

# 本文章已註冊DOI數位物件識別碼

## ► The Constituency of Classifier Constructions in Mandarin Chinese

漢語單位詞結構的句法成分分析

doi:10.6519/TJL.2011.9(1).1

Taiwan Journal of Linguistics, 9(1), 2011

臺灣語言學期刊, 9(1), 2011

作者/Author: 張寧(Nina-Ning Zhang)

頁數/Page: 1-49

出版日期/Publication Date: 2011/03

引用本篇文獻時，請提供DOI資訊，並透過DOI永久網址取得最正確的書目資訊。

To cite this Article, please include the DOI name in your reference data.

請使用本篇文獻DOI永久網址進行連結:

To link to this Article:

[http://dx.doi.org/10.6519/TJL.2011.9\(1\).1](http://dx.doi.org/10.6519/TJL.2011.9(1).1)



DOI Enhanced

DOI是數位物件識別碼（Digital Object Identifier, DOI）的簡稱，是這篇文章在網路上的唯一識別碼，用於永久連結及引用該篇文章。

若想得知更多DOI使用資訊，

請參考 <http://doi.airiti.com>

For more information,

Please see: <http://doi.airiti.com>

請往下捲動至下一頁，開始閱讀本篇文獻

PLEASE SCROLL DOWN FOR ARTICLE



THE CONSTITUENCY OF CLASSIFIER CONSTRUCTIONS IN  
MANDARIN CHINESE\*

Niina Ning Zhang

## ABSTRACT

This paper examines the constituency of the construction that contains three elements: a numeral, a word that encodes a counting unit, such as a classifier or measure word, and a noun in Mandarin Chinese. It identifies three structures: a left-branching structure for container measures, standard measures, partitive classifiers, and collective classifiers; a right-branching structure for individual and individuating classifiers; and a structure in which no two of the three elements form a constituent, for kind classifiers. The identification is based on the investigation of four issues: <i> the scope of a left-peripheral modifier; <ii> the dependency between the modifier of unit word and that of a noun; <iii> the complement and predicate status of the combination of a numeral and a unit word; <iv> the semantic selection relation between a unit word and a noun. The paper also shows that the co-occurrence of a numeral and a unit word and the position of certain partitive markers are not reliable in identifying syntactic constituents. It also argues against quantity-individual semantic mappings with different syntactic structures. Finally, the paper presents a comparative deletion analysis of the constructions in which the functional word *de* follows a unit word.

Key words: classifier, measure, constituent, left-branching, right-branching, Chinese

---

\* The main arguments of this paper were presented at the 7th Workshop on Formal Syntax & Semantics (FOSS-7), Taipei, April 23-25, 2010. I am grateful to the audience of the workshop. I also thank the reviewers and the editors of *Journal of Taiwan Linguistics* for their comments. I am responsible for remaining errors. This research is supported by grants from the National Science Council, Taiwan.

## 1. INTRODUCTION

This paper studies one of the most fundamental issues in the study of the syntactic structures of classifier and measure word constructions in Mandarin Chinese: their constituency. Such constructions contain three basic elements, i.e., a numeral, such as *san* ‘three’ in (1), a noun, such as *putao* ‘grape’ in (1), and a unit word between them, such as the classifier (CL) *ke* in (1a), the standard measure *gongjin* ‘kilo’ in (1b), or the container measure *wan* ‘bowl’ in (1c). I call such a construction a counting construction.

- (1) a. *san ke putao*  
       three CL grape  
       ‘three grapes’  
       b. *san gongjin putao*  
       three kilo grape  
       ‘three kilos of grapes’  
       c. *san wan putao*  
       three bowl grape  
       ‘three bowls of grapes’

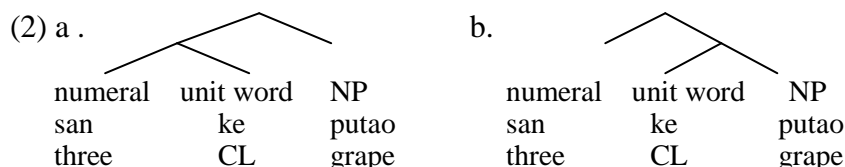
The occurrence of a unit word is licensed by the occurrence of the other two elements. One basic question is, among the three elements, whether any two of them form a constituent. In other words, is the structure of a counting construction left-branching or right-branching?

Greenberg (1990 [1975]: 227) states:

“There are many indications that in the tripartite construction consisting of quantifier (Q) [= numeral], classifier (Cl), and head noun (N), Q is in direct construction with Cl and this complex construction, which will be called the classifier phrase, is in turn in construction with N.”

Similarly, Li & Thompson (1981: 105), Paris (1981: 105-117), Tang (1990a), Croft (1994: 151), Lin (1997: 419), and Hsieh (2008) have all proposed a unified left-branching structure, in which the numeral and the unit word form a constituent, excluding the noun, as in (2a). In contrast, Tang (1990b: 413, 2005) and Cheng & Sybesma (1998, 1999), among others, have proposed a unified right-branching structure, in which a unit

word and the noun form a constituent first, excluding the numeral, as in (2b).



In contrast to both schools, X. P. Li (2010) proposes that both a left- and a right-branching structure are possible, and that the former is mapped to a quantity or measure reading, and the latter is mapped to an individual or counting reading. For instance, *liang ping jiu* ‘two bottle wine’ has a pure quantity reading in (3a), but an individual reading in (3b). It is claimed that (3a) has a structure like (2a), and that (3b) has a structure like (2b).

- (3) a. ta-de wei            neng zhuangxia liang ping jiu.  
          his stomach can contain two bottle wine  
          ‘His stomach can contain two bottles of wine.’  
      b. Ta ling-le liang ping jiu, zuo-shou yi ping,  
          he lift-PRF two bottle wine left-hand one bottle  
          you-shou yi ping.  
          right-hand one bottle  
          ‘He carried two bottles of wine, one in the left hand and  
          the other in the right hand.’

Although not many arguments have been proposed for any of the above three approaches, I will examine all of those that I have found.

In order to investigate whether different types of unit words show different patterns of constituency, we need to check all types of such words. I list the types in my study in (4). I list the terms that appear in Chao (1968) in the last column.<sup>1</sup>

<sup>1</sup> I put aside other types of “measures” in Chao (1968) as they are not unit words of nominals.

(4)

My Term	Example	Description	Chao's Term
Standard measure <sup>2</sup>	a. shi <u>gongjin</u> luobo ten kilo carrot 'ten kilos of carrots'	Unit of the dimensions such as length, area, volume, weight	Standard measure (p. 604)
Container measure	b. shi <u>xiang</u> luobo ten box carrot 'ten boxes of carrots'	Unit of capacity dimension, in the form of a container	Container measure (p. 601)
Individual CL	c. shi <u>gen</u> luobo ten CL carrot 'ten carrots'	Unit that represents the natural unit of non-mass elements	Individual measure (p. 503)
Individuating CL	d. shi <u>dui</u> tu ten CL earth 'ten piles of earth'	Unit that occurs with a mass noun (e.g., Croft 1994: 162)	Partitive measure (p. 599)
Collective CL	e. shi <u>dui</u> luobo ten CL carrot 'ten piles of carrots'	Unit for counting groups of non-mass elements	Group measure (p. 595)
Partitive CL <sup>3</sup>	f. shi <u>pian</u> luobo ten CL carrot 'ten slices of carrot'	Unit for counting parts of a non-mass element	Partitive measure (p. 600)
Kind CL	g. shi <u>zhong</u> luobo ten CL carrot 'ten types of carrot'	Unit for counting types of elements	Group measure (p. 597)

In this table, the term “mass element” means stuff or matter, which shows no natural atomicity, and is encoded as a mass noun. The term “non-mass element” means an element that shows natural atomicity. Such an element is encoded as a non-mass noun. For an extensive discussion of the defining properties of countability and their realization

<sup>2</sup> Other than the well-recognized standard measures such as *gongjin* ‘kilo’, the words *nian* ‘year’, *yue* ‘month’, and *ri* ‘day’ may be ambiguous between unit words and regular nouns (J. Tang 2005: 457). See S. Tang (2010) for a recent research on this issue.

<sup>3</sup> Partitive CL is a different term from partitive construction (e.g. Fodor & Sag 1982, Jackendoff 1977). The latter denotes a part-whole relation within a definite domain (e.g., *three kilos of the tea*), whereas pseudo-partitive constructions denote the quantity of entities (e.g., *three kilos of tea*). The counting constructions discussed here, including those contain a partitive CL, are all pseudo-partitive constructions.

in Mandarin Chinese, see Zhang (2010b), among others.

Following Chao (1968), I separate individual CLs from other types of unit words. This type of CL represents the natural unit of non-mass elements, as in (4c). They do not divide or individualize anything. However, individuating CLs, as in (4d), on the other hand, 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).

Keeping the difference between mass and non-mass nouns in mind, I separate partitive CLs, as in (4f), from individuating CLs, as in (4d), although both are called “partitive measures” in Chao (1968). The former occur with non-mass nouns, whereas the latter occur with mass nouns. I also divide kind CLs, as in (4g), from collective CLs, as in (4e), although both are called “group measures” in Chao (1968). The former denotes kind units, and is blind to the distinction between mass and non-mass nouns, whereas the latter does not denote kind units and is used for non-mass nouns only.

In my study, the same form of a word can belong to different types of unit word, depending on the type of the associated noun, and the semantic function of the unit. In (4d), the CL *dui* occurs with the mass noun *tu* ‘earth’, and it is thus an individuating CL. However, in (4e), *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’, it denotes a part of a carrot and thus it is a partitive CL, as seen in (4f). But when it occurs with *shuye* ‘leaf’, as in (5a) 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 *mutou* ‘wood’, as in (5b), it apportions the mass of wood, therefore it is an individuating CL. The two examples of the CL *duo* in (6) show the same point.

- (5) a. san pian shuye [Individual CL]  
       three CL leaf  
       ‘three leafs’  
       b. san pian mutou [Individuating CL]  
       three CL wood  
       ‘three pieces of wood’

- (6) 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 my study, I do not consider words that may not be preceded by any numeral other than *yi* ‘one’, such as those in (7) (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’, whereas no real numeral can be replaced by *man*. The element following such use of *yi* is analyzed as a noun in B. Li (2009).

- (7) a. {yi/\*san} shen nitu  
       one/three body mud  
       ‘a body (covered all over in) mud’  
       b. {yi/\*san} lian you  
       one/three face oil  
       ‘a face (covered all over in) oil’

I will make a proposal that the seven types of unit words exhibit three patterns of constituency. First, constructions of container measures, standard measures, partitive CLs, and collective CLs have a left-branching structure, as in (2a). Second, constructions of individual and individuating CLs have a right-branching structure, as in (2b). Third, in constructions of kind CLs, there is no evidence to show that any two of the three elements form a constituent. I will present several arguments to support my proposal.

