Count and Mass Across Languages

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11

Counting and classifiers*

LISA LAI-SHEN CHENG

11.1 Introduction: Three puzzles

We normally think of classifier-languages such as Chinese to be different from languages like English, simply because these languages use classifiers even for count nouns. Furthermore, that bare count nouns in Chinese can appear in argument positions suggest that even bare count nouns behave like mass nouns. These facts in Chinese have led to various claims concerning the interpretation of bare nouns as well as the nature of the classifiers. Below, I first put forth three puzzles in relation to the interpretation of bare count nouns, as well as the asymmetries concerning classifiers. With these puzzles as background, I re-examine classifiers in Mandarin and Cantonese. Let us consider first the Universal Grinder puzzle.

11.1.1 *The Universal Grinder puzzle*

Most nouns in English, for example, can be either mass or count, depending on the context.

(1) a. There is steak all over the floor.
b. Kim put apple in the salad.

(Pelletier 1979, Pelletier and Schubert 1989)

Both *steak* and *apple* in (1) have the 'ground' reading (i.e. being interpreted as a mass noun). This can be attributed to the so-called 'universal grinder'. A 'universal grinder' (the term due to David Lewis) takes an object corresponding to any (apparent) count noun (e.g. *man*), and puts the object in one end of the grinder, and asks what is on the floor (e.g. *There is man all over the floor*). Interestingly, for a language like (Mandarin) Chinese, though many have claimed that it only has mass

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nouns (see Borer 2005, Chierchia 1998a,b among others), corresponding grinder examples (as in (2a)) do not lead to the same reading as we saw in (1).[1]

(2) a. qiáng-shang dōu shì gǒu. [Mandarin]
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.'

Crucially, (2a) has the so-called 'wall-paper' reading (see Cheng, Doetjes and Sybesma 2008). The noun *gǒu* 'dog' does not have the reading that would have resulted from a universal grinder. Instead, the sentence yields the picture that the wall has a wall-paper with (little) dogs on it.

Given the contrast between English and Chinese, we have the following 'universal grinder puzzle': if all nouns in Chinese have a mass denotation, how come *gǒu* 'dog' in (2a) cannot have a mass interpretation? Note that in the Chinese case, it is as if we cannot even appeal to the universal grinder. That is, if nouns in Chinese are not mass nouns, we should still be able to appeal to the universal grinder, and get to the same reading as in English. Given the interpretation in (2a), this is apparently not possible. On the other hand, if Chinese has a count/mass distinction, why do we use classifiers so prevalently?

11.1.2 *Classifier reduplication puzzle 1: Mandarin vs. Cantonese*

Cheng (2009a) shows that there is a systematic difference between Cantonese and Mandarin in the reduplication of classifiers.[2] (3a,b) show that Mandarin classifiers cannot be reduplicated, in contrast with Cantonese (4a,b); DE and GE in the glosses (here and elsewhere in this article) stand for the particular type of classifier in the examples.

(3) a. *Ge-ge rén dōu yǒu zìjǐ de lǐxiǎng. [Mandarin]
CL-CL person all have self DE ideal
'Everyone has his own ideal.'

[1] I will gloss *dōu* as 'all' in this chapter. But see Cheng 2009a, which treats *dōu* as a maximality operator.
[2] Typical sortal classifiers are glossed as CL, while mensural classifiers are glossed as CL with its meaning put as a superscript. The numbers in the Cantonese examples indicate tones.

b. *Ge-ge chúshī dōu zuò yī-dào cài.
CL-CL chef all make one-CL dish
'Every chef makes a dish./One chef per dish.'
(data adapted from Yang 2004)

(4) a. Go^{3}-go^{3} jan^{4} dou^{1} jau^{5} zi^{6}gei^{2} ge^{3} lei^{5}soeng^{2}. [Cantonese]
CL-CL person all have self GE ideal
'Everyone has his own ideal.'

b. Go^{3}-go^{3} cyu^{2} dou^{1} zou^{6}-zo jat^{1}-dip^{6} sung^{3}.
CL-CL chef all make-PERF one-CL dish
'Every chef makes a dish.'

Given that both Mandarin and Cantonese are classifier languages, what is the difference between the classifiers in the two languages which can lead to such a difference in reduplication?

11.1.3 *Classifier reduplication puzzle 2: Cantonese*

In (4), we see that Cantonese classifiers can be reduplicated. However, there is some restriction on reduplication. As shown in (5) and (6), the reduplication of measure phrases is restricted. The question arises as to why (5b, c) are ungrammatical, while (6) is grammatical.

(5) a. bong^{6}-bong^{6} yuk^{6} dou^{1} hou^{2} san^{1}sin^{1}. [Cantonese]
CL^{pound}-CL^{pound} meat all very fresh
'Every pound of meat is fresh.'

b. ?*ma^{5}-ma^{5} bou^{3} dou^{1} hou^{2} leng^{3}.
CL^{yard}-CL^{yard} cloth all very pretty
'Every yard of cloth is very pretty.'

c. ?*cek^{3}-cek^{3} dei^{6} dou^{1} hou^{2} gon^{1}zeng^{6}.
CL^{foot}-CL^{foot} floor all very clean
'Every foot of floor is very clean.'

(6) cek^{3}-cek^{3} bou^{6} dou^{1} jat^{1}yeong^{6} gam^{3} fut^{3}. [Cantonese]
CL^{foot}-CL^{foot} cloth all same such wide
'Every foot of cloth is all the same width.'

