

Nouns or Classifiers: A Non-movement Analysis of Classifiers in Chinese*

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It is shown in this paper that in Chinese sortal and mensural classifiers differ from one another in their semantic—not categorial—feature, both being listed as CI in the lexicon and none undergoing the syntactic operation of N-to-CI movement. In English, by contrast, the so-called measure words are categorized as N, and not CI. This feature and non-movement analysis of classifiers may explain in a principled way the cross-linguistic variation in the mass-count property of duration expressions, on the one hand, and the cross-linguistic co-occurrence restriction between numerals and plural morphology, on the other. Such an account is also free of some empirical and typological problems raised for Cheng & Sybesma's (1998, 1999) theory of Chinese classifiers and Li's (1999) theory of Chinese plural morphology.

Key words: numerals, classifiers, plural morphology, count nouns, mass nouns, sortal, mensural, English, Chinese, Austronesian languages, Tibeto-Burman languages

1. Introduction

Recently the phrase structure of the functional projections of nominals and modifiers has been an important issue. This paper focuses on a detailed study of how

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the different kinds of classifiers in Chinese may be syntactically and semantically distinguished. For a detailed discussion of the optimality of the syntactic and semantic analyses of modifiers in Chinese and Formosan languages, see Tang (2003, 2005a), among others.¹

Based on findings in Tang (2001a, 2002a, 2003, 2004), it is first suggested that Chinese classifiers may be distinguished by the feature [\pm sortal] in the sense of Senft (2000), in addition to features like [\pm N], [\pm CI], and the like. Note that, taking Mandarin as an example, these two types of classifiers, however, do not differ from one another with respect to the possibility of the occurrence of a marker *de* between the classifier and the noun as well as the possibility of the occurrence of an adjective between the numeral and the classifier, a counter-argument to a claim in Cheng & Sybesma (1998, 1999). An analysis along this line of thought may not only capture the cross-linguistic morphological variations of Chinese classifiers, but may also account for the distinct phrase structure of the *de*-less and *de*-marked classifier expressions posited in Tang (1993).

By means of a comparison of the syntactic and semantic behavior of numerals, classifiers, count nouns, and plural morphology in modern Chinese with that in pre-Qin Chinese, Formosan languages, and Tibeto-Burman languages, it is further pointed out that, as stated in Tang (2001a, 2001b, 2002a, 2002b, 2003, 2004), a postulation as in Doetjes (1996) and Cheng & Sybesma (1999) would be problematic, their claim being that in order to be able to be semantically countable, syntactically count nouns must co-occur either with the English-type of *s*-plural marker or with the Chinese-type of classifier. This is because there exist some languages in which the count noun may

¹ With respect to the functional projections of nominal modifiers in Chinese, as stated in Tang (1990, 1993), *de* in Chinese noun phrases should not be treated as a genitive marker, a claim against Li's (1985, 1990) case analysis of *de*. Unlike Tang (1990, 1993), in which *de* is analyzed as heading a functional projection indicating modification relations, Simpson (1997, 2001) argues that as a lexical instantiation of determiner, *de* should head the projection of DP and that *de*-phrases in Chinese involve the so-called D-XP hypothesis of relative clauses (cf. Kayne 1994 and den Dikken & Signhapseecha 2002). Based on diachronic and synchronic evidence, Tang (2003), by contrast, illustrates that Chinese *de* does not project to DP, nor do *de*-phrases involve the so-called D-CP or D-XP hypothesis as proposed in Kayne (1994) and Simpson (1997, 2001), respectively (cf. Borsley 1997 and Cheng & Sybesma 1999). Further evidence is also shown in Tang (2005a) from other kinds of languages like Formosan languages. Note that Tang (2001c) claims that adverbs/adverbials in Chinese clauses should not be treated as specifiers of functional categories, movement or non-movement, in the sense of Alexiadou (1997) and Cinque (1999) (cf. Ernst 2002). Tang (2003, 2005a) also demonstrate that modifiers in Chinese and Formosan noun phrases are not located as specifiers either, base-generation or movement.

appear with the numeral without the presence of a plural marker and a classifier (cf. Chierchia 1998 and Kurafuji 2002).

In addition, a closer examination of the co-occurrence restriction between the classifier and the plural morphology in the above-mentioned various types of languages indicates that, as stated in Tang (2001a, 2001b, 2002a, 2002b, 2003, 2004), a proposal as in Li (1999) would also be problematic, which claims that the projection of CIP is present in classifier languages like Chinese but not in non-classifier languages like English, hence the impossibility of the co-occurrence of the numeral with the plural marker in Chinese and the opposite in English. This is because there appear some languages in which the co-occurrence restriction between the numeral and the plural morphology has nothing to do with the presence or absence of the projection of CIP. Instead, it has something to do with the semantic interpretation of the [\pm definite] feature of the plural morphology (cf. Chung 2000, Nakanishi & Tomioka 2004 and Dayal 2004).

On the basis of these different types of observations, we posit in Tang (2001a, 2001b, 2002a, 2002b, 2003, 2004) and this paper that for languages like Chinese Cheng & Sybesma's (1998, 1999) N-to-Cl movement analysis of measure words and Li's (1999) Cl-barrier analysis of the N-to-D movement of the plural morphology are both problematic. Instead, an account based on a feature analysis of the functional projections of nominals seems to be preferred.

Cheng & Sybesma (1999) indicate that although Chinese has been claimed in Chierchia (1998) to be a mass noun language, nouns in Chinese can still be classified into the so-called mass-count nouns and mass-mass nouns, in contrast to the so-called count-count nouns and count-mass nouns in languages like English (cf. Doetjes 1996 and Li 1999). Based on a kind of evidence different from theirs, it is also suggested in Tang (2001a, 2001b, 2002a, 2002b, 2003, 2004) and this paper that cross-linguistically, regardless of whether the co-occurrence of the numeral with the noun requires the presence of a classifier, a plural marker or neither as well as of whether the plural morphology may appear with or without the classifier, syntactically each language may still have a way of distinguishing count nouns from mass nouns, a fact which also argues for the posited feature analysis of classifiers as well as that of the co-occurrence restriction between the numeral and the plural morphology.

2. Tang's (1990, 1993) analysis of Chinese classifiers

Among others, Senft (2000) divides classifiers into two distinct types as (1a-b) below state.

Senft (2000)

- (1) a. Sortal classifiers individuate whatever they refer to in terms of the kinds of entity that they are.
- b. Mensural classifiers individuate in terms of quantity.

Under (1a-b), Mandarin Chinese classifiers like (2a) are [+sortal], whereas those like (2b) are [-sortal].

Mandarin

- (2) a. ge, li, zhang, gen, etc.
- b. ping ‘bottle’, bei ‘cup’, dai ‘bag’, xiang ‘box’, etc.

In her discussion of [-sortal] classifiers in Chinese, Tang (1990:408, 1993:744) point out that, as exemplified in (3), a marker *de* may be observed between the [-sortal] classifier and the noun.

Mandarin (Tang 1990:408, 1993:744)

- (3) a. liang bang rou
two pound meat
‘two pounds of meat’
- b. [liang bang]-de rou
two pound-DE meat
(lit.) ‘meat that is sorted in accordance with two pounds’²

Note that the absence of *de* in (3a) and the presence of *de* in (3b) result in a difference in meaning between these two phrases. Hence, as shown in Tang (1993:744), the semantic contrast between (4a) and (5a).

Mandarin (Tang 1993:744)

- (4) a. rou, ta mai-le liang bang. (*yigong shi shi bang.)
meat he buy-LE two pound altogether be ten pound
(lit.) ‘Meat, he bought two pounds. (*Altogether it was ten pounds.)’
- b. ta mai-le liang bang.
he buy-LE two pound
(lit.) ‘He bought two pounds (of something).’

² Cases like (3b) may also carry the literal meaning of ‘meat that weighs two pounds’. For more discussion of the syntax and semantics of such examples, see §3.

- (5) a. rou, ta mai-le [liang bang]-de. (yigong shi shi bang.)
 meat he buy-LE two pound-DE altogether be ten pound
 (lit.) ‘Meat, he bought the kind that was sorted in accordance with two
 pounds. (Altogether it was ten pounds.)’
 b. ta mai-le [liang bang]-de.
 he buy-LE two pound-DE
 (lit.) ‘He bought (something) that was sorted in accordance with two
 pounds.’³

Under Tang’s (1990, 1993) analysis, in cases like (3a) *liang bang* ‘two pounds’ and *rou* ‘meat’ are more of a head-complement relation, whereas in those like (3b) *liang bang de* and *rou* are more of a modifier-modifiee relation.⁴

³ As opposed to (4b), (5b) does not mean ‘he bought two pounds of something’. Similarly, (4b) does not carry the meaning of ‘he bought something that was sorted in accordance with two pounds’.

