textbooks* and *John read books*, where the former entails the latter, but not vice versa. In negative contexts, this entailment gets reversed: *John didn't read books* entails *John didn't read textbooks*, but not vice versa. Consider now (2a), where *even* appears with negation. Contrary to (1a), (2a) seems to imply that Book A is likely to be read (the likely reading). Moreover, in (2b), when *even* occurs with an adversative predicate like *surprise*, which is a DE operator (Kadmon and Landman 1993), we obtain both unlikely and likely readings.

(2) a. John didn't even read [Book A]$_F$.
b. I was surprised that John even read [Book A]$_F$.

Two theories have been proposed to account for the likely reading of *even* in DE contexts. One theory holds that this reading obtains when *even* takes scope over a DE operator at the LF (scope theory: Karttunen and Peters 1979, Wilkinson 1996). For instance, the LF of (2a) is given in (3); *even* combines with a negated proposition, thus C will denote the set of propositions {that John didn't read Book A, that John didn't read Book B, that John didn't read Book C,…}. The ScalarP in (1c) then says that 'that John didn't read Book A' is the least likely, or equivalently, 'that John read Book A' is the

* I would like to thank Rajesh Bhatt, Daniel Büring, Irene Heim, Maribel Romero, Bernhard Schwarz, Satoshi Tomioka, and audience members at *WCCFL* 25 and *SALT* 16. An extensive version of the paper will be published as Nakanishi (2006).

[1] [ ]$_F$ marks the element with intonational focus that is associated with *even*.

[2] There have been disagreements as to whether the relevant proposition is 'less' likely or the 'least' likely (Kay 1990, Rullmann 1997, Guerzoni 2003). In this paper, I simply take the latter view.

[3] Besides a ScalarP, *even* is known to trigger an existential presupposition (see footnote 13). This presupposition is put aside here, since it is not crucial to the main arguments of the paper.

© 2006 Kimiko Nakanishi. Proceedings of the 25th West Coast Conference on Formal Linguistics, ed. Donald Baumer, David Montero, and Michael Scanlon, 288-296. Somerville, MA: Cascadilla Proceedings Project.

most likely. In this way, the DE operator *not* reverses the likelihood scale. The obtained presupposition is consistent with our intuition in (2a) that Book A is likely to be read. Similarly, in (2b), when *even* takes scope over the DE operator *surprise*, the likelihood scale gets reversed by *surprise*, yielding the likely reading. Moreover, in (2b), *even* can take scope under *surprise* in which case we obtain the same presupposition as (1a), that is, 'that John read Book A' is the least likely proposition in C. Since *surprise* is a presupposition hole, this presupposition is passed on to (2b) as a whole (Karttunen 1973). The other theory holds that unlikely and likely readings are manifestations of two different *even*. In particular, *even* is lexically ambiguous between a regular *even* and an NPI *even* (lexical theory: Rooth 1985, von Stechow 1991, Rullmann 1997, Giannakidou to appear).[4] The NPI *even* triggers a ScalarP in (4a), which is completely opposite from the one in (1c). Under this theory, *even* in (2a) is below negation, as in (4b). Then this NPI *even* evokes the ScalarP that 'that John read Book A' is the most likely proposition. This ScalarP holds for the whole sentence, since negation is a presupposition hole. In (2b), we can simply assume that *even* is ambiguous between a regular *even* and an NPI *even*, and that the former gives us the unlikely reading, whereas the latter yields the likely reading.[5]

(3) LF: [even C [not [John read [Book A]$_F$]]] even > ¬

(4) a. $[\![even_{NPI}]\!]^w(C)(p)$ is defined only if p is the most likely proposition among the alternatives in C.
b. LF: [not [even$_{NPI}$ C [John read [Book A]$_F$]]] ¬ > even$_{NPI}$

There are at least two arguments against the scope theory. First, the scope theory needs to posit a stipulative movement of *even* above a DE operator (Rullmann 1997, among others). For one thing, the movement is unusual in that it is not clause-bound; in (2b), to yield the likely reading, the embedded *even* must take scope over *surprise* in the main clause. Furthermore, the scope of *even* differs from other focus particles like *only*; unlike *even*, *only* takes scope under negation in *John didn't only read* [*Book A*]$_F$. Second, there are many languages that seem to have a lexical distinction between two types of *even* (Dutch, German, Finnish, Italian, Spanish, etc.; König 1991, von Stechow 1991, Rullmann 1997). For example, in the German examples in (5), *sogar* 'even' exclusively expresses the unlikely reading that Maria is unlikely to be greeted, while *auch nur* '(lit.) also only' exclusively expresses the likely reading that Maria is likely to be greeted. Then, it makes sense to claim that *sogar* is a regular *even* with a ScalarP in (1c), whereas *auch nur* is an NPI *even* with a ScalarP in (4a).

