THE MORPHOLOGY AND INTERPRETATIONS OF GRADABLE ADJECTIVES IN JAPANESE

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There has been a debate concerning the categorial status of nominal adjectives in Japanese (*na*-adjectives), since they exhibit several properties of both canonical adjectives (*k*-adjectives) and nouns. Although properties of each category have been observed, there has been no cross-categorical approach to the differences among these elements. This paper demonstrates that the theory of scale structures proposed by Kennedy and McNally (2005) captures various morphological realizations of prenominal modifiers in Japanese. First, maximum-standard adjectives with lower closed scales and adjectives with upper closed scales tend to be realized as *na*-adjectives. Second, relative adjectives tend to be *k*-adjectives. Third, non-gradable modifiers are realized as nominal modifiers (*no*-adjectives). There are also some cases where relative “adjectives” and maximum-standard “adjectives” with scales whose lower end is closed are realized as *no*-adjectives. These observations reveal a tendency for a certain scale type to have a certain morphological form of adjectives in Japanese.*

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1. Introduction

Japanese has several morphological types of prenominal modifiers.¹ One type is *k*-adjectives (usually referred to as canonical adjectives), whose stem

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¹ In this paper, I do not discuss the prenominal modifiers where tense morphemes (i.e. the non-past tense morpheme *-u* and the past tense morpheme *-ta*) are overtly realized (i.e. full relative clauses). I do not consider the morphemes *-i*, *-na* and *-no* in (1) to be tense morphemes. I consider the morpheme *-ta* in (1d) not as the past tense marker, but as the participial morpheme. See also footnote 6.

ends with the consonant /k/, as in (1a).^{2, 3} Another is *na*-adjectives, whose stem precedes the morpheme *-na* in the attributive position, as in (1b).⁴ In (1c), the modifier has the form ‘nominal stem + the linking morpheme *-no*.’⁵ I refer to this type of modifier as a *no*-adjective. The modifier in

² Although several attempts have been made to investigate adjectives, there does not seem to be a concrete criterion for defining “adjectives.” It has been, however, generally accepted that one characteristic of adjectives is their ability to modify nouns. Here, I use the term “adjective” to refer to elements that modify a noun, not to elements that belong to the syntactic category Adjective. It should be noted that the adjectives dealt with in this paper would not necessarily all belong to the same syntactic category.

³ I refer to the (1a)-type of adjectives as *k*-adjectives on the assumption that the stem of these adjectives ends with the consonant /k/. I assume that /k/ is dropped in (1a) by the phonological rule that prohibits the sequence of the consonant /k/ and the vowel /i/ in modern Japanese (cf. Itô (1989), Nishiyama (1999)). Nishiyama (1999) claims that the consonant /k/ is the predicative copula in the sense of Bowers (1993). But I assume that it is the morpheme *-i* following the adjectival stem in (1a) that functions as the predicative copula, although it is usually assumed to be the non-past tense marker. I also suppose that the morpheme *-k-* is the functional head *a* that forms a relative adjective.

⁴ Following Nishiyama (1999), I suppose that the morpheme *-na* is the predicative copula.

⁵ There are some stems that allow two types of morphological realizations.

(i)	a.	maru(k)-i	teeburu	(<i>k</i> -adjective)
		round	table	
	b.	?maru-no	teeburu	(<i>no</i> -adjective)
		round	table	
		‘a/the round table’		
(ii)	a.	siro(k)-i	syatu	(<i>k</i> -adjective)
		white	shirt	
	b.	siro-no	syatu	(<i>no</i> -adjective)
		white	shirt	
		‘a/the white shirt’		
(iii)	a.	wazuka-na	okane	(<i>na</i> -adjective)
		a.little	money	
		wazuka-no	okane	(<i>no</i> -adjective)
		a.little	money	

Although each pair has the same stem, there is a semantic difference between the (a)- and (b)-examples in terms of gradability (Morita (2010)). *K*-adjectives and *na*-adjectives are gradable since they accept modification by degree adverbs such as *totemo* ‘very’ and *motto* ‘more.’ *No*-adjectives, on the other hand, are non-gradable, because they cannot be modified by the degree adverbs.

(iv)	a.	totemo {maru(k)-i/*maru-no}	teeburu
		very round / round	table
	b.	totemo {siro(k)-i/*siro-no}	syatu
		very white / white	shirt
	c.	motto {wazuka-na/*wazuka-no}	okane
		more a.little / a.little	money

(1d) is a deverbal adjective, whose source is an intransitive verb.⁶

- (1) a. *k*-adjective
 taka(k)-i biru
 high building
 ‘(a/the) high building’
- b. *na*-adjective
 sizuka-na yuube
 quiet evening
 ‘(a/the) quiet evening’
- c. *no*-adjective
 nihon-no haiyuu
 Japanese actor
 ‘(a/the) Japanese actor’
- d. deverbal adjective
 simat-ta doa
 closed door
 ‘(a/the) closed door’

The status of *na*-adjectives has been the subject of controversy. *Na*-adjectives are often referred to as *Nominal Adjectives* or *Adjectival Nouns*, since they exhibit syntactic properties of *k*-adjectives and nouns.⁷ There are several properties shared by *na*-adjectives and nouns. First, both *na*-adjectives and nouns take the copula *-da* when they appear at the end of a sentence, while *k*-adjectives and verbs do not.

These observations also suggest that the semantics of adjectives affects their morphological realizations in Japanese.

⁶ Here I refer to an adjective that has the participial form as a deverbal adjective. I assume that the morpheme *-ta* in the deverbal form is not the past tense morpheme, but the participial morpheme. The following examples are cases in which a tense marker is overtly realized.

- (i) a. *simat-te* *ir-u* *mado*
 closed Cop-Nonpast window
 ‘a/the window which is closed’
- b. *simat-te* *i-ta* *mado*
 closed Cop-Past window
 ‘a/the window which was closed’

Notice that the morpheme *-te* attaches to the verb stem in the above examples. I assume that the morpheme *-te* is an allomorph of the participial morpheme *-ta* in (1d): *-te* is used when a copular verb follows; otherwise, *-ta* is used.