In this chapter, I address these puzzles. I will first review the arguments that the count/mass distinction is still found in Chinese, though not at the nominal level; but rather, at the classifier level. In sections 11.3 and 11.4, I examine classifiers in Mandarin and Cantonese further. After discussing the differences between Mandarin and Cantonese, I turn to further examine a set of classifiers which Cheng and Sybesma (1998) call 'massifiers' (see below); in particular, I re-examine massifiers in

relation to the *de*-test, the adjective test, as well as their ability to reduplicate. I show that massifiers do not behave uniformly with respect to the tests. In section 11.5, I discuss *di*[1] in Cantonese, which can be considered to be a plural classifier as well as the implication this has for our understanding of bare nouns and the nature of classifiers.[3]

11.2 Count/mass at the classifier level

Cheng and Sybesma (1998, 1999, 2005) argue that classifiers are not all the same. Following Tai and Wang (1990) and Croft (1994) among others, they made a distinction between classifiers that *create* a unit of measure and the ones that name the unit in which the entities denoted by the noun come naturally. They call the first type *massifiers* and the second type *count-classifiers*.

They employed two tests to distinguish these two types of classifiers: their co-occurrence with *de* (which is typically considered to be a modification maker (see also Cheng and Sybesma 2009 for a difference analysis of *de*)), as well as their co-occurrence with adjectives such as *small* and *big*. They suggest that the difference among classifiers reflects a count-mass distinction. Below we review each of these tests in turn.

11.2.1 *Classifier* + de *(Mandarin)*

The classifiers that are associated with 'count'-nouns (i.e. *count-classifiers*) cannot be followed by *de* (such as (7)), whereas container classifiers or measure classifiers (i.e. *massifiers*) can (as in (8)) (see also Chao 1968, Paris 1981, Zhu 1982, Tang 1990).[4]

[3] In this chapter, I do not discuss the phenomenon in which a classifier appears following the noun. See Zhang (this volume) for a detailed discussion. I do not think that when the 'classifier' appears post-nominally, it is a functional category on a par with a prenominal classifier. As Zhang (this volume) notes, its distribution is similar to a bare noun. Furthermore, typical count-classifiers cannot all appear postverbally (e.g. *yī-zhāng zhuōzi* [one-CL-table] vs. **zhuō-zhāng*; *yī-zhī gǒu* [one-CL-dog] vs. **gǒu-zhī*) and in some cases, the meaning changes when the putative classifier appears postverbally (e.g. *yī-fēng xìn* 'one-CL-letter' vs. *xìn-fēng* 'envelope'), the latter fact leads one to think of this as something along the lines of compounding, which can yield non-compositional readings.

[4] Li (2008) briefly discusses a couple of counter-examples as in (i) and (ii):

(i) shí duō běn de shū
ten more CL[volume] DE book
'approximately 10 books'

(ii) liǎng bǎi duō fēng de xìn
two hundred more CL DE letter
'approximately 200 letters'

Note that all these examples involve a number marked with *duo* 'more', and it gives an approximate number. Hsieh (2008) also discusses such examples. Her conclusion is that in cases when sortal classifiers can appear with *de*, either the quantity is approximate, or there is contrastive focus on the classifier.

(7) a. bā tóu (*de) niú [Mandarin]
eight CL DE cow
'eight cows'

b. jiǔ gēn (*de) wěibā
nine CL DE tail
'nine tails'

c. shí zhāng (*de) zhuōzi
ten CL DE table
'ten tables'

(8) a. sān bàng (de) ròu [Mandarin]
three CL^{pound} DE meat
'three pounds of meat'

b. liǎng xiāng (de) shū
two CL^{box} DE book
'two boxes of books'

Aside from the fact that they can appear with *de*, *massifiers* differ from *count-classifiers* in that they can occur with both count (a set) and mass nouns (as in (8b)), while *count-classifiers* can only appear with count nouns. (9) provides the Cantonese counterparts, showing that massifiers can appear with *ge*^{3}, the Cantonese counterpart of *de*.

(9) a. sam^{1} bui^{1} (ge^{3}) seoi^{2} [Cantonese]
three CL^{cup} GE water
'three cups of water'

b. ng^{5} tiu^{4} (*ge^{3}) seng^{2}
five CL GE string
'five strings'

c. sam^{1} seung^{1} (ge^{3}) syu^{1}
three CL^{box} GE book
'three boxes of books'

As discussed in Cheng and Sybesma (1998), when *de* appears with a container/measure phrase, it provides a quantity reading. *Sān-bēi shuǐ* [three-CL^{cup} water] can have a reading in which the three cups are present (such as 'she is holding three cups of water in her hands'), as well as a quantity reading, as in 'you need to put three cups of water in the soup'. However, when *de* is present, as in *sān-bēi de shuǐ* [three-CL^{cup} DE water], the non-quantity reading is not available.

11.2.2 *Adjective + classifier*

Massifiers and count-classifiers further differ in their co-occurrence possibility with *dà* 'big' and *xiǎo* 'small'.[5,6] (10)–(11) show that massifiers can co-occur with these adjectives while count-classifiers cannot.

(10) a. yī dà zhāng zhǐ [Mandarin]
one big CL^{sheet} paper
'one large sheet of paper'

b. nà yī xiǎo xiāng shū
that one small CL^{box} book
'that one small box of books'

(11) a. *yī dà zhī gǒu [Mandarin]
one big CL dog

b. *yī dà wèi lǎoshī
one big CL teacher

Cheng and Sybesma (1998, 1999) argue that the count-mass distinction is not reflected at the lexical level in Chinese languages, but at the classifier level.