In addition to this introduction section and the final summary section (Section 6), the organization of the paper is the following. Section 2 presents four arguments for a non-unified analysis of the constituency of counting constructions, and makes the proposal that there are three possible structures. Section 3 discusses three invalid arguments in the constituency study. Section 4 discusses the semantic mappings of the syntactic structures. Finally, Section 5 discusses the occurrence of the functional word *de* with a counting construction, with respect to the proposed constituency.

**2. FOUR ARGUMENTS FOR THE NON-UNIFIED ANALYSIS**

Unit words do not behave the same syntactically. In this section, I present some differences, and link the differences to the different structures of the various counting constructions.

**2.1 The Scope of a Left-peripheral Modifier**

Two incompatible modifiers may co-occur if they scope over different constituents. In each of the examples in (8) and (9), two incompatible modifiers co-occur:

- (8) a. dada de yi wan xiao yingtao  
big DE one bowl small cherry  
'a big bowl of small cherries'  
b. fangfangzhengzheng de yi bao sanjiao binggan  
square DE one package triangle cookie  
'a square package of triangle cookies'  
c. yuanyuan de yi guan fang-tang  
round DE one can square-sugar  
'a round can of sugar cubes'  
d. hen da de yi zhuo xiao keren  
very big DE one table small guest  
'a very big table with small guests sitting at it'
- (9) a. dada de yi dui xiao yingtao  
big DE one pile small cherry  
'a big pile of small cherries'  
b. hen chang de yi pai chao-duan de xiao qiche  
very long DE one row super-short DE small car  
'a very long row of super-short small cars'

The acceptability of this type of data indicates that the scope of the left-peripheral modifier excludes the NP, which has its own modifier. This fact shows that the two modification domains belong to two different constituents, and that the first constituent is composed of a numeral and a unit word. Putting categorial labels of the constituent nodes aside, among the three structures in (10) (Mod = modifier), only (10a) can capture the fact that the left modifier does not scope over the



(10) a.   
 b.   
 c.

(11) a. \*[dada de] yi li xiao yingtao [Individual CL]  
           big DE one CL small cherry  
       b. \*hen da de yi di xiao shui [Individuating CL]  
           very big DE one CL small water  
       c. \*hen da de yi pian xiao {xiangjiao/juzi} [Partitive CL]  
           very big DE one CL small banana/orange  
       d. \*hen zhong de yi gongjin qing muliao  
           very heavy DE one kilo light wood  
   [Standard measure]  
       e. \*hen da de yi zhong xiao yu [Kind CL]  
           very big DE one kind small fish

<sup>4</sup> Note that although constructions of collective CLs allow incompatible modifiers, as shown in (9), the example in (i), which looks like a collective CL construction, does not. In such a CL copying construction, the first CL can be replaced by the individual CL *ge*, and thus it is not a real collective CL.

It is necessary to clarify that the occurrence of the left-peripheral modifier cannot be the result of movement from a position between the numeral and the unit word. This is because the modifier must be followed by *de*, which means that it must be phrasal (e.g., C. R. Huang 1989, Tang 1990b: 420), however, no unit word may be modified by a phrase in Mandarin Chinese (Tang 1990b: 418). If a phrase moves from a non-phrase position, the movement will violate the Structure-Preserving Constraint (Emonds 1970).

- (12) \*yi [ dada de] wan xiao yingtao  
           one big DE bowl small cherry

My conclusion to this subsection is that container measure and collective CL constructions have a left-branching structure, in which the numeral and the unit word form a constituent, excluding the noun.

## 2.2 Syntactic Dependency of Modifiers

A shape modifier of a noun can occur as a modifier of an individual CL (Zhu 1982: 52). In (13a), the adjective *chang* ‘long’ occurs to the left of the CL *tiao*, and the noun is *xianglian* ‘necklace’. The same adjective may occur to the left of *xianglian* in (13a’). The meaning of the two counting constructions is the same, regardless of the position of the adjective. Other examples in (13) show the same pattern.<sup>5</sup>

- (13) a. yi chang tiao xianglian = a’. yi tiao chang xianglian  
           One long CL necklace           one CL long necklace  
           Both: ‘one long necklace’  
       b. yi bo pian shuye                   = b’. yi pian bo shuye  
           one thin CL leaf                   one CL thin leaf  
           Both: ‘one thin leaf’

- 
- (i) 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 groups of sheep’

<sup>5</sup> Examples in (13) and other examples in Tang (2005: 446) are counter-examples to the claim that individual CLs may not be modified by adjectives (Cheng & Sybesma 1998: 390, 1999: 516) and also to the claim that if a unit word is modified, the associated noun must denote mass (Cheng 2009: 3).

- 10

- (15) a. yi da di shui      ≠ b. \*yi di da shui  
          one big CL water                      one CL big water  
          ‘a big drop of water’

[Individuating CL]

My conclusion to this subsection is that individual CL constructions have a right-branching structure and container measure or collective CL constructions have a left-branching structure.

### 2.3 The Complement and Predicate Status

The combination of a numeral and a standard measure, or a container measure, or a partitive CL, can be the complement or predicate of a dimension-denoting element. In (16a), in the attributive expression introduced by *de* to the left of the noun *gunzi* ‘stick’, *chang* ‘long, length’ takes *san cun* ‘three inch’ as its complement. Similarly, in (16b), *zhong* ‘heavy, weight’ takes *san liang* ‘three *liang*’ as its complement (1 *liang* = 50 grams). Other examples in (17) and (18) also illustrate this complement function of the combination of a numeral and a unit word.

- (16) a. [[san cun] chang] de gunzi  
          three inch long DE stick  
          ‘a stick that is three inches long’  
       b. [[san liang] zhong] de danjieshi  
          three liang heavy DE gallstone  
          ‘a gallstone that is two liang heavy’
- (17) a. [[san ping] rongliang] de jiujiing  
          three bottle capacity DE alcohol  
          ‘three bottles of alcohol’  
       b. [[san bei] rongliang] de mianfen  
          three cup capacity DE flour  
          ‘three cups of flour’
- (18) a. [[san duan] chang] de kewen  
          three paragraph long DE text  
          ‘three paragraphs of text’

- b. [[san ceng] gao] de loufang  
 three floor high DE building  
 ‘a building that has three floors’

In contrast, the combination of a numeral and an individual CL may not have such a function, as seen in (19). In (19a), for example, *chang* ‘long’ takes *san gen kuaizi* ‘three CL chopstick’ as its complement. In the absence of the word *kuaizi* ‘chopstick’, the string *san gen* ‘three CL’ alone may not function as a complement (note: in the intended readings of all of the examples in this subsection, the dimension word does not modify the noun to its right).

- (19) a. [san gen \*(kuaizi) chang] de gunzi  
 three CL chopstick long DE stick  
 ‘a stick that is as long as three chopsticks’  
 b. [yi ge \*(jidan) da] de danjieshi  
 one CL egg big DE gallstone  
 ‘a gallstone that is as big as an egg’

The contrast is seen not only in attributive expressions, but also in the so-called double subject constructions such as (20) (see Zhang 2009 for the syntax of the construction), and comparative constructions such as (21). In (20a), *liang mi* ‘two meter’ is the predicate of *chang* ‘length’. If we replace the standard measure *mi* ‘meter’ with the individual CL *zhang*, the sentence becomes unacceptable, as seen in (20b). The comparative constructions in (21) show a similar contrast.

- (20) a. Na zhang zhuzi [chang liang mi].  
 that CL table long two meter  
 b. \*Na ge zhuzi [chang liang zhang].  
 that CL table long two CL  
 ‘That table is two meters long.’

- (21) a. Baoyu bi Daiyu [gao san cun]  
 Baoyu than Daiyu tall three inch  
 b. \*Baoyu bi Daiyu [gao san gen].  
 Baoyu than Daiyu tall three CL  
 ‘Baoyu is three inches taller than Daiyu.’

Since only a constituent can be a complement, the acceptable examples in (16) through (18), (20a), and (21a) are a clear indication that the combination of the numeral and the unit word is a syntactic constituent. The impossibility for the combination of the numeral and the individual CL to function as a complement in (19), (20b), and (21b) fails to support the constituent status of the combination.

Other types of CLs behave like individual CLs in this aspect. The examples in (22) all show that the combination of a numeral and a CL may not be the complement of the dimension word *da* ‘big’.

- |         |                            |    |                          |
|---------|----------------------------|----|--------------------------|
|         | [individuating CL]         |    | [collective CL]          |
| (22) a. | *[san di da] de shui       | b. | *[san dui da] de juzi    |
|         | three CL big DE water      |    | three pile big DE orange |
|         | [kind CL]                  |    |                          |
|         | c. *[san zhong da] de juzi |    |                          |
|         | three kind big DE orange   |    |                          |

My conclusion to this subsection is that standard measure, container measure, and partitive CL constructions have a left-branching structure, in which the numeral and the unit word form a constituent, excluding the noun.

#### 2.4 Semantic Selection

It is well-known that there may be a semantic selection relation between a CL and the associated noun. Selection means that syntagmatically “certain forms arbitrarily behave alike in one way and certain others behave alike in another” (Chao 1968: 6; also see Bloomfield 1933: 164-165). A recent discussion of the selection of CLs is seen in Wu & Bodomo (2009: 488). In (23a), for instance, the individual CL *pi* may occur with *ma* ‘horse’, but not with *zhu* ‘pig’.

- (23) a. san pi {ma/\*zhu}  
           three CL horse/pig  
       b. san zhan {deng/\*lazu}  
           three CL lamp/candle  
       c. san sou {chuan/\*feiji}  
           three CL ship/plane

Semantic selection is also found in individuating CLs, which occur with mass nouns. In (24a), the individuating CL *ji* (劑) may occur with *yao-shui* ‘medicine-liquid’, but not with *ji-tang* ‘chicken-soup’ (contra Chao 1968: 508 “Mass nouns do not have specific classifiers”; also p. 503; Krifka 2008: Sec. 2).

- Unlike individual and individuating CLs, other types of unit words do not show selectional restrictions on nouns. In (25a), the container measure *chexiang* ‘cattle-car (of a train)’ is blind to the semantic distinction between *ma* ‘horse’ and *zhu* ‘pig’. The lack of selectional restriction is also seen in the examples of the standard measure in (26), the collective CLs in (27), the partitive CL in (28), and the kind CL in (29).

- 14

- b. yi pian {qiche/mayi}  
 one CL car/ant  
 ‘one big area of cars/ants’
- (28) yi pian {xigua/huluobo/juzi} [Partitive CL]  
 one CL watermelon/carrot/orange  
 ‘a slice of watermelon/carrot/orange’
- (29) san zhong {yao-shui/shu} [Kind CL]  
 three kind medicine-liquid/book  
 ‘three kinds of medicine-liquid/books’

Long & Ma (2008) claim that standard measures never occur with animate nouns. But this constraint simply reflects our world knowledge, since we usually do not measure animate entities with standard measures. Thus it is a pragmatic constraint, rather than s-selectional restriction. If a proper context is found, the constraint disappears. Imagine if the total weight of certain students is 550 kgs, the following sentence is then natural:

- (30) Zhuangzai-zhe 550 gongjin xuesheng de na ge qiqiu  
 load-PRG 550 kg student DE that CL balloon  
 manman de sheng-qilai le.  
 slow DE rise-up PRT  
 ‘The balloon that has 550 kg students with it is rising up slowly.’

