Degree words and scalar structure in Japanese

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Abstract

The interaction of event structure and scalar structure has provided accounts for various phenomena revolving around verbs and degree modification. This paper demonstrates that such an interaction is indeed relevant in explaining the pattern of modification that the adverb totemo ‘very’ exhibits in Japanese. In particular, I will argue that the distinction between a ‘trivial standard’ and a ‘nontrivial standard’ discussed in the analysis of deverbal adjectives by Kennedy and McNally (1999) plays an important role in determining the range of verbs that accept degree modification by totemo. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

The seminal four-way verb classification based on aspectual properties, i.e., state, activity, accomplishment, and achievement (Vendler, 1967; Dowty, 1979), has proven to offer a critical tool to account for a number of linguistic phenomena. The aspect-based classification is founded on a wide range of syntactic and semantic diagnostic tests. For instance, achievements and activities differ in the selection of...
time adverbials: the former can cooccur with *in an hour* while the latter with *for an hour*, but not vice versa. Achievements and accomplishments demonstrate distinguishable behavior: the latter, but not the former, can serve as a complement of verbs like *stop* and *finish*.

Telicity in what Dowty (1979) calls 'degree achievements' (or 'degree words' in the sense of Bolinger (1972)) has raised a challenging question for linguists. Verbs like *cool*, *sink*, and *age* do demonstrate semantic and syntactic properties common among achievement verbs (cf. Dowty, 1979), but durational adverbs can also appear with these verbs, as is shown in the following examples, taken from Dowty (1979: 88).

(1) The soup cooled for ten minutes.
(2) The ship sank for an hour (before going under completely).
(3) John aged forty years during that experience.

These adverbial phrases are not normally compatible with telic verbs, but degree achievements do allow for them.

Hay et al. (1999) argue that the variable behavior of deadjectival degree achievements like *widen*, *lengthen*, *cool*, *dry*, and *straighten* is explained by the interaction between event structure of the verbs and scalar structure that is associated with the adjectives from which the verbs are derived. The scalar structure of adjectives like *wide* and *long* is 'unbounded' without a maximum or minimum standard being specified. The verbs derived from these adjectives are interpreted as atelic. The following entailment test shows that these deadjectival verbs pattern with activity verbs like *run* and thus are atelic.

(4) a. They are lengthening the rope. \(\Rightarrow\) They have lengthened the rope.
   (Hay et al., 1999: (27a))
   b. John is running. \(\Rightarrow\) John has run.

Adjectives such as *dry* and *straight*, on the other hand, are mapped onto a scalar structure that is 'bounded' in that these adjectives bear a maximum value. Deadjectival verbs based on this type of adjectives are associated with the telic interpretation. Again, the entailment test attests to this generalization.

(5) a. The clothes are drying. \(\nRightarrow\) The clothes have dried.
   (Hay et al., 1999: (26))
   b. John is drawing a circle. \(\nRightarrow\) John has drawn a circle.

Hence, scalar structure of the base adjectives plays an important role in accounting for the telicity of deadjectival verbs.

Another issue related to scalar structure is taken up by Kennedy and McNally (1999) in their analysis of degree modifiers such as *very*, *well*, and *much*. They claim that the standard value associated with adjectives and adjectival passives can be either context insensitive or context dependent, and that those degree modifiers are
susceptible to such a difference. For example, very modifies adjectives whose standard value is context dependent, as in very tall and very expensive; whereas well modifies adjectives that are associated with context insensitive standards, as in well aware and well able. Thus, reference to the nature of the standard value as they interact with scalar structure and event structure has proven to be significant in linguistic research.

The goal of this paper is to demonstrate that the interaction of scalar structure with event structure of verbs is indeed relevant in accounting for a certain degree modification phenomenon in Japanese. In so doing I hope to illuminate the significance of scalar structure tied into lexical semantic representation of verbs (Hay et al., 1999; Kennedy and McNally, 1999). In what follows below, I will first sketch the distribution of the degree modifier totemo ‘very’. This adverb normally modifies adjectives, but it can also modify an interesting array of verbs. I will then show that those verbs constitute semantically coherent sets, and that their event structures share a property that leads to the projection of scalar structures. I will further demonstrate that the nature of the standard value associated with a verb is a crucial factor to determine whether totemo can modify the verb. The analysis proposed for totemo will then be applied to another degree modifier sukkari ‘entirely, completely’, which exhibits slightly different modification pattern from totemo. The analysis proposed for the account of the degree modification in Japanese hinges on a crucial interaction between event structure and scalar structure as well as the nature of the standard value.

2. Degree modification with totemo

The adverb totemo ‘very’ modifies the majority of adjectives in Japanese. As the examples in (6) show, adjectives are morphologically identifiable: they are inflected for the present tense (or imperfect), -i.

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1 The totemo modification is normally odd with color adjectives such as akai ‘red’, kuroi ‘black’, and aoi ‘blue’. It is perhaps because the values associated with color terms are not gradable. These adjectives, however, can be considered gradable when the context allows such an interpretation. Consider the following contrast.

(i) a. *Kono isu-wa totemo aoi.
   this chair-Top very blue
   ‘This chair is very blue.’

   b. Kao-ga totemo aoi.
   face-Nom very blue (pale)
   ‘Your face is very pale.’

The color adjective in (ia) identifies the color of the chair as being blue, and the color blue in this case is not gradable. In (ib), on the other hand, aoi describes a physical condition, which is subject to change. The facial color in this context is gradable according to the physical condition of the individual.

A similar observation can be made with certain nouns. Compare the following pair, which is suggested by Hideo Kishimoto (personal communication).
(6) totemo takai ‘very expensive’
totemo tiisai ‘very small’
totemo omosiroi ‘very interesting’
totemo kasikoi ‘very wise’
totemo warui ‘very bad’

The adjectives in (6) are all gradable, and the modifier totemo intensifies the gradable values these adjectives denote.

