Two types of adverbial polarity items in Japanese: absolute and relative

Osamu Sawada
University of Chicago
sawadao@uchicago.edu

<Abstract>
This paper investigates the semantics and pragmatics of the Japanese adverbial polarity items *zenzen* and *mattaku* and argues that there are two types of adverbial polarity items in Japanese, absolute and relative, which is similar to the case with gradable adjectives (e.g. Rostein and Winter 2004; Kennedy and McNally 2005; Kennedy 2007). *Mattaku* is absolute in the sense that it denotes an endpoint of scale, while *zenzen* is relative in the sense that it posits a contextually determined standard and denotes that the actual degree is 'far removed' from it. This paper shows that the lexical semantics of adverbial polarity items is diverse (Giannakidou 1998, 2006; Yoshimura 2007).

【Key words】: adverbial polarity items, absolute vs. relative, scalar implicature, context-dependency

1. Introduction
Japanese reference grammars often state that the adverbs *zenzen* and *mattaku* can both serve to 'strengthen' the force of an expressed negation (similarly to *at all* in English):

(1) (Watashi-wa) {*zenzen/mattaku*} okane-ga nai.
 I -TOP ZENZEN/MATTAKU money-NOM NEG.EXIST
 'I don't have money at all.'

However, *mattaku* and *zenzen* are different in terms of **polarity** and **scalarity**. In sentence (1), *zenzen* is natural in a situation where the speaker actually has a little money, whereas *mattaku* is unacceptable in that situation:

(2) (Context: Taro realized that his banking account has only $10 in it.)
 (Watashi-wa) {*zenzen* /??*mattaku*} okane-ga nai
 I -TOP ZENZEN/ at all money-NOM NEG.EXIST
 'I don't have money ZENZEN/at all.' [1]

In this context, sentence (2) is natural if it contains *zenzen* but is odd if it features *mattaku*. It seems that the English *at all* correspond to *mattaku*. We can summarize this observation as follows:

(3) Descriptive observation:
 '*Zenzen* not P' implies 'a little P' but '*mattaku* not P' entails 'completely not P.' (cf. *almost*; Sadock 1981)

The purpose of this paper is to investigate the scalar and polar properties of the Japanese 'at all' items *zenzen* and *mattaku* and argue that, as is the case with gradable adjectives (e.g. Rostein and Winter 2004; Kennedy and McNally 2005; Kennedy 2007), there are two types of adverbial polarity items, an absolute type and a relative type. *Mattaku* is absolute (context independent) in the sense that it denotes the endpoint of a scale, while *zenzen* is relative (context dependent) in the sense that it posits a contextually determined standard and denotes that the actual degree is 'far removed' from it (i.e. from the expected degree). This distinction can naturally explain why '*zenzen* not P' has a positive implicature. I argue that the implicature is a scalar implicature (cf. *almost*; Sadock 1981). I will also focus on cases where *zenzen* is used in positive assertions. I argue that although the positive *zenzen* does not occur in a downward entailing or a nonveridical contexts, *zenzen* is indirectly licensed/ rescued (Giannakidou 2006) by its negative presupposition. This paper shows that the lexical semantics of adverbial polarity items is diverse (Giannakidou 1998, 2006; Yoshimura 2007) and that this diversity can be captured in a similar way to other grammatical categories, such as gradable adjectives and degree adverbs.

2. Similarities between *zenzen* and *mattaku*
There are some similarities between *zenzen* and *mattaku*. One such similarity is concerned with ellipsis (Buchanan 2007):

(4) a. John-wa   {zenzen /mattaku /amari}   sake-o   noma-nai.
       John-TOP   ZENZEN /at all   / that much   sake-ACC drink-NEG
       'John does not drink sake {ZENZEN/at all/that much}.'
    b. Mary-mo   {zenzen /mattaku /*amari} [e]   da
       Mary-also   ZENZEN /at all   / much   PRED
       'Mary (does not drink sake) {ZENZEN/at all/that much} either.'

As we can see in (4b), *mattaku* and *zenzen* (unlike *amari*) can precede an ellipsis site (i.e. an environment where 'V-*nai*' is omitted).

