1. Introduction

In Chinese, a compound can be made of a noun and a classifier (CL), as shown by the underlined part in the examples in (1). I will call the compound-internal CL lower CL, and the one out of the compound higher CL. In (1b), for instance, *qun* is the lower CL and *ge* is the higher one.

\[
\begin{align*}
\text{(1) } & \text{a. yi di shui-di} & \text{b. yi ge yang-qun} & \text{c. yi zu xian-tiao} \\
& \text{one CL water-CL} & \text{one CL sheep-CL} & \text{one CL line-CL} \\
& \text{‘one water-drop’} & \text{‘one sheep-group’} & \text{‘one group of lines’}
\end{align*}
\]

One goal of this paper is to show that even for a nominal that has a built-in element to denote unit, another unit word is still required to link the nominal

* National Chung Cheng University
to a numeral in Chinese. Thus the occurrence of a CL between a numeral and a nominal in Chinese is clearly a syntactic issue. It reflects a syntagmatic relation between a numeral and a nominal in the language. The language system has a consistent syntactic pattern, not affected by semantics.

Another goal of the paper is to show how CLs exhibit different syntactic properties in different syntactic positions. The lower CLs are identified as a realization of the functional head Dimension (Dmsn), if they are not kind CLs. If CLs can be a realization of Dmsn, in addition to the realization of Unit, we see how the syntactic context decides the syntactic status of linguistic formatives. The higher CLs in cases such as (1a) and (1b) are a place-holder of Unit, without semantic contents. I argue that a construction with a place-holder CL may have a different structure from the corresponding construction in which the same CL is not a place-holder.

Identifying the possible place-holder function of the higher CL in counting constructions is significant in at least two aspects. First, the surface position of a unit word in a counting construction must be a functional head. Second, CLs provide one more instance of evidence for the parallelism between the syntax of nominals and the syntax of verbal or clausal constructions: both may have X° place-holders. The English auxiliary do in the so-called do-support is a place-holder in the verbal domain. We now find similar place-holders in the nominal domain.

The paper is organized as follows. Section 2 introduces the background about the theory of countability in Mandarin Chinese. Section 3 describes the syntactic similarities and differences between N-CL compounds and bare
nouns in Mandarin Chinese. Section 4 reports, on the one hand, how the lower CL decides the dimensionality of the compound, and plays a role in the non-mass status of the compound when the noun root is a mass noun; and on the other hand, how the lower CL has no influence on the non-count status of the compound. These two properties lead us to see that, while the higher CL heads Unit, the lower CL never does so. Instead, it can be a realization of Dmsn. In Section 5, various relations between the higher CL and the lower CL are discussed. It shows that if there is no place-holder CL, although there are two CLs, only the lower one can be an individuating CL, and only the higher one encodes a counting unit. The two CLs also interact with respect to dimension modifiers. In Section 6, I present the semantic emptiness of the higher CL that is ge or a copy of the lower CL, arguing for their place-holder status. In Section 7, I present the syntactic derivations of different counting constructions that contain an N-CL compound, including those containing a place-holder. Section 8 is a brief summary.

2. Mass and non-mass nouns in Mandarin Chinese

In Zhang (2010), I propose that the contrast between count and mass is not a dichotomous contrast. Instead, there are two features to make the distinction: numerability ([+/-numerable]) and dimensionality ([+/-dimension]).

[+numerable] means that a noun may combine with a numeral directly. In (2a), the noun *apple* can combine with the numeral *three* directly, and
therefore it has [+numerable]. In (2b), however, the Chinese noun *pingguo* ‘apple’ may not combine with the numeral *san* ‘three’ directly, and therefore the noun has [-numerable].

(2)  
\[
\begin{align*}
\text{a.} & \quad \text{three apples} \\
\text{b.} & \quad *\text{san pingguo} \\
& \phantom{=} \text{three apple} \\
\text{c.} & \quad \text{san ge pingguo} \\
& \phantom{=} \text{three CL apple} \\
& \phantom{=} \text{‘three apples’}
\end{align*}
\]

I claim that a count noun is defined exclusively by [+numerable]. It is generally recognized that such a combination possibility is the most reliable grammatical property of count nouns (e.g., Chierchia 2010, 104). I further argue that this is the only defining grammatical property of a count noun, cross-linguistically. The syntagmatic property of count nouns is clearly linguistic, rather than extra-linguistic. It is thus not surprising that numerability is expressed in various ways, cross-linguistically and within the same language.

In Chinese, generally speaking, no noun may combine with a numeral directly, as seen in (2), and therefore, no noun is a count noun. Numerability of the language is instead represented exclusively by unit words, including CLs and measure words.

In languages such as Yudja (Lima 2010) and Halkomelem Salish (Wilhelm 2008, 64), every noun can combine with a numeral freely, and thus every noun can have [+numerable] and then be a count noun.
(3) txabïa apeta [Yudja] (Lima 2010, 7)
three blood
‘three units of blood’
(the unit is identified in the context: drops, puddles, or containers)

A similar situation occurs in Chinese idioms and compounds, where a numeral is not followed by any unit words. In the examples in (4a, b), a kind CL is implied, and in (4c, d, e, f), an individual CL is implied.

(4) a. wu-xiang-fen
five-spice-powder
‘five-spice-power’
b. wu-du-ju-quan
five-poison-all-complete
‘having all five kinds of sins’
c. san-jiao-guanxi
three-angle-relation
‘triangle relation’
d. yi xin bu neng er yong
one hear not able two use
‘don’t be absent-minded’
e. San ren xing bi you wo shi.
three person walk must have my teacher
‘One can always find a teacher around.’
f. san fang liang ting
three room two sitting.room
‘3 bedrooms & 2 sitting room’

In languages such as English, in an unmarked situation, words like *cat* are [+numerable], and words like *oil* and *furniture* are [-numerable]. It is also well-know that certain words are count in one language, but non-count in another language.

[+dimension] means that a noun may be modified by a size (e.g., *big*)
or shape (e.g., *round*) modifier. Although all nouns in Chinese have [-numerable], they are not the same, with respect to dimensionality. Semantically, nouns that allow a dimension modifier, such as *he* ‘river’ in (5a), denote elements showing natural atomicity, whereas those that disallow such a modifier, such as *you* ‘oil’ in (6a) and *minzhu* ‘democracy’ (7a), denote massive objects or immaterial notions.\(^1\)

\[(5)\]  
\begin{align*}  
 & a. \text{changchang de he} & b. \text{da qi-qiu} & c. \text{fang xigua} \\
 & \text{long de river} & \text{big air-ball} & \text{square watermelon} \\
 & \text{‘long river’} & \text{‘big balloon’} & \text{‘square watermelon’} \\
\end{align*}

\[(6)\]  
\begin{align*}  
 & a. *\text{chang (de) you} & b. *\text{da (de) zhengqi} & c. *\text{fang de mianfen} \\
 & \text{long de oil} & \text{big de steam} & \text{square de flour} \\
\end{align*}

\[(7)\]  
\begin{align*}  
 & a. *\text{fang (de) minzhu} & b. *\text{bo (de) zibenzhuyi} \\
 & \text{square de democracy} & \text{thin de capitalism} \\
\end{align*}

In Zhang (2010), I also claim that the notion of mass is not the direct negation of count. It is the combination of two syntagmatic properties that defines mass: [-numerable] and [-dimension]. Words such as *oil* in English and their counterparts in Chinese are mass nouns. This refined analysis makes it possible to precisely identify elements that may not combine with

\(^1\) In Chinese, *da* ‘big’ and *xiao* ‘small’ are ambiguous in size-denoting and degree denoting. The latter reading can be seen in the examples in (i). We do not consider such uses of the adjectives.

\[(i)\]  
\begin{align*}  
 & a. \text{da hao xingshi} & b. \text{xiao xian shenshou} \\
 & \text{big good situation} & \text{small show skill} \\
 & \text{‘very good situation’} & \text{‘show the skill a little bit’} \\
\end{align*}
a numeral directly but may allow a dimension adjective, e.g., furniture in English, and pingguo ‘apple’ in Chinese. They are non-count and non-mass nouns.

