How universal is the Universal Grinder?*

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1. Introduction

In this paper we investigate the interpretation of the bare noun in the Mandarin sentence in (1a) and the consequences it has for the semantic denotation of mass nouns and count nouns in the lexicon. The sentence in (1a) has what we would like to call the "wall-paper reading": it is only felicitous to describe a situation in which a wall has been decorated with numerous little dogs. The noun *gǒu* 'dog' does *not* have a mass reading. Note that for the mass reading we need *gǒu-ròu* 'dog flesh/meat' (in (1b)). Note also, that a bare mass noun like *shuǐ* 'water' is perfect in these sentences (see (1c)).

(1) a. qiáng-shang dōu shì gǒu.
wall-TOP all COP dog
'There are dogs all over the wall.'
NOT: 'There is dog all over the wall.'
b. qiáng-shang dōu shì gǒu-ròu.
wall-TOP all COP dog-flesh/meat
'There is dog(meat) all over the wall.'
c. dì-shang dōu shì shuǐ.
floor-TOP all COP water
'There is water all over the floor.'

The obligatory count reading for *gǒu* 'dog' in (1a) is interesting from all possible perspectives. It is certainly unexpected in view of theories which say that all nouns have a mass denotation in the lexicon or that they are lexically unmarked for mass or count and get a default mass reading unless individuation is done in syntax (see Sharvy 1978; Borer 2005; and others). Arguments for these views are constructed on the basis of the observation that if you don't do anything, you get a mass interpretation (as in (2)). It would similarly apply to Mandarin noun phrases like those in (3) and (4), for which the case can be made that the classifier serves the function of individuation. Note that what we generally think of as "count nouns" (in (3))

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and "mass nouns" (in (4)) both need a classifier when used with a numeral (see Cheng & Sybesma 1999 for discussion).

(2) Mother termite complains about her son Johnny: "Johnny is very choosy about his food. He will eat book, but he won't touch shelf." (Gleason 1965)

(3) a. sān *(ge) rén
three CL people
'three persons'
b. sān *(zhī) bǐ
three CL pen
'three pens'

(4) a. sān *(píng) jiǔ
three CL-bottle liquor
'three bottles of liquor'
b. sān *(bǎ) mǐ
three CL-handful rice
'three handfuls of rice'

In Borer's view, "count interpretation must be structurally licensed, but mass interpretation need not be" (Borer 2005:108). She says that "mass interpretation is … a default interpretation, associated with the absence of dividing structure" (p. 94). Plural number marking and classifiers both reflect the presence of the syntactic structure that is needed in order to have a count interpretation. In the absence of such structure, a mass interpretation imposes itself, and thus Borer correctly predicts both the fact that the bare nouns in (2) have a mass interpretation and the obligatory insertion of the classifier in (3) and (4), where the numeral requires a count interpretation for the noun. The question (1a) poses here is: if all nouns come out of the lexicon with the mass denotation as the default denotation, then why can't the bare N *gǒu* 'dog' have a mass reading?

If we assume that *gǒu* 'dog' in (1a) is a count noun, the sentence still presents a problem, this time in view of the idea that all count nouns can be ground by the Universal Grinder (Pelletier 1975):

> "Consider a machine, the "universal grinder". This machine is rather like a meat grinder in that one introduces something into one end, the grinder chops and grinds it up into a homogeneous mass and spews it onto the floor from its other end. […] Now if we put into one end of a meat grinder a steak, and ask what there is on the floor at the other end, the answer is 'There is steak all over the floor' (where steak has a mass sense). […] The reader has doubtless guessed by now the purpose of our universal grinder: Take an object corresponding to any (apparent) count noun he wishes (e.g., 'man'), put the object in one end of the grinder, and ask what is on the floor (answer: 'There is man all over the floor'). (Pelletier 1975/1979:6)

This time we are confronted with the following problem: if there is such a thing as a Universal Grinder, which seems to work fine for English, why doesn't it work in (1a)? We tackle this question by first addressing the following questions:

1. Why do unmarked count nouns get a mass interpretation in English?
2. How do we explain the impossibility of getting a mass reading in (1a)?
3. How do we explain the difference between Mandarin and English?