Another similarity has to do with pragmatic function. Intuitively, *zenzen* and *mattaku* have an 'emphatic' meaning in Israel's (1996) sense. They are different from attenuating NPIs (Israel 1996) such as *amari* '(all) that':

(5) Taro-wa   *amari*   okane-ga   nai.
    Taro-TOP   all that   money-NOM   NEG. EXIST
    'Taro does not have all that much money.'

Amari is an NPI, but unlike *mattaku* and *zenzen*, it has a pragmatic function of 'attenuation'. In (5), the speaker is saying that the actual amount of money does not reach to a contextually determined standard (or expected degree), but it is not very from this standard.

3. Empirical differences between *zenzen* and *mattaku*
Despite the similarities discussed in section 2, *zenzen* and *mattaku* do not have the same meaning. There are several diagnostics that can be used to distinguish between the two adverbs. The first of these has to do with implicit comparison (Sapir 1944; Kennedy in press; Sawada 2007). In implicit comparison, the truth-value of the proposition in the 'main clause' is determined based on the standard of comparison:

(6) (Context: Taro spent $500 shopping, while Ziro spent $10.)
     Taro-ni *kurabe-tara*   Ziro-wa   okane-o   tukawa-naka-tta.
     Taro-DAT compare-COND Ziro-TOP   money-ACC   use-NEG-PAST
     'Compared to Taro, Ziro didn't use money.'
      → Ziro spent some money. (implicature)

In (6) there is a positive implicature that 'Ziro spent some amount of money.' Notice that *mattaku* cannot appear in implicit comparison, but *zenzen* can:

(7) (Context: Taro spent $500 shopping, while Ziro spent $10.)
     Taro-ni *kurabe-tara*   Ziro-wa okane-o   {**zenzen** /??**mattaku**}   tukawa-naka-tta.
     Taro-DAT compare-COND Ziro-TOP money-ACC   ZENZEN/ at all (completely)   use-NEG-PAST
     'Compared to Taro, Ziro didn't use money {ZENZEN/at all}.'

The second diagnostic has to do with partial negation. A negative sentence with *zenzen* can precede a partial negation with *mattaku*, but not vice versa, as shown in (8):

(8) a. Taro-wa   **zenzen**   benkyoo-si-nai.
       Taro-TOP   ZENZEN study-do-NEG
       'Taro does not study ZENZEN.' (implies: Taro studies a little.)
       Mattaku   to iu wake de-wa nai-ga.
       at all (completely)   *it is not the case that*-although
       'Although it is not the case that (he does not study) <u>at all (completely).</u>'
    b. Taro-wa   **mattaku**   benkyoo-si-nai.
       Taro-TOP   at all (completely) study-do-NEG
       'Taro does not study at all.' (=completely zero).'
       # **Zenzen**   *to iu wake de-wa nai*-ga.
        ZENZEN   it is not the case that-though
        'Although it is not the case that (he does not study) ZENZEN.'

In (8a), the flow of discourse is a natural. However, if we exchange the position of *zenzen* and *mattaku* in (8a), the result is odd, as shown in (8b). The partial negation '*Zenzen/mattaku to iu wake de-wa nai*' conveys that 'Taro studies

a little', which conflicts semantically with a negative sentence with *mattaku*, but not one with *zenzen*.

4. Absolute polarity item vs. relative polarity item

The above discussion shows that *zenzen* and *mattaku* are different in terms of the properties of polarity and scale:

(9) '*Zenzen* not P' implies 'a little P' but '*mattaku* not P' entails 'not P.'

What does this mean theoretically? I would argue that Japanese adverbial polarity items are lexicalized into two types, an absolute type and a relative type:

(10) a. *Zenzen* is a relative polarity item, because '*zenzen* not P' is true iff there is a contextually determined standard with respect to P that is 'far removed' from the actual degree with respect to P on the scale of alternatives.
   b. *Mattaku* is an absolute polarity item. It denotes a minimum endpoint of a scale and does not require a contextual standard.