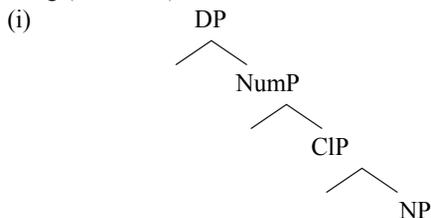
Cases like (ib-d) below are, by contrast, instances of (4b), repeated as (ia), that are located in the focus construction *shi...de*.

Mandarin

- (i) a. ta mai-le liang bang.
 he buy-LE two pound
 (lit.) ‘He bought two pounds (of something).’
 b. ta *shi* mai-le liang bang *de*.
 he be buy-LE two pound DE
 (lit.) ‘He did buy two pounds (of something).’
 c. ta *shi* mai-le liang bang.
 he be buy-LE two pound
 (lit.) ‘He did buy two pounds (of something).’
 d. ta mai-le liang bang *de*.
 he buy-LE two pound DE
 (lit.) ‘He did buy two pounds (of something).’

⁴ According to Tang, (3a) and (3b) are not transformationally related by an optional operation of *de*-insertion or *de*-deletion. Instead, they are base-generated as two distinct structures. We assume with Tang’s (1990:413) postulation of nominal projection as in (i) below, in which modifiers may be projected under the recursive X’ and/or XP.

Tang (1990:413)



With respect to [+sortal] classifiers in Chinese, Tang (1990, 1993:744) point out that while cases like (6a-b) are bad, those like (7a-b) are not.

Mandarin (Tang 1993:744)

- (6) a. [liang ge] (*-de) ren
two CL DE man
'two men'
b. [san wei] (*-de) laoshi
three CL DE teacher
'three teachers'
- (7) a. [liang ben] (-de) shu
two CL DE book
(lit.) 'two books/books that are sorted in accordance with two in number'
b. [san zhi] (-de) bi
three CL DE pen
(lit.) 'three pens/pens that are sorted in accordance with three in number'

The unacceptability of (6a-b) may be attributed to the following two reasons. One is that it is rather hard to imagine that human beings would be sorted for sale, for instance, according to number and another is that *wei* is a classifier that is used only for people with a higher social status or in a politer way. An account along this line of thought seems to be evidenced by the fact that *de* may appear between *li/ge* and a [-human] noun.

Mandarin (Tang 2001a)⁵

- (8) a. pingguo, ta mai-le wu li/ge. (*yigong shi ershi li/ge.)
apple he buy-LE five CL CL altogether be twenty CL CL
(lit.) 'Apples, he bought five. (*Altogether it was twenty apples.)'
b. ta mai-le wu li/ge. (bu shi shi li/ge.)
he buy-LE five CL CL not be ten CL CL
(lit.) 'He bought five. (Not ten.)'
- (9) a. pingguo, ta mai-le [wu li/ge]-de. (yigong shi ershi li/ge.)
apple he buy-LE five CL CL-DE altogether be twenty CL CL
(lit.) 'Apples, he bought the kind that was sorted in accordance with five in number. (Altogether it was twenty apples.)'

⁵ For more discussion of *de* in (7a-b), (9a-b), with [+sortal] classifiers, and *de* in (3b), (5a-b), with [-sortal] classifiers, see Tang (1993) and §3. See also Tang (1993) for a comparison of the syntactic and semantic behavior of various kinds of *de* in Chinese nominals.

- b. ta mai-le [wu li/ge]-de. (bu shi [shi li/ge]-de.)
 he buy-LE five CL CL-DE not be ten CL CL-DE
 (lit.) ‘He bought (something) that was sorted in accordance with five, not ten, in number.’

In addition to the presence or absence of *de* in question, Tang (1990:418) also observes that certain adjectives may appear between the numeral and the [-sortal] classifier, as illustrated in (10) below.

- Mandarin (Tang 1990:418)⁶
 (10) a. yi da zhang zhi
 one big piece paper
 (lit.) ‘one large piece of paper’

⁶ As pointed out in Tang (1990:419-420), in (10a-b) *de* and degree modifiers like *hen* ‘very’ cannot be present. Compare, for instance, (i) and (ii) below.

- Mandarin (Tang 1990:419-420)
 (i) a. yi da(*-de) zhang zhi
 one big-DE piece paper
 (lit.) ‘one large piece of paper’
 b. na yi (*hen) xiao xiang shu
 that one very small box book
 (lit.) ‘that small box of books’
 (ii) a. yi zhang da-de zhi
 one CL big-DE paper
 (lit.) ‘a piece of paper that is large’
 b. yi zhang hen da-de zhi
 one CL very big-DE paper
 (lit.) ‘a piece of paper that is very large’

Given the grammaticality contrasts in (ia-b) and (iia-b), Tang (1990) proposes that in (i) *da* ‘large’ and *zhang* ‘piece’ form an X but in (ii) *da-de* and *zhi* ‘paper’ form an XP. Cases like (iii), as opposed to (iia-b), are other instances of X.

- Mandarin (Tang 1983)
 (iii) a. yi zhang da zhi
 one CL big paper
 (lit.) ‘a piece of paper that is large’
 b. yi zhang (*hen) da zhi
 one CL very big paper
 (lit.) ‘a piece of paper that is large’

And, for a discussion of the co-occurrence of an adjective with the [+sortal] classifier, see §3.

- b. na yi xiao xiang shu
that one small box book
(lit.) ‘that small box of books’

Before turning to the discussion of Cheng & Sybesma’s (1998, 1999) analysis of Chinese classifiers, one thing needs to be mentioned here. Tang (1996) indicates that in addition to the head-complement relation as in (3a) and the modifier-modifiee relation as in (3b), there appears a third kind of relation between the projection of the numeral-classifier sequence and that of the noun in Chinese. Examples like (11), with [+sortal] classifiers, are of this sort.

Mandarin (Tang 1996)

- (11) [bi] [shi zhi] ‘pen ten CL’: the argument-predicate relation

Under Tang’s analysis, while in (3a-b) *liang bang (de)* ‘two pound (DE)’ and *rou* ‘meat’ may form a nominal constituent, in (11) *bi* ‘pen’ and *shi zhi* ‘ten CL’ are base-generated as two distinct nominals. In other words, the structures of (3a) and (11) are not treated as being transformationally related. Such an account, thus, may capture the definiteness effect as in (12) and the sentence-final condition as in (13), among other things.⁷

Mandarin (Tang 1996:462, 481)

- (12) a. ta mai-le [(zhe) shi zhi bi].
he buy-LE this ten CL pen
‘He bought (these) ten pens.’
b. ta mai-le [bi] [(zhe) shi zhi].
he buy-LE pen this ten CL
(lit.) ‘He bought pens ten.’
- (13) a. ta mai-le [shi zhi bi]/ [bi] [shi zhi].
he buy-LE ten CL pen pen ten CL
(lit.) ‘He bought ten pens/pens ten.’
b. ta ba [shi zhi bi]/*[bi] [shi zhi] mai-diao-le.
he BA ten CL pen pen ten CL sell-down-LE
‘He sold out ten pens.’

⁷ According to Tang (1996), in (11), not (3a-b), *shi zhi* ‘ten CL’ may act as a secondary predicate of *bi* ‘pen’ and project as the innermost argument of a verb in the sense of Larson (1988).

- c. ta lian [yi ge shitou]/*[shitou] [yi ge] dou ban-bu-dong.
 he even one CL stone stone one CL all carry-not-move
 ‘He cannot even move a stone.’

And, as stated in Tang (1996, 2001a), the same facts are also found with [-sortal] classifiers.

Mandarin (Tang 2001a)

- (14) a. ta mai-le [(zhe) shi wan mian].
 he buy-LE this ten bowl noodle
 ‘He bought (these) ten bowls of noodles.’
 b. ta mai-le [mian] [(*zhe) shi wan].
 he buy-LE noodle this ten bowl
 (lit.) ‘He bought noodles ten bowls.’
- (15) a. ta mai-le [shi wan mian]/ [mian] [shi wan].
 he buy-LE ten bowl noodle noodle ten bowl
 (lit.) ‘He bought ten bowls of noodles/noodles ten bowls.’
 b. ta ba [shi wan mian]/*[mian] [shi wan] chi-diao-le.
 he BA ten bowl noodle noodle ten bowl eat-down-LE
 ‘He ate up ten bowls of noodles.’
 c. ta lian [yi wan tang]/*[tang] [yi wan] dou he-bu-wan.
 he even one bowl soup soup one bowl all drink-not-finish
 ‘He cannot even finish eating one bowl of soup.’

So far the above-mentioned observations about classifiers in Chinese, in particular, Mandarin classifiers, may be summarized as follows. First, Chinese classifiers may be marked as [\pm sortal] in accordance with their inherent meaning. Second, Chinese classifiers and nouns may of the head-complement, modifier-modifiee or argument-predicate relation. Third, regardless of their inherent semantic difference, syntactically both the [+sortal] and the [-sortal] classifiers may bear with the noun the head-complement, modifier-modifiee, or argument-predicate relation. Based on these claims, we will turn to the examination of Cheng & Sybesma’s (1998, 1999) postulations about Chinese classifiers.

