

Classifier Structures in Mandarin Chinese

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by

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For James Tomlinson Myers

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Abbreviations

| | |
|--------|--------------------------------------|
| 1 | first person |
| 2 | second person |
| 3 | third person |
| ADESS | adessive case |
| BA | causative marker |
| CL | classifier |
| DE | associative particle |
| DeP | Delimit Phrase |
| DEM | demonstrative |
| DIM | diminutive |
| DUR | durative aspect |
| EXP | experiential aspect |
| E-YI | the existential quantifier <i>yi</i> |
| FEM | feminine |
| FUT | future tense |
| G-YI | the generic quantifier <i>yi</i> |
| INT | interjection |
| M-YI | the maximal quantifier <i>yi</i> |
| MASC | masculine |
| MonP | Monotocity Phrase |
| NumP | Number Phrase |
| ORD | ordinal |
| PART | partitive case |
| PASS | passive |
| PL | plural |
| PRF | perfect aspect |
| PRT | sentence-final aspect particle |
| PST | past |
| Q | question |
| QuantP | Quantifier Phrase |
| RED | reduplicant |
| RUW | reduplicated unit word |
| SG | singular |
| SUW | simple (not reduplicated) unit word |
| UW | unit word |
| TOP | topic |
| UnitP | Unit Phrase |

Chapter 1

Introduction

Three kinds of innovations are offered in this book: new observations, new generalizations, and new analyses, with respect to a kind of linguistic formatives, namely, *classifiers* (or CL for short), in Mandarin Chinese. The word *zhi* in example (1a) (unless specified otherwise, all examples in this book are from this language) is a CL. The CL occurs between the numeral *san* ‘three’ and the noun *bi* ‘pen’. In (1b), *di* is also a CL.

- (1) a. *Yaoyao kanjian-le san zhi bi.*
Yaoyao see-PRF three CL pen
‘Yaoyao saw three pens.’
b. *Yaoyao kanjian-le san di you.*
Yaoyao see-PRF three CL oil
‘Yaoyao saw three drops of oil.’

Some languages have CLs and some do not. Some languages have the counterpart of the CL in (1b), but not that in (1a). From the English translations of the two examples we can see that English has a correlate for the CL *di* in (1b) (*drop*), but does not have a counterpart to the CL *zhi* in (1a). In this book, CLs like *zhi* are called *individual CLs* (they are called individual measures in Chao 1968: 585), and CLs like *di* are called *individuating CLs* (they are grouped into partitive measures in Chao 1968). Languages that have both types of CLs, such as Mandarin Chinese, Japanese, and Mayan languages, are called numeral CL languages.

Mandarin Chinese is a typical CL language. This is because, first, in a numeral expression (or ‘numeral-plus-noun construction’, as in Gil 2008), the occurrence of a CL is obligatory in the language (except in idiomatic expressions, compounds, or certain list contexts), whereas it can be optional in some other CL languages such as Indonesian. Second, the word order of a numeral expression is fixed in this language: the CL follows the numeral and precedes the noun. There is no variance in word order for the three elements in a nominal.¹ This is different from Japanese and Korean. Third,

1. Following the convention of generative grammar, I use the term *nominal* to cover all levels of elements that are [+V, -N]: word, phrase, and word-internal element.

the three elements are next to each other, and thus no other functional elements such as case markers intervene in the elements of a numeral expression. This is again different from languages such as Japanese and Korean. These characteristics of Mandarin Chinese represent a simple pattern of numeral expressions. This book gives a thorough syntactic analysis of CL constructions of this simple pattern.