⁷ In the traditional grammar of Japanese, *na*-adjectives are referred to as *keiyoo-doosi* (adjectival verbs). Given that the stem of *na*-adjectives includes the morpheme *-na*, they exhibit similar inflectional patterns to the copula verb *da*.

(2) The copula *-da*a. *na*-adjective

Ano hito-ga sizuka-da.
 that person-Nom quiet-Cop.Nonpast
 'That person is quiet.'

b. noun

Ano hito-ga sensee-da.
 that person-Nom teacher-Cop.Nonpast
 'That person is a teacher.'

c. *k*-adjective

Ano hito-ga utukusi(k)-i/ *utukusi(k)-da.
 that person-Nom beautiful / beautiful-Cop.Nonpast
 'That person is beautiful.'

d. verb

Ano hito-ga pan-o tabe-ru / *tabe-da.
 that person-Nom bread-Acc eat-Nonpast/ eat-Cop.Nonpast
 'That person eats bread.' (cf. Miyagawa (1987: 43))

Second, the morpheme *-mitai* 'seem' attaches only to *na*-adjectives and nouns; it does not attach to *k*-adjectives and verbs.

(3) The morpheme *-mitai*a. *na*-adjective

sizuka-mitai
 quiet-seem
 'seems to be quiet'

b. noun

gakusee-mitai
 student-seem
 'seems to be a student'

c. *k*-adjective

*utukusi(k)-mitai
 beautiful-seem

d. verb

*tabe-mitai
 eat-seem

(Miyagawa (1987: 44))

Na-adjectives also share some syntactic properties with *k*-adjectives. First, both *na*-adjectives and *k*-adjectives can be used adverbially.

(4) Adverbial use

a. *na*-adjective

Hanako-ga *sizuka-ni* heya-o de-ta.
 Hanako-Nom quiet-Adv room-Acc leave-Past
 'Hanako left the room quietly.'

b. *k*-adjective

Hanako-ga *utukusik-u* odor-u.
 Hanako-Nom beautiful-Adv dance-Nonpast
 'Hanako dances beautifully.' (cf. Ohkado (1991: 76))

Second, *na*-adjectives and *k*-adjectives accept modification by the degree adverb *totemo* 'very.'

(5) Modification by the degree adverb *totemo* 'very'a. *na*-adjective

Hanako-ga *totemo* *sizuka-da*.
 Hanako-Nom very quiet-Cop.Nonpast
 'Hanako is very quiet.'

b. *k*-adjective

Hanako-ga *totemo* *utukusi(k)-i*.
 Hanako-Nom very beautiful
 'Hanako is very beautiful.'

c. noun

*Hanako-ga *totemo* *sensee-da*.
 Hanako-Nom very teacher-Cop.Nonpast

d. verb

*Hanako-ga *totemo* *okasi-o* *tabe-ru*.⁸
 Hanako-Nom very sweets-Acc eat-Nonpast
 (Ohkado (1991: 76–77))

Third, both *na*-adjectives and *k*-adjectives can directly follow the morpheme *-yori* 'than' in comparative constructions.

(6) Comparative constructions

a. *na*-adjective

Hanako-ga Emiko-yori *sizuka-da*.
 Hanako-Nom Emiko-than quiet-Cop.Nonpast
 'Hanako is quieter than Emiko.'

⁸ Notice that the degree adverb *totemo* 'very' modifies the verb in (5d). This sentence becomes grammatical in the case where *totemo* modifies the adverb *takusan* 'a lot,' which is phonologically elided.

- b. *k*-adjective
 Hanako-ga Emiko-yori utukusi(k)-i.
 Hanako-Nom Emiko-than beautiful
 'Hanako is more beautiful than Emiko.'
- c. noun
 *Hanako-ga Emiko-yori sensee-da.
 Hanako-Nom Emiko-than teacher-Cop.Nonpast
- d. verb
 *Hanako-ga Emiko-yori pan-o tabe-ru.⁹
 Hanako-Nom Emiko-than bread-Acc eat-Nonpast
 (cf. Ohkado (1991: 77))

In addition, the emphatic particles such as *-sae* 'even,' *-sura* 'even,' and *-mo* 'also' can attach to nouns and verbs, but not to *na*-adjectives and *k*-adjectives.

- (7) Emphatic particles such as *-sae* 'even,' *-sura* 'even' and *-mo* 'also'¹⁰
- a. noun
 sensee-sae/sura/mo
 teacher-even/even/also
 'even/also a/the teacher'

⁹ As in the case mentioned in footnote 8, the sentence in (6d) also becomes grammatical if the adverb *takusan* 'a lot' is phonologically elided.

¹⁰ Note that the examples in (7) show whether or not the emphatic particles can attach directly to the root. (7c) becomes grammatical if the morpheme *-de*, which I assume is the predicative copula (cf. Nishiyama (1999)), is inserted between the verbal root and the emphatic particle.

A reviewer points out that the emphatic particles can attach to nouns as in (7a) only if the nouns function as the arguments of verbs; these particles cannot attach to the predicative nominals, as in (i).

- (i) *sensee-sae(-de) ar-u.
 teacher-even(-DE) Cop-Nonpast

Although this is an issue to be investigated, I focus on the fact that a nominal root directly precedes the emphatic particle in some cases.

The reviewer also mentions that (7d) is grammatical if the 'epenthetic' vowel /u/ is inserted after the root of an adjective, as given in (ii).

- (ii) utukusik-u sae ar-u
 beautiful-U even Cop-Nonpast

I assume, however, that the vowel /u/ is not epenthetic; rather, it is the functional head of Pred.