The adverb totemo also modifies verbs. As Bolinger (1972) discusses for English, there are at least two types of intensifiers for verbs. Consider the following.

(7) a. He quite exasperates me.
   b. It rather softened his feelings toward her.
   c. Why do they insist so. (Bolinger, 1972: 160)
(8) a. Why do you eat so?
   b. I wish she wouldn’t talk so. (Bolinger, 1972: 162)

Bolinger explains that intensifiers in (7) modify the intensity of the event denoted by the verb. For example, quite in (7a) intensifies the degree at which he exasperates me. The verbs in (8), in contrast, are intensified for ‘extensibility’ in that the amount of eating or talking, rather than its degree, is intensified. Bolinger calls verbs like those in (7) ‘degree verbs’.

When the adverb totemo ‘very’ modifies verbs in Japanese, it enters into two modification relations that are parallel to (7) and (8) above, i.e., one to intensify for degree and the other for extensibility. First, consider the following examples of intensification for extensibility.

(9) Taroo-wa (gengogaku-no hon-o) totemo yonda.
    Taro-Top (linguistics-Gen book-Act) very read
    ‘Taro read a lot (of linguistics books).’
(10) Taroo-wa (susi-o) totemo tabeta.
     Taro-Top (susi-Acc) very ate
     ‘Taro ate a lot (of sushi).’

(ii) a. Ano hito-wa totemo inaka-da.
     that person-Top very the country-is
     ‘That person is very rustic.’
      this-Top very desk-is
      ‘This is a very desk.’

In (ii) both inaka ‘the country’ and tukue ‘desk’ are nouns. Inaka in (iia), however, is used to describe the person’s rustic nature, and in this sense, what the noun means refers to a gradable property. In (iib), in contrast, tukue can in no way induce a gradable property.

Ernst (1984) investigates degree adverbs in English.
The modifier *totemo*, as an intensifier, refers to a large quantity of the direct object. In (9), for example, it is the amount of linguistics books Taro read, rather than the degree of book reading, that is intensified. I assume that the verbs in these examples are not degree verbs.

The examples in (9–13) contrast with the following with respect to what is being intensified.

(11) Taro-Top very borrowed

(Taro borrowed a lot (of money).)

(12) Taro-Top very sold

(Taro sold a lot (of used books).)

(13) Taro-Top very memorized

(Taro memorized a lot (of vocabulary).)

The adverb *toterno* in this set of examples refers to the degree of a state denoted by the verb. It is the degree of Taro’s suffering in (14) and the degree of the star’s shining in (15), for instance, that are intensified. That is, what is referred to in (14)–(17) is comparable with what *totemo* intensifies in adjective modification in (6). For this reason, I consider the verbs in (14)–(17) instances of degree verbs. The remainder of this paper will focus on the relationship between *toterno* and degree verbs, excluding the modification of the type in (9)–(13).

We have just observed that not all Japanese verbs are degree verbs. In examining an extensive list of verbs, furthermore, degree verbs that can be modified by *totemo* are not random, but rather seem to constitute semantically coherent sets of verbs.

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3 The adverb *totemo* as an intensifier for extensibility may be more clearly manifested by the addition of *takusan* ‘a large amount’ after *totemo*. *(9)–(13)* are all interpreted in such a way that *takusan* is abbreviated.

4 The addition of *takusan* ‘a large amount’ after *totemo* in *(14)–(17)* results in awkwardness.
Such verb classes include psych verbs, verbs of emission, and inchoative verbs of change of state. Many change of state verbs that allow totemo modification are deadjectival verbs, but are not limited to them. Examples of each verb class are given below.

(18) Psych verbs
   a. Taroo-wa totemo kurusinda.
      Taro-Top very suffered
      'Taro suffered very much.'
   b. Taroo-wa totemo komatta.
      Taro-Top very troubled
      'Taro is troubled very much.'
   c. Taroo-wa totemo yorokonda.
      Taro-Top very was pleased
      'Taro was very pleased.'
   d. Taroo-wa totemo odoroita.
      Taro-Top very was surprised
      'Taro was very surprised.'

(19) Verbs of emission
   a. Hosi-ga totemo hikatta/kagayaita/kirameita.
      star-Nom very shone/glittered/sparkled
      'The star shone/glittered very much.'
   b. Gomi-ga totermo niotta.
      garbage-Nom very stunk
      'The garbage stunk very badly.'

(20) Change of state verbs: deadjectival verbs
   a. Miti-ga totemo hirogatta.
      street-Nom very widened
      'The street widened very much.'
   b. Miti-ga totemo sebamatta.
      street-Nom very narrowed
      'The street got narrow very much.'
   c. Suupu-ga totemo atatamatta.
      soup-Nom very warmed
      'The soup got warmed very much.'

(21) Change of state verbs: those that do not have adjectival counterparts; inchoative
   a. Naiyoo-ga totemo kawatta.
      content-Nom very changed
      'The content got changed very much.'
   b. Seetaa-ga totemo tizimatta.
      sweater-Nom very shrunk
      'The sweater shrunk very much.'
   c. Yasai-ga totemo kusatta.
      vegetables-Nom very rotted
      'Vegetables rotted very much.'
A large majority of the verbs outside the classes listed above, such as verbs of putting and removing, verbs of sending, verbs of creation, and verbs of motion, among others (classifications are taken from Levin, 1993) resist *totemo* modification.

Psych verbs, verbs of emission, and change of state verbs allow *totemo* modification with the interpretation parallel to that in (14)–(17), and hence are considered degree verbs. As is common among degree verbs, *totemo* plays a role in intensifying the degree of some gradable property. While in the case of degree adjectives with *totemo*, such gradable property may readily be attributed to the meaning of the adjectives itself, it is not immediately clear what the source is of a gradable property in degree verbs. That is, what aspects of a verb lead to it having a gradable property that can be intensified by *totemo*? What is shared by degree adjectives and degree verbs? I will take up this question in the next section.