Casting this in an approach as Rothstein (2010), we can say that the mapping between natural atomicity and semantic atomicity is at the classifier level in Chinese languages, while in English it is at the lexical level (through a lexical operation) (natural atomicity being inherently individuable while semantic atomocity is atomicity relative to a context *k*). This provides an answer to the second question in section 11.1.1, namely, if Chinese has a count/mass distinction, why are classifiers used even for count nouns? There is a generalized use of classifiers in Chinese languages because the mapping between natural atomicity and semantic atomicity is not at the lexical level; instead, the mapping takes place at the classifier level. It is therefore very important to understand what classifiers really are.

[5] Zhu (1982:52) indicated that some 'count-classifiers' can also have such adjectives preceding them. The examples that he gave involve nouns such as *zhǐ* 'paper', *shítóu* 'stone', *féizào* 'soap', and *bīng* 'ice'. However, all of these nouns are arguably 'mass' nouns. It should also be noted that in verifying whether or not an adjective can be added, one should also vary the numeral, and not limit it to *one* only. With the numeral *one,* in some cases, it does not have a numeral reading, as the numeral *one* is in some cases comparable to the English article *a*. And in other cases, it provides a reading similar to 'a whole'.

[6] Li (2008) puts forth some counter-examples to Cheng and Sybesma (1998, 1999). However, it should be noted that the examples all have a special reading. Consider (i):

(i) wǔ-máo qián mǎi-le yī dà ge mángguǒ
50-cent money buy-PERF one big CL mango
'Such a sizable mango only costs 50 cents.'

Again, in such cases, when the numeral is changed to a higher one than *one*, the sentence becomes degraded.

11.3 Chinese classifiers

Consider first the following list of classifiers.

(12) a. yī-běn shū [Mandarin]
one-CL book
'a book'

b. yī-jiàn jiājù
one-CL[piece] furniture
'a piece of furniture'

c. yī-kuài dàngāo
one-CL[slice] cake
'a slice of cake'

d. yī-bēi shuǐ
one-CL[cup] water
'a cup of water'

e. yī-shēng shuǐ
one-CL[litre] water
'a litre of water'

On the surface, the list in (12) appears to provide the same information: the nouns in Mandarin are preceded by a classifier when we have a numeral. And if there is a difference, we expect a difference along the lines discussed above concerning massifiers versus count-classifiers. However, I show below that among the so-called massifiers, there is a difference in their behavior with respect to the two tests mentioned above. Before we discuss this, we need to first turn to consider the difference between Cantonese and Mandarin, since it provides us with a window to the nature of classifiers.

11.3.1 *Cantonese vs. Mandarin*

Cheng and Sybesma (1999) note that there is a difference between Cantonese and Mandarin classifier-noun combinations. In particular, whereas Mandarin bare nouns can be used to denote definiteness, Cantonese bare nouns cannot. Instead, to express definiteness in Cantonese, classifier-noun combinations (without a numeral) are used (rather than bare nouns). This is illustrated in (13) and (14). (14a) illustrates that the bare noun in Mandarin is interpreted as definite in a bounded event. However, in the same environment in Cantonese, a classifier-noun sequence has to be used (13a). In (14b), a bare noun in Mandarin appears in the subject

position, and it is obligatorily interpreted as definite. In contrast, (13b) shows that in the same environment in Cantonese, the classifier has to be present.[7]

(13) a. Wu^{4}fei^{1} jam^{2}-jyun^{4} *(wun^{2}) tong^{1} la. [Cantonese]
Wufei drink-finish CL^{bowl} soup SFP
'Wufei finished drinking the soup.'

b. *(Zek^{3}) gau^{2} gam^{1}jat^{6} dak^{6}bit^{6} teng^{1}waa^{6}.
CL dog today special obedient
'The dog is specially obedient today.'

(14) a. Húfēi hē-wán-le tāng. [Mandarin]
Hufei drink-finish-LE soup
'Hufei finished the soup.'

b. (*zhī) gǒu jīntiān tèbié tīnghuà.
CL dog today very obedient
'The dog/dogs was/were very obedient today.'

The difference with respect to classifier-nouns and bare nouns between Cantonese and Mandarin is not restricted to expressing definiteness. Sybesma (2008) notes that we see the same effect with specific indefinites. (15) and (16) provide examples where specific indefinites are facilitated. We see again that in Cantonese, in such cases, the classifier must be present, and in these cases in Mandarin, the classifier is optional.

(15) a. lo^{2} *(tiu^{4}) sing^{2} bong^{2}-sat^{6} leung^{5} zek^{3} geok^{3}. [Cantonese]
take CL rope bind-tight two CL legs
'Bind both legs tight with a rope.'

b. yòng (gēn) shéngzi bǎ iǎng zhī tuǐ bǎng-shàng. [Mandarin]
use CL rope ba two CL leg bind-up
'Bind both legs up with a rope.'

(16) a. zik^{1}-hak^{1} pai^{3} *(go^{3}) din^{6}-gung^{1} lei^{4}. [Cantonese]
immediately send CL electrician come
'Send an electrician over immediately'.

b. mǎshàng pài (ge) diàngōng lái. [Mandarin]
immediately send CL electrician come
'Send an electrician over immediately'.

