Mass/Count Distinction and Japanese Semantics*

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Abstract

The recent development of plural logic has been a good news for a student of the semantics of a language like Japanese which has no systematic distinction between singular and plural. But plural logic is applicable only to countable predicates; it is not applicable to non-countable predicates. Thus, the first question that must be settled before we may apply plural logic to Japanese is to make sure that it has countable predicates.

I argue that Japanese has indeed countable predicates and that they can be recognized by a kind of numeral suffixes which can modify them. Japanese numeral suffixes are divided into three classes, namely, (1) sortal suffixes, or classifiers, (2) unit-forming suffixes, and (3) measure suffixes; they can be distinguished from each other by a certain simple test. I argue that a sortal suffix’s contribution to the meaning of a sentence in which it occurs is not to its truth-conditional content but to its conventional implicature only, and hence that a noun which typically occurs with a sortal suffix has an individuating force by itself.

On the basis of the above, we can single out a class of count nouns. The resulting distinction between count nouns and non-count nouns largely coincides with the count/mass distinction, and we argue that, in contrast to what is commonly thought, this distinction is more robust in a classifier language like Japanese than in a number-sensitive language like English.

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1 Introduction

The recent development of plural logic\(^1\) has been a good news for a student of the semantics of a language like Japanese which has no systematic distinction between singular and plural. Plural logic gives us a semantical framework in which reference and predication need not be singular. The traditional assumption that they should be singular or reducible to singular ones has precluded a natural account of them in a number-neutral language like Japanese. For example, in a Japanese sentence\(^2\)

\begin{verbatim}
(1) Kodomo ga waratta.
   child(ren) NOM laughed

  (A child/Children laughed.)
\end{verbatim}

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\(^1\) [McKay 2006], [Oliver and Smiley 2001], [Oliver and Smiley 2013], [Yi 1999], [Yi 2005], and [Yi 2006].

\(^2\) Here is a list of abbreviations that will be used in the following. NOM: nominative, GEN: genitive, ACC: accusative, DAT: dative, LOC: locative, TOP: topic, NumSuf: numeral suffix, COP: copula, POL: polite.
the noun *kodomo* may refer to a number of children as well as a single child. But there is no expression that corresponds to it in the language which is standardly used in formal semantics for expressing the truth condition of an object language sentence; this is a language of predicate logic and in this language a predicate should be singular, that is, it can be true of each single thing only separately, not jointly.

As long as we stick to such a metalanguage, we have to turn *kodomo* into a singular predicate somehow. The usual way to do this is to interpret *kodomo* as referring to a set consisting of a number of children or a mereological sum of them.

It could be argued that this way of proceeding is unsatisfactory. Instead of introducing “plural objects” like sets and mereological sums, we can change the logic of our metalanguage and allow plural reference and predication. Once we do this, there is no need to introduce any special objects in our ontology; *kodomo* is not a singular predicate that is true of some “plural objects”, but a number-neutral predicate which may be true of a number of children as well as a single child, just as it is in Japanese. Thus, it seems that plural logic is a particularly suitable framework for a semantic account of Japanese.

There is a question, however, that must be settled before we may be able to apply plural logic to Japanese expressions. Plural logic is applicable only to countable predicates: it is not applicable to non-countable expressions. Consider the following sentence.

\[(2) \text{ Mizu ga koboreta.} \]
\[
\text{water NOM spilled}
\]
\[
\text{(Water spilled.)}
\]

*Mizu* (water) does not refer to a single countable object or a number of countable objects; it is a mass noun just like English “water”. Plural logic by itself does not give us any hint as to how to handle such non-countable expressions.

In order to be able to apply plural logic to a sentence like (1), we should have first justified an assumption that *kodomo* in (1) is a countable predicate unlike a mass predicate *mizu* in (2). But it has been claimed that there are several reasons to believe that there is no mass/count distinction in Japanese. If there is any truth to such a claim, we should give up the hope that plural logic gives us a key to the semantics of Japanese.

Three sorts of reasons have been advanced for denying the mass/count distinction to Japanese.

(i) As Japanese has no singular/plural distinction and does not have an indefinite article, there is no way of telling the difference

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3 The occurrence of *kodomo* here might be a definite one as well. Nothing depends on whether *kodomo* is definite or indefinite, however, as far as the point in discussion is concerned.

4 See the works cited in the previous footnote.
between a noun like *kodomo* (child/children) and that like *mizu* (water) without the knowledge of their meaning.

(ii) In Japanese, the same quantifier expressions are used to express both count and mass quantification; *takusan no kodomo* means many children, and *takusan no mizu* means much water.

(iii) In Japanese, a numeral cannot modify a noun without help of some numeral suffix (*NumSuf*)\(^\text{5}\). Thus, “three children” should be expressed as

\[(3) \quad \text{san- nin no kodomo,} \]
\[\text{three}\quad \text{NumSuf}\quad \text{GEN}\quad \text{child(ren)}\]

which has just the same syntactic form as an expression that means three cans of petroleum.

\[(4) \quad \text{san- kan no sekiyu} \]
\[\text{three}\quad \text{NumSuf}\quad \text{GEN}\quad \text{petroleum}\]

Thus, even when you wish to assign a number to countable objects like children, you should use the construction of the form

\[
\text{Numeral} + \text{NumSuf} + \text{no} + \text{Noun},
\]

which is common to an expression that specifies a quantity of mass object.

Of these three, the last one is the most important one. It is so not because it provides the strongest reason to deny the existence of mass/count distinction in Japanese. As a matter of fact, none of (i)–(iii) offers a good reason to do so.

As for (ii), it is not true that every quantifier expression can express both count and mass quantification; one important class of Japanese quantifier expressions consists of the so-called indeterminate phrases such as *dare* (who), *dore* (which) and *dono* N (which N); they express singular quantification, and hence, they are only applicable to count nouns. Moreover, even among quantity nouns, one of which is *takusan* above, *tasuu* (many) and *shousuu* (a few) are used only for count quantification, whereas *tairyou* (huge amount) and *shouryou* (small amount) are used only for mass quantification.

As for (i), though the existence of plural form and an indefinite article is crucial for distinguishing a count noun from a mass noun in English, there may be a totally different way to tell the former from the latter in other languages. In fact, I am going to argue that in Japanese the kind of a numeral suffix used in the construction mentioned in (iii) gives such a means to distinguish a count noun from a mass noun.

\[\text{\(^{5}\) There are exceptions like set phrases as} \quad \text{san baka (three fools) and} \quad \text{shichi kenjin (seven sages).}\]

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This is the reason why (iii) is important; contrary to the intention of those who have cited it as evidence against the existence of mass/count distinction in Japanese, it gives us a clue to mark mass/count distinction or something similar to it. Though (3) and (4) have a common form on the surface, there exists a big difference between them because the numeral suffixes that appear in them are of different kinds.

Lisa Cheng and Rint Sybesma have argued that in Chinese there are two kinds of classifiers, individual classifiers and non-individual classifiers (massifiers), and that this fact shows the existence of mass/count distinction in it\(^6\). Similarly I am going to argue that the existence of different kinds of classifiers, which I call here as “numeral suffixes”, shows that there is a distinction that is similar to mass/count distinction in Japanese as well.

There are two points that my account of Japanese numeral suffixes differs from that of Chinese classifiers given by Cheng and Sybesma. Firstly, I distinguish three kinds of numeral suffixes in Japanese, not two. Secondly, I place more emphasis on semantic differences between them; in addition to the syntactic criteria, I propose a semantic criterion to decide which class each suffix belongs.

\section*{2 Three kinds of numeral suffixes}

I divide Japanese numeral suffixes into the following three classes\(^7\)\(^8\).

\begin{enumerate}
\item sortal suffixes (classifiers)
  \begin{itemize}
  \item nin \text{人} (for persons),
  \item tou \text{頭} (for big animals),
  \item hon \text{本} (for stick-like objects),
  \item mai \text{枚} (for sheet-like objects),
  \end{itemize}
\item unit-forming suffixes
  \begin{enumerate}
  \item container type
    \begin{itemize}
    \item jyo-s\-u-ji (for measured things),
    \end{itemize}
  \end{enumerate}
\end{enumerate}
... (B) partitive type
    kire 切れ (slice),
    teki 滴 (drop),
    tsubu 粒 (grain),
    ...

3. measure suffix
    kiro キロ (kilogram or kilometer),
    métoru メートル (meter),
    en 円 (yen),
    baito バイト (byte),
    ...

It is relatively clear which numeral suffix belongs to the class of measure suffixes. They are nouns that express units for measurement; kiro is a unit of weight or distance (kiro is ambiguous between the two), métoru (meter) is a unit of length, and so on. This class is open-ended and a new measure suffix is added to the language whenever some new measurement system is introduced into the society. A good example is baito (byte), which became part of common Japanese only in 1980’s.

Iida Asako has pointed out that measure suffixes are different from other two kinds of suffixes in that they can be replaced by other measure suffixes through conversion⁹. Such conversions might be within the same measurement system or between different ones; ichi métoru (one meter) may be replaced with either hyaku senchi (one hundred centimeters) in the metric system or san ten san shyaku (3.3 shyaku) in the traditional Japanese system.

The second class of numeral suffixes, unit-forming suffixes, container type in particular, is also open-ended. Container type suffixes are common nouns for some form of container, and can be used independently without being associated with a numeral as the following example shows.

(5) Mizu ga bin ni haitte-iru.
    water NOM bottle(s) LOC is in

    (Water is in the bottle(s).)

Interestingly, these nouns can even be modified by the numeral phrases with numeral suffixes of the first kind. In the following sentence, a numeral phrase san ko modifies the preceding container noun hako.

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⁹ Iida Asako 2005, pp.16f.
(6) Hako san ko no hon ga aru.
    box(es) three NumSuf GEN book(s) NOM are there
    (There are three boxes of books.)

Just like measure suffixes, a new suffix of this kind will be added when a
new form of container becomes popular in the society. “Pakku” (pack) is just
such a case and this is shown by the fact that it is written in katakana which is
reserved for a word of foreign origin.

Although a unit-forming suffix of partitive type may not occur by itself, it
can be a part of a compound noun like kami-kire (紙切れ, piece of paper), sui-
teki (水滴, drop of water), and oo-tsubu (大粒, large grain). These compound
nouns also can be modified by numeral noun phrases.

(7) Oo-tsubu san ko no ichigo ga aru.
    large grain three NumSuf GEN strawberry NOM are there
    (Literally: There are three large grains of strawberry.)

Compared to those of container type, it is rather rare for a new partitive
type unit-forming suffix to emerge, but it does happen. Piisu, a transliteration
of English piece, is the case in point.

Why do I include both types of suffixes under one category, unit-forming
suffixes? Why should we not have four different kinds of numeral suffixes? It
is because the function of both container type and partitive type suffixes is to
divide a certain whole into several parts.

This is literally the case with a partitive type suffix. Consider

(8) san kire no syake.
    three NumSuf [slice] GEN salmon
    (three slices of salmon)

This noun phrase refers to a result of cutting up one whole fish into a number
of slices.

A container type suffix also involves dividing a whole into several parts. The
noun phrase

(9) san hako no hon
    three NumSuf [box] GEN book(s)
    (three boxes of books)

refers to a certain collection of books that are divided into three parts, each of
which is put into a box.

I suppose that this is reason enough to group the two types of suffixes into
one category, but you will see later that there is another reason to do so.
In contrast to the second and third kinds of suffixes, the first kind of numeral suffixes, which I call “sortal suffixes” or “classifiers”, forms a closed class. They never occur as independent nouns, but only with numerals, either with definite numerals as in (3) or with indefinite numerals as in the following sentence.

(10) Suu nin no gakusei ga kita.
    a few NumSuf GEN student(s) NOM came.
    (A few students came.)

They cannot be a part of a compound noun unlike unit-forming suffixes. Though nuno kire (piece of cloth) and ko bin (small bottle) are all right, *nuno mai (intention: for sheets of cloth) or *ko nin (intention: for persons of small size) cannot be recognized as Japanese.

A suffix of this kind should be learned one by one; in contrast to unit-forming suffixes, many of which come from a noun that has a meaning by itself, a learner cannot guess what a given sortal suffix is for.

It is said that there is now a tendency to use a general-purpose suffix like tsu (①) and ko (➌) for a wide variety of items. If this is true, then we may expect that a number of sortal suffixes in use will decrease in the future, because it seems to be extremely rare for a new sortal suffix to emerge.

Nevertheless sortal suffixes are important to Japanese as a language. Although I am going to argue that a sortal suffix by itself does not contribute to the truth condition of a sentence in which it occurs, this does not mean that its contribution to the meaning of a sentence is nil. Far from that; a sortal suffix sometimes disambiguate homonyms and almost always conveys an important piece of information of the nature of conventional implicature, or so I will argue in §6.3.

3 Numeral phrase modifier bun and kinds of numeral suffixes

So far, we have been trying to characterize the three kinds of numeral suffixes by more or less syntactical features like possible contexts of occurrences and productivity.

Kobuchi-Philip has claimed that there is another syntactic feature that distinguishes a sortal suffix from other kinds of numeral suffixes. Consider

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10 It frequently happens that numeral suffixes in general are called “classifiers”. But, this name is only appropriate for sortal suffixes, and hence, I will use “classifier” only as another name for them.

11 There is a similar observation about Chinese classifiers in [Cheng and Sybesma 1998] (§2.2).

12 [Iida Asako 2005], p.36. But there exists another view. See [Onodera 2014].

13 See [Kobuchi-Philip 2011], pp.310–312.
She claimed that (11) was ungrammatical, suggesting that a sortal suffix cannot be used with a modifier bun in general.

To see that there is no similar problem with other kinds of numeral suffixes, the following two examples may suffice.

(12) ni hako bun no hon
    two CL-box GEN book
    (books that are just enough to fill two boxes)

(13) san pondo bun no niku
    three CL-pound GEN meat
    (meat that amounts to three pounds)

However, although it may seems difficult to get a meaningful interpretation of (11) at first glance, it is not right to judge it to be ungrammatical. It can be a meaningful expression if some suitable context is supplied. For example, if you are trying to figure out how many teachers are necessary to teach a certain group of students, (11) may mean “students that need three teachers to teach”. Under this interpretation of (11), what it means is totally different from an expression which lacks bun, namely,

(14) roku nin no gakusei
    six CL-person GEN student(s)
    (six students)

Hence, if we want to distinguish the kinds of Japanese numeral suffixes by the use of “bun”, then we had better consider semantic differences, not syntactic ones. And once we take semantics into consideration, we will notice that, in the case of unit-forming and measure suffixes, an expression like (12) or (13) and a corresponding expression which lacks bun are semantically connected. Consider two sentences, one which contains an occurrence of (12) and another with that of an expression just like (12) but without bun.

(15) Ni hako bun no hon ga aru.
    two CL-box GEN book NOM are there
    (There are books which are just enough to fill two boxes.)

(16) Ni hako no hon ga aru.
    two CL-box GEN book NOM are there
    (There are two boxes of books.)

\(^{14}\) (11) is the same as (46a) of [Kobuchi-Philip 2011].
As English translations make it clear, (16) entails the existence of two boxes as containers of books, while there is no such entailment with (15); it is perfectly possible that those books have not been put into boxes yet. Hence, (15) does not entail (16). This means that (15) and (16) are different in their truth conditions. The converse entailment, however, is valid, that is, if there are two boxes of books, then there are books which are just enough to fill two boxes.

In contrast to this, it seems that the following two sentences do not differ in their truth conditions.

(17) San pondo bun no niku ga aru.
three NumSuf GEN meat NOM are there
(There is meat that amounts to three pounds.)

(18) San pondo no niku ga aru.
three NumSuf GEN meat NOM are there
(There are three pounds of meat.)

Isn’t it obvious that (18) is true if (17) is true, and vice versa? We must be careful, though. To see that it is not necessarily so, consider these.

(19) Ni-hyaku guramu bun no ringo o katta.
two-hundred NumSuf GEN apple ACC bought
(I bought apple that amounts to two hundred grams.)

(20) Ni-hyaku guramu no ringo o katta.
two hundred NumSuf GEN apple ACC bought
(I bought two hundred grams of apple, or I bought an apple/apples that weigh(s) two hundred grams.)

As an English translation of (20) shows, (20) is ambiguous between two readings. (20) under the first reading is equivalent to (19), but (20) under the second reading is not. According to this reading, (19) does not entail (20) though it is entailed by it; suppose that I bought two apples that weigh one hundred grams each, then (19) is true, because there is now two hundred grams of apple altogether, but (20) under this reading is not true, because I only bought apples which weigh one hundred grams.

To see that there is a similar ambiguity in (18), suppose that you are looking at the meat counter of a supermarket, where packs of meat in different volumes are displayed; further suppose that each pack is labelled by the weight of the meat it contains, and that there left only three packs of the meat and they are all labelled “one pound”. In this situation, (17) would be true because there are three pounds of meat altogether, but (18) would not be true because there are only one pound packs of meat (ichi pondo no niku), not three pound packs of meat (san pondo no niku).
Moreover, the converse is not valid, either, that is, it is possible that (17) is false even when (18) is true. To see this, consider a case in which only two packs of three pound meat remain on the counter. It is easy to see that (18) is true but (17) is false in this situation.