One hypothesis about the contrast between CL languages and other languages is that nouns like *bi* ‘pen’ are mass nouns in Chinese, and therefore, like the word *oil* in English, such nouns require CLs. Accordingly the function of individual CLs like *zhi* in (1a) is to individuate mass. Such a hypothesis is falsified in this book. In addition to falsifying problematic hypotheses like this, we have developed a new understanding of the relation between mass nouns and other types of nouns. Our new analysis of the issue shows that the traditional binary count-mass division is not fine-grained enough to reach an acceptable level of descriptive adequacy. Instead, we identify two new properties (called features, in a technical way) to capture the contrasts of four basic types of nominals, represented by the English words *pen*, *oil*, *belief*, and *furniture*, respectively. We argue that Chinese *bi* ‘pen’ correlates with the *furniture*-type only, not with the *oil*-type. There are also languages in which neither the *zhi*-type of CLs in (1a) nor the *di*-type of CLs in (1b) occurs in numeral expressions, in contrast to both English and Chinese. For instance, it is perfectly fine to say *txabia apeta* ‘three blood’ in Yudja (an indigenous language spoken in Brazil; Lima 2010; 2012). This type of languages has been generally ignored in the literature, although their existence has been noted since the early 1940s (Whorf 1941). Comparing Chinese with these under-studied languages enlightens our understanding of the functions and structural properties of CLs in the language system.

Another influential hypothesis regarding the contrast between CL languages and other languages is that the CL *zhi* in (1a) is required to correlate with a plural marker, such as *s* in the English word *pens*. In Mandarin Chinese, a bare noun may encode either singular or plural entities, as shown by the two translations of *shuye* ‘leaf’ in (2).

- (2) *He-li piao-zhe shuye.*
 river-in float-DUR leaf
 ‘There are leaves floating on the river.’
 ‘There is a leaf floating on the river.’

It has been declared that CL languages have no systematic way to encode the contrast between singularity and plurality. We however observe that Mandarin Chinese does have a systematic and productive way to encode the contrast. In (3a), the reduplicative CL *pian-pian* introduces a plural reading; and in (3b), the simple form of the CL *pian*, in the absence of a numeral, introduces a singular reading.

- (3) a. *He-li piao-zhe (yi) pian-pian shuye.*
 river-in float-DUR one CL-RED leaf
 ‘There are many leaves floating on the river.’
 Not: ‘There is a leaf floating on the river.’
- b. *He-li piao-zhe pian shuye.*
 river-in float-DUR CL leaf
 ‘There is a leaf floating on the river.’
 Not ‘There are leaves floating on the river.’

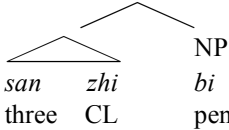
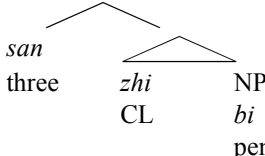
We show that all CLs can be reduplicated to encode unit-plurality in the language. The semantic type of the encoded plural is abundant plural, which has been attested in many languages. We also provide a series of arguments to falsify the traditional assumption that constructions like (3b) are derived by a numeral-deletion operation. In neither examples like (3a), nor examples like (3b), is there a syntactic position for a numeral. We thus investigate the interactions between plural markers and certain kinds of quantifiers, and the correlation between semantic and morphological markedness of plural markings, from a cross-linguistic perspective.

It has been recognized in the literature that CLs in CL languages may play multiple roles, beyond that in a numeral expression (Bisang 1993, 1999). In (1a) and (1b), the CLs function as counting units. In (3a) and (3b), the CLs function as number markers. What is the function of a CL in other constructions, such as *ke* in (4a) and *pian* in (4b)? In such constructions, *yi* ‘one’ does not contrast with any other numeral, and thus is not a numeral. Importantly, as in (1a) and (1b), the CL is obligatory in such constructions, and exhibits similar selectional restrictions on the nouns. It seems that when Mandarin Chinese is labeled as a numeral CL language, what we really see is that CLs occur in various kinds of nominal expressions, not restricted to numeral expressions at all.

- (4) a. *Yi ke shu zong you shu-gen.*
 one CL tree always have tree-root
 ‘A tree always has roots.’

- b. *Jie-shang yi pian hunluan.*
 street-on one CL choas
 ‘There is choas in the street.’

In addition to identifying the distributions and functions of CLs in various kinds of nominals, we also examine their positions in syntactic structures. As we have seen, numeral expressions, such as (1a) and (1b), are composed of three basic elements: a numeral, a CL, and an NP. It has long been unclear how these three elements are organized in the syntactic structure: which two of them are combined first before the third element is integrated? Or, talking in a technical way, does the CL c-command the NP? Some propose the structure in (5a), and others propose the structure in (5b), for the expression in (1a), for example.