Our investigations lead us to the following claims and conclusions. First, we think that theories which deny that there is a mass-count distinction in the lexicon are wrong. In contrast, we think that in all languages one can find nouns with mass denotations and nouns with count denotations at the lexical level. Second, there is no difference whatsoever in this respect between languages that are numeral classifier languages and languages that are not, which implies that classifiers in examples such as (3) are not a source of countability (against Lucy 1992). Finally, we claim that the Universal Grinder is a mechanism based on coercion and that languages differ as to which triggers may play a role. At the end of the paper, we discuss the lack of count to mass shifts for kind-denoting nouns in English (in contrast with Dutch).

2. Triggers for the Universal Grinder

2.1. Morpho-syntactic factors

We start out from the first of the questions listed above: why do count nouns in languages such as English get a mass interpretation when they are used in the absence of count syntax? As we can deduce from Borer's work (Borer 2005), all nouns in English that have a count meaning are formally marked as such: by *a*, *one*, the plural marker or something else. We can rephrase this slightly and say that count nouns in languages such as English *must* be explicitly marked as such (Sybesma 2007), which then in turn leads to the claim that count nouns that are unmarked cannot be interpreted as count (for the status of nouns such as *furniture*, see Doetjes 2007). As 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. The noun then has both the form (unmarked) and the meaning (mass) of a mass noun, and no problem occurs.

(5) a. There are dog**s** all over the wall.
    b. There is dog all over the wall.

(6) a. There is **a** turkey in the fridge.
    b. There is turkey in the fridge.

(7) a. There is tomato/apple/chicken/dog… in the salad.
b. Johnny won't touch shelf.

In other words, in our view a mass interpretation of count nouns in languages such as English is a "last resort" or "coerced" interpretation. What is important is that the trigger for this mass interpretation is a morpho-syntactic one: the lack of the marking appropriate for a count interpretation.

If this claim is correct, it may shed some light on the question why the bare *gǒu* 'dog' in (1a) resists a mass interpretation. (8a–c) show that bare nouns in Mandarin can be interpreted as indefinite, definite, or generic (see Cheng & Sybesma 1999, 2005). As is also clear from these examples, bare nouns are unmarked for number.

(8) a. Húfēi mǎi shū qù le.
Hufei buy book go SFP
'Hufei went to buy a book/books/the book/the books.'
b. gǒu jīntiān tèbié tīnghuà.
dog today very obedient
'The dog/the dogs was/were very obedient today.'
c. gǒu ài chī ròu.
dog love eat meat
'Dogs love to eat meat.'

In other words, count nouns in Mandarin do not have to be marked by elements like indefinite or definite articles, or plural markers to get a count interpretation (but see Sybesma 2007). This leads to the prediction that Mandarin will be immune to morpho-syntactic coercion, as we observed in English. We know that this prediction is correct, because of (1a); (9a) and (9b) are two more examples, showing that we always get a count reading with count nouns and that no grinding takes place. Note that *hěnduō* in (9a) is similar to *a lot* in that it combines both with mass nouns (*hěnduō bīngqílín* 'a lot of ice cream') and with count nouns. In the latter case, a mass interpretation of the count noun is systematically excluded.[1] The lack of mass readings is unexpected in a scenario in which mass readings occur in the absence of count syntax.

(9) a. wǒmen zuótiān chī-le hěnduō píngguǒ/bīngqílín
we yesterday eat-PERF many/much apple/ice cream
'We ate many apples/much ice cream yesterday.' (NOT: much apple)
b. pánzi-lǐ yǒu píngguǒ/bīngqílín
plate-inside have full-PERF apple/ice cream
'The plate is full of apples/*apple/ice cream.'