Like agentitivity of VPs (i.e., whether an agent-oriented adverb is allowed) and gradability of APs (i.e., whether a degree word is allowed), numerability and dimensionality are defined syntagmatically.

In this analysis, Chinese nouns can be divided into mass and non-mass nouns. The former is [-dimension] and the latter is [+dimension].

I assume that the surface positions of a numeral its following CL are Spec and head of UnitP, and dimension modifiers are hosted by Spec of DimensionP (DmsnP).

### 3. Basic properties of N-CL compounds

#### 3.1 The CLs and Ns of N-CL compounds

In some languages, one can find the so-called singulatives, as shown by the suffixes in (8b), (9b) (Acquaviva 2010, 7), and the right morpheme of the examples in (10) (Yi 2010, 94):

(8)  
<table>
<thead>
<tr>
<th>a. hteb</th>
<th>b. hteb-a</th>
<th>[Moroccan Arabic]</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘fire wood’</td>
<td>‘piece of firewood’</td>
<td></td>
</tr>
</tbody>
</table>

(9)  
<table>
<thead>
<tr>
<th>a. glao</th>
<th>b. glav-enn</th>
<th>[Breton]</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘rain’</td>
<td>‘raindrop’</td>
<td></td>
</tr>
</tbody>
</table>
(10) a. mwul-pangwul  
   b. pis-pangwul  
   c. kilum-pangwul [Korean]
   water-drop  
   rain-drop  
   oil-drop
   ‘water drop’
   ‘rain drop’
   ‘oil drop’,

Similar complex words are found systematically in Mandarin Chinese. The
singulartives are just CLs. Any type of CL may occur with a noun, forming
a compound, as seen in (11).

(11) a. shui-di     zhi-zhang     tu-dui     [individuating CL]
   water-CL  paper-CL  earth-CL
   ‘water-drop’  ‘paper-piece’  ‘earth-pile’

b. hua-duo     shu-ben     ma-pi     [individual CL]
   flower-CL  book-CL  horse-CL
   ‘flower’  ‘book’  ‘horse’

c. huluobo-pian     pinguo-kuai     hua-ban     [partitive CL]
   carrot-CL  apple-CL  flower-CL
   ‘carrot-slice’  ‘apple-chunk’  ‘flower-petal’

d. yang-qun     yaoshi-chuan     shu-dui     [collective CL]
   sheep-CL  key-CL  book-CL
   ‘sheep-flock’  ‘key-bunch’  ‘book-pile’

e. shu-zhong     dongwu-lei     shipin-lei     [kind CL]
   tree-CL  animal-CL  food-CL
   ‘tree-type’  ‘animal-type’  ‘food-type’

CLs are thus systematically able to occur in an N-CL compound. Although
accidental gaps occur (e.g., the CL ge may not occur in such a compound),
the pattern of the compound is an attested construction in the language,
and its generality should not be ignored in analyzing the formal properties
of CLs. This is parallel to the situation that one does not deny the availability of the consonant-vowel combination in Mandarin Chinese, even though the combinations such as /k‘u2/, /ku2/, and /su3/ do not exist in the language.

Not only all types of CLs, but also both mass and non-mass nouns, may occur in an N-CL compound. The noun root *shui* ‘water’ in (11a) is a mass noun, and the noun root *hua* ‘flower’ in (11b) is a non-mass noun.

Furthermore, the selection of the dimensionality of a CL in an N-CL compound is identical to that of the corresponding free form CL. The individual CL *zhi* occurs with the non-mass noun *qiang* ‘gun’ in (12a), but not the mass noun *you* ‘oil’ in (12b). In contrast, the individuating CL *di* occurs with the mass noun *shui* ‘water’ in (13a), but not the non-mass noun *putao* ‘grape’ in (13b).

(12) a. qiang-zhi
    gun-CL
    ‘gun’

b. *you-zhi
    oil-CL

(13) a. shui-di
    water-CL
    ‘water drop’

b. *putao-di
    grape-CL

The unacceptability of data like (12b) and (13b) indicates that a CL has its consistent selection pattern, regardless of whether it is in a compound or not.

Furthermore, compound-internal CLs have a consistent position: they always surface at the end of a word in Chinese. The underlined morphemes
in (14), which are not the last morphemes of the words, are lexical roots, not CLs, although they share forms with the nominal or verbal CLs in (15).

(14) a. **ge-zi**  height-suffix  ‘height (of a person)’
b. **ben-zi**  book-suffix  ‘writing book’
c. **yi-xia-zi**  one-down-suffix  ‘immediately’

(15) a. san **ge** haizi  three CL kid  ‘three kids’
b. san **ben** shu  three CL book  ‘three books’
c. Pai wo san **xia**!  pat I three CL  ‘Pat me three times!’

All CLs in Chinese have been developed from other lexical categories such as nouns and verbs. Thus the form-sharing is not surprising.

This fixed final position of CLs in the compounds makes them different from regular nominal components of a compound, which have no constraint on their positions:

(16) a. **dao-di** ~ di-dao  road-earth  ‘real’
b. **ren-qing** ~ qing-ren  person-love  ‘human relation’
c. cha-hua ~ hua-cha  tea-flower  ‘tea flower’
d. he-fan ~ fan-he  box-meal  ‘meal box’

3.2 The distributions and readings of N-CL compounds

The distributions of N-CL compounds are similar to those of bare nouns.
Like a bare noun, an N-CL compound can occur in an argument position, as in (17a), and a predicate position, as in (17b):

\[(17)\]  
\[a.\] \text{Kefei kanjian-le hua-duo.}  
Kefei see-PRF flower-CL  
\text{‘Kefei saw (the) flowers.’}  
\text{‘Kefei saw \{the/a\} flower.’}  
\[b.\] \text{Zhe shi hua-duo.}  
dem be flower-CL  
\text{‘This is a flower.’}  
\text{‘These are flowers.’}

Like a bare noun, the interpretation of an N-CL compound can be definite, or indefinite, as seen in (18a), generic, as seen (18b), or kind, as seen in (19). Also like a bare noun, such a compound does not have to denote plural or collective entities (contra Li & Thompson 1981, 82). Singular readings of (18a) and (18b) are possible.

\[(18)\]  
\[a.\] \text{Ta xiang yao hua-duo.}  
he want want flower-CL  
\text{‘He wants to have flowers.’}  
\text{‘He want to have the flower(s).’}  
\[b.\] \text{Hua-duo hui diaoxie.}  
\text{Flowers can wither.’}  
\text{‘\{That flower/Those flowers/Flowers\} can wither.’}

\[(19)\]  
\[a.\] \text{Zhang Zhongjing faxian-le shancha hua-duo.}  
Zhang Zhongjing discover-PRF camellia flower-CL  
\text{‘Zhang Zhongjing discovered camellia.’}  
\[b.\] \text{Zai zhe ge dao-shang, ma-pi yijing miejue-le.}  
at this CL island-on horse-CL already extinct-PRF  
\text{‘On this island, horses have become extinct.’}
But, as noted in X. P. Li (2010, 55), if the compound-internal CL is a kind CL, the compound is different from a bare noun. Such a compound shows properties of kind-denoting nominals only, whereas a bare noun can be ambiguous in kind and non-kind reading. I use (20) to show that such a compound may not be the argument of the presentational *fei-zhe* ‘fly-PROG’, whereas a bare noun can.