2. Conditions on *totemo* modification

In this section I will demonstrate that an adequate analysis for the behavior of *totemo* calls for reference to a specific component of event structure and scalar structure in the sense of Kennedy and McNally (1999). It will be further shown that the interaction of event structure and scalar structure can account for not only the modification pattern of *totemo* but also that of another degree modifier, *sukkari* 'entirely, completely'.

2.1. State and event structure

What I refer to as event structure parallels the representation of lexical decomposition along the lines of Dowty (1979). While there is representational variation depending on the theoretical framework one assumes, I will generally adopt the following schema which Pinker (1989) and Levin and Rappaport Hovav (1998) call Thematic Core and Lexical Semantic Template, respectively.

(22) \[ \text{[} x \text{ ACT] CAUSE [} y \text{ BECOME [ ]}_{\text{state}}\text{]} \]

Terms such as CAUSE and BECOME in (22) are primitives, and \[ ]_{\text{state}} is a constant, whose content is determined by the individual verb. Each subpart of (22) reflects a different aspectual type such as stative, activity, achievement, and accomplishment. Given the representation of (22) above, I will further assume that event structure of each aspectual type takes the following schemata.

(23) a. Stative:
    \[ [ ]_{\text{state}}\]

b. Activity:
    \[ [x \text{ ACT]}\]

c. Achievement:
    \[ [y \text{ BECOME [ } ]_{\text{state}}\text{]}\]

d. Accomplishment:
    \[ [[x \text{ ACT]} \text{ CAUSE [} y \text{ BECOME [ } ]_{\text{state}}\text{]}\text{]}\]
I would like to claim that a common denominator in degree adjectives and verbs that can be modified by *totemo*, as exemplified in (18)–(21), can be identified in very general terms as STATE (i.e., the \[ \text{state} \] portion of the schema in (22)), and that STATE in a verb's event structure may give rise to a gradable property. First, the stative nature of psych verbs has been extensively discussed both internal to Japanese and cross-linguistically. Psych verbs in English, as exemplified in (24) for instance, cast a challenge to theories of linking such as the Universal Alignment Hypothesis of Perlmutter and Postal (1984) and the Uniformity of Theta Assignment Hypothesis of Baker (1988).5

(24) a. John's attitude angered Mary.
   b. Great meals always please my uncle.
   c. Thunder frightens small children.

   b. Ann likes French movies.
   c. Sam worried about his low grades.

The pattern of linking of the two arguments associated with psych verbs, i.e., theme and experiencer, is different between the two sets of verbs. In (24) theme is the subject and experiencer is the object; while in (25) the linking of these two arguments is reversed. This is why the psych verbs in (24) are called object-experiencer verbs while those in (25) subject-experiencer verbs. While various theories approach these two types of psych verbs differently, it is an accepted view that subject-experiencer verbs are stative (Grimshaw, 1990; Jackendoff, 1990). Japanese psych verbs are to a large extent subject-experiencer verbs, and the pattern of object-experiencer is morphologically marked by the causative morpheme (Akatsuka, 1976; Pesetsky, 1995). As is expected, furthermore, psych verbs like those in (18), which are all subject-experiencer verbs, can readily be regarded as stative in that they refer to a psychological state which describes the subject without a dynamic event. That is, psych verbs in (18) take the event structure of the type in (23a). When *totemo* modifies a psych verb, it intensifies the degree to which the subject is in a specific psychological state denoted by the verb.

Second, emission verbs in (19), such as *hikaru* 'shine', *kagayaku* 'glitter', *kirameku* 'sparkle', and *niou* 'stink', are compatible with *totemo*. It is not always evident as to which type of event structure these emission verbs take as their lexical representation. Many emission verbs fit Levin's (1993: 233) explanation of this class that they "describe intrinsic properties of their subjects". That is, under this

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5 The Universal Alignment Hypothesis and the Uniformity of Theta Assignment Hypothesis are given below.

(i) **Universal Alignment Hypothesis**
   
   There exist principles of UG which predict the initial relation borne by each [argument] in a given clause from the meaning of the clause.

(ii) **Uniformity of Theta Assignment Hypothesis**
   
   Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-Structure.
interpretation, emission verbs are stative, taking the schema of (23a). Verbs in (19), however, can also be conceived of as instances of (23c) although these eventualities are not punctual, as achievement verbs are supposed to be. Nevertheless, the emission verbs in (19) arguably include a STATE component whether they are classified under stative or achievement (or some aspectual types other than those in (23)).

In contrast, there are emission verbs that seem to better fit with (23b). Consider the following example.

(26) *Kodomo-ga toterno sakenda.

child-Nom very screamed
'The child screamed very much.'

In (26) the verb does not describe stative or inchoative eventualities as those in (19), but instead it refers to the child's volitional action. It suggests that the verb in (26) is better represented on a par with (23b). As I will elaborate on later in this section, (23b) does not contain a STATE component, and the modification by toterno is not allowed in (26). Hence, emission verbs do not appear to be homogeneous in their event structure representations, and the modification possibilities can be predicted partially by looking at the internal structure of event structure.6

Finally, we shall briefly examine the presence of STATE in change of state verbs. It is generally agreed upon, regardless of which theoretical approach one adopts, that change of state verbs, transitive (causative) and intransitive (inchoative), have the lexical semantic representation that correspond to (23d) and (23c), respectively. For example, change of state verbs in English, break and dry, in their transitive and intransitive uses, can be represented as follows:

(27) a. Transitive dry: [x CAUSE [y BECOME DRY]]
    b. Intransitive dry: [y BECOME DRY]

In Japanese many change of state verbs demonstrate transitive (causative) and intransitive (inchoative) pairs that are morphologically related (Jacobsen, 1992). This is shown in (28).

