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著者(英)	Yo Matsumoto, Yasuyo Ichikawa(Yoshida)
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JAPANESE CLASSIFIERS AND THE PRAGMATIC REDUCTION OF LEXICAL MEANINGS

Yo Matsumoto Yasuyo Ichikawa (Yoshida)

NINJAL *Nishinomiya, Japan*

1. INTRODUCTION

The topic discussed in this paper is the division of labor between semantics and pragmatics in lexical meanings (McCawley 1978, Horn 1984, Blutner 2004).[1] We will provide relevant data from Japanese classifiers. There are cases the use of a classifier is restricted because of the possibility of the use of another classifier. We will argue that this phenomenon of restriction is pragmatically governed, and therefore need not be treated in the semantic description of classifiers. We will present an analysis based on 1) the neo-Gricean theory of pragmatics (Horn 1984, 2004, Levinson 1987, 2000), especially the Conversational Condition on Quantity implicature (Matsumoto 1995), and 2) the prototype view of semantics (Fillmore 1982, Lakoff 1987, Matsumoto 1993).

2. SEMANTICS AND PRAGMATICS IN LEXICAL SEMANTICS

The simplification of a semantic description of lexical items by general principles of pragmatics can be seen in Grice's (1989 [1967]) analysis of logical connectives and quantifiers. For example, the conjunction *or* is often used in natural language in a way very different from logical *or* (disjunction); in natural language the expression "A or B" is often used when the speaker is not sure which of A and B is true. He pointed out that the 'not-sure' meaning of *or* is produced because of the speaker observing his Cooperative Principles of Conversation and therefore can be eliminated from the semantics of the word, which is just that of the logical *or*. Another case is the meanings of quantifiers (Grice 1989 [1967], Horn 1972). Grice claims that the semantic meaning of *some*, for example, is 'at least some', and the 'exactly some, not several or all' reading is an implicature that is produced based on the failure of using alternative words like *several* and *all*. That is, the existence of *several* and *all* restricts the use of *some* when they are more appropriate.

An attempt in a similar line is made by McCawley (1978) in his analysis of the meanings of certain lexical and periphrastic expressions. McCawley observes that periphrastic causative expressions like *cause to die* have only the reading of indirect causation, while others like *cause to fall*, he says, have the reading of both direct and indirect causation. He attributes this difference to the existence of corresponding lexical items like *kill*, which have direct causation reading. That is, *kill* restricts the reading of *cause to die* to only indirect causation, whereas the lack of a lexical item for *cause to fall* makes the phrase ambiguous or vague. McCawley gives a pragmatic account of this

phenomenon. He says that periphrastic causatives are semantically neutral with respect to the directness of causation but given an interpretation of 'indirect causation' through conversational implicature due to the existence of corresponding lexical causatives representing direct causation. He attributes this conversational implicature to the extra effort required in using periphrastic expressions. Such a pragmatic account would eliminate many negative conditions (e.g. 'not direct causation') from the semantic entries of a word.

Similar analyses have been made for pairs of terms such as a) *square* and *rectangle*, b) *finger* and *thumb*, and c) *player* and *pitcher* in certain contexts (Horn 1984, cf. Kempson 1980).

Grice (1989: 47) formulates such an attempt to simplify semantic descriptions by pragmatics in terms of Modified Occam's Razor: "Senses are not to be multiplied beyond necessity." However, it is not just senses but also conditions that can be kept minimum. Thus, we may formulate our attempt to reduce semantics by pragmatics by the following principle.

(1) Pragmatic Occam's Razor:
Do not multiply senses or conditions in semantic description if they can be derived from (an) independently motivated general principle(s) of pragmatics.