(20) Tian-shang fei-zhe {niao/*niao-lei}.
    sky-on    fly-PROG bird/bird-kind
    ‘Birds are flying in the sky.’

If the kind meaning of the compound-internal kind CL is projected to the whole compound, the exclusive kind reading of such a compound is expected.

### 4. Dimensionality, numerability and N-CL compounds

#### 4.1 Classification of unit words

All unit words tell us what counts as one in counting. Unit words include CLs and measure words. The latter group is composed of standard measures such as *kilo* and container measures such as *cup* in *three cups of tea*.²

Kind CLs have no occurrence restrictions. They occur with all types of

² I put aside Chao’s (1968, 698) quasi-measures, which include some standard measures and nouns with deleted unit words. I also ignore other types of “measures” in Chao (1968), which are not unit words of nominals.
nouns. Standard and container measures occur with both [+dimension] nouns and the material type of [-dimension] nouns, but reject nouns denoting immaterial notions. So these three types of unit words are not sensitive to the contrast between [+dimension] and [-dimension]. In the following data, the nouns in the a-examples are [+dimension] and those in the b-examples are [-dimension].

(21) a. shi zhong luobo b. shi zhong mianfen [kind CL]
ten CL carrot ten CL flour
‘ten types of carrot’ ‘ten types of flour’

(22) a. shi gongjin luobo b. shi gongjin mianfen [standard measure]
ten kilo carrot ten kilo flour
‘ten kilos of carrots’ ‘ten kilos of flour’

(23) a. shi xiang luobo b. shi xiang mianfen [container measure]
ten box carrot ten box flour
‘ten boxes of carrots’ ‘ten boxes of flour’

Unit words that select [-dimension] nouns are Chao’s (1968) individuating CLs, as shown in (24). Such CLs occur with mass nouns (e.g., Croft 1994, 162). Semantically, individuating CLs are associated with the idea that “the noun refers to some kind of mass and the classifier gives a unit of this mass” (Denny 1986, 298, cited in Aikhenvald 2003, 318).

(24) a. shi dui tu b. wu gu zhengqi c. wu zhang zhi
ten CL earth five CL steam five CL paper
‘ten piles of earth’ ‘five puffs of steam’ ‘five pieces of paper’
d. wu di you  e. wu tan you  f. wu pao niao
five CL oil  five CL oil  five CL urine
‘five drops of oil’  ‘five puddles of oil’  ‘five units of urine’
g. liu ji yao-shui
six CL medicine-liquid
‘six units of medicine liquid’

Unit words that occur with [+dimension] nouns are divided into three types.
A. What counts as one is bigger than the natural unit of the element denoted by the non-mass noun. In this case, a collective CL is used, as in (25a).

Collective CLs (called group measures in Chao 1968, 595) include the so-called arrangement CLs, such as pai ‘row’ and luo ‘stack’, and number set CLs, such as shuang ‘pair’, dui ‘pair’, and da ‘dozen’. B. What counts as one is smaller than the natural unit. In this case, a partitive CL is used, as in (25b). C. What counts as one matches the natural unit. In this case, an individual CL is used, as in (25c).³

(25) a. shi dui luobo  [collective CL]
ten CL carrot
‘ten piles of carrots’

³ Partitive CL is one of the various types of unit words for pseudo-partitive constructions. Pseudo-partitive constructions denote the quantity of entities (e.g., three kilos of tea), whereas partitive constructions (e.g., Fodor & Sag 1982; Jackendoff 1977) denote a part-whole relation within a definite domain (e.g., three kilos of the tea). The counting constructions discussed here, including those contain a partitive CL, are all pseudo-partitive constructions. The fractional CL cheng in Chinese is used in partitive constructions only. I do not discuss this CL in this paper.
(i) Ba cheng xuesheng yijing kao-le Tuofu.
   eight CL student already test-PRF TOEFL
   ‘80% of the students have taken the TOEFL test.’
b. shi pian luobo  
   ten CL carrot 
   ‘ten slices of carrot’

c. shi gen luobo  
   ten CL carrot 
   ‘ten carrots’

Generally speaking, the same form of a unit word can belong to different types, depending on the type of the associated noun, and the semantic function of the unit. In (24a), the CL dui occurs with the mass noun tu ‘earth’, and it is thus an individuating CL. However, in (25a), dui occurs with the non-mass noun luobo ‘carrot’, and it is thus a collective CL. Similarly, when the CL pian occurs with luobo ‘carrot’ in (25b), it denotes a part of a carrot and thus it is a partitive CL, but when it occurs with shuye ‘leaf’ in (26a) below, it represents the natural unit of a leaf, and therefore it is an individual CL. Moreover, if the CL pian occurs with the mass noun moutou ‘wood’, as in (26b), it apportions the mass of wood, therefore it is an individuating CL. The two examples of the CL duo in (27) show the same point.

(26) a. san pian shuye  
   three CL leaf 
   ‘three leaves’

b. san pian mutou  
   three CL wood 
   ‘three pieces of wood’
(27) a. san duo hua [individual CL]
three CL flower
‘three flowers’
b. san duo yun [individuating CL]
three CL cloud
‘three pieces of cloud’

In English, the CL *piece* is also ambiguous. It is an individuating CL in (28a), but a partitive CL in (28b) (see Lehrer 1986, 115):

(28) a. a piece of paper
b. a piece of celery

The CL *ge* in Mandarin Chinese functions like a chameleon. This CL can be used as an individual CL, when it occurs with nouns with [+dimension], as seen in (29a); a kind CL, as in (29b), or an individuating CL, as in (29c) (adapted from Lü et al. 1999 [1980], 599), when it occurs with a noun denoting an immaterial notion. However, it never occurs with a material-denoting mass noun, as seen in (29d). None of the nouns in (29c) and (29d) have [+dimension], but the former cannot occur with a standard or container measure, whereas the latter can. The acceptability of the former group, where *ge* occurs with a mass noun, indicates Chao’s (1968, 508-509) generalization that “Mass nouns do not take the individual classifier *ge*” (sic) is not accurate.4

4 Many papers have been published on *ge*. See Myers (2000) for a review. The word *ge* in data like the following is also a CL, followed by a nominalized element (Ōta 2003 [1958], 363; Chao 1968, 320). The word *ta* here has been analyzed as
(29) a. san ge xianglian
   three CL necklace
   ‘three necklaces’

b. Shijie-shang you liang ge butong de minzhu.
   world-on have two CL different de democracy
   ‘There are two kinds of democracy in the world.’


(i) Zanmen wan ta (yi) ge tongkuai!
   we      p l a y  i t  o n e  CL satisfaction
   ‘Let’s play as much as we like.’

Ge may also occur in other contexts in which no numeral may occur. Ge in such
uses is thus not a unit word. For instance, it can occur to the left of an adjective,
as in (ii-a); or to the left of negation, as in (ii-b) (Ōta 1958, sec 21.4; Zhu 1982,
49):

(ii) a. Akiu pao-le *(ge) kuai.
    Akiu run-prf ge  fast
    ‘Akiu ran fast.’

   b. Akiu xiao *(ge) bu-ting.
    Akiu laugh ge  not-stop
    ‘Akiu laughed endlessly.’