This distinction is similar to that which exists for gradable adjectives and the Dutch *even*-items *zelfs maar* and *ook maar*. As for the gradable adjectives (Kennedy and McNally 2005; Kennedy 2007), relative gradable adjectives like *tall* require a contextually determined standard (e.g. *Tom is tall*), while absolute gradable adjectives such as *bent* do not (e.g. *This rod is bent*).

   As for the Dutch even-items, *zelfs maar* is associated with a relative presupposition, whereas *ook maar* is associated with an absolute presupposition (i.e., it concerns an absolute minimum on a scale; Hoeksema and Rullmann (2001: 141)). Notice, however, that *zenzen* and *mattaku* are not EVEN items. That is, they are not focus particles that introduce alternatives at the focus site and make scalar and existential presuppositions or conventional implicatures. In the rest of this paper, I would like to verify the idea proposed in (10).

5. Scalar and polar components of *zenzen*

We can divide the meaning of *zenzen* into two components, a scalar component and a polarity component (analogously to *almost*; Sadock 1981; Horn 2002; Nouwen 2006, among many others):

(11) '*Zenzen* not P' (P = gradable predicate)
   Scalar component: the actual degree with respect to P is 'far' removed from the contextually determined standard with respect to P
   Polar component: P

In '*mattaku* not P', on the other hand, the actual degree with respect to P is the minimum endpoint of a scale. Therefore, '*mattaku* not P' entails 'completely not P.'

6. Scalar component of *zenzen* and *mattaku*

This section considers the scalar component of the degree adverbs.

6.1. Proportion in *zenzen*

I argued above that the notion of 'distance' from the contextual standard plays an important role, but 'distance' is a vague concept. Let us consider this problem based on the following example:

(12) **Zenzen**   mizu-ga   nai.
   ZENZEN   water-NOM   NEG.EXIST
   'There is no water at *zenzen*.'

Imagine the following two situations. In each situation, there is 100 ml of water in a cup.

(13)

Although the amount of water is the same in both situations, sentence (12) is natural for Situation A but odd for

Situation B. How acceptable is sentence (12) if 24% of the cup is filled with water? I can imagine a situation where people say that it is difficult to determine the truth value of the sentence because 24% is a borderline case (for them). This means that the notion of 'distant' is vague and there is no cut-off point (sharp boundary) that distinguishes 'distant' from 'not distant.'[2]

6.2. Scalar component of *zenzen* and *mattaku*
How can we capture the semantics of '*zenzen* not P' and '*mattaku* not P'? Before answering to this question, it is necessary to consider a simple negative sentence.

6.2.1. Semantics of the adjectival *nai*
Let us observe the following sentence:

(14) (Context: the speaker is planning to pay for his/her apartment.)
    Okane-ga   nai.
    money-NOM   NEG.EXIST
    'I don't have money.'

(14) does not mean 'I have zero amount of money.' Instead, it means that 'the actual amount of money is less than a contextually determined standard' (e.g. Morita 1994). Traditional Japanese grammars treat *nai* in (14) as a non-existential adjective (predicative). This *nai* is different from the affix *nai* that attaches to a verb stem (e.g. *ika-nai* 'not go'), in that the former is an independent word whereas the latter is a dependent word. Here, I assume that the adjectival *nai* can behave as a 'relative' gradable adjective only when it co-occurs with a gradable noun (e.g. money, time, water) (cf. Furukawa 2005). I also assume that the unmodified APs (of type $<d, <e,t>>$) actually contain a 'null degree morpheme' *pos* whose function is to relate the degree argument of the adjectives to an appropriate standard of comparison (Cresswell 1977; von Stechow 1984; Kennedy and McNally 2005, among others), as shown in (15):

(15)

$$S <t>$$

DP — Deg P $<e, t>$
Ogane-ga
$<e>$ Deg   A
             pos   nai
   $<< d, <e, t>>, <e, t>>$ $<d, <e, t>>$
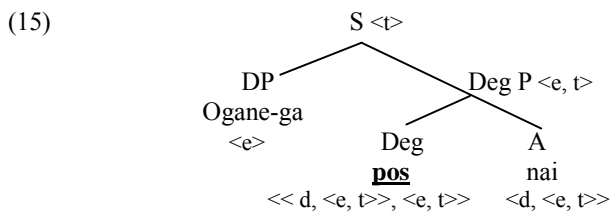
(16) shows the compositional semantics of example (13):