Therefore, a semantic selection is found between an individual or individuating CL and its associated noun, but not between a unit word of other types and its associated noun.

Selection relation must be represented in a local syntactic relation, i.e., the two elements that exhibit the relation must form a constituent, excluding other elements. The right-branching structure can capture the semantic relation, since the unit word and the noun form a constituent, whereas the left-branching structure does not capture the relation, since the unit word and the noun do not form a constituent.

In Hsieh (2008:47 fn. 15), a unified left-branching structure is proposed. In order to explain the semantic selection between an individual CL and a noun, a feature-percolating theory is mentioned. However, since the CL in the assumed left-branching structure does not



c-command the noun, the assumed percolation is hard to maintain.

Based on the semantic selection of a unit word on its associated noun, I conclude that individual and individuating CL constructions have a right-branching structure, in which the unit word and the noun form a constituent, excluding the numeral. However, no parallel selection is found in for other types of unit words, and thus there is no evidence to support this constituency for them.

## 2.5 Three Possible Structures

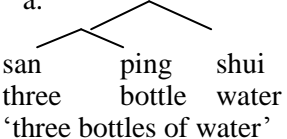
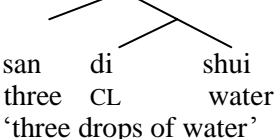
The content of the discussion in this section is summarized in (31).

(31)

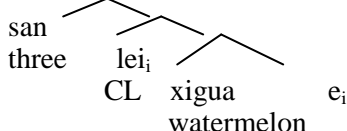
	The combination of a numeral and a unit word as the scope of a modifier => Left-branching	The complement/predicate status of the combination of a numeral and a unit word => Left-branching	Syntactic dependency of modifiers => Right-branching	Semantic selection of a unit word on a noun => Right-branching
Container measure	+	+	-	-
Standard measure	-	+		-
Collective CL	+	-	-	-
Partitive CL	-	+		-
Individual CL	-	-	+	+
Individuating CL	-	-		+
Kind CL	-	-		-

The blank cells and the cells with a negative value in (31) indicate either that the tests do not apply or that the constraints have independent sources. If we consider only the positive values of the four constituency tests, we can conclude that the constructions of the first four classes of unit words (container measures, standard measures, collective CLs, and partitive CLs) have a left-branching structure, in which the numeral and

the unit word form a constituent, excluding the noun, as shown in (32a), and that the constructions of individual and individuating CLs have a right-branching structure, in which the CL and the noun form a constituent, excluding the numeral, as shown in (32b).

- (32) a.  b. 

The remaining class is that of kind CL. The constructions of such CLs do not show evidence of the grouping of any two of the three elements (the numeral, kind CL, and noun) into a constituent. I speculate that (33b) is the structure of (33a). In this structure, no two overt elements form a constituent, and the noun *xigua* 'watermelon' is merged with an empty element which is co-indexed with the kind CL *lei*.

- (33) a. san lei xigua  
three CL watermelon  
'three kinds of watermelon'  
b. 

We can compare the example in (33a) with the following examples derived from an internet search, in which a kind CL is followed by a combination of a noun and another kind CL (in the form of *lei* or *zhong*):

- (34) a. Taiwan te-you [100 zhong niao-lei]  
Taiwan special-have 100 kind bird-kind  
jian-jie  
concise-introduction  
'a concise introduction to 100 kinds of birds that exist only in Taiwan'

- b. renhe liang zhong zhiwu-lei  
 any two kind plant-kind  
 ‘any two kinds of plants’
- c. Bei Taiwan de ren ke fen-wei liang lei  
 north Taiwan DE person can divide-into two kind  
 ren-zhong.  
 person-kind  
 ‘The people in the north of Taiwan can be divided into two types.’

In each example of (34), there is an overt kind CL to the right of the noun. Such data show that the silent *e* in (33b) can have an overt counterpart in other examples.

What is important to my discussion here is that in (33a), the overt kind CL *lei* does not form a constituent with the noun *xigua* ‘watermelon’. In the absence of evidence for an alternative analysis, to capture the properties of kind CLs, (33b) can be a plausible hypothesis.<sup>6</sup>

### 3. THREE INVALID ARGUMENTS

In this section, I falsify three arguments that have been used in the literature to support the syntactic constituency of counting constructions. The arguments relate to the co-occurrence of a numeral and a unit word, the position of certain partitive markers, and the immobility of a numeral-CL string.

#### 3.1 The Co-occurrence of a Numeral and a Unit Word

In CL languages such as Chinese, a numeral and a CL are adjacent. Greenberg (1972) thus claims that the two elements should form a constituent. Similarly, Croft (1994: 151) claims that since a CL and a numeral co-occur, they must form a constituent. Thus a unified

<sup>6</sup> Liao (2008) claims that in a partitive construction, the lower CL must be a kind CL, as in (ia). However, in (ib), the lower CL is an individual CL. Data like (ib) are counter-examples to the claim.

(i) a. san zhi zhe yi zhong gou    b. san pian zhei    ge xigua  
 three CL this one kind dog    three CL this.one CL watermelon  
 ‘three of this kind of dog’    ‘three slices of this watermelon’

left-branching structure for all CL constructions is proposed from this co-occurrence perspective.

This is not an effective argument (contra Wilhelm 2008: 60). In English, an auxiliary (e.g., *have* or *be*) needs to occur with a subject or expletive, but the two elements never form a constituent. Also, as pointed out by Krifka (2008: Sec. 6.3), while the co-occurrence of two elements might lead to a certain morphological combination, this does not mean in itself that the two elements form a syntactic constituent. The combination of a numeral and a CL can be similar to the fusion of a preposition and its following article in French *aux* (= *à les* ‘to the’) and German *beim* (= *bei dem* ‘at the’).

The co-occurrence of two elements can also be a semantic requirement, and thus the two elements do not have to form a syntactic constituent. In counting, a numeral needs to occur with an overt or covert counting unit, and a unit word encodes such a unit (Wilhelm 2008). Therefore, a numeral generally occurs with a unit word, either a CL or a measure word in Mandarin Chinese. A numeral and a CL may also form a phonological phrase. However, as is well-known, phonological phrases are not necessarily isomorphic to syntactic constituents. For instance, the syntactic constituency of (35a) is not reflected in the phonological grouping in (35b) (Jackendoff 1997: 26).

- (35) a. [<sub>DP</sub> a [<sub>NP</sub> [<sub>AP</sub> big] house]]    b. [<sub>φ</sub> [<sub>ω</sub> a big] [<sub>ω</sub> house]]

### 3.2 The Position of Two Partitive Markers

#### 3.2.1 The position of *duo* ‘more’

Lü et al. (1999 [1980]) claim that *duo* ‘more’ may follow a measure word, but not a CL in general (with exceptions; see 3.2.3 below). Wang (1994) uses the occurrence of the post-unit *duo* to distinguish CLs from measure words. In Hsieh (2008: 46), it is assumed that if *duo* follows a unit word, the unit word and its preceding numeral should form a constituent. X. P. Li (2010: 120) uses the same argument to claim that such *duo* constructions have a left-branching structure.

However, the position of *duo* is not an effective argument in judging the constituency of the containing structure, for the following reason.

*Duo* is an additive partitive quantifier, scoping over the single unit-morpheme to its immediate left. The unit morpheme can be a

numeral unit, such as *shi* ‘ten’, *bai* ‘hundred’, *qian* ‘thousand’, etc., or a measure word, or a CL. In (36), for instance, the unit morpheme to the immediate left of *duo* is *shi* ‘ten’, which is the second morpheme of the word *wu-shi* ‘five-ten => 50’. The quantity expressed by this example is 50 plus a part of *shi* ‘ten’. It can be any number between 50 and 60.

- (36) *wu-shi duo feng xin*  
       five-ten more CL letter  
       ‘fifty and more letters’ ( $50 < x < 60$ )

*Duo* does not scope over the two-morpheme string *wu-shi* ‘fifty’ in (36), since the reading of the phrase may not cover figures such as 70, which is 50 plus 20 (20 is a part of 50). The following minimal pair is telling (from Lü et al. 1999 [1980]: 184; 1 *mu* = 6.666 m<sup>2</sup>). Both (37a) and (37b) can be roughly translated as ‘10 *mu* and more (of) land’. But precisely speaking, they cover different ranges.

- (37) a. *shi duo mu di*  
       ten more mu land  
       ‘10 *mu* and more (of) land’ ( $10 < x < 20$ )  
       b. *shi mu duo di*  
       ten mu more land  
       ‘10 *mu* and more (of) land’ ( $10 < x < 11$ )

In (37a), *duo* ‘more’ is adjacent to *shi* ‘ten’ to its left. In this case, it means part of ten. The quantity expressed by the whole phrase is 10 plus a part of 10, i.e., any figure between 10 and 20 (e.g., 12 *mu*). In (37b), *duo* is adjacent to the standard measure *mu* to its left. In this case, it means part of one *mu*. The quantity expressed by the whole phrase is 10 plus a part of one *mu*, i.e., any figure between 10 and 11 *mu* (e.g., 10.6 *mu*).

Similarly, the reading of (38a) is 30 plus a part of 10. The quantity expressed by the whole nominal is thus any number between 30 and 40, e.g., 33 *mu*. In contrast, the reading of (38b) is 30 plus a part of one *mu*. The quantity expressed by the whole nominal is any number between 30 and 31 *mu*, e.g., 30.4 *mu*.

- (38) a. san-shi duo mu di  
           three-ten more mu land  
           ‘30 *mu* and more (of) land’ ( $30 < x < 40$ )  
       b. san-shi mu duo di  
           three-ten mu more land  
           ‘30 *mu* and more (of) land’ ( $30 < x < 31$ )

Therefore, if *duo* follows a unit word, as in (37b) and (38b), it scopes over the unit only, excluding the numeral. Thus, nothing indicates that the numeral and the unit word form a syntactic constituent.

### 3.2.2 The position of *ban* ‘half’

Lü et al. (1999 [1080]) claim that *ban* ‘half’ may follow a measure word, but not a CL in general (with exceptions; see 3.2.3 below). In Hsieh (2008:46), it is assumed that if *ban* follows a unit word, the unit word and its preceding numeral should form a constituent. Again, I think that the argument is not valid.