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6 There is at least one other emission verb whose nature of event structure is not clear. Consider the following example.

(i) *Kane-ga toterno natta.

bell-Nom very rang
'The bell rang very much.'

The verb naru 'ring' does not describe an inherent property of the subject in (i), nor does it seem to refer to a specific state to which the bell has ended up with. These two situations would correspond to event structure representations of (23a) and (23c) respectively. Furthermore, the subject, kane 'bell', is not a volitional agent, and therefore cannot fall under (23b), either. While I will leave the determination of lexical semantic representation of this verb to future study, I wish to point out that even if we were to assume that the verb takes the representation of (23c), the impossibility of toterno modification would be explained by the non-gradable nature of the STATE component that this verb may have. I will discuss such a condition in Section 2.2 in detail.
Transitive and intransitive verbs in (28) share a root, to which various forms of transitivizer and intransitivizer suffixes are added. While they are not identical as in English, the semantic relationship between transitive and intransitive counterparts is straightforwardly captured by the representation similar to (27). Therefore, I will assume that intransitive change of state verbs in Japanese include STATE in their event structure.

To summarize thus far, we first described the range of verbs that can be modified by the adverb *toterno* ‘very’. The semantic classes that allow *toterno* modification have been generalized as psych verbs, emission verbs, and change of state verbs. I have then identified that a STATE component of a verb’s lexical semantic representation (or event structure) is the property that these verb classes share. We may regard the presence of a STATE component as a necessary condition for *toterno* modification. A consequence of this necessary condition is that if the event structure of a verb clearly does not contain a STATE component, such as activity verbs, semelfactive verbs, and change of location verbs, then the verb should not be modified by *toterno*. The following examples attest to it.7

(29) *Taroo-wa toterno hasitta.
   Taro-Top very ran
   ‘Taro ran very much.’

(30) *Taroo-wa toterno waratta.
   Taro-Top very laughed.
   ‘Taro laughed very much.’

(31) *Taroo-wa doa-o toterno tataita.
   Taro-Top door-Act very hit/knocked
   ‘Taro hit/knocked on the door very much.’

(32) *Hune-ga toterno sizunda.
   ship-Nom very sank
   ‘The ship sank very much.’

(33) *Booru-ga toterno otita.
   ball-Nom very fell
   ‘The ball fell very much.’

7 The adverb *toterno* in these examples could be understood to serve as an intensifier for extensibility. Under such an interpretation, some of these examples may be marginally acceptable.
None of the activity verbs in (29) and (30), the semelfactive verb in (31), and the change of location verbs in (32) and (33) include a STATE component in the event structure. As is expected, totemo modification is not allowed. Thus, given the nature of event structure of verbs, the availability of totemo modification is partially predictable. The first condition that is required for totemo modification is thus stated in (34).

(34) A verb must have a STATE component in its event structure.

2.2. Gradable properties and scalar structure

We have observed above that a STATE component within a verb's event structure plays a crucial role in determining whether the verb is compatible with totemo. If the presence of a STATE component is all that is required for totemo modification, however, we face a number of counterexamples to such a generalization. In what follows below I will discuss further constraints to account for a wide range of totemo modification.

First, consider the following.

   cat-Nom very died
   'A cat died very much.'

b. *Omotya-ga totemo kowareta.
   toy-Nom very broke
   'A toy broke very much.'

c. *Ki-no eda-ga totemo oreta.
   tree-Gen branch-Nom very broke
   'A tree branch broke very much.'

d. *Sara-ga totemo wareta.
   dish-Nom very broke
   'A dish broke very much.'

All the verbs in (35) are change of state verbs, which arguably include a STATE component in their event structures. As is shown, however, none of the verbs accept totemo modification. What separates the verbs in (35) from those that can be modified by totemo, as in (18)–(21), is that the STATE component in an event structure of the latter group expresses a gradable property whereas such a property is not observed with the verbs in (35). Verbs like sinu 'die' and kowareru 'break' in (35) fail to take totemo for this reason: the dead state of a cat and the broken state of a toy do not convey gradable properties. This condition is added to (34), as in (36).

(36) a. A verb must have a STATE component in its event structure.
    b. The STATE component must refer to a gradable property.

It is interesting to note that the condition on gradability should account for the contrast observed with adjectives and nouns, as was described in footnote 1. Relevant examples are repeated below.
The ungrammaticality of the (b) examples with respect to totemo modification can readily be attributed to lack of gradable properties in what the adjective (37b) and the noun (38b) denote, as opposed to their presence in the (a) sentences.

Second, there is an interesting set of verbs that display seemingly peculiar behavior with respect to totemo modification. Examples illustrating such a property come from change of state verbs. Some change of state verbs cannot be modified by totemo, but a morphologically altered verbal form can improve the acceptability. For instance, magaru ‘bend’, kooru ‘freeze’, tokera ‘melt’, kawaku ‘dry’, and kogeru ‘burn’, among many more, are intransitive verbs which have morphologically related transitive counterparts, like those in (28) above, and their lexical semantic representations pattern with (27b). While these verbs do not accept totemo modification in their past (or present) tense form, when they are in the -te iru (gerund + iru ‘be’) form, totemo modification becomes more admissible. Consider the following contrasts.8

(39) a. *Harigane-ga totemo magatta.
   wire-Nom very bent
   ‘The wire bent very much.’
   b. Harigane-ga totemo magatte-iru.
   wire-Nom very is bent
   ‘The wire is very bent.’

(40) a. *Toosuto-ga totemo kogeta.
   toast-Nom very burned
   ‘The toast burned very much.’
   b. Toosuto-ga totemo kogete-iru.
   toast-Nom very is burned
   ‘The toast is very burned.’