(16) a. ⟦nai⟧ $= \lambda d\lambda x. \neg(exist_{gradable} (x) = d)$
    b. ⟦pos⟧ $= \lambda G\lambda x. \exists d [d \geq Stand \wedge G(d)(x)]$
    c. ⟦pos⟧ (⟦nai⟧) $= \lambda x. \exists d [d \geq Stand \wedge \neg(exist_{gradable} (x) = d)]$
    d. ⟦pos⟧ (⟦nai⟧) (⟦okane⟧) $= \exists d [d \geq STAND \wedge \neg (exist_{gradable} (money) = d)]$

Notice that the gradable adjective *nai* is decomposed into $\neg$ and the gradable use of *aru* 'exist.' Interestingly, the antonym of the adjective *nai* is the verb *aru* 'exist', which is also a gradable predicate. (16d) shows that the degree to which money exists is less than a contextually determined standard.[3]
    Note that the following sentence seems not to have a 'less than a standard' meaning:

(17) (Context: the speaker is looking for a bookstore.)
    Honya-ga   nai.
    Book store-NOM   NEG.EXIST
    'There is no bookstore.' (I cannot find a bookstore.)

Here, *nai* seems to be interpreted as a simple non-existential predicate (i.e. $\lambda x. \neg exist (x)$). Notice, however, that if we posit a context in which the speaker is talking about the number of bookstores in a given place, the sentence can be interpreted as 'the number of bookstores (in the given place) is less than a contextually determined standard.' Thus the predicative use of *nai* seems to have two types: a gradable use and non gradable use.[4]

6.2.2. Scalar meaning of *zenzen* and *mattaku*

What, therefore, is the meaning of *zenzen*? I argue that *zenzen* is a degree morpheme (just like *pos*) but it has the context-dependent relation 'less than a standard by large amount (cf. *much*, Kennedy and McNally 2005). (19) shows the compositional semantics of example (18):

(18) Okane-ga   zenzen   nai.
     money-NOM   ZENZEN   NEG.EXIST
     'I don't have money ZENZEN.'

(19) a. ⟦zenzen$_{NEG}$⟧ = λG$_{<d, <e,t>>}$λx. ∃d [d<!! STAND ∧ G (d)(x)]

   b. ⟦nai⟧ = λdλx. ¬(exist $_{gradable}$ (x)=d)

   c. ⟦zenzen$_{NEG}$⟧ (⟦nai⟧) = λx. ∃d [d<!! STAND ∧ ¬ (exist $_{gradable}$ (x) =d)]

   d. ⟦zenzen$_{NEG}$⟧ (⟦nai⟧)(⟦okane⟧) = ∃d [d<!! STAND ∧ ¬ (exist $_{gradable}$ (money) =d)]

Okane-ga zenzen nai (=19d) does not necessarily mean, 'I have zero money.' It means 'I do not have an amount of money that is less than the given standard by a considerable amount.' Notice that according to the nonotonicity principle, if it is true that the speaker in (17) does not have an amount of money that is less than the standard by a considerable amount (e.g. 5 dollars), it is also true that he/she doesn't have any larger amount of money (e.g. 6 dollars).

   What about the meaning of *mattaku*? I would argue that the denotation of *mattaku* can be represented in (19a), where the universal quantifier (∀) is used. (19) shows the compositional semantics of example (17) with *mattaku*:

(19) a. ⟦mattaku$_{NEG}$⟧ = λGλx.∀d [d<STAND → G(d)(x)]

   b. ⟦nai⟧ = λdλx. ¬(exist $_{gradable}$ (x)=d)

   c. ⟦mattaku$_{NEG}$⟧ (⟦nai⟧) = λx.∀d [d<STAND → ¬ (exist $_{gradable}$ (x)=d)]

   d. ⟦mattaku$_{NEG}$⟧ (⟦nai⟧)(⟦okane⟧) =∀d [d<STAND → ¬ (exist $_{gradable}$ (money)=d)]

(19d) means 'I have zero money.'