The prediction is not restricted to Mandarin. In fact, we expect all languages that do not require overt marking of count nouns with count readings to behave like Mandarin in being immune to morpho-syntactic coercion. Let us look at two such languages, Brazilian Portuguese and Gungbe. Both Brazilian Portuguese and Gungbe make use of "number neutral nouns". Brazilian Portuguese count nouns may be marked for plural, but a non-plural form is not necessarily interpreted as a singular. A bare 'numberless' noun may be interpreted as singular, plural, and, depending on the speaker, kind (Schmitt and Munn 2002; see also Müller 2002). Gungbe is similar to Mandarin in having bare nouns with varied interpretation (but it does not have numeral classifiers).

The following Brazilian Portuguese and Gungbe examples support our hypothesis that there is a connection between the obligatory marking of count nouns with a count interpretation and the coercion of a mass reading for count nouns that are not marked as count. In both languages we get the exact same count interpretation we get in Mandarin.[2]

Brazilian Portuguese (Jairo Nunes, p.c.)

(10) Tem cachorro espalhado por toda a cidade
has dog spread for all the city
'There were dogs all over the city.'
NOT: 'There was dog all over the city.'

Gungbe (Kwa) (Enoch Aboh, p.c.)

(11) a. Avun to ado lo ji gbon fi le kpo
dog at wall DET on pass place num all
Lit.: 'There were dogs on all parts of the wall.'
= 'There were dogs all over the wall.'
NOT: 'There is dog all over the wall.'

b. Adide to ado lo ji gbon fi le kpo
ant at wall DET on pass place num all
'Ants were all over the wall.'

We conclude from this that there are good reasons to assume that count nouns come out of the lexicon as count and that a mass interpretation of a count noun is the result of coercion.

In Mandarin, Gungbe and Brazilian Portuguese we also find sentences in which grinding seems to have taken place. However, such sentences confirm our conclusion in an interesting way. Consider, first, the Mandarin case in (12).

(12) a. wǒmen zuótiān chī-le yú
we yesterday eat-PERF fish
'We ate fish.'

b. #wǒmen zuótiān chī-le zhū
we yesterday eat-PERF pig
'We ate a pig'.

The normal way to say 'eat fish' in Mandarin involves the bare noun *yú* 'fish'. The question is what kind of interpretation we get in (12a). According to the reasoning developed above, it cannot be a mass reading. Interestingly, in Mandarin, 'eat+animal' phrases are only felicitous in case the animal in question is typically (or imaginably) served as a whole. In other words, we do not get a mass reading even in (12a); rather we may have a singleton reading, next to the also available plural reading. This is confirmed by the reaction native speakers consulted had when confronted with (12b): the reaction was either 'you must have been very hungry!' or the sentence invoked the picture of a traditional wedding banquet — in both cases, the pig is present as a whole. Similarly, when googling *chī niú* 'eat cow', relevant sentences we found always have a lion or a tiger as the subject. This matches the singleton reading claim: when a tiger eats a cow, the whole cow is there. The singleton reading is excluded for plurals in languages such as English, and rather corresponds to a singular form *a fish*. As number neutral nouns do not distinguish between singular and plural, the unmarked form may be used to refer to a singleton.[3]

We observe the same preference for a singleton reading in Brazilian Portuguese. The following sentence is only acceptable (for at least some speakers) in a mass-like reading if the dog matter on the wall originates from one single dog (Jairo Nunes, p.c.). For instance, we first have a dog, then we have an explosion, then we may utter (13). In English, this is not the case.[4]

(13) Tem cachorro por toda a parede
has dog for all the wall
'There is a dog all over the wall.'

In sum, in these Mandarin and Brazilian Portuguese sentences, the grinder seems to have done its work, but in actual fact it hasn't: the obtrusiveness of the singleton interpretation indicates that the count reading is still there.