No other CL can occur in such contexts. Lü (1983, 131) claims that in certain cases,
ge is used for prosodic reasons (cf. W. Zhang 1991, 266).

In (iii), ge also rejects a numeral. In (iv), ge precedes a pronoun (Cheng &
Sybesma 1999, 538) or proper name (Ōta 2003 [1958], 75; Cheng & Sybesma 1999,
523).

(iii) Wo he (*yi) ge shui  jiu  lai.
    I  drink one ge water then come
    ‘I’ll come after I drink some water.’

(iv) Na *(ge) Hufei zhen bu xianghua.
    that CL Hufei truly not decent
    ‘That Hufei is really unreasonable.’

However, examples like (iv) may show that the uses of pronouns and proper names
have the syntax of common nouns (Ōta 2003 [1958], 75; X. F. Zhang 2008, 413;
De Clercq 2008). In S. Wang (1989, 110), the ge in (iv) is claimed to function as
an indefinite determiner.
Unit words are for counting. In counting, there is no restriction to numerals. In my study, I do not consider words that may not be preceded by any numeral other than yi ‘one’, such as those in (30) (Chao 1968, 603; Li & Thompson 1981, 111). In such constructions, the word yi is probably not a numeral, since it can be replaced by the adjective man ‘full’ (Y. M. Li 2000, 54), whereas real numerals cannot. The element following such a use of yi is analyzed as a noun instead of a CL in B. Li (2009).

(30) a. {yi/*san} shen nitu      b. {yi/*san} lian you
    one/three body mud            one/three face oil
    ‘a bodyful of mud’            ‘a faceful of oil’

4.2 Dimensionality of unit words

Modifiers of unit words vary cross-linguistically. In this section, I discuss dimension modifiers of unit words in Mandarin Chinese only.

Two types of unit words may not be modified by a dimension modifier: standard measures (Liu 1980, 10; cf. Lu 1987, fn. 3) and kind CLs:

(31) a. san sheng you      b. *san {chang/da} sheng you
    [standard measure]

```
three liter oil three long/big liter oil
‘three liters of oil’

(32) a. san zhong qianbi  b. *san {chang/da} zhong qianbi [kind CL]
three kind pencil three long/big kind pencil
‘three kinds of pencil’

Note that the adjectives da ‘big’ and xiao ‘small’ may mean ‘significant’ and ‘insignificant’, respectively (see footnote 1). Such readings are not dimension readings, and thus the two adjectives may modify abstract nouns (cf. English big idea, big chance) and abstract units in these readings:

(33) a. si da bi jiaoyi  b. si xiao tiao jianyi
four big CL transaction four small CL suggestion
‘four significant transactions’ ‘four minor suggestions’

All other types of unit words may be modified by a dimension adjective in Chinese (Lu 1987, Luo 1988, among others), and thus have the feature [+dimension] (Note that not only individual CLs can be modified, but also the numeral preceding the adjective is not restricted to yi ‘one’. Thus Cheng & Sybesma’s 1998, 390 two restrictions are both inaccurate).

(34) a. san tiao xianglian  b. san chang tiao xianglian
    [individual CL]
    three CL necklace three long CL necklace
    ‘three necklaces’ ‘three long necklaces’
(35) a. san di you  b. san da di you

three CL oil        three big CL oil
‘three drops of oil’ ‘three big drops of oil’

[individuating CL]

(36) a. san pian xigua  b. san da pian xigua

three CL watermelon three big CL watermelon
‘three slices of watermelon’ ‘three big slices of watermelon’

[partitive CL]

(37) a. san qun yang  b. san da qun yang

three CL sheep        three big CL sheep
‘three flocks of sheep’ ‘three big flocks of sheep’

[collective CL]

(38) a. san xiang xianglian  b. san da xiang xianglian

c. san ping you        d. san da ping you

three box necklace  three big box necklace
‘three boxes of necklaces’ ‘three big boxes of necklaces’

[container measure]

Individual CLs in other languages such as Thai (Hundius & Kölver 1983, 169-171), Kiriwina (Croft 1994, 150), and Hungarian (Csirmaz & Dékány 2010, e.g., (36)) may also be modified by dimension adjectives. But since kind CLs may not do so, the feature is not a defining property of CLs. Cross-linguistically, CLs in Korean may not be modified (Byeong Yi, p.c., Sept. 16, 2010).
4.3 Compound–internal CL as a realization of Dmsn

In 3.4.3, we have seen that kind CLs may not be modified by a dimension adjective, whereas all other types of CLs may. This contrast remains for N-CL compounds. If the lower CL is a kind CL, the whole compound may not be modified by a dimension adjective, as seen in (39b) and (40b).

(39) a. hua-lei
    flower-type
    ‘flower type’

   b. *da hua-lei
    big flower-type

(40) a. shu-zhong
    tree-type
    ‘tree type’

   b. *da shu-zhong
    big tree-type

However, if the lower CL is not a kind one, the whole compound may be modified by a dimension adjective, regardless of whether the noun itself may be modified by such an adjective if it occurs alone. In (41a), hua ‘flower’ is modified by da ‘big’, and thus there is no surprise to see that in (41b) da occurs with the compound hua-duo ‘flower-CL’. In (42a), however, xue ‘blood’ may not be modified by da ‘big’, but the compound xue-di ‘blood-cl’ can be modified by da in (42b).

(41) a. da hua
    big flower
    ‘big flower’

   b. da hua-duo
    big flower-CL
    ‘big flower’

   c. yi da duo hua
    one big CL flower
    ‘one big flower’

(42) a. xue-di
    blood-cl
    ‘blood-cl’
(42) a. *da xue  b. da xue-di  c. yi da di xue
    big blood  big blood-CL  one big CL blood
    ‘big blood-drop’  ‘big blood-drop’

In (42b), the values of dimensionality of the two elements of the compound
are conflicted: xue ‘blood’ has [-dimension], as seen in (42a), and di has
[+dimension], as seen in (42c). Since the whole compound can be modified
by a dimension adjective and thus has [+dimension], the feature of the
compound-internal CL must have been projected to the whole compound.

The projection is seen not only in modification, but also in predication.
In (43a) and (43b), the mass noun may not be the subject of the dimension
predicate hen da ‘very big’. In (44a) and (44b), however, the corresponding
N-CL compound, which has the same mass noun root as in (43), can be
the subject of the dimension predicate.

    oil very big  air very big

    oil-CL very big  air-CL very big
    ‘The oil drop is big.’  ‘The (ball-like) air-unit is big.’

Like a diminutive marker, a compound-internal CL itself may not be
modified, but it makes the whole compound able to be modified by a
dimension adjective. I conclude that a compound-internal CL contributes the
feature [+dimension] to the whole compound, if it is not a kind CL. In
other words, it is the compound-internal CL that contributes the non-mass status of the compound, when the noun root is a mass noun.

Syntactically, I thus claim that a compound-internal CL, if it is not a kind CL, is a realization of the head of DmsnP. The whole compound is thus a non-mass one, with the feature [+dimension]. If the compound-internal CL is a kind CL, it should be base-generated at N, with the feature [-dimension].

So the syntactic status of a CL is context-dependent.

4.4 The non-count status of an N-CL compound

Like other nouns in Chinese, N-CL compounds may not combine with a numeral directly, as seen in (45). A unit word is required for such a combination, as in (46). So N-CL compounds are also non-count nouns.

\[(45)\] a. *san shui-di  
three water-CL  
b. *san hua-duo  
three flower-CL

\[(46)\] a. liang ge shui-di  
two  CL water-CL  
‘two water-drops’  
b. liang pai shui-di  
two  CL water-CL  
‘two rows of water-drops’

It is well-known that quantifiers have co-occurrence restrictions with respect to the count/mass contrast in English. Some quantifiers also show the similar occurrence restrictions in Chinese.

In Chinese, it is unit words, rather than nouns, that can be count elements.
So if a quantifier has to occur with a count element in Chinese, it must combine with a unit word.

According to Cardinaletti & Giusti (2006), quantifying elements can be modifiers or non-modifiers, cross-linguistically. In Chinese, modifiers can be followed by the functional word \textit{de}. Quantifying elements such as \textit{daliang} ‘a lot’, \textit{suoyou} ‘all’, \textit{quanbu} ‘all’, \textit{daduoshu} ‘most’ can be followed by \textit{de}, and thus they should be quantifying modifiers. They modify NPs directly, and thus may not be followed by a CL, as seen in (47) (see Tang 2007, 984; Hsieh 2008, 61; X. P. Li 2010, 5):

(47) a. suoyou (de) (*duo) hua  
    all de CL flower  
    ‘all of the flowers’ 

(47) b. daliang (de) (*ping) shui  
    a.lot de bottle water  
    ‘a lot of water’

Putting such modifiers aside, I consider quantifiers that may not be followed by \textit{de}.

Cardinal numerals, ordinal numerals, and quantifiers such as \textit{ji} ‘how many’ (Chao 1968, 580; it is called “unknown figure” in Iljic 1994, 107), \textit{ji} ‘a few, several, several’, \textit{haoji} ‘several’, \textit{ge} ‘each’ (各有), \textit{zheng} ‘whole’ (整), and \textit{man} ‘all’ (满) must be followed by a unit word (i.e., a CL or measure word) in counting, as seen in (48). Such quantifiers occur with elements that have [+numerable].

(48) a. san *(duo) hua  
    three CL flower  
    ‘three flowers’ 

(48) b. di san *(duo) hua  
    ord three CL flower  
    ‘the third flower’
c. Ni you ji *(duo) hua? d. haoji *(duo) hua
you have how many CL flower several CL flower
‘How many flowers do you have?’ ‘several flowers’
e. man *(ben) riji dou xie-zhe liang ge zi: jian fei
whole CL diary all write-prg two CL word lose fat
‘The whole diary is full of two words: lose weight.’

But these quantifiers have no restriction on dimensionality feature of the element following them. In (49a), the quantifier *ji ‘how many’ precedes the CL *di, which is modified by the dimension adjective *da ‘big’. In (49b), *ji precedes the standard measure *sheng ‘liter’, which rejects a dimension adjective. *Ji may occur with either of them, indicating that it is not sensitive to the dimension feature of the unit words.

(49) a. Ji da di you? b. Ji (*da) sheng you?
how many big CL oil how many big liter oil
‘How many big drops of oil?’ ‘How many (*big) liters of oil?’

Quantifiers such as (yi)-dianr ‘some, a little’, *renhe ‘any’, and *henshao ‘little’ may not be followed by any unit word, as shown in (50).

(50) a. Nali you (yi)-dian (*ping/*di) niunai.
there have some bottle/CL milk
‘There is a little milk.’
b. Duo xue yi-dian (*ge) Ma-Lie!
more study some CL Marx-Lenin
‘Study more of Marxism and Leninism!’
Iljic (1994, 107) claims that such quantifiers are for mass or abstract nouns only. Precisely speaking, it is a unit word, rather than a non-mass noun, that may not be quantified by such quantifiers. In Reading B of (50c), xigua ‘watermelon’ is not a mass noun, but it is quantified by yi-dian ‘a little’.

The rejection of unit words, which are the only count elements in the language, indicates the rejection of [+numerable]. Therefore, quantifiers such as (yī) dianr ‘some, a little’, renhe ‘any’, and hen shao ‘very little’ can be regarded as quantifiers that occur with [-numerable] expressions, similar to much and little in English.

In addition to the two types of quantifiers introduced above, quantifiers such as henduo, haoduo, or haoxie, which all mean ‘many, much’, may occur with any type of nouns or unit words (Tang 2007, 984; Hsieh 2008, 61) (the same is true of takusan ‘many, much’ in Japanese, another CL language; see Iida 1998, 4).
However, when *henduo* occurs with a unit word, e.g., a CL, it may not be followed by *de*, as in (52a), patterning with a quantifier that occurs with [+numerable], such as a numeral, as seen in (52b); whereas when it occurs without a CL, it may be followed by *de*, as in (53a), patterning with a quantifying modifier such as *suoyou*, as seen in (53b) (see (47a)) (Hsieh 2008, 61).

(51) a. henduo (ben) shu  
b. henduo (di) shui
   many   CL  book      many   CL  water
   ‘many books’         ‘a lot of {water/drops of water}’

(52) a. henduo (*de) ben shu  
b. san (*de) ben shu
   many   de  CL  book    three   de  CL  book
   ‘many books’           ‘three books’

(53) a. henduo (de) shu  
b. suoyou (de) shu
   many   de  book        all    de  book
   ‘many books’           ‘all items of the books’

Such quantifiers are thus ambiguous in their status.

The fact that certain quantifiers are sensitive to numerability further indicates that nominal constructions in Chinese exhibit the contrast between count and non-count elements.

Now we turn to N-CL compounds. As expected, when quantifiers that need to occur with a unit word (see 2.5) combine with such compounds, a unit word must occur, as seen in (54a); and when quantifiers that reject a unit word combine with such compounds, no unit word may occur, as
seen in (54b).

(54) a. Nali you ji *(ge) shui-di? there have how many CL water-CL ‘How many water drops are there?’
   b. Yusan-shang juran mei-you renhe (*ge) shui-di. umbrella-on even not-have any CL water-CL ‘There is not even any water drop on the umbrella.’