In Cheng and Sybesma (1999), it is stipulated that Mandarin classifiers cannot be used without a numeral. The presence of numerals is associated with (non-specific) indefinites. Sybesma (2008) starts to address the difference between Mandarin and

[7] In both Mandarin and Cantonese, we see classifier-noun combinations in the case of indefinites (in object positions of an unbounded event for instance). In these cases, it is possible that there is a null numeral *one* present (see Cheng and Sybesma 1999).

Cantonese classifiers. He first discusses the difference in the two languages in terms of the use of classifiers. In particular, he points to Erbaugh (2002), which shows that (a) more nouns appear without a classifier in Mandarin than in Cantonese; (b) the number of specific classifiers (as opposed to the general one) used by Cantonese speakers is far higher than the number used by Mandarin speakers; and (c) in Mandarin, the general classifier *ge* is used much more often than its counterpart *go*^{3} in Cantonese.

Sybesma (2008) then shows that while hundreds and hundreds of the most common nouns in Mandarin feature the suffix *-zi*, the counterpart of this element in Cantonese is lacking with the same nouns. The *Dàoxù Xiàndài Hànyǔ cídiǎn* ('Reverse dictionary of Modern Chinese [Mandarin]') lists close to one thousand nouns suffixed by *-zi*. Note that *-zi* has two functions; one is a nominalizer, as in the example *lóng-zi* [deaf-ZI] 'deaf person'; the other function is more difficult to pinpoint. Consider the examples in (17).

(17) a. hái-zi 'child' [Mandarin]
b. zhuō-zi 'table'
c. fáng-zi 'house'

Hái 'child', *zhuō* 'table', and *fáng* 'house' in (17) are the so-called bound morphemes, which typically do not appear alone. If they do not appear with *-zi*, they have to appear with another morpheme, as shown in (18).

(18) a. xiǎo-hái 'child' [Mandarin]
small-child
b. shū-zhuō 'desk'
book-table
c. shū-fáng 'study-room'
book-house

Going through more than 600 such nouns, Sybesma notes that these nouns are virtually all count nouns (only 17 may be questionable). This link between *-zi* and count nouns has already been observed by Rygaloff (1973). The corresponding nouns in Cantonese are bare, without *zi*, as shown in (19).

(19) a. sai^{3}lou^{6} 'child' [Cantonese]
b. toi^{2} 'table'
c. uk^{1} 'house'

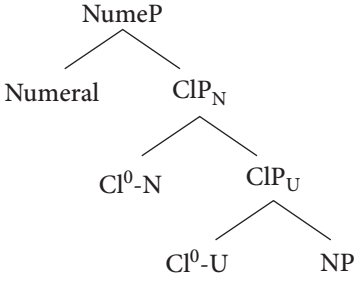
In other words, large numbers of count nouns in Mandarin are marked with *-zi*, while in Cantonese, no such marking is present. Sybesma concludes from this that count nouns in Mandarin come out of the lexicon marked as count (e.g. by *-zi*), while count nouns in Cantonese are not marked as such in the lexicon.

11.3.2 *Two classifier nodes*

Based on the difference between Cantonese and Mandarin in terms of the use of *-zi* and the use of the general classifier, Sybesma (2008) proposes that *-zi* is a unit marker; that is, it marks a count-noun as count (from the lexicon). That is, count-nouns in Mandarin come out of the lexicon with a unit marker, marking the nouns as count. It therefore follows that a count-classifier in Mandarin is not a unit marker. It simply allows a numeral to attach to a noun (see Doetjes 1997, as well as Cheng and Sybesma 1999). Let's call such classifiers Cl-N(UMERAL) here. This can thus provide an explanation as to why classifiers in Mandarin have to appear with a numeral—without a numeral, classifiers are simply not needed in Mandarin. On the other hand, Cantonese count-nouns do not come out of the lexicon marked as count. The count-classifier in Cantonese thus plays the role of a unit marker. Let's call such classifiers Cl-U(NIT). Its appearance is thus not restricted to the presence of a numeral.

In other words, there are two types of count-classifiers, namely, Cl-U and Cl-N. Cl-U is a unit-marker, and Cl-N bridges the numeral and the noun. One possible way to implement this is to have two classifier projections, with the count-classifier marking units as the lower classifier projection, as indicated in (20) (see Cheng and Sybesma 2009).

(20)



I hypothesize here that count-classifiers in Cantonese start out from the lower Cl-U position, as they are unit-markers and move to the higher Cl-N position, in order to bridge the numeral and the noun phrase. On the other hand, Mandarin count-classifiers start out in Cl-N, being selected by the Numeral.

Now we can turn to the Classifier reduplication puzzle 1. To recapitulate, Cantonese classifiers can easily reduplicate while the ones in Mandarin cannot. If Cantonese classifiers are unit markers, the null hypothesis is that only unit markers can reduplicate, yielding a distributive reading. The reduplication of Cl-U thus yields universal quantification over individual units; in contrast, Mandarin count-classifiers are not unit markers, and thus cannot be reduplicated (see also Cheng 2009a).

11.4 Do all classifiers individuate or divide?

In Cheng and Sybesma (1999), it is stated that '[l]ike D, the count-classifier may be said to have a singularizing function: the count-classifier identifies singular units; it picks out one instance of what is denoted by N' (p. 517). In other words, there is a simple divide between count-classifiers and massifiers: count-classifiers spellout the unit denoted by the noun while massifiers create the unit for counting/measuring. The question that arises is whether such a simple divide holds. In particular, given the difference that we have seen above between Cantonese and Mandarin, it is essential that we examine the classifiers in a little more detail. I will argue that not all massifier classifiers are individuators/dividers, and even for the dividers, they do not always divide.