- b. verb
 tabe-sae/sura/mo
 eat-even/even/also
 ‘even/also eat’
- c. *na*-adjective
 *sizuka-sae/sura/mo
 quiet-even/even/also
- d. *k*-adjective
 *utukusi(k)-sae/sura/mo
 beautiful-even/even/also (cf. Ohkado (1991: 78))

The approaches to the categorial status of *na*-adjectives proposed so far are classified into three main types. First, it is claimed that *na*-adjectives belong to a different syntactic category from either nouns or *k*-adjectives (Miyagawa (1987)). Another approach is to claim that *na*-adjectives belong to the same category as *k*-adjectives (Ohkado (1991), Urushibara (1993), Nishiyama (1999)). The third approach is to propose that *na*-adjectives belong to the same category as nouns, but not *k*-adjectives (Uehara (1998), Mihara (2008)).

Although many studies have discussed this issue, most of them have focused only on the syntactic behaviors of each category, and there has been no cross-categorial approach to their morphological and semantic properties.¹¹ In this paper, I demonstrate that the semantic theory proposed by Kennedy and McNally (2005) enables us to capture the morphological realizations of prenominal modifiers in Japanese in a principled way. Specifically, each type of prenominal modifier has characteristic properties in terms of scale structures. First, there is a tendency for maximum-standard adjectives with lower closed scales and adjectives with upper closed scales

¹¹ There have been several studies on the morphology and semantics of adjectives in Japanese. Nishiyama (1999) observes a morphological distinction between *k*-adjectives and *na*-adjectives; the stem of *k*-adjectives is native Japanese and monomorphemic, while the stem of *na*-adjectives is Sino-Japanese and polymorphemic. Although this generalization seems to be correct, this paper reveals that a semantic analysis can also capture a distinction between *k*-adjectives and *na*-adjectives.

Uehara (2002) gives a semantic approach to a distinction between *k*-adjectives and *na*-adjectives; the “basic” semantic types such as DIMENSION, AGE, VALUE and COLOR are usually associated with *k*-adjectives, while *na*-adjectives tend to have more “specific” meanings. I believe that Uehara’s (2002) observation can be explained by the difference in scale structures between *k*-adjectives and *na*-adjectives. That is, *na*-adjectives tend to be the overt realizations of closed-scale adjectives whose standards are absolute, and thus their meanings would be more specific.

to have the *na*-adjective forms in Japanese. Second, open-scale adjectives tend to be realized as *k*-adjectives. Third, nongradable adjectives are realized as *no*-adjectives, whose stems are nominal. There are also some cases in which relative modifiers and maximum-standard modifiers with scales whose lower end is closed are realized as *no*-adjectives. These observations indicate that the semantics of adjectives affects their morphological realizations in Japanese.

The organization of this paper is as follows. In section 2, I briefly review Kennedy and McNally's (2005) account of the scale structures of adjectives. In section 3, I demonstrate that there is a tendency for each scale type to have a certain morphological form of prenominal modifiers in Japanese. The last section concludes the paper.

2. Scale Structure of Adjectives

Kennedy and McNally (2005) give a semantic analysis of gradable adjectives in terms of scale structures. Gradable adjectives map their objects onto abstract representations of measurement, or degrees. Degrees are defined to be points or intervals ordered on a scale. Some gradable adjectives have open scales (i.e. scales that lack minimal and maximal elements), while others have closed scales (i.e. scales that have a minimal and/or maximal element(s)). In order to make a distinction between open-scale and closed-scale adjectives, Kennedy and McNally (2005) use the distribution of proportional modifiers such as *half*, *mostly*, and *most of the way*. Closed-scale adjectives accept modification by these modifiers, while open-scale adjectives do not, as illustrated in (9) and (10).

(8) Modification by proportional modifiers

	closed-scale adjectives	open-scale adjectives
Modification by proportional modifiers	√	??

(9) Closed-scale adjectives

- a. The glass is half/mostly full.
- b. Her eyes were half/most of the way closed.
- c. These images are half/mostly invisible.

(Kennedy and McNally (2005: 352))

(10) Open-scale adjectives

- a.?? The rope is half/mostly long.
- b.?? A 15-year-old house is half/mostly old.
- c.?? That car was half/mostly expensive.

(Kennedy and McNally (2005: 353))

Kennedy and McNally (2005) further divide closed scales into three types—totally closed scales, lower closed scales, and upper closed scales. Totally closed scales are those that have both minimal and maximal elements. Lower closed scales have a minimal but lack a maximal element, and upper closed scales have a maximal but no minimal element. In order to demonstrate that all four types of scales are attested, Kennedy and McNally (2005) use the distribution of endpoint modifiers such as *100%*, *completely*, and *fully*. The four scale types give rise to different patterns of acceptability with endpoint modifiers, as given in (11). It should be noted that Kennedy and McNally (2005) take adjectival polarity into account. Given that a scale structure is an ordered set of degrees, the ordering relation is crucial to a distinction between positive and negative members of antonym pairs. Antonym pairs like *tall/short*, *open/closed*, and *certain/uncertain* use the same scales, but they have inverse ordering relations on those scales. If the positive member of an antonym pair has a maximal degree, the negative member has the minimal degree, and vice versa.

(11) Scale types and modification by endpoint modifiers

	Open scale	Lower closed scale	Upper closed scale	Totally closed scale
$\text{Deg}_{\max} A_{\text{pos}}$	??	??	√	√
$\text{Deg}_{\max} A_{\text{neg}}$	??	√	??	√

(Kennedy and McNally (2005: 354))

(12) Open scale pattern

- a. Her brother is completely ??tall/??short.
- b. The pond is 100% ??deep/??shallow.
- c. Max is fully ??eager/??uneager to help.

(13) Lower closed scale pattern

- a. The pipe is fully ??bent/straight.
- b. The room became 100% ??loud/quiet.
- c. That author is completely ??famous/unknown.

- (14) Upper closed scale pattern
 - a. We are fully certain/??uncertain about the results.
 - b. This product is 100% pure/??impure.
 - c. The treatment is completely safe/??dangerous.
- (15) Closed scale pattern
 - a. The room was 100% full/empty.
 - b. The flower was fully open/closed.
 - c. The figure was completely visible/invisible.