(5) a. Der Hans hat {sogar / *auch nur} [die Maria]$_F$ begruesst.
the Hans has {even / also only} the Maria greeted
'Hans even greeted Maria.' (unlikely reading)
b. Niemand hat {*sogar / auch nur} [die Maria]$_F$ begruesst.
no one has { even / also only} the Maria greeted
'Nobody even greeted Maria.' (likely reading)
c. Es hat uns überrascht, das {sogar / auch nur} [der Hans]$_F$ da war.
it has us surprised that {even / also only} the Hans there was
'It surprised us that even Hans was there.' (*sogar*: unlikely reading, *auch nur*: likely reading)

In this paper, I show that Japanese have multiple *even* items that at first site seem to correspond to *even* and *even*$_{NPI}$. However, I argue that the scope theory is more suitable for explaining the Japanese data. In particular, I provide a compositional analysis of the *even* items under the scope theory (à la Guerzoni 2003). I further show that the proposed analysis extends to the data on Japanese NPIs (à la Lahiri 1998). The analysis here supports the line of research that uses the semantics of *even* as a key to understand the seemingly unrelated polarity phenomena (Heim 1984, among others).

[4] The term NPI (or negative polarity item) *even* comes from the fact that *even* with the likely reading appears in contexts where NPIs can appear, or roughly speaking, in DE contexts. See sections 2 and 3 below on this point.
[5] For both theories, a question remains as to why (2b) lacks the unlikely reading. The scope theory needs to posit an obligatory movement of *even* over negation, and the lexical theory needs to assume that the regular *even* is banned in the immediate scope of negation.

2. Japanese *Even* under the Scope Theory

Japanese has a variety of focus particles that correspond to the English *even*. Among them, this paper focuses on three items; *-mo* 'also, even', *-demo* 'even', and *-dake-demo* '(lit.) even only'.[6,7] We have seen in (1a) that the English *even* triggers the least likely ScalarP in positive contexts. In this case, *-mo* and *-demo*, but not *-dake-demo*, are felicitous, as in (6a). With the adversative predicate *surprise*, the English *even* in (2b) evokes both unlikely and likely readings. In Japanese, as in (6b), the unlikely reading obtains with *-mo* and *-demo*, while the likely reading obtains with *-dake-demo*. The same pattern is observed in other DE contexts (e.g., conditionals, etc.). The Japanese data so far correspond to the German data in (5a) and (5c); *-mo* and *-demo* are like *sogar*, whereas *-dake-demo* is like *auch nur*, that is, the former is a regular *even* and the latter is an NPI *even*. However, the Japanese *even* items in negative contexts pattern differently from the German items in (5b); in (6c), *-mo* and *-demo*, but not *-dake-demo*, are felicitous. Given this deviance, the lexical theory faces at least two problems. First, we need to posit two types of NPI *even*, one licensed by negation (*-mo*, *-demo*) and one by other DE operators (*-dake-demo*). It also seems problematic that the first type is identical to the regular *even*. Second, the lexical theory ignores the apparent morphological complexity of *-dake-demo* (cf. Guerzoni 2003 on German). It is clear that *-dake-demo* consists of *-dake* 'only' and *-demo* 'even', and we would want to question why that is the case. In the following, I show that the scope theory is more suitable for explaining the Japanese data. For one thing, the scope theory has only a regular *even*, and so there is no problem of positing two types of NPI *even*. More importantly, I argue that, following Guerzoni's (2003) analysis on German *auch nur*, *-dake-demo* needs to be decomposed into *-dake* and *-demo*, and that this decomposition naturally accounts for why *-dake-demo* behaves like an NPI.

(6) a. John-wa [sono hon]$_F$ {-mo / -demo / ??-dake-demo} yon-da.
John-TOP that book {-even / -even / -only-even} read-PAST
'John even read that book.' (unlikely reading)

b. John-ga [sono hon]$_F$ {-mo / -demo / -dake-demo} yonda-to-wa odoroi-ta.
John-NOM that book {-even / -even / -only-even} read-that-TOP was surprised
'I was surprised that John even read that book.' (*-mo*, *-demo*: unlikely, *-dake-demo*: likely)

c. John-wa [sono hon]$_F$ {-mo / -demo / *-dake-demo} yom-ana-katta.
John-TOP that book {-even / -even / -only-even} read-NEG-PAST
'John didn't even read that book.' (likely reading)

---

[6] *-Mo* corresponds to the English *also* without any prominence on the NP that *-mo* attaches to. With a focus on the NP, *-mo* retains the *even* interpretation. This paper exclusively examines cases where *-mo* attaches to a focused element, i.e., *-mo* as *even*. I assume here that the focus particle *-mo* is lexically distinct from the universal quantifier *-mo* in (i) (Shimoyama 2001). Regarding *-demo*, it can be morphologically decomposed into the copular verb *-de* followed by *-mo*. However, it is not clear whether this decomposition is necessary, given that *-demo* is often treated as a single lexical item corresponding to *even*, as in (ii). Thus, here I treat *-demo* as a non-decomposable lexical item, and ignore subtle semantic differences between *-mo* and *-demo*. However, the degree of acceptability of *-demo* in (6) seems to vary among the informants. A source of variation needs to be investigated in the future research. Furthermore, I exclude another use of *-demo* exemplified in (iii), where *-demo* takes *tea* as a typical example of things you could drink.

(i) Dare-mo-ga ki-ta.
who-MO-NOM come-PAST 'Everyone came.'