2.2 World knowledge factors

In the previous section, we saw that the lack of overt marking of count nouns with a count interpretation makes Mandarin insensitive to the morpho-syntactic triggers that play a role in coercing bare count nouns into a mass reading in English. In this section, we discuss cases (e.g., (14a,b)) in which a mass reading is for bare count nouns in Mandarin as well as the trigger for such readings.

(14) a. shālā lǐ yǒu píngguǒ/júzi/*zhū
salad inside have apple/orange/pig
'There is apple/orange/*pig in the salad.'
b. nǐ liǎn-shàng yǒu píngguǒ/dàn/*zhū
you face-on have apple/egg/pig
'There is apple/egg/*pig on your face.'

The bare nouns in these sentences clearly have a "ground" meaning; no singletons play a role here. This paradigm raises two questions. First, what is the difference between (9a,b) and (14a,b) such that in the former, a mass/"ground" interpretation is impossible, while we can get such a reading in the latter? Secondly, why is there a difference between *píngguǒ* 'apple' and *júzi* 'orange' on the one hand and *zhū* 'pig' on the other? Why can the former be ground and not the latter?

To answer the first question, we propose that a mass reading does not have to be coerced by morpho-syntactic triggers; it can also be coerced by world knowledge triggers. In all sentences in (14), a singleton reading simply hampers interpretation. The salad context in (14a) triggers coercion, because salad ingredients such as apples tend to be chopped. As to (14b), a singleton reading does not come up: unless it is a picture, one does not have a whole apple or a whole egg on one's face.

It is even possible to get a mass reading in a sentence like (1a). If we change *gǒu* 'dog' into *píngguǒ* 'apple' and we say that the scene describes what we get after some kid eats a lot of apple and subsequently vomits all over the wall, then knowledge of the world can enforce a mass reading. Without any context given, the wall paper reading is of course the first one that comes up.

(15) qiáng-shang dōu shì píngguǒ.
wall-TOP all COP apple
WALL PAPER READING: 'There are apples all over the wall.'
MASS: 'There is apple all over the wall.'

We observe a similar knowledge of the world effect in English and Dutch in that grindability seems sensitive to size, as in (16) and (17). When you put small things in a salad, you do not need to grind them first, and the use of an unmarked count noun is odd:

(16) a. There's tomato in the salad
b. ?? There's berry/cherry in the salad

(17) a. Er zit tomaat in de salade
b. ?? Er zit bes/kers in de salade

In other words, knowledge of the world plays a role in the grindability of elements in English and Dutch as well, just like in Mandarin. Note that the effect of world knowledge is the opposite in the two types of languages, which is due to the morpho-syntactic differences discussed above. In Chinese, where coercion is not triggered by morpho-syntactic factors, world knowledge makes grinding available in those contexts where mass readings strongly impose themselves. In languages such as English and Dutch, world knowledge blocks grinding in contexts where the mass reading is not likely to occur.

2.3 Lexical blocking effects

Let us now turn to the second question raised above with respect to Chinese: why can we grind apples and oranges, but not pigs, as is illustrated in (14)?

We hypothesize that availability of forms with *ròu* 'flesh, meat', as we saw in (1b), blocks the possibility of forcing a mass reading onto words such as *zhū* 'pig'. If we replace *zhū* 'pig' in (14a) with *zhūròu* 'pig meat: pork', the sentence is fine, as (18a) shows; (18b) shows that we have a similar effect in English (and even more similar in Dutch, (18c)).

(18) a. shālā lǐ yǒu zhū *(ròu)
salad inside have pig (meat)
'There is pork in the salad.'
b. There is pork/?*pig in the salad.
c. er zit *varken/varkensvlees in de salade
there sits pig/pig meat in the salad
'There is pork in the salad.'

The following examples show that, in English and Dutch, it really seems to be the availability of another, frequently used lexical item that is crucial here.