(Kennedy and McNally (2005: 355))

Kennedy and McNally (2005) argue that scale structures are crucial in determining the standard of comparison: gradable adjectives with totally open scales have a context-dependent standard, while adjectives with totally or partially closed scales introduce a trivial, non-context-dependent standard. They refer to the former as relative adjectives and to the latter as absolute adjectives.

According to Kennedy and McNally (2005), the distinction between open and closed scales is related to the distinction between ‘total’ and ‘partial’ predicates in the sense of Rotstein and Winter (2004). Total adjectives require their arguments to have the maximal degree of the gradable property they introduce. Partial adjectives, on the other hand, require their arguments to have some degree of the gradable property in question. In other words, total adjectives have a maximum standard while partial adjectives have a minimum standard. Following Kennedy and McNally (2005), let us refer to total adjectives as maximum-standard adjectives and to partial adjectives as minimum-standard adjectives.

Kennedy and McNally (2005) claim that absolute adjectives have either a maximum or minimum standard, while relative adjectives have neither. They observe that the semantic distinction between relative and absolute adjectives can be found in entailment patterns. First, either one of the entailments in (16) holds true for absolute adjectives. This fact is supported by the contradictory statements in (17) and (18).

- (16) a. For a maximum-standard absolute adjective *adj*, an assertion of *x is adj* should entail that *x* has a maximal amount of *adj*-ness, that is, that nothing can be more *adj* than *x*.
- b. For a minimum-standard absolute adjective *adj*, a denial *x is not adj* should entail that *x* has a zero degree of *adj*-ness, that is, that *x* possesses no amount of *adj*-ness at all.

(Kennedy and McNally (2005: 359))

- (17) Maximum-standard adjectives¹²
- a. #The plant is dead, though one part of it still appears to be alive.
 - b. #The paper is complete. I just have to write the conclusion.
(Kennedy and McNally (2005: 359))
- (18) Minimum-standard adjectives
- a. #My hands are not wet, but there is some water on them.
 - b. #The door isn't open, but it is ajar.
 - c. #The spot is not visible, but I can see a little bit of it.

(Kennedy and McNally (2005: 359))

On the other hand, neither of the entailments in (16) applies to relative adjectives.

- (19) Relative adjectives
- a. Sam is not tall, but his height is normal for his age.
 - b. That film is interesting, but it could be more interesting.
- (Kennedy and McNally (2005: 359))

Second, different kinds of entailments are triggered by relative and absolute adjectives in comparative constructions. Absolute adjectives give rise to the positive and negative entailments in the comparative form, but relative adjectives do not.

- (20) Absolute adjectives
- a. The floor is drier than the countertop. |= The countertop is not dry.
(maximum-standard)
 - b. The floor is wetter than the countertop. |= The floor is wet.
(minimum-standard)
- (Kennedy and McNally (2005: 360))

- (21) Relative adjectives
- a. Rod A is longer than rod B. |≠ Rod A/B is (not) long.
 - b. Rod A is shorter than rod B. |≠ Rod A/B is (not) short.
- (Kennedy and McNally (2005: 360))

Third, there are some pairs of absolute antonyms for which the denial of one form entails the assertion of the other.

¹² There are some cases where the entailment in (16a) does not seem to hold.

(i) A: Your glass is empty; let me get you another beer.

B: No it's not—there are still a few drops left in it.

(Kennedy and McNally (2005: 359))

According to Kennedy and McNally (2005), B's response in (i) is possible as a joke. But the joke is only allowed if A's assertion entails that B's glass is 100% empty.

(22) Absolute adjectives

- a. The door is not open / closed. $\models$ The door is closed / open.
- b. The table is not wet / dry. $\models$ The table is dry / wet.
- c. The baby is not awake / asleep. $\models$ The baby is asleep / awake.

(Kennedy and McNally (2005: 359))

The positive member of each pair in (22) has a minimum degree while the negative member has a maximum degree on the same scale. Relative antonyms, on the other hand, do not give rise to the same entailment patterns.

(23) Relative adjectives

- a. The door is not large / small. $\nmodels$ The door is small / large.
- b. The table is not expensive / inexpensive.
 $\nmodels$ The table is inexpensive / expensive.
- c. The baby is not energetic / lethargic.
 $\nmodels$ The baby is lethargic / energetic.

(Kennedy and McNally (2005: 359))

Given that absolute adjectives have either a minimum standard or a maximum standard, there are six types of absolute adjectives in terms of scale structures, as given in (24).

(24) Six types of absolute adjectives

- a. Maximum-standard adjectives with lower closed scales
- b. Minimum-standard adjectives with lower closed scales
- c. Maximum-standard adjectives with upper closed scales
- d. Minimum-standard adjectives with upper closed scales
- e. Maximum-standard adjectives with totally closed scales
- f. Minimum-standard adjectives with totally closed scales

Each type of (partially or totally) closed scale is illustrated in (25). The white dot represents an open endpoint on a scale, and the black dot a closed endpoint.

(25) a. Lower closed scale

b. Upper closed scale

Here are some examples of absolute adjectives in English.

(26) Absolute adjectives in English

Lower closed scale		Upper closed scale		Totally closed scale	
Maximum standard	Minimum standard	Maximum standard	Minimum standard	Maximum standard	Minimum standard
naked	dressed	safe	dangerous	closed	open
straight	bent/curved/ crooked	complete	incomplete	full	
flat/smooth	rough	clear	unclear	empty	visible
quiet	loud	truthful	untruthful	invisible	alive
unknown	famous	certain	uncertain	dead	awake
dry	wet	perfect	imperfect	asleep	
clean	dirty	pure	impure	satiated	hungry
whole	cracked	healthy	sick/ unhealthy		

(26) provides two interesting observations. First, some deverbal adjectives can be found in (26), such as *dressed*, *bent* and *closed*.¹⁴ Notice that they have either lower closed scales or totally closed scales. Kennedy and McNally (2005: 365) mention that deverbal adjectives cannot have lower-open scales because “there should always be a minimal event that supports the truth of the adjectival predication and that is homomorphically related

¹³ As given in (25c) and (25c'), there are two types of totally closed scales, since the maximum standard corresponds to either the upper end or the lower end on the scale. It should also be noted that there are some antonym pairs of totally closed adjectives, both members of which have the maximum standards on the same scale, such as *full* and *empty*.