In this paper, we are going to argue for a case to which such pragmatic reduction of lexical meanings can be appropriately applied. The phenomenon to be discussed involves the use of Japanese numeral classifiers: the use of a classifier is restricted due to the possibility of the use of another classifier (Matsumoto 1993). In Matsumoto (1993) it was suggested that this phenomenon is pragmatically governed and that such restrictions need not be treated in the semantic description of classifiers. In this paper we will present details of this account, with the formulation of a constraint on conversational implicature (Matsumoto 1995) and new data on classifier use, primarily based on Ichikawa's work (see Yoshida 2013, Yoshida & Matsumoto 2011).

3. NUMERAL CLASSIFIERS IN JAPANESE

3.1. System of Japanese classifiers.

The linguistic expressions we are going to examine are numeral classifiers (Allan 1977, Craig 1986, Aikhenvald 2000, Nishimitsu and Mizuguchi 2004). Numeral classifiers are a set of morphemes that occur primarily with numerals and are selected in accordance with the nature of the objects counted. Examples from Japanese are given in (2).

(2) a. Ringo-ga huta-tsu aru.[2]
apple-Nom two-CLASS there.be
"There are two apples."

b. Empitsu-ga ni-hon aru.
pencil-Nom two-CLASS there.be
"There are two pencils."

c. Kuruma-ga ni-dai aru.
car-Nom two-CLASS there.be
"There are two cars."

Major classifiers in Japanese are listed in Table 1, grouped according to the major conditions of use (see Matsumoto 1993, Downing 1996 for more extensive lists). Some of them (i.e., *-tsu* and *-hiki*) are general classifiers, which are default choices within inanimate and nonhuman animate domains, respectively. One major class of classifiers within the inanimate domain is configurational classifiers, used for objects of certain shape/size. Another class is the somewhat miscellaneous group of nonconfigurational classifiers, which are used for objects of a certain structure and/or function (and sometimes shape/size in addition).

The semantics of Japanese classifiers has been the target of many studies (Matsumoto 1993, Downing 1996, Mano and Yonezawa 2013). Typically, classifiers are prototype-based categories (Lakoff 1987, Matsumoto 1993). Based on experimental evidence, Matsumoto (1993) argues that members belonging to a classifier category are not equal in status, with some members more prototypical than others. For example, cars and busses are judged as the most acceptable as members of the *-dai* category (and therefore are prototypical examples), while ceiling lights and wall clocks are less so (Matsumoto 1993).

Table 1 Major Japanese classifiers

A) Classifiers for inanimate entities	
i) general classifier	
-tsu	inanimate entities in general (used with native numerals)
ii) configurational classifiers	
-ko	3-dimensional objects, e.g., stones[3]
-hon	saliently 1-dimensional (or long) objects, e.g., pencils
-mai	saliently 2-dimensional (or flat) objects, e.g., paper
-tsubu	saliently 0-dimensional (or tiny) objects, e.g., grains
iii) nonconfigurational classifiers	
-dai	vehicles and machines, e.g., cars, computers
-satsu	bound objects, e.g., books
-ken	houses and other buildings
-chaku	clothing
-ki	flying vehicles, e.g., airplanes
-choo	handled tools and weapons, e.g., rifles
-joo	medical tablets
B) Classifiers for animate domain	
-ri/nin	human beings
-hiki	nonhuman animate beings in general
-too	large four-legged animals
-wa	winged animals

The system of Japanese classifiers is interesting in two ways. First, there is much overlap in the referential domains of classifiers (Matsumoto 1993). General classifiers are

potentially applicable for the referents of nongenral classifiers. Configurational classifiers as analyzed above cover the whole referential domain of concrete objects and so one of them should be available to any referent of nonconfigurational classifiers. Second, the system is rather loosely structured (Matsumoto 1993, Downing 1996). Nonconfigurational classifiers are a miscellaneous set, and there is no clear relationship between configurational and nonconfigurational classifiers. Referents of *-dai* (a classifier for vehicles and machines), for example, come in different shapes and sizes (compare TV sets, thin mobile phones, and long cars of a train), and so it is not subordinate (or superordinate) to any one of the configurational classifiers.