- (5) a. 
 san zhi bi
 three CL pen
- b. 
 san zhi bi
 three CL pen

Not many arguments can be found in support of either proposal, although this is a basic issue of the syntax of numeral expressions. In this book, all arguments that we can find are shown to be problematic. New arguments that are directly relevant to constituency are looked for. Considering the interactions of the elements of a numeral expression, and the way these elements interact with modifiers, we find new generalizations that show two constituency patterns: although CLs like those in (1) exhibit the right-branching structure, as in (5b), some other types of CLs exhibit the left-branching structure, as in (5a).

One more fresh set of facts explored in this book is a special type of compound, which has not been paid enough attention in the literature: the one that is composed of a noun and a CL, such as *hua-duo* ‘flower’ in (6).

- (6) *Yaoyao na-le san ge hua-duo.*
 Yaoyao take-PRF three CL flower-CL
 ‘Yaoyao took three flowers.’

In (6), the CL *ge* must still necessarily occur between the numeral and the compound, although the latter already contains the CL *duo*. The syntax and semantics of this kind of compound confirm that the occurrence of

individual CLs with numerals in CL languages is a syntactic requirement, and that the position of such CLs is a functional head position, which may be taken by a place-holder, i.e., a semantically vacuous element.

Although we are still not confident about many details of various CL structures in Mandarin Chinese, we are confident in the progress of our understanding of the empirical issues, and to some extent, the understanding of the general natural laws beneath the facts.

The theoretical framework of this book is generative grammar. We focus on the uses of CLs in nominals such as (1), (3), (4), and (6), rather than other constructions such as verbal constructions. The acceptability judgment of the examples is based on the northern dialect of Mandarin Chinese, my mother tongue.

In Chapter 2, the issue of countability is investigated. In Chapter 3, we discuss the relationship between CLs and quantifiers in Mandarin Chinese. Next, in Chapter 4, we probe the number markers of the language. Then in Chapter 5, we study the constituency of numeral constructions in the language. The constituency patterns reached are then spelled out into enriched syntactic structures in Chapter 6. In this chapter, relevant functional projections are also established with empirical considerations. Meanwhile, typological patterns of the properties of the functional categories are discussed. In Chapter 7, noun-CL compounds are analyzed, and thus one more new dimension of knowledge is added. Chapter 8 concludes the book.

Chapter 2

Classifiers and countability

2.1. Introduction

Why does a numeral expression need a CL in CL languages such as Mandarin Chinese?² It has been widely assumed that the obligatory occurrence of a CL with a numeral and a noun in CL languages is related to the count-mass contrast in nominals. The goal of this chapter is to show that this traditional assumption is not fine-grained enough to cover the systematic contrasts of various types of nominals in either Mandarin Chinese or other languages. Instead, I argue that two syntagmatic properties of nominals are syntactically significant: the ability of a noun to combine with a numeral directly, and the ability of a noun to be modified by a delimitive (size, shape, or boundary) modifier. The two newly recognized properties or features can be attested in the co-occurrence restrictions of articles, quantifiers, adverbs, and CLs, in pronominalization, and in certain context-triggered shifts. It is the combination of the different values of the two features, rather than the alleged binary count-mass contrast, that explains various syntactic contrasts of different types of nominals, cross-linguistically. I argue that although the positive value of the first feature alone is enough to define the count status of a nominal, it is the combination of the negative values of both features that defines the mass status of a nominal. This chapter shows that the popular assertion that all nouns in Chinese are mass nouns is not accurate. Instead, all nouns in Chinese are non-count nouns, but they are further divided into mass and non-mass ones.

The chapter also falsifies the generally believed entailment relation between plurality and the count status. Furthermore, it also identifies the distinctive function of CLs of CL languages, which separates the languages from non-CL languages such as English.

The two features argued for in this chapter, Numerability and Delimitability, also set the scene for the analysis of other syntactic issues to be dis-

2. CLs in general are called *liang-ci* ‘quantity-word’ in Li (1924), *danwei-ci* ‘unit-word’ in Lü (1942: Ch. 11.72), and *measures* in Chao (1968). See Section 6.2.1 for more names for CLs in various theories.

cussed in this book. They are encoded in functional categories, to be shown in later chapters.