I have reviewed in section 11.2 the two tests used in Cheng and Sybesma (1999) for distinguishing count-classifiers from massifiers (i.e. the *de*-test and the adjective-test). These tests will be used below to further flesh out the distinctions among the classifiers.

11.4.1 *Count-classifiers vs. containers*

If a count-classifier is a Cl-U (as in the case of Cantonese), or a Cl-N, it is by definition not an individuator or a divider. A typical count-classifier simply spells out the unit that comes with the count noun. Note that these are the classifiers which cannot be followed by *de* or preceded by the adjectives *small* and *big*, as shown in (21) (as well as the examples in (8), (9) and (11)).[8]

(21) a. sān (*xiǎo) zhī (*de) gǒu [Mandarin]
three small CL DE dog
'three dogs'

b. saam^{1} (*sai^{3}) zek^{3} (*ge^{3}) gau^{2} [Cantonese]
three small CL GE dog
'three dogs'

Contrast a count-classifier with a container-phrase. When container-phrases are used as classifiers (thus as massifiers), they can be followed by *de* or preceded by the adjectives *small* and *big*, or both ((8b) is repeated here as (22a)). Thus, the contrast between a count-classifier and a container-classifier is the prototypical difference between count-classifiers and massifiers stated in Cheng and Sybesma (1999).

(22) a. liǎng xiāng (de) shū [Mandarin]
two CL^{box} DE book
'two boxes of books'

[8] I use numerals higher than *one* just to ensure that we are really using numerals rather than readings such as *whole* (see footnote 4).

b. sān dà xiāng shū
three big CL[box] book
'three big boxes of books'

(23) wǔ dà bēi de jiǔ [Mandarin]
five big CL[cup] DE wine
'five big cups of wine'

Note that the container-classifiers have two functions: they individuate and measure (see also the discussion above concerning the interpretation of the noun phrase with *de* present). We also see this in English:

(24) a. Add two cups of wine to the soup. (only measure function)
b. Put two bottles of wine on the table. (only individuating function)

When *de* is present, only the measure reading is present. It is not possible to order a glass of wine in a restaurant by using (25b) ((25a) must be used instead).

(25) a. yī-bēi jiū [Mandarin]
one-CL[cup] wine

b. yī-bēi de jiū
one-CL[cup] DE wine

Note that the adjectives *small* and *big* in these cases (i.e. with measure phrase, as in (22) and (23)) modify the container phrase (that is, big boxes and big cups), and not the noun phrase itself (i.e. big books and big wine).

11.4.2 *Classifiers associated with furniture nouns*

Consider now a class of nouns which are in between simple count nouns and mass nouns, namely, furniture nouns, which contain naturally atomic elements (such as tables and chairs), but they are not semantically atomic, in the sense that we do not use them as count nouns. These nouns are similar to the count nouns in (21), since they are also nouns with naturally atomic elements. Consider now the classifiers that are used with furniture nouns in Cantonese and Mandarin, as in (26).

(26) a. sān-jiàn jiājù [Mandarin]
three-CL[piece] furniture
'three pieces of furniture'

b. saam^{1}-gin^{6} ga^{1}si^{1} [Cantonese]
three-CL[piece] furniture
'three pieces of furniture'

Classifiers such as *jiàn/gin*^{6} 'piece' respect natural atomicity. They denote sets of semantic atoms, which are countable (such as three pieces of furniture). These classifiers do not individuate, and they also do not create a unit for counting in

the same way that *cup* creates the unit for counting for *wine*. Consider now the examples in (27) which show their co-occurrence with *de* and adjectives.[9]

(27) a. sān dà jiàn jiājù [Mandarin]
three big CL^{piece} furniture
'three big pieces of furniture'

b. *sān jiàn de jiājù
three CL^{piece} DE furniture

(27a,b) show that the *de*-test and the adjective test diverge. The classifiers which are used for *furniture*-nouns can be modified by *small* and *big*, though they cannot be followed by *de*. In other words, classifiers associated with *furniture* nouns differ from typical *count*-classifiers, which cannot be modified by *big* or *small*. However, these classifiers are not compatible with a quantity measure.

11.4.3 *Nouns without natural atomicity*

Turning now to nouns without natural atomicity (i.e. without inherent individuability). Aside from using container classifiers, we can use other types of *massifiers,* as shown in (28).

(28) sān-kuài dàngāo [Mandarin]
three-CL^{slice} cake
'three slices of cake'

Kuài or *slice* is a good case of individuating/dividing classifiers, which impose atomic structure on matter. They don't 'spell-out' a unit which comes with the nouns; instead, they create a unit for counting. These individuating classifiers have the property that the individuation they involve is relatively stable over time. Once cake has been divided up into slices, the slices hold until their structure is disturbed.

As with the classifiers for *furniture*-nouns, we also see a splitting between the two tests that we used earlier for distinguishing *count*-classifiers and massifiers. Again, *de* cannot be used but adjectives can be used. In other words, these classifiers have more affinity with count-classifiers in that they do not provide quantity measure.

(29) a. *sān kuài de dàngāo [Mandarin]
three CL^{slice} DE cake

b. sān dà kuài dàngāo
three big CL^{slice} cake
'three big slices of cake'

[9] Note that for some reason, it is better to use *dà* 'big' in case of *jiàn* 'piece' rather than *xiǎo* 'small'. This has nothing to do with the size of furniture, since *toy*, which is a 'furniture'-noun has the same result.