3. Cheng and Sybesma’s (1998, 1999) analysis of Chinese classifiers

Under Cheng & Sybesma’s (1998, 1999) theory of Chinese classifiers, the [+sortal] classifier and the [-sortal] classifier differ from each other in the following two aspects.

First, as shown in (16a-b) below, for instance, the marker *de* cannot appear between the [+sortal] classifier and the noun, to be compared with the opposite with the [-sortal] classifier in (16c-d), which are taken from Tang (1990:408).

Mandarin (Cheng & Sybesma 1998, 1999)

- (16) a. jiu gen (*de) weiba
 nine CL DE tail
 b. shi zhang (*de) zhuozi
 ten CL DE table

Mandarin (Tang 1990:408)

- (16) c. [san bang] (-de) rou
 three pound-DE meat
 d. [liang xiang] (-de) shu
 two box-DE book

Second, an adjective cannot occur between the numeral and the [+sortal] classifier, as (17a-b) illustrate.

Mandarin (Cheng & Sybesma 1998, 1999)

- (17) a. yi (*da) zhi gou
 one big CL dog
 b. yi (*da) wei laoshi
 one big CL teacher

But the same again does not hold for the [-sortal] classifier.

Mandarin (Tang 1990:418)

- (17) c. yi (da) zhang zhi
 one big piece paper
 ‘one big piece of paper’
 d. na yi (xiao) xiang shu
 that one small box book
 ‘that small box of books’

With respect to their claim about the non-co-occurrence of *de* with the [+sortal] classifier, it does not seem to be true. For example, as already pointed out in (9), the ‘numeral-[+sortal] classifier’ sequence may co-occur with *de* to modify the noun. The same observation is also found in cases like (18), to be compared with the [-sortal] (5a-b) and (19).

Mandarin (Tang 2001a)

- (18) a. ta mai-le yi he [shi li]-de pingguo.
 he buy-LE one box ten CL-DE apple
 (lit.) ‘He bought a box of apples that were sorted in accordance with ten in number.’
- b. pingguo, ta mai-le yi he [shi li]-de, bu shi yi he [wu li]-de.
 apple he buy-LE one box ten CL-DE not be one box five CL-DE
 (lit.) ‘Apples, he bought one box of the kind that was sorted in accordance with ten in number, not five.’
- (19) a. ta mai-le (liang bao) [wu bang]-de rou.
 he buy-LE two parcel five pound-DE meat
 (lit.) ‘He bought (two parcels of) meat that were sorted in accordance with five pounds.’
- b. rou, ta mai-le (liang bao) [wu bang]-de, bu shi (liang bao)
 meat he buy-LE two parcel five pound-DE not be two parcel
 [si bang]-de.
 four pound-DE
 (lit.) ‘Meat, he bought (two parcels of) the kind that was sorted in accordance with five pounds, not four pounds.’

In other words, cases like (9) and (18)-(19), with or without empty categories, all indicate that in Chinese both the [+sortal] and the [-sortal] classifiers could be used as a kind of measure word to modify the noun (cf. Cheng & Sybesma’s relevant discussion of variables and empty pronouns in (38)-(39)).

Recall that it has been pointed out in footnote 2 that cases like (3b) may also mean ‘meat that weighs two pounds’. This is because, as illustrated in (20) and (21) below, while the [\pm sortal] numeral-classifier sequence alone may appear with *de* to modify the noun, various kinds of elements may also be found to intervene between the classifier and *de* (see also Tang 1996:471-472).

Mandarin

- (20) a. [liang bang (zhuang)]-de rou
 two pound pack-DE meat
 (lit.) ‘meat that is sorted in accordance with two pounds’
- b. [liang bang (zhong)]-de rou
 two pound heavy-DE meat
 (lit.) ‘meat that weighs two pounds’

- (21) a. [wu-shi ren (fen)]-de cai
fifty man set-DE dishes
(lit.) ‘dishes that are for fifty people’
b. [shi lou (gao)]-de fangzi
ten floor high-DE house
(lit.) ‘house that is ten-story’
c. [yi-bai ye (hou)]-de bijiben
one-hundred page thick-DE notebook
(lit.) ‘notebook that is one-hundred-page’

Thus, when the numeral-classifier sequence alone is used as a kind of measure word, the meaning of the whole noun phrase may be ambiguous.

Since such [\pm sortal] classifier expressions alone may be used as quantitative expressions modifying the nouns, they need to be non-specific in reference, as in (22b), with the [+sortal] classifier, but the same restriction does not hold for non-modifying *de*-less classifier expressions, as in (22a) (see also Tang 1996).⁸

Mandarin

- (22) a. ta mai-le (zhe) wu li pingguo.
he eat-LE this five CL apple
‘He bought (these) five apples.’
b. ta mai-le yi he [(zhe) wu li (zhuang)]-de pingguo.
he buy-LE one box this five CL pack-DE apple
(lit.) ‘He bought a box of apples that were sorted in accordance with five in number.’

⁸ The same kind of the definiteness effect is also found in cases like (i) and (ii) below, with the [-sortal] classifier.

Mandarin (Tang 1993, 1996)

- (i) a. ni ba (na) wu bang rou fang zai nali?
you BA that five pound meat put on where
(lit.) ‘Where did you put those five pounds of meat?’
b. ni ba na yi dai [(na) wu bang]-de rou fang zai nali?
you BA that one bag that five pound-DE meat put on where
(lit.) ‘Where did you put that bag of five-pound meat?’
(ii) a. ta (*na) yi-bai bang zhong.
he that one-hundred pound heavy
‘He weighs one-hundred pounds.’
b. ta zhong (*na) yi-bai bang.
he heavy that one-hundred pound
‘He weighs one-hundred pounds.’

Before turning to the examination of Cheng & Sybesma's (1998, 1999) second claim about the contrast between the [+sortal] and the [-sortal] classifiers in Chinese, two more observations need to be pointed out here with respect to the co-occurrence of *de* and the classifier. As pointed out in Tang (2001a), several factors may affect the possibility of the different occurrence of [\pm sortal] classifiers in Chinese. For example, predicate type is one of them.

Mandarin (Tang 2001a)

- (23) a. (pingguo,) ta you [wu li] (?-de)(pingguo).
 apple he have five CL-DE apple
 b. (pingguo,) ta mai-le [wu li] (-de) (pingguo).
 apple he buy-LE five CL-DE apple
 c. (pingguo,) ta you yi he [wu li] *(-de) (pingguo).
 apple he have one box five CL-DE apple
 (lit.) 'Apples, he has a box that is sorted in accordance with five in number.'
 d. (pingguo,) ta mai-le yi he [wu li] *(-de) (pingguo).
 apple he buy-LE one box five CL-DE apple
 (lit.) 'Apples, he bought a box that was sorted in accordance with five in number.'
- (24) a. (rou,) ta you [wu bang] (?-de)(rou).
 meat he have five pound-DE meat
 b. (rou,) ta mai-le [wu bang] (-de) (rou).
 meat he buy-LE five pound-DE meat
 c. (rou,) ta you yi bao [wu bang] *(-de)(rou).
 meat he have one box five pound-DE meat
 (lit.) 'Meat, he has a box that is sorted with five pounds in weight.'
 d. (rou,) ta mai-le yi bao [wu bang] *(-de)(rou).
 meat he buy-LE one box five pound-DE meat
 (lit.) 'Meat, he bought a box that was sorted in accordance with five pounds in weight.'

This variation in acceptability between (23a), (24a) and (23b), (24b) may be attributed to the (im)compatibility of the semantics of the predicates *you* 'have' and *mai-le* 'bought' with the semantics of the classifiers and the nouns in the head-complement relation, on the one hand, and in the modifier-modifiee relation, on the other hand. Thus, as shown in (23c-d) and (24c-d), when the head-complement relation and the modifier-modifiee relation in a nominal are lexically realized by two different classifiers, the one

that acts as modifier may and must be followed by *de*, sortal or non-sortal.

A second factor that may decide the semantic (in)compatibility in question seems to have something to do with the information weight of the modifier-modifiee relation. Thus, (25b) and (26b) are better than (25a) and (26a).

Mandarin (Tang 2001a)

- (25) a. ta jinnian zhong-le [san ke] (?-de) shu.
he this-year plant-LE three CL-DE tree
b. ta jinnian zhong-le [yi-bai ke] (-de) taoshu.
he this-year plant-LE one-hundred CL-DE peach-tree
- (26) a. ta jintian he-le [yi wan] (?-de) tang.
he today drink-LE one bowl-DE soup
b. ta jintian he-le [shi wan] (-de) niuroutang.
he today drink-LE ten bowl-DE beef-meat-soup

It is thus not surprising to find from the data collected by the Chinese Knowledge Information Processing Group (CKIPG) the following similar grammatical examples like (27a-b), in which *de* appears with the [+sortal] classifier.

Mandarin (CKIPG)

- (27) a. mei chao yue sheng-xia [ershi-si mei]-de luan.
every nest about give-birth-down twenty-four CL-DE egg
(lit.) 'Every nest has about twenty-four eggs.'
b. yi nian yue zhongzhi-le [yibai-sishi-duo-wan
one year about plant-LE one-hundred-forty-more-million
ke]-de shumu.
CL-DE tree
(lit.) '(They) planted more than one million and forty-hundred-thousand trees a year.'