In order to introduce the empirical range of the discussion, I use the traditional term *countability* as a convenient cover term. Readers will eventually see that facts are analyzed based on the two features mentioned above, without any implementation of the term.

In addition to this introductory section and the last, the summarizing one, this chapter is composed of five substantial parts. Section 2.2 introduces the two features and proposes my new theory of the count-mass contrast, based on the features. Section 2.3 and Section 2.4 are investigations of the features in Chinese nouns and unit words, respectively. Section 2.5 compares this new analysis of the count-mass contrast with other approaches in the literature. Section 2.6 further argues that the count and non-count contrast is syntactic, and shows the problems of certain current syntactic analyses of CLs in numeral expressions.

2.2. Decomposing countability

2.2.1. Identifying two new features syntagmatically

It is well-recognized that there are two kinds of relationship between linguistic elements: paradigmatic and syntagmatic. A paradigmatic relationship is established by a substitution test. For instance, the three words *of*, *by*, and *for* establish a paradigmatic relation in forming the string *government {of/by/for} the people*, since one of them can substitute another, i.e., each of them may occur in the same syntactic position. A syntagmatic relationship, however, is defined by the compatibility of co-occurring elements in the same construction, e.g., the relationship between *the* and *people* in the string *the people*. Paradigmatic and syntagmatic relationships have been metaphorically viewed as vertical and horizontal ones, respectively.

Many formal features such as tense and aspect of verbal expressions, gender and person of nominal expressions are defined paradigmatically. Selection features are typical syntagmatic features. For instance, the transitive verb *drink* c-selects a nominal, because it needs to occur with a nominal; and it s-selects a liquid-denoting nominal, because it needs to combine with this type of nominal.

Different kinds of syntagmatic relations exhibit different properties. In selection, the occurrence of the selected element is obligatory. But there are

other syntagmatic relations that do not exhibit this kind of strict relation. For instance, gradability of adjectival expressions is defined by the possibility to occur with a relative degree word such as *quite*, *terribly*, and *fairly* (e.g., Sapir 1944; Bolinger 1972). In (7a), the adjective *nice* is gradable since it may occur with the degree word *quite*. In contrast, the adjective *next* is not gradable, since it may not occur with any degree word, such as *quite*, as shown in (7b).³

- (7) a. *the quite nice book* b. *the (*quite) next book*

Another example of non-obligatory co-occurrence relation is seen in the feature of agentivity. Agentivity of a verbal expression is defined by the possibility to be modified by an agent-oriented adverb. For instance, the VP *shouted* in (8a) is agentive since it may occur with the agent-oriented adverb *deliberately*, and the VP *arrived* in (8b) is not agentive, since it may not occur with *deliberately*.

- (8) a. *Kim shouted deliberately.* b. *Kim arrived (*deliberately).*

In defining gradability and agentivity, a feature is identified simply in the way that it allows X. Allowing does not mean requiring. Therefore the presence of X is not obligatory.

With this background in mind, I now introduce two features which are also defined syntagmatically, in order to analyze the count-mass contrast.

Some nouns may combine with a cardinal numeral directly, and some may not. In (9a), for instance, the noun *unicorn* combines with the numeral *one* directly. In (10a), however, the noun *oil* may not do so.⁴

- (9) a. *one unicorn* b. *five unicorns* c. *zero unicorns*
 d. *0.5 unicorns* e. *1.0 unicorns* f. *five beliefs*
- (10) a. *(*one) oil* b. *(*one) furniture*

-
3. The word *very* may occur with non-gradable adjectives such as *next*. However, in addition to being a degree word, *very* also means actual or precise, used to emphasize the exact identity of a particular person or thing, according to *The New Oxford American Dictionary* (Second Edition 2005, Oxford University Press).
4. In this book, I do not discuss the construction in which a numeral is semantically related to a noun phrase but occurs external to the noun phrase, e.g., as an adverbial. See Rijkhoff (2002: 33) for such constructions.