(ii) John-demo hon-o kat-ta.
John-even book-ACC buy-PAST 'Even John bought a book.' (Kuroda 1965:82)

(iii) Ocha-demo nomimasu-ka?
tea-DEMO drink-Q 'Would you like tea or something?'

[7] A focus particle in Japanese often appears as a postposition attached to a focused NP. However, a focus site can be larger than the focused NP, as in (i), where the VP *do cleaning* is focused (Aoyagi 1994). For this reason, just like the English focus particles, I assume that the Japanese focus particles are sentential operators.

(i) Nitiyoobi-ni John-wa ryoori-o tukut-ta. [Soozi]$_F$-mo si-ta.
Sunday-on John-TOP meal-ACC make-PAST [cleaning]-even do-PAST
'On Sunday, John made a meal. (He) even did cleaning.'

2.1. -Mo / -Demo *'even'*

Let us first present the analysis of *-mo* and *-demo*. (6a) above shows that these items trigger a ScalarP in (1c). Under the scope theory, the reason why *-mo*/*-demo* with *surprise* in (6c) yields only the unlikely reading is that these items never take scope over *surprise*. That is, they do not move above a clause-boundary. Regarding negative contexts, it has been argued that negation in Japanese tends to take narrow scope (cf. Kuno 1980:161). For instance, (7) asserts that John read everything but Book A. This assertion obtains when *-dake* 'only' takes scope over negation. Unlike the corresponding English sentence, (7) lacks the reading where negation takes scope over *-dake*. Given the restrained scope of negation, it makes sense to assume that *-mo*/*-demo* in (6c) takes scope over negation without any stipulative movement.[8] Then the LF of this sentence is the same as the one in (3), which yields the likely reading (due to the scale-reversing by negation). A piece of supporting evidence comes from the example of non-local negation in (8a). When negation is in the main clause and *-mo*/*-demo* is in the embedded clause, only the unlikely reading is available. This can be explained if we assume the LF in (8b); *even* combines with 'that John read Book A', and evokes the ScalarP that this proposition is the least likely. Since negation is a presupposition hole, this ScalarP holds for the entire sentence.[9]

(7) John-wa [Hon A]$_F$-dake yom-ana-katta.
John-TOP Book A-only read-NEG-PAST 'John didn't only read Book A.'

(8) a. John-wa [Hon A]$_F${-mo / -demo} yonda-wake-de-wa-nai.
John-TOP Book A{-even / -even} read-it is not the case
'It is not the case that John even read Book A.'
b. LF: [not [even C [John read [Book A]$_F$]]] ¬ > even

2.2. The Compositional Analysis of -Dake-demo *'(lit.) even only'*

We have seen in (6) that *-dake-demo* '(lit.) even only' is infelicitous in positive and negative contexts, and evokes the likely reading in other DE contexts. I propose here a compositional analysis of *-dake-demo*, based on Guerzoni's (2003) analysis of *auch nur* '(lit.) also only' in German. In particular, I argue that there is a semantic conflict between *-dake* 'only' and *-demo* 'even', and that this conflict can be resolved only in certain context (roughly, DE contexts). This analysis accounts for why the distribution of *-dake-demo* is restricted (i.e., NPI-like distribution) and also for why *-dake-demo* has only the likely reading. Guerzoni argues that *auch nur* needs to be decomposed into *auch* 'also' and *nur* 'only', and that the two particles evoke the presuppositions in (9a) and (9b), respectively.[10] Additivity of *auch* in (9a) and exclusivity of *nur* in (9b) are incompatible. For example, in (5a), suppose that *auch* and *nur* are both independently associated with *die Maria*. Then (9a) says that there is some x≠Maria such that I greeted x, while (9b) says that there is no x≠Maria such that I greeted x.

---

[8] I am not arguing that the scope of negation is the lowest (e.g., the existential closure of indefinites can be lower than negation; Nakanishi 2006). Suffice it to say here that negation is lower than the relevant focus particles.

[9] If we allow the lexical theory to take into account the 'scope' interaction between *-mo*/*-demo* and negation, the lexical theory can do without positing two types of NPI *even*, one licensed by negation and one by other DE operators. Suppose that *-mo*/*-demo* is always a regular *even* and *-dake-demo* is an NPI *even*. When *-mo* or *-demo* is above negation, it combines with a negated proposition, yielding the likely reading. However, even if we dismiss the first problem, the second problem regarding the complexity of *-dake-demo* still remains. Moreover, the lexical theory fails to account for the fact that *-dake-demo* cannot be licensed by negation in a higher clause, as in (i). Assuming LF: ¬>*-dake-demo*, it is not clear why *-dake-demo*, an NPI *even*, is infelicitous in the scope of negation.

(i) *John-wa [Hon A]$_F$-dake-demo yonda-wake-de-wa-nai.
John-TOP Book A-only-even read-it is not the case

[10] Guerzoni (2003) claims that *nur* in *auch nur* is different from the regular *nur* in that it takes exclusivity in (9b) as its presupposition; (9b) is generally considered to be a truth-condition of *nur* (Horn 1969, among others). Guerzoni's claim is motivated by the fact that a sentence with *auch nur*, say, (5b), is truth-conditionally equivalent to the corresponding sentence without *auch nur*; if *nur* had a truth-conditional contribution, the truth condition of (5b) should differ from the one of the sentence without *auch nur*. See Guerzoni (2003) for details.