To summarize, so far we have shown in the above discussion that syntactically Mandarin Chinese does allow both the [+sortal] and the [-sortal] classifiers to co-occur with *de* in a nominal though the semantics of the whole noun phrase needs to be compatible with that of the whole sentence. In other words, cases like (16a-b) taken from Cheng & Sybesma (1998, 1999) should not be treated as syntactically impossible or ungrammatical. An analysis along this line of thought may be further evidenced by the well-formedness contrast between (16b) and (28).

Mandarin

- (28) mingtian-de huodong xuyao [yi-bai zhang] (-de) fangzhuozi.
 tomorrow-DE activity need one-hundred CL DE square-table
 ‘Tomorrow’s activity needs one-hundred square tables.’

Recall that, as pointed out in (1), Senft (2000) defines sortal classifiers as individuating whatever they refer to in terms of the kinds of entity that they are, and mensural classifiers as individuating in terms of quantity. One interesting and important thing to notice is that while the sortal and the mensural classifiers may be distinct in their intrinsic meaning, it is not true that in Chinese the sortal classifier cannot contribute to the expression of quantity, nor is it the case that in Chinese the mensural classifier has no bearing with the kinds of entity. In the case of the sortal classifier, this is due to the fact that in Chinese the numeral needs to co-occur with the classifier when it appears with the noun, as (29) demonstrates.

Mandarin

- (29) wu *(zhi) gou
 five CL dog
 ‘five dogs’

As for the mensural classifier, this is because it may still bear some kind of semantic agreement with the noun, as (30) illustrates.

Mandarin

- (30) a. wu ban xuesheng
 five classroom student
 (lit.) ‘five classrooms of students’
 b. ?*wu ban shui
 five classroom water

Thus, by analogy or language change, it is not surprising that in Chinese the sortal classifier together with the numeral may also function as some kind of standard to be measured against.

With the fact that in Chinese *de* may co-occur with the [\pm sortal] classifier, let us now consider Cheng & Sybesma’s (1998, 1999) claim about the non-co-occurrence of an adjective with the [+sortal] classifier in Chinese. This, however, does not seem to be true, either, as exemplified in (31) and (32).

Mandarin (Tang 2001a)

- (31) a. guang kao diandiao yi xiao ke zhi jiu neng
only depend remove one small CL mole then can
duo-guo shenme zainan. (CKIPG)
escape-GUO some disaster
'Just by removing a small mole, one can escape from some disaster.'
- b. yi xiao li mi (Chao 1968)
one small CL rice
(lit.) 'one small grain of rice'
- c. yi da kuai shitou (Chao 1968)
one big CL stone
'one big stone'
- d. xianzai lianwu hen gui. yi xiao li
now wax-fruit very expensive one small CL
heizhenzhu jiu yao san-shi yuan.
black-pearl then need thirty dollar
'Nowadays the wax fruit is very expensive. One small Blackpearl will
cost thirty dollars.'
- (32) a. [da ben]-de shi yuan, [xiao ben]-de wu yuan.
big CL-DE ten dollar small CL-DE five dollar
(lit.) 'The big (one) costs ten dollars, and the small (one) five dollars.'
- b. wo yao [xiao tiao]-de yu.
I want small CL-DE fish
(lit.) 'I want the small fish.'

In fact, sentences like (32) further indicate that the [+sortal] classifier not only may be preceded by an adjective, it may also be followed by *de*.

In addition to the above-mentioned two contrasts between the [+sortal] classifier and the [-sortal] classifier in Chinese, Cheng & Sybesma (1998) also point out three distinctions between *de*-marked and *de*-less [-sortal] classifiers, the first two differences of which are summarized in (33).

Cheng & Sybesma (1998)

- (33) a. Only the *de*-marked [-sortal] classifier can act as modifying expression.
b. Only the *de*-less [-sortal] classifier can appear with demonstratives.

As already shown in the previous discussion, Tang (1990, 1993) posit that while the *de*-marked classifier and the noun are of a modifier-modifiee relation, the *de*-less classifier

and the noun are of a head-complement relation. Moreover, like other quantitative modifying expressions, the *de*-marked classifier must be non-specific in reference. Thus, it follows from our analysis that only *de*-less classifiers can appear with demonstratives. And, in fact, such a contrast has already been shown in the previous discussion to hold with the [-sortal] and the [+sortal] classifiers. Similarly, while we agree that only *de*-marked classifiers can act as modifying expressions, this applies to both the [+sortal] and the [-sortal] classifiers.

The third distinction is that the *de*-marked [-sortal] classifier does not seem to be able to co-occur with a relative clause.

Mandarin (Cheng & Sybesma 1998)

- (34) a. san wan [wo mama zhu de] tang
 three CL:bowl I mother cook DE soup
 ‘three bowls of soup which my mother cooked’
 b. ??san wan de [wo mama zhu de] tang
 three CL:bowl DE I mother cook DE soup
- (35) a. [wo mama zhu de] san wan tang
 I mother cook DE three CL:bowl soup
 ‘three bowls of soup which my mother cooked’
 b. ??[wo mama zhu de] san wan de tang
 I mother cook DE three CL:bowl DE soup

According to our observation, however, while the *de*-marked classifier may appear with a relative clause, the latter tends to follow the former.⁹

⁹ By comparison with (37a-b), (ia-b) below are not bad.

Mandarin

- (i) a. ta mai-le [Lisi xie]-de [yi-bai ben]-de [youguan
 he buy-LE Lisi write-DE one-hundred CL-DE about
 yuyanxue]-de shu.
 linguistics-DE book
 b. ta mai-le [meiguo jinkou]-de [wu-shi xiang]-de
 he buy-LE America import-DE five-ten box-DE
 [mei you zi]-de putao.
 not have seed-DE grape

This distinction may be attributed to constraints on the restrictiveness/non-restrictiveness and the scope of modification of relative clauses. We shall leave this issue for further study.

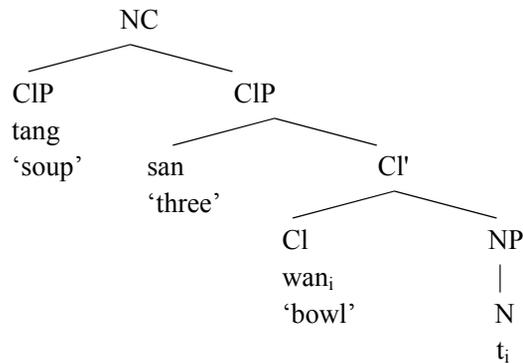
Mandarin (Tang 2001a)

- (36) a. ta mai-le [yi-bai ben]-de [Lisi xie]-de shu.
 he buy-LE one-hundred CL-DE Lisi write-DE book
 'He bought one hundred books that Lisi wrote.'
- b. ta mai-le [wu-shi xiang]-de [meiguo jinkou]-de shuiguo.
 he buy-LE five-ten box-DE America import-DE fruit
 'He bought fifty boxes of fruits that were imported from America.'
- (37) a. ?ta mai-le [Lisi xie]-de [yi-bai ben]-de shu.
 he buy-LE Lisi write-DE one-hundred CL-DE book
- b. ?ta mai-le [meiguo jinkou]-de [wu-shi xiang]-de putao.
 he buy-LE America import-DE five-ten box-DE grape

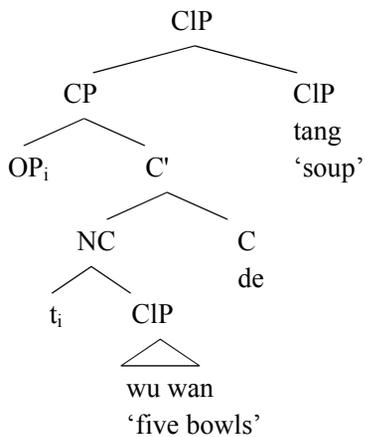
On the basis of their discussions of Chinese classifiers, Cheng & Sybesma (1998) posit three distinct phrase structures as in (38a-c) for the [-sortal] classifier and those as in (39a-c) for the [+sortal] classifier. Of (39a-c), according to their analysis, (39b) is disallowed, hence the impossibility of the co-occurrence of *de* with the [+sortal] classifier.