The contrast can also be seen in predication (the examples in (11) are adapted from Chierchia 2010: 104):

- (11) a. *The boys are at least thirty.* b. **The gold is at least thirty.*
 c. *The gold is at least thirty pounds.*

The numeral *thirty* is the predicate of the nominal *the boys* in (11a), whereas it may not be a predicate of the nominal *the gold* in (11b). Comparing (11b) and (11c), we see that the numeral needs the support of the measure word *pounds* to function as the predicate of the string *the gold*. Following the assumption that the copula in a nominal predicate construction in English is a tense-bearer or a raising verb (Stowell 1981, 1983, among others) and therefore the surface order of the subject-copula string is derived by the raising of the subject from its base-position, I assume that the combination of the subjects with the numeral predicates in their base-positions is possible in (11a), but not in (11b). The contrast is related to the type of nominal instantiated by *boy* and that by *gold*.

A similar contrast is also seen between Argument Structure Nominals and their correlated simple nominals. According to Grimshaw (1990) and Alexiadou (2011: 34), in English and Greek, Argument Structure Nominals, such as *jumping of the cow* in (12a), may not occur with a numeral, whereas the correlated simple nominals may, as shown by *jump* in (12b, c):

- (12) a. **One jumping of the cow was interrupted by the fireworks.*
 b. *One jump was disqualified.*
 c. *two jumps*

I use the feature *Numerability* to represent the contrast between nominals that may combine with a numeral directly and nominals that may not do so. Accordingly, [+Numerable] means allowing a numeral, and [-Numerable] means disallowing a numeral. Therefore, the nominals in (9), (11a), and (12b/c) are [+Numerable] and those in (10), (11b/c), and (12a) are [-Numerable].⁵

The numerals in the nominals in (9) are different. In this analysis, Numerability cares about the ability to occur with a numeral only; no special status is given to the contrast among *one*, *zero*, integers, and other numerals.

The feature Numerability is attested in the fact that certain elements intrinsically bring about a relevant effect. For instance, the occurrence of

5. I use bivalent, rather than privative, feature analysis in classification of nominals (see Harbour 2011).

English suffixes such as *-er*, *-ee*, *-ant/-ent*, and *-ist* makes a noun able to occur with a numeral. In (13a), the noun *advice* has [–Numerable], since it may not occur with the numeral *one*. In (13b), however, the suffix *-er* occurs with the noun, and the numeral may occur. The acceptability contrast in (13) indicates that it is the suffix that brings about the feature [+Numerable] to the nominal.

- (13) a. **one advice* b. *one adviser*

On the other hand, in Dutch, the presence of a collective affix such as *-werk* makes the noun unable to occur with any numeral (de Belder 2010; 2011a: 218) and thus the affix is a marker of [–Numerable] in my analysis. In (14a), the nominal *suiker* ‘sugar’ has [+Numerable], since it occurs with the numeral *drie* ‘three’. In both (14b) and (14c), *-werk* occurs. In the presence of the numeral *drie* ‘three’, (14b) is not acceptable. The acceptability contrast between (14b) and (14c) indicates that it is the suffix that brings about the feature [–Numerable] to the nominal (COL = COLLECTIVE).

- (14) a. *drie suiker-en* b. **drie suiker-werk-en* [Dutch]
 three sugar-PL three sugar-COL-PL
 ‘three sugars’
 c. *suiker-werk*
 sugar-COL
 ‘confectionery’

In addition to Numerability, we also identify the feature Delimitability. Some words may be modified by a size-denoting expression (e.g., *big*, *small*), shape-denoting expression (e.g., *long*, *round*, *square*, *thin*), or boundary expression (e.g., *whole*), and some may not. I use the general term *delimitive modifier* to cover size-, shape-, and boundary-denoting modifiers. In (15a), (15b), and (15c), the delimitive adjectives *big*, *large*, and *square* modify the concrete nouns *unicorn*, *furniture*, and *watermelon*, respectively. In (15d), (15e), (15f), and (15g), however, the adjectives may not modify *oil*, *music*, *belief*, and *wine* (see Jespersen 1924: 198, Quine 1960: 104, McCawley 1979 [1975]: 170, Bunt 1985: 199). In (16a), the abstract noun *story* may be modified by *whole*, but in (16b), the abstract noun *leisure* may not.⁶

6. Dixon (1982) calls shape and size modifiers *dimension modifiers*. In Tang (2005: 456), “m-feature” refers to [+/–bound].