8 A referee points out that a similar alternation, as below, can be observed in English.

(i) a. *The road twists very much through the mountains.
   b. ?The road is very much twisted.
When telic verbs are in the -te iru form, they refer to the state as a result of the action denoted by the verb.\(^9\) For example, magaru ‘get bent’ is an achievement verb, and when it appears in the -te iru form, as in magatte-iru, it describes the subject’s state of being bent as a result of becoming bent. It is important to note that the verbs in (39)-(42) do satisfy both conditions in (36): they all have the STATE component in their event structure, and the STATE component refers to a gradable property. And yet, totemo modification is not possible unless the morphology can salvage them from such a situation by creating an environment in which a resulting state is regarded as having a property that can be intensified by totemo. It is now necessary to determine any potential factors that distinguish between the gradable properties of the verbs in (39)-(42) and those in (18)-(21).

Let us assume that a gradable property of the STATE component is mapped onto scalar structure. I wish to claim that the gradable property of the STATE component is not homogeneous with respect to the standard value: the gradable property defined over scalar structure must be characterized by what Kennedy and McNally (1999) call ‘nontrivial standard’ as a condition for totemo modification. In analyzing (deverbal) adjectives and their modification phenomena, Kennedy and McNally introduce the terms trivial vs. nontrivial standard, and give the definitions in (43).

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\(^9\) The -te iru form bears two basic meanings, progressive and resultative (Kindaichi, 1976; Soga, 1983; Jacobsen, 1992; Tsujimura, 1996; Ogihara, 1998, 1999). The progressive reading is typically associated with activity verbs, as in (i), and the resultative interpretation is commonly observed with, but is not limited to, achievement verbs, as in (ii).

(i) Taroo-ga aruite-iru.
   Taro-Nom is walking
   ‘Taro is walking.’

(ii) Inu-ga sinde-iru.
    dog-Nom is dead
    ‘A dog is dead (as a result of having died).’

The progressive reading describes an on-going action while the resultative interpretation refers to a state as a result of an event denoted by the verb.
An adjective has a trivial standard iff its standard defaults to an endpoint of the scale.

An adjective has a nontrivial standard iff its standard is context dependent.

For example, adjectives such as *tall, interesting*, and *expensive* are associated with nontrivial standards because their standards vary depending on the context: a 6-foot man may be tall as a non-athlete, but he may not be as a basketball player. In contrast, adjectives like *awake, wet*, and *empty* are associated with trivial standards because their standards default to endpoints regardless of the context. Given the dichotomy in (43), (44a) is a contradictory statement because *wet* is associated with a trivial standard, and regardless of the context, its standard defaults to an endpoint; (44b), in contrast, is not contradictory because the standard varies depending on the context.

(44) a. #My hands are not wet, but there is a little bit of water on them.
b. That film is interesting, but it could be more interesting.
   (Kennedy and McNally, 1999: (20)-(21))

Furthermore, the trivial vs. nontrivial standard is reflected on the selection of adverbs, as in (45) and (46), also taken from Kennedy and McNally (1999).

(45) a. *completely* awake/wet/empty (trivial standard)
   b. ?*completely* tall/interesting/expensive (nontrivial standard)

(46) a. *well* understood/defined/written (trivial standard)
   b. *very* tall/expensive/happy (nontrivial standard)

I would like to argue that the two-way distinction of the standard value is indeed relevant to a satisfactory explanation for the behavior of *toterno* as described in (39)-(42). More specifically, I wish to propose that *toterno* modifies only verbs whose gradable properties mapped onto scalar structure are associated with nontrivial standards. Recall that psych verbs, some emission verbs, and some verbs of change of state can be modified by *toterno*. Representative examples from each class are repeated below.

(47) *Taro*–wa *totemo* kurusinda. (Psych verb)
   *Taro*–Top *very* suffered
   ‘Taro suffered very much.’

(48) *Hosi*–ga *totemo* hikatta. (Emission verb)
   *star–Nom* *very* shone
   ‘The star shone very much.’

(49) *Suupu*–ga *totempo* atatamatta. (Change of state verb)
   *soup–Nom* *very* warmed
   ‘The soup got warmed very much.’

The STATE components of these verbs refer to the situations in which Taro is in the state of suffering, in which the star is shiny, and in which the soup is warm. These
states are gradable and hence are mapped onto scalar structure, but are not identified with maximal and minimal endpoints. Furthermore, their standards vary depending on context. Suffering, just like any other psychological state, is rather subjective, and what is ‘suffering’ to one may not be so perceived by others. Similarly, standards for something to be ‘shiny’ or ‘warm’ seem to vary substantially depending on individuals and situations: a person who likes his soup piping-hot and a person who hates burning his tongue with hot soup may well have quite different standards for soup to be ‘warm’. The nontrivial standards that the verbs in (47)–(49) employ can be demonstrated by the fact that the adverb kanzenni ‘completely’, which implies a maximal or minimal endpoint, cannot appear with these verbs, as is illustrated in (50) below.

(50) a. *Taro-ga kanzenni kurusinda.  
   Taro-Nom completely suffered  
   ‘Taro suffered completely.’

 b. *Hosi-ga kanzenni hikatta.  
   star-Nom completely shone  
   ‘The star shone completely.’

c. ?*Suupu-ga kanzenni atatamatta.  
   soup-Nom completely warmed  
   ‘The soup warmed completely.’

Hence, the gradable properties of the STATE components of these verbs are associated with nontrivial standards, and totemo intensifies the gradable properties with nontrivial standards. In contrast, verbs in (39)–(42) are associated with trivial standards, as the following examples demonstrate. Compare (51) with (50).