Mandarin (Cheng & Sybesma 1998)

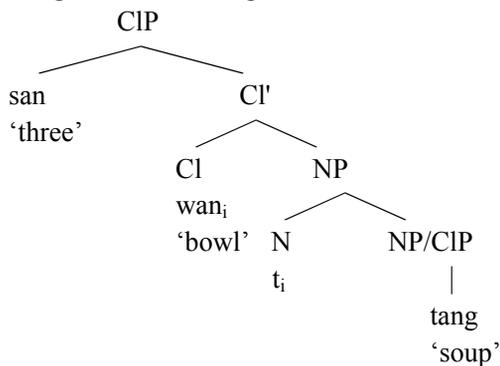
- (38) [-sortal]
 a. tang san wan 'soup three bowl'



b. wu wan de tang ‘five bowl DE soup’

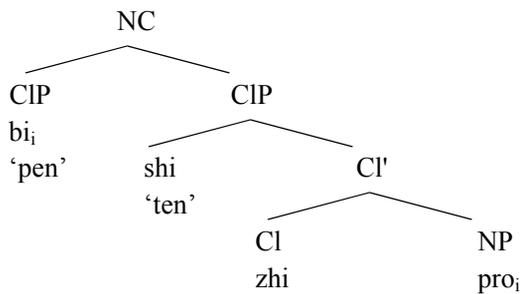


c. san wan tang ‘three bowl soup’

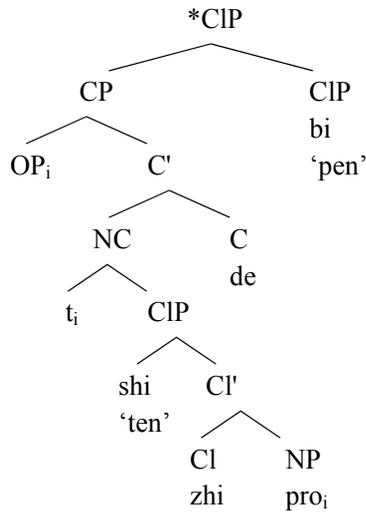


(39) [+sortal]

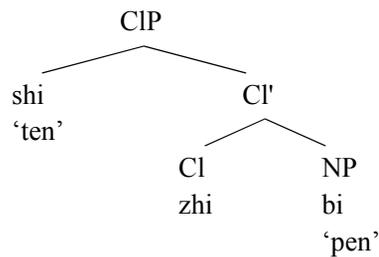
a. bi shi zhi ‘pen ten CL’



b. *shi zhi de bi 'ten CL DE pen'



c. shi zhi bi 'ten CL pen'



Some properties of (38a-c) and (39a-c) are summarized in (40) below.

Cheng & Sybesma (1998)

- (40) a. The [+sortal] classifier is base-generated as CI whereas the [-sortal] classifier, which is claimed to be a noun, undergoes N-to-CI movement.
 b. The numeral-classifier-noun sequence projects to CIP.
 c. The *de*-marked [-sortal] classifier is treated as a relative clause.
 d. The noun-numeral-classifier sequence is treated as one constituent.

In the following discussion, we focus on some problems raised for (40a, d).¹⁰ First, as already pointed out in (13), the noun-numeral-classifier sequence does not behave as a

¹⁰ See footnote 21 for a comment on (40b) and Tang (2003) for arguments against a relative-clause analysis of the numeral-classifier-*de* sequence.

constituent.¹¹ Phrase structures like (38a) and (39a), nevertheless, will incorrectly predict that such a sequence can appear in any nominal position of a sentence.¹²

Second, we have shown in our discussion so far that in Chinese the [+sortal] classifier and the [-sortal] classifier may behave the same with respect to their co-occurrence with *de* and an adjective.¹³ Below are some more pieces of evidence for this claim. To begin with, examine [-sortal] classifiers like *bei* ‘cup’ in (41) and [+sortal] classifiers like *ben* ‘CL’ in (42).

Mandarin (Tang 2001a)

- (41) a. [-sortal]
 yi **bei** shui
 one cup water
 ‘one glass of water’
- b. [+adjective, +de]
 [**da** bei]-**de** hen gui.
 big cup-DE very expensive
 (lit.) ‘(Something) that is in a big glass is very expensive.’
- c. [-classifier]
 *yi **ge** bei shui
 one CL cup water
- d. [-noun]
 *yi ge **bei**
 one CL cup
- e. yi **zheng** bei shui
 one whole cup water
 ‘the whole glass of water’
- (42) a. [+sortal]
 yi **ben** shu
 one CL book
 ‘one book’

¹¹ As pointed out in (15), the same restriction is found with the [-sortal] classifier.

¹² Among others, see Tang (1996) and Nakanishi (2002) for a detailed discussion of a non-movement analysis of predicative numerals in Chinese and Japanese, respectively.

¹³ Among others, similar observations have also been pointed out in Chao (1968) and Lu (1987). That is, while it might be the case that the adjective and *de* under consideration generally appear with the [-sortal] classifier, it, however, is not true that they can never co-occur with the [+sortal] classifier. Note also that both possibilities are also found with Southern Min classifiers, sortal or non-sortal.

- b. [+adjective, +de]
[da ben]-de hen gui.
 big CL-DE very expensive
 (lit.) ‘(Books) that are big are very expensive.’
- c. [-classifier]
 *yi **ge** ben shu
 one CL CL book
- d. [-noun]
 *yi ge **ben**
 one CL CL
- e. yi **zheng** ben shu
 one whole CL book
 ‘the whole book’

Cases like (41a-e) and (42a-e) indicate that the [-sortal] classifier *bei* ‘cup’ in (41a) and the [+sortal] classifier *ben* ‘CL’ in (42a) behave the same in that they both can appear with adjectives like *da* ‘big’ and the marker *de*, as in (41b) and (42b); they both cannot take other classifiers like *ge* ‘CL’, as in (41c) and (42c); they both cannot act as a noun, as in (41d) and (42d); and they both can occur with expressions like *yi zheng* ‘the whole’, as in (41e) and (42e). In other words, synchronically speaking, when they follow the numeral, neither the [+sortal] classifier *ben* nor the [-sortal] classifier *bei* may still act as a noun, though they may co-occur with an adjective and/or *de*.

By contrast, as opposed to classifiers like *bei* ‘cup’ and *ben* ‘CL’, expressions like *beizi* ‘cup’ in (43a-c) and *benzi* ‘notebook’ in (44a-c) may behave the same in that they both cannot take other nouns like *shui* ‘water’ and *shu* ‘book’ as their complements, as in (43a) and (44a); they both can act as a noun, as in (43b) and (44b); and they both cannot appear alone with numerals like *yi* ‘one’, as in (43c) and (44c).

Mandarin (Tang 2001a)

- (43) a. yi ge beizi (***shui**)
 one CL cup water
 ‘one cup’
- b. **da-de** beizi hen gui.
 big-DE cup very expensive
 ‘Cups that are big are very expensive.’
- c. yi ***(ge)** beizi
 one CL cup
 ‘one cup’

- (44) a. yi ge benzi (*shu)
 one CL notebook book
 ‘one notebook’
- b. **da-de** benzi hen gui.
 big-DE notebook very expensive
 ‘Notebooks that are big are very expensive.’
- c. yi *(ge) benzi
 one CL notebook
 ‘one notebook’

In view of the above-given grammaticality contrast between (41)-(42) and (43)-(44), it should be clear by now that synchronically the [-sortal] classifier cannot be more nominal than the [+sortal] classifier in Chinese, though an opposite is claimed in Cheng & Sybesma (1998, 1999).

In addition, the just-mentioned absence of the grammaticality contrast between (41) and (42), on the one hand, and the presence of the grammaticality contrast between (41)-(42) and (43)-(44), on the other, clearly indicate that morphologically and syntactically speaking, in Chinese both [-sortal] classifiers like *bei* ‘cup’ and [+sortal] classifiers like *ben* ‘CL’ should be analyzed as base-generated classifiers with distinct m-features and s-features in the sense of Ouhalla (1991).

While examples like (41)-(44) suggest that synchronically Chinese [+sortal] and [-sortal] classifiers both do not act as nouns, Peyraube (1991) points out that, like [-sortal] classifiers, diachronically many Chinese [+sortal] classifiers come generally from a noun (or from a verb in very few cases) through the process of grammaticalization. According to him, for example, *mei* ‘CL’ comes from a noun meaning ‘tree-trunk’, *kou* ‘CL’ from the noun ‘mouth’, *zhu* ‘CL’ and *gen* ‘CL’ from the noun ‘root’, *tou* ‘CL’ from the noun ‘head’, *ge* ‘CL’ from the noun ‘bamboo-trunk’, *zhang* ‘CL’ from the verb ‘to stretch (a bow)’, *zhi* ‘CL’ from the noun ‘bird’, *tiao* ‘CL’ from the noun ‘branch’, etc. In other words, diachronically in Chinese both [+sortal] and [-sortal] classifiers may come from a noun. In this sense, their origins may be equally nominal. In addition, Peyraube points out that both the [+sortal] and the [-sortal] classifiers are first used in post-nominal position and then move in pre-nominal position. These two observations together with the fact that they no longer act as a noun nowadays make one wonder why, as posited in Cheng & Sybesma (1998), the [-sortal] classifier results from a syntactic operation of N-to-Cl movement but the [+sortal] classifier does not.

Third, in Chinese [-sortal] classifiers are of various types. They may indicate standards for length, weight, volume and area; they may be aggregates; they may be containers, etc. It is not the case that all of them may appear with the adjective and *de*, a

test for the (im)possibility of undergoing N-to-Cl movement in Cheng & Sybesma's (1998) analysis of Chinese classifiers. Compare, for instance, (45) with (41)-(44).