Although we have looked at only a few examples, we may be justified in thinking that a numeral suffix shows a different semantic behavior depending on its kind. It relates to the semantics of a phrase of the form

Numeral + Numeral Suffix + bun.

or a numeral noun phrase followed by bun if we call the part “Numeral + Numeral Suffix” as a “numeral noun phrase”, which we may also call “numeral phrase”.

To see precisely how the kind of a numeral suffix influences its semantics, it is necessary to look at the different ways a numeral noun phrase is positioned in relation to the noun phrase it modifies. It is because the position of a numeral noun phrase as well as that followed by bun in a sentence may make a difference in the way how it should be interpreted. In particular, we will see that, when a numeral noun phrase with a measure suffix is used adverbially in a sentence, there will be no ambiguity like that which is found in (17) and (19). This means that we may be able to see the semantic difference between the kinds of numeral suffixes much more clearly if we consider the sentences in which a numeral noun phrase occurs adverbially.

4 The positions of a numeral phrase in a sentence

A numeral noun phrase of the form “Numeral + Numeral Suffix” can occur in three different positions in a sentence. The constructions involving a numeral noun phrase can be classified according to the position of its occurrence in a sentence.

In the following let Q be a numeral noun phrase of the form “Numeral + Numeral Suffix”, N a noun which Q modifies, and cp a case particle ga (NOM) or o (ACC). There are three different ways Q may occur in a sentence. I list them with one example sentence for each.

(I) “Q no N” type

(21) San nin no gakusei ga kita.

(three NumSuf GEN student(s) NOM came

(Three students came.)
In the course of commenting on each of the three types in the following, I will note two things in particular: first, whether the noun N should have an individuated reference or non-individuated one, and secondly, if N has an individuated reference, whether Q which modifies N should express a distributive property or a collective one.

Unlike the mass/count distinction, the distinction between individuated reference and non-individuated one must be unfamiliar to a reader. This distinction is supposed to apply to a particular occurrence of a noun, not a noun as a lexical item.

An occurrence of a noun N has an individuated reference when its extension on the occasion of its use is given as consisting of single Ns, in other words, the questions like the following should be answerable in principle:

What is it to be one N?
When is one N the same as another N?

If N’s particular occurrence has an individuated reference, then we also say that it has an individuated domain as its extension.

On the other hand, an occurrence of a noun N has a non-individuated reference when its extension on the occasion of its use is given only as those to which N applies; the only question that is supposed to be answerable is

Is/ Are this/ these N or not?

Similarly, if N’s particular occurrence has a non-individuated reference, then we also say that it has a non-individuated domain as its extension.

Let us consider some examples.
(i) Hon ga san satsu aru.
   book(s) NOM three CL are there
   (There are three books.)

(ii) Hon ga san hako aru.
     book(s) NOM three CL (box) are there
     (There are three boxes of books.)

(iii) Hon ga san kiro aru.
     book(s) NOM three kg are there
     (There are three kg of books.)

_Satsu_ in (i) is a sortal suffix for book-like objects, _hako_ in (ii) is a unit-forming suffix, and _kiro_ in (iii) is a measure suffix.

There is no need to know the exact number of individual books\(^{15}\) to decide whether (ii) or (iii) is true; in the case of (ii), you only need to know that each box contains _hon_, namely, a book or books, and in the case of (iii), you only need to know that what weighs 3 kg are _hon_, that is, a book or books. Thus, in the cases of (ii) and (iii), if you know whether _hon_ applies to a given object or objects, it is enough to decide their truth values. In contrast, in order to know the truth value of (i) you have to know how many books there are, and it requires, in turn, to know which object constitute a single book. In short, the occurrence of _hon_ in (i) is individuative, while that in (ii) and (iii) are non-individuative.

In short, if you need to know what one N is in order to understand a sentence in which N occurs, its occurrence has an individuated reference; otherwise, it has a non-individuated reference. This characterization, however, is given in English, and, if N is a Japanese common noun, this does not work, because “one N” would be nothing but a gibberish. In general, a numerial cannot come immediately befor a noun in Japanese, and for that reason we don’t have a simple formula like “one N”. Although there is a way to state the distinction directly for a Japanese noun, we will be able to explain it only after we have developed some relevant material. For the time being, I should ask you to tolerate the present explanation given in English.

When a certain occurrence of N has an individuated domain as its extension, it always makes sense to ask whether a predicate \(\phi\) which is true of N is also true of each N in the same context. If \(\phi\) is also true of each N, then it is called “distributive”; if not, then it is called “collective”. It is easy to see that such a distinction between predicates cannot be made with respect to a non-individuated domain.

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\(^{15}\) Japanese _hon_ is ambiguous just like English “book” is and it might mean (i) a physical object, namely, a copy of a book, (ii) a type object like a book as a certain work, or (iii) book as a universal. In this paper we always use _hon_ in the first sense.
I admit that all this is rather too abstract. Hopefully, this becomes clear as we look at the concrete cases of the three different positions (I)–(III) where a numeral noun phrase may occur.

(I) “Q no N” type. All the examples we have considered so far are of this type.

Many of complex noun phrases of the form “NP\textsubscript{1} no NP\textsubscript{2}” with two noun phrases NP\textsubscript{1} and NP\textsubscript{2} are semantically belong to one or the other of two general kinds. Suppose that NP\textsubscript{1} refers to A. Then, in one kind, the entire noun phrase refers to some B which are related in A. Here are two examples of the complex noun phrases of this kind.

(25) kodomo no oya
child(ren) GEN parent(s)

(paren/parents of child/children)

(26) Tanaka-san no hon
GEN book(s)

(Mr./Ms. Tanaka’s book(s))

In (25), the second noun oya (parent) itself expresses a relation that B bears to A, whereas this relation should be guessed from the context in (26); it may refer to books owned by Tanaka-san, written by him, or written about him.

In another kind of noun phrases of the same form, NP\textsubscript{1} expresses a certain property, and the entire noun phrase denotes those individuals in the extension of NP\textsubscript{2} which satisfy the property. Examples are these.

(27) aka-iro no posuto
red-color GEN mailbox(es)

(mailbox(es) of red color)

(28) kinzoku-sei no batto
metal-made GEN bat

(bat(s) that is/are made of metal)

A numeral noun phrase of the type “Q no N” belongs to the latter kind; Q denotes a certain quantitative property which may be possessed by those denoted by N. This at least seems to be generally the case irrespective of the kind of a numeral suffix that occurs in Q. But there are some differences in other respects among them depending on the kind of a numeral suffix.

(a) When a numeral noun phrase Q has a sortal suffix like nin as in (21), Q expresses a numerical property. It is debatable whether this property should be like that of being three people or that of being three, and we are going to discuss this point later in §6.3. It is certain, however, Q like san nin (three
(for person)) is applicable only to an individuated domain; if you wish to know whether *san nin* applies to *gakusei* (student), you should have known which *gakusei* is one *gakusei*. This means that in the present case a noun N modified by Q should have an individuated reference.

It must be obvious that Q is a collective predicate; *san nin* is true of a number of people collectively, but it is not true of each of them.

(b) Suppose that Q has a unit-forming suffix, for example, *san hako no hon* (three boxes of books). Should the occurrence of a noun *hon* have an individuated reference? I suppose not. In order to see whether we are given *san hako no hon*, we don’t need to know how many books are there; if we can recognize three groups of books each of which can be called *hon* (there is no singular or plural form of *hon* as it is a Japanese word), it is enough. We don’t need to know which *hon* is one *hon*, but only which is/are *hon*.

This is even more obvious if we consider an example like *san kan no sekiyu* (three cans of petrol) and *san teki no mizu* (three drops of water). We don’t know which *sekiyu* (petrol) or *mizu* (water) is one such, but we understand the entire noun phrases perfectly and may be able to tell whether they give the correct descriptions.

Thus, in this case, a noun N has a non-individuated reference.

(c) In the case of numeral noun phrases Q with a measure suffix, the modified noun N has an individuated reference in some cases, and a non-individuated one in others.

Consider the following noun phrase 16.

(29) *ni-sen shii-shii no kuruma*  
two thousand cc GEN car(s)  
(a car/cars of 2000cc)

It is very difficult not to understand the predicate *ni-sen shii-shii* as distributive. (29) must refer to one or more than one car which are of 2000cc displacement each. Thus, the occurrence of *kuruma* in (29) must have an individuated reference.

On the other hand, the most natural interpretation of

(30) *ni-jyu kiro no hon*  
twenty kilogram GEN book(s)

would be as meaning a certain collection of books that weighs 20kg altogether, and not as meaning a single book that weighs 20kg. Hence, it is natural to judge that *hon* in (30) has a non-individuated reference.

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16 I borrow this example from [Okutsu 1989], p.203.
It is not impossible, however, to interpret (30) differently, because we can imagine a book which is so enormous that it weighs 20kg\textsuperscript{17}. Then the occurrence of hon in (30) would have an individuated reference and ni-ju kiro would be a distributive predicate\textsuperscript{18}.

Even with a “mass” noun niku, there is a similar ambiguity. Consider the following sentence.

(31) San pondo no niku o katta.
three pound(s) GEN meat ACC bought

(I bought three pounds of meat. Or, I bought some packs of three pound meat.)

As English translations show, this sentence can be interpreted in two ways. According to one reading, it means that I bought meat that weighs three pounds in total, while, according to another, it means that I bought several packs of meat which weighs two pounds each\textsuperscript{19}.

Lastly, for some N, “Q no N” may be interpreted in three different ways. Such a noun is found among those nouns that refer to various natural things which we work on for our purposes like food and wood. Ringo (apple) is a typical example. Sometimes ringo might refer to an individual apple or a number of individual apples and sometimes it might denote the stuff that constitutes one apple or a number of apples\textsuperscript{20}. Thus, the noun phrase which we encountered before in (20), namely,

(32) ni-hyaku guramu no ringo
two hundred gram GEN apple(s)

might mean three different things:

\textsuperscript{17} The heaviest book in my study is the first edition of Handbook of Logic and Language and it weighs 0.75kg.

\textsuperscript{18} We can explicitly distinguish the two readings of (30) in the following way.

\textsuperscript{19} The two readings can be exhibited in the following way if we use the notational convention that will be introduced in §7.2.

\textsuperscript{20} Ringo might mean apple trees as well. When ringo is used in this meaning, the sortal suffix for it is not ko (果) but hon (本). We will discuss this case in §6.2.
1. one or more than one apples each of which weighs 200g, or
2. a number of apples which weigh 200g altogether, or
3. some apple stuff that weighs 200g in all.

According to the first reading, *ringo* has an individuated reference and *ni-hyaku guramu* is a distributive predicate, while according to the second and third, *ringo* has a non-individuated reference.

(II) “N Q” type. In a noun phrase of this type, a noun is modified by another noun which comes immediately after it. This is possible not only with a numeral noun but also a quantity noun in general as the following examples show.

(i) Hyaku guramu no ringo o mit-tsu katta.
    hundred gram GEN apple(s) ACC three CL bought
    (I bought three 100g apples (= apples which weigh 100g each).)

(ii) Hyaku guramu no ringo o san pakku katta.
    hundred gram GEN apple(s) ACC three CL(pack) bought
    (I bought three bags of 100g apples. Or, I bought three 100g bags of apples.)

(iii) Hyaku guramu no ringo o san kiro katta.
    hundred gram GEN apple(s) ACC three kg bought
    (I bought 100g apples that amounts to 3 kg in total.)

Moreover, a modifying numeral noun phrase Q’ can take all three positions for (I)–(III) types. Q’ in (i)–(iii) appears as type (III). For type (I) and type (II) appearances, here are examples.

(iv) Mit- tsu no hyaku guramu no ringo o katta.
    three CL GEN hundred gram GEN apple(s) ACC bought

(v) Hyaku guramu no ringo mit- tsu o katta.
    hundred gram GEN apple(s) three CL ACC bought

Of these two quantity nouns, *tasuu* expresses a non-proportional quantifier, while *zen-in* expresses a proportional one. A quantity noun Q which expresses a proportional quantifier may occur in yet another way in a sentence, which we may label as “N no Q” type. Here is an example.

(i) Gakusei no zen-in ga kita.
    students GEN all NOM came
    (All of the students came.)

Although *tasuu* in (34) expresses a non-proportional quantifier, it expresses a proportional one if it is used in this way, namely,

(ii) Gakusei no tasuu ga kita.
    students GEN many NOM came
For sortal and unit-forming suffixes, there is no difference semantically between the present type of construction and the previous one.

For a measure suffix, however, there is an important difference from type (I) construction. Put simply, in type (II) construction, a noun modified by Q with a measure suffix cannot have an individuated reference. This is shown by the fact that we cannot make sense of this:

(35) *kuruma ni-sen shii-shii.

Unlike (29), (35) cannot mean a car (or cars) of 2000cc displacement.

As a result of this difference, there will be no ambiguity in the following (36) and (37), which correspond to ambiguous (31) and (32) respectively.

(36) hon nijyu kiro
books twenty kilogram

(37) niku san pondo
meat three pound

(36) cannot mean an enormous book that weighs 20kg, and likewise (37) cannot mean a pack or packs of three pound meat.

Similarly, while (32) was three way ambiguous, its counterpart

(38) ringo ni-hyaku guramu
apple two hundred gram

means “some apples or apple stuff that weigh 200g in all”; it never means “an apple or a number of apples each of which weighs 200g”. It is interesting to compare (39) with (20): (39) differs from (20) in that (32), which is of type (I), is replaced by (38), type (II) expression.

(39) Ringo ni-hyaku guramu o katta.
apple two hundred NumSuf ACC bought

(20) Ni-hyaku guramu no ringo o katta
two hundred NumSuf GEN apple ACC bought

(Many of the students came.)

See [Iida Takashi 20xx], Chapter 3.
If (39) is true, then the total amount of the apple I bought must be 200g. Thus, unlike (20), (39) entails (19). As it is obvious that (19) entails (39), they are equivalent to each other.

(III) “N cp Q” or “Q N cp” type. With the last type of construction, it is frequently said that Q has “floated”. It is as if Q has come out of a noun phrase it was in and moved away from its host noun N. There is an ample literature about this phenomenon, but here I assume simply that Q in this type of construction can be regarded as an adverbial.

(23) and (24) were given as two examples of this type above, and they have Q with a sortal suffix.

(23) Gakusei ga san nin kita.
student(s) NOM three NumSuf came

(24) San nin gakusei ga kita.
three NumSuf student(s) NOM came

(Three students came.)

Not only do they not differ semantically from each other but also there is no semantical difference between those sentences and similar ones of type (I), namely (21), or type (II), namely (22). In sum, for a numerical noun phrase Q with a sortal suffix, it makes no semantical difference which type of the construction it occurs in, and the modified noun should have an individuated reference in all of them.

The situation is exactly the same with a Q having a unit-forming suffix. For such Q again, there is no semantic difference whatever type of construction is used. The noun modified by Q should have a non-individuated reference in all.

The remaining case is that of Q having a measure suffix, but it does not differ from the type (II) case, that is, the modified noun N should have a non-individuated reference.

---

A Type (II) noun phrase “Q N” can also be modified by another numerical noun Q’. But, in contrast to a type (I) noun phrase, Q’ must be restricted to those with a unit-forming suffix (or, a container suffix that will be explained later in §6.1). Here are some examples.

(i) *Ringo ni-hyaku guramu o mit- tsu katta.
apple(s) two hundred gram ACC three CL bought

(ii) Ringo ni-hyaku guramu o san fukuro katta.
apple(s) two hundred gram ACC three CL(bag) bought

(I bought three bags of 200g apples.)

(iii) ?Ringo ni-hyaku guramu o san kiro katta.
apple(s) two hundred gram ACC three kg bought

Only allowable case is (ii), in which a type (II) noun phrase ringo ni-hyaku guramu is modified by Q’ with a unit-forming suffix fukuro (bag).

See [Nakanishi 2008].
Thus, *ni-hyaku guramu* (200 grams) cannot be interpreted as a distributive predicate in (40) nor (41). They are not only equivalent to each other, but also equivalent to (39), and hence, to (19).

(40) Ni-hyaku guramu ringo o katta.
two hundred NumSuf apple ACC bought

(41) Ringo o ni-hyaku guramu katta.
apple ACC two hundred NumSuf bought

(I bought two hundred grams of apple.)

Let us summarize how a noun N modified by a numeral noun phrase Q is to be interpreted in each of (I)–(III) types according to the kind of a numeral suffix appearing in Q:

<table>
<thead>
<tr>
<th>type</th>
<th>sortal</th>
<th>unit-forming</th>
<th>measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I)</td>
<td>individuated</td>
<td>non-individuated</td>
<td>individuated</td>
</tr>
<tr>
<td>(II)</td>
<td>individuated</td>
<td>non-individuated</td>
<td>non-individuated</td>
</tr>
<tr>
<td>(III)</td>
<td>individuated</td>
<td>non-individuated</td>
<td>non-individuated</td>
</tr>
</tbody>
</table>

As you can see, Q with a sortal suffix like *san nin* (three (for person)) is always applied to an individuated domain. It is not a distributive predicate, but a collective one in all cases. Only other case in which Q can be applied to an individuated domain is Q with a measure suffix used in type (I). In this case, Q is a distributive predicate, not a collective one.