(51) a. Harigane-ga kanzenni magatta.  
   wire-Nom completely bent  
   ‘The wire bent completely.’

 b. Toosuto-ga kanzenni kogeta.  
   toast-Nom completely burned  
   ‘The toast burned completely.’

c. Aisukuriimu-ga kanzenni kootta.  
   ice cream-Nom completely froze  
   ‘The ice cream froze completely.’

d. Sentakumono-ga kanzenni kawaita.  
   laundry-Nom completely dried  
   ‘The laundry dried completely.’

The contrast between (50) and (51) suggests that the standard values that the STATE components of the verbs in (51) exhibit default to maximal endpoints, to which the adverb kanzenni refers. Since totemo requires that the standard value associated with the verb be nontrivial, the verbs in (51) reject being modified by it.
Recall that totemo modification with these verbs improves when the verbs appear in the -te iru form. As footnote 9 briefly states, the resultative -te iru describes the state of the subject as a result of the dynamic event denoted by the verb. For instance, the temporal illustration of the sentence in (52a) below can be schematically represented in (52b).

(52) a. Sentakumono-ga kawaite-iru.
   laundry-Nom is dry
   ‘The laundry is dry.’

b.  

The point F encodes the final moment at which the dry state of the laundry is attained. This point corresponds to the STATE component of the event structure of the verb kawaku ‘dry’. More specifically, the point F refers to the endpoint of the scale that was projected from the STATE component of the verb, and this is why the standard value of the verb is trivial, as is evidenced by (51d). What kawaite-iru in (52a) describes, however, is the phase that follows the point indicated by F. In this phrase, there are no endpoints to which a standard value is to default, and hence the standard of kawaite-iru is nontrivial, subject to context.

The morphological addition of -te iru, thus, may well be interpreted to change the nature of the standard value from trivial to nontrivial. That is, once these verbs appear in the -te iru form, they refer to the resulting states such as the melted state of ice cream and the dryness of the laundry, for example, and the degree to which ice cream or the laundry is in the defined states, i.e., how frozen ice cream is or how dry the laundry is, seems to be a matter of the given situation. For example, frozenness of ice cream can range from being on the soft side to being solid. The following examples should give an additional illustration of contextual flexibility.

   laundry-Nom raw-dry-is
   ‘The laundry is half dry.’

b. Sentakumono-ga karakarani kawaite-iru.
   laundry-Nom very dry is dry
   ‘The laundry is extremely dry.’

In (53a) the deverbal noun of the verb kawaku ‘dry’, kawaki, is compounded with nama ‘raw’: together they refer to the state of the laundry that can fall in the domain of dryness and yet may require further drying. The mimetic word, karakarani, in (53b) describes the state of the laundry that needs no further drying. The presence of descriptive words like nama-kawaki and karakarani seems to provide support that the state of dryness to which the -te iru form refers can be viewed as being context dependent and hence associated with trivial standard.

Viewed as such, the verbs in (39)–(42) in and by themselves are with trivial standards and disallow totemo modification. Once the verbs appear in the -te iru form, the morphology serves as changing the nature of the standard value, from trivial to
nontrivial, thereby allowing for the modification by *totemo*. This seems to be a reasonable conclusion especially when we observe a similar phenomenon in English adverbs *well* and *very*, as mentioned briefly above. Recall that *well* and *very* differ in that the former modifies adjectives with trivial standard while the latter those with nontrivial standard, as in *well defined* vs. *very tall*. Once *well* finds an adjective with trivial standard, like *well defined*, the entire phrase can now be modified by *very*, as in *very well defined*. That is, the standard value can be a derived property.

The condition of *totemo* modification is now stated in (54).

(54) a. A verb must have a STATE component in its event structure.
   b. The STATE component must refer to a gradable property.
   c. The gradable property defined over scalar structure must be with nontrivial standard.

A consequence drawn from our analysis based on the interaction of event structure and scalar structure along with the nature of the standard value is that if a verb has two or more meanings (or senses) that differ in the nature of event structure or scalar structure, it is predicted that such variation may be reflected on the availability of *totemo* modification. I will demonstrate that the prediction is indeed borne out. Consider the following contrasts.

(55) a. *Booru-ga totemo otita.
   ball-Nom very fell
   ‘The ball fell very much.’
   b. Seiseki-ga totemo otita.
   grade-Nom very dropped
   ‘The grade dropped very much.’

(56) a. *Gun-ga nisi-no hoo-e totemo susunda.
   military-Nom west-Gen direction-to very proceeded
   ‘The military proceeded to the west very much.’
   b. Koosinkoku-no kaihatu-ga totemo susunda.
   developing country-Gen development-Nom very progressed
   ‘The development of developing countries progressed very much.’

(57) a. *Keeki-ga totemo yaketa.
   cake-Nom very baked
   ‘A cake is baked very much.’
   b. Mune-ga totemo yaketa.
   chest-Nom very burned
   ‘My chest is burned very much. = I have heartburn.’

(58) a. *Neko-ga totemo sinda.
   cat-Nom very died
   ‘A cat died very much.’
   b. ?*Azi-ga totemo sinda.
   taste-Nom very died
   ‘The taste died very much.’
c. Azi-ga totemo sinde-iru.
taste-Nom very is dead
'The taste is very dead.'

Otiru 'drop, fall' in (55) and susumu 'proceed' in (56) can be used to describe a physical change in location, as in (a), or figuratively characterize lowering of some states such as grades, as in (55b), or describing progress that has been made, as in (56b). As the contrasts above show, the availability of totemo modification varies depending on the meaning of the verbs. In (55a) the verb otiru 'fall' is a change of location verb with inherent direction, and as we have discussed earlier, it is not associated with a STATE component nor a gradable property, resulting in unacceptable modification by totemo. In (55b), on the other hand, a drop in grades presents a property measurable by degree, and the standard value associated with it is nontrivial. While in a real life situation, it is natural to assume that grades range from 100 points to 0 or A to F, thereby possibly providing maximal and minimal endpoints, what is regarded as high and low grades depends on individuals and situations, and furthermore the degree to which a drop in grades occurs seems to be totally based on a standard that each individual has under a certain situation. That is, although there may be absolute endpoints in a scale that constitutes a grading system, whether it is by numbers or by letter grades, the range of the drop within a scale can vary depending on context. It is such a gradable property based on a nontrivial standard to which totemo refers.