This semantic conflict is the reason why (5a) is infelicitous with *auch nur*. In contrast, in a negative context in (5b), the conflict can be resolved if we assume that *auch* can take scope over negation. With this assumption, a possible LF would be the one in (9c). Additivity of *auch* says that there is some x≠Maria such that nobody greeted x. Exclusivity of *nur* is that there is no x≠Maria such that g(1) greeted x (where g is an assignment function; see Heim and Kratzer 1998). Following Heim's (1983) theory of the presupposition projection, the final presupposition of *nur* is that there is no x≠Maria such that everybody greeted x, or equivalently, nobody greeted anybody different from Maria. This is not inconsistent with additivity of *auch*. In this way, *auch* and *nur* has no conflict with an intervening negation. In contrast, when they are both above or below negation, the semantic conflict between the two cannot be resolved. In sum, Guerzoni's analysis appeals to the fact that there is a semantic conflict between additivity of *auch* in (9a) and exclusivity of *nur* in (9b). This conflict can be resolved when there is some intervening operator (e.g., negation) that makes the two presuppositions consistent.

(9) a. $[\![auch]\!]^w(C)(p)$ is defined iff there is some proposition q in C such that q≠p and q is true.
b. $[\![nur]\!]^w(C)(p)$ is defined only if there is no proposition q in C such that q≠p and q is true.
c. LF: [also C [nobody$_1$ [only C [t_1 greeted [[Maria]$_F$]$_F$]]]] also > ¬ > only

Another property of *auch nur* that needs to be explained is that it has only the likely reading. Guerzoni (2003) claims that this is due to a ScalarP of *nur* in (10).[11] With the LF in (9c), a ScalarP in (10) is that 'that g(1) greeted Maria' is the most likely proposition. Following Heim (1983) again, the ScalarP in the end is that 'that everyone greeted Maria' is the most likely, yielding the likely reading.

(10) $[\![nur]\!]^w(C)(p)$ is defined only if p is the most likely (or least noteworthy, least interesting, least informative, etc.) proposition among the alternatives in C.

We are now ready to examine the Japanese *-dake-demo*. Just like *nur* 'only' in *auch nur*, *-dake* 'only' in *-dake-demo* evoke the two presuppositions, namely, exclusivity in (9b) and scalarity in (10).[12] In the case of the German *auch* 'also', it is obvious that it evokes additivity in (9a). However, it is not clear whether *-demo* 'even' has this presupposition.[13] Suppose if the only student who failed the exam was the best student John. (11) is felicitous under this scenario, indicating that *-demo* may not evoke additivity. If so, we can no longer appeal to the conflict between additivity and exclusivity. Instead, I argue that, when the two particles combine with the same proposition, there is a systematic conflict between a ScalarP of *-demo* and a ScalarP of *-dake*: *-demo* requires the relevant proposition to be the least likely, as in (1c), while *-dake* requires it to be the most likely, as in (10).

(11) [John]$_F$-demo otita-to-wa odoroi-ta.
John-even failed-that-TOP surprised-PAST 'I was surprised (to find out) that even John failed.'

Structurally, in NP-*dake-demo*, *-dake* 'only' directly attaches to the NP, followed by *-demo* 'even', that is, *-demo* is above *-dake* in the structure. Then, extending Guerzoni's (2003) analysis, *-demo* must

[11] It is controversial whether a ScalarP is always part of the meaning of *nur* (König 1991). Guerzoni (2003), following Lerner and Zimmermann (1983), assumes that a ScalarP is always present even when it is not apparent (Guerzoni 2003:190). Lerner and Zimmermann argue that *only* may involve a different evaluation. For instance, the sentence *only the prime minister came* may involve a likelihood scale with respect to cardinality, as in (i). Interestingly, some informants seem to obtain only this cardinality reading in (6b) with *-dake-demo* (see Nakanishi 2006 for discussions).

(i) For every n∈N such that n ≠ |{the prime minister}|,
'that m people came, where m = |{the prime minister}|' is more likely than 'that n people came'.

[12] Just like a sentence with *auch nur*, a sentence with *-dake-demo* is truth-conditionally equivalent to the corresponding sentence without *-dake-demo*. Thus, we can assume that *-dake* 'only' in *-dake-demo* has no truth conditional import, and that exclusivity is a presupposition.