5 A simple test for identifying the kind of a numeral suffix

In this section, I would like to present a test to see which kind a given numeral suffix belongs to. It is semantic in character, because it consists in seeing whether a certain entailment relation holds or not.

Let $S$ be a sentence of the form

$\text{Noun + ga + Numeral + Numeral Suffix + aru/iru}$,

and $S(\text{bun})$ a sentence which is just like $S$ except that it has bun right after a numeral suffix that occurs in $S$. Hence, $S(\text{bun})$ is of the form

25 In a type (III) construction, it is impossible for another numeral noun $Q'$ to occur for a further modification. Thus, the three types (I)–(III) can be distinguished by the possibility of further modification by another numeral noun. But, it is a syntactical difference, not a semantical one.
Noun + ga + Numeral + Numeral Suffix + bun + aru/iru,

You may recognize that $S$ has a type (III) construction, more specifically, “N cp Q” type construction.

For example, (42) is one of $S$s, and (43) is (42)(bun).

(42) Ringo ga ni-hyaku guramu aru.
    apple NOM two hundred NumSuf are there
    (There are two hundred grams of apple.)

(43) Ringo ga ni-hyaku guramu bun aru.
    apple NOM two hundred NumSuf are there
    (There is apple that weighs two hundred grams in all.)

I am going to examine for each kind of numeral suffixes how $S$ and $S$(bun) are logically related to each other. My claim is that each kind of suffix can be characterized by having different entailment relations.

1. I start with measure suffixes. Let $\pi$ be a measure suffix and $S$ is a sentence with $\pi$ of the form specified above. (42) is such an $S$, and (43) is $S$(bun) for this $S$. How are (42) and (43) logically related to each other?

There seems to be no difference between them in truth condition; if (42) is true, then (43) must be true, and vice versa. The same seems to hold with other measure suffixes listed in §2, namely, kiro (κιρο, either kilogram or kilometer), metoru (μέτρο, meter), en (泠, yen), and baito (バイト, byte). For some measure suffixes, a sentence of the form $S$ may sound strange if not ungrammatical. Consider this.

(i) ?Hon ga ni-sen en aru.
    book(s) NOM two thousand NumSuf(yen) are there
    (Intended meaning: there are books that cost two thousand yen altogether.)

This sentence sounds a little strange, but it can be interpreted as saying the same thing as a sentence which results by the addition of bun to (i), namely,

(ii) Hon ga ni-sen en bun aru.
    book(s) NOM two thousand NumSuf(yen) are there
    (I bought some books that cost two thousand yen altogether.)

This sounds perfectly all right. Such facts do not seem to be specifically concerned with whether $S$ is equivalent to $S$(bun) for two reasons. First, if you put okane (money) instead of hon in (i), the result is perfectly all right and equivalent to the bun-added sentence. Secondly, you may choose another verb (and another case particle, if necessary) to get a more natural sentence with hon. For example, both of the following pair sound natural and they are equivalent.

(iii) Hon o ni-sen en katta.
    book(s) ACC two thousand NumSuf(yen) are there
    (I bought some books that cost two thousand yen altogether.)

(iv) Hon o ni-sen en bun katta.
    book(s) ACC two thousand NumSuf(yen) bought
    (I bought books that are worth two thousand yen altogether.)
It is essential here that a noun phrase in $S$ is not of type (I). As we saw in §3 with (19) and (20), if $S$ had a noun phrase of type (I), $S$ and $S(\text{bun})$ would not be equivalent. On the other hand, for our purpose, $S$ could have had a type (II) noun instead; $S$ and $S(\text{bun})$ would be also equivalent then. I have chosen the type (III) construction for $S$, because it is suitable for all sorts of numeral noun phrases and will not sound awkward like some specific cases of the type (II) do.

I suppose that the following holds for any measure suffix $\pi$ and any noun $N$,

$$S \Leftrightarrow S(\text{bun})^{27}.$$  

2. Let us turn to unit-forming suffixes. Consider the following pair of sentences.

27 It may be objected that the following two are not equivalent to each other.

(i) Teipu ga ni mètoru aru.
    tape NOM two NumSuf(meter) are there
    (There are two meters of tape.)

(ii) Teipu ga ni mètoru bun aru.
    tape NOM two NumSuf(meter) are there
    (There is tape that amounts to two meters.)

It may be argued that what is talked about in (i) is a single reel of tape which has the remaining length of two meters whereas it is the total sum of the remaining parts of several reels of tape that is talked about in (ii). In that case, (ii) would not entail (i).

I believe this is wrong. Even if there is a suggestion that what are involved in (i) and (ii) are different in that it is a continuous length of two meter in (i) but a discontinuous length that amounts to two meter in (ii), it is not part of their truth conditions but more like a conversational implicature. If a hearer of (i) or (ii) is aware of the other form which is not used on the occasion, she may think that there must be a reason why the speaker chose the particular form. Suppose it was (ii) that was uttered. She may reason as follows: why did the speaker utter (ii) instead of (i) which is simpler? Maybe he (the speaker) thought the simpler (i) gave me a false suggestion that only one reel of tape is involved. Hence, two meter in question must be the sum of tape on several reels. It is similar for the other case: the fact that the speaker did not choose to utter (ii) means that he was sure that the utterance of (i) would not give a false suggestion; hence, what (i) naturally suggests, that is, there is a continuous length of two meters of tape, is true.

Such a difference in conversational implicature between (i) and (ii) seems to be widely found with a noun referring to stuff. A sentence of the form $S(\text{bun})$ suggests a discontinuous existence of stuff whereas $S$ does not. You may see this for yourself in the following pair.

(iii) Wain ga ni rittoru aru.
    wine NOM two NumSuf(liter) are there
    (There are two liters of wine.)

(iv) Wain ga ni rittoru bun aru.
    wine NOM two NumSuf(liter) are there
    (There is wine that amounts to two liters.)

22
(44) Ringo ga san hako aru.
apple(s) NOM three box(es) are there
(There are three boxes of apples.)

(45) Ringo ga san hako bun aru.
apple(s) NOM three box(es) are there
(There are apples that are just enough to fill three boxes altogether.)

(44) is an $S$ of the specified form with a unit-forming suffix $hako$, and (45) is the $S(bun)$ for this $S$. As we have already remarked, (44) logically entails (45), but not vice versa, because (44) entails that the apples are actually divided into three boxes, which is not entailed by (45).

As it may not be enough to see only the case of a container type suffix, let us consider the case of a partitive type suffix as well.

(46) Ringo ga san kire aru.
apple(s) NOM three slice(s) are there
(There are three slices of apple.)

(47) Ringo ga san kire bun aru.
apple(s) NOM three slice(s) are there
(There is apple that is just enough to get three slices of it altogether.)

It is obvious that (46) entails (47); if (46) is true, then how can (47) be false? Does (47) entail (46)? The answer must be “no”; for (46) to be true there must be actually three separate slices of apple, but (47) does not require that.

Thus, we may say that the following holds for any unit-forming suffix $\pi$ and any common noun $N$.

if $S$ is a sentence of the specified form with a unit-forming suffix $\pi$ and a common noun $N$, then

$$S \Rightarrow S(bun), \text{ but } S(bun) \not\Rightarrow S.$$
there are two readings of $S$, according to one $S$ entails $S(\text{bun})$ and according to the other $S$ does not.

(a) Here is an example of $S$ with a noun that has no thing/stuff ambiguity. It is easy to see that $S$ does not entail $S(\text{bun})$.

(48) Koin ga san ko aru.
    coin(s) NOM three NumSuf are there
    (There are three coins.)

(49) Koin ga san ko bun aru.
    coin(s) NOM three NumSuf are there

(49) says that there are coins which are enough for three things, because the suffix $ko$ is used for things in general\(^{28}\). These three things cannot be the three coins. It should be determined from the context of the utterance what they are; maybe there are enough coins to fill three piggy banks, or to buy three rolls. Otherwise, this does not make sense. At any rate, it is certain that (48) does not entail (49).

It is also obvious that the converse does not hold, that is, (49) does not entail (48) in general. If the three things that are in question in (49) are piggy banks, then it might be justified to say that (48) is also true when (49) is true, provided that (48) is interpreted as meaning that there are at least three coins. But, if what is at issue in (49) are three rolls and two coins are enough to buy them, then (48) is false though (49) is true.

Thus, we may say that, for any sortal suffix $\pi$ and any common noun $N$ which does not have thing/stuff ambiguity,

if $S$ is a sentence of the specified form with a sortal suffix $\pi$ and noun $N$, then

no entailment holds between $S$ and $S(\text{bun})$,

provided that $S(\text{bun})$ can be made sense at all, given the context of the utterance.

(b) Now, consider the following pair, which has tamago (egg(s)) instead of koin (coin(s)).

(50) Tamago ga san ko aru.
    egg(s) NOM three NumSuf are there
    (There are three eggs.)

(51) Tamago ga san ko bun aru.
    box(es) NOM three NumSuf are there

\(^{28}\) Strictly speaking, this is not true; there are things like trees and sheets which $ko$ does not apply. See [Iida Asako 2004], pp. 345f. and [Iida Asako 2005], Ch.4.
(There is egg which amounts to (the edible parts of) three individual eggs.)

This time there is no difficulty in understanding what (51) says. Anybody who hears (51) will imagine a bowl into which three eggs are broken. Moreover, (50) entails (51); if there are three individual eggs, it is also true that there is some egg stuff which amounts to (the edible parts of) three individual eggs.

It is worth noticing that there is another reading of (51). According to it, san ko (three things) does not refer to three eggs, but some other three things that can be determined from the context of the utterance. If these three things are cakes, then (51) says that there is/are enough egg/eggs to make three pieces of cake. If (51) is read in this way, it is not entailed by (50).

Tamago (egg) is another noun that belongs to the class of those which are three way ambiguous in the phrase “Q no N” discussed in §4 (case (c)). Such an N refers sometimes to a number of individuals (including just one individual) and sometimes to the stuff that constitutes (parts of) such individuals. Examples are ringo (apple), maguro (tuna), and matsu (pine). We may call them “nouns of thing/stuff ambiguity”.

Why is the situation so different when Q has a sortal suffix? It is because the phrase “Q bun” can modify a noun N only when N has a non-individuated reference. If Q has a unit-forming suffix or a measure suffix, then N which Q applies to has always a non-individuated reference. Hence, the occurrences of N in S and S(bun) may refer to the same non-individuated domain.

But, if Q has a sortal suffix, the occurrence of N in S must have an individuated reference, whereas in S(bun) it must have a non-individuated reference because “Q bun” can only modify a noun with a non-individuated reference. This means that S and S(bun) are logically independent and there cannot be any logical entailment between them.

In reality, however, (50), which has the form S, entails (51), which has the form S(bun). How is it possible?

---

29 As we have seen before, Q with a measure suffix may apply to N with an individuated reference if Q occurs in the context

Q no N.

But, if we substitute Q with “Q bun”, then N can have only non-individuated reference. The following example shows this clearly.

(i) ?ni-sen shii-shii bun no kuruma
two thousand cc GEN car

We will be at a loss to make sense of this. It is because ni-sen shii-shii (of 2000cc) can be applied meaningfully to individual cars but the presence of bun precludes it.
There is one more problem. Though “Q bun” as a whole modifies a noun occurrence with a non-individuated reference, if Q has a sortal suffix, there must be some noun occurrence which has an individuated reference. Where is such a noun occurrence in (49) or (51)?

The answer to both questions is given by the existence of another type of construction involving bun, which is utilized in (49) and (51). In such a construction bun attaches to a combination of a common noun and a numeral noun phrase; it has the form

\[(N' \text{ Q}) \text{ bun,}\]

and modifies a noun N which is different from N'. If the identity of N' is obvious or can be easily guessed from the context, it is frequently dropped. Hence, on the surface, it seems that “Q bun” with a sortal suffix is modifying N by itself, but in reality another noun N' is involved. Let us call this type of construction a “noun-involving bun”.

A noun-involving bun can modify a noun N only when N has a non-individuated reference, but the noun N' which is a part of the modifying phrase may have an individuated reference as well as a non-individuated one. This means that Q may have a unit-forming or measure suffix as well as a sortal one. In the following examples, (52) has a sortal suffix, (53) a unit-forming one, and (54) a measure one.

(52) gakusei san nin bun no kyoukasho
student three NumSuf GEN textbook
(textbooks that are just enough for three students)

(53) hon san hako bun no omosa
book three NumSuf GEN weight
(the weight of three boxes of books)

(54) ringo ni-hyaku guramu bun no karorii
apple two hundred NumSuf GEN calorie
(the calorie that is contained in 200g of apple)

A particularly interesting case is the following (55), which is very closely related to (51).

(55) san ko bun no tamago
three NumSuf GEN egg

A noun like tamago (egg) or ringo (apple) which has a thing/stuff ambiguity may have an individuated reference in some occurrences and a non-individuated one in others.

Though (55) may mean some egg/eggs that is/are just enough to make three cakes or whatever, the first interpretation that naturally comes to mind when
we hear it is that it refers to some egg stuff which amounts to (the edible parts of) three individual eggs. In this reading, the N′ which is implicitly present is tamago in its thing sense. In other words, (55) may be an abbreviated form of either

\[(55a)\] keiki san ko bun no tamago,
\[\text{(some egg/eggs that is/are just enough to make three pieces of cake)}^{30}\]

or

\[(55b)\] tamago san ko bun no tamago.
\[\text{(some egg stuff that comes from three individual eggs)}\]

Note that in (55b) the first occurrence of tamago should mean individual eggs while the second one should mean some egg stuff. In contrast, tamago in (55a) may mean either individual eggs or some egg stuff, although it should have a non-individuated reference.

In general, if N is a noun having a thing/stuff ambiguity, then the sentence S(bun), i.e.

\[N \text{ ga } Q \text{ bun} \text{ aru}\]

is most naturally interpreted as an abbreviated form of

\[N^{\text{stuff}} \text{ ga } N^{\text{thing}} \text{ Q} \text{ bun} \text{ aru}.

But, just as the fact that (55) can be also interpreted as (55a) as well shows, this is not the only interpretation. Depending on the context of the utterance, what is implicitly present in (55) might be some three things that can be made from some individual eggs or egg stuff.

In conclusion, if S has a sortal suffix π and a noun N which has thing/stuff ambiguity, then there are two readings of S, according to one of them S entails S(bun) but not vice versa, and according to the other there is no entailment relation between them.

Finally, let us put the above considerations all together.

In the following, let N be a common noun, ν a numeral, and π a numeral suffix, and S a sentence of the form

\[N + \text{ ga } + \nu + \pi + \text{ aru/iru}.

\[^{30}\text{Of course, there is no need that this is the right interpretation. The three things that are at issue might be, say, three cups of chawan-mushi (Japanese steamed egg custard).}\]
Further suppose that $S(\text{bun})$ is a sentence which results from $S$ by inserting \text{bun} immediately after $\pi$.

The test is divided into two parts. First, let us suppose the N is not a noun having a thing/stuff ambiguity.

Then, our test is given as follows.

1. $\pi$ is sortal if and only if there is no entailment relation between $S$ and $S(\text{bun})$.
2. $\pi$ is unit-forming if and only if $S \Rightarrow S(\text{bun})$ but $S(\text{bun}) \not\Rightarrow S$,
   and
3. $\pi$ is measure if and only if $S \Leftrightarrow S(\text{bun})$

For the case in which N has a thing/stuff ambiguity, our test is just the same except the first clause for a sortal suffix, which runs like this:

$\pi$ is sortal if and only if $S$ has two readings such that according to one of them there is no entailment between $S$ and $S(\text{bun})$ and according to another $S$ entails $S(\text{bun})$.

6 Two problematic cases

6.1 Three bottles of beer and two glasses of water

Our test seems to have obvious counterexamples in the cases of numeral suffixes hon/bon (_ELEM) and hai/bai (_ELEM). Consider the following pairs of sentences.

(56a) Biiru ga san bon aru.
   beer NOM three NumSuf is/are there
   (There are three bottles of beer.)

(56b) Biiru ga san bon bun aru.
   beer NOM three NumSuf \underline{is}/are there
   (There is beer that is enough to fill three bottles.)

(57a) Mizu ga ni hai aru.
   water NOM two NumSuf is/are there
   (There are two glasses of water.)

(57b) Mizu ga ni hai bun aru.
   water NOM two NumSuf \underline{is}/are there
   (There is water that is enough to fill two glasses.)
You may easily see that (56a) entails (56b) but not vice versa and that the same holds with (57a) and (57b). Thus, according to our test, hon/bon (本) and hai/bai (ヘ) should be unit-forming suffixes. However, both of them never occur as independent nouns, but only with numerals. Moreover, it is difficult to understand what sort of unit they help to determine because they by themselves do not indicate any form of container or receptacle.

This last point gives us a clue to see what is going on in these sentences. It is certain that some kind of container or receptacle for beer or water are involved in them. What are they and how can we find them?

Let us remind ourselves of the fact that a noun which works as a unit-forming suffix can be modified by a numeral noun with a sortal suffix. Here I repeat the example sentence (6) which shows this.

(6) Hako san ko no hon ga aru.

box(es) three NumSuf GEN book(s) NOM is/are there

(There are three boxes of books.)