Like *duo* ‘more’, *ban* ‘half’ is also a partitive quantifier, scoping over one single adjacent morpheme. When *ban* follows a unit, it scopes over the unit only, excluding the numeral. For instance, in the three examples in (39), *ban* follows *mi* ‘meter’. The reading of (39a) is 5 plus a half of a meter, i.e., 5.5m. The reading of (39b) is 13 plus a half of a meter, i.e., 13.5m. This example never means the half of 13 (i.e., 6.5). Similarly, the reading of (39c) is 300 plus a half of a meter, i.e., 300.5m.<sup>7</sup>

- (39) a. wu mi ban                    b. shi-san mi ban  
           five meter half            ten-three meter half  
           ‘5.5 meters’                ‘13.5 meters’  
       c. san-bai mi ban  
           three-hundred meter half  
           ‘300.5 meters’

<sup>7</sup> The partitive markers *ban* ‘half,’ *ji* ‘a few, several,’ and *duo* ‘more’ have different distributions. Although *duo* can either precede or follow a unit word, as seen in (37) and (38), *ban* may not precede a unit word, and *ji* may not follow a unit word:

- (i) a. shi mi ban    b. \*shi ban mi    (ii) a. \*shi mi ji    b. shi ji mi  
       ten meter half    ten half meter    ten meter several    ten several meter  
       ‘10.5 meters’                                    ‘10 and more meters’

Since *ban* never scopes over the combination of a numeral and a unit word, its position does not show whether the combination is a constituent or not.

### 3.2.3 The condition for the occurrence of post-unit *duo* and *ban*

When Lü et al. (1999 [1980]) claim that *duo* ‘more’ and *ban* ‘half’ may not follow a CL, they also report some exceptions. We have shown that when these two partitive markers follow a unit word, they scope over the unit word only, introducing an additional fractional quantity. My own observation is that if a context allows the occurrence of a fractional numeral, it also allows the occurrence of *duo* or *ban* after a unit word, including a CL. In (40a), the verb *yong* ‘use’ takes the object that has the fractional numeral 3/4. In (40b) and (40c), we see that in the same context, the object can contain the partitive marker *duo* and *ban*, respectively. In (41a), however, the verb *zhaixia* ‘pick’ may not take the object that has the fractional numeral 3/4. Then in (41b) and (41c), we see that in the same context, the object may not contain the partitive marker *duo* and *ban*, respectively. The examples in (42) and (43) show the same type of contrast.

- (40) a. Zuo zhe ge dangao wo yong-le 3/4 ge pingguo.  
       make this CL cake I use-PRF 3/4 CL apple  
       ‘I used three-quarters of an apple to make this cake.’  
       b. Zuo zhe ge dangao wo yong-le yi ge duo pingguo.  
       make this CL cake I use-PRF one CL more apple  
       ‘I used one apple and (some) more to make this cake.’  
       c. Zuo zhe ge dangao wo yong-le yi ge ban pingguo.  
       make this CL cake I use-PRF one CL half apple  
       ‘I used one and a half apples to make this cake.’
- (41) a. \*Ta cong shu-shang zhaixia-le 3/4 ge pingguo.  
       he from tree-on pick-PRF 3/4 CL apple  
       b. \*Ta cong shu-shang zhaixia-le yi ge duo pingguo.  
       he from tree-on pick-PRF one CL more apple  
       c. \*Ta cong shu-shang zhaixia-le yi ge ban pingguo.  
       he from tree-on pick-PRF one CL half apple

- (42) a. Na zhi yang yao-sui-le 3/4 zhi qianbi.  
           that CL goat chew-broken-PRF 3/4 CL pencil  
           ‘That goat chewed three-quarters of a pencil into pieces.’  
       b. Na zhi yang yao-sui-le san zhi duo qianbi.  
           that CL sheep chew-broken-PRF three CL more pencil  
           ‘That sheep chewed three and more pencils into pieces.’  
       c. Na zhi yang yao-sui-le san zhi ban qianbi.  
           that CL sheep chew-broken-PRF three CL half pencil  
           ‘That sheep chewed three and a half pencils into pieces.’
- (43) a. \*Wo mai-le 3/4 zhi qianbi.  
           I buy-PRF 3/4 CL pencil  
       b. \*Wo mai-le san zhi duo qianbi.  
           I buy-PRF three CL more pencil  
       c. \*Wo mai-le san zhi ban qianbi.  
           I buy-PRF three CL half pencil

The same numeral-initial nominal may occur in one context, but not another. The acceptability contrast exhibited in the above data is not a contrast in nominal-internal constituency. Just as existential verbs may not take a definite argument, so certain verbs may be sensitive to other formal properties of nominal arguments. Thus, it is possible that verbs such as those in (41) and (43) disallow their internal argument to start with a fractional number. Instead, only integers are allowed.

### 3.3 The Movement Argument

In Mandarin Chinese, the combination of a numeral and a unit word may not be fronted:

- (44) a. Shufen mai-le san ben shu.  
           Shufen buy-PRF three CL book  
           ‘Shufen bought three books.’  
       b. \*San ben, Shufen mai-le shu.  
           three CL Shufen buy-PRF book
- (45) a. Shufen mai-le san jin niurou.  
           Shufen buy-PRF three jin beef  
           ‘Shufen bought three jin of beef.’



- b. \*San jin, Shufen mai-le niurou.  
three jin Shufen buy-PRF beef

This is in contrast to the following Japanese examples:

- (46) a. Taroo-wa san-satu no hon-o katta.  
Taroo-TOP three-CL NO book-ACC bought  
b. San-satu, Taroo-wa hon-o katta.  
three-CL Taroo-TOP book-ACC bought  
Both: ‘Taroo bought three books.’

Saito et al. (2008: 260) use the contrast between (44) and (46) to show that the CL construction is right-branching in Mandarin Chinese and thus the combination of the numeral and the CL may not move, whereas the CL construction is left-branching in Japanese and thus the combination of the numeral and the CL can move (see Watanabe 2010 for more discussion of the syntax of Japanese CL constructions). In this paper, I have also argued that individual CL constructions in Mandarin Chinese have a right-branching structure, and thus the unacceptability of (44b) is expected. Our conclusion is compatible with Saito et al.’s. However, if the constructions of some other types of unit words, such as the standard measure in (45a), have a left-branching structure, as we proposed, how is it that the combination of the numeral and the unit word may still not move, as seen in (45b)?

I think that the unacceptability of (45b) does not falsify my analysis. The reason is that the parallel left quantity-denoting constituent of a nominal may not move in Mandarin Chinese, either, as seen in (47b). The constituency status of the string *hen duo* ‘very many’ is not controversial. The fact that the string may not move does not affect its constituent status.

- (47) a. Shufen mai-le hen duo (de) shu.  
Shufen buy-PRF very many DE book  
‘Shufen bought many books.’  
b. \*Hen duo (de), Shufen mai-le shu.  
very many DE Shufen buy-PRF book

Although it is not clear to me why the language has this constraint, at least data like (47) indicate that such a movement argument, if it is

proposed, is not a valid argument against my analysis. There might be an independent explanation for the general ban on the left dislocation of quantifiers in Mandarin Chinese.

#### 4. REMARKS ON THE SEMANTIC MAPPINGS OF THE DIFFERENT STRUCTURES

Non-unified structures of CL constructions have also been seen in the literature. However, different structures are claimed to correlate with different readings. In this section, I argue against two such mappings.

##### 4.1 Against Individual-quantity Mapping

X. P. Li (2010: 118-121) claims that for a numeral-initial nominal in Mandarin Chinese, a quantity or measure reading is mapped to the left-branching structure, whereas an individual or counting reading is mapped to the right-branching structure. Four arguments are presented to support such individual-quantity mapping: (A) the silence of a numeral; (B) the position of *de*; (C) the position of *duo*; and (D) the position of a relative clause. Argument C has been shown to be invalid in 3.2.2 above. The problems of Argument B will be discussed in Section 5. In this section, I falsify Arguments A and D, i.e., the silent numeral argument and the relative clause argument.

The silent numeral argument for the individual-quantity mapping of constituency is based on the following fact. The numeral *yi* ‘one’ to the left of a unit word may be silent (Cheng & Sybesma 1999: 530, among others). Yang (2001: 86) specifies that the silence may occur when *yi* immediately follows a verb, a demonstrative, or a universal quantifier. The three examples in (48) all allow a silent *yi*.

- (48) a. Shufen mai-le (yi) ben shu.  
           Shufen buy-PRF one CL book  
           ‘Shufen bought a book.’  
       b. zhe (yi) ben shu  
           this one CL book  
           ‘this book’

- c. mei (yi) ben shu  
 every one CL book  
 ‘every book’

It has been shown in Hsieh (2008: 125) that on a quantity reading, the unit word must co-occur with an overt numeral, whereas on an individual reading, the numeral *yi* ‘one’ can be silent. I use (49) to show the contrast:

- (49) a. Shufen mai-le gang xiancai.  
 Shufen buy-PRF jar pickle  
 ‘Shufen bought a jar of pickles.’  
 b. Shufen bu-duo-bu-shao zhenghao mai-le \*(yi) gang xiancai.  
 Shufen not-more-not-less exactly buy-PRF one jar pickle  
 ‘Shufen bought exactly one jar of pickles, no more and no less.’

In (49a), the numeral to the left of the container measure word *gang* is silent. Such a construction has an exclusive indefinite individual reading, rather than quantity reading (e.g., Hsieh 2008: 125). A quantity reading can be seen in (49b), where the expressions *bu-duo-bu-shao* ‘not-more-not-less’ and *zhenghao* ‘exactly’ signal a quantity reading. In this context, it is impossible to delete the numeral *yi* ‘one’.

X. P. Li claims that since a numeral may not be silent in a quantity reading, the dependence of a unit word on a numeral in the quantity reading is closer than the one in the individual reading. He claims that for this reason, in the quantity reading, but not in the individual reading, a numeral and a unit word should form a constituent, a left-branching structure. Thus, the same numeral-initial expression may have two different structures. (49a) has a right-branching structure, whereas (49b) has a left-branching structure.

More plausibly, I think, is that the numeral may not be deleted for a quantity reading simply because the numeral is the focus of such a reading. This restriction follows the general principle of PF deletion: it never applies to the focused element.

We further observe that all types of unit words can occur with a silent *yi* ‘one’, as shown in (50), including a standard measure, seen in (50d). There is no focus on the implicit *yi* in any of the examples in (50), and thus only the individual reading is available.

- (50) a. wo xiang mai ben shu. [Individual CL]  
 I want buy CL book  
 ‘I want to buy a book.’
- b. wo gang chi-le pian niu-rou. [Individuating CL]  
 I just eat-PRF slice cow-meat  
 ‘I just ate a slice of beef.’
- c. wo xiang mai ping jiu. [Container measure]  
 I want buy bottle wine  
 ‘I want to buy a bottle of wine.’
- d. wo gang mai-le jin yangrou. [Standard measure]  
 I just buy-PRF jin mutton  
 ‘I just bought a jin of mutton.’ (1 *jin* = 500 grams)
- e. wo gang chi-le pian xigua. [Partitive CL]  
 I just eat-PRF slice water-melon  
 ‘I just ate a slice of water-melon.’
- f. wo gang yujian-le qun qiangdao. [Collective CL]  
 I just meet-PRF group robber  
 ‘I just met a group of robbers.’
- g. Tamen zhaodao-le zhong hen tebie de zhiwu.  
 they find-PRF kind very special DE plant  
 ‘They found a kind of very special plant.’ [Kind CL]

In Section 2 I have argued that individual and individuating CL constructions have a right-branching structure, and that container measure, standard measure, partitive CL and collective CL constructions have a left-branching structure. The fact that all types of counting constructions allow the silent *yi* and thus may have both individual and quantity readings indicates that the syntactic distinction does not correlate with the semantic distinction of the two readings.