Mandarin (Tang 2001a)

- (45) a. yi **bang** rou
one pound meat
'one pound of meat'
b. *yi **ge** bang rou
one CL pound meat
c. *yi ge **bang**
one CL pound
d. *[(yi) **da** bang] (-de) rou
one big pound-DE meat
e. [(yi) **zheng** bang] (-de) rou
one whole pound-DE meat
(lit.) 'the whole pound of meat'

As opposed to each b instance of (41)-(44), [-sortal] classifiers like *bang* 'pound' cannot take adjectives like *da* 'big'. Should they be treated as a base-generated Cl or as resulting from the operation of N-to-Cl movement?¹⁴

Another relevant Chinese fact is that the Chinese counterparts of English duration expressions like *week*, *hour*, *month*, *day*, *year*, etc. exhibit various kinds of behavior with respect to the presence/absence of a [+sortal] classifier. Consider, for example, (46) below.

Mandarin (Tang 2001a)

- (46) a. san (ge) xingqi/xiaoshi
three CL week hour
'three weeks/hours'

¹⁴ Chierchia (1998) also points out that in English not all measure words may take adjectives, as shown in (i).

English (Chierchia 1998)

- (i) a. I bought two beautiful slices of pizza.
b. ?I bought two beautiful pounds of pizza.

Both Chierchia's and our observations about the co-occurrence of adjectives and measure words seem to suggest that such a co-occurrence (im)possibility is not a necessary factor for the determination of their category type.

- b. liang *(ge) yue/ libai/ zhongtou
 two CL month week hour
 ‘two months/weeks/hours’
- c. si (*ge) tian/ nian
 four CL day year
 ‘four days/years’

Expressions like *xingqi* ‘week’ and *xiaoshi* ‘hour’ may appear with or without the classifier in the presence of the numeral, as in (46a). By contrast, those like *yue* ‘month’, *libai* ‘week’ and *zhongtou* ‘hour’ must occur with the classifier, as in (46b), and those like *tian* ‘day’ and *nian* ‘year’ cannot take the classifier, as in (46c).¹⁵

However, when such expressions are followed by the marker *de*, it cannot be absent, as (47a-c) exemplify.¹⁶

Mandarin (Tang 2001a)

- (47) a. [san (ge) xingqi/ xiaoshi] *(-de) shijian
 three CL week hour DE time
 ‘the period of three weeks/hours’
- b. [liang ge yue/ libai/ zhongtou] *(-de) gongfu
 two CL month week hour DE time
 ‘the period of two months/weeks/hours’
- c. [san tian/ nian] *(-de) shijian
 three day year DE time
 ‘the period of three days/years’

In view of these similarities and differences, should these duration expressions be

¹⁵ As opposed to duration expressions, frequency expressions all cannot take classifiers and adjectives.

Mandarin

- (i) a. liang (*da) (*ge) ci
 two big CL time
 ‘two times’
- b. si (*zheng) (*ge) bian
 four whole CL time
 ‘four times’

A question then arises as to whether frequency expressions should be treated on a par with sortal or mensural classifiers in the sense of Cheng & Sybesma (1998, 1999).

¹⁶ Like *bang* ‘pound’ in (45d-e), these expressions may take *zheng* ‘whole’ but not adjectives like *da* ‘big’ and *xiao* ‘small’.

analyzed as N, base-generated CI or derived CI?

So far we have illustrated many problems raised for a claim that in Chinese [+sortal] classifiers are listed in the lexicon as CI whereas [-sortal] classifiers are N. In the next section an alternative will be presented in which both types of classifiers are base-generated as CI and marked with a distinction in the specification of the feature [\pm sortal].

4. Towards a solution

Based on the previous discussion in §2 and §3 and other relevant facts in other types of languages, Tang (2001a, 2002a, 2003, 2004) assume with Tang (1990, 1993, 1996) and propose (48) for Mandarin Chinese.¹⁷

Mandarin (Tang 2001a, 2002a)

- (48) a. The *de*-less numeral-classifier sequence and the noun are of head-complement relation.
b. The *de*-marked numeral-classifier sequence and the noun are of modifier-modifiee relation.
c. Both [+sortal] and [-sortal] classifiers may project as heads or modifiers of (48a-b).
d. Both [+sortal] and [-sortal] classifiers are listed as CI in the lexicon.
e. Classifiers are marked with m-features, c-features and s-features.

And m-features, c-features and s-features refer to features like [\pm bound], [\pm CI] and [\pm sortal], respectively.

To give an example, consider first (49) and (50).

Mandarin (Tang 2001a, 2002a)

- (49) a. [-N, +CI]: *ge*, *li*, *zhang*, *wei*, *ping*, *bei*, *dai*, *xiang*, etc.
b. [+N, -CI]: *beizi* ‘cup’, *pingzi* ‘bottle’, *benzi* ‘notebook’, etc.
c. [+N]/[+CI]: *gen*, *wan* ‘bowl’, etc.
(50) a. [+sortal]: *ge*, *li*, *zhang*, *wei*, *gen*, etc.¹⁸
b. [-sortal]: *ping*, *bei*, *dai*, *xiang*, *bang*, *wan*, etc.

¹⁷ As stated in footnote 4, here we assume with Tang (1990:413) that Chinese nominal expressions may be of the projections of DP-NumP-ClP-NP and leave the issue open whether numerals and classifiers are located in Spec or head position.

¹⁸ Chinese classifiers like *ge*, for instance, are in the process of no longer individuating whatever they refer to in terms of the kinds of entity that they are.

(49a) states that synchronically and syntactically all classifiers in Mandarin, [+sortal] or [-sortal], are not derived from nouns and (49b) states that nouns in Mandarin need to appear with a classifier in the presence of the numeral. Elements in (49c) exhibit two uses.

Compared to (49a-c), the above-given various kinds of duration expressions in Mandarin are listed in the lexicon as in (51).

Mandarin (Tang 2001a, 2002a)

- (51) a. [+N]/[+CI]: xingqi, xiaoshi, etc.
 b. [+N, -CI]: yue, libai, zhongtou, etc.
 c. [-N, +CI]: tian, nian, etc.

It thus follows from (51a-c) that Mandarin (46a-b) may observe the mentioned grammaticality contrasts with respect to the presence/absence of the classifier. That is, classifiers like *ge* are required only in cases where the numeral co-occurs with the noun.¹⁹

Under this approach, as pointed out in Tang (2001a, 2002a, 2003, 2004:392), Chinese count nouns and mass nouns may be distinguished at the levels of classifier

¹⁹ Three points need to be mentioned here. In (49b) expressions like *beizi* and *pingzi* are categorized as nouns. However, for some Mandarin speakers cases like *yi beizi shui* ‘one cup of water’ are acceptable whereas for others *de* needs to appear between *beizi* and *shui*. For these speakers *beizi* may be listed as [+N]/[+CI], with which only the numeral *yi* may appear to denote the meaning of ‘whole/full’.

Also, as shown in (47), *de* may be required between the [\pm CI] duration phrase and the noun, though some speakers might accept the absence of *de* in (47). Note further that while *de* may be optional in cases with frequency expressions like *san ci (de) jihui* ‘three chances’, it is obligatory in those like *san ci *(de) pinglü* ‘the frequency of three times’. One possible factor might be that for those who require the presence of *de*, the considered duration/frequency phrase seems to be of complement or apposition relation with the noun. We shall leave conditions on the distribution of *de* for future research.

In addition, as discussed in (23)-(24) and (25)-(26), several other factors may be involved for the grammaticality of the syntactic behavior of the classifier. Similarly, while cases like (i) below are bad, those like (ii) are not.

Mandarin

- (i) *wo yao san [xiao tiao]-de yu.
 I want three small CL-DE fish
 (ii) ta zuotian budao-le wu [xiao tiao]-de niqiu he san [da tiao]-de shibanyu.
 he yesterday catch-LE five small CL-DE loach and three big CL-DE grouper
 ‘Yesterday he caught five small loaches and three big groupers.’

We shall leave for further research factors like predicate types and information weight.

and noun. That is, in the case of Chinese mass nouns, they can only appear with [-sortal] classifiers, whereas in the case of Chinese count nouns, they may occur with [\pm sortal] classifiers. By comparison, in the presence of numerals English mass nouns must take measure words, whereas English count nouns may appear with or without measure words, which are categorized as [+N, -CI]. Such a feature-matching requirement may be derived in a manner of Spec-head agreement or feature checking in the spirit of the Minimalist program in Chomsky (1995).²⁰

Our feature and non-movement analysis of Chinese classifiers may also capture in a principled way the dialectal variation in the categorization of duration expressions between Mandarin (46a-c), (51a-c), for instance, and Southern Min (52a-c), (53a-c).

Southern Min (Tang 2001a, 2002a, 2003)

- (52) a. saN (*e) kang
three CL day
'three days'
b. saN (e) lepai
three CL week
'three weeks'
c. saN (*e) kogoeh
three CL month
'three months'
d. saN (*e) ni
three CL year
'three years'
- (53) a. [+N]/[+CI]: lepai, etc.
b. [-N, +CI]: kang, kogoeh, ni, etc.