Similar constructions are frequently used for a noun for a container or receptacle which cannot directly take a numeral.

(58) Petto-botoru san bon no ochya ga aru.

PET bottle(s) three NumSuf GEN tea NOM is/are there

(There are three Pet bottles of tea.)

(59) Hon ga dan-bouru-bako san ko aru.

book(s) NOM cardboard box(es) three NumSuf is/are there

(There are three cardboard boxes of books.)

It also frequently happens that the noun for a container is omitted if it is understood in the context what kind of a container is involved. Thus, petto-botoru in (58) and dan-bouru-bako in (59) may be omitted depending on the context.

What we have in (58) and (59) as well as in (6) is a complex expression which has the same function as a numeral noun, namely, if N<sup>cont</sup> is a common noun for a container or receptacle and Q(N<sup>cont</sup>) is a numeral noun with a sortal suffix suitable for N<sup>cont</sup>, then an expression

N<sup>cont</sup> + Q(N<sup>cont</sup>)

has the same function as a numeral noun Q' with a unit-forming suffix.

Thus,

(60) hako san ko

box three NumSuf

(three boxes)
in (60) is such an expression. It consists of a common noun for boxes (*hako*), a numeral *san* (three) and a sortal suffix suitable for *hako*. It works exactly in the same way as a numeral noun with a unit-forming suffix

(61) san hako

three NumSuf

(three boxes)

does.

In this case, you can use either (60) or (61), but when a common noun $N^{cont}$ for a container or receptacle like *petto-botoru* and *dan-bouru-bako* cannot directly take a numeral, you have to use it with a suitable sortal suffix, that is, not like (61) but like (60).

We may add *bun* to this expression, which modifies a noun with a non-individuated reference. This *bun* added word sequence, namely,

$N^{cont} + Q(N^{cont}) + \text{bun}$

functions just as a *bun* added numeral noun phrase with a unit-forming suffix. Thus, *hako san ko bun* ((61) with *bun* meaning “just enough for three boxes”) functions just as *san hako bun* ((61) with *bun* meaning “just enough for three boxes”). It is the same with *petto-botoru* and *dan-bouru-bako*; *petto-botoru san bon bun* (just enough for three Pet bottles) works just like a numeral noun phrase with a unit-forming suffix *bin* (a numeral suffix indicating a bottle) like *san bin bun* (just enough for three bottles).

And, sometimes, a container indicating noun $N^{cont}$ is dropped when it is obvious from the context. This must be exactly what is happening in (56) and (57); in (56), some noun like *oo-bin* (big bottle) is implicitly present and the suffix *bon* is applied to that noun; in (57) on the other hand, a noun like *koppu* (cup) and *gurasu* (glass) is understood in the context and the suffix *bai* is applied to it.

When a sortal suffix for a container indicating noun like *bin* and *bai* occurs in a sentence like (56) and (57), let us say it is used as a “container suffix”. So-called general classifiers\textsuperscript{31} *ko* and *tsu* can be used as container suffixes.

(62) Jyamu ga san ko aru.

jam NOM three NumSuf is/are there

(There are three bottles/cans of jams.)

A numeral noun *san ko* is used for counting some containers of jam, which is implicitly understood in the context.

There is a way to know whether a given sortal suffix $\pi$ is used as a container suffix in a sentence $S$. It is to see whether we can supply a noun of a container which should be counted by $\pi$ so that $S$ can be paraphrased with this noun. In the case of (62), we can easily find such a noun.

\textsuperscript{31} [Zubin and Shimojo 1993].
can be a paraphrase of (62). In contrast, with

(48) Koin ga san ko aru.
coin(s) NOM three NumSuf are there
(There are three coins.)

it is rather difficult to imagine that the sortal suffix \( \text{ko} \) does not count coins but some containers of coins, though it is not impossible to do so given a special context.

In conclusion, there is no need to conclude that \( \text{bon} \) and \( \text{bai} \) are not sortal suffixes because there is an entailment like that from (56a) to (56b). The entailment holds because a noun phrase consisting of a container noun, a numeral, and a sortal suffix for the container noun functions just as a numeral noun with a unit-forming suffix, and \( \text{bon} \) and \( \text{bai} \) function as sortal suffixes in these cases as well.\(^{32}\)

\[^{32}\] Our claim that a noun for a container or receptacle is implicitly present in the sentences like (56) and (57) might make some wonder whether we have here the same construction that we discussed in the previous section, namely, a noun-involving \( \text{bun} \). This is not so, however. Suppose that what is implicitly present in (56a) and (56b) is a container noun \( \text{oo-bin} \) (big bottle). Then, they would be abbreviations of the following two:

(56a) Biiru ga oo-bin san bon aru.
beer NOM big bottle three NumSuf is/are there
(There are three big bottles of beer.)

(56b) Biiru ga oo-bin san bon bun aru.
beer NOM big bottle three NumSuf is/are there
(There is beer that is enough to fill three big bottles.)

A sequence of four words \( \text{oo-bin san bon bun} \) that appears in the latter has just the same elements as those of a noun-involving \( \text{bun} \), namely, a common noun, a numeral, a numeral suffix, and \( \text{bun} \). But, in the case of a noun-involving \( \text{bun} \), a sequence consisting of the first three elements, that is, a common noun, a numeral, and a numeral suffix cannot appear as an independent constituent phrase in a sentence. Consider these.

(i) *Tamago ga keiki san ko aru.
egg NOM cake three NumSuf is/are there

(ii) *Keiki san ko no tamago ga aru.
cake three NumSuf GEN egg NOM is/are there

They are ungrammatical, but if you insert \( \text{bun} \) after a numeral suffix \( \text{ko} \) they become perfectly good sentences which mean that there is enough egg to make three cakes.

In contrast, as you see in (56a) above, \( \text{oo-bin san bon} \) (three big bottles) works as a constituent phrase without \( \text{bun} \) in it. Here are examples that show the same fact.

(iii) Oo-bin san bon no biiru ga aru.
big bottle three NumSuf GEN beer Nom is/are there
6.2 Chopsticks, shoes, and twins

Another set of cases which seem to be counterexamples to our test are numeral suffixes like ぜん (zen) and そく (soku). Consider (63) and (64), which have the form of $S$ required in our test.

(63) Hashi ga go zen aru.
(There are five sets of chopsticks.)

(64) Kutsu ga go soku aru.
(There are five pairs of shoes.)

The sentences of the form $S(bun)$ which correspond to them are the following.

(65) Hashi ga go zen bun aru.
(There are chopsticks just enough for five sets.)

(66) Kutsu ga go soku bun aru.
(There are shoes just enough for five pairs.)

How are (63) and (65) (or (64) and (66)) logically related to each other? It is not unreasonable to think that they are logically equivalent, that is, they have the same truth condition; if one is true, then the other must also be true.

At the same time, it is almost certain that they have different implications; even if they have truth condition in common, there must be some reason why a speaker chooses to utter one, not the other.

In what sort of situation is uttering (65) instead of (63) natural? We may imagine someone who counts a bunch of chopsticks that are alike each other and utter (65) after having found out that there are ten of them. But, do we think (63) is not true in this situation? I suppose we do not. If there are ten chopsticks which can be paired each other to form five sets of them, there is no denying that there are five sets of chopsticks.

If we hear the utterance of (63), on the other hand, we just think of five sets of chopsticks that may be different from each other in various ways. Still it is obvious that (65) is also true when (63) is true. If (65) may sound strange in this situation, it is because (65) lacks an extra piece of information that (63)
suggests, namely, that the chopsticks are not only enough to form five sets but are already arranged as those sets, and hence, uttering (65) after (63) violates one of the Gricean maxims of conversation (the Maxim of Quantity). But there is no difference in truth condition between them all the same.

Thus, we must admit that (63) and (65) are logically equivalent. Similarly, it can be argued that (64) and (66) are also logically equivalent. Then, according to our test, numeral suffixes zen and soku must be measure ones. Can we accept this conclusion, however?

Are there any reason to think that zen and soku are measure suffixes? One might argue in the following way. For one thing, we have numeral suffixes for individual chopsticks and individual shoes. For individual chopsticks, we use a sortal suffix hon which generally applies to long and narrow things. Similarly, for individual shoes, we use a sortal suffix ko, which applies to material objects in general. Thus,

\[
\text{hashi ichi zen}
\]
\[
\text{chopstick one NumSuf}
\]
\[
\text{(one set of chopsticks)}
\]

consists of

\[
\text{hashi ni hon}
\]
\[
\text{chopstick two NumSuf}
\]
\[
\text{(two chopsticks)}
\]

If we have already a sortal suffix for chopsticks in hon, then why do we need another one for sets of chopsticks? Hence, zen must express a measure.

However, there is some reason against regarding zen and soku as measure suffixes. Although zen ( зуб ) can be used by itself, not as a part of a numeral noun phrase, in such uses it is a common noun for a tray for food, not any sort of measure. This is even more obvious with soku (足). It never appears outside of a numeral noun phrase.

Now I am going to argue that zen and soku are sortal suffixes and that the logical equivalence between (63) and (65), or (64) and (66), does not affect the validity of our test for the kind of a numeral suffix.

First, let us remember that what we count are not limited to single things: we also count combinations of things like coffee sets or groups of people like couples and families. Kumi (組) is a general-purpose sortal suffix for such combinations or pluralities. Thus, we say like this.

\[
(67) \text{FuuFu ga san kumi iru.}
\]
\[
\text{couple NOM three NumSuf is/are there}
\]
\[
(\text{There are three couples.})
\]
That *kumi* is a sortal suffix according to our test is shown by the fact that there is no entailment relation between (67) and the following (68) even when the utterance of (68) makes sense.

(68) Fuufu ga san kumi bun iru.
    couple NOM three NumSuf is/are there

(There are couples which are just enough for three combinations of something.)

In what sort of circumstances does an utterance of (68) make sense? One possible scenario is to imagine that we are trying to form three groups of people, to which *san kumi* (three groups) refers, and a couple or couples are somehow necessary for them. There can be many cases. In one case, it might be stipulated that each of the three groups should have at least two couples. Or, in another, it might be stipulated that each group should have at least one person who belongs to a couple. In the former case, the truth of (67) is not sufficient for that of (68). On the other hand, in the latter, even though (68) is true, (67) may not be true, because the existence of two couples would be enough to satisfy the stipulated condition.

Secondly, some nouns may refer to either a plurality or its member. *Futago* (twin(s)) is a case in point. Whether a noun refers to a plurality or its member is marked by the presence or absence of a plural endings in English. But, in a language like Japanese whose noun does not change its form according to number, the difference must be marked by some other means; one of them is to use different sortal suffixes. You see this in the following two sentences.

(69) Futago ga san kumi iru.
    twin(s) NOM three NumSuf is/are there

(There are three pairs of twins.)

(70) Futago ga roku nin iru.
    twin(s) NOM six NumSuf is/are there

(There are six twins.)

Thirdly, *hashi* (chopstick(s)) and *kutsu* (shoe(s)) are the nouns just like *futago* (twin(s)) in that they may refer to either a plurality or its member. Hence, considering a pararell example with *futago* (twin(s)) might help us to see the situation clearer. Consider the following sentence, which is the result of inserting *bun* to (69).

(71) Futago ga san kumi bun iru.
    twin(s) NOM three NumSuf is/are there

(There are twins just enough to form three pairs.)
Isn’t this logically equivalent to (69) which does not have bun? But in the above haven’t we see that kumi is a sortal suffix and S with kumi is logically independent of S(bun) in general?

We may now see what is responsible for such an apparent contradiction. It is not our test but the ambiguity in the noun futago (twin(s)). If we think that (69) and (71) are logically equivalent, then we interpret futago in (71) as referring to individual persons whereas futago in (69) refers to pairs. In fact, (71) has two readings: according to one, futago refers to individual persons, whereas according to another it refers to twins as pairs just like fuufu (couple(s)) in (68). Thus, it is this latter reading which is the right interpretation of S(bun), if S is (69), and they are logically independent from each other; it is easy to imagine a scenario for them like the one we made up with (67) and (68).

Now it must be obvious why our test seemed to fail with zen and soku. Like kumi they are sortal suffixes which apply to pluralities only. Moreover, the common nouns to which these suffixes are attached can refer to members of a plurality as well as pluralities themselves. Hashi (chopstick(s)) may refer to individual chopsticks as well as matched pairs of them; similarly, kutsu (shoe(s)) may refer to individual shoes as well as matched pairs of them. Hence, if (63) and (65) are thought to be logically equivalent, then the occurrences of hashi in two sentences refer to different things; in (63) it refers to matched pairs of chopsticks, while in (65) it refers to individual chopsticks. If we do not want to have different references in two occurrences, then we should interpret (65) in such a way that hashi refers to matched pairs of chopsticks, not individual chopsticks. Then, it is not difficult to imagine a scenario in which (63) and (65) are no longer equivalent.

In order to understand this scenario, we must remember that zen is also used for counting trays in which various foods are displayed. Suppose that we have to serve five such trays in which various foods are displayed. Suppose that we have to serve five such trays and that each tray needs two different sets of chopsticks. Then, of course, (63) does not entail (65). If we interpret (63) as saying that there are at least five sets of chopsticks, then (65) entails (63). But we may interpret (63) as saying that there are just five sets of them. Then (65) does not entail (63) because there must be at least ten sets of chopsticks for (65) to be true in the imagined situation.

6.3 What does a sortal suffix contribute to the meaning of a sentence?

We may conclude that zen and soku are sortal suffixes. This conclusion does not make our test for the kind of a suffix invalid. It is a hidden ambiguity in a noun like hashi (chopstick(s)) and kutsu (shoe(s)) that made it appear that our test gave a wrong verdict. These nouns may refer to either individuals or

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33 In reality, I have never met such arrangements, but it does not matter because at least such an arrangement is possible.
pluralities of them.

A question may arise here. As we have noticed, different sortal suffixes are used depending on whether a noun refers to individuals or pluralities. The noun hashi requires hon when it refers to individual chopsticks, while it requires zen when it refers to matched pairs of them. The question is whether a sortal suffix like hon and zen has a truth conditional content. This question is important because it is frequently assumed that in contrast to other kinds of numeral suffixes a sortal suffix does not contribute to the truth condition of a sentence in which it occurs.

Eric McCready has considered this question with special emphasis on the case of zen. His conclusion is this.

(...) classifiers make a dual contribution to meaning: A conventionally implicated domain restriction, and an individuation of objects for quantification that takes in the truth-conditional domain.34

I believe, however, that there is an alternative way to construe the function of a sortal suffix, according to which it does not directly contribute to the truth condition of a sentence in which it occurs, but helps to disambiguate the noun it attaches to through its conventional implicature; we do not need to suppose that a sortal suffix (classifier) has any truth-conditional content. In this subsection, I try to defend this alternative.

There are some clear cases in which a particular choice of a sortal suffix helps to disambiguate an expression. For example, kami might mean either paper (紙) or hair (髪). Although the two senses can be easily distinguished in a written Japanese because different characters (kanji) are used for them, if they are only heard it may be difficult to distinguish them in spite of the difference in accent. But if they are accompanied by a sortal suffix as is shown below, there will be little chance of misunderstanding them.

(71) kami san mai
      paper three NumSuf
      (three sheets of paper)
(72) kami san bon
      hair three NumSuf
      (three hairs)

The case of kami is that of pure homonymy; kami in the sense of paper and that in the sense of hair are different words that have similar pronunciation by a pure accident. There is no reason to think that a word kami should have a single extension that encompasses both paper and hair, and that different sortal suffixes restrict it to one or the other. When kami is used in a sentence,

34 [McCready 2012], p.148.
it is used by itself to refer to either paper or hair, and a sortal suffix is chosen accordingly. A sortal suffix indicates which word occurs in a sentence.

The cases of pure homonymy are rare compared to those in which a single word has different senses that are connected to each other in a certain way. Such cases are sometimes called “paronomy”. In Japanese, a sortal suffix also helps to identify one particular sense among those that are not only associated with one single word but also related to each other. For example, *ringo* may mean either fruits or trees, just as English “apple” may. Sometimes it is an accompanying sortal suffix that makes it clear which sense is at issue. In (73) *ringo* refers to fruits, while it refers to trees in (74).

(73) ringo san ko
      apple(s) three NumSuf
      (three apples)

(74) ringo san bon
      apple(s) three NumSuf
      (three apple trees)

This time again I think it better to construe an occurrence of *ringo* as referring to either fruits only or trees only rather than referring to both of them indiscriminately; a sortal suffix is, as it were, chosen after the preceding decision about the noun’s reference. Consider the following sentence.

(75) Ringo ga tasuu aru.
      apple(s) NOM many is/are there
      (There are many apples/apple trees.)

Because of the occurrence of *tasuu* (many), *ringo* here must have an individuated domain. Still (75) is ambiguous; it may mean that there are many apple fruits, or it may mean that there are many apple trees. But it cannot mean that there are many apple fruits and apple trees.36

The same is true with respect to *hashi* (chopstick(s)) and *kutsu* (shoe(s)). It is not that a sortal suffix *zen* individuates a domain that is not yet fully individuated, but that its presence helps to determine which one of the two fully individuated domains is the right one for the occurrence of *hashi* at issue.