¹⁴ The table in (26) at first glance would appear to suggest that deverbal adjectives are always derived from achievement verbs. Kennedy and McNally (2005), however, give some examples of deverbal adjectives whose sources are not achievement verbs. For example, the deverbal adjective *unknown* is derived from the stative verb *know*, which is atelic.

to the lower bound on the scale.” Second, most minimum-standard adjectives with upper closed scales have a form in which one of the negative morphemes *un-/in-* attaches to their antonym adjectives; the maximum-standard adjective *complete*, for example, uses an upper closed scale, and the minimum-standard adjective on the same scale is its antonym *incomplete*, which is formed by attachment of the negative morpheme *in-* to the positive member *complete*.

Now a question arises as to the distinction between lower closed scales and upper closed scales. These two scales are the same in the sense that the scale is partially closed: either the upper or lower end on the scale is closed. It is unclear how lower and upper closed scales should be distinguished. Consider, for example, the antonym pair of the adjectives *certain* and *uncertain*. According to Kennedy and McNally (2005), this antonym pair uses an upper closed scale: the positive adjective *certain* has the meaning that its argument has the degree that corresponds to the upper endpoint on the scale. But it might be possible to suppose that this antonym pair has a lower closed scale: the adjective *certain* might require the argument to possess the degree that corresponds to the lower endpoint on the scale. If lower and upper closed scales were treated uniformly as ‘partially closed scales,’ it would not be necessary to make a distinction between them.

The next section, however, demonstrates that there exists a clear distinction between lower and upper closed scales; in Japanese, some adjectives with lower closed scales have different morphological realizations from adjectives with upper closed scales. The morphological differences among scale types show a correlation between the morphology and semantics of adjectives.

3. Correlation between the Morphology and Semantics of Adjectives in Japanese

3.1. Relative Adjectives

Now let us consider the scale structures of prenominal modifiers in Japanese. First, relative adjectives tend to be realized as *k*-adjectives in Japanese. Morita (2010, 2011) demonstrates that the semantic classes such as SIZE, LENGTH, HEIGHT, SPEED, DEPTH, WIDTH, WEIGHT, and TEMPERATURE tend to have the *k*-adjective forms.¹⁵ The adjectives related to

¹⁵ The semantic classification of adjectives is based on Scott’s (2002) universal hierarchy of AP-related functional projections. See also footnote 18.

these semantic classes are gradable; they can accept modification by the degree adverb *totemo* 'very,' and they cannot be modified by endpoint modifiers such as *hanbun* 'half,' *hotondo* 'mostly,' *kanzen-ni* 'completely' and 100%.

(27) a. SIZE:

totemo ooki(k)-i/tiisa(k)-i inu
 very big /small dog
 *{hanbun/hotondo/kanzen-ni /100%} ooki(k)-i/tiisa(k)-i inu
 half /mostly /completely/100% big /small dog

b. LENGTH:

totemo naga(k)-i/mizika(k)-i kami
 very long /short hair
 *{hanbun/hotondo/kanzen-ni /100%} naga(k)-i/mizika(k)-i
 half /mostly /completely/100% long /short
 kami
 hair

c. HEIGHT:

totemo taka(k)-i/hiku(k)-i biru
 very high /low building
 *{hanbun/hotondo/kanzen-ni /100%} taka(k)-i/hiku(k)-i
 half /mostly /completely/100% high /low
 biru
 building

d. SPEED:

totemo haya(k)-i/oso(k)-i kuruma
 very fast /slow car
 *{hanbun/hotondo/kanzen-ni /100%} haya(k)-i/oso(k)-i kuruma
 half /mostly /completely/100% fast /slow car

e. DEPTH:

totemo huka(k)-i/asa(k)-i mizuumi
 very deep /shallow lake
 *{hanbun/hotondo/kanzen-ni /100%} huka(k)-i/asa(k)-i
 half /mostly /completely/100% deep /shallow
 mizuumi
 lake

f. WIDTH:

totemo hiro(k)-i/sema(k)-i tuuro
 very wide /narrow path
 *{hanbun/hotondo/kanzen-ni /100%} hiro(k)-i/sema(k)-i tuuro
 half /mostly /completely/100% wide /narrow path

g. WEIGHT:

totemo omo(k)-i/karu(k)-i kaban

very heavy /light bag

*{hanbun/hotondo/kanzen-ni /100%} omo(k)-i/karu(k)-i kaban

half /mostly /completely/100% heavy /light bag

h. TEMPERATURE:

totemo atu(k)-i/samu(k)-i heya

very hot /cold room

*{hanbun/hotondo/kanzen-ni /100%} atu(k)-i/samu(k)-i heya

half /mostly /completely/100% hot /cold room

The above examples show that the adjectives of SIZE, LENGTH, HEIGHT, SPEED, DEPTH, WIDTH, WEIGHT, and TEMPERATURE have totally open scales, and that they have the *k*-adjective forms in Japanese.

3.2. Absolute Adjectives

Next, let us consider absolute adjectives in Japanese. Sawada and Grano (2011) observe a tendency for adjectives with lower closed scales to have the deverbal forms in Japanese, as given in (28).

- (28) a. magat-ta sao
bent rod
'a/the bent rod'
- b. katamui-ta too
inclined tower
'a/the leaning tower'

In (28a), for example, the prenominal modifier *magat-ta* 'bent' has a deverbal form, whose source is the intransitive verb *magar-* 'bend.'