The same may also be said about duration expressions in Hakka (54) and Cantonese (55) below.

Hakka (Hsiou-Chun Liu, personal communication, 2003)

- (54) a. sam *(tsak) lipai
three CL week
'three weeks'

²⁰ According to Cheng & Sybesma (1998, 1999), however, in Chinese the difference between mass nouns and count nouns is grammatically reflected at the level of the classifier, whereas in Indo-European languages it is reflected at the level of the noun.

- b. sam (*tsak) tiamtSiung
three CL hour
'three hours'
- c. sam *(tsak) ngiet
three CL month
'three months'
- d. sam (*tsak) ngit
three CL day
'three days'
- e. sam (*tsak) ngien
three CL year
'three years'
- f. [+N, -CI]: lipai, ngiet, etc.
- g. [-N, +CI]: tiatSiung, ngit, ngien, etc.

Cantonese (Bit-Chee Kwok, personal communication, 2003)

- (55) a. saam (*go) nin
three CL year
'three years'
- b. samm *(go) jyut
three CL month
'three months'
- c. samm (go) singkei
three CL week
'three weeks'
- d. saam *(go) laibaai
three CL week
'three weeks'
- e. saam (*go) jat
three CL day
'three days'
- f. [+N]/[+CI]: singkei, etc.
- g. [+N, -CI]: jyut, laibaai, etc.
- h. [-N, +CI]: nin, jat, etc.

Similarly, the typological distinction in the marking of the feature [\pm sortal] between Chinese-type languages and English-type languages may also be accounted for in a principled way. For instance, as shown in (56), while the feature [\pm sortal] is

marked in CI in Mandarin, it is marked in N in English.

English (Tang 2001a, 2002a)

- (56) a. one book(*-s)/two book*(-s)
b. one bottle(*-s)/two bottle*(-s) of milk(*-s)
c. one bottle(*-s)/two bottle*(-s)

And, as opposed to Mandarin, Southern Min, Hakka, and Cantonese duration expressions, English ones are all labeled as N.

English (Tang 2001a, 2002a)

- (57) a. one day(*-s)/two day*(-s)
b. one week(*-s)/two week*(-s)

There are two more pieces of evidence for the feature and non-movement approach posited here. First, with respect to the relationship between classifiers and plural morphology, Doetjes (1996) and Cheng & Sybesma (1999) both posit that “in order for count nouns to be able to be counted, the semantic partitioning of what they denote must be made syntactically visible. In languages like English, number morphology is the grammatical marker, whereas in languages like Chinese, which lack the number morphology, the grammatical marker is the classifier.”

Tang (2001b, 2002b, 2004), however, point out that this kind of claim does not seem to be true cross-linguistically. Pre-Qin Chinese, for instance, allows the count noun to appear with the numeral without the presence of English-type of *-s* or Chinese-type of classifier.

pre-Qin Chinese (Peyraube 1991)

- (58) zhi hu yi lu sanshi...
capture tiger one stag thirty
'We captured one tiger, thirty stags...'

Formosan languages like Paiwan, on the other hand, observe only [+human] classifiers, as in (59) and (60); those like Kavalan permit the absence of [-human] classifiers, as in (61); those like Amis show that only numerals larger than 1 are marked with the classifier, as in (62); and those like Sqliq Atayal exhibit no classifiers, as in (63).²¹

²¹ For a detailed discussion of the classifiers in these and other Formosan languages, see Tang (2001b, 2002b, 2004, 2005a), in which classifier languages are further divided as poor- and

Paiwan (Tang 2001b, 2004)

- (59) a. *(ma-)/*mane-cidil a kakeDian (Tang et al. 1998)
 MA- MANE-one A child
 ‘one child’
- b. *(ma-)/*mane-sepat a kakeDian
 MA- MANE-four A child
 ‘four children’
- c. *(mane-)/*ma-Lima a kakeDian
 MANE- MA-five A child
 ‘five children’
- d. *(mane-)/*ma-tapuLu a kakeDian
 MANE MA-ten A child
 ‘ten children’
- (60) a. (*ma-)ita a vatu/ kun (Tang et al. 1998)
 MA-one A dog skirt
 ‘one dog/skirt’
- b. (*ma-)sepat a vatu/ kun
 MA-four A dog skirt
 ‘four dogs/skirts’
- c. (*mane-)Lima a vatu/ kun
 MANE-five A dog skirt
 ‘five dogs/skirts’

Kavalan (Chang et al. 1998)

- (61) a. kin-turu a sunis
 KIN-three A child
 ‘three children’
- b. (u-)turu a wasu
 U-three A dog
 ‘three dogs’

Amis (Liu 2001)

- (62) a. cecaj ‘one’: [α human]
 b. ta-tulu ‘three, [+human]’/tulu ‘three, [-human]’

rich-classifier languages. See also Chung (2000) and Tang (2004) for a discussion of how Austronesian languages like Indonesian and Formosan languages may raise problems for the Nominal Mapping Parameter in Chierchia (1998) and Kurafuji (2002).

Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2001)

- (63) a. qutux/ cyugal laqi'
one three child
'one child/three children'
b. qutux/ cyugal xuzil
one three dog
'one dog/three dogs'

Likewise, as Dai (1991) illustrates, in Tibeto-Burman languages like Tاراon (Mirish), classifiers are not required for count nouns. Compare, for instance, (64a) and (64b).

Tاراon (Mirish) (Dai 1991)

- (64) a. ta³¹ peng⁵⁵ wuun⁵⁵ gie⁵³
rice bowl one
'one bowl of rice'
b. ma³¹ tsau⁵³ ka³¹ n⁵⁵
cow two
'two cows'

Similar observations are also found in Jingpo.

Jingpo (Dai 1991)

- (65) a. phun⁵⁵ ma³¹ li³³
tree four
'four trees'
b. la⁵⁵ si⁵¹ (khum³¹) ma³¹ li³¹
bean CL four
'four beans'

And, like numerals in Amis (62), in (Bokar) Tani the optionality or obligatoriness of the occurrence of classifiers is subject to the distinct types of numerals, as shown in (66).

(Bokar) Tani (Dai 1991)

- (66) a. numeral = 1: The classifier can be optionally used.
b. numeral = 2: The classifier tends to be deleted.
c. numeral \geq 3: The classifier cannot be used.

Note further that, as exemplified in the above-given data, in addition to classifiers, plural morphemes are not required in the relevant pre-Qin, Paiwan, Kavalan, Amis, Squliq Atayal and Tibeto-Burman data. Corbett (2000) also points out that there appear non-classifier languages like Miya, in which the plural marker may be optional or obligatory in accordance with noun types.

And, as opposed to Tibeto-Burman languages like Taraon (Mirish), Jingpo and (Bokar) Tani, there appears another type of Tibeto-Burman languages in which classifiers must be used when numerals combine with count nouns. Hani, as an example, is of this sort.

Hani (Dai 1991)

- (67) tsho⁵⁵ ni¹³ ga³¹
 man two CL
 'two men'

Taking into consideration all these various kinds of numeral classifiers cross-linguistically, Tang (2001a, 20001c, 2002b, 2002c, 2004) propose a typology of classifiers as in (68) below and suggest a feature analysis of Num and Cl for the countability or interpretation of the count noun.²²

Tang (2001a, 2004)

- (68) a. non-classifier languages: pre-Qin Chinese, English, Squliq Atayal, Seediq, etc.
 b. classifier languages:
 rich-classifier languages: Chinese, Hani, Qiang, etc.
 poor-classifier languages: Paiwan, Bunun, Kavalan, Amis, Tsou, Taraon (Mirish), Jingpo, (Bokar) Tani, Tshanglo, etc.

Another piece of evidence for the account posited in this paper is concerned with the co-occurrence restriction between the classifier and the plural morphology

²² In view of the problems for the N-to-Cl-movement analysis of the Chinese [-sortal] classifiers and the typological variation in the presence/absence of classifiers, it seems to remain a question as to whether the numeral-classifier-noun sequence in Chinese should be projected as CIP in the sense of Cheng & Sybesma (1999), in which Chinese definite noun phrases are claimed to be CIPs but not DPs. Li (1998, 1999) and Kim (2002), for instance, argue that definite nominal expressions in Chinese still project to DP. See also Tang (2005b) for a DP analysis of Chinese noun phrases.

discussed in Li (1999). Under her analysis, such restrictions between classifiers and plural morphemes as in Chinese (69) and English (70) below are attributed to proposals as in (71).