[13] The English *even* is generally considered to evoke an additive (or existential) presupposition as well as a scalar presupposition (Karttunen and Peters 1979; but see, Krifka 1991, von Stechow 1991, Rullmann 1997 for counter-examples). For instance, (1a) presupposes that there is something other than Book A that John read.

scope over some operator to resolve the semantic conflict with *-dake*. In particular, if *-demo* is above an operator that reverses the likelihood scale, a ScalarP of *-demo* and a ScalarP of *-dake* become consistent. Assuming that a DE operator has a scale-reversal property, a DE operator can serve as an intervener that resolve the conflict (cf. Lahiri 1998).[14] This analysis accounts for the NPI-like distribution of *-dake-demo*; *-dake-demo* is licensed under DE contexts because a DE operator can make the presuppositions of *-dake* and of *-demo* consistent. For example, in (6b), the proposed analysis would predict that *-dake-demo* is acceptable when its LF is (12a). A ScalarP of *-demo* says that 'that I was surprised that John read Book A' is the least likely, which leads to the reading that Book A is likely to be read due to a scale-reversal property of *surprise*. In contrast, a ScalarP of *-dake* says that 'that John read Book A' is the most likely. Thus, there is no conflict between the two scalar presuppositions. Notice that there is no way of deriving the unlikely reading. Consider the LF in (12b), where *-demo* is below *surprise*. In this case, a ScalarP of *-demo* says that 'that John read Book A' is the least likely, yielding the unlikely reading. In contrast, a ScalarP of *-dake* says that 'that John read Book A' is the most likely proposition. Apparently, these two presuppositions are inconsistent. The current analysis can also explain why *-dake-demo* is unacceptable in positive and negative contexts. In positive contexts, there is no operator that can reverse the likelihood scale of *-demo*, and so there is no way of resolving the conflict with *-dake*. Regarding negative contexts, I showed in section 2.2 that negation in Japanese takes narrow scope than focus particles. First, the fact that (6c) with *-demo* has the likely reading indicates that *-demo* is above negation. Second, (7) shows that *-dake* is also above negation. Thus, in the case of *-dake-demo*, both *-demo* and *-dake* take scope over negation, as in (12c). Then, just like in positive contexts or in (12b), there is no intervener to resolve the conflict.

(12) a. LF: [even C [surprise [only C [John read [[Book A]$_F$]$_F$]]]] even>surprise>only
b. LF: *[surprise [even C [only C [John read [[Book A]$_F$]$_F$]]]] surprise>even>only
c. LF: *[even C [only C [not [John read [[Book A]$_F$]$_F$]]]] even>only>¬

Let's take stock. I argued that *-mo* and *-demo* evoke a ScalarP in (1c), which yields the unlikely reading in positive contexts. In negative contexts, they only have the likely reading because they combine with a negated proposition, negation being low. Moreover, the fact that *-mo* and *-demo* lack the likely reading in other DE contexts indicates that they are unable to take scope over a DE operator. Then, one of the arguments against the scope theory, i.e., stipulative movements of *even*, does not hold for Japanese. Regarding *-dake-demo*, *-demo* 'even' must move over a DE operator to resolve a semantic conflict with *-dake* 'only'. Notice that the movement of *-demo* here is semantically motivated; *-demo* moves to resolve the conflict with *-dake*.[15] This analysis predicts that *-dake-demo* is licensed only when the LF is as follows: *even*>DE>*only*. It also accounts for why *-dake-demo* is unacceptable in positive and negative contexts: in positive contexts, there is no DE operator and, in negative contexts, negation is unable to take scope over *-dake* 'only'. Furthermore, a ScalarP of *-dake* and a ScalarP of *-demo* with the LF: *even*>DE>*only* both yield the likely reading, which is consistent with our intuition on *-dake-demo*. In this way, the distribution of the Japanese *even* items can be straightforwardly captured by the scope theory. Thus, the cross-linguistic data on multiple *even* items do not necessarily support the lexical theory, contra what has been generally claimed for other languages.[16] Moreover, the scope analysis proposed here (à la Lahiri 1998, Guerzoni 2003) gives us a natural explanation for a correlation between the distribution of *even* with the likely reading (so-called NPI *even*) and DE contexts. In the next section, I provide a further advantage of the current analysis. In particular, I show that the current analysis is capable of explaining the distribution of Japanese NPIs.

[14] The scope theory relies on the assumption that all DE operators reverse the likelihood scale. However, it is not clear whether that is actually the case (Rullmann 1997). I leave this issue for the future research.
[15] Unlike NP-*dake-demo*, NP-*dake-mo* seems to be always infelicitous. This may indicate that *-demo* and *-mo* are different in that the former, but not the latter, potentially moves for semantic reasons. In other words, *-mo* cannot move even when there is a semantic conflict, and thus *-dake-mo* can never be licensed.
[16] Another argument for the scope theory comes from Guerzoni's (2003) analysis on *even* in questions. She argues that the German *auch nur* in questions leads to a negatively biased interpretation, and that the scope theory, but not the lexical theory, is able to account for this property.

3. Extension to Japanese NPIs

The three *even* items in Japanese (*-mo, -demo*, and *-dake-demo*) can be a part of NPIs, as in (13).[17] When the cardinal predicate *one* is followed by the *even* items in positive contexts, as in (13a), the sentence is unacceptable.[18] In negative contexts in (13b), only *one* + *-mo* is acceptable, while the other two are acceptable in other DE contexts, as in (13c). It has been independently argued that the theory of *even* helps us to understand seemingly unrelated phenomena of NPIs (Heim 1984, Lee and Horn 1994, Lahiri 1998, Guerzoni 2003).[19] Following this line of investigation, the Japanese NPIs provide us with an interesting test case to examine whether there is any correlation between the semantics of *even* and of NPIs. In the following, I show that the scope analysis of the *even* items directly extends to the data on NPIs. This clearly indicates that the semantics of *even* plays a crucial role to understand the nature of (at least some type of) NPIs.