   There are several important points to note regarding the semantics of *zenzen* and *mattaku*. First, we must stipulate that *zenzen* in (18a) and *mattaku* in (19a) combine with negation. For example, if *zenzen* does not combine with negation, the resulting sentence generates a wrong interpretation: 'I have an amount of money that is far distant from a standard.'

   Secondly, we should distinguish the semantics of *zenzen* from the 'imprecise' use of *mattaku*. One might say that sentence (18) is felicitous even if the speaker has a little money, provided we interpret it as an exaggeration. However, it is important to notice that this is a case of 'imprecision,' and that that kind of imprecise meaning is not part of the lexical semantics of *mattaku*.[5] (For a detailed discussion of imprecision, see Pinkal 1995; Lasershohn 1999; Kennedy and McNally 2005; Barker 2006; Kennedy 2007).

7. Polarity component of *zenzen*: conversational implicature

Now let us turn our attention to the polarity component of *zenzen*. As we saw in section 1, '*Zenzen* not P' implies 'P.' I argue that the positive meaning is a conversational implicature, which is derived from the Maxim of Quantity. Let's verify this idea using two tests, the cancelability test and the detachability test. If the implicature is cancelable and non-detachable, it is a conversational implicature.

   First, the implicature is cancelable because the implicature in (20a) can be canceled by (20b):

(20) Cancelability test
   a. **Zenzen**   nemur-e-<u>na</u>-katta.
      ZENZEN sleep-can-NEG-PAST
      'I could not sleep *zenzen*.' (I could hardly slept.)
      Implicature → I slept a little.
   b. Toiuka,   **mattaku**   nemur-e -<u>na</u>-katta.
      I mean,   MATTAKU   sleep-can-NEG-PAST
      'I mean, I could not sleep at all (completely).'   (=I slept zero minutes.)

Second, the implicature of *zenzen* is non-detachable:

(21) Detachability test

    a. **Zenzen**   nemur-e-<u>na</u>-katta.
      ZENZEN sleep-can-NEG-PAST
      'I could not sleep ZENZEN.' (=I could hardly sleep.)
    b. **Hotondo** nemur-e-<u>na</u>   -katta.
      Almost   sleep-can-NEG-PAST
      'I could hardly sleep.'

(21a) and (21b) have the same semantic content and both convey the same positive implicature: 'I slept a little.'[6] Since the implicature is cancelable and non-detachable, it is safe to consider the positive implicature **conversational**. The fact that the positive implicature is **reinforceable** supports this idea:

(22) Kinoo-wa   **zenzen**   nemur-e-<u>na</u>-katta.
    Yesterday-TOP ZENZEN   sleep-can-not-PAST
    'I could not sleep ZENZEN.'
    Mattaku   to iu wake de-wa nai-ga.
    at all (completely)   *it is not the case that*-though
    'Although it is not the case that (I did not sleep) <u>at all (completely).</u>'

I would argue that the polarity implicature derives from the Q-Principle 'Say as much as you can.' Based on the scale in (23), saying '*zenzen* (not P)' conversationally implies that 'it is not the case that <u>*mattaku* (not P)</u>':

(23) Scale of completeness
    mattaku (not P)
    zenzen (not P)
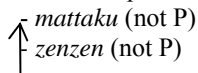
8. The positive *zenzen*
Zenzen, but not *mattaku*, can appear in a positive assertion that contains a 'relative' gradable adjective. My analysis can naturally explain why this is the case. Observe the following dialogue:

(24) A: Kono hon -wa   **omoshiroku-nai**-yone?
      This   book-TOP   interesting-not-CONFIRMATION
      'This book is not interesting, right?'
    B: {Zenzen /*mattaku}   omoshiroi-yo.
      ZENZEN/ MATTAKU   interesting-INTERJECTION
      'It IS interesting.'