In general, when a sortal suffix is attached to a noun, the noun has an associated domain which is already fully individuated. A sortal suffix is chosen after the preceding decision about the noun’s reference. For example, in (75) *tasuu* (many) is replaced by *takusan* (many, much), then *ringo* may be used in its stuff sense as well, and hence, the resulting sentence would be four-ways ambiguous. For, *ringo* may refer to apple wood as well.

35 If *tasuu* (many) is replaced by *takusan* (many, much), then *ringo* may be used in its stuff sense as well, and hence, the resulting sentence would be four-ways ambiguous. For, *ringo* may refer to apple wood as well.

36 Pelletier suggests in [Pelletier 2012] that every noun has one comprehensive domain which includes any kind of things it may refer to. But if it were so, I wonder why (75) could not mean the numerousness of both apple fruits and apple trees. (75) means either there are many apple fruits or there are many apple trees, not both.
according to this individuated domain, and it gives a hearer a hint for that domain, which sometimes has the effect of disambiguation. 

In order to explain how a sortal suffix achieves it, we must be clear about its contribution to the meaning of a sentence in which it occurs. McCready has argued quite successfully that it should be a conventional implicature. He invites us to consider the following sentence\textsuperscript{37}.

\begin{equation}
\text{(76)} \# \text{Otoko ga ni satsu haittekita.}
\end{equation}

\hspace{1cm} man/men NOM two NumSuf entered.

As McCready tells us, this sentence is weird, but not false; instead it is just inappropriate, because the classifier \textit{satsu} is used for books. In such a case, we may first suspect that it might be a case of presupposition failure. The standard behavior of presuppositions are (1) its failure’s inducing truth value gaps, (2) escaping from presupposition “holes” such as negation and modal operators, and (3) exhibiting “binding” behavior, namely, if a sentence S carries a presupposition P, and S’ entails P, then no presupposition is projected in “If S’ then S”. It is easily seen that the case of a sortal suffix satisfies (1) and (2), but not (3). Hence, it cannot be a case of presupposition failure\textsuperscript{38}.

It cannot be a case of conversational implicature, either. For one thing, what the sortal suffix \textit{satsu} indicates cannot be cancelled\textsuperscript{39}.

There is one remaining option, the case of conventional implicature. Our case satisfies all of its three main properties: (1) it is triggered by particular lexical items or constructions, (2) it is scopeless, and (3) it cannot be “bound” by presupposition\textsuperscript{40}.

Thus, we may say that the “meaning” of (76) has two components, namely, 

truth-conditional content: that two men entered, and

conventional implicature: that men are book-like objects.

Now we can see that the weirdness of (76) comes from the conventional implicature it has: its falsity makes (76) inappropriate.

All this is very clear and I am in complete agreement with it. Moreover, I want to claim that, once we recognize the ambiguity in the nouns like \textit{hashi} (chopstick(s)) and \textit{kutsu} (shoe(s)), this is enough to explain how sortal suffixes like \textit{zen} and \textit{soku} work, and, contrary to what McCready claims, there is no need to suppose that they “make a dual contribution to meaning”.

Consider this sentence.

\begin{equation}
\text{(77)} \text{Ringo ga go hon aru.}
\end{equation}

\hspace{1cm} apple(s) NOM five NumSuf is/are there

\textsuperscript{37} [McCready 2009], p.199 and [McCready 2012], p.144. I have changed the number of the example sentence.

\textsuperscript{38} [McCready 2009], pp.199–201 and [McCready 2012], pp.144-146.

\textsuperscript{39} [McCready 2012], p.146.

\textsuperscript{40} [McCready 2009], pp.201f. and [McCready 2012], pp.146f.
As it was remarked above, the occurrence of ringo must have an individuated domain because of the presence of the sortal suffix hon. But, ringo may mean either fruits or trees. Thus, (77) is ambiguous at least^41^ between

(77a) Ringofruit ga go hon aru.
(77b) Ringotree ga go hon aru.

Because the sortal suffix hon is used for long and slender things, they have respectively the following conventional implicatures.

(CI–77a) Apple fruits are long and slender things.
(CI–77b) Apple trees are long and slender things.

(CI–77a) is obviously false. This means that if the occurrence of ringo in (77) is interpreted as in (77a) then (77) will have no truth value (or will be inappropriate at least). Hence, we may conclude that (77) should be interpreted as (77b)^42^.

Just as the conventional implicature of the sortal suffix hon contributes to disambiguate ringo (apple(s)), the conventional implicature of zen does the same with respect to hashi (chopstick(s)).

Consider again (63), which I repeat here.

(63) Hashi ga go zen aru.
(chopstick(s) NOM five NumSuf is/are there

Just as ringo is ambiguous whether it refers to apple fruits or apple trees, hashi is ambiguous whether it refers to individual chopsticks or matched pairs of them^43^.

^41^ There is another possible reading of (77). It is to interpret hon as a container suffix. Then, (77) will mean something like that there are five bottles of apple juice. This reading may be safely ignored here.

^42^ Even though (77a) is wrong in that its conventional implicature is false, we may make sense of its assertion in some circumstances. For example, if it is found out that there are five apple fruits at the place that is relevant to the conversational context, we may suppose that hon was just a slip of the tongue and the speaker wanted to say that there were five apple fruits. But, of course, this does not make (77a) true or appropriate.

^43^ You may object that this leads to the violation of Occam’s eraser (“Do not multiply senses beyond necessity”). Such a worry might be relieved, if we notice that these different senses associated with a single word can be derived from a certain central one. For example, if we suppose that various senses of ringo (apple(s)) is derived from ringo in the sense of fruits, then ringo in the sense of trees can be defined in the following way.

Val(X, ringotree) ↔ ∃Y[Val(Y, ringo) ∧ Fruit-of(Y; X)].

Similarly, provided that hashi (chopstick(s)) in the sense of a matched pair is the basic sense of hashi, then hashi which is counted by the use of hon is given by this.

Val(x, hashiindividual) ↔ ∃X[Val(X, hashi) ∧ xX],

where “xX” means that x is one of X.
(63a) Hashi\textsuperscript{individual} ga go zen aru.
(63b) Hashi\textsuperscript{matched/pair} ga go zen aru.

Just as before, each has the following conventional implicature.

(CI–63a) Each chopstick is a pair.
(CI–63b) Each pair of matched chopsticks is a pair.

As the former is obviously false and the latter is obviously true, it is immediate that (63b) is the right interpretation.

In this way, the conventional implicature of the sortal suffix \textit{zen} makes it possible to find the individuated domain for \textit{hashi} in (63). We don’t need to suppose that the sortal suffix directly operates on a not-yet completely individuated domain for \textit{hashi}.

We may conclude that the semantic contribution of a sortal suffix to the meaning of a sentence does not extend to its truth condition but is confined in its conventional implicatures. This does not mean, however, that a sortal suffix’s semantic contribution is not important in interpreting a sentence in which it occurs. We have just seen that exactly the opposite is true.

7 Individuated/non-individuated distinction and mass/count distinction

Our discussion so far allows us to make the following three claims.

(I) We can distinguish a class of sortal suffixes from other kinds of numeral suffixes by a simple test.

(II) A noun modified by a numeral noun phrase with a sortal suffix should have an individuated domain.

(III) A sortal suffix does not have truth-conditional content.

They allow us to do two things. First, we can draw the individuated/non-individuated distinction in such a way that uses only the resources available in Japanese.

If \( S \) is a sentence in which a common noun \( N \) occurs, and there is a sortal suffix \( \pi \) which is appropriate for \( N \), then it makes sense to ask what it is to be called as

\[
(*) \text{ichi} \ \pi \ \text{no} \ \text{N}.
\]

By (III), we know that a sortal suffix \( \pi \) does not have truth-conditional content. This means that (*) corresponds to English “one \( N \)”. 

40
As we remarked in §4, unlike in English, in a classifier language like Japanese an occurrence of a numeral should be accompanied with a suffix. But, as we know that a sortal suffix does not have truth-conditional content, we can go metalinguistic, and, instead of asking what it is to be one N, ask what it is to be called as “ichi π no N” for N and a sortal suffix π which is appropriate for N.

Thus, we can characterize the individuated/non-individuated reference for an occurrence of a Japanese common noun N in a sentence S in this way: if there is a sortal suffix π appropriate for N and we need to know what it is to be called “ichi π no N” in order to understand S, then the occurrence of N has an individuated reference; otherwise, it has a non-individuated reference.

Incidentally, just as knowing what it is to be one N involves also knowing when one N is the same as another N, knowing what it is to be called “ichi π no N” involves also knowing when “aru N” (some N) is “onaji ichi π no N” (one and the same N) with “betsu no N” (another N). This shows that a sortal suffix for N not only indicates what sort of things N refers to, but also plays an essential role in stating an identity condition for the things N refers to. This should justify our calling it a “sortal” suffix.

Secondly, we can single out count nouns from common nouns in Japanese and regard the rest of them as non-count nouns. We have been working with a distinction between individuated reference and non-individuated one. It is a particular occurrence of a noun that has an individuated reference or non-individuated reference. But, the distinction which we are now going to draw is the one between nouns as lexical items.

By (II) and (III), the individuation of the domain must be achieved by the modified noun itself. This means that a noun which typically occurs with a sortal suffix has an individuating force by itself. It is the main characteristic of a count noun. Moreover, by (I) we can single out a class of such count nouns by a simple test.

### 7.1 Singling out count nouns

However, we cannot define a count noun simply as a common noun that can be modified by a numeral noun phrase with a sortal suffix. If this were the right definition, then almost all of the Japanese common nouns would be count nouns.

The main reason why such a simple definition does not work lies in the existence of the construction which we considered in §6.1, that is, the construction that involves container suffixes. I repeat here two of the examples we considered there.

\[
\begin{align*}
(56a) \quad & \text{Biiru ga san bon aru.} \\
& \text{beer NOM three NumSuf is/are there}
\end{align*}
\]

(There are three bottles of beer.)
Jyamu ga san ko aru.
jam NOM three NumSuf is/are there

(There are three bottles/cans of jams.)

As we have argued in §6.1, though a numeral noun phrase san bon (san ko) seems to modify biiru (jyamu) that immediately precedes it, in reality it modifies some noun for a container that is implicitly understood in the context, and the occurrence of biiru in (56a) (jyamu in (62)) does not have an individuated reference. Hence, such cases should be excluded if we wish to characterize a count noun as a common noun taking a certain kind of numeral noun phrases.

Moreover, the sortal suffix tsu, which is called a “general classifier” along with ko that occurs in (62), can be used with a wide variety of common nouns, some occurrences of which cannot be regarded as having an individuated reference.

As tsu has several distinctive features, it may not be amiss to spend a few words on them.

In order to express the numbers less than ten, Japanese has two sets of numerals, native Japanese numerals and Chinese-derived numerals. Tsu can be used only with native numerals, whereas ko can be used only with Chinese-derived ones. If we wish to use tsu with a numeral that refers to a number which is greater than nine, then the numeral seems to occur without any numeral suffix, but it had better to be interpreted as occurring with an unpronounced tsu.

(78) Kumo ga futa- tsu ukandeiru.
cloud(s) NOM two NumSuf is/are floating

(Two clouds are floating.)

(79) Kono hon ni wa hanashi ga
this book LOC TOP story NOM
jyuu-ni aru.
twelve is/are there

(This book contains twelve stories)

There are certain kinds of things that can be counted only by tsu. A common characteristic of those counted only by tsu seems to be a lack of materiality or substantiality. Abstract things like possibilities, riddles, choices are counted by tsu, and so are things which may have only a vague boundary like shadows, footprints and stains. Hanashi (story) in (79) belongs to the former category, and kumo (clouds) in (78) to the latter.

The characteristic uses of tsu, however, that is most pertinent to our present concern is the ones in sentences like the following.

---

44 This is sometimes called “∅-classifier construction”. See [Zabin and Shimojo 1993], p.499.
45 See [Iida Asako 2004], p.366.
What are said to be three in these sentences depend on the contexts of their utterances. If an utterance of (80) is about a situation in a restaurant, then they must be three cups of coffee, whereas they might be three bags of coffee beans if it is about what happened at the counter of a coffee shop. The same thing applies to (81) as well.

This strongly suggests that a phrase of the form

\[ \text{a numeral + tsu} \]

functions just like \( Q(N^{\text{CONT}}) \), a numeral noun with a sortal suffix suitable for a container-indicating noun \( N^{\text{CONT}} \), which we discussed in §6.1. One difference is that a noun referring to a container cannot occur explicitly in the case of \( \text{tsu} \); we might suppose that the sentences like (80) and (81) contain the construction of the form

\[ \emptyset + \text{a numeral + tsu}, \]

46 English “three coffees” may mean three kinds of coffee. But, Japanese \text{koohii mit-tsu} never means that. If we want to express three kinds of coffee in Japanese, we would say

(i) \text{koohii san syurui},
\text{coffee three kind(s)}
or

(ii) \text{san syurui no kohhii},
\text{three kind(s) GEN coffee}

Moreover, \text{syurui} (kind) can never be dropped. Instead of saying (ii) we may also say

(iii) \text{mit-tsu no syurui no kohhii},
\text{three NumSuf GEN kind(s) GEN coffee}

But if you dropped \text{no syurui}, then it can mean only something like three cups or three bags of coffee.

47 This may be too strong. But a sentence like the following seems to be grammatically suspect.

(i) \text{?Koohii o kappu mit-tsu tanonda}.
\text{coffee ACC cup three NumSuf ordered}

If a postposition \text{de} is inserted immediately after \text{kappu}, this sentence becomes all right.
in which the place of $∅$ corresponds to that of a noun for a container or receptacle\(^{48}\).

Another evidence that the use of *tsu* in a sentence like (80) and (81) is of the same kind as that of *hon/bon* or *ko* as a container suffix is that it fits the entailment pattern that is characteristic of a unit-forming suffix. The sentence (81) has the form of the sentence $S$ for our test for the kind of a numeral suffix. It entails the sentence of the form $S(\text{bun})$, namely,

\[(82) \text{Koohii ga mit- tsu bun aru.}
\]

(There is coffee enough for three coffees.)

Thus, we may conclude that the "general classifier" *tsu* is sometimes used as a container suffix like *hon/bon* and *ko*, and that the noun occurrence that is modified by such a use of *tsu* does not have an individuated reference.

Now I propose the following as a characterization of a count noun.

**Definition**

A common noun $N$ is a count noun if and only if $N$ can be modified by a numeral noun phrase with a sortal suffix which is not used as a container suffix.

Let us see what sort of nouns will be count nouns according to this definition.

1. First of all, various nouns that apply only to people form a typical class of count nouns; some are for different age groups like *kodomo* (child(ren)), *wakamono* (youth(s)) and *roojin* (old people), some are for different occupations like *sensei* (teacher(s)), *kango-shi* (nurse(s)), and *ten-in* (salesclerk(s)), and some are for different nationalities like *nihon-jin* (Japanese person(s)), *kankoku-jin* (Korean person(s)) and *amerika-jin* (American person(s)). Sortal suffixes that accompany them are *nin* ($ਓ$) or *mei* ($໊$).

2. Secondly, there are various nouns for animals other than humans. For larger ones like oxen and tigers, *tou* ($಄$) is used as a sortal suffix, while *hiki* ($ඖ$) is used for smaller ones like cats and dogs; *hiki* is also used for insects and fish. According to our definition, these nouns are all classified as count nouns as

\[∅ + \text{a numeral} + ∅.\]

Here is an example.

(i) Koohii o ni-jyuu tanonda.

(We ordered twenty coffees.)

\(^{48}\) If a numeral is the one denoting a number larger than nine, then *tsu* will not be pronounced. Thus, in such cases, this construction will be realized as

$∅ + \text{a numeral} + ∅$. 

Here is an example.
lexical items, but among them those like buta (pig(s)) and syake (salmon) which
denote animals that are utilized by us for food have thing/stuff ambiguity; when
they are used in stuff sense they can take only unit-forming or measure suffixes,
ever sortal ones.

3. Similarly, nouns for plants and their parts are also count nouns. To count
trees and grasses hon (本) is used; mai (枚) counts leaves, rin (輪) flowers, and
ko (個) fruits and roots. Just like the names for animals, many of them have
thing/stuff ambiguity, and if they are used in stuff sense they cannot take sortal
suffixes.

4. Many of the names of various artifacts we use daily are also count nouns.
Many of the things we find at our home, namely, cars and bicycles, tables and
chests, refrigerators and washing machines, computers and phones, and so on,
are all referred to by the nouns that take a sortal suffix dai (台). Of course, not
every artifact is counted by dai. Clothes are counted by chaku (着), keys and
coins by ko (個), plates by mai (枚), knives and forks by hon (本).

Some artifacts serve as materials for other artifacts; we process paper to
make things like boxes and books, we cook spaghetti to make a dish for lunch,
or we mash tofu to make dressing. Japanese nouns for paper, spaghetti, and
tofu, namely, kami, supagettei, and toufu, are all count nouns according to our
definition, for kami takes a sortal suffix mai (枚), supagettei takes hon (本), and
toufu takes chou (丁). But, ichi mai no kami (a sheet of paper) can be teared
up into yon kire no kami (four pieces of paper), and mashed tofu is still called
tofu. This means that the nouns like kami and toufu have thing/stuff ambiguity.