Notice that adjectives with totally closed scales are also deverbal, as in (29).

- (29) Deverbal adjectives with totally closed scales
hirai-ta/ai-ta 'open,' *simat-ta/tozi-ta* 'closed,' (*me-ni*) *mier-* 'visible,'
(*me-ni*) *mie-nak-* 'invisible,' *iki-ta* 'alive,' *sin-da* 'dead,'
(*me-ga*) *same-ta* 'awake,' *nemut-ta* 'asleep,' *manzoku-si-ta* 'satiated'

This observation is compatible with Kennedy and McNally's (2005) claim that deverbal adjectives should not be associated with a scale whose lower end is open, since there must be a minimal event that is homomorphically related to the lower end on the scale.

It is not the case, however, that lower-closed adjectives are always realized as deverbal adjectives. Some adjectives with lower closed scales are realized as *na*-adjectives, as given in (30).

- (30) *Na*-adjectives with lower closed scales
massugu-na 'straight,' *sizuka-na* 'quiet,' *yuume-na* 'famous,'
nameraka-na 'smooth,' *kirei-na/seiketu-na* 'clean,' *taira-na* 'flat'

The examples in (31) show that *na*-adjectives do not always have lower closed scales.

- (31) *Na*-adjectives with upper closed scales
anzen-na 'safe,' *kiken-na* 'dangerous,' *akiraka-na* 'clear,'
humeeryoo-na 'unclear,' *kanzen-na/kanpeki-na* 'complete, perfect,'
hukanzen-na 'incomplete, imperfect,' *seizitu-na* 'truthful,'
huseizitu-na 'untruthful,' *tasika-na* 'certain,' *hutasika-na* 'uncertain,'
junsui-na 'pure,' *hujun-na* 'impure,' *kenkoo-na* 'healthy'

These observations require a detailed classification of absolute adjectives in terms of scale structures.

Now let us classify absolute adjectives in Japanese into six scale types. In the previous section, I have given some examples of absolute adjectives in English. Here are the Japanese counterparts to the English absolute adjectives in (26).

- (32) Absolute adjectives in Japanese

Lower closed scale		Upper closed scale		Totally closed scale	
Maximum standard	Minimum standard	Maximum standard	Minimum standard	Maximum standard	Minimum standard
hadaka-no 'naked'	(huku-o) ki-ta 'dressed'	anzen-na 'safe'	kiken-na/ abunak- 'dangerous'	simat-ta/ tozi-ta 'closed'	hirai-ta/ ai-ta 'open'
massugu-na 'straight'	magat-ta 'curved, crooked, bent'	kanzen-na/ kanpeki-na 'complete, perfect'	hukanzen-na 'incomplete, imperfect'	ippai-no 'full'	
taira-na 'flat'	zarazara- si-ta/ dekoboko- si-ta 'rough'	meeryoo-na /akiraka-na 'clear'	humeeryoo- na 'unclear'	kara-no 'empty'	(me-ni) mier- 'visible'
nameraka- na 'smooth'	si-ta 'loud'	seizitu-na 'truthful'	huseizitu-na 'untruthful'	sin-da 'dead'	iki-ta 'alive'
sizuka-na 'quiet'	urusak- 'loud'	tasika-na 'certain'	hutasika-na 'uncertain'	nemut-ta 'asleep'	(me-ga) same-ta 'awake'
mumee-no 'unknown'	yuume-na 'famous'	junsui-na 'pure'	hujun-na 'impure'		kuuhuku-no 'hungry'
kawai-ta 'dry'	nure-ta/ simet-ta 'wet'	kenkoo-na 'healthy'	hukenkoo-na 'unhealthy'/ byooki-no 'sick'	manzoku- si-ta 'satiated'	
kirei-na/ seiketu-na 'clean'	yogore-ta 'dirty'				
kanzen-na/ mukizu-no 'whole'	kake-ta/ kudake-ta 'cracked'				

Recall that each scale type of adjective in English exhibits a different acceptability pattern with endpoint modifiers such as *100%*, *completely* and *fully*, as repeated in (33).

(33) Scale types and modification by endpoint modifiers

	Lower closed scale	Upper closed scale	Totally closed scale
Deg _{max} A _{pos}	??	√	√
Deg _{max} A _{neg}	√	??	√

(Kennedy and McNally (2005: 354))

The adjectives in (34) show the same acceptability patterns with *kanzen-ni* ‘completely’ and *100%*.

- (34) a. Adjectives with lower closed scales
kanzen-ni massugu-na/??magat-ta sen
completely straight / bent line
‘a/the completely straight/??bent line’
b. Adjectives with upper closed scales
100% junsui-na/??hujun-na mizu
100% pure / impure water
‘100% pure/??impure water’
c. Adjectives with totally closed scales
kanzen-ni simat-ta/hirai-ta doa
completely closed /open door
‘a/the completely closed/open door’

The observations in (32) suggest that there is a tendency for each scale type to contain adjectives of a certain morphological form in Japanese. First, maximum-standard adjectives with lower closed scales tend to be *na*-adjectives, while minimum-standard adjectives with lower closed scales tend to be deverbal. Second, both maximum-standard and minimum-standard adjectives with upper closed scales tend to be realized as *na*-adjectives. Third, totally closed-scale adjectives, whether they have a maximum standard or a minimum standard, tend to be realized as deverbal forms. These facts can be summarized as in (35).

(35) Absolute adjectives in Japanese

	Lower closed scale adjective		Upper closed scale adjective	Totally closed scale adjective
	maximum-standard	minimum-standard		
morphology	<i>na</i> -adjective	deverbal	<i>na</i> -adjective	deverbal

3.3. Similarities between English and Japanese Absolute Adjectives

The facts observed in (32) show some similarities between English and Japanese in the morphological realizations of absolute adjectives. First, the tendency for adjectives with lower closed scales and totally closed scales to be deverbal is not specific to Japanese; it also holds in English. Recall that deverbal adjectives in English have either lower closed scales or totally closed scales, although deverbal forms cannot be found in the other scale types. It should also be noted that in English, as well as in Japanese, adjectives with scales whose lower end is closed tend to be deverbal when they have a minimum standard, rather than a maximum standard.