There is no endpoint on the scale of 'interestingness'. Since *zenzen,* but not *mattaku*, is relative and it does not denote an endpoint of a scale, it can be used with an upward directed scale that lacks an endpoint. The denotation of (24B) with *zenzen* can be represented as follows:[7]

(25) ⟦zenzen$_{POS}$⟧ (⟦omoshiroi⟧) = λx.∃d [d>!! STAND ∧ interesting (x) = d]

There is a question as to whether the positive *zenzen* is a polarity item. The question arises because the positive *zenzen* has neither a downward entailing context nor a nonveridical context (i.e., *zenzen* is not in the scope of some nonveridical operators such as questions, modals, and imperatives). But I would argue that the positive *zenzen* can still be considered a polarity item because it has the following negative presupposition:

(26) **Negative presupposition of the positive *zenzen*:**
    '*Zenzen* P' presupposes that <u>P is considered to be false of the subject (i.e. *the book*) for the addressee</u> in speaker's individual epistemic model.

Thus (24B) becomes odd if it is uttered in an out-of-the-blue context (Arimitsu 2002; Odani 2007):

(27) (Out-of-the-blue context)
    # Zenzen   omoshiroi-yo.
    ZENZEN   interesting-INTERJECTION
    'It IS interesting.'

Therefore, it is possible to consider that *zenzen* is **rescued** (or 'indirectly' licensed) (Giannakidou 1998, 2006) by its **negative presupposition** (i.e. (26)).

9. Conclusion and theoretical implications

In this paper, I have argued that similarly to gradable adjectives (Rostein and Winter 2004; Kennedy and McNally 2005; Kennedy 2007), there are two types of (scalar use of) adverbial polarity items in Japanese, absolute and relative. *Mattaku* is absolute in the sense that it denotes an endpoint of scale, while *zenzen* is relative in the sense that it posits a contextually determined standard and denotes that the actual degree is 'far removed' from this contextually determined standard. I argued that this distinction can naturally account for the reason why *zenzen* P, but not *mattaku* P, has a positive implicature. The proposed analysis can also explain why, *zenzen* can appear in a positive assertion whose scale does not have a maximum endpoint. In terms of polarity sensitivity, I argue that the positive *zenzen* can still be regarded as a polarity item because it has a negative presupposition.

 Finally, let's consider the above analyses from a broader perspective. What do these analyses imply for polarity theory in general? It has been claimed that the base meaning of PIs requires an 'even like' flavor (Heim 1984; Kadmon and Landman 1993; Lee and Horn 1994; Lahiri 1998; Chierchia 2006). For example, Lahili (1998) proposes that NPIs behave like the scalar focus particle *even* (Rooth 1985) because the sentence *there isn't even any student* is interpreted roughly as *there isn't even one student*. However, although this approach can account for the meaning of *mattaku*, it does not explain *zenzen*. "Mattaku not P" can be paraphrased by *mo* 'even', but *zenzen* cannot necessarily be paraphrased by *mo*:

(28) a. Toori-ni-wa   **mattaku**   hito-ga   i-nai.
   Street-LOC-TOP MATTAKU person-NOM exist-NEG
   'There is no one at all in the street.'   (Must be zero people.)
  b. Toori-ni-wa   **zenzen**   hito-ga   i-nai.
   Street-LOC-TOP ZENZEN   person-NOM exist-NEG
   'There is no one ZENZEN in the street.'   (OK even if there are 2-3 people.)
(29) Toori-ni-wa   **hito-ri**   **-mo**   (hito-ga)   i-nai.
  Street-LOC-TOP one-NCL (person)-even   person-NOM exist-NEG
  'There is not even ONE person in the street.'

(28a) can be paraphrased by (29), but (28b) cannot necessarily be paraphrased by (29). This means that the adverbial polarity items cannot be reduced to a single semantic source, viz. *even*. The speaker is not using *zenzen* in order to express that even the most liberal (i.e. broadest) choice of domain makes the sentence true. I proposed that *zenzen*'s emphatic meaning arises from a notion of 'distance.' Although both *mattaku* and *zenzen* involve the meaning of scalarity, we cannot say that their semantics are the same. This paper showed that the semantics of polarity items are diverse (Giannakidou 2006; Yoshimura 2007) just like the semantics of other grammatical categories, like adjectives.