3.2. Classifier choice in overlapping referential domains

Given the overlapping referential domains of classifiers, there is an issue of choice when more than one is potentially available. In such cases, there are certain preference rules (Matsumoto 1993). First, nongeneral classifiers are given priority over general classifiers. For example, all the referents of configurational and nonconfigurational classifiers for inanimate entities should also satisfy the conditions of *-tsu,* the general classifier for inanimate entities. However, the use of the general classifier is judged (relatively) strange in such cases, and more specific classifiers are preferred.

(3) Kuruma-ga {ni-dai/??huta-tsu} aru.
car-Nom two-CLASS there.be
"There are two cars."

Also, birds and large animals satisfy the condition of *-hiki*, the general classifier for nonhuman animate beings, but for those living things Japanese speakers usually employ *-wa*, a classifier for winged living things, and *-too*, a classifier for large four-legged animals.

Second, nonconfigurational classifiers tend to be given priority over configurational classifiers (Matsumoto 1993), as is the case of TV sets in (4), in which *-dai* is preferred over *-ko* (a classifier for three-dimensional objects).

(4) Terebi-ga {ni-dai/??ni-ko} aru.
TV-Nom two-CLASS there.be
"There are two TV sets."

Women's one-piece swimwear should satisfy the conditions for *-mai*, a classifier for two-dimensional objects; rifles should satisfy the conditions of *-hon*, a classifier for one-dimensional objects; oval-shaped medical tablets should satisfy the conditions of *-tsubu*, a classifier for zero-dimensional objects. These objects are, however, usually referred to by *-chaku*, a classifier for certain clothing, *-choo*, a classifier for handled tools and weapons, and *-joo*, a classifier for medical tablets, respectively.

3.3. Nature of priority patterns

Two things should be made clear about the restriction in the use of nonprioritized classifiers. First, the unacceptability of the nonprioritized classifiers is a matter of degree

(Matsumoto 1993). For example, the use of *-tsu* for houses (referents of *-ken*) is not completely unacceptable (Matsumoto 1988); in Yoshida's data, the acceptability rating is 4.22 in a scale ranging from 0.00 to 10.00. The nonconfigurational classifiers also do not totally rule out the use of configurational classifiers. The acceptability of *-tsubu* for medical tablets (to which *-joo* is preferred) is 8.25; that of *-hon* for rifles (to which *-choo* is preferred) is 5.18.

There are two major factors determining the relative unacceptability of nonprioritized classifiers. The first factor is the prototypicality of the referents as category members of a prioritized classifier (Matsumoto 1993). For example, the use of *-tsu* for cars or other prototypical referents of *-dai* is almost unacceptable, while that of clocks or other non-prototypical referents of *-dai*, has a higher degree of acceptability. In general, the more prototypical a referent is with respect to a prioritized classifier, the less acceptable the use of a nonprioritized classifier for that referent. There is a high negative correlation between the acceptability of *-tsu* and *-ken* (r= –0.78) (Matsumoto 1988), and between that of *-tsu* and *-hon* (r= –0.75) (Matsumoto 1986). A similar result is obtained with respect to *-tsu* and *-dai* (r= –0.92) (Matsumoto's unpublished work).

The unacceptability also depends on individual prioritized classifiers; different classifiers have different strengths in restricting the use of nonprioritized classifiers. For example, the acceptability of *-tsu* for the prototypical referents of prioritized classifiers is different from classifier to classifier. We tested the acceptability of *-tsu* for the prototypical example of *-ko*, *-hon*, *mai*, *-tsubu*, *-dai*, *-ki*, *-satsu*, *-ken*, *-chaku*, *-choo* and *-joo*, by asking 20 native speakers of Japanese to rate it on a 7-point scale. The results are given in Table 2, with the values adjusted to range between 0.00 and 10.00.