Aside from this type of 'divider'-classifier, we can also use measure phrases for nouns without natural atomicity. Consider first the examples in (30) and (31).

(30) a. sān-shēng (de) shǔi [Mandarin]
three-CL^{litre} DE water
'a litre of water'

b. sān-bàng (de) ròu
three-CL^{pound} DE meat
'three pounds of meat'

(31) a. *sān dà shēng shǔi [Mandarin]
three big CL^{litre} water

b. *sān dà bàng ròu
three big CL^{pound} meat

These examples show a reverse pattern from the *furniture*-classifiers and the 'divider'-classifiers. That is, they cannot be modified by the adjectives *big* and *small*. This shows that measure phrases cannot be modified while containers and other massifiers can. This is probably because of the fact that measures such as *litre* and *pound* are not gradable.[10] Note further that measure phrases, like container phrases can be used with count nouns, as shown in (32). And their ability to appear with *de* does not alter.

(32) a. liǎng gōngjīn (de) shuǐguǒ [Mandarin]
two CL^{kilo} DE fruit
'two kilos of fruit'

b. liǎng bàng (de) píngguǒ [Cantonese]
two CL^{pound} DE apple
'two pounds of apples'

These measure phrases measure overall quantity not by presupposing individual parts and counting them, but by using a unit of measure which *creates* 'virtual individuals' which can be counted, but which have no individual identity. To see this more clearly, consider the English sentence in (33).

(33) a. I bought two litres of milk.
b. I bought two bottles of milk.

(33a) tells us nothing about the units of milk that you buy, in contrast with (33b) where the container phrase is used. The individual litres have no identity; they only provide us with the overall quantity.

[10] A reviewer points out that for English non-gradable nouns, it is possible to use adjectives to get to an intensive reading, such as *He waited one long hour (for his bride to arrive)*, and that in French, *un petit kilo* 'a small kilo' can have an interpretation 'just under one kilo'. These interpretations are however not possible in Mandarin/Cantonese.

Measure phrases raise the following questions. First, are these 'virtual' individuals created by measure phrases really individuals or not? Second, are all measure phrases the same? To answer these questions, we need to consider data with reduplicated classifiers which can bring out more contrasts.

Consider first the 'divider'-classifier in Cantonese, which can be reduplicated.[11]

(34) faai^{3}-faai^{3} dan^{6}gou^{1} dou^{1} hou^{2} daai^{6}. [Cantonese]
CL^{slice}-CL^{slice} cake all very big
'Every slice of cake is very big.'

We have suggested above that only Cl-U can be reduplicated because they are unit-markers. The fact that (34) is grammatical indicates that the 'divider'-classifier can be syntactically located in Cl-U, though semantically they still divide. In other words, both dividers and unit markers can be mapped onto Cl-U, therefore allowing reduplication (which yields universal quantification over individual units).

Consider now the sentences in (35), which show that not only is it the case that measure phrases are not all the same when it comes to reduplication ((35a) vs. (35b), (5a) vs. (5b)), but the same measure phrase can be sometimes reduplicated and sometimes not ((35b) vs. (35c)).

(35) a. ?*ma^{5}-ma^{5} bou^{3} dou^{1} hou^{2} leng^{3}. [Cantonese]
CL^{yard}-CL^{yard} cloth all very pretty
'Every yard of cloth is very pretty.'

b. cek^{3}-cek^{3} bou^{3} dou^{1} jat^{1}jeong^{5} gam^{2} fut^{3}.
CL^{foot}-CL^{foot} cloth all same such wide
'Every foot of cloth is all the same width.'

c. ?*cek^{3}-cek^{3} dei^{6} dou^{1} hou^{2} gon^{1}zeng^{6}.
CL^{foot}-CL^{foot} floor all very clean
'Every foot of floor is very clean.'

We have seen that 'divider'-classifiers can be reduplicated (perhaps because they also appear in Cl-U); the data in (35) seem to suggest that sometimes measure phrases appear in Cl-U, sometimes not, which is not a very desirable conclusion.

Note that to interpret 'every yard of cloth' or 'every foot of floor' in the context of (35a) and (35c), it is enough to create 'virtual' individuals. That is, we do not need to have actual separated, or individuated units like *a slice (of cake)*. In particular, in (35a) and (35c), the reading of 'every yard of cloth', or 'every foot of floor' equals 'the whole cloth', and 'the whole floor'. No individuation is actually needed. On the other hand, in (35b), we need to compare 'every foot of cloth' in terms of its width. Thus, 'a foot of cloth' has to be separated from other feet of cloth. In order words,

[11] It should be noted that in such cases, it is still not possible to reduplicate the classifier in Mandarin.

reduplication yields actual individuations, which must be compatible with the predicate. In the case of (35a) and (35c), individuation is actually not necessary and thus cannot be done.

In contrast, in (5a), in order to measure meat to get *a pound of meat*, we need to isolate a certain amount (i.e. a unit) (a pound of meat has to be weighed separately from the rest of the meat). If this reasoning is on the right track, it implies that measure phrases can be individuators/dividers. And when they are dividers, they behave as other dividers which are not measure phrases in being able to reduplicate.

The distinction between dividers and non-dividers can be further supported by the behavior of container-classifiers. Consider the following contrast.