Therefore N-CL compounds behave the same as regular nouns in the language, when they occur with numerals and various quantifiers. Such a compound is a non-count noun, with the feature [-numerability].

With the two features, [+dimension] and [-numerability], clearly, compounds like shui-di ‘water-CL’ are non-mass and non-count nouns, similar to pingguo ‘apple’ and the English word furniture. However, an N-CL compound contains a CL, a unit-denoting element. It expresses atomicity morphologically. But still, it requires the help of a unit word in order to show up with a numeral.

5. The relations between the higher and the lower CLs

5.1 No multiple individuating

If an N-CL compound has [+dimension], it is a non-mass noun. Non-mass
nouns do not occur with individuating CLs. Thus if the lower CL is an individuating CL, the higher one cannot be another different individuating CL. Both *di* and *tan* are unambiguously individuating CLs, as seen in (55a) and (55b). The examples in (55c) and (55d) show that they cannot co-occur in the same counting construction. So, semantically, only one individuating CL is allowed for one mass noun.

(55)  

a.  yi  di shui  
    one CL water  
    ‘one drop of water’

b.  yi  tan shui  
    one CL water  
    ‘one puddle of water’

c. *yi  di shui-tan  

    one CL water-CL

d. *yi  tan shui-di  
    one CL water-CL

Other CLs such as *tiao, zhang, pian* are ambiguous. *Tiao* is an individual CL when it occurs with *yu* ‘fish’, but an individuating CL when it occurs with *bu* ‘cloth’; *zhang* is an individual CL when it occurs with *zhuozi* ‘table’, but an individuating CL when it occurs with *zhi* ‘paper’; *pian* is an individual CL when it occurs with *shuye* ‘leaf’, but an individuating CL when it occurs with *bing* ‘ice’. If such a CL occurs as a higher CL, as in (56), one cannot exclude the possibility that the CL is an individual CL, representing the unit established by the lower CL. Thus, in no case may one mass noun occur with two individuating CLs.

(56)  

a.  san  tiao mu-pian  
    three CL wood-CL  
    ‘three pieces of wood strips’

b.  san  pian mu-tiao  
    three CL wood-CL  
    ‘three pieces of wood strips’
5.2 No multiple counting-units

If the two CLs of a counting construction have different forms, and the higher one is not ge, it is the higher one that encodes the counting unit. In (57a), there is only one CL, juan, which denotes a counting unit in a roll shape. In (57b), the lower CL is the same as the one in (57a), but the counting unit is the higher CL, dui, which denotes a pile-shape. One uses this expression to count the collective unit pile, rather than the individual unit for the luggage. The examples in (58) show the same point.

(57) a. san juan xingli b. san dui xingli-juan
three CL luggage three CL luggage-CL
‘three rolls of luggage’ ‘three piles of luggage-rolls’

(58) a. si duo hua b. si pai hua-duo c. si zhong hua-duo
four CL flower four CL flower-CL four CL flower-CL
‘four flowers’ ‘four rows of flowers’ ‘four kinds of flowers’

Since each counting operation allows only one counting unit, based on the readings of the examples in (57) and (58), we conclude that it is the higher CL that denotes the counting unit. So the higher one is consistently a
realization of Unit, as assumed at the end of Section 2. This CL is more local to the numeral than the lower one. The lower one, as claimed in 4.3 above, can be a realization of Dmsn.

5.3 The semantic interactions between the two CLs

All CLs may have semantic contents (Allan 1977, 285). A higher CL and a lower CL may interact in different ways.

The shape meaning of the whole counting construction can be either the sum of the meanings of the two CLs, or the hierarchical combination of the meanings of the two CLs. In (59a) and (59b), for instance, both the flat-thin shape denoted by the CL *pian* and the narrow-strip shape denoted by the CL *tiao* are accessible, regardless of which one is the higher one. The two examples mean the same (note that *pian* is not a collective CL in (59) and (60)).

(59) a. san pian mu-tiao b. san tiao mu-pian
three CL  wood-CL three CL  wood-CL
Both: ‘three wood units that are flat-thin and narrow’

Zhang (2011a) claims that s-feature projection is flexible, if the sources of the features are not in a thematic relation. Here we see that the shape features of two CLs can both be projected. Since the features from the two CLs are compatible, their combination is expected. But of course, conflict modifiers in the shape composition are not allowed, as seen in (60).
Recall that individual and individuating CL constructions are right-branching (Chapter 3), and thus a higher modifier and a lower modifier are in the same domain, which may not hold conflicting semantics. In 5.1, we have stated that when the lower CL is an individuating CL, the higher one, if it is neither ge nor a copy of the lower one, is an individual CL. So *pian* in (59a) and *tiao* in (59b) are both individual CLs. The ban of conflict modifiers between the higher CL and the nominal is expected in the right-branching structure.

In (61a), however, the higher CL is the collective CL *dui* ‘pile’. In this case, the shape of a pile is composed of wood pieces in the shape of strips, a hierarchical relation between the two shapes. Conflict modifications are possible, as seen in (61b), since the modifiers have different scopes. Zhang (2011b) argues that collective CL constructions are left-branching, and thus the two modifiers are not in the same domain.

In this section, I have discussed various relations between the higher CL and the lower CL. I have shown that although there are two CLs, only the lower one can be an individuating CL, and only the higher one encodes
a counting unit. The shape meanings of the two CLs can also both be projected.

6. The place-holder CLs

So far, in all of the examples discussed above, the higher CL is neither ge nor a copy of the lower CL. In this section, we show that if the higher CL is ge or a copy of the lower CL, it functions as a place-holder. This means that the upper CL in such constructions has no semantics.

6.1 Ge as the higher CL

If the higher CL is ge, the meaning of the lower CL is projected. First, the real counting unit is the lower one, rather than ge. In both (62a) and (62b), the higher CL is ge, but the shapes of the water-units are different. In (62a), the lower CL denotes a unit in a drop shape, and the counting unit denoted by the whole counting construction is also in a drop shape, identical to the one denoted by the lower CL. In (62b), the lower CL denotes a unit in a puddle shape, and the counting unit denoted by the whole counting construction is also in a puddle shape, identical to the one denoted by the lower CL.

(62) a. san ge shui-di   b. san ge shui-tan
    three CL water-CL     three CL water-CL
    ‘three drops of water’ ‘three puddles of water’
Moreover, in the following three groups of examples, although *ge* follows the numeral immediately in all of the cases, the reading of the a-forms is decided by the lower CL, and is thus different from the meaning of the b-forms, where *ge* is the only CL.

(63) a. san ge luobo-pian  
   three CL carrot-CL  
   ‘three carrot-slices’ ≠ ‘three carrots’

     b. san ge luobo  
       three CL carrot

(64) a. san ge yang-qun  
   three CL sheep-CL  
   ‘three flocks of sheep’ ≠ ‘three sheep’

     b. san ge yang  
       three CL sheep

(65) a. san ge shu-zhong  
   three CL tree-type  
   ‘three kinds of trees’ ≠ ‘three trees’

     b. san ge shu  
       three CL tree

We know that if there is only one CL, the unique CL encodes the shape of the counting unit. This is the case for the b-forms of (63), (64), and (65). We have also just seen in 5.2 that the higher CL denotes the counting unit. We now see that when an N-CL compound is preceded by the CL *ge*, it is the compound-internal CL that denotes the shape of the counting unit.

Second, *ge* as the higher CL has no effect on the s-selection of the verb that takes the counting construction as its argument. In (66a), the CL *juan*, which denotes a unit in a roll-shape, satisfies the s-selection of the complex verb *ya-bian* ‘press-flat’, whereas the CL *pian*, which denotes a unit in a
flat shape, does not. In (66b), although the higher CL is ge, we see the same s-selection pattern. In this example, the selection is satisfied by the lower CL, a non-local element. The examples in (67) show the same point.

(66) a. Daiyu ya-bian-le yi xiao {*pian/juan} zhi.
   Daiyu press-flat-PRF one small CL/CL paper
   ‘Daiyu pressed a small {*piece/roll} of paper flat.’

b. Daiyu ya-bian-le yi ge xiao zhi-{*pian/juan}.
   Daiyu press-flat-PRF one CL small paper-CL/CL
   ‘Daiyu pressed a small {*piece/roll} of paper flat.’

(67) a. Lu-shang ji-le yi {*di/tan} shui.
   road-on accumulate-PRF one CL/CL water
   ‘A {*drop/puddle} of water has accumulated on the road.’

b. Lu-shang ji-le yi ge shui-{*di/tan}.
   road-on accumulate-PRF one CL water-CL/CL
   ‘A {*drop/puddle} of water has accumulated on the road.’

Therefore, the higher CL ge has no semantic function, behaving like a place-holder.

6.2 The CL copying constructions

If the higher CL has the same form as a collective CL, it is also semantically vacuous. For instance, if it is a copy of a collective CL, it does not behave like a collective CL. This can be seen in three aspects.

First, the higher copy of a collective CL allows a reading correlation
between the construction in which an adjective precedes the higher CL and the construction in which the same adjective follows the higher CL. In (68a) the adjective *da* ‘big’ follows the higher CL *qun*, whereas in (68b), the same adjective precedes the higher CL *qun*. The two examples mean the same.

(68) a. san qun da yang-qun  
    three CL big sheep-CL
    ‘three big flocks of sheep’ = ‘three big flocks of sheep’

This is similar to the semantic correlation between (69a) and (69b), discussed in 3.2.2. Crucially, the CLs in (68) are collective and the ones in (69) are individual. Also, the correlation is seen in the N-CL construction in (70), where the CL *kuai* is not a collective CL.

(69) a. san tou da niu  
    three CL big cow
    ‘three big cows’ = ‘three big cows’

(70) a. san kuai da bing-kuai  
    three CL big ice-CL
    ‘three big ice chunks’ = ‘three big ice chunks’

For a real collective CL, such a correlation does not exist (3.2.2):

(71) a. san qun da yang  
    three CL big sheep
    ‘three flocks of big sheep’ ≠ ‘three big flocks of sheep’
Thus, the higher copy of a collective CL does not behave like a collective CL.

Second, if the higher CL is a copy of the lower collective CL, the left-peripheral modifier may not be incompatible with the modifier of the compound. In (72b), the left-peripheral modifier is dada ‘big’, which is in conflict with the adjective preceding the compound, xiao ‘small’. This example is not acceptable. This is in contrast to the constructions in which there is only one collective CL, as in (73).

(72) a. san qun yang-qun  b. *dada de san qun xiao yang-qun
    three CL sheep-CL   big de three CL small sheep-CL
    ‘three flocks of sheep’

(73) a. san qun yang           b. dada de san qun xiao yang
    three CL sheep               big de three CL small sheep
    ‘three flocks of sheep’    ‘three big flocks of small sheep’