(19) a. We had elephant/reindeer/giraffe for dinner last night.
b. We had ?*cow/beef for dinner last night.

(20) a. We hebben gisteravond olifant/rendier/giraf gegeten.
we have yesterday evening elephant/reindeer/giraffe eaten
b. We hebben gisteravond ?*koe/rundvlees gegeten.
we have yesterday evening cow/beef eaten

The difference with Mandarin is, that in that language no land animal is ever consumed without having been ground and suffixed with *ròu* 'meat' first; the availability of the form with *ròu* 'meat' generally blocks grinding of the corresponding form without *ròu*.

3. Mass kinds in English and Dutch

Aside from a mass reading, we also have what we call a "mass kind reading", as in the Dutch sentence in (21a) and its English translation in (21b).

(21) a. Jan is dol op soep.
b. John is crazy about soup.

Generally, count nouns with no marking can also be used as mass kinds, but interestingly, Dutch and English differ in that Dutch is much more flexible than English. Consider the following examples.

(22) a. Zijn moeder houdt van appel maar niet van kiwi.
his mother holds of apple but not of kiwi
'His mother likes apples but not kiwis.'
b. *His mother likes apple but she hates kiwi.
c. His mother likes apples but not kiwis.

Although there is some speaker variation with respect to the *kiwi* in Dutch (though no-one judges the sentence completely bad; the *appel* is always okay), the corresponding English sentence in (22b) is out: apparently, we need the plural form to get a kind reading, see (22c). Still, even for English, a mass kind interpretation for unmarked count nouns is not completely excluded, as is shown by (23a), clearly different in meaning from (23b):

(23) a. I love chicken/elephant/dog.
b. I love chickens/elephants/dogs.

Dutch displays a pattern that is only minimally different from English. First, the Dutch version of (22c), with plural *appels* and *kiwi's*, would also be acceptable. Second, the paradigm in (23) also holds in Dutch:

(24) a. Zij houden van kip/olifant/hond.
they hold of chicken/elephant/dog
'They love chicken/elephant/dog.'
b. Ik houd van kippen/olifanten/honden.
I hold of chickens/elephants/dogs
'I love chickens/elephants/dogs.'

This means that the two languages only differ in that, at least according to the majority of speakers we consulted, Dutch is, generally, consistent in allowing count nouns with no marking to get a mass kind interpretation, while English, it seems, only allows this for some nouns and not for others.

Considering the difference between the cases in (22b) and (23a) more carefully, it turns out that English does not allow mass kind readings in those contexts where the use of a plural or the corresponding mass noun does not change the meaning of the sentence, as illustrated in (25).

(25) a. Ik houd van tomaten. ↔ Ik houd van tomaat.
b. I love tomatoes. ↔ I love *tomato/ the stuff tomatoes are made of.

This equivalence typically holds when the bare noun is a fruit or another edible object. When the direct object of the verb *to love* is animate, however, this type of equivalence usually does not hold, as shown in (26). In these cases, the use of a mass kind is possible in English:

(26) a. Ik houd van olifanten. ↮ Ik houd van olifant.
b. I love elephants. ↮ I love elephant/ the stuff elephants are made of.

When the plural is used, the object is typically not interpreted as food in these cases, while the corresponding mass nouns do refer to food. The difference between plurals such as *tomatoes* and *elephants* is related to the first interpretations we get for these nouns: *tomatoes* are classified as food, and *elephants* are not. It is very hard to use the noun *elephant* for food unless the shift to a mass interpretation is made, and in order to not have the food meaning for *tomatoes* a particular context has to be established, e.g. a discussion about a painter who loves tomatoes in the sense that he loves the way they look.