A parallel situation is obtained in (57). Yakeru in (57) also has at least two meanings: something gets baked and something gets burned. The former sense of yakeru has a creation meaning while the latter implies change of state. When the verb has the creation sense, as in (57a), the STATE refers to a final product of the event denoted by the creation verb, and hence, does not present a gradable property. Without a gradable property, a scalar structure cannot be projected, and totemo is not compatible with the verb under the creation interpretation. The same verb without the creation sense, i.e., (57b), is identified with a nontrivial standard: the degree of burning sensation in our body is determined by different standards, which vary depending on individuals who experience it. The verb under the interpretation that is associated with a nontrivial standard makes totemo modification permissible, as is evidenced by (57b).

(58) presents an interesting contrast. As we have observed earlier, totemo modification in (58a) is illicit because the STATE component of the verb's event structure does not have a gradable property to be mapped onto scalar structure. The identical verb is used in (58b–c), but with the particular selection of the subject, azi 'taste', the verb induces a different sense that describes tastelessness, which may be regarded as a gradable property. Since the adverb kanzenni 'completely' can cooccur with the verb under such an interpretation, the gradable property is trivial, and this is why

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10 A referee points out that bake in English has a creation meaning only as a transitive verb. It is clear that such a generalization does not apply to Japanese: that is, (63a) without totemo is a perfectly grammatical sentence with a creation sense.
(58b) is awkward. The verbal morphology of -te iru in (58c), however, changes the nature of the standard value to nontrivial, thereby allowing for totemo modification.\(^{11}\) Thus, different senses of a verb are reflected in lexical representations of the verb such as event structure and scalar structure, and the adverb totemo is sensitive to the nature of each level of representation.

To summarize, we have examined a range of data that illuminate various conditions on totemo modification for degree verbs, and argued that those conditions are stated over event structure and scalar structure of a verb. The three conditions are given in (59).

\[(59) \text{a. A verb must have a STATE component in its event structure.} \]
\[\text{b. The STATE component must refer to a gradable property.} \]
\[\text{c. The gradable property defined over scalar structure must be with nontrivial standard.} \]

First, verbs that are deprived of the possibility of totemo modification by failing to satisfy (59a) include activity, semelfactive, and change of location verbs, such as warau ‘laugh’, tataku ‘hit’, and sizumu ‘sink’. These verbs do not have a STATE component in their event structure representations, and therefore totemo cannot modify them. Second, verbs such as sinu ‘die’ and kowareru ‘break’ do have a STATE component in their event structure, but it is not associated with gradable properties. Without gradable properties, no scalar structure can be projected for these verbs. The modification of these verbs by totemo results in ungrammaticality. Third, psych verbs, some emission verbs, and some change of state verbs do satisfy all the conditions in (59), and totemo modification is allowed. Crucially, these verbs are characterized by the nontrivial standard value associated with their gradable properties defined over scalar structure. These verbs include kurusimu ‘suffer’ (psych verb), hikaru ‘shine’ (emission verb), and atatamaru ‘warm’ (change of state verb). Finally, if a verb satisfies (59a,b) but its standard value in its scalar structure is trivial, the verb by itself cannot be modified by totemo. Verbs belonging to this type, including magaru ‘bend’, kooru ‘freeze’, and kawaku ‘dry’, however, can be compromised by changing the verbal form to -te iru. The morphology of -te iru on this group of verbs changes their trivial standard to nontrivial standard, which ultimately makes it possible for the verbs to be modified by totemo. The interaction of the conditions in (59) and verbs illustrating each instance are summarized below.

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\(^{11}\) I would like to thank Chris Brockett for suggesting this example to me.
In this section we have demonstrated that the interaction of event structure and scalar structure provides a coherent account for the range of *tometo* modification phenomenon. For the remainder of this section, I will discuss another degree adverb *sukkari* ‘entirely, completely’ to show that a similar set of conditions can be applied in explaining its distribution, providing further motivation for the kind of analysis proposed above.

The adverb *sukkari* ‘entirely, completely’ exhibits a range of distribution data identical with *tometo* as far as the first two classes of verbs in (60) are concerned. Put differently, *sukkari* seems to observe the conditions in (59a) and (59b). This is shown in (61).

(61) a. *Kodomo-ga sukkari waratta.
   child-Nom entirely laughed
   ‘The child laughed entirely.’

b. *Taroo-ga doa-o sukkari tataita.
   Taro-Nom door-Acc entirely hit/knocked
   ‘Taro hit/knocked on the door entirely.’

c. *Hune-ga sukkari sizunda.
   ship-Nom entirely sank
   ‘The ship sank entirely.’

d. *Neko-ga sukkari sinda.
   cat-Nom entirely died
   ‘The cat died entirely.’

The verbs in (61a–c) do not have a STATE component in their event structure, resulting in ungrammatical sentences. The verb in (61d) does have a STATE
component in its event structure, but does not refer to a gradable property. Since scalar structure cannot be invoked without a gradable property, the modification fails. Of interest is the third group in (60), psych verbs, emissions verbs, and change of state verbs. While these verbs accept *totemo* modification, *sukkari* does not modify them, as is illustrated below.

(62) a. *Taro-ga sukkari kurusinda
   Taro-Nom entirely suffered
   ‘Taro suffered entirely.’
b. *Hosi-ga sukkari hikatta.
   star-Nom entirely shone
   ‘The star shone entirely.’
c. *Suupu-ga sukkari atatamatta.
   soup-Nom entirely warmed
   ‘The soup warmed entirely.’