There is a large difference among classifiers. The acceptability of *-tsu* for the prototypical referents of *-ko* (apples), for example, is quite high, almost perfectly accepted, while that for the prototypical referents of *-dai* (cars) is quite low, almost completely unacceptable.

Table 2 The acceptability of *-tsu* for the referents of other inanimate classifiers

objects	classifiers used	acceptability of *-tsu*
apple	*-ko*	8.20
medical tablet	*-joo*	7.37
grains of rice	*-tsubu*	7.02
magazine	*-satsu*	6.67
newspaper	*-bu*	6.58
rifle	*-choo*	5.70
pencil	*-hon*	5.53
house	*-ken*	4.22
bombardier	*-ki*	3.95
paper	*-mai*	3.60
(a trickle of) tears	*-suji*	2.80
car	*-dai*	1.23

Another thing to note is the relationship between the prioritized and nonprioritized classifiers. There is often no sense relation to describe the relationship between prioritized and nonprioritized classifiers. In some cases, the relationship of hyponymy holds: the relationship between general classifiers and nongeneral classifiers are in a superordinate-subordinate relationship (e.g., *-tsu* is superordinate to the other classifiers for inanimate objects, and *-hiki* is superordinate to the other classifiers for living things). However, it is difficult to characterize the relationship between prioritized non-configurational classifiers and nonprioritized configurational classifiers. I suggested above that the classifier *-dai* restricts the use of *-ko* for TV sets. However, not all the referents of *-dai* are potential referents of *-ko*. That is, the (potential) referential domains of *-ko* and *-dai* crosscut each other. Another example is *-chaku* and *-mai*. *-Chaku* is used for the clothing, typically those which are worn on the torso (as opposed to head and legs) on the outermost layer (as opposed to underwear). The referents of *-chaku* include a set of suits, jackets, coats, women's one-piece swimwear, and the upper part of a bikini. The use of *-chaku* restricts the use of *-mai* for one-piece swimwear, but *-chaku* is not subordinate to *-mai*, since its referents include a set of suits and the upper part of a bikini, which cannot be regarded as potential referents of *-mai*. Again, the referential domain of *-chaku* crosscuts the (potential) referential domain of *-mai*. Therefore, prioritized *-dai* or *-chaku* cannot be said to be hyponyms of nonprioritized *-ko* or *-mai.*

This relationship between configurational and non-configurational classifiers is a result of the way the classifier system is organized. Configurational classifiers and non-configurational classifiers are defined on the basis of quite different kinds of conditions. Therefore, there is no way to state the relationship between two kinds of classifiers on the basis of the semantic conditions, and it is therefore unfruitful to look for a hyponymy relationship between configurational and non-configurational classifiers.

3.4. Some possible solutions

There are a few possible accounts of this restriction by prioritized classifiers. One solution would stipulate that a nonprioritized classifier has conditions that explain the limited use of the classifier for certain possible referents. For example, *-tsu* would have conditions like NOT SALIENTLY ONE-DIMENSIONAL or NOT VEHICLE OR MACHINES. This is a very undesirable solution since the semantic description of *-tsu* would be quite complex, and it does not capture the point that the relative unacceptability is caused by the presence and prototypicality of other classifiers. If an independent principle can account for the restricted use of *-tsu* for the referents of other classifiers, the description would be quite simple.

Another is to say that lexical choice is based on the idea that the specific precedes the general. Kageyama (1980), for example, formulates the priority found in the choice of *actor* and *actress* as a condition on the lexical insertion (he worked within the framework of Generative Semantics). His formulation, somewhat simplified, is:

> When two lexical items P and Q exist that satisfy a general condition of lexical insertion, if P has more specification [=conditions] than Q, then P has a priority over Q in lexical insertion.