- (36) Minimum-standard adjectives with a lower closed scale in English
dressed, bent, curved, crooked, cracked

As mentioned above, Kennedy and McNally (2005) claim that the scales that deverbal adjectives use must be lower closed, because their meanings indicate the existence of a minimal event, which is homomorphically linked to the lower endpoint on the scale. It, however, remains unclear why minimum-standard adjectives, not maximum standard adjectives, are deverbal in the case of lower closed scales.

Second, most minimum-standard adjectives with upper closed scales have the negated form of their antonyms (i.e. the maximum-standard adjectives on the same scale) in both English and Japanese. In English, the minimum-standard adjective *incomplete*, for example, is formed by the attachment of the negative morpheme *in-* to the maximum-standard adjective *complete*. The same observation holds true in Japanese. The minimum-standard adjective *hukanzen-na* ‘incomplete’ has a form in which the negative morpheme *hu-* ‘in-/un-’ attaches to the maximum-standard adjective *kanzen-na* ‘complete.’

(37) Upper closed scale adjectives

	Maximum standard	Minimum standard
Japanese	kanzen-na/kanpeki-na 'complete, perfect' meeryoo-na/akiraka-na 'clear' seizitu-na 'truthful' tasika-na 'certain' junsui-na 'pure' kenkoo-na 'healthy'	hu -kanzen-na 'incomplete, imperfect' ¹⁶ hu -meeryoo-na 'unclear' hu -seizitu-na 'untruthful' hu -tasika-na 'uncertain' ¹⁷ hu -jun-na 'impure' hu -kenkoo-na 'unhealthy' / byooki-no 'sick'
English	complete perfect clear truthful certain pure healthy	in -complete im -perfect un -clear un -truthful un -certain im -pure un -healthy/sick

Antonym pairs of lower-closed adjectives, on the other hand, do not have this morphology. This morphological difference clearly shows a distinction between lower and upper closed scales.

3.4. Another Semantic Factor in Determining the Morphology

The observations in (32) suggest that an adjective with a certain type of scale has a certain type of morphology. But it is not the case that an adjective with a certain type of morphological form must be linked to a certain scale type. I have shown that maximum-standard adjectives with lower closed scales and adjectives with upper closed scales tend to be *na*-adjectives. However, *na*-adjectives are not always the overt realizations of either maximum-standard adjectives with lower closed scales or totally closed scale adjectives. There are a number of *na*-adjectives that have totally open scales, as shown in (38).

¹⁶ The negative morpheme *hu*- cannot attach to the positive adjective *kanpeki-na* 'perfect.'

¹⁷ The negative morpheme *hu*- usually attaches only to Sino-Japanese stems, not to native Japanese stems. This example is an exception since the stem *tasika* 'certain' is native Japanese.

- (38) *Na*-adjectives with totally open scales
kokkee-na ‘funny,’ *mare-na* ‘rare,’ *sinsen-na* ‘fresh,’ *baka-na* ‘stupid,’
kiree-na ‘beautiful,’ *okasi-na/kimyoo-na* ‘strange,’ *sinsetu-na* ‘kind,’
syooziki-na ‘honest,’ *suki-na* ‘favorite,’ *kirai-na* ‘unfavorite’

These adjectives can be modified by the degree adverb *totemo* ‘very,’ but they cannot be modified by endpoint modifiers such as *kanzen-ni* ‘completely’ and 100%.

- (39) a. *totemo*/??*kanzen-ni* *sinsen-na* *yasai*
 very / completely fresh vegetable
 ‘very/??completely fresh vegetables’
 b. *totemo*/??100% *kiree-na* *tori*
 very / 100% beautiful bird
 ‘a/the very/??completely beautiful bird’

The tendency in (35) cannot account for the fact that some *na*-adjectives have totally open scales. It should be noted that they are related to particular semantic classes, namely SUBJECTIVE COMMENT and EVIDENTIAL (cf. Scott (2002)).¹⁸ This fact suggests that it is not only the scale types but also the semantic classes of adjectives that are crucial to the morphological realizations of adjectives in Japanese.

3.5. Nominal Modifiers

Last, let us consider the difference between *no*-adjectives and *na*-adjectives. Morita (2010, 2011) observes that non-gradable modifiers are usually realized as *no*-adjectives in Japanese.¹⁹ In (40) and (41), *no*-adjectives are the overt realizations of the semantic classes NATIONALITY/ORIGIN and MATERIAL.

¹⁸ According to Scott (2002), SUBJECTIVE COMMENT indicates “the speaker’s own evaluation or an evaluation that may be more transitory,” and EVIDENTIAL indicates “some kind of general, stable, or standard evaluation” (Scott (2002: 109–110)). Following Cinque (1994, 1999), Scott (2002) claims that each semantic class of adjectives occurs in the specifier of the functional projection semantically related to it, and there is a fixed universal hierarchy of the functional projections, as given in (i).

(i) ... SUBJECTIVE COMMENT > ?EVIDENTIAL > SIZE > LENGTH > HEIGHT > SPEED > ?DEPTH > WIDTH > WEIGHT > TEMPERATURE > ?WETNESS > AGE > SHAPE > COLOR > NATIONALITY/ORIGIN > MATERIAL > COMPOUND ELEMENT > NP (Scott (2002: 114))

¹⁹ As mentioned in section 1, I consider the stem preceding the morpheme *-no* to be nominal.