The adverb *sukkari* is similar to *kanzenni* ‘completely’ in that neither can cooccur with the verbs in (62): when *sukkari* is replaced by *kanzenni*, the sentences are still not acceptable. Recall that the standard value associated with these verbs is nontrivial, and this nature of standard value is required by *totemo*. It suggests then that *sukkari* puts a reverse condition of *totemo* on the nature of standard value: that is, *sukkari* requires trivial standard. This, in turn, means that the last class of verbs in (60) should be able to accept *sukkari* without the mediation of the verbal morphology, *-te iru*. This prediction is indeed borne out, as is shown in (63).

(63) a. Harigane-ga sukkari magatta.
   wire-Nom entirely bent
   ‘The wire bent entirely.’
b. Aisukuriimu-ga sukkari kootta.
   ice cream-Nom entirely froze
   ‘The ice cream froze entirely.’
c. Sentakumono-ga sukkari kawaita.
   laundry-Nom entirely dried
   ‘The laundry dried entirely.’

The verbs in (63) are associated with trivial standard. Since *sukkari* calls for this type of standard value, the modification is acceptable. The conditions for *sukkari* modification can be stated as in (64).

(64) a. A verb must have a STATE component in its event structure.
   b. The STATE component must refer to a gradable property.
   c. The gradable property defined over scalar structure must be with trivial standard.

It should be remembered that although the verbs in (63) cannot be modified by *totemo*, the addition of *-te iru* improves its acceptability because *-te iru* changes the
standard value from trivial to nontrivial. If -te iru has such a function of shifting trivial standard to nontrivial with the verbs in (63), then the output of the morphological addition to the same range of verbs should be ruled out by sukkari modification since sukkari requires trivial standard. This prediction turns out not to hold. Consider the following examples.

(65) a. Harigane-ga sukkari magatte-iru.
   wire-Nom entirely is bent
   'The wire is bent entirely.'

b. Aisukuriimu-ga sukkari kootte-iru.
   ice cream-Nom entirely is frozen
   'Ice cream is frozen entirely.'

c. Sentakumono-ga sukkari kawaite-iru.
   laundry-Nom entirely is dried
   'The laundry is dried entirely.'

According to our analysis presented above, the -te iru form of these verbs are associated with nontrivial standard. That is, (65) is expected to present a reverse situation of (39)–(42). This apparent contradiction, however, should not undermine the role of -te iru that has been discussed thus far. I believe, instead, that there is a critical difference between toterno and sukkari with respect to their scope of modification. Compare the following two examples.

(66) a. Sentakumono-ga toterno kawaite-i-nai.
   laundry-Nom very is dried
   'The laundry is very dry.'

b. Sentakumono-ga sukkari kawaite-i-nai.
   laundry-Nom entirely is dried
   'The laundry is entirely dry.'

Let us assume that our analysis is on the right track, and that totemo modifies kawaite-iru in (66a) while sukkari modifies kawaku in (66b) according to the requirement that each adverb puts on the type of standard value. It would not be surprising, then, if negation on the predicates has a different scope relationship to the adverbs. This is shown in (67).\(^\text{12}\)

(67) a. Sentakumono-ga totemo kawaite-i-nai.
   laundry-Nom very is dried-Neg
   'The laundry is very not-dry.'

b. Sentakumono-ga sukkari kawaite-i-nai.
   laundry-Nom entirely is dried-Neg
   'The laundry is not entirely dry.'

\(^{12}\) (67a) is slightly awkward due to the fact that the totemo-negation sequence is not commonly used. A more appropriate expression with the same meaning is zenzen-negation.
As the translations indicate, the scope relation is not identical in these two cases. In (67a) *totemo* has scope over the entire predicate, *kawaite-i-nai*. That is, it is the not-dry state of the laundry that is intensified by the adverb. In (67b), on the other hand, negation has scope over *sukkuri*. What is intensified in this case is exactly identical with the situation in (66b): the trivial standard that is associated with the verb *kawaku* is intensified by *sukkari*. It suggests that an adverb ‘looks for’ an appropriate standard value in a predicate and once it finds the right type of standard, it does not become influenced by further morphological derivation. In (66a) *totemo* does not find the right type of standard until *-te iru* is added, and the whole predicate including *-te iru* is within its intensifying scope. In (66b) *sukkari* finds its appropriate standard in the verb itself, and its ‘search’ stops there. Further derived verbal forms are irrelevant to *sukkari* modification.

4. Conclusion

In this paper I have discussed the degree modification involved in the Japanese adverb *totemo*. This adverb normally modifies adjectives, but can also modify some verbs. I have presented the range of verbs that can be modified by *totemo*, which is semantically coherent: psych verbs, verbs of emission, and verbs of change of state are the semantic classes that are identified as verbs that are compatible with *totemo*. I argued that modification possibilities by *totemo* is reduced to the internal structure of event structure and its interaction with scalar structure. Relevant to such an interaction is particular reference to trivial and nontrivial standard values. I have proposed that in order for *totemo* to be able to modify a verb, the verb must have a STATE component specified in its event structure, the STATE component must have a gradable property to be mapped onto scalar structure, and the gradable property needs to be associated with a nontrivial standard. An alternative situation is that verbs with trivial standards, which normally disallow *totemo*, can be mediated by the verbal morphology of *-te iru* as it changes the nature of the standard value. The explanation of the behavior that *totemo* exhibits provides further motivation for scalar structure that has been advanced by Hay et al. (1999). More crucially, it supports the two-way distinction proposed for the nature of the standard value by Kennedy and McNally (1999).

References

Ernst, T., 1984. Toward an integrated theory of adverb position in English. Bloomington, IN: IULC.