5. As we remarked above, the “general classifier” tsu is used in counting
abstract things like possibilities and choices. Kinds of abstract things that
can be counted only with the help of tsu are many. Speaking of nouns
that are close to our concerns, we need tsu in order to count go (word(s)) and
bun (sentence(s)). Such uses of tsu is not those as a container suffix, for the
entailment that is characteristic with a container suffix does not hold with them.
Consider the following.

(83) Kanou-sei ga mit- tsu aru.
  possibility NOM three NumSuf is/are there

(There are three possibilities.)

(84) Kanou-sei ga mit- tsu bun aru.
  possibility NOM three NumSuf is/are there

49 Some kinds of abstract things that are not referred to by an English count noun may be
counted by tsu, and hence, Japanese nouns for them should be count. An example is shouko,
which means “evidence”.

(i) Sore ni wa mit- tsu shouko ga aru.
  that OBL TOP three NumSuf evidence NOM is/are there

(There are three pieces of evidence for that.)
It is not easy to come up with a suitable context for (84) to make sense. Even in a context in which (84) makes sense, (83) does not entail (84). Thus, the noun kanou-sei (possibility/possibilities) is a count noun, and so are many Japanese nouns for abstract things.

Naturally there are many nouns which do not appear in any of the above but will be judged as count nouns according to our definition. On the contrary, you might be now wondering whether there is any Japanese noun which will not be judged as count according to our definition. I am going to argue that there are non-count nouns in Japanese even with our very weak condition for being a count noun. Before doing that, however, I would like to spend a few words on those nouns which have thing/stuff ambiguity; although they are count nouns according to us, they have an aspect of non-count nouns as well.

7.2 Dual-life nouns—nouns of thing/stuff ambiguity

In several places during our discussion so far, I have mentioned the nouns that have thing/stuff ambiguity. According to our definition of a count noun, they are all classified as count nouns because they take sortal suffixes which are not used as container suffixes. But there exists a sort of duality, which we have termed “thing/stuff ambiguity”, in these nouns. Some researchers have called such nouns as “dual-life nouns” or “dual nouns” because they seem to lead a dual life as a count noun and a mass noun.50

We have just seen in the previous subsection that there are at least three classes of such dual-life nouns. They are (I) nouns for animals and their products that are utilized by us mainly for food, (II) nouns for plants and their parts or products that are utilized by us for a certain purpose, some for food, some for clothing, and some for making furniture and buildings, and (III) nouns for artifacts that may serve as the material for some other artifacts. Let me give examples of each.

(I) buta (pig(s)), syake (salmon), tamago (egg(s)), . . .
(II) ringo (apple(s)), retasu (lettuce(s)), matsu (pine(s)), . . .
(III) kami (paper), supagettei (spaghetti), toufu (tofu), pan (bread), . . .

The nouns that belong to one of these classes are primarily count nouns which refer to individuals, but they are also used as nouns that refer to the stuff that materially constitutes those individuals, and that is the source of duality of these nouns.

Suppose that the following sentence is uttered at the bedside of a sick child.

50 For example, see [Pelletier 2012] and [Yi 2012].
(85) Ringo o futa saji tabeta.
apple ACC two spoonfuls of apple ate

(Ate two spoonfuls of apple.)

Except in a very rare case where a huge spoon and very small apples are involved, the occurrence of *ringo* (apple) cannot refer to individual apples but to some apple stuff like grated apple. Here *ringo* is used just like *mizu* in a sentence which we encountered in the beginning of our discussion, namely,

(2) Mizu ga koboreta.
water NOM spilled

(Water spilled.)

The existence of sentences like (2) and (85) definitely shows that we have to recognize a kind of predicates which has a much wider range of application than even plural predicates. I call this new kind of predicates as “not-necessarily-countable predicates” or “NNC predicates” for short, and indicate them by a special type of variables “X, Y, Z, . . .” as in the following.

\[ F(X). \]

A plural predicate \( F(X) \) is only a special sort of an NNC-predicate just as a singular predicate \( F(x) \) is a special sort of a plural predicate. Variables “X, Y, Z, . . .” are called “NNC variables”; “x, y, z, . . .” are plural variables and “x, y, z, . . .” are singular variables.

We may rewrite a Japanese sentence in a somewhat artificial style in order to make its truth condition more explicit. For example, we may rewrite (2) in this way.

\[(2') \exists X [mizu(X) \land koboreta(X)].\]

Formulated in this way, we can easily see that (2) entails the following.

(86) Nanika ga koboreta.
something NOM spilled

(Something spilled.)

For, if we rewrite (86) in the style of (2') it becomes this.

\[(86') \exists X \ koboreta(X).\]

---

51 In intention at least, they are the same as what several authors have called “mass predicates”. See, for example, [Keslicki 1999].

52 Such a claim must be backed up by a systematic account of mass quantification, but I am not yet prepared to give such an account here. I assume that the validity of such simple inferences is accounted for by any one of the accounts of mass quantification now available in the literature like [Roeppe 1983] and [Higginbothm 1994].
Now let us see how (85) should be written in this style. The first try might be something like the following.

\[(85') \exists X [\text{futa}(X) \land \forall x \eta x \rightarrow \exists Y [\text{sa}ji(x, Y) \land \text{ringo}^{\text{stuff}}(Y)] \land \text{tabeta}(c, X)],\]

where “\text{futa}(X)” means that \(X\) are two, “\text{sa}ji(x, Y)” means that \(x\) is one spoonful of \(Y\), and “\text{tabeta}(c, X)” means that \(c\), the child, ate \(X\); lastly, “\text{ringo}^{\text{stuff}}(Y)” means that \(Y\) is some apple stuff.

Thus, we have interpreted \textit{futa saji no ringo} (two spoonfuls of apple) as referring to a plurality consisting of two individuals each of which is one spoonful of apple stuff.

We can go a little further and define the NCC predicate “\text{ringo}^{\text{stuff}}(Y)” in terms of the plural, and hence, countable predicate “\text{ringo}(X)” if we may help ourselves to some other NCC predicates.

One predicate we need is the one which expresses the relation between individual apples and the matter that constitutes them. It may be written as

\[\text{MC}(\mathcal{X}, X),\]

and read as “\(\mathcal{X}\) materially constitutes \(X\)”. If we are talking of material objects \(X\), then we may suppose that

\[\forall X \exists Y \text{MC}(\mathcal{X}, X)^{53}.\]

Another predicate we need is the part-whole relation “\(\leq\)” between portions of matter. Then, we might say that for the predicate “\text{ringo}^{\text{stuff}}(\mathcal{Y})” to apply to \(A\) it is necessary and sufficient that

\[\exists Y \exists Z [\text{ringo}(Y) \land \text{MC}(Y, Z) \land A \leq Z],\]

namely, \(A\) is part of the matter that constitutes some individual apples.

Though this seems to be in the right direction, there is one minor defect in this characterization. We do not regard any old part of an apple as apple-stuff, and it is the same with Japanese \textit{ringo}; for example, stems and seeds are not thought to be \textit{ringo} in stuff sense. It is easy to correct this failure, however. Just add one more condition like “\(A\) is edible” to the above. An extra condition that is needed will be different depending on which dual-life noun is involved. If we are dealing with \textit{matsu} in the sense of pine wood, then the condition will be something like “\(A\) is usable”\(^{54}\).

The same pattern applies to dual-life nouns in general. In the following I make use of the semantic value relation \(\text{Val}(\mathcal{X}, E)\), which means that \(\mathcal{X}\) is semantic value of an expression \(E\).

\(^{53}\) For simplicity’s sake I am assuming here that if \(\text{MC}(\mathcal{X}, X)\) holds then \(X\) is the matter which constitutes \(\mathcal{X}\), but you may define \(\mathcal{X}\) as the largest \(\mathcal{Y}\) such that \(\mathcal{Y}\) materially constitutes \(X\).

\(^{54}\) See [Gillon 2012], p.715.
Characterizing the stuff sense of a dual-life noun

Let $N$ be a dual-life noun. Then, for any $\mathcal{X}$,

\[
\text{Val}(\mathcal{X}, N_{\text{stuff}}) \text{ if and only if } \exists Y \exists Y \left[\text{Val}(Y, N) \land \text{MC}(Y, Y) \land \mathcal{X} \leq Y \land \text{U}(\mathcal{X})\right],
\]

where “$\text{U}(\mathcal{X})$” means that $\mathcal{X}$ satisfies a certain condition that is determined by $N$.

Though we do not try to do it here, with a semantic account of $\text{bun}$, we can easily show why an entailment from $S$ to $S(\text{bun})$ is valid for one reading of $S$, if $S$ has a dual-life noun.

Except a small number of nouns like $\text{tamago}$ (egg(s)), most dual-life nouns can be used with a numeral suffix $\text{kire}$ (slice(s), piece(s)). If we look into the way this suffix is used with them, we will realize that most of dual-life nouns lead triple life in fact.

Consider this simple sentence.

(87) Ringo da.

apple(s) COP

This sentence may mean one of three things.

(i) An apple or apples here. (whole individual apples)

(ii) Some apple here. (apple stuff)

(iii) Slices of an apple or apples here. (apple slices)

Compare this with similar sentences with a count, but not dual-life noun $\text{jitensya}$ (bicycle(s)) and a non-count noun $\text{mizu}$ (water).

(88) Jitensya da.

bicycle(s) COP

(89) Mizu da.

water COP

(88) can mean only “a bicycle or bicycles here”, and (89) may mean either “some water is here” or “a glass or glasses (a bottle or bottles, etc.) of water is/are here”. But they have no reading that corresponds to (iii). It is because the parts of $\text{jitensya}$ (bicycle(s)) are not called $\text{jitensya}$ in the case of (88), and there cannot be any individual object which is called $\text{mizu}$ in the case of (89).
It is true that (87) might be about a bag or bags of apples or a bottle or bottles of apple juice; but the reading (i) covers the former case, and (ii) covers the latter. If you have, however, a bag containing a number of apple slices or a can of them, neither (i) nor (ii) will do. You might say that the reading (ii) covers them, but if you say that, then (ii) will cover also the reading (i), and there will be no point of distinguishing the stuff sense of a dual-life noun. And if we distinguish the senses involved in (i) and (ii), then the sense involved in (iii) should be distinguished from either of them.

This means that with respect to most of dual-life nouns N we have to recognize the third sense, namely, the sense in which N refers neither to whole individuals nor to the matter constituting them but to parts of the whole individual which are spatially continuous and persist in time even if only briefly. Let us mark this sense as putting a superscript "piece" to a noun. It is not difficult to characterizing this sense of a dual noun N.

**Characterizing the piece sense of a dual-life noun**

Let N be a dual-life noun. Then, for any X,

\[ \text{Val}(X, N^{\text{piece}}) \text{ if and only if } \forall x[x \in X \rightarrow \exists Y[\text{Val}(Y, N) \land \exists y[y \in Y \land P(x, y)]]], \]

where "P(x, y)" means that x is a piece of y.

It is worth noting that no NNC predicates are necessary for characterizing this sense of a dual-life (or more precisely, triple-life) noun; countable predicates suffice for that.

Moreover, if the numeral suffix kire is explicitly employed, there is no need to suppose that the relevant noun occurs with a special sense; it can be interpreted as occurring in its primary sense, namely, denoting whole individuals. Consider a sentence which looks very similar to (85).

(90) Ringo o futa kire tabeta.

(Ate two slices of apple.)

The occurrence of ringo (apple) in (85) had to be interpreted as having stuff sense, but that of the same noun in (90) need not be interpreted in that way. In fact, its truth condition can be given in the following way.

(90') \[ \exists X[\text{futa}(X) \land \forall x[x \in X \rightarrow \exists Y[\exists y[y \in Y \land \text{kire}(x, y)] \land \text{ringo}(Y)]] \land \text{tabeta}(c, X)], \]
Comparing this with the characterization of the piece sense of a dual-life noun, you may notice that the phrase *kire no ringo* (slices of apple) corresponds to “*ringo* piece”, namely, the piece sense of *ringo*. *(90)′* should also be compared with *(85)′*; you will notice that “*ringo* stuff(*Y*)” in *(85)′* is replaced by “∃\(\exists y \eta Y \land *ringo*(Y)\)” in *(90)′*, which means that an NNR variable is replaced by a plural variable.

It is not hard to understand why most of dual-life nouns take a numeral suffix like *kire* and have uses such as the reading (iii) of *(87)*. They denote solid objects which have clear and definite shapes. Usually we have no difficulty in recognizing what constitutes one whole individual that is called by such a noun. Yet they can be processed in various ways for our purposes; in particular, they can be cut into larger or smaller solid pieces, each of which has its own identity and is useful in various ways.

There is a difference between the nouns like *syake* (salmon) and *ringo* on one hand and those like *kami* (paper) and *supagettei* (spaghetti) on the other. As the nouns of the former kind denote objects found in nature, it is determined by nature what constitutes one individual of its sort; it is given by nature what *ip-piki no syake* (one salmon) or *ik-ko no ringo* (one apple) is.

In contrast, what constitutes *ichi-mai no kami* (one sheet of paper) or *ip-pon no supagettei* (one piece of spaghetti) is not given by nature. We buy bundle of, say, twenty sheets of paper, and say that we bought *ni-jyuu mai no kami* (twenty sheets of paper). We might, however, cut each paper in two, and say that we have now *yon-jyuu mai no kami* (forty sheets of paper). Is it correct to classify the noun *kami* (paper) as a count noun? Isn’t it the case that *kami* is not a count noun just as English “paper” is not and that a numeral suffix *mai* functions as a unit-forming one here?

What *kami* or *supagettei* primarily denotes are countable discrete objects. Their parts can be called by the same nouns, but if they are used in that way, they are used in their stuff sense; after all, they are dual-life nouns. If you cut twenty sheets of paper in half and get forty sheets of them, there are two different pluralities \(X_1\) and \(X_2\) which are constituted by the same matter \(X\) before and after the cutting.

It may be added that there is a clear difference between *kami* or *supagettei*...
with the numeral suffix *kire* (slice(s), piece(s)) and the same noun with the sortal suffix *mai* or *hon/pon*.

(91) ichi mai no kami
one NumSuf GEN paper

(92) hito kire no kami
one NumSuf GEN paper

(92) usually has an implication that the piece of paper it denotes is not large enough to be counted by *mai*; it is as if it lacks an independent existence which deserves an application of a classifier, or a sortal suffix.

When *ichi mai no kami* (a sheet of paper) is cut in half, we have made two whole individuals in the form of *ni mai no kami* (two sheets of paper) from one individual, whereas when we tear a part of *ichi mai no kami* (one sheet of paper) in order to get *hito kire no kami* (one piece of paper) we have only some part of an individual.

Thus, I believe that we can also distinguish three senses in *kami* and *supagettei*: (i) referring to individuals having the standard size, which depends on what sort of *kami* or *supagettei* is relevant, (ii) referring to parts of those individuals, and (iii) referring to the matter that constitutes them. Sortal suffixes like *mai* (مى) and *hon/pon* (ຊ) are used for the sense (i), partitive type unit-forming suffixes like *kire* (਺, slice(s)) and *kake* (ਧ, piece(s)) are used for the sense (ii), and container type unit-forming suffixes like *taba* (ਲ, bundle(s)) and *fukuro* (ਧ, bag(s)) are used for the sense (iii).

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60 *Mai* requires a Chinese derived numeral, while *kire* requires a native one. This difference between the two suffixes is, of course, irrelevant to what is at issue here.

61 A noun *pan* (bread) gives us an instructive case. There are at least three sortal suffixes that can be used with *pan*, and they can be used even within a single noun phrase.

(i) Ip- pon to ni mai to san ko
one NumSuf and two NumSuf and three NumSuf
no pan ga aru.
GEN bread NOM is/are there

This sentence says that there are one breadstick, two sliced bread, and three buns. In this sentence, *pan* (bread) refers to an individuated domain the individuation of which is achieved by the noun itself; three sortal suffixes *hon/pon* (ຊ), *mai* (مى), and *ko* (ਗ) inform us about the various shapes of the six individuals, but this information is not a part of (i)’s truth condition; in terms of truth conditions, (i) is not different from the following.

(ii) Rok- ko no pan ga aru.
six NumSuf GEN bread NOM is/are there

(There are six pieces of bread.)

It should be noted that (i) has the same truth condition with (ii) because the numeral suffixes occurring in (i) are sortal. If they were partitive type unit-forming suffixes *kire* and *kake*, then (i) and (ii) would not have the same truth condition.
An interesting case is that of koori (氷, ice). When ko (個) is used with this noun, clearly it is not used as a container suffix. Hence, koori is classified as a count noun according to our criterion. It has also the three senses like ringo (apple) has; each of them is seen in the following.

(93-i) koori ni ko
      ice two NumSuf
      (two blocks of ice)

(93-ii) koori futa kake
       ice two NumSuf
       (two pieces of ice)

(93-iii) koori futa saji
       ice two NumSuf
       (two spoonfuls of ice)

English “ice” is not a count noun, but Japanese koori is a count noun, just as kami is the one. This result may look surprising at first, but it may not necessarily be surprising that different languages construe mass/count distinction in slightly different ways. Moreover, the difference between “ice” and koori is not a big one in reality, because the latter is after all a dual noun that has a stuff sense as well, and as we will see soon, it belongs to a kind of dual nouns in which the stuff sense is more pronounced than the thing sense.