The acceptability contrast between (72b) and (73b) also indicates that there is no evidence for grouping the numeral with the higher CL if it is a copy of the lower one. Such a construction is thus always right-branching. The dependency between the modifier of the higher CL and that of the lower CL in (68) and (70) also indicates that the former c-commands the latter, and thus the structure of the whole counting contraction must be right-branching, patterning with that of individual or individuating CL construction (Chapter 3).

Third, if the higher CL is a copy of the lower one, dimension modifiers
may either precede the CL, or next to the N-CL compound, as seen in (68a) and (68b), but not in both positions. In (74a), there are two dimension modifiers, but the higher CL \textit{dui} is not a copy of the lower CL \textit{pian}. In (74b), there are also two dimension modifiers, \textit{chang} ‘long’ and \textit{cu} ‘thick’, but there is only one CL, \textit{tiao}. Similarly, in (74c), the unique CL \textit{qun} has a dimension modifier, \textit{da} ‘big’, and the simple noun \textit{yang} ‘sheep’ also has one, \textit{xiao} ‘small’. In (74d), there are two modifiers, \textit{da} ‘big’ and \textit{ baise} ‘white’ and two CLs, but \textit{ baise} is not a dimension modifier. All of these examples are fine.

(74) a. san da dui xiao mu-pian b. san chang tiao cu xianglian
    three big CL small wood-CL three long CL thick necklace
    ‘three big piles of small wood-pieces’ ‘three long and thick necklaces’
  c. san da qun \{xiao/da\} yang d. san da qun baise de yang-qun
    three big CL small/big sheep three big CL white de sheep-CL
    ‘three big flocks of small sheep’ ‘three big flocks of white sheep’

In (75), however, the two CLs have the same form, \textit{qun}, and both the higher CL and the compound have a dimension modifier. The example is not acceptable, regardless of whether the two modifiers are identical or not.

(75) *san da qun \{xiao/da\} yang-qun
    three big CL small/big sheep-CL

The constraint seen in (75) indicates that if the higher CL is a copy of the lower one, it cannot have a dimension modifier independent of that of
the compound. Comparing this example with (74d), we generalize that in a CL copying construction, only one dimension modifier is allowed. We have seen the identical meaning of (68a) and (68b) before. The position of a dimension modifier in a CL copying construction is free. Thus, it is plausible to assume that in (74d), the unique dimension modifier \textit{da} ‘big’ is actually in construal with the lower CL, although it precedes the higher CL. In other words, if the higher CL is a copy of the lower one, it is not modifiable. The higher CL has no independent semantics to host an independent modifier. If so, such a CL must be semantically defective.

### 6.3 The alternation possibility

The above two subsections show that if the higher CL is \textit{ge} or a copy of the lower one, it has no semantics, behaving like a place-holder. In this subsection, we provide further evidence for the place-holder status of such CLs.

In (76), the forms in the three columns mean the same for each row. The higher CL is \textit{ge} in column A, and a copy of the lower CL in column B. The forms in column C have only one CL each.

\begin{verbatim}
(76)  A      B      C
a. san ge shui-di  san di shui-di  san di shui [individuating CL]  
   three CL water-CL three CL water-CL three CL water  
   A/B/C: ‘three water-drops’

b. san ge hua-duo  san duo hua-duo  san duo hua  [individual CL]
   three CL flower-CL three CL flower-CL three CL flower  
   A/B/C: ‘three flowers’
\end{verbatim}
c. san ge luobo-pian san pian luobo-pian san pian luobo \[partitive CL\]
three CL carrot-CL three CL carrot-CL three CL carrot
A/B/C: ‘three carrot-slices’
d. san ge yang-qun san qun yang-qun san qun yang \[collective CL\]
three CL sheep-CL three CL sheep-CL three CL sheep
A/B/C: ‘three flocks of sheep’
e. san ge shu-zhong san zhong shu-zhong san zhong shu \[kind CL\]
three CL tree-type three CL tree-type three CL tree
A/B/C: ‘three kinds of trees’

The alternation between the forms in column A and the forms in column B is always possible. If the higher CLs in both columns are semantically vacuous, the alternation is expected.

Moreover, either group may always be changed into the corresponding simple forms in column C. If the higher CLs in column A and column B are all place-holders, this possibility of change is also expected. The semantics of a place-holder construction can be expressed by a construction without the place-holder.\(^5\)

The alternation among the three constructions is not found in other kinds of compounds, such as xizhao-jian ‘bath-room’, you-tiao ‘oil-stick \(=>\) a kind of fried food’, ruan-jian ‘soft-ware’ and jiu-bei ‘wine-cup’. For instance,

\(^5\) The change in the opposite direction is not always possible. Not all single CL constructions may be changed into a double CL construction, due to the gap mentioned in 3.1 before. For instance, (ia) may not be changed into either (ib) or (ic).

three CL wall three CL wall-CL three CL wall-CL
‘three walls’
the CL ge in (77a) may not be replaced by a copy of the second morpheme of the compound, as in (77b); and (77a) has a different reading from (77c).

(77) a. san ge jiu-bei ≠ b. *san bei jiu-bei c. san bei jiu

three CL wine-cup three cup wine-cup three cup wine

‘three wine-cups’ ‘three cups of wine’

The contrast between the possible alternation of N-CL compound constructions and the impossible parallel alternation of other types of compounds supports a syntactic analysis of N-CL compounds.

6.4 The significance of place-holder CLs

I have shown that if the higher CL is ge or a copy of the lower one, it is a place-holder. We have seen that in (76), a place-holder CL may occur with all possible types of CLs. This consistency indicates that the occurrence of place-holder CLs is systematic in the language.

Place-holders are semantically vacuous. The possibility to have a place-holder shows that the presence of a post-numeral CL in Chinese is a syntactic issue. It further falsifies the assumption that the existence of classifiers is caused by the alleged mass status of nouns in the language.

Moreover, the possibility to have a place-holder to occur in the position of a regular CL means the position must be a functional head position. If the syntactic position for a CL that occurs between a numeral and a nominal is Unit, we now see that Unit can be realized by a place-holder.
A well-known place-holder of a functional head position is the English auxiliary *do*, which occurs in a clausal structure. The discovery of the place-holders in nominal constructions supports the cross-categorial symmetry in syntax (Chomsky 1970).

7. Syntactic representations of N-CL counting constructions

7.1 The constructions without a place-holder CL

According to our conclusion reached in 4.1, the lower CL, if it is not a kind CL, is a realization of Dmsn. In order to derive a possible N-CL compound, I claim that the N head of an NP moves to the head of DmsnP. The derivation of (78a) is (78b):

\[
\begin{align*}
(78) & \text{a. da bing-kuai} \\
& \text{big ice-CL} \\
& \text{‘big ice-chunk’} \\
& \text{b.} \\
& \text{DmsnP} \\
& \text{da} \\
& \text{big} \\
& \text{Dmsn'} \\
& \text{Dmsn} \\
& \text{NP} \\
& \text{kuai} \\
& \text{CL} \\
& \text{bing} \\
& \text{ice}
\end{align*}
\]
Since the NP lands to the left of the lower CL, the latter always shows up at the right-edge of the compound. This captures the position consistency of the lower CL, mentioned in 2.1.

After the N-to-Dmsn movement, the noun alone may not have a syntactic dependency with another element anymore. The N-CL *hua-duo* ‘flower-CL’ in (79a) is derived by the raising of *hua* at N to *duo* at Dmsn. After the raising, *hua* alone may not be related to the topic *hua* at the sentence-initial position, as shown in (79b). However, the whole compound *hua-duo* may be topicalized, as seen in (79c). The topicalization in (79c) is parallel to that in (80b), where the noun *hua* ‘flower’ alone does not undergo any head movement. The restriction follows the well-recognized constraint on head movement, which Platzack (2010, 8) formalizes as “If a head $\beta$ moves to $\alpha$, the $\{\alpha + \beta\}$ acts as one constituent.” Of course, the effect of this constraint is the same effect as that of the traditional Lexical Integrity (e.g., Di Sciullo & Williams 1987).

(79) a. Shufen mai-le san ge hua-duo.  
Shufen buy-PRF three CL flower-CL  
‘Shufen bought three flowers.’

b. *Hua, Shufen mai-le san ge <hua>-duo.  
flower Shufen buy-PRF three CL flower-CL

c. Hua-duo, Shufen mai-le san ge <hua-duo>.  
flower Shufen buy-PRF three CL flower-CL  
‘Flowers, Shufen bought three.’

(80) a. Shufen mai-le san ge hua.  b. Hua, Shufen mai-le san ge.  
Shufen buy-PRF three CL flower  
flower Shufen buy-PRF three CL  
‘Shufen bought three flowers.’  ‘Flowers, Shufen bought three.’
If the lower CL is a kind CL, since it does not project a dimensionality feature, it is base-generated simply at N, instead of Dmsn. Presumably, (81a), for instance, is derived by a direct merger of two N roots, as illustrated in (81b) (This is an overt version of the NP of the last tree of 4.5.1). As we discussed in 2.2, the kind meaning of the kind CL is projected to the whole compound.

(81) a. shu-zhong
   tree-CL
   ‘tree types’

b. 
   N
   N
   N
   shu zhong
   tree CL

Now let us see the structure of a counting construction that contains an N-CL compound. We have argued that the higher CL heads UnitP and the lower one, if it is not a kind CL, heads DmsnP. It is possible that both the higher CL and the compound each have a dimensional adjective, as seen in (82a). The derivation of (82a) is (82b). Note that the two CLs are different in this example and the higher one is not ge. Thus there is no place-holder in the structure. The higher CL is the counting unit.

(82) a. san chang tiao bo mu-pian
   three long CL thin wood-CL
   ‘three long and thin wood pieces’
If the higher CL is a collective CL, as we argued in Chapter 3, the construction has a left-branching structure. (83b) is the structure of (83a).

(83) a. liang da dui xiao mu-tiao  
    two big CL small wood-CL  
    ‘two big piles of small wood strips’
7.2 The constructions with a place-holder CL

We have claimed in 5 that if the higher CL is ge, it is a place-holder of Unit, and it always alternates with a copy of the lower CL. In (84a), ge may alternate with kuai. The structure of (84a) is (84b).

\[(84)\ a. \ wu \{ge/kuai\} \ da \ bing-kuai \\
\hspace{1cm} \text{five CL/CL} \quad \text{big ice-CL} \\
\hspace{1cm} \text{‘five big ice-chunks’} \]
Recall that constructions of collective CLs have a left-branching structure, and the constructions of individual CLs have a right-branching structure (Chapter 3). In 6.2 above, we conclude that if the higher CL is a copy of a collective CL, the structure of the whole counting construction is right-branching. (85b) is the structure of (85a), where no place-holder occurs, whereas (86b) is the structure of (86a) (= (72a)), in which the higher CL is a place-holder.

(85) a. san qun yang
    three CL sheep
    ‘three groups of sheep’
(86) a. san qun yang-qun
    three CL sheep-CL
    ‘three groups of sheep’

b. 