(13) a. * [Hito-ri]$_F${-mo / -demo / -dake-demo} ki-ta.
one-CL{-even / -even / -only-even} come-PAST

b. [Hito-ri]$_F${-mo / *-demo / *-dake-demo} ko-na-katta.
one-CL{-even / -even / -only-even} come-NEG-PAST
'(lit.) Even one person didn't come.' = Nobody came.

c. [Hito-ri]$_F${*-mo / -demo / -dake-demo} kita-to-wa odoroi-ta.
one-CL{-even / -even / -only-even} come-that-TOP was surprised
'(lit.) I was surprised that even one person came.' = I was surprised that anyone came.

Before examining the Japanese data, let us first summarize Lahiri's (1998) analysis of Hindi NPIs. Like Japanese NPIs, Hindi is able to form an NPI by combining *ek* 'one' with *bhii* 'even'. (14a) shows that *bhii* corresponds to the English *even* when it combines with a focused NP. (14b) and (14c) show that *ek bhii* is an NPI that is licensed in negation contexts, but not in positive contexts.

(14) a. [Ram]$_F$ bhii aayaa
Ram even came
'Even Ram came.'

b. [Ek]$_F$ bhii nahiiN aayaa
one even didn't came
'No one came.'

c. *[Ek]$_F$ bhii aayaa
one even came

Assuming that *bhii* 'even' associates with focus just like the English *even*, Lahiri (1998) argues that *bhii* in (14b) associates with the cardinality predicate *ek* 'one'. Then, the relevant alternatives would be the propositions that we obtain by replacing *ek* with other cardinality predicates, that is, {one came, two came, …, n came}. A ScalarP of *bhii* (the same as a ScalarP of *even* in (1c)) yields that 'that one came' is the least likely proposition in C. However, this is inconsistent with the meaning of *one*. For instance, if 'five came' is true, then 'one came' must be true, and if three came, one must have come. In this way, as in (15), 'that one came' is always entailed by the proposition with other cardinality predicates, i.e., the proposition with *one* is the weakest, or the most likely (cf. Chierchia 2004:77, "… being stronger entails being less likely"). This is of course inconsistent with a ScalarP of *bhii*.

(15) $\exists x[|x|=n \wedge come(x,w)] \rightarrow \exists x[|x|=1 \wedge come(x,w)]$

Lahiri's analysis offers a straightforward account for *ek bhii* in negative contexts. Adopting the scope theory of *even*, *bhii* 'even' takes scope over negation and combines with the proposition 'that one didn't come'. Then it evokes a ScalarP that this proposition is the least likely proposition in C, or

[17] Alternatively, NPIs can be formed with an indeterminate pronoun followed by an *even* item (either *-mo* or *-demo*, but not *-dake-demo*). I do not discuss this type of NPIs in this paper.

[18] Numerals in Japanese must be followed by a classifier that carries some semantic information of the associated NP. For simplicity, I ignore the existence of a classifier, although this does not affect the analysis of the paper.

[19] Strictly speaking, what is relevant here is a particular kind of NPIs, namely, so-called strong NPIs (or minimizer NPIs such as *lift a finger, budge an inch*). These NPIs are able to appear with an overt *even*, as in *John didn't (even) lift a finger to help Mary* (Heim 1984). Similarly, the German *auch nur* can appear with a strong NPI, as in *(auch nur) mit der Wimper zucken* '(even) bat an eyelid' (Schwarz 2005: footnote 32).

equivalently, 'that one came' is the most likely proposition, which is consistent with the meaning of *one*. More generally, Lahiri's analysis predicts that *ek bhii* is licensed whenever *bhii* takes scope over an operator that reverses the likelihood scale. That is, *ek bhii* is licensed only if *bhii* scopes over a DE operator, giving a natural explanation for Ladusaw's (1979) generalization that NPIs are licensed only in DE contexts. Indeed, *ek bhii* is licensed under a variety of DE contexts (e.g., conditionals, adversative predicates, restriction of universal quantifiers, etc.). In this way, under Lahirian analysis, the correlation between NPIs and DE contexts are not arbitrary. The restricted distribution of NPIs is derived from independent properties of *bhii* 'even'.

It is obvious that exactly the same analysis applies to the Japanese *one* + *-mo*. In positive contexts in (13a), there is a conflict between a ScalarP of *-mo* and the semantics of *one*. In negative contexts in (13b), due to low scope of negation, *-mo* combines with a negated proposition, which reverses the likelihood scale. Then the semantic conflict is resolved. The previous section showed that *-mo* never moves above a DE operator, unlike the English *even* and the Hindi *bhii*. That is, in DE contexts other than in negative sentences, *-mo* is below a DE operator. Then there is no way of resolving a conflict between a ScalarP of *-mo* and the semantics of *one*, accounting for why (13c) with *-mo* is infelicitous.