Note that the absence of *yi* ‘one’ is due to deletion, a phonological operation, since the reading of all of the above examples must be singular. *Yi* is semantically and syntactically present. Therefore, the silence of *yi* does not tell us the constituency of the relevant structure.

It needs to be pointed out that, as in the case of constructions with an overt *yi*, constructions with a covert *yi* can also be specific. Data like the following show that Cheng & Sybesma’s (1999: 526) claim that silent *yi* constructions must be non-specific is not accurate. The post-BA position is a typical position for definite or specific indefinite nominals. Since a counting expression with a silent *yi* may occur in this position, as seen in

(51a), it can be specific. Similarly, the subject of a secondary predicate in an existential coda construction (J. Huang 1987) must be specific indefinite. Since a counting expression with a silent *yi* may also occur in this position, as seen in (51b), it can be specific.

- (51) a. Shouwei ba ge cong nanfang lai de xiaotou  
 guard BA CL from south come DE thief  
 fang-pao-le.  
 release-away-PRF  
 ‘The guard got released a thief who had come from the south.’  
 b. Shufen mai-le zhang zhuozi san tiao tui.  
 Shufen buy-PRF CL table three CL leg  
 ‘Shufen bought a table which has three legs.’

The relative clause argument for the individual-quantity mapping of constituency is based on the fact that in Mandarin Chinese, a relative clause may either immediately precede a noun, as in (52a), or precede a numeral, as in (52b).

- (52) a. ta he-le yi wan [<sub>RC</sub> mama zuo de] tang.  
 he drink-PRF one bowl mom make DE soup  
 b. ta he-le [<sub>RC</sub> mama zuo de] yi wan tang.  
 he drink-PRF mom make DE one bowl soup  
 BOTH: ‘He drank one bowl of soup that mom made.’

The nominal that has a pre-numeral modifier, such as the one in (52b), is exclusively specific (Zhang 2006), and thus must have an individual reading, rather than a quantity reading. X. P. Li (2010: 120) labels an individual reading as a counting reading and a quantity reading as a measure reading. In his analysis, it is assumed that the object in (52a) has a left-branching structure [[*yi wan*] *tang*], and that the object in (52b) has a right-branching structure [*yi* [*wan tang*]]. However, it is more likely that the higher relative clause in (52a) is hosted by a higher functional projection of the whole complex nominal, and that the lower relative clause in (52b) is hosted by a projection local to the noun. Therefore, the different positions of the relative clause are not related to the constituency of the numeral, the unit word, and the noun of the construction.

In (52), the unit word is a container measure. Constructions of other types of unit words also allow a pre-numeral relative clause. In (53), for instance, the unit word is the individual CL *ben*. We can see that the pre-numeral relative clause is available regardless of the type of the unit word to the right of the numeral.

- (53) a. ta kan-le yi ben [<sub>RC</sub> baba xie de] shu.  
           he read-PRF one CL dad write DE book  
       b. ta kan-le [<sub>RC</sub> baba xie de] yi ben shu.  
           he read-PRF dad write DE one CL book  
       BOTH: ‘He read one book that dad wrote.’

We conclude that all of the above arguments for the individual-quantity mapping of constituency are problematic.

The syntactic contrast between a quantity-reading and individual reading of a nominal has been systematically studied since A. Li (1998). A. Li presents certain tests to separate the two readings in Mandarin Chinese. For instance, the quantity reading of *san ge ren* ‘three CL person’ in (54a) may not enter into a co-referential relation with a following pronoun, but the individual-reading of the same nominal in (54b) may do so (A. Li 1998: 698).

- (54) a. San ge ren<sub>i</sub> tai-bu-dong zhe jia gangqin.  
           three CL people lift-not-move this CL piano  
           ‘Three people cannot lift up this piano.’  
           \*Tamen<sub>i</sub> de liliang tai xiao.  
           their DE strength too small  
           ‘Their strength is too weak.’  
       b. Ta mingtian hui kandao san ge ren<sub>i</sub>, hai hui gen  
           he tomorrow will see three CL people and will with  
           tamen<sub>i</sub> zuo pengyou.  
           them make friends  
           ‘He will meet three people tomorrow and will make friends  
           with them.’

Rothstein (2009) also presents a few contrastive properties of the two readings. They are compatible with A. Li’s observations. She (p. 110) also mentions that in English, “On the measure reading, the suffix *-ful(s)* can often be added to the classifier, but this is inappropriate for the

individuating reading.” The examples in (55) are given to show the contrast:

- (55) a. Add two cup(ful)s of wine to the soup. [Quantity]  
 b. Bring two cup(#ful)s of wine for our guests. [Individual]  
 c. We needed three bucket(ful)s of cement to build that wall. [Quantity]  
 d. Three bucket(#ful)s of mud were standing in a row  
 against the wall. [Individual]

According to Akmajian & Lehrer (1976: 412), “The suffix *-ful* added to nouns is a partially productive way of converting nouns to quantifiers.” If a speaker chooses the quantifier version of an expression (i.e., the *-ful* form), instead of the plain noun version, the intended meaning must be a quantity (or measure) one, instead of an individual one.

Rothstein further reports certain morphological contrasts of the two readings in Hebrew. However, no constituency contrast is presented.

In A. Li (1998), the contrast of the two readings is represented as the contrast between NumP (for the quantity reading) and DP (for the individual reading). The latter has one more layer of functional projection than the former. Liao (2010) argues that the contrast should be represented at a higher level, such as in the projection of modals. In neither A. Li’s work nor Liao’s work have we seen any claim to support a contrast in the nominal-internal constituency.

The different types of constituency argued in my Section 2 do not correlate with the individual-quantity contrast. Each of the structures may have both readings. In (56), the individual CL *duo* and the noun *hua* ‘flower’ form a constituent, excluding the numeral *san* ‘three’ (i.e., right-branching structure). Now, we see that (56a) has an individual reading and (56b) has a quantity reading. In (57), the container measure *ping* ‘bottle’ and the numeral *san* ‘three’ form a constituent, excluding the noun *jiu* ‘wine’ (i.e., left-branching structure). (57a) has an individual reading and (57b) has a quantity reading. In (58), the kind CL *zhong* ‘kind’ does not form a constituent with either the numeral *san* ‘three’ or the noun *yu* ‘fish’. (58a) has an individual reading and (58b) has a quantity reading.

- (56) a. wo ba san duo hua dou fang zai zhuzi-shang le.  
 I BA three CL flower all put at table-on PRT  
 'I put all of the three flowers on the table.' [Individual]  
 b. zheli zhi neng fang san duo hua.  
 here only can put three CL flower  
 'Only three flowers can be put here.' [Quantity]
- (57) a. wo ba san ping jiu dou fang zai zhuzi-shang le.  
 I BA three bottle wine all put at table-on PRT  
 'I put all of the three bottles of wine on the table.' [Individual]  
 b. zhexie qian zhi neng mai san ping jiu.  
 this money only can buy three bottle wine  
 'This amount of money can buy only three bottles of wine.' [Quantity]
- (58) a. You san zhong yu you de hen kuai.  
 have three kind fish swim DE very fast  
 'There are three kinds of fish which swim very fast.' [Individual]  
 b. Ni zuiduo zhi neng tiao san zhong yu.  
 you most only can choose three kind fish  
 'You can choose only three kinds of fish at most.' [Quantity]

In X. P. Li (2010), individual CL constructions have a default individual reading (p. 123), as in my (56a), and such a reading has a right-branching structure. For the possible quantity reading of such constructions, as in my (56b), he resorts to the operation of semantic shift (p. 135). Since quantity reading has a left-branching structure in his analysis, the assumed semantic shift must correlate with a change in the syntactic structure. However, no syntactic evidence has been shown to support a left-branching structure for individual CL constructions.

Moreover, consider the two modification examples in (8) and (9). As mentioned above, if a construction has a pre-numeral modifier, it has an individual reading, but the modification evidence shows that in such examples, the construction clearly has a left-branching structure. This is unexpected if individual readings correlate with a right-branching structure.



Furthermore, English numeral-initial count NPs such as *three small children* have no CL, but they also have the two readings (Li 1998: 695). The numeral-initial nominals in (59a) and (59b) both have a quantity reading, whereas the one in (60) has an individual reading. There is no evidence for the difference in the c-commanding relation of *three* and *small children* between (59a) and (60).

- (59) a. That bed sleeps three small children.  
       b. That hotel suite accommodated 100 guests.
- (60) Three small children have arrived. They are all in the kitchen.

I thus claim that the contrast between a left- and right-branching structure of unit constructions does not correlate with the contrast between individual and quantity readings.

#### 4.2 Against Container-containee Mapping

Since Selkirk (1977), it has been noted that a container measure expression can have either a container reading or a containee reading. The two readings can be seen in my Mandarin Chinese examples in (61a) and (61b), respectively.

- (61) a. Shufen dasui-le    san    ping    niunai.  
       Shufen brink-PRF   three bottle   milk  
       ‘Shufen broke three bottles of milk.’  
       b. Shufen    he-le        san    ping    niunai.  
       Shufen    drink-PRF   three bottle   milk  
       ‘Shufen drank three bottles of milk.’

Selkirk (1977) claims that the containee reading is also a quantity reading, and that it has a left-branching structure, whereas the container reading has a right-branching structure. A similar proposal is made in Landman (2004, cited in Rothstein 2009). Zhang (2010a) argues against this constituency analysis and proposes that the contrast between the container and containee reading is a matter of the projection of semantic features from the same syntactic structure.

X. P. Li (2010), following Rothstein (2009), correlates the container reading with an individual reading, which is assumed to have a

right-branching structure, and correlates the containee reading with a quantity reading, which is assumed to have a left-branching structure. However, the two correlations are not justified, as shown in our following examples. In the two examples in (62), *shi ping jiu* ‘ten bottle wine’ has a containee reading. In (62a), the word *zuzu* ‘as much as’ provides a quantity context, and thus a quantity reading is available. In Li’s approach, the expression has a left-branching structure. However, in (62b), the reduplicate form of *ping-ping* ‘bottle-bottle’ provides an individual context (X. P. Li 2010: 115), and thus *shi ping jiu* should have an individual reading. Likewise, the container reading of *shi ping jiu* in (63) can have either a quantity reading, as in (63a), or individual reading, as in (63b).