- (15) a. *a big unicorn* b. *large furniture* c. *square watermelon*
 d. **large oil* e. **large music* f. **huge belief*
 g. **square wine*
- (16) a. *whole story* b. **whole leisure*

The contrast is also found in predication, as seen in (17) (Chierchia 2010: 110; Vázquez Rojas 2012: 66):

- (17) a. *The violets are small.* b. *The furniture is small.*
 c. **The snow is small.*
- (18) a. *The luggage is round.* b. **The blood is round.*

In (17a), the delimitive adjective *small* is the predicate of *the violets*, and in (17b), the adjective is predicated of *the furniture*. In (17c), however, the adjective may not be the predicate of *the snow*.⁷

I use the feature Delimitability to represent the contrast between nominals that may be modified by a delimitive modifier and nominals that may not. Thus, [+Delimitable] means allowing a delimitive modifier, and [–Delimitable] means disallowing a delimitive modifier. The nominals in (15a), (15b), (15c), (16a), (17a), and (17b) are [+Delimitable] and other nominals in (15) through (17) are [–Delimitable].

Although Delimitability is defined syntagmatically, it has a semantic correlation. When a nominal has [+Delimitable], its denotation must have “a certain shape or precise limits” (Jespersen 1924: 198). The shape or limits are delimitable in certain dimensions (e.g., length, size, volume, shape, and time), and therefore, atomicity is exhibited. In contrast, a nominal with [–Delimitable] denotes either material, which is in itself independent of shape or size, such as *silver*, *water*, *butter*, *gas*, *air*, or immaterial notions that have no intrinsic boundaries, such as *leisure*, *music*, *traffic*, *success*, *tact*, *commonsense* (cf. Jespersen 1924: 198).⁸ In my understanding, the

7. The example in (i) is from Bunt (1985: 213). According to Schwarzschild (2011), although the word *sugar* is normally used as a mass noun, similar to *snow*, in (i), however, it has the same use as words such as *furniture*.

(i) *The sugar in these boxes is cubic.*

8. Note that dimensional abstract nouns such as *tiji* ‘volume’ and *chicun* ‘size’ may be modified by a size adjective (e.g., *da chicun* ‘big size’). Such relational nouns must be saturated by a delimitable noun (e.g., *qunzi de chicun* ‘the size of the skirt’ vs. **lilun de chicun* ‘*the size of the theory’), unlike other types of

former group of nouns can occur with a standard or container measure, as seen in (19a) and (20a), whereas the latter group cannot, as seen in the rest of the examples in (19) and (20).⁹

- (19) a. *a kilo of butter* b. **a kilo of leisure* c. **a kilo of beliefs*
(20) a. *a bowl of butter* b. **a bowl of leisure* c. **a bowl of beliefs*

Note that immaterial nouns such as *belief* can be [+Numerable], as seen in (9f), although they are [−Delimitable], as seen in (15f).

Similar to Numerability, Delimitability is also attested in the fact that certain elements intrinsically bring about a relevant effect. For instance, *shui* ‘water’ alone may not be modified by *xiao* ‘small’, as seen in (21a); but if it is followed by a CL such as *di*, the whole compound *shui-di* can be modified by *xiao*, as seen in (21b). Similarly, *ni* ‘mud’ alone may not be modified by *xiao*, as seen in (22a); but if it is followed by a CL such as *kuai*, the whole compound *ni-kuai* can be modified by *xiao*, as seen in (22b). The examples in (23a) and (23b) show the same point (This issue is further discussed in Section 7.3.1).