Notes

[1] Since I am not sure *zenzen* can be paraphrased by the English expression *at all*, I will gloss *zenzen* as ZENZEN.
[2] There are multiple approaches to the phenomenon of vagueness, e.g. fuzzy logic, supervaluationism, and the epistemic view. Here, I prefer to use the notion of vagueness in a theory-neutral way.
[3] The fact that *nai* can appear in comparatives also supports the idea that it can behave as a gradable adjective:

(i) Taro-wa   Hanako-yori okane-ga   nai.
 Taro-TOP   Hanako-than money-NOM NEG.EXIST
 'Taro has less money than Hanako.'

[4] Recall that *nai* can also behave as an affix that attaches to a verb stem. I consider the affixal *nai* is different from the independent word *nai* in that the former just denotes a truth-functional negation. Of course, if the affixal *nai* is attached to a gradable verb, we can get the 'less than a standard' meaning. In this case, the context-dependent meaning comes from the meaning of the gradable verb.

[5] I thank the audience at the vagueness and language use meeting for bringing this problem to my attention.

[6] *Zenzen* and *hotondo* do not have the same meaning. The negative use of *hotondo* posits a minimum standard (in this case zero minutes) and denotes that the actual degree is not equal to the minimum standard. Notice that, unlike English *almost*, *hotondo* cannot modify existential quantifiers (Furukawa 2005). Thus *hotondo* cannot modify a numeral (*hotondo 10-nin 'almost 10-people'). I would argue that this is because *hotondo* always posits a standard that corresponds to an endpoint (a minimum in the case of a negative sentence and maximum in the case of a positive sentence). For example, the truth condition of sentence (20b) can be represented as follows:

(i) $[\![hotondo_{NEG}]\!]$ ($[\![$could not sleep$]\!]$) $= \lambda x. \exists d$ [d = minimum standard $\wedge \neg$ (could sleep (x) = d)]

By negating the idea that 'the degree to which I could sleep is zero minutes', we get the (scalar) implicature that 'I could sleep a little.' I treat the verb *nemur-e-ta* 'could sleep' as 'gradable', whose denotation is '$\lambda d \lambda x.$ could- sleep (x) =d'. That is to say, *nemuru-e-ta* maps its degree argument onto abstract representations of measurement. This idea is supported by the fact that the verb can combine with a degree words like *yoku* 'well' or measure phrases such as 1-*jikan* '1 hour'. When there is no explicit degree morpheme, pos is attached to the verb to relate the degree argument of the gradable verb to a contextually determined standard.

[7] This predicts that if an upward directed scale has an endpoint, the sentence with *mattaku* becomes okay:

(i) Mattaku   heiki-da.
   Completely   all right-pred
   'I am completely all right.'

References

Arimitsu, N. 2002. "Hiteiteki bunmyaku to hitei kyokusei koumoku ni kansuru iti-kousatsu: *not at all* vs. *zenzen* o tyuusinni." (Notes on Negative Context and Negative Polarity Items: *not at all* vs. *zenzen*). *Gengo kagaku ronsyuu* **8** (Studies of Linguistic Science), 63-80.

Barker, C. 2006. "Vagueness." In E. Brown (ed), *Encyclopedia of Language & Linguistics* (2nd edition), 294-298. Amsterdam: Elsevier.

Buchanan T.M. 2007. "Two Types of Negative Polarity Items: Evidence from VP-ellipsis in Japanese." In Hedde Zeijlstra and Jan-Philipp Soehn eds. *Proceedings of the Workshop on Negation and Polarity*, 31-35.

Chierchia, G. 2006. "Broaden Your Views: Implicatures of Domain Widening and the 'Logicality' of Language." *Linguistic Inquiry* 37:4, 535-590.

Cresswell, M.J. 1977. "The Semantics of Degree." In B. Partee (ed.), *Montague Grammar*, 261-292. New York: Academic Press.