- (62) a. Siyu zuzu he-le shi ping jiu.  
 Siyu as.much.as drink-PRF ten bottle wine  
 ‘Siyu drank as much as ten bottles of wine.’  
 [Containee, quantity]
- b. Siyu he-le shi ping jiu, ping-ping dou hen haohe.  
 Siyu drink-PRF ten bottle wine bottle-bottle all very good  
 ‘Siyu drank ten bottles of wine, and every bottle was very excellent.’  
 [Containee, individual]
- (63) a. Siyu lin-lai-le zuzu shi ping jiu.  
 Siyu bring-come-PRF as.many.as ten bottle wine  
 ‘Siyu brought as many as ten bottles of wine.’  
 [Container, quantity]
- b. Siyu dasui-le shi ping jiu, ping-ping dou hen zhengui.  
 Siyu break-PRF ten bottle wine bottle-bottle all very precious  
 ‘Siyu broke ten bottles of wine, and each bottle was very precious.’  
 [Container, individual]

All of these facts simply show that the following three contrasts are independent each other: container vs. containee reading, quantity vs. individual reading, and the left-branching vs. right-branching structure.

### 4.3 More Remarks

In addition to the two syntax-semantics mappings that I argued against in the previous two subsections, some other mappings are also seen in the literature. For instance, Tang (1990a: 353) mentions that in English, mass noun constructions have a left-branching structure and count noun constructions have a right-branching structure. The same correlation is also stated in Watanabe (2006: 261, 270) for Japanese. It is beyond the scope of this paper to discuss these languages. In my own analysis of Mandarin Chinese, the contrast between a left-branching structure and right-branching structure is obviously not the contrast between count and mass nouns. My conclusion that individual and individuating CL constructions have an identical constituency shows that there is no difference in the structure of mass nouns and non-mass nouns in Mandarin Chinese.

## 5. THE CONSTITUENCY AND OCCURRENCE OF *DE*

### 5.1 Background

In Mandarin Chinese, the functional element *de* may introduce a modifier such as an adjective or relative clause to the left of another element. We have seen such examples in (8) and (9). *De* may also surface between a unit word and a noun. If the unit word is an individual or individuating CL, there are certain constraints, which will be explained later. However, in general, all types of unit words may be followed by *de*, as observed in Tang (2005: 444), Hsieh (2008: 42), X. P. Li (2010), and Her & Hsieh (2010: 540).<sup>8 9</sup>

---

<sup>8</sup> I do not consider the inherent attributive use of numeral expressions, as shown in the underlined part in (i) (Tang 2005: 434).

- (i) a. Ta mai-le liang tao [wu ben de shu].  
       he buy-PRF two CL five CL DE book  
       ‘He bought 2 sets of books with 5 volumes (each).’  
       b. Ta mai-le liang mi [yi gongfen de shengzi].  
       he buy-PRF two meter one cm DE rope  
       ‘He bought two meters of the rope that is 1 cm thick.’

Such attributive constructions have different syntactic and semantic properties from the pseudo-partitive constructions discussed here. See Schwatchild (2006), Hsieh (2008),

- (64) a. Shufen chi-le yi-bai {ge/gongjin/bao/pian/dui/zhong}  
 Shufen eat-PRF one-hundred CL/kilo/bag/slice/pile/kind  
 de pingguo.  
 DE apple  
 ‘Shufen ate 100 apples or 100 {kilos/bags/slices/piles/kinds}  
 of apples.’
- b. Shufen chi-le san-fen-zhi-yi li de ganmao-yao.  
 Shufen eat-PRF one-third CL DE cold-pill  
 ‘Shufen took one third of a cold pill.’
- c. Yi liang tiao de maojin ni zong mai-de-qi ba!  
 one two CL DE towel you after.all buy-can PRT  
 ‘You should be able to afford to buy one or two towels!’

Hsieh (2008: 45) claims that “The use of *de* calls for the organization of all the relevant information in an N-C sequence as a constituent” (her N = numeral; C = CL). The same idea is found in X. P. Li (2010: 205, his Argument B, as I mentioned at the beginning of 4.1 above). They thus both argue for a unified left-branching structure from this *de*-perspective.

However, we have shown that an individual CL construction may not have two incompatible modifiers (see 2.1). If *de* occurs, the constraint remains. The consistency does not support a left-branching structure for the counting construction.

- (65) \*Shufen chi-le hen da de yi-bai ge (de) xiao pingguo.  
 Shufen eat-PRF very big DE 100 CL DE small apple

Moreover, if an individual or an individuating CL s-selects a noun, it does so regardless of the presence of *de*. In (66), the noun *pingguo* ‘apple’ may occur with the CL *ge*, but not the CL *zhan*. The latter is for lamps. The selection restriction is not affected by the occurrence of *de*. I have argued that the selection supports a right-branching structure, rather than a left-branching one. This consistency does not support a left-branching structure for the counting construction.

---

Liao (2008), and X. P. Li (2010) for discussions of such constructions.

<sup>9</sup> Examples in (64) and other examples in Tang (2005: 444) and Hsieh (2008: 42) are counter-examples to the claim that individual CLs may not be followed by *de* (Cheng & Sybesma 1998, 1999).

- (66) Shufen chi-le yi-bai {ge/\*zhan} (de) pingguo.  
 Shufen eat-PRF 100 CL/CL DE apple  
 ‘Shufen ate 100 apples.’

We thus need a more plausible analysis of the *de* versions of various counting constructions.

## 5.2 The Quantity-reading Condition

In a context where the quantity is not emphasized, *de* may not follow an individual CL, individuating CL, or kind CL, but may follow a unit word of other types, i.e., a partitive CL, collective CL, container measure, or standard measure.

- (67) a. \*Zhuzi-shang you san ge de pingguo.  
 table-on have three CL DE apple  
 [Individual CL]  
 b. \*Zhuzi-shang you san di de you.  
 table-on have three CL DE oil  
 [Individuating CL]  
 c. \*Zhuzi-shang you san kuan de fuzhuang.  
 table-on have three kind DE clothes  
 [Kind CL]
- (68) a. Zhuzi-shang you san pian de xiangjiao.  
 table-on have three CL DE banana  
 ‘There are three slices of banana on the table.’  
 [Partitive CL]  
 b. Zhuzi-shang you san dui de yingtao.  
 table-on have three pile DE cherry  
 ‘There are three piles of cherries on the table.’  
 [Collective CL]  
 c. Zhuzi-shang you san bao de pingguo.  
 table-on have three CL DE apple  
 ‘There are three bags of apples on the table;  
 [Container measure]

- d. Zhuozi-shang you san bang de yingtao.  
 table-on have three pound DE cherry  
 ‘There are three pounds of cherries on the table.’  
 [Standard measure]

The division coincides with the one between the right-branching type and the left-branching type of counting constructions. Specifically, the individual CL *ge* in (67a), and the individuating CL *di* in (67b) have a right-branching structure, and the kind CL *kuan* in (67c) has an extended right-branching structure (see 2.5). They all disallow *de* in this context, where the quantity is not emphasized. In contrast, the partitive CL *pian* in (68a), the collective *dui* CL in (68b), the container measure *bao* in (68c), and the standard measure *bang* in (68d), all have a left-branching structure. They all allow *de* in the same context.

If the same right-branching type of counting constructions occurs in a context where quantity is emphasized, their acceptability improves significantly. In (69), the quantity reading is attested in the presence of the adverb *yigong* ‘total’, and in (70), the quantity reading is attested in the predicate *zugou* ‘enough’.

- (69) a. Zhuozi-shang yigong you 300 ge de pingguo.  
 table-on total have 300 CL DE apple  
 ‘There are 300 apples in total on the table.’  
 b. Zhuozi-shang yigong you 300 di de you.  
 table-on total have 300 CL DE oil  
 ‘There are 300 drops of oil in total on the table.’  
 c. Zhuozi-shang yigong you 300 kuan de fuzhuang.  
 table-on total have 300 kind DE clothes  
 ‘There are 300 kinds of clothes in total on the table.’
- (70) a. Yi liang ge de pingguo jiu zugou le.  
 one two CL DE apple just enough PRT  
 ‘Just one or two apples are enough.’  
 b. Yi liang di de you jiu zugou le.  
 one two CL DE oil just enough PRT  
 ‘Just one or two drops of oil are enough.’  
 c. Yi liang kuan de fuzhuang jiu zugou le.  
 one two kind DE clothes just enough PRT  
 ‘Just one or two kinds of clothes are enough.’

The fact that the occurrence of *de* in the right-branching counting construction is sensitive to a quantity reading is further seen in the following examples. In the presence of a demonstrative, where an individual rather than a quantity-reading is more prominent, the contrast emerges (Cheng & Sybesma 1998: 393 claim that no demonstrative may occur with a post-unit *de*. However, I find (71) natural. All of the nominals in (71) can be found via an internet search):

- (71) a. Ni ba na san xiang de shu qingli-diao!  
 you BA that three box DE book clear-away  
 ‘Clear away those three boxes of books!’  
 [Container measure]
- b. Ni ba na yi dui de lüyou-shu qingli-diao!  
 you BA that one pile DE travel-book clear-away  
 ‘Clear away that pile of travel books!’  
 [Collective CL]
- c. Ni ba na san jin de fanqie qingli-diao!  
 you BA that three kiloDE tomato clear-away  
 ‘Clear away those three kilos of tomatoes!’  
 [Standard measure]
- d. Ni ba na liang bufen de kewen bei yixia!  
 you BA that two part DE text recite once  
 ‘Recite those two parts of the text!’  
 [Partitive CL]
- (72) a. \*Ni ba na san ge de pingguo qingli-diao!  
 you BA that three CL DE apple clear-away  
 [Individual CL]
- b. \*Ni ba na san di de you qingli-diao!  
 you BA that three CL DE oil clear-away  
 [Individuating CL]
- c. \*Ni ba na san zhong de niu-rou qingli-diao!  
 you BA that three CL DE cow-meat clear-away  
 [Kind CL]

The above contrast tells us that with respect to the occurrence of *de*, the left-branching type is less constrained, whereas the right-branching type is licensed only in a quantity reading. We try to explain this contrast in the next section.

Note that in Section 4.1 I argued against the claim that a left-branching structure encodes a quantity reading and a right-branching structure encodes a non-quantity reading. The pattern observed here further falsifies the claim.

### 5.3 Different Sources of *De*

It is possible that there are two different sources of *de* related to a counting construction, and that the left-branching constructions can contain either of them, while the right-branching construction can contain only one of them, the one that is related to a quantity reading.

In this section, I show that the *de* version of a counting construction can be a quantity-comparative modification construction. The modification analysis of the *de* version of measure word constructions has been seen in Cheng & Sybesma (1998: 393) and Tang (2005). In X. P. Li (2010), the *de* construction is called the as-many/much-as construction. I now combine these two insights and propose that the construction is a specific type of modification construction: elliptical comparative construction.

Elliptical comparative constructions are independently observed in Mandarin Chinese. In (73a), the pro-form *name da* ‘so big’ takes *zhima* ‘sesame seed’ as its antecedent. In such a construction, the word *name* ‘so’ can be deleted, without affecting the reading. (73a) and (73b) have the same reading. In this construction, *de* introduces a comparative modifier. (73c) is my analysis of (73b).