Turning now to *-dake-demo* '(lit.) even only', let us assume that the semantics of *one* and a ScalarP of *-dake* 'only' are systematically consistent; *one* is the weakest predicate, that is, the proposition with *one* is the most likely proposition, and *-dake* evokes a ScalarP in (10) that the relevant proposition is the most likely proposition. With this assumption, the distribution of *one* + *-dake-demo* can be explained by the same scope analysis. In positive contexts in (13a), there is no DE operator to resolve the conflict between the semantics of *one* and *-dake* 'only' on the one hand and *-demo* 'even' on the other. In negative contexts in (13b), since negation is low, it cannot intervene between *-dake* and *-demo*. In the previous section, we have seen that *-demo* in *-dake-demo* can move above a DE operator whenever there is a semantic motivation. Thus, in DE contexts like the one in (13c), we can assume that *-demo* moves to resolve the conflict, yielding the LF in (16) (cf. (12a)). With this LF, a ScalarP of *-demo*, a ScalarP of *-dake*, and the semantics of *one* are all consistent.

(16) LF: [even C [surprise [only C [$[[\text{one}]_F]_F$ came]]]] even>surprise>only

Finally, the analysis of *one* + *-demo* requires an additional assumption. In particular, I assume that *-demo* in *one* + *-demo* comes with a hidden *only*. This is not implausible given that the distribution of *one-demo* and *one-dake-demo* are the same. Moreover, *-demo* and *-dake-demo* are almost equivalent in meaning when they attach to a predicate of a minimal amount, as in (17). Based on the discussion above, we know that a predicate of a minimal amount is the weakest predicate, thus a proposition with such a predicate is the most likely proposition among the alternatives. Then, a ScalarP of *only* in (10) that the relevant proposition is the most likely makes no contribution; this presupposition is already evoked by the meaning of a minimal amount predicate. If we assume that *one* + *-demo* comes with a hidden *only*, we would predict it to have the same distribution as *one* + *-dake-demo*. This prediction is borne out, as in (13). In (13c) with *-demo*, the hidden *only* motivates the movement of *-demo*, yielding the same LF as the one in (13c) with *-dake-demo*. Notice that *-demo* and *-dake-demo* evoke different presuppositions when they attach to a non-minimal amount, as in (6b) above; *-demo* yields the unlikely reading, while *-dake-demo* the likely reading. This is because, without the presence of a minimal amount, the ScalarP of *only* does make a contribution that the relevant proposition is the most likely, which is unavailable otherwise. Thus, the distribution of *-demo* and that of *-dake-demo* are different.

(17) a. $[\text{Sukosi}]_F$\{-demo/-dake-demo\} tabe-nasai.
little-CL\{-even/-only-even\} eat-IMP
'(lit.) Eat even a little.'

b. $[\text{Go-hun}]_F$\{-demo/-dake-demo\} mat-te.
five-minute\{-even/-only-even\} wait-please
'(lit.) Please wait even five minutes.'

4. Conclusion

In this paper, I presented a compositional analysis of the Japanese *even* items under the scope theory. The distribution of the *even* items as well as of the NPIs with *even* is explained by the scope

interaction between *even*, *only*, and a DE operator. A ScalarP of *-mo* and *-demo* in (1c) yields the unlikely reading when there is no DE operator (as in positive contexts) or when *-mo*/*-demo* is under a DE operator. In contrast, the likely reading obtains when *-mo*/*-demo* is above a DE operator (as in negative contexts due to the narrow scope of negation). With the presence of *-dake* 'only' as in *-dake-demo*, *-demo* 'even' obligatorily moves above a DE operator to resolve a conflict between a ScalarP of *-demo* and a ScalarP of *-dake*. The resulting LF: *even* > DE > *only* always yields the likely reading. *-Dake-demo* is infelicitous when there is no way of creating this LF (e.g., non-DE contexts, negative contexts with low scope negation). The proposed analysis for the *even* items directly extends to the data on *even* NPIs, paired with the semantics of *one*. Under this analysis, it is only natural that so-called NPI *even* and some NPIs are in need of DE contexts.[20]

An important issue that has not been discussed in the paper is the issue on the *even* items in contexts for free choice items (FCIs) (imperatives, generics, etc.); the *even* items are able to appear in these contexts. Lahiri (1998) shows that the Hindi NPI *ek bhii* '(lit.) one even' can also appear in these contexts. He argues that these contexts, as well as DE contexts, are able to resolve the semantic conflict between a ScalarP of *bhii* and the semantics of *one*. In so doing, Lahiri argues for a unified account of NPIs and FCIs (Kadmon and Landman 1993, Lee and Horn 1994, Krifka 1995). It remains to be seen whether the same analysis holds for the Japanese *even* items.

References

Aoyagi, Hiroshi. 1994. On association with focus and scope of focus particles in Japanese. *MITWP* 24, 23-44.

Chierchia, Gennaro. 2004. Scalar implicatures, polarity phenomena, and the syntax/pragmatics interface. In A. Belletti ed., *Structures and Beyond*, 39-65. Oxford: Oxford University Press.

Giannakidou, Anastasia. to appear. The landscape of EVEN items. *Natural Language and Linguistic Theory*.

Guerzoni, Elena. 2003. *Why Even Ask? On the Pragmatics of Questions and the Semantics of Answers*. Ph.D. dissertation, MIT.