Interestingly, small animals such as *shrimps* and *mussels* behave like *tomatoes*, while nouns denoting large fruits such as *watermelon*, *cantaloupe* and *pumpkin* are used as mass nouns in a kind reading, and thus resemble *elephant* (thanks to one of the reviewers for drawing our attention to these facts). The case of *mussels* and *shrimps* probably has to do with the blocking effect discussed in the previous section. The count-to-mass shift is often blocked for nouns denoting small objects (in this case small animals). As for *watermelon(s)*, for some speakers, the same type of non-equivalence occurs that has also been observed for *elephant(s)* in (26b). Somehow, the use of the plural suggests to native speakers that one is talking about the objects and not about the food. As our informant noticed, the use of the plural immediately suggests that the speaker likes watermelons because s/he wants to paint them or sit on them, for instance.

Given the examples discussed above, the difference between English and Dutch can be accounted for by assuming that in English, the following presupposition applies to N-mass when it is derived by grinding:

(27) Presupposition that holds for any N-mass that is derived from N-count by grinding (e.g. *English*): The denotation of N-mass excludes stuff that is also an individual N-count.

For this reason, English uses (28a) instead of (28b): when we love tomatoes, we mean that we love the stuff tomatoes are made of. (28b) is odd, because it is strange to love the stuff tomatoes are made of, without liking individual tomatoes.

(28) a. I love tomatoes.
b. *I love tomato.

For dogs and elephants, this is different; see (23) and (26a,b). One can like the individuals, without liking the stuff they are made of, and the other way around. Apparently, for big fruits like watermelons, this is also the case.

In Dutch, the presupposition in (27) does not apply: the denotation of N-mass includes stuff that is also an individual N-count. As a result, mass kinds are available. The blocking effect of the presupposition in (27) typically occurs when the mass noun has a kind reading. In existential contexts the presupposition has no effect, as grinding simply does not take place when a count interpretation is intended. The effect only occurs in sentences where a kind generalizes over stuff and count individuals made of that same stuff.

4. Conclusion

Our main conclusion is that the lexicon universally distinguishes between nouns with count denotations and nouns with mass denotations.

We have shown that the Universal Grinder is operative as a "last resort" to interpret morpho-syntactic form and structure that is otherwise uninterpretable. We have also shown that it may be triggered or blocked by strong world knowledge cues, and that it may be blocked by other lexical forms or items that already have the intended meaning.

As we saw, Mandarin, due to its lack of obligatorily present countability markers of the type that English has (such as *a*, *one* and plural *s*) offers very little possibility for grinding: only in contexts where we have a strong world knowledge cue (e.g. the salad context) do we find it (and then only if it is not blocked by the availability of another lexical item with the intended meaning).

With respect to Dutch and English we observed that morpho-syntax creates contexts in which coercion to a mass interpretation is triggered; however, when we move into the domain of mass kinds, the Grinder meets with fewer constraints in Dutch than in English.

In any case, a theory which claims that all nouns start out with a mass denotation or are unmarked for count or mass and are given a count interpretation in syntax cannot account for the facts presented in this paper. In particular the claim that Mandarin or, more generally, Chinese, nouns are only individuated when a classifier is present is wrong. A mass-(or unmarked)-in-the-lexicon theory cannot explain the fact in (1a).

Notes

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1. To express the mass reading, it is necessary to use compounds such as *píngguǒ-suì* 'apple-crumbs'.

2. This example does not constitute a minimal pair with (1a), as it has been modified by our informant, who did not like the use of the bare singular in the Brazilian Portuguese counterpart of (1a), which we will discuss below (see example (13)). Similarly, the example in (11b) is given to us by our informant, who made up a 'good' example with a bare noun being all over the wall.

3. Actually, what we call here the singleton reading and the plural reading are two possible ways to use the number neutral noun. They correspond to different situations in which the bare noun can be used felicitously, rather than to two different meanings of the noun. From a semantic point of view, the meaning of the bare noun is compatible with singular and with plural reference.

4. It seems that speakers of Brazilian Portuguese have a harder time getting the wall paper reading (see note 2 and example (1a)) while they get this special type of singleton reading more easily than Mandarin speakers. This is an issue for further research.

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