This suggestion is also inadequate in explaining the phenomena found in classifiers. First, the way he formulates the relationship between the prioritized and nonprioritized items does not predict a priority relationship between configurational and nonconfigurational classifiers. Second, it has nothing to say about the degree of acceptability of nonprioritized items. While there is some truth in the idea of the specific being prioritized over the general in classifier choice, such a principle must also account for the non-hyponymy relationship and degrees of acceptability of nonprioritized classifiers.

4. A PRAGMATIC ACCOUNT

4.1. Proposal of a pragmatic account

The restricted use of nonprioritized items can be pragmatically accounted for (Matsumoto 1993). The "priority rules" are in fact reflections of the pragmatic principle of informativeness. The relevant pragmatic principle is the first half of Grice's (1975) Maxim of Quantity (Quantity-1), which is termed Q1 principle in Levinson (1987) and is subsumed under Q-principle in Horn's (1984) framework. I adopt the version of this maxim used in Matsumoto (1995): Make your contribution as informative (strong) as possible. The present pragmatic account states that when an object satisfies the conditions of more than one classifier, the more informative one is preferred over the less informative one by virtue of the Maxim of Quantity-1. That is, the unacceptability of the use of a nonprioritized classifier in the presence of a prioritized one comes from the use of a less informative expression counting as a failure to give certain information that a speaker is expected to convey.

More specifically, we argue that the restricted use of a nonprioritized classifier is accounted for by the following condition on implicature.

(5) Conversational Condition on Quantity implicatures (Matsumoto 1995):
The choice of a weaker item instead of a stronger item must not be attributed to the observance of any information-selecting Maxim of Conversation other than the Quality Maxims and the Quantity-1 Maxim (i.e., the Maxims of Quantity-2, Relation, and Obscurity Avoidance, etc.)

This means that if the information carried by the stronger item is regarded as unnecessary or irrelevant in context, or if the expression is obscure (infrequent, stylistically restricted), then the implicature is not produced. One example is given in (6) (see Matsumoto 1995). B's utterance in (6a) does not produce the implicature in (6b), if it is safe to assume that the speaker knows that the hearer is unfamiliar with the names of small towns in the area.

(6) a. A: "What town does Bill live in?"
B: "He lives in a very small town to the north of Tokyo."
b. 'B does not know which of the very small towns to the north of Tokyo Bill lives in.'

We claim that this pragmatic view, in conjunction with a theory of prototype semantics and a refined notion of informativeness, can give a satisfactory account of the phenomena found in classifiers.

The present pragmatic account makes the following predictions. First, it predicts that the failure to use a relatively more informative classifier produces an implicature that the object referred to does not satisfy the conditions of that classifier. This prediction is borne out by the intuition of native speakers. For many, the use of *-ko* or *-tsu* instead of more informative *-dai* (used for vehicles and other mechanical objects) for a car suggests that the car is wrecked or is a toy (something that does not satisfy the conditions of *-dai*), as observed in Matsumoto (1993: 698). Second, if this is an implicature, it should be cancellable (Grice 1975). This is borne out, too. It is acceptable to use *-ko* or *-tsu* for a car (implicating the referent is not vehicle-like) and add that the car actually works. For example, in the following sequence of utterances, the use of *-ko* in the first utterance produces an implicature that the car is a wreck or a toy, which is canceled by the second utterance.

(7) Boku-wa kuruma-o ik-ko kat-ta.
I-TOP car-ACC one-CLASS buy-PAST

Mochiron kichitto unten dekiru yatsu-da-yo.
of.course all.right drive can one-COP-SFP

"I bought a car. Of course, it can be driven all right."

Also, this pragmatic view predicts that in a context where the information about specific properties of objects are not at issue (irrelevant to the purpose of the utterance), otherwise unselected classifiers might be used, just as bitches can be referred to as *dogs* when their gender is irrelevant for the current purpose of the exchange. This prediction is borne out, too. Speakers accept the use of *-tsu* more readily when they focus on the number of objects. Shimojoo (1997) points out that the use of *-tsu* is more acceptable if the numeral plus *-tsu* is accompanied by *choodo* 'exactly', and attributes this to the Quantity Maxim. In such a context, only the number of objects is at issue, and so speakers can omit the information as to the properties of the referents by conforming to the Quantity-2 principle (Do not make your contribution more than is required).