(36) a. bui^{1}-bui^{1} seoi^{2} dou^{1} hou^{6} mun^{5}. [Cantonese]
CL^{cup}-CL^{cup} water all very full
'Every cup of water is very full.'

b. *bui^{1}-bui^{1} ge^{3} seoi^{2} dou^{1} hou^{6} mun^{5}
CL^{cup}-CL^{cup} GE water all very full

As mentioned above, container classifers can individuate or measure. In (36a), in order to compare every cup of water, *water* has to be individuated (i.e. a cup of water has to be separated from other cups of water). Thus, the reduplication is licit. On the other hand, when container-classifiers appear with *ge*^{3}, it is necessarily of the measure function (and thus not generated in Cl-U). In this case, it is not possible to reduplicate.

As for the *de/ge*^{3} test and the *adjective*-test, if the presence of *de/ge*^{3} provides a quantity measure, then measure phrases that yield quantity naturally allow it. But adjectives such as *big* or *small* are unlikely to be good with measure phrases since some measures just cannot be modified (e.g. a small kilo?; a big pound?). Table 11.1 provides a summary table for these two tests.

Table 11.1. Summary

	Count-Cl		Massifiers		
		Containers	Furniture	for nouns lacking natural atomicity	
				divider	non-divider measure
	běn/bun^{2}	bēi/bui^{1}	jiàn/gin^{6}	kuài/faai^{3}	bàng/bong^{6}
de	*	✓	*	*	✓
Adj	*	✓	✓	✓	*

In sum, we see differences among the massifiers. It is clear that the semantics of the classifiers matter when it comes to the different tests. Whether they can reduplicate or not depends on whether they are interpreted as a divider/unit-marker or not.

11.5 Plural classifiers

One of the controversial questions in Mandarin and Cantonese is whether *xiē* in Mandarin and *di*^{1} in Cantonese are 'plural' classifiers. This question is completely unexpected if one considers all nouns in Chinese as mass nouns. Here, I argue that *di*^{1} in Cantonese is a better candidate for a plural classifier than *xiē* in Mandarin.

Consider first the data in (37) and (38). With *xiē* and *di*^{1}, we get a plurality interpretation, instead of singularities. These examples also show that in their distribution, *xiē* and *di*^{1} are similar to other classifiers in that they appear after the numeral *one* and can follow a demonstrative. It should be noted that they can also appear with mass nouns (38); I will come back to this point below.

(37) a. yī xiē shū [Mandarin]
one XIE book
'a few/some books'

b. nèi xiē shū
that XIE book
'those books'

c. jat^{1} di^{1} syu^{1} [Cantonese]
one DI book
'a few/some books'

d. go^{2} di^{1} syu^{1}
that DI book
'those books'

(38) a. yī xiē shuǐ [Mandarin]
one XIE water

b. jat^{1} di^{1} seoi^{2} [Cantonese]
one DI water
'some water'

Iljic (1994) puts forth some objections concerning analyzing *xiē* in Mandarin as a plural classifier (see also Yang 2005). First, in Mandarin, *xiē* can appear with the general classifier *ge*, as in (39a); so it cannot also be a classifier. This objection in Iljic (1994) does not apply to Cantonese however. *Di*^{1} in Cantonese cannot appear with the general classifier *go*^{3} (or any other classifier), as in (39b).

(39) a. yī xiē ge rén [Mandarin]
one XIE CL person
'some people'

b. *jat[1] di[1] go[3] jan[4] [Cantonese]
one DI CL person

Second, *xiē* and *di[1]* cannot appear with numerals other than *one* for counting (counting strictly requires 'non-plural' classifiers/measure phrases, (40a,b)).

(40) a. *sān xiē shū [Mandarin]
three XIE book

b. *saam[1] di[1] syu[1] [Cantonese]
three DI book
Intended: 'three books'

At first sight, this seems to be very problematic for treating *xiē* and *di[1]* as a (plural)-classifier. However, this may be related to the possibility of neutralizing number opposition in the presence of numerical modification. In many languages such Breton and Hungarian, numerals cannot combine with plural nouns (see Acquaviva 2008).

Di[1] in Cantonese further differs from *xiē* in Mandarin in a couple of respects. First, though in both languages, *xiē*/*di[1]* can appear without the numeral *one* to express indefinite plural (as in the Cantonese example (41a)), in Cantonese, *di[1]* behaves like regular classifiers in that *di[1]*-N can express definiteness, as in (41b).

(41) a. keoi[5] soeng[2] maai[5] di[1] syu[1]. [Cantonese]
he want buy DI book
'He bought some books.'

b. ngo[5]dei[6] maai[5]-zo[2] di[1] syu[1] la[3].
we buy-PERF DI book SFP
'We bought the books already.'

In (41b), the books have to be known already and previously mentioned; this holds for both *go[3] hok[6]saang[1]* and *di[1] hok[6]saang[1]* in (42a,b), the former contains the general (singular)-classifier.

(42) a. go[3] hok[6]saang[1] hou[2] cung[1]ming[4]. [Cantonese]
CL student very intelligent
'The student is very intelligent.'

b. di[1] hok[6]saang[1] hou[2] cung[1]ming[4].
DI student very intelligent
'The students are very intelligent.'

Second, *di[1]*-N combinations behave like other classifier-N combinations in allowing bare modifiers/possessors (i.e. without the modification marker *ge[3]*) to precede them (while this is not possible in Mandarin), as in (43)–(44).