- | | | | | |
|------|----|----------------------------------|----|---|
| (21) | a. | <i>*xiao shui</i> small water | b. | <i>xiao shui-di</i> small water-CL 'small drop(s) of water' |
| (22) | a. | <i>*xiao ni</i> small mud | b. | <i>xiao ni-kuai</i> small mud-CL 'small chunk(s) of mud' |
| (23) | a. | <i>*da yun</i> big cloud | b. | <i>da yun-duo</i> big cloud-CL 'big piece(s) of cloud' |

On the other hand, English words such as *woman*, *brother*, and *child* may be modified by a delimitive adjective such as *tall*, but if the suffix *-hood*

abstract relational nouns (e.g., *xingzhi* ‘nature’), which can be saturated by a non-delimitable noun (e.g., *gai lilun de xingzhi* ‘the nature of the theory’).

9. In idiomatic expressions, *ton* can occur with any noun. But *ton* in expressions such as *tons of leisure* may not be replaced by, or in contrast with, other standard measures such as *pound* and *kilo*. I thank Audrey Li for pushing me to clarify this.

or *-ship* occurs with a noun, no delimitive adjective may occur, as seen in (24). Therefore, the suffixes *-hood* and *-ship* are markers of [–Delimitable].

- (24) a. *tall* {woman/brother/child}
 b. **tall* {womanhood/brotherhood/childhood}
 c. *tall* {lady/friend/priest}
 d. **tall* {ladyship/friendship/priestship}

Delimitive adjectives are different from but not contrastive to gradable adjectives. The latter has an argument of type <d>, which is bound by a degree operator. The binding is seen if a degree word occurs or the adjective is in a comparative construction (Higginbotham 1985; Kennedy 1997, among others). Words like *big* are both gradable and delimitive, but words like *absolute* are neither. In addition, words like *square* and *whole* are delimitive but not gradable, whereas words like *heavy* and *cheap* are gradable but not delimitive.

Unlike other adjectives, delimitive adjectives reject collective readings. Moltmann (2004: 766; 2012: 24) notes that size and shape adjectives may not have collective readings. In (25a), *heavy* has both reading A, a distributive reading, and reading B, a collective reading. In (25b), however, *round* does not have a collective reading.

- (25) a. *The boxes are heavy.*
 A. Each one of the boxes is heavy.
 B. The total sum of boxes is heavy, each individual box is not necessarily heavy.
 b. *The boxes are round.*
 A. Each one of the boxes is round.
 B. #The total sum of boxes is round, each individual box is not necessarily round.

Schwarzchild (2011) calls size and shape adjectives stubbornly distributive predicates. He claims that such a predicate applies to singularities only. In our viewpoint, such a predicate is delimitive, and its argument is [+Delimitable]. The contrast between stubbornly distributive and other predicates instantiates the contrastive values of delimitability in a plural context.

The fact that delimitive adjectives are different from gradable adjectives and reject collective readings indicates that they form a natural class semantically. Our feature Delimitability seems to get support from this semantic perspective.

I now clarify two further issues with respect to the feature Delimitability. First, words such as *big*, *small*, *enormous*, *huge*, and their Chinese counterparts have an intensifier usage. As stated in Morzyski (2009: 176), “an adjective that normally expresses size characterizes the degree to which the gradable predicate holds”, as shown in (26) (also see Constantinescu 2011: 35). In adjectives used in this way, *big* can be replaced by *real*, *da* ‘big’ can be replaced by *zhenzhengde* ‘real’ or *qiang* ‘strong’, and *xiao* ‘small’ can be replaced by *shaowei* ‘moderately’ in certain contexts.

- (26) a. *big idiot* b. *big smoker* c. *big idea*
 d. *da bendan* e. *da hao xingshi*
 big fool big good situation
 ‘big fool’ ‘very good situation’
 f. *xiao xian shenshou* g. *da huo* h. *da feng*
 small show skill big fire big wind
 ‘show the skill a little bit’ ‘strong fire’ ‘strong wind’

The intensifying readings are not size readings, and thus the adjectives in such a use are not delimitive adjectives. Similar intensifying readings are also found in other adjectives such as *good*, as in (27) (Levinson 2010: 150; Kayne 2005a: 195):¹⁰

- (27) a. *He braided her hair good and tight.*
 b. *A good many linguists went to the conference.*

Second, the adjectives *deep* and *shallow* in expressions such as *deep water* and *shallow water* do not semantically modify *water*. Instead, the delimitive adjectives may modify the source location of water, and the type of the location is used for the type of water.