We have been working so far under an assumption that a dual-life noun denotes things in its primary sense; it is also the reason why a dual-life noun is classified as a count noun. Before leaving this topic, let us consider whether it is possible to drop this assumption and give a different account of a dual-life noun.

The piece sense of a dual-life noun cannot be primary, because there are nouns like tamago (egg(s)) that lack it. Hence, the question is whether the thing sense of a dual-life noun can be characterized by its stuff sense.

Suppose then that ringo (apple) in its stuff sense is primary, and try to characterize the thing sense of ringo. It might be thought that this could be achieved by singling out parts of the apple stuff which form a spatio-temporally continuous whole and identifying each one with an individual apple. This does not work, however. For one thing, some of apple stuff may exist in liquid or grinded form, and hence, the spatio-temporal continuity is not sufficient for being an apple. Secondly, even if we could exclude apple stuff in non-solid state, ringo in its stuff sense does not denote all the matter which constitutes individual apples; it denotes only the parts which are edible, but individual apples are more than their edible parts.

It seems that similar consideration applies to the nouns of the classes (I) and (II) in general. In contrast, for many of the nouns of the class (III) such
as kami (paper) and supagettei (spaghetti), it might be possible to characterize
the thing sense of them by their stuff sense; first, paper and spaghetti do not
exist as liquid or powders, and hence it may be relatively easier to ascertain a
shape of one sheet of paper or one piece of spaghetti in a given region; secondly,
what the class (III) nouns denote in their stuff sense usually coincides with the
matter that constitutes the things that are denoted by their thing sense; for
example, おはなしの本 (one sheet of paper) is materially constituted by
nothing but paper, which is denoted by kami in stuff sense. This means that
there will not be a problem that arises with a noun like ringo, namely, ringo
in its stuff sense does not denote the whole matter that constitutes individual
apples but only its edible part.

For example, if we suppose that the primary sense of the noun kami (paper)
is to denote paper material, then we might characterize its object-denoting sense
in the following way.

\[
\text{kami}^\text{thing}(X) \ \text{if and only if} \ \exists \mathcal{X}[\text{kami}(\mathcal{X}) \land \text{MC}(\mathcal{X}, X) \land \text{sheet}(X)],
\]

where “MC(\mathcal{X}, X)” means as before that \(\mathcal{X}\) materially constitutes \(X\) and “sheet(X)”
means that \(X\) are sheet-like objects.

Characterizing the thing sense of a dual noun by its stuff sense is importantly
different from characterizing the stuff sense by its thing sense. In the latter case,
it was not unreasonable to assume that

\[
(*) \ \forall \mathcal{X} \exists X \text{MC}(\mathcal{X}, X),
\]

but it is not true that

\[
(**) \ \forall \mathcal{X} \exists X \text{MC}(\mathcal{X}, X)^{62}.
\]

As (*) holds, it is generally true that for any dual-life noun \(N\),

\[
\exists X \text{Val}(X, N^\text{thing}) \rightarrow \exists \mathcal{X} \text{Val}(\mathcal{X}, N^\text{stuff}).
\]

But the reverse does not hold, because (**) is not true. This explains why from

(i) おリンゴ 要
apple(s) ACC ate

or,

\[
\exists X[\text{ringo}(X) \land \text{tabeta}(c, X)],
\]

we can infer that

(ii) おリンゴ 要
apple ACC ate

or,

\[
\exists \mathcal{X}[\text{ringo}(\mathcal{X}) \land \text{tabeta}(c, \mathcal{X})],
\]

but not vice versa. (Of course, we also need another premise to the effect that if you ate one
or more apples then you ate also some apple stuff.)
And, it is not a trivial matter to find out \( \mathcal{X} \) which satisfies “\( \exists X \text{MC}(\mathcal{X}, X) \)”. This is the reason why such a reduction might work only for the class (III) of dual-life nouns.

This suggests that we might make a subdivision within dual-life nouns, namely, the nouns of classes (I) and (II) on one hand, and those of class (III) on the other. The thing sense is primary for the former, and the stuff sense is primary for the latter. In other words, we divide dual-life nouns into those closer to count nouns and those closer to non-count nouns. This may also explain the fact that in most cases English nouns which correspond to those of the class (III) like kami (paper) and koori (ice) are non-count nouns.

Now let us leave the topic of dual-life nouns, and see what sort of nouns are left as pure non-count nouns.

### 7.3 Are non-count nouns mass nouns?

Common nouns which are not count nouns are non-count nouns. Given the way a count noun was characterized above, the definition of a non-count noun should be the following.

**Definition**

A common noun \( N \) is a non-count noun if and only if either \( N \) cannot be modified by a numeral noun phrase with a sortal suffix or if \( N \) can be so modified then the sortal suffix is used as a container suffix.

Let us see what sorts of nouns will be non-count ones according to this definition. We will see that there are a good number of them, even though the condition we impose on a count noun was a very weak one, namely, a common noun is a count noun if some of its occurrence can take a sortal suffix other than a container suffix.

1. First of all, there are nouns for various liquids like mizu (water), biiru (beer), sekiyu (oil) and so on. If a numeral noun phrase with a sortal suffix is applied to them, it is certain that the sortal suffix is used as a container suffix. We have seen this in examples (56) and (57) in §6.1.

2. Similarly, nouns for various gases like sanso (oxygen), puropan-gasu (propane gas), sarin (sarim) and many others are non-count nouns. We might say sanso futa tsu (two oxygens) or puropan-gasu ni hon (two propanes), but they mean two cylinders or two bottles of oxygen or propane, and hence, the sortal suffixes tsu and hon are here used as container suffixes.

3. Tsuchi (soil) and suna (sand) do not take a sortal suffix except when it is used as a container suffix. We might say suna futa tsu (two sands), but
it can only mean something like two bags or two boxes of sand. There is no sortal suffix which counts *tsuchi* or *suna* by itself. Nouns for things in powder form like *shio* (salt) and *kosyoo* (pepper) belong to the same family. Another example is *yuki* (snow).

4. The nouns like *kome* (rice) and *azuki* (an adzuki bean), or more generally, nouns for grain and beans are also non-count ones. Some nouns for fish eggs like *ikura* (salmon roe) and *kyabia* (caviar) belong to the same class, and so are various kinds of berries like *ichigo* (strawberry). It might be thought that they are count nouns because grains of rice or adzuki beans\(^{63}\) as well as fish eggs and berries can be counted by *tsubu* ( rumor). However, it is not a sortal suffix but a partitive type unit-forming suffix\(^{64}\).

*Teki* ( 湼) is another partitive type unit-forming suffix which can be used with non-count nouns that refer to liquid-like stuff. *Tsubu* ( 粒) can be used only with nouns for the stuff consisting of small particle-like objects. These two suffixes are different from another sort of partitive type unit-forming suffixes like *kire* and *kake* in that the former picks up individual particle-like objects from a given totality, whereas the latter refers to separated parts of individual objects. Consider (94)–(96).

(94) Kome ga san tsubu aru.
   rice NOM three NumSuf there is/are
   (There are three grains of rice)

(95) Mizu ga san teki aru.
   water NOM three NumSuf there is/are
   (There are three drops of water)

(96) Ringo ga san kire aru.
   apple NOM three NumSuf there is/are
   (There are three slices of apple)

The three nouns *kome* (rice), *mizu* (water) and *ringo* (apple) all occur here with non-individuated reference. But there is a difference between (94) and (95) on one hand, and (96) on the other. In the latter, each slice of apple must come

\(^{63}\) English “rice” is not a count noun, whereas “bean” is count.

\(^{64}\) If a proof is needed, consider the following pair of sentences.

(i) Kome ga jyu tsubu aru.
   rice NOM ten NumSuf is/are there
   (There are ten grains of rice.)

(ii) Kome ga jyu tsubu bun aru.
   rice NOM ten NumSuf is/are there
   (There is rice which amounts to ten grains.)

It is easily seen that (i) implies (ii), but that (ii) does not imply (i).
from some individual apple, and hence, there exist, as it were, three levels in this case, namely,

a plurality of apples (including a single apple) — an individual apple
— a slice of an apple.

In contrast, with (94) and (95), there is no middle level; there are only two levels, that is,

rice (water) — a grain of rice (a drop of water).

It may seem that a grain of rice corresponds to an individual apple, but the parallelism with water suggests otherwise. Just as san teki no mizu (three drops of water) do not exist by their own but exist only as parts of some totality which is mizu (water), san tsubu no kome (three grains of rice) are considered to exist only as parts of a total mass which is referred to by kome (rice). In this, tsubu is essentially different from a sortal suffix ko (ŋ).

It is not true in reality that rice is never counted with ko, but it is comparatively rare and, when it is done, it is felt to be rather deviant to an ordinary speaker of Japanese. With larger size beans, however, the matter seems to be different. For example, take a noun daizu (soybean). Both tsubu and ko are applicable to it. Yet it seems to make a difference which suffix is used. If you are referring to a bag of soybeans and wish to single out some of them, it is natural to use tsubu. But if you are talking of an experiment of germinating soybeans, you will be more likely to use ko because your attention will be on each soybean, not their collection.

What is common in grains, beans and fish eggs is that we usually encounter them as a heap or bunch of small unit-like things. They can be seen from two different perspectives; (i) we may start from a totality and look at various parts of it, or (ii) we may start with looking at some of the unit-like things without paying much attention to the given totality. The sizes of the small-unit things seem to have an influence on which perspective we will take when we talk about them. If there were apples which are as small as beans, then it would not be strange for us to use tsubu with them.

5. The most interesting cases of non-count nouns are those that refer to various mixtures. If we mean by “mixture” what is understood in chemistry, then some of the examples we have mentioned above also belong to this class. In particular, many of the liquids and gases mentioned are mixtures in this chemical sense. Here I list some of the nouns that may not be easily put under any of the categories we have considered so far.

I divide them broadly into (a) the nouns that refer to liquid-dominant type mixture, and (b) those that refer to solid-dominant type mixture. Under (a) are included miso shiru (miso soup), doro mizu (muddy water) and tare (dressing); under (b) are included nendo (clay), jyamu (jam) and nikujyaga (boiled potatoes and meat).
This kind of nouns will be important when we come to discuss what are the
common characteristics of non-count nouns, because what they denote are not
homogeneous as some accounts demand from a mass noun.

6. In English there are many abstract nouns which are usually classified as
mass nouns. But, in the case of Japanese it is rather hard to find an abstract
noun which cannot take a sortal suffix \(tsu\). There seems to be nothing wrong
with the following sentence.

\[
(97) \text{Futa } tsu \text{ no } jiyuu \text{ ga aru.}
\]

\[
\text{two NumSuf GEN freedom NOM is/are there}
\]

(Literally: There are two freedoms.)

This might be explained by supposing that what are counted here is not
freedom itself but the kinds of freedom; (98), which contains an explicit mention
of kinds, is equivalent to (97).

\[
(98) \text{Futa } tsu \text{ no syurui no } jiyuu \text{ ga aru.}
\]

\[
\text{two NumSuf GEN kind(s) GEN freedom ga aru.}
\]

\[
\text{NOM is/are there}
\]

(There are two kinds of freedom.)

Although \textit{syurui} (kind(s)) is another abstract noun, it is a count noun that takes
the sortal suffix \(tsu\). Thus, any abstract noun \(N\) which can be replaced with
\textit{syurui no} \(N\) may be regarded as count. It does not mean, however, that any
abstract noun which is countable is in this way. There are some abstract nouns
for which counting what it refers to and counting the different kinds of them
are clearly different. Consider the following pair of sentences with the noun \textit{bun}
(sentence(s)).

\[
(99) \text{Futa } tsu \text{ no } bun \text{ ga aru.}
\]

\[
\text{two NumSuf GEN sentence(s) NOM is/are there}
\]

(There are two sentences.)

\[
(100) \text{Futa } tsu \text{ no syurui no } bun \text{ ga aru.}
\]

\[
\text{two NumSuf GEN kind(s) GEN sentence(s) ga aru.}
\]

\[
\text{NOM is/are there}
\]

(There are two kinds of sentences.)

They are not equivalent because \(tsu\) counts the sentences themselves in (99),
not their kinds as in (100).

It may not be reasonable, however, to insist on a clear demarcation between
count and non-count within abstract nouns. For, it is very likely that any form
of counting never becomes an issue with many of the abstract nouns, and hence, they will never be modified by a numeral noun phrase. In a language like English, any noun should have either a singular or plural form. Even a mass noun should have a number, and it is singular. This is why the mass/count distinction should be drawn for English common nouns. If the distinction were not clearly drawn, then we would be uncertain with some nouns whether they have plural forms or not. In contrast, Japanese is a number-neutral language and there is no need to be bothered by a question whether a given noun is singular or plural. Thus, there is no need to classify every common noun into either a count noun or non-count one. Then, there would be no point in worrying about those expressions with which such an issue never arises whether they are count or not.

Now that we have made a survey of non-count nouns, we may ask what are the common characteristics of them. In particular, we would like to know how our distinction between count nouns and non-count nouns among Japanese common nouns is related to that between count nouns and mass nouns that is usual in philosophy.

One influential way of distinguishing a mass noun from a count one, which goes back to [Quine 1960], is given in terms of two properties, cumulativity and distributivity. They can be characterized in this way\(^65\) (in the following, “sum” and “part” are to be understood mereologically).

(C) A common noun \(N\) is cumulative if and only if \(N\) applies to any sum of things to which \(N\) applies.

(D) A common noun \(N\) is distributive if and only if \(N\) applies to any part of something to which \(N\) applies.

There is a terminological problem here. For, we have introduced the term “distributive” in §4 for a noun (occurrence) \(N\) which has an individuated reference. Namely, if a predicate \(\phi\) which is true of \(N\) is also true of each \(N\) in the same context, then \(\phi\) is called “distributive”. Hence, let us call the distributivity characterized in (D) as “mereologically distributive” or “\(m\)-distributive” and distinguish it from the distributivity which is defined only for an individuative domain.

If a common noun \(N\) is cumulative and mereologically distributive, it is said to be homogeneous.

Then, the claim is that a common noun \(N\) is a mass noun if and only if it is homogeneous, namely, both cumulative and \(m\)-distributive.

It has been frequently pointed out, however, that in a language like English a common noun in plural form also has the property (C); if “students” applies to \(A\) and applies to \(B\), then it also applies to \(A\) and \(B\) combined. In a language

\(^{65}\) Cf. [Koslicki 1999], pp.59f.
like Japanese in which a noun does not change its form with number, (C) is valid with any common noun. If A are *gakusei* (student(s)) and B are also *gakusei*, then the sum of A and B are *gakusei* as well. This means that in a number-neutral language like Japanese what distinguishes a mass noun from a count one comes down to whether it is mereologically distributive or not.

It is true that a noun which is count by our criterion is not mereologically distributive, though it may be distributive in the sense of §4. If *kodomo* (child(ren)) refers to a number of children A, then it applies to some parts of them, namely, one of A or those among A, but there are some parts to which it does not apply, namely, an arm of one of A or the sum of all the arms of A.

But it has also been pointed out repeatedly that if it is necessary for a mass noun to be distributive in this sense, that is, mereologically distributive, then (i) many nouns which are considered to be mass will turn out to be not mass, and more seriously, (ii) there will be no mass nouns. First, if mereological distributivity were a necessary condition for a mass noun, then a noun for a mixture like *miso shiru* (miso soup) or *doro mizu* (muddy water) could not be a mass noun; although a piece of tofu can be a part of miso soup, it cannot be called *miso shiru*. Secondly, even a noun for a non-mixture like *mizu* (water) or *sanso* (oxygen) would not be a mass noun; for, there are parts of water and oxygen which are too small to count as water or oxygen.

Thus, Koslicki has proposed a weakened version of mereological distributivity as a necessary condition for a certain class of mass nouns, namely, those refer to stuff-like entities.

(WD) A common noun N is weakly distributive if and only if N applies to any part that results from myriad of unprincipled divisions of something to which N applies.

As Koslicki explained, this is to capture the intuition that (a) a mass noun N applies to very many parts, though not absolutely all of them, of something to which N applies, and (b) these many parts can be picked quite randomly.

Although some might complain about the vagueness of “myriad” and “unprincipled”, I think that this is a promising way of characterizing a certain class of mass nouns in ontological terms. One worry is that this property can be had only by concrete beings. But, as we saw above with respect to abstract nouns, at least in the case of Japanese, it may not be a good idea to pursue the mass/count distinction too vigorously. So, let us talk only concrete nouns in the following, and see what follows if we identify a mass noun with a common noun which is weakly distributive. This means that we will consider whether

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66 See [Quine 1960], p.99.
67 [Koslicki 1999], p.63. She talks of mass predicates instead of mass nouns, but this does not make any essential difference here.
68 Let us stipulate that “distributive” which occurs in the context “weakly distributive” should always mean “mereologically distributive”.
69 [Koslicki 1999], p.63.
our characterization of a non-count noun and that of a mass noun in terms of
weakened distributivity coincide or not.

We have to consider the relation between two theses about a Japanese con-
crete common noun N.

(NC) N is a non-count noun according to our criteria.

(M) N is a mass noun in the sense that it is weakly distributive.