(43) a. wu^{4}fei^1 gin^6 laang^{1}saam^1 [Cantonese]
Wufei CL sweater
'Wufei's sweater' (i.e. *one* particular sweater of his)

b. wu^{4}fei^1 di^1 laang^{1}saam^1
Wufei DI sweater
'Wufei's sweaters' (it is necessarily more than one sweater)

(44) a. ji^{5}cin^4 go^3 zung^{2}tung^2 [Cantonese]
former CL president
'the former president'

b. ji^{5}cin^4 di^1 zung^{2}tung^2
former DI president
'the previous presidents'

Lastly, as discussed in Arsenijevic and Sio (2008) and Cheng and Sybesma (2009), classifiers can license N-ellipsis, as in (45a). In (45b), we see that *di^1* can also license N-ellipsis.[12]

(45) a. nei^5 bun^2 syu^1 bei^2 ngo^5 **bun^2** __ hou^2 tai^2. [Cantonese]
2SG CL book compare 1SG CL good read
'Your books are more interesting than mine.'

b. nei^5 di^1 syu^1 bei^2 ngo^5 **di^1** __ hou^2 tai^2.
2SG DI book compare 1SG DI good read
'Your book is more interesting than mine.'

These facts together suggest that *di^1* in Cantonese is a classifier. When typical count-(singular)-classifiers combine with a count noun, it yields a singularity. When *di^1* combines with a count noun, it yields a plurality of objects. We have seen in (38) that *di^1* can combine with a mass noun. In such cases, it yields an amount reading.

11.5.1 *The Universal Grinder and number*

Let us now turn back to the Universal Grinder puzzle. Consider again the sentence in (46) (repeated from (2)).

(46) qiáng-shàng dōu shì gǒu. [Mandarin]
wall-top all COP dog
'There are dogs all over the wall.'
not: 'There is dog all over the wall.'

[12] It should be noted that there is a difference between *yī-xiē* and *xiē* in Mandarin in this respect. With *yī-xiē*, it appears to be able to license ellipsis, while *xiē* by itself cannot. Typical classifiers can license ellipsis even when the numeral is not present.

Cheng, Doetjes, and Sybesma (2008) argue that a mass interpretation of count nouns in languages such as English is a 'last resort' or 'coerced' interpretation. In particular, count nouns in English have to be grammatically (morphosyntactically) marked as singular by *a* or plural *-s*, as in (47a); a bare noun is not licit. In the absence of such marking, *morphosyntactic* coercion may take place (depending on the right context), leading to a grinding interpretation (compare (47b) and (47c); and (48a) and (48b)).

(47) a. Sybren bought books/a book/*book.
b. There are dogs all over the wall.
c. There is dog all over the wall.

(48) a. There is a turkey in the fridge.
b. There is turkey in the fridge.

In contrast to languages like English, bare nouns in Chinese (Mandarin or Cantonese) are unmarked for number; therefore, Chinese will be immune to morphosyntactic coercion (as is shown in (46)). (49a,b) further support this claim. *Hěnduō* 'a lot' in (49a) is similar to *a lot* in English in that it combines both with mass nouns (*hěnduō bīngqílín* 'a lot of ice cream') and with count nouns (*hěnduō píngguǒ* 'a lot of apples'). (49a) shows that when *hěnduō* appears with a count noun such as *píngguǒ*, we only get a count-reading, and no grinding takes place.

(49) a. wǒmen zuótiān chī-le hěnduō píngguǒ/bīngqílín. [Mandarin]
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 apple/ice cream
'There are/is apples/*apple/ice cream on the plate.'

The lack of a mass reading is further shown in (49b). In this case, the context easily facilitates a mass reading of *píngguǒ* 'apple', but the mass reading is not available. This supports the availability of morphosyntactic coercion in the absence of morphosyntactic marking on number. Since Chinese does not mark number in the morphosyntax, the absence of count syntax will not trigger coercion.[13]

11.6 Conclusion

In the beginning of this chapter, three puzzles were put forth concerning the interpretation of bare nouns and the reduplication of classifiers. With respect to

[13] Cheng, Doetjes, and Sybesma (2008) discuss a couple of other factors which sometimes lead to a coerced reading.

the Universal Grinder puzzle, as proposed in Cheng, Doetjes, and Sybesma (2008), the count-mass coercion (i.e. grinder interpretation) requires a morphosyntactic trigger. Since bare count nouns in Chinese are not marked morphosyntactically, such coercion is not triggered by morphosyntax.

Concerning the reduplication puzzles, I suggest that only Cl-u's (i.e. classifiers that also play the role of a unit marker) can reduplicate, and this distinguishes Cantonese from Mandarin, since the latter does not have Cl-u's. On the other hand, we see that measure phrases in Cantonese can sometimes reduplicate and sometimes not. I suggest that reduplication yields actual individuation, which has to be compatible with the predicate.

We have seen that the divide between count-classifiers and massifiers is too simple, though count-classifers still stand apart when it comes to the *de*-test and the adjective test, since they can go with neither *de* or the adjective *dà* 'big' or *xiǎo* 'small'. Massifiers do not behave uniformly when it comes to these two tests. From the discussion above, we can conclude that *de* appears with quantity measures (including container), while the adjectives *dà* 'big' and *xiǎo* 'small' appear with almost all massifiers regardless of whether they divide or not. Their inability to appear with measure phrases rests upon the nongradability of measure phrases.

Lastly, *di*^{1} in Cantonese appears to function as a classifier, including its ability to license N-ellipsis. If *di*^{1} is indeed a classifier, then it further supports the claim made in Cheng and Sybesma (1999) that classifiers express number. More work still needs to be done to investigate the semantics of *di*^{1}, in particular, its combination with mass nouns.