Heim, Irene. 1983. On the projection problem for presuppositions. *WCCFL* 2, 114-125.

Heim, Irene. 1984. A note on negative polarity and downward entailingness. *NELS* 14, 98-107.

Heim, Irene, and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.

Horn, Laurence. 1969. A presuppositional analysis of *only* and *even*. *CLS* 5, 97-108.

Kadmon, Nirit, and Fred Landman. 1993. *Any*. *Linguistics and Philosophy* 16, 353-422.

Karttunen, Lauri. 1973. Presuppositions of compound sentences. *Linguistic Inquiry* 4, 169-194.

Karttunen, Lauri, and Stanley Peters. 1979. Conventional implicature. In C. K. Oh and D. A. Dinneen eds., *Syntax and Semantics 11: Presuppositions*, 1-55. New York: Academic Press.

Kay, Paul. 1990. Even. *Linguistics and Philosophy* 13, 59-111.

König, Ekkehard. 1991. *The Meaning of Focus Particles*. London: Routledge.

Krifka, Manfred. 1991. A compositional semantics for multiple focus constructions. *SALT* 1, 128-157.

Krifka, Manfred. 1995. The semantics and pragmatics of polarity items. *Linguistic Analysis* 25, 1-49.

Kuno, Susumu. 1980. The scope of question and negation in some verb-final languages. *CLS* 16, 155-169.

Kuroda, S.-Y. 1965. *Generative Grammatical Studies in the Japanese Language*. Ph.D. dissertation, MIT.

Ladusaw, William. 1979. *Polarity sensitivity as Inherent Scope Relations*. Ph.D. dissertation, University of Texas.

Lahiri, Utpal. 1998. Focus and negative polarity in Hindi. *Natural Language Semantics* 6, 57-123.

Lee, Young-Suk, and Laurence Horn. 1994. *Any* as Indefinite plus *Even*. Manuscript. Yale University.

Lerner, Jean-Yves, and Thomas Ede Zimmermann. 1983. Presupposition and quantifiers. In R. Bäuerle, et al. eds., *Meaning, Use, and Interpretation of Language*, 290-301. Berlin: Walter de Gruyter.

Nakanishi, Kimiko. 2006. *Even*, *only*, and negative polarity in Japanese. *SALT* 16.

Rooth, Mats. 1985. *Association with Focus*. Ph.D. dissertation, University of Massachusetts, Amherst.

Rullmann, Hotze. 1997. *Even*, polarity, and scope. *Papers in Experimental and Theoretical Linguistics* 4, 40-64.

Schwarz, Bernhard. 2005. Scalar additive particles in negative contexts. *Natural Language Semantics* 13, 125-168.

Shimoyama, Junko. 2001. *Wh-Constructions in Japanese*. Ph.D. dissertation, University of Massachusetts.

von Stechow, Arnim. 1991. Current issues in the theory of focus. In A. von Stechow and D. Wunderlich eds., *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, 804-825. Berlin: Walter.

Wilkinson, Karina. 1996. The scope of *even*. *Natural Language Semantics* 4, 193-215.

[20] The generalization here is too strong in that the distribution of *-dake-demo* is not limited to DE contexts. For instance, *-dake-demo* can appear in contexts for free choice items (see the last paragraph of this section). Thus, more generally, *-dake-demo* is licensed whenever the relevant semantic conflict is resolved. A DE context is a typical example, but it is not the only environment. See Nakanishi (2006) for further discussion.

Proceedings of the 25th West Coast Conference on Formal Linguistics

edited by Donald Baumer,
David Montero, and Michael Scanlon

Cascadilla Proceedings Project Somerville, MA 2006

Copyright information

Proceedings of the 25th West Coast Conference on Formal Linguistics
© 2006 Cascadilla Proceedings Project, Somerville, MA. All rights reserved

ISBN 1-57473-415-6 library binding

A copyright notice for each paper is located at the bottom of the first page of the paper.
Reprints for course packs can be authorized by Cascadilla Proceedings Project.

Ordering information

Orders for the library binding edition are handled by Cascadilla Press.
To place an order, go to www.lingref.com or contact:

Cascadilla Press, P.O. Box 440355, Somerville, MA 02144, USA
phone: 1-617-776-2370, fax: 1-617-776-2271, e-mail: sales@cascadilla.com

Web access and citation information

This entire proceedings can also be viewed on the web at www.lingref.com. Each paper has a unique document # which can be added to citations to facilitate access. The document # should not replace the full citation.

This paper can be cited as:

Nakanishi, Kimiko. 2006. The Semantics of *Even* and Negative Polarity Items in Japanese. In *Proceedings of the 25th West Coast Conference on Formal Linguistics*, ed. Donald Baumer, David Montero, and Michael Scanlon, 288-296. Somerville, MA: Cascadilla Proceedings Project.

or:

Nakanishi, Kimiko. 2006. The Semantics of *Even* and Negative Polarity Items in Japanese. In *Proceedings of the 25th West Coast Conference on Formal Linguistics*, ed. Donald Baumer, David Montero, and Michael Scanlon, 288-296. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #1460.