```
   RP
     ┌─ QunatP
     │   R'
     │   ┌── san
     │   │   Quant' R NP
     │   │   └── yang
     │   └── Quant UnitP sheep
     │       ┌── <san>
     │       │   Unit'
     │       │       Unit NP
     │       │       └── qun
     │       │           ┌── <qun>
     │       │           │   group
     │       └── quant
     └── three
```
Since constructions with a place-holder CL have a consistent right-branching structure, we see the similarity in configuration between (86b) and (84b). The consistent right-branching structures are expected if place-holders must c-command their associates. Thus, a place-holder CL must c-command the lower CL.

The above structures capture the fact that CLs display different syntactic properties in different contexts. In addition to three possible functional head positions for CLs, Unit, Num, and Dmsn, the structures may also vary with the status of the higher CL. If a CL is a place-holder, the structure of the counting construction can be different from that of the corresponding construction in which the same CL is not a place-holder.

8. Conclusion

In this paper, I have shown that even for a nominal that has an internal element to denote unit, another unit word is still required to link the nominal to a numeral in Chinese. Thus the presence of a post-numeral CL in Chinese is clearly syntactic, rather than semantic.

I have also shown how the presence of a lower CL decides the dimensionality of the compound on the one hand, and the presence of the unit word does not make a non-count nominal be a count nominal, on the other hand. These two properties have led us to see that a lower CL is a realization of Dmsn, rather than Unit. Therefore, in addition to Unit and Num, the two syntactic positions identified before, there is a third functional
position for CLs: Dmsn.

I have also shown that if the higher CL is ge or a copy of the lower CL, it is a place-holder of Unit, without semantic contents. In this case, the structure of the construction may be different from that of the corresponding construction in which the same CL is not a place-holder. N-CL constructions have thus led us to see more about the syntactic nature of CLs, the syntactic positions of various types of CLs, and the cross-categorial availability of place-holders for functional heads.