Let us start with a question whether (NC) implies (M). In other words, could
we show that N is weakly distributive if N is a non-count noun?

A non-count noun does not have an individuating force by itself, and it can
divide its reference only by some external means, namely, by using some unit-
forming suffix. In contrast, a count noun can divide its reference by its intrinsic
property, namely, by dividing it as so many individuals of the sort that is named
by the noun.

This feature of a count noun puts a restriction on possible ways of reference
division by external means; when we divide the reference of a count noun by
using a unit-forming suffix of a container type, we have to observe the boundaries
between individuals. Suppose that we have twenty books and that we wish to
refer to them by san hako no hon (three boxes of books); this noun phrase
divide the reference of hon (books), but any way of dividing twenty books must
leave each individual book as it is; you cannot divide twenty books into, say,
ten books and a half, and nine books and a half, because ten books and a half
cannot be referred to by hon whereas ten books can be.

In the case of a non-count noun, there is no such restriction because there
are no boundaries between individuals that must be observed in dividing the
reference. In this respect it may be said that a non-count noun allows its
reference to be divided in freer ways than a count one does. Does this imply,
however, that a non-count noun allows a “myriad of unprincipled divisions” of
its reference?

The answer must be “No”, or at most “That depends”. Our characterization
of non-count nouns is essentially a negative one in terms of the absence of a co-
ocurrence with a sortal suffix, and hence, it will not lead to any positive trait
common to them without any extra assumption. The best we can do is to see
for each class of nouns which are non-count according to our criterion whether it
is weakly distributive. Still, we may expect that if a noun N is non-count by our
criterion then N is likely to be a mass noun. For, looking back to our survey of
non-count nouns above, you will find that all of them, with a possible exception
of nouns like kome (rice) and suna (sand), are weakly distributive. Even with
the case of kome and suna we might argue that they are weakly distributive
because a part of a rice (sand) particle is also called kome (suna).

Next, let us consider whether (M) implies (NC), in other words, a noun N
must be non-count if N is weakly distributive. Unlike its converse, I think that
there is a promising line of thought that might be able to establish this by a general argument.

Suppose that $N$ is a mass noun, and hence, weakly distributive. Consider a particular occurrence of $N$ which refers to $N$. As $N$ is weakly distributive, there are the myriad of ways of dividing $N$ so that each part that results from the division is called $N$. Moreover, as these ways may not be based on any principle, there is no reason to regard one of these various ways as privileged. If there are the myriad ways of dividing $N$ into each part being called $N$ and there is no privileged way among them, then we cannot say how many $N$ there are in an absolute way, even though we can say how many $N$ are there according to one particular way of dividing $N$.

This means that there is no definite answer to the question

\[(Q) \text{ Ikutsu no N ga arimasu ka.} \]

(How many $N$ are there?)

In other words, $N$ is not a count noun.

If this argument or something like this is successful, then we have shown that a weakly distributive noun cannot be a count noun and we may safely assume that any mass noun is a non-count noun.

As we saw above, its reverse cannot be shown in a general way. But, it is also true that we have not found any example of a non-count noun which is not weakly distributive, we may conjecture that the non-count/count distinction largely coincides with the mass/count one. So we may be allowed to conclude that the mass/count distinction among nouns as lexical items exists in Japanese.

### 7.4 Robustness of mass/count distinction in Japanese

We started with the distinction among the noun occurrences, namely, those with individuated reference and those with non-individuated reference. Then, we turned to another distinction which should be drawn among nouns as lexical items; it is between count nouns, which can have individuated reference in some of their occurrences, and non-count nouns, which cannot have individuated reference in any of their occurrences. As we saw in the previous subsection that our count/non-count distinction largely coincides with the count/mass distinction which is defined in ontological terms, and we have not found any serious example of a non-count noun which is not a mass noun, we may be excused to identify count/mass distinction with count/non-count distinction in the following.

A count noun may have a non-individuated reference as well as an individuated reference. This is obviously true with dual-life nouns, but it is also true with count nouns which are not dual-life ones. We have already encountered such cases (for (101), compare it with (30) of §4).
(16) Ni hako no hon  ga aru.
   two  CL-box  GEN  book(s)  NOM  is/are there
   (There are two boxes of books.)

(101) Ni-juu kiro no hon  ga aru.
   twenty kilogram  GEN  book(s)  NOM  is/are there
   (There are 20kg of books.)

The fact that the noun hon (book(s)) retains its character of count noun may be seen from the fact that we can meaningfully ask (102) on hearing either of (16) and (101).

(102) Hon wa zenbu-de nan satsu ari masu ka.
   book(s)  TOP  in all  how many  NumSuf  is/are there  POL  ?
   (How many books are there in all?)

The reason why (102) is meaningfully asked is that (16) and (101) both imply that there is some unique numeral $\nu$ which makes the following (103) true, though we may not know the identity of this numeral (in other words, we may not know how many books there are in all).

(103) $\nu$ satsu no hon  ga aru.
   NumSuf  GEN  book(s)  NOM  is/are there
   (There are $\nu$ books.)

The same thing cannot be said with a mass noun. Consider the following.

(104) Ni-sen shii-shii no mizu ga aru.
   two thousand cc  GEN  water  NOM  is/are there
   (There is 2000cc of water.)

We may find an equivalent sentence which has a different measure suffix like rittoru (liter) or a unit-forming suffix like bin (瓶, bottle), but as mizu (water) is a non-count noun, and hence, there is no sortal suffix that is applicable to it, there can be nothing comparable to a statement (103) or a question (102)\textsuperscript{70}. In other words, though the occurrence of hon (book(s)) in (16) or (101) has a non-individuated reference, it is possible in principle to individuate it, whereas there is no such possibility for the occurrence of mizu (water) in (104), if it is not the case that some container noun is implicitly present.

This suggests that the difference of a count noun and a non-count one as lexical items may show itself in their occurrences in various constructions.

\textsuperscript{70} (104) might have a reading in which some container noun is implicitly present. In that case, we may meaningfully ask a question similar to (102).
An obvious case that should be considered is the one when a common noun occurs bare in a sentence like the following.

(105) Kodomo ni hon o ageta.
child(ren) DAT book(s) ACC gave
(I gave a book/books to a child/children.)

(106) Koohii ni satoo o ireta.
coffee DAT sugar ACC put
(I put sugar into coffee.)

When a common noun appears bare as an argument in a type of a sentence like the above sentences, which I call "state of affairs sentences", it is interpreted either as a definite noun phrase or as an indefinite noun phrase depending on the context. As (105) and (106) are given here without any context, each of the four occurrences of a common noun may be either definite or indefinite. I interpret all of them as indefinite, because nothing turns on which interpretation we take.

Two sentences (105) and (106) are very similar in their constructions, but an important difference is that kodomo (child(ren)) and hon (book(s)) that occur in (105) are count nouns whereas koohii (coffee) and satoo (sugar) in (106) are non-count nouns. This difference makes us to construe the existential quantifiers involved in (105) and (106) differently, namely, we interpret the truth condition of (105) as something like

\[(105') \exists X \exists Y [kodomo(X) \land hon(Y) \land ageta(c, X, Y)]\]

whereas we interpret that of (106) as something like

\[(106') \exists X \exists Y [koohii(X) \land satoo(Y) \land ireta(c, X, Y)].\]

The use of plural variables in (105') is justified by the fact that kodomo (child(ren)) and hon (book(s)) are count nouns, which is justified in turn by another fact that there are sortal suffixes nin (ਓ) and satsu (࡭) which are appropriate for them.

With a dual-life noun, in some cases we may not sure whether it should be interpreted as referring to individual things or the matter that constitutes them, but there are also cases in which we may easily see what its right interpretation is.

(107) Ringo ga korogatta.
apple NOM rolled

---

71 [Iida Takashi 2009], p.217. As it will be mentioned in the text soon, all the example sentences considered so far are of this type.

72 Suppose that "c" denotes the speaker.
(An apple/Apples rolled.)

(108) Ringo ga ochita.
apple NOM fell

(An apple/Apples/Some apple fell.)

(109) Ringo ga koboreta.
apple NOM spill

(Some apple spilled.)

You may be reasonably sure that ringo refers to one or more than one apples in (107) and some apple stuff in (109). In contrast, if you are presented with (108) alone, you cannot decide whether ringo refers to individual apples or some apple stuff.

Although some occurrences of a dual-life noun are ambiguous between thing sense and stuff sense, it is relatively clear whether a given common noun is a dual-life noun or not. Of course, it may happen that a noun which once used to be a pure count noun becomes a dual-life one as a language evolves. This may take place, for example, when the meat of a certain animal which has never been used for food is newly introduced into a market and becomes popular; in a case like this, the name of the animal, which used to refer only to individual animals, will refer to their meat as well. We may be sure, however, the distinction between common names as lexical items, namely, that between pure count nouns, dual-life nouns, and non-count nouns, is relatively stable.

This last point should make us doubt the universality of “the universal grinder” ([Pelletier 1975]). If anything is put into this machine, it spews it onto the floor as a homogeneous mass. Suppose that a man were fed to the machine by a tragic turn of events. According to Pelletier73, if you were asked what is on the floor after this tragedy happened, the answer must be

(110) There is man all over the floor,

and this shows that any count noun can be given a mass sense.

Cheng, Doetjes and Sybesma74 pointed out that you could not find a sentence that corresponds to (110) in Mandarin, and argued that the universal grinder is not so universal as it was claimed to be75. It is equally difficult to find such a sentence in Japanese. If we have to translate (110) into Japanese without using a paraphrase like

(111) hito dat- ta mono,
man COP PAST entity/entities

(the stuff that used to be a man)

73 [Pelletier 1979], p.6.
74 [Cheng, Doetjes, and Sybesma 2008].
75 Of course, this means not that there is something which this machine cannot grind up, but that there are count nouns that cannot be turned into mass nouns with its help.
Then the best we can do will be something like (112)–(114).

(112) Yuka jyuu hito darake da.
floor all over man covered with COP

(113) Yuka ga hito de ippai da.
floor NOM man with full of COP

(114) Hito ga yuka jyuu ni hirogatteiru.
man NOM floor all over LOC is/are spread

But, they all fail to express what (110) says; we cannot interpret the occurrence of *hito* (man/men) in them as having a mass sense; (111) is likely to be interpreted as saying that any floor space is occupied by a man, (112) as saying that the entire floor is crowded with many men, and (113) as saying that men are spread over the floor.

If you replace *hito* (man/men) with a non-count noun like *mizu* (water) in (112)–(114), then the resulting sentences all mean that the floor is covered with water. Hence, if *hito* had a mass sense, then there would be nothing in the sentential contexts which prevents this sense from showing itself. Therefore, we may conclude that it does not have a mass sense.

Even when *hito* is replaced by a dual-life noun like *ringo* (apple) in (112)–(114), it needs some effort to interpret it as having a mass sense. Consider (115), which comes from (112).

(115) Yuka jyuu ringo darake da.
floor all over apple covered with COP

Although this sentence can be read as a description of a floor covered with slices of apples or grinded ones, the likeliest image we have on hearing it must be a great number of apples that cover an entire floor[^76].

This robustness of count/mass distinction in Japanese (and other classifier languages) might seem surprising at first, but if you understand why an English noun “man” can get a mass sense in a sentence like (110), it may not look so surprising after all.

Cheng, Doetjes and Sybesma explained why “man” gets a mass sense in (110) in this way[^77].

(….) count nouns in languages such as English must be explicitly marked as such, which then in turn leads to the claim that count nouns that are unmarked cannot be interpreted as count (….). As

[^76]: With a dual-life noun like *kami* (paper) and *toufu* (tofu), it is much easier to get a mass sense interpretation for the sentences corresponding to (112)–(114). This may be another piece of evidence that these dual-life nouns are closer to non-count ones than to count ones.

[^77]: [Cheng, Doetjes, and Sybesma 2008], p.52. I have omitted some reference, but the emphasis is as in original.
count nouns need to be marked, the use of a count noun which is formally unmarked for countability leads to ungrammaticality, unless it is interpreted, not as count, but as mass.

This is very persuasive. (110) exploits the absence of an expected mark for a count noun to get a mass sense across to an audience. There is no comparable method like this in Japanese, because its noun needs not be explicitly marked as count or non-count. Thus, if we cannot use a paraphrase like (111), then the only clue we can have is whether the noun as a lexical item is count or non-count. This must be the reason of the robustness of count/mass distinction in Japanese.

Pelletier also considers a sort of “dual” of the universal grinder, namely, “universal packagers”, which take any item that is referred to by a mass noun and convert it into an object78. Specialized forms of such a machine are not uncommon; English noun phrases below refer to some of their products.

(116) a beer
(117) an ice cream

We can see that the presence of the indefinite article marks the nouns “beer” and “ice cream” as count.

How are they to be translated into Japanese? The likeliest ones would be the following.

(118) bīru hito tsu
beer one NumSuf

(119) aisu-kuriimu hito tsu
ice cream one NumSuf

If any English mass noun can be turned into a count one by putting an indefinite article before it, then its Japanese translation would be a corresponding noun followed by hito-tsu.

This tsu is, however, a sortal suffix used as a container suffix as we saw above in §7.1. This means that (118) and (119) must implicitly refer to some container and that hito-tsu modifies a certain noun which refers to this container. Hence, the occurrences of bīru (beer) and aisu-kuriimu (ice cream) in (118) and (119) have non-individuated reference.

As we saw above, it is possible for a count noun to become a dual-life noun, namely, to acquire a use which is akin to that of a mass noun. In this respect, there is no difference between Japanese and English. Is it also possible for a

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78 [Pelletier 2012], §4. Pelletier included also various types of mud and kinds of scotch among “objects”; I don’t discuss this aspect of his view here because it can be discussed in an adequate way only when we consider the mass/count distinction in the context of generic sentences.
non-count noun to acquire a use which is akin to that of a count noun? It seems so in English; it is not difficult to use a noun which is lexically a mass noun as if it is a count noun. It is because any noun can be turned into a count-like one when we use it with an indefinite article or put a plural ending. The matter is entirely different with Japanese; just as we saw in our discussion of the universal grinder, the absence of an explicit marking of count/non-count makes such a change more difficult. For a mass noun to acquire a use like that of a count noun, we need a sortal suffix that will accompany with such uses; it can be one of already existing sortal suffixes or a new one. But there are two considerations that make such a change very hard; first, it will be difficult not to think that such a suffix is a container suffix and the noun is still used in its old sense, and secondly, it is rare for a new sortal suffix to emerge.

The failures of the universal grinder and the universal packagers at Japanese common names come from the fact that Japanese does not have an obligatory and explicit marking for count/mass distinction, and hence, it should rely on the distinction at a lexical level. This explains the seemingly surprising robustness of the mass/count distinction in Japanese.

As I discussed briefly in another place\cite{Iida2009}, Japanese sentences are classified into those that report a concrete state of affairs and those that ascribe an enduring property to a subject. I called the former as “state of affairs sentences” and the latter as “attribute sentences”. (120) is a state of affairs sentence and (121) is an attribute one\footnote{I have borrowed this pair of sentences from \cite{Koike1994} (p.51).}.

\begin{align*}
(120) \quad & \text{Tori ga tobu.} \\
& \text{bird(s) NOM fly} \\
& \text{(A bird/The bird/Some birds/The birds is/are going to fly.)} \\
(121) \quad & \text{Tori wa tobu.} \\
& \text{bird(s) TOP fly} \\
& \text{(A bird flies.)}
\end{align*}

Note that an English translation of (121) is a generic sentence. This is not an accident owing to this particular example; the class of Japanese sentences that (121) represents has many characteristics that are thought to be typical of generic sentences.

Though \textit{tori} (bird(s)) is a count noun, non-count nouns also occur in attribute sentences, as the following examples show.

\begin{align*}
(122) \quad & \text{Yuki wa tsumetai,} \\
& \text{snow TOP is cold} \\
& \text{(Snow is cold.)}
\end{align*}

\footnote{\cite{IidaTakashi2009}.}
Our discussion of the mass/count distinction in Japanese has been limited to its appearances in state of affairs sentences, and attribute sentences like (122) and (123) were kept from our considerations. It is mainly from two reasons. First, I believe that a semantic account of mass/count distinction and that of a generic sentences are mostly independent from each other. Secondly, I also believe that a satisfactory semantics of generic sentences could be built only after we have some workable account of non-generic sentences, or, in the case of Japanese, state of affairs sentences. Consequently, a discussion of the mass/count distinction in generic sentences can be put off until some later time when we have a good understanding of the same distinction in state of affairs sentences.

If we take a wider look at the mass/count distinction in state of affairs sentences in general, we notice that there are many constructions which are important to it but we have not considered in this paper. Most of them are related to various forms of quantification. Our focus in this paper has been on the nouns modified by numeral noun phrases, which are in reality just one of the various quantificational devices in Japanese. The most prominent quantificational devices in it are “quantity nouns” such as zenbu (all), takusan (many, much), and sukoshi (a few, a little). Thus, the next step we should take is to extend our account of the mass/count distinction to the constructions with these expressions and aim for a general account of mass/count quantification in Japanese.
References


[Yi 2012] Byeong-uk Yi, “Coersion and the mass/count distinction” a talk given at SEP 2012 in Columbus, Ohio, USA.