These phenomena show that the restricted use of nonprioritized classifiers is indeed pragmatic in nature, and can be accounted for by the Conversational Condition on implicature.

4.2. Pragmatic account and patterns of restriction

How does this pragmatic view account for the different degrees of the unacceptability of nonprioritized classifiers? First, the prototypicality effect on the use of nonprioritized classifiers can be accounted for in the following way (Matsumoto 1993). As seen above, our claim is that the unacceptability of the use of a less informative classifier in the presence of a more informative one comes from the failure to give certain information that a speaker is expected to convey. When the referent is an atypical member of a more informative classifier category, however, this failure to convey certain information is not serious, since atypical members of the classifier category do not satisfy some of the prototype conditions of the classifier anyway. This accounts for the phenomenon of the negative correlation between the prototypicality (acceptability) of objects as referents of a more informative classifier on the one hand and the acceptability of a less informative classifier for those objects on the other.

How does the present view account for the difference in the restriction effects of different classifiers? Our account is the following. There are two factors involved in determining the strength of restriction. The first one is the relative informativeness of prioritized items. If the prioritized classifier is much richer in information than the nonprioritized classifier and the speaker fails to use the former, then the information loss is serious. However, if it is not so rich in information, the failure is not so serious, since the information loss is relatively small. Thus, the effect of restriction should be correlated with the relative richness of information of the stronger (prioritized) item in relation to the weaker (nonprioritized) item.

The second factor is the frequency of the stronger item. Conversational Condition on Horn scales states that implicature is produced if the failure cannot be attributed to the observance of some other maxim, including the Maxim of Obscurity Avoidance. This is in keeping with Horn's observation that a specific term must be sufficiently natural and stylistically unmarked in order for the term to trigger implicature (Horn 1984: 34). In the case of classifiers, if a prioritized classifier is infrequently used or stylistically restricted, then the failure to use that item does not have to be attributed to the observance of Quantity-1 Maxim. This predicts that infrequent and stylistically restricted classifiers do not restrict the use of other classifiers.

Of these two factors, the frequency of classifiers can be investigated with the use of a corpus. Tono, Yamazaki, and Maekawa (2013) list the word frequencies of classifiers with the numeral one in CSJ and BCCWJ, normalized to per million words. They are shown in Table 2.

Table 3 Frequencies of classifiers (per million words)

-hon	70
-ko	47
-mai	45
-hiki	20
-dai	16
-satsu	16
-ken	9

Other classifiers are infrequent and not listed in the dictionary.

Informativeness is more difficult. Classifiers subordinate to *-tsu* and *-hiki* can be safely said to be more informative than *-tsu* and *-hiki* respectively, since they have additional conditions. But how can we know if the classifiers like *-dai* and *-chaku* convey more information about referents than the configurational classifiers like *-ko* and *-mai*?[4]

Such an informativity difference can be experimentally tested. We asked 6 native speakers of Japanese to rate the sets of referents of classifiers in terms of how "special" their referents are (rephrased as 'not ordinary' and 'having salient features') on a five-point scale. The results are as follows, with the ratings adjusted to range between 0.0 and 10.0.

Table 4 The degrees of the informativeness of different classifiers

-choo	9.2	*-bu*	4.6
-ki	7.9	*-satsu*	4.6
-suji	8.3	*-tsubu*	4.2
-joo	6.7	*-mai*	2.9
-ken	6.3	*-hon*	2.9
-chaku	5.0	*-ko*	0.4
-dai	4.6		

Under the present view, then, implicatures are produced when the stronger item is sufficiently richer in information than the weaker item and sufficiently frequent or stylistically unrestricted in order to license restriction. The interaction of these two kinds of predictions—one based on relative richness of information and the other based on frequency and stylistic restriction—should predict the different strengths of restriction by different classifiers.