- (73) a. Shufen mai-le [yi ge [[zhima name da de] wanju]].  
       Shufen buy-PRF one CL sesame so big DE toy  
       b. Shufen mai-le yi ge zhima da de wanju.  
       Shufen buy-PRF one CL sesame big DE toy  
       Both: ‘Shufen bought a toy as big as a sesame seed.’  
       c. Shufen mai-le [yi ge [[zhima ~~name~~ da de] wanju]].  
       Shufen buy-PRF one CL sesame so big DE toy

Similarly, I claim that *de* in (74a) also introduces a comparative modifier. The full form of (74a) is (74b), and the first *pingguo* ‘apple’ and *name duo* ‘so many’ are deleted at PF. (75) shows the same point. In the following, I discuss (74) only.



- (74) a. Shufen chi-le yi-bai ge de pingguo.  
 Shufen eat-PRF 100 CL DE apple  
 ‘Shufen ate 100 apples.’  
 b. Shufen chi-le [[[yi-bai ge pingguo] ~~name duo~~ de] pingguo].  
 Shufen eat-PRF 100 CL apple so many DE apple
- (75) a. Shufen chi-le san-fen-zhi-yi li de ganmao-yao.  
 Shufen eat-PRF one-third CL DE cold-pill  
 ‘Shufen took one third of a cold-pill.’  
 b. Shufen chi-le [[[san-fen-zhi-yi li ~~ganmao-yao~~] ~~name duo~~  
 Shufen eat-PRF one-third CL cold-pill so much  
 de] ganmao-yao].  
 DE cold-pill

In (74b), the antecedent of *name duo* ‘so many’ is *yi-bai ge pingguo* ‘one hundred CL apple’, which is a syntactic constituent.

The deletion of the noun, e.g., *pingguo* ‘apple’ in (74b), is an instance of backward deletion, in which the licensing string (“antecedent”) occurs to the right of the ellipsis site, and both the licensing string and the ellipsis site must be right-peripheral in their respective domains (Wilder 1997: 92). In (76), for instance, backward deletion of the object in the relative clause of the subject is licensed by the object in the main VP (Wilder 1997: 87):

- (76) [Anyone [who meets ~~any of our sales people~~]]  
 [really comes to like any of our sales people]

Similarly, in (74b), the ellipsis site of *pingguo* is right-peripheral in the domain of [*yi-bai ge pingguo*], and its licensing string *pingguo* is right-peripheral in the domain of the whole object and sentence.

The operation of the deletion of the string *name duo* ‘so many’ in (74b) is parallel to the operation of the deletion of *name* in (73b). The non-parallel details of the two operations can also be explained. In (73b), the dimension word *da* ‘big’ may not be deleted with *name* ‘so’, since its absence will lead to a different reading. Compare (73b) with (77).

- (77) Shufen mai-le yi ge zhima de wanju.  
 Shufen buy-PRF one CL sesame DE toy  
 ‘Shufen bought a toy that is made of sesame seeds.’

Following the same recoverability principle in deletion (Hankamer 1973, Chomsky 1965, 1968), the dimension word *duo* in (74b) must be deleted together with *name*, since its presence may lead to a partitive reading of *duo*, an unintended reading. Compare (74a) with (78).

- (78) Shufen chi-le yi-bai ge duo de pingguo.  
 Shufen eat-PRF one-hundred CL more DE apple  
 ‘Shufen ate more than 100 apples.’

It is thus the general recovery condition of PF deletion that decides why the dimension word must not be deleted in (73), and must be deleted in (74).

There is a similarity between the *de* version of a counting construction and the elliptical comparative construction in (73). As noted in Cheng & Sybesma (1998: 392), in the *de* version of a container measure construction, the referent of a container measure does not have to be present in the discourse. In (79a), there are two container-denoting words, *wan* ‘bowl’ and *bei* ‘cup’, and neither is followed by *de*. It is unclear which one denotes the container as an instrument and which one denotes a measure. The sentence is unacceptable. In (79b), however, *bei* is followed by *de*, but *wan* is not. In this case, it is clear that *wan* denotes the instrument and *bei* denotes the measure. In the discourse context of (79b), no cup has to be present. The wine can be contained in a jar or a bottle.

- (79) a. \*Ta yong xiao wan he-le san bei jiu.  
           he with small bowl drink-PRF three cup wine  
       b. Ta yong xiao wan he-le san bei de jiu.  
           he with small bowl drink-PRF three cup DE wine  
           ‘He drank three cupfuls of wine from a small bowl.’

In the elliptical comparative construction in (73), the referent of *zhima* ‘sesame seed’ does not have to occur in the discourse. In this sense, (73) is parallel to the *de* construction in (79b) above. What is relevant here is the property under the comparison: size in (73) and quantity in (79b).

Three arguments support this elliptical comparative analysis of the *de* version of individual and individuating CL constructions.

First, if an expression cannot occur in a full-fledged quantity comparative construction, it may not occur in a *de* construction. The forms in (80b) and (81b) are not acceptable, nor are those in (80a) and (81a). This correlation supports my hypothesis that the a-forms and b-forms are derivationally related.

- (80) a. \*yixie de shu      <= b. \*[yixie shu    name duo    de shu]  
           some DE book                    some book so        many DE book  
           Lit.: ‘as many as some books’
- (81) a. \*mei (yi) ben de shu <= b. \*[mei (yi)    ben shu    name duo    de  
           every one CL DE book            every one CL book so        many DE  
           shu]  
           book  
           Lit.: ‘as many as every book’

Second, while a counting construction may have either a quantity reading or an individual reading (A. Li 1998), if it has an exclusively individual reading in a certain context, it may not host *de*. This suggests that the *de* construction is not compatible with an individual reading. If the *de* construction is a quantity comparative construction, the incompatibility is explained. I use (82) and (83) to show this point.

In (82a), a modifier occurs to the left of the numeral 100. Such a construction always has a specific and thus an individual reading (see the discussion of (52b) above). In (82b), the word *yigong* ‘altogether, in total’ signals a quantity context. In this context, a pre-numeral modifier may not occur, as shown in (82c).

- (82) a. [Shufen mai de] 100 ge xigua  
           Shufen buy DE 100 CL watermelon  
           ‘the 100 watermelons that Shufen bought’  
       b. Ta yigong chi-le 100 ge xigua.  
           He total eat-prf 100 CL watermelon  
           ‘He ate 100 watermelons in total.’  
       c. \*Ta yigong chi-le [Shufen mai de] 100 ge xigua.  
           he total eat-PRF Shufen buy DE 100 CL watermelon

The contrast in (83) shows that the *de* version of a CL construction is subject to the same constraint, although no quantity adverb such as

*yigong* ‘total’ is present. Such a construction may not host a pre-numeral modifier, as seen in (83b) (More examples showing a similar constraint are seen in Cheng & Sybesma 1998: 394; Tang 2005: 448). The constraint in (83b) is the same as the one in (82c). In both cases, a quantity context is in conflict with the exclusive individual reading of the pre-numeral modifier construction. The quantity context is provided by the adverb *yigong* ‘total’ in (83b), and by the post-CL *de* in (83b). My quantity comparative analysis explains the impossibility of the co-occurrence of the pre-numeral modifier and the post-CL *de*.

- (83) a. 100 ge de xigua  
           100 CL DE watermelon  
           ‘100 watermelons’  
       b. \*[Shufen mai de] 100 ge de xigua  
           Shufen buy DE 100 CL DE watermelon

Third, the noun to the right of *de* can be silent in other *de* constructions, as in (84a), but not in the *de* version of a counting construction, as shown in (84b) (Tang 1990, Cheng & Sybesma 1998: 397, fn. 6). In my analysis, this is because the undeletable noun is the licenser of the elided noun in the comparative modifier.

- (84) a. Zuo-bian you hong de fanqie, you-bian you huang  
           left-side have red DE tomato right-side have yellow  
           de (fanqie).  
           DE tomato  
           ‘There are red tomatoes on the left side and yellow ones  
           on the right side.’  
       b. Zuo-bian you 100 ge de fanqie, you-bian you 200 ge  
           left-side have 100 CL DE tomato right-side have 200 CL  
           de \*(fanqie).  
           DE tomato  
           ‘There are 100 tomatoes on the left side and 200 on the right  
           side.’

In this elliptical comparative perspective, *de* introduces a modifier to the left of another element (i.e., the modifiee). The whole construction is further derived by ellipsis. The syntactic position of *de* is the same as that of the *de* in (73b). Crucially, the noun following *de* is not in a

counting construction at all. The noun that is in a counting construction has been deleted, and the containing counting construction is embedded in the modifier. Thus the position of *de* in this case does not show the constituency of the elements inside a counting construction (contra Hsieh 2008: 45; X. P. Li 2010: 205).

We have seen that the *de* version of the right-branching structure is constrained by the quantity-reading condition, but for the *de* version of the left-branching structure, this condition is not forced. This contrast can be explained by the hypothesis that when *de* occurs in a left-branching counting construction, it is ambiguous between the *de* that introduces a comparative modifier and the *de* that does not. It is in the latter case that *de* occurs between two syntactic constituents of a counting construction. In the former case, *de* is a comparative modification marker, which is external to the counting construction. The two forms in (85) show the contrast:

- (85) a. [[*san bei*] *de jiu*]  
           three cup DE wine  
       b. [[*san bei jiu*] ~~name duo~~] *de jiu*  
           three cup wine so       much DE wine  
       Both: ‘three cups of wine’

In (85a), *de* occurs between two syntactic constituents of a counting construction, *san bei* ‘three cup’ and *jiu* ‘wine’, whereas in (85b), *de* is out of the counting construction *san bei jiu* ‘three cup wine’.

I have proposed a fine-grained analysis of the *de* version of counting constructions, to capture the constraint on the occurrence of *de* with individual, individuating, and kind CL constructions, and the absence of the constraint on other types of counting constructions.

## 6. SUMMARY

In this paper I have investigated the constituency of counting constructions in Mandarin Chinese. Such constructions contain three elements: a numeral, a noun, and a unit word between them. I have discussed four issues: <i> the scope of a left-peripheral modifier; <ii> the dependency between the modifier of unit word and that of a noun; <iii> the complement and predicate status of the combination of a

numeral and a unit word; <iv> the semantic selection of a unit word on a noun. Based on the different behaviors of the different types of unit words, I have identified three structures: a left-branching structure for container measures, standard measures, partitive CLs, and collective CLs; a right-branching structure for individual and individuating CLs; and a structure in which no two of the three elements form a constituent for kind CLs. I have also falsified invalid arguments such as the co-occurrence of a numeral and a unit word and the position of the partitive markers *duo* ‘more’ and *ban* ‘half’. I have also argued against the quantity-individual semantic mappings with the different syntactic structures. Finally, I have presented a comparative deletion analysis of the constructions in which the functional word *de* follows a unit word.

Putting kind CL constructions aside, the division between the left- and right-branching structures argued for in this paper has no correlation with the division between the alleged sortal and mensural CL constructions. According to Grinevald (2002: 261), individual CLs are sortal ones and individuating CLs are mensural ones. In my analysis, both kinds of CLs have a right-branching structure. My division also does not match Ōta’s (2003 [1958]: 147) division between measuring (*ji-liang* 計量) and counting (*ji-shu* 計數) constructions: the former is for standard measure and container measure and the latter is for the rest, including individual and collective CL constructions. In my analysis, collective CL constructions have the same structure as that of standard and container measures. Since the sortal-mensural division and the measuring-counting division are not supported by any syntactic evidence, it is not surprising that they do not correlate with the syntactic analysis presented here.