(40) NATIONALITY/ORIGIN:

- a. (**totemo*) nihon-no haiyuu
very Japanese actor
- b. (**totemo*) tyuugoku-no kabin
very Chinese vase

(41) MATERIAL:

- a. (**totemo*) tetu-no tobira
very iron door
- b. (**totemo*) ki-no tukue
very wooden desk

Some *no*-adjectives, however, have maximum standards on lower closed scales or on totally closed scales, as given in (42). Notice that these adjectives can be modified by endpoint adverbs such as *kanzen-ni* ‘completely,’ *hanbun* ‘half’ and *hotondo* ‘almost.’

- (42) a. *kanzen-ni* hadaka-no otoko
completely naked man
- b. *kanzen-ni* mumee-no sakka
completely unknown writer
- c. *hanbun* kara-no koppu
half empty glass
- d. *hotondo* ippai-no koppu
almost full glass

Moreover, there are other *no*-adjectives that have totally open scales; the *no*-adjectives in (43) can accept modification by degree adverbs like *totemo*/*hizyoo-ni* ‘very’ and *kanari* ‘pretty much.’

(43) Relative *no*-adjectives

- a. *totemo* ganbariya-no gakusee
very person.who.perseveres-NO student
‘a/the student who perseveres’
- b. *hizyoo-ni* benkyooka-no gakusee
very hard.worker-NO student
‘a/the student who works very hard’
- c. *kanari* doryokuka-no gakusee
pretty.much hard.worker-NO student
‘a/the student who works very hard’
- d. *totemo* bizin-no tuma
very beautiful.person-NO wife
‘a/the very beautiful wife’

These modifiers cannot co-occur with endpoint modifiers such as *hanbun*

'half,' *hotondo* 'mostly' and *kanzen-ni* 'completely.'

- (44) a. *{*hanbun/hotondo/kanzen-ni* /100%} *ganbariya-no*
 half /mostly /completely/100% person.who.perseveres-NO
 gakusee
 student
- b. *{*hanbun/hotondo/kanzen-ni* /100%} *benkyooka-no* *gakusee*
 half /mostly /completely/100% hard.worker-NO student
- c. *{*hanbun/hotondo/kanzen-ni* /100%} *doryokuka-no* *gakusee*
 half /mostly /completely/100% hard.worker-NO student
- d. *{*hanbun/hotondo/kanzen-ni* /100%} *bizin-no* *tuma*
 half /mostly /completely/100% beautiful.person-NO wife

Kato (2003) observes that there are two types of *-no*, i.e. the "predicative" *-no* and the "non-predicative" *-no*. If "X-*no* Y" can be paraphrased as "Y which is X," the morpheme *-no* is predicative. If, on the other hand, "X-*no* Y" can be paraphrased as "X and its Y," the morpheme *-no* is non-predicative. I claim that there is another type of *-no*, i.e. the linking *-no*, that combines with a stem to form non-gradable modifiers in (40) and (41). The morpheme *-no* in (42) and (43) is predicative, since *hadaka-no* 'naked' in (42a) and *ganbariya-no* in (43a), for example, can be paraphrased as follows.

- (45) a. *hadaka-no otoko* → *hadaka-de ar-u* *otoko*
 naked man naked Cop-Nonpast man
 'a naked man'
- b. *ganbariya-no* *gakusee*
 person.who.perseveres-NO student
 'a/the student who perseveres'
- *ganbariya-de ar-u* *gakusee*
 person.who.perseveres Cop-Nonpast student

Relative adjectives can be overtly realized not only as *k*-adjectives, but also as *na*-adjectives and *no*-adjectives. When they are realized as *no*-adjectives, they show a peculiar morphological property: the stems of the modifiers in (44) include the morphemes *-ya*, *-ka*, and *-zin*, all of which mean 'person.' It follows that relative adjectives are allowed to be realized as *no*-adjectives only if the stem includes the morpheme describing 'person.' This fact also confirms that the semantics plays an important role in determining the morphology of adjectives in Japanese.

4. Concluding Remarks

This paper has revealed that there is a tendency for a certain scale type of adjective to have a certain morphological form in Japanese. First, non-gradable adjectives are realized as *no*-adjectives. Second, relative adjectives (i.e. open-scale adjectives) tend to have the *k*-adjective forms. Third, there are two types of morphological realizations for absolute adjectives. Adjectives are realized as *na*-adjectives when they are either maximum-standard adjectives with lower closed scales or adjectives with upper closed scales. Minimum-standard adjectives with lower closed scales and adjectives with totally closed scales tend to be deverbal. The morphological realizations of adjectives in Japanese are summarized as follows.

(46) Adjectives in Japanese

Nongradable	Gradable				
	Relative	Absolute			
	Open scale	Lower closed scale		Upper closed scale	Totally closed scale
		maximum standard	minimum standard		
<i>no</i> -adjective (the linking - <i>no</i>)	<i>k</i> -adjective	<i>na</i> -adjective	deverbal	<i>na</i> -adjective	deverbal
	<i>na</i> -adjective (the semantic classes SUBJECTIVE COMMENT and EVIDENTIAL)	<i>no</i> -adjective (predicative - <i>no</i>)			<i>no</i> -adjective (predicative - <i>no</i>)
	<i>no</i> -adjective (predicative - <i>no</i>)				

If the generalization in (46) is correct, the next thing to consider is what causes each scale type to have a different morphological form. In the framework of Distributed Morphology, it has been claimed that a root is category-neutral and it becomes an N, V, or A when it merges with a functional head such as *n*, *v*, or *a*. If both *k*-adjectives and *na*-adjectives belong to the same syntactic category Adjective, a root should combine with the *a* head to form an “adjective.” Given that the morpheme *-k* of *k*-adjectives and the morpheme *-na* of *na*-adjectives are the overt realizations of the *a* head (cf. Morita (2010, 2011)), the *a* head with which each type

combines should differ with respect to scale structure. It might also be possible to suppose that each scale type of adjectives has different internal structure: a root would combine with a different functional head, and thus each type would belong to a different lexical category. Another possibility is to suppose that it is not the functional head but the root (or the stem) that encodes information about scale structure. Further research on this issue from various aspects is required.

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