-Dai, which is both relatively rich in information and relatively frequent/stylistically unrestricted is the strongest in the degree of prioritized the use of *-tsu*. *-mai* and *-hon*, which are not so rich in information but frequent/stylistically unrestricted is less strong than *-dai* in the power of restriction. The same is true of *-satsu*, *-ken*, which are rich in information but are moderately frequent. *-Choo* and *-joo*, which are rich in information but very low in frequency do not have much power in restricting the use of*-tsu*. *-Tsubu*, which is relatively low in both information and frequency, and *-ko*, which is frequent, but extremely low in information, do not significantly affect the use of *-tsu*.

The correlation between the degree of acceptability of *-tsu* and that of informativeness was –0.33. If we calculate the correlation only with respect to the frequent classifiers in Table 3, the coefficient value is –0.56. This means that as far as frequent classifiers are concerned, there is a moderate negative correlation between informativeness and the acceptability of *-tsu*. The referents of very specific and informative classifiers, *-choo, -suji, -joo, -ki* differ in the acceptability of *–tsu. -Choo* and *-joo* do not lower the acceptability of *-tsu*, but *-ki* and *-suji* do. The reason for this difference may be related to frequency difference and collocation difference. Among the four, *-ki* is more frequently used than the others, and *-suji* has a high collocation with *namida* ‘tears’ used in the experiment.

The informativeness differences in Table 4 also correctly predict the preferred choice of nonconfigurational classifiers over configurational classifiers. Nonconfigurational classifiers are judged as more informative than configurational classifiers. Thus, the preferred use of *-chaku* over *-mai* for certain clothing, that of *-da*i over *-ko* for 3-dimensional machines, and that of *-joo* over *-tsubu* for medical tablets are accounted for.

5. CONCLUSION

The pragmatic account of restriction, with a theory of prototype semantics, a refined notion of the richness of information, and constraints on the pairs of items that trigger implicature (the richness of information and high frequency of stronger items), can make a satisfactory account of the restriction phenomena observed in classifiers.

The present pragmatic account suggests that at the level of semantics it is not necessary to state that a nonprioritized classifier cannot be fully used for referents of a more informative classifier. Thus, part of the burden of meaning description is removed from the domain of semantics to pragmatics. This is a case where a general pragmatic principle simplifies the semantic description of lexical items, a case of the Pragmatic Occam's Razor. This is a desirable solution since it removes many idiosyncratic aspects of classifier use from the semantic description and it enables us to capture them in terms of an independently motivated general principle of pragmatics.

NOTES

[1] This paper has a long history, dating back to the paper the first author wrote in 1986. We would like to thank Elizabeth Traugott for her suggestions and guidance at that stage. The paper is completely rewritten on the basis of the data the second author has provided. We would like to thank the late Yoshihiro Nishimitsu in his role in establishing the current understanding of classifier semantics and the importance of pragmatics. This article is devoted in remembrance of him.

[2] Japanese has two series of numerals, native and Sino-Japanese, and a classifier selects for either one of them. *-Tsu* selects the native series (e.g., *huta* 'two' in (2a), while *-hon* and *-dai* select the Sino-Japanese series (e.g., *ni* 'two' in (2b, c)).

[3] There is much more to be said about the semantics of *-ko*, which involves not just three-dimensionality but also such factors as solidity and movability. See Mano (2004), Yoshida and Matsumoto (2011), and Yoshida (2013).

[4] One constraint suggested for the pair of expressions forming a Horn scale producing Quantity implicature is that one entails the other (Horn 1972). However, the entailment condition on Horn scales has turned out not to be a necessary condition (see Hirschberg 1985, Matsumoto 1995).

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