A further issue to be investigated is the feature makeup of the unit words in the three structures, and the categorial labels of the nodes of the different structures. These issues are important, but the constituency has to be settled first.

## REFERENCES

- Aikhenvald, Alexandra. 2003. *Classifiers: A Typology of Noun Categorization Devices*. Oxford: Oxford University Press.
- Akmajian, Adrian & Adrienne Lehrer. 1976. NP-like quantifiers and the problem of determining the head of an NP. *Linguistic Analysis* 2.4: 395-413.
- Bloomfield, Leonard. 1933. *Language*. New York: Holt, Rinehart & Winston.

- Bunt, Harry C. 1985. *Mass Terms and Model-Theoretic Semantics*. Cambridge: Cambridge University Press.
- Chao, Yuen-Ren. 1968. *A Grammar of Spoken Chinese*. Berkeley: University of California Press.
- Cheng, Lisa Lai-Shen & Rint Sybesma. 1998. *Yi-wan tang, yi-ge tang*: Classifiers and massifiers. *Tsing-Hua Journal of Chinese Studies* 28.3: 385-412.
- Cheng, Lisa Lai-Shen & Rint Sybesma. 1999. Bare and not so bare nouns and the structure of NP. *Linguistic Inquiry* 30.4: 509-542.
- Cheng, Lisa Lai-Shen. 2009. Counting and classifiers. Handout distributed at Mass/Count Workshop, University of Toronto, Feb. 7-8, 2009.
- Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 1968. *Language and Mind*. New York: Harcourt, Brace, and World.
- Croft, William. 1994. Semantic universals in classifier systems. *Word* 45: 145-171.
- Emonds, Joseph. 1970. Root and structure-preserving transformations, PhD Dissertation, MIT.
- Fodor, Janet and Ivan Sag. 1982. Referential and quantificational indefinites. *Linguistics and Philosophy* 5: 355-398.
- Greenberg, Joseph. 1972. Numeral classifiers and substantival number: Problems in the genesis of a linguistic type. *Working Papers on Language Universals* 9: 1-39, Stanford: Department of Linguistics, Stanford University.
- Greenberg, Joseph. 1990 [1975]. Dynamic aspects of word order in the numeral classifier. *On Language. Selected Writings of Joseph H. Greenberg*, eds. by K. Denning and S. Kemmer, 227-240. Stanford: Stanford University Press [First published in *Word Order and Word Order Change*, ed. by C. Li, 27-43. Austin: University of Texas Press, 1975].
- Grinevald, Colette. 2002. Making sense of nominal classification systems. *New Reflections on Grammaticalization*, eds. by Ilse Wischer & Gabriele Diewald, 259-275. Amsterdam/Philadelphia: John Benjamins.
- Hankamer, Jorge. 1973. Unacceptable ambiguity. *Linguistic Inquiry* 4: 17-68.
- Her, One-Soon & Chen-Tien Hsieh. 2010. On the semantic distinction between classifiers and measure words in Chinese. *Language and Linguistics* 11.3: 527-551.
- Hsieh, Miao-Ling. 2008. *The Internal Structure of Noun Phrases in Chinese*. Taipei: Crane Publishing Co., Ltd.
- Huang, Chu-Ren. 1989. *Mandarin Chinese NP De -A Comparative Study of Current Grammatical Theories*. Nankang, Taipei (PhD dissertation, Cornell University, 1987).
- Huang, Cheng-Teh James. 1987. Existential sentences in Chinese and (in)definiteness. *The Representation of (In)definiteness*, eds. by Reuland, Eric & Alice ter Meulen, 226-253. Cambridge, MA: MIT Press.
- Jackendoff, Ray. 1977. *X-bar Syntax: A Study of Phrase Structure*. Cambridge, MA: MIT Press.

- Krifka, Manfred. 2008. Different kinds of count nouns and plurals. Handout distributed at Syntax in the World's Languages III, Freie Universität Berlin, Sept. 25-28, 2008.
- Landman, Fred. 2004. *Indefinites and the Type of Sets*. Oxford: Blackwell.
- Li, Bingzhen. 2009. *Liangzhong Biao Fei-yuqi Jieguo-yi Jiegou de Bijiao*. [Comparison between two constructions referring to unexpected results], *Yuyan Kexue*, 8.2: 188-196.
- Li, Charles and Sandra Thompson. 1981. *Mandarin Chinese: A Functional Reference Grammar*. Berkeley: University of California Press.
- Li, Xu-Ping. 2010. *On the Semantics of Classifiers in Chinese*. PhD. Dissertation, Bar-Ilan University.
- Li, Yen-hui Audrey. 1998. Argument determiner phrases and number phrases, *Linguistic Inquiry*. 29: 693-702.
- Liao, Wei-wen Roger. 2008. Multiple Classifiers Construction and Nominal Expressions in Chinese. To appear in *NELS* 39.
- Liao, Wei-wen Roger. 2010. Indefinites in Chinese and the theory of D-V merge. To appear in *NELS* 40.
- Lin, Jo-wang. 1997. Noun phrase structure in Mandarin Chinese: DP or NP? *Chinese Languages and Linguistics* 3: 401-434.
- Loke, Kit-ken. 1994. Is *GE* merely a 'general classifier?' *Journal of Chinese Language Teachers' Association* 29 .3: 35-50.
- Long, Tao & Qingzhu Ma. 2008. *Duliang-hengliang ci de yuyi gongneng yanjiu* [A study of the semantic functions of measure words]. *Zhongguo Yuyanxue Bao* 13: 32-43.
- Lü, Shuxiang et al. 1999 [1980]. *Xiandai Hanyu Babai Ci* [800 Words in Chinese]. Beijing: Shangwu Press (1<sup>st</sup> edition, 1980).
- Ōta, Tatsuo. 2003 [1958]. *Chūgokugo rekishi bunpo* [A historical grammar of modern Chinese], Tokyo: Konan shoin, 1958. [Chinese translation by S. Jiang and C. Xu, *Zhongguoyu Lishi Wenfa*, Beijing University Press: Beijing, 2003].
- Paris, Marie-Claude. 1981. *Problèmes de Syntaxe et de Sémantique en Linguistique Chinoise*. Paris: Collège de France, Institut des Hautes Etudes Chinoises.
- Rothstein, Susan. 2009. Individuating and measure readings of classifier constructions: Evidence from Modern Hebrew. *Brill's Annual of Afroasiatic Languages and Linguistics* 1:106-145.
- Saito, Mamoru, T.-H. Jonah Lin, Keiko Murasugi. 2008. N'-ellipsis and the structure of noun phrases in Chinese and Japanese. *Journal of East Asian Linguistics* 17: 247-271.
- Schwarzschild, Roger. 2006. The role of dimensions in the syntax of noun phrases. *Syntax* 9: 67-110.
- Selkirk, Elisabeth. 1977. Some remarks on noun phrase structure. *Formal Syntax*, eds. by P. Culicover, T. Wasow and A. Akmajian, 285-316. New York: Academic Press.
- Tang, Chih-chen Jane. 1990a. A note on the DP analysis of Chinese noun phrases. *Linguistics* 28: 337-354.



Niina Ning Zhang

- Tang, Chih-chen Jane. 1990b. *Chinese Phrase Structure and Extended X'-Theory*. PhD. Dissertation, Cornell University.
- Tang, Chih-chen Jane. 2005. Nouns or classifiers: A non-movement analysis of classifiers in Chinese. *Language and Linguistics* 6: 431-472.
- Tang, Sze-Wing. 2010. *Zai shuo "nian, yue, ri"* [Revisiting *nian, yue, ri*]. Zhu-Lu Symposium, Beijing, Aug. 17-18, 2010.
- Wang, Lianqing. 1994. *Origin and Development of Classifiers in Chinese*. PhD. Dissertation, Ohio State University.
- Watanabe, Akira. 2006. Functional properties of nominals in Japanese: Syntax of classifiers. *Natural Language and Linguistic Theory* 24: 241-306.
- Watanabe, Akira. 2010. Notes on nominal ellipsis and the nature of no and classifiers in Japanese. *Journal of East Asian Linguistics* 19: 61-74.
- Wilder, Chris. 1997. Some properties of ellipsis in coordination. *Studies on Universal Grammar and Typological Variation*, eds. by Artemis Alexiadou and T. Alan Hall, 59-107. Amsterdam: John Benjamins.
- Wilhelm, Andrea. 2008. Bare nouns and number in Dëne Suliné, *Natural Language Semantics* 16: 39-68.
- Wu, Yicheng & Adams Bodomo. 2009. Classifiers ≠ Determiners. *Linguistic Inquiry* 40: 487-503.
- Yang, Rong. 2001. *Common Nouns, Classifiers, and Quantification in Chinese*. PhD. Dissertation, Newark: The State University of New Jersey.
- Zhang, Niina Ning. 2006. Representing specificity by the internal order of indefinites. *Linguistics* 44.1: 1-21.
- Zhang, Niina Ning. 2009. The syntax of relational-nominal second constructions in Chinese. *Yuyanxue Luncong* 39: 257-301, Beijing: Peking University Press.
- Zhang, Niina Ning. 2010a. Projecting semantic features. *Studia Linguistica*, to appear.
- Zhang, Niina Ning. 2010b. Two defining properties of countability. Paper presented at the Conference on Empirical, Theoretical and Computational Approaches to Countability in Natural Language, Bochum, Sept. 22-24, 2010.
- Zhu, Dexi. 1982. *Yufa Jiangyi* [Lectures on grammar], Beijing: Shangwu Press.

Niina Ning Zhang  
 Graduate Institute of Linguistics  
 National Chongcheng University  
 Minhsiung, Chiayi, Taiwan 62102, ROC  
 Lngnz@ccu.edu.tw

## 漢語單位詞結構的句法成分分析

張寧  
國立中正大學

由數詞，單位詞，及名詞構成的短語可分析為三種句法結構：容器單位詞，度量單位詞，部分單位詞及群體單位詞出現在左分枝結構中，個體單位詞及個體化單位詞出現在右分枝結構中，種類單位詞出現在延伸式右分枝結構中。此結論由以下考慮得出：左邊緣修飾語的轄域；單位詞的修飾語與名詞的修飾語之間的依存關係；數詞與單位詞的合成體之可能的句法功能；以及單位詞對名詞的語意選擇。本文指出數詞與單位詞的共現以及“多”及“半”的位置都無法證明數詞與單位詞是否構成一個句法成分。而且左右分枝與數量語義及個體語義無對應關係。此外，本文認為單位詞後帶“的”的結構有可能是比較句的省略句式，所以“的”的位置並不一定標示句法成分的分界處。

關鍵字：單位詞，量詞，句法成分，左分枝，右分枝，漢語