Mandarin

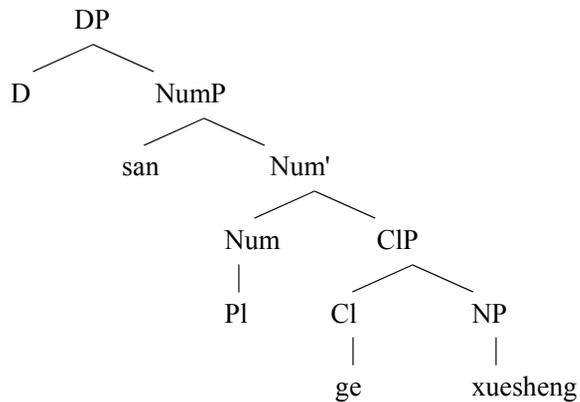
- (69) a. (*yi-ge) xuesheng-men
 one-CL student-MEN
 ‘students’
 b. (*san-ge) xuesheng-men
 three-CL student-MEN
 ‘students’

English

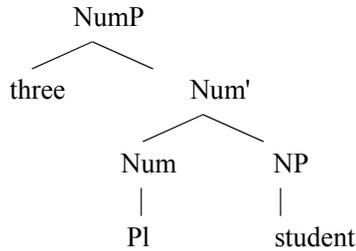
- (70) a. one student(*-s)
 b. three student*(-s)

Mandarin *-men* vs. English *-s* (Li 1999)

- (71) a. The singular/plural distinction is marked in Number.
 b. Mandarin *-men* is a plural morpheme realized on an element in Determiner.
 c. English *-s* is a plural morpheme realized in N.
 d. *san ge xuesheng* ‘three CL student’:



e. *three students*:



Under Li's analysis in (71), classifier languages like Chinese and non-classifier languages like English differ in two important aspects. One distinction is that only classifier languages may have the projection of CI and the other one is that they differ in the realization of plural morphemes. These two conditions coupled with conditions on N-movement enable Li to capture the grammaticality contrast between Chinese (69) and English (70).

Li's approach, nevertheless, is problematic in view of Formosan languages like Squliq Atayal data in (72) below, as Tang (2001a, 2002b, 2004) state.²³

Squliq Atayal (Taoshan) (Yayut Isaw, personal communication, 2001)

- (72) a. qutux/ cyugal laqi'
 one three child
 'one child/three children'
- b. qutux/ cyugal xuzil
 one three dog
 'one dog/three dogs'
- c. br-biru /q-laqi'
 Red-book Red-child
 'books/children'
- d. cyugal (*br-)biru />(*q-)laqi'
 three Red-book Red-child
 'three books/three children'

On the one hand, as pointed out before, cases like (72a-b) suggest that, like English, Squliq Atayal is a non-classifier language. On the other hand, those like (72c) exemplify that, unlike English, plural marking by reduplication cannot co-occur with the numeral in Squliq Atayal. Furthermore, as given in (73) below, in Squliq Atayal

²³ For a detailed discussion of the co-occurrence restrictions between the classifier and the plural morphology in these and other Formosan languages, see Tang (2001b, 2002b, 2004).

reduplicated nouns cannot act as predicates.

Squliq Atayal (Taoshan) (Pawang Nayban, personal communication, 2002)

- (73) (*q-)laqi' qu Sayun ru Tali.
Red-child Nom Sayun and Tali
'Sayun and Tali are children.'

The same restriction, however, does not hold for English plural nouns.

English

- (74) They are students.

Therefore, it seems that a movement account based on the presence or absence of the projection of CIP cannot capture the relevant facts in a principled way.²⁴

To summarize, as pointed out in Tang (2004:395-396), the following properties seem to have been observed in languages like English, Chinese, and Squliq Atayal.

(75) English

- a. It is a non-classifier language.
- b. Plural nouns can act as predicates.
- c. Bare nouns cannot be interpreted as plural.
- d. *-s* is marked with [α human], [+plural] and [α definite]; *-s* is a pure plural marker.
- e. three student*(-s)/this student(*-s)/these student *(-s)/student(-s)

(76) Paiwan

- a. It is a poor-classifier language.
- b. Plural nouns can act as predicates.
- c. Bare nouns can be interpreted as plural.
- d. Plurality via reduplication is not productive; it is marked with [+human], [+plural] and [α definite].
- e. ma-telu a va*(vaya)vayan/aicu a va(*vaya)vayan/
MA-three A girl-Red this A girl-Red
'three girls/this girl/

²⁴ As illustrated in Tang (2001b, 2002b, 2004), regardless of the distinct syntactic and semantic behavior of the classifier and plural morphology found in the Formosan and Tibeto-Burman languages under consideration, they all have a way to distinguish syntactically count nouns from mass nouns. For a detailed discussion of the count-mass distinction in noun, see Tang (2001b, 2002b, 2004).

aicu a mareka a va*(vaya)vayan/ va(vaya)vayan
 this A some A girl-Red girl-Red
 these girls/girl(s)'

(77) Mandarin

- a. It is a rich-classifier language.
- b. Plural nouns via *-men* affixation cannot act as predicates.
- c. Bare nouns can be interpreted as plural.
- d. *-men* is marked with [+human], [+plural] and [+definite]; *-men* is not a pure plural marker. (cf. Iljic 1994, Cheng & Sybesma 1999, among others)
- e. san-ge haizi(*-men)/ zhe-yi-ge haizi(*-men)/
 three-CL child-MEN this-one-CL child-MEN
 'three kids/this kid/
 zhe-yixie haizi(-men)/ haizi(-men)
 this-some child-MEN child-MEN
 these kids/kid(s)'

(78) Squliq Atayal

- a. It is a non-classifier language.
- b. Plural nouns via reduplication cannot act as predicates.
- c. Bare nouns can be interpreted as plural.
- d. Plurality via reduplication is not that productive; it is marked with [α human] and [+plural].
- e. cyugal (*br-)biru /(*br-)biru qani/*(br-)biru qani/(br-)biru
 three Red-book Red-book this Red-book this Red-book
 'three books/this book/these books/book(s)'

According to Tang (2004:396-397), these properties seem to suggest the following things. First, languages like English may have overt plural morphology lexically realized as Num, whereas those like Chinese and Squliq Atayal may have the feature [+plural] specified in Num. Second, overt plural morphology may be merged with nouns, whereas the feature [+plural] may be licensed and identified by demonstratives, numerals, nouns, etc. Third, affixation of genuine plural morphemes like English *-s* may be done at syntax, whereas that of non-genuine plural morphemes like Chinese *-men* and Squliq Atayal reduplication may be done in the lexicon. Fourth, plural nouns that can serve as predicates may be interpreted as non-referential or indefinite, whereas those that cannot serve as predicates may not. Fifth, numerals larger than 1 are marked with features like [+plural, -definite] and thus they may match with English *-s*, which is marked with features like [+plural, α definite], but not with Chinese *-men* and Squliq

Atayal reduplication, which are marked with features like [+plural, +definite].²⁵ An account along this line of thought seems to be further evidenced by the fact that, as shown in the above-given examples, in Chinese and Squiliq Atayal while numerals larger than 1 cannot appear with CI-N-*men* and N-reduplication, respectively, demonstratives like *zhe-yixie* ‘these’ and *qani* ‘this, these’ can, the former of which is marked with features like [+plural, +definite] and the latter of which is marked with features like [α plural, +definite]. In addition, such a feature analysis need not rely solely on the presence or absence of classifiers to account for the various kinds of cross-linguistic co-occurrence restrictions in question.²⁶

5. Conclusion

We have shown in this paper that in Chinese sortal and mensural classifiers differ from one another in their semantic, not categorial, feature, both being listed as CI in the lexicon and none undergoing the syntactic operation of N-to-CI movement. In English, by contrast, the so-called measure words are categorized as N, not CI. This feature and non-movement analysis of classifiers may explain in a principled way the cross-linguistic variation in the mass-count property of duration expressions, on the one hand, and the cross-linguistic co-occurrence restriction between numerals and the plural morphology, on the other hand. Such an account is also free of some empirical and typological problems raised for Cheng & Sybesma’s (1998, 1999) theory of Chinese classifiers and Li’s (1999) theory of the Chinese plural morphology.

²⁵ Such kind of feature-matching requirement may be derived in a manner of Spec-head agreement or feature checking in the spirit of the Minimalist program (see Chomsky 1995). Alternatively, it may also be done by a condition on the c-command relation between the [+definite] and [-definite] features within a nominal projection.

²⁶ Dayal (2004) and Nakanishi & Tomioka (2004), among others, also study plural nouns in terms of their referential properties. We shall leave for further research the (non-) quantificational properties of Chinese *-men*.

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名詞或量詞：漢語量詞的非移位分析

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本文指出漢語個體量詞和非個體量詞雖然在語意屬性上有所差異，在詞類劃分上卻都是量詞，而不是經由名詞的移位而轉換過來的；相對的，英語中所謂的「度量詞」則仍屬名詞。這種非移位的語意屬性分析除了可以有系統的詮釋不同語言間的「持續詞」的可數性以及數詞與複數詞的共存限制，還可以避免 Cheng & Sybesma (1998, 1999) 和 Li (1999) 等相關分析的語言事實和語言類型的問題。

關鍵詞：數詞，量詞，複數詞，可數名詞，不可數名詞，個體性，非個體性，英語，漢語，南島語，藏緬語