Furukawa, Y. 2005. "Why can Bare NPs in Japanese Have Universal Readings in Certain Environments?" *Proceedings of ConSOLE* XIII.

Giannakidou, A. 1998. *Polarity Sensitivity as (Non) veridical Dependency.* Amsterdam/Philadelphia: John Benjamins Publishing Company.

Giannakidou, A. 2006. "Only, Emotive Factive Verbs, and the Dual Nature of Polarity Dependency." *Language* 82(3), 575-603.

Grice, H.P. 1975. "Logic and Conversation." In: Cole, Peter. and Jerry Morgan (eds.), *Syntax and Semantics*, *3 Speech Acts*, 41-58. New York: Academic Press.

Grice, H.P. 1989. *Studies in the Way of Words.* Cambridge, Mass: Harvard University Press.

Heim, I. 1982. *The Semantics of Definite and Indefinite Noun Phrases*. Ph.D. Dissertation. University of Massachusetts.

Hoeksema, J. and H. Rullmann. 2001. "Scalarity and Polarity: A Study of Scalar Adverbs as Polarity Items." In Hoeksema, J., Rullmann, H., Sánchez-Valencia, V., and van der Wouden, T (eds.), *Perspectives on Negation and Polarity Items*, 129-171. Amsterdam/Philadelphia: John Benjamins Publishing.

Horn, L.R. 2002. "Assertoic Inertia and NPI Licensing." In *Papers from the 38th Annual Meeting of the Chicago Linguistic Society*.

Israel, M. 1996. "Polarity Sensitivity as Lexical Semantics." *Linguistics and Philosophy* 19, 619-666.

Kadmon, N. and F. Landman. 1993. "*Any.*" *Linguistics and Philosophy* 16, 353-422.

Kennedy, C. 2007. "Vagueness and Grammar: The Semantics of Relative and Absolute Gradable Adjectives." *Linguistics and Philosophy* 30(1), 1-45

Kennedy, C. In press. "Modes of Comparison." In *Papers from the 43rd Annual Meeting of the Chicago Linguistic Society.*

Kennedy, C. and L. McNally. 2005. "Scalar Structure, Degree Modification, and the Semantics of Gradable Predicates." *Language* 81(2), 345-381.

Lahiri, U. 1998. "Focus and Negative Polarity in Hindi." *Natural Language Semantics* 6, 57-125.

Lasersohn, P. 1999. "Pragmatic Halos." *Language* 75, 522-551.

Lee, Y. and L.R. Horn. 1995. "*Any* as Indefinite plus *Even*." Ms, Yale University.

Morita, Y. 1995. *Nihongo no siten* (Viewpoint of Japanese). Tokyo: Soutakusya.

Nouwen, R. 2006. "Remarks on the Polar Orientation of *Almost*." In van der Weijer, J. and Los, B (eds.), *Linguistics in the Netherlands* 2006.

Odani, M. 2007. "The Establishment of Construction and Pragmatic Strengthening: The Case of Japanese *Zenzen ... Nai* Construction." *Proceedings of the 9th Conference of the Pragmatics Society of Japan*, 17-24,

Pinkal, M. 1995. *Logic and Lexicon*. Dordrecht: Kluwer.

Rooth, M. *Association with Focus.* Ph.D. Dissertation, University of Massachusetts.

Rostein, C. and Y. Winter. 2004. "Total Adjective vs. Partial Adjectives: Scale Structure and Higher-order Modifier." *Natural Language Semantics* 12, 259-288.

Sadock, J. M. 1981. "Almost." In Cole, P (ed.), *Radical Pragmatics*, 257-271. New York: Academic Press.

Sapir, E. 1944. "Grading: A Study in Semantics." *Philosophy of Science* 11, 93-116.

Sawada, O. 2007. "Pragmatic Aspects of Implicit Comparison: An Economy-based Approach." Ms, University of Chicago.

Von Stechow, A. 1984. "Comparing Semantic Theories of Comparison." *Journal of Semantics* 3, 1-77.

Yoshimura, K. 2007. *Focus and Polarity: Even and Only in Japanese.* Ph.D. Dissertation, University of Chicago.