10. The retroflexion suffix *-r* in Mandarin Chinese encodes endearment, as well as diminutiveness. In the former reading, no size meaning is expressed, as seen in (i).

- (i) a. *da-men-r* b. *qi-shui-r*
 big-door-ENDEARMENT air-water-ENDEARMENT
 ‘big door’ ‘soda water’

In Cinque (2011: 6), the functional projection to host an endearment element is ranked lower than the one for a diminutive element. Also see Fortin (2011: 3) for the distinctions between the two readings of diminutives.

2.2.2. Defining count and mass by the two features

Traditionally, the notion of count is in direct contrast to the notion of mass. Different from this binary analysis, I use the two values of the two features, Numerability and Delimitability, to make a more fine-grained classification. The four possible combinations of the two values of the features are summarized in (28). Among the four possibilities, (28a) and (28b) are both count, (28d) is mass, and (28c) is non-count and non-mass.

(28)

| | [Numerable] | [Delimitable] | example | countability status |
|----|-------------|---------------|----------------------------------|-------------------------------------|
| a. | + | + | <i>unicorn</i> in (9a), (15a) | count with a delimitable feature |
| b. | + | – | <i>belief</i> in (9f), (15f) | count without a delimitable feature |
| c. | – | + | <i>furniture</i> in (10b), (15b) | non-count, non-mass |
| d. | – | – | <i>oil</i> in (10a), (15d) | mass |

In this analysis, the feature Numerability alone may distinguish a count noun from a non-count noun. If a nominal may combine with a numeral directly in the context, it has [+Numerable] and thus is a count nominal in that context. Otherwise, it is a non-count one. According to Chierchia (1998: 353; 2010: 104), the ability to combine with a numeral is the signature property of a count nominal.

But Numerability alone is not enough to decide whether a noun is a mass noun. A non-count noun is not necessarily a mass noun. Well-recognized mass nouns, such as the word *oil*, may be neither combined with a numeral directly, nor modified by a delimitive adjective. In my analysis, it is the combination of [–Numerable] and [–Delimitable] that defines the mass status of a nominal.

The independent status of (28c) shows that non-count nominals do not have to be mass ones. Words like *furniture* may be modified by a delimitive modifier, although they may not be combined with a numeral directly.

Thus, [+Delimitable] is not part of the defining property of a count element (contra Wiltschko 2005, among others). On the one hand, *duckling* and the German word *Eichhörnchen* ‘squirrel’ can be modified by delimitive modifiers (e.g., *small duckling*), but they can occur as non-count nouns, in addition to count nouns (see de Belder 2011b: 181, fn. 12). On the other hand, words such as *belief* may combine with a numeral, and thus are count nouns, but they may not be modified by a delimitive adjective.

In my approach, like the feature of gradability for APs and the feature agentivity for VPs, the features related to the count-mass contrast for NPs can also be defined syntagmatically. I claim that the two features, Numerability and Delimitability, are available in identifying the countability status of nouns in all languages that have adnominal numerals and delimitive modifiers. Also, the two features are the only criteria to be considered in analyzing the count-mass contrast. The relationship between plural markers and the count-mass contrast will be discussed in Sections 2.2.6 and 2.5.3.

2.2.3. Attesting the two features in co-occurrence restrictions

The linguistic reality of Numerability and Delimitability is independently attested in co-occurrence restrictions of articles, quantifiers, adverbs, and CLs.

It is well-known that indefinite articles and some quantifiers occur with count nouns in English. For instance, *every*, *many*, *a few*, *several*, and *another* occur with nouns that have [+Numerable] (e.g., {*many*/**much*} *unicorns*), and *much*, *little*, and *a little* occur with nouns that have [–Numerable] (e.g., {**many*/*much*} *oil*; {**many*/*much*} *furniture*). A clearer contrast is seen in the Turkish examples in (29) and (30). The nouns in these examples have neither a plural marker nor a CL. The words *kitap* ‘book’ and *şehir* ‘city’ may combine with a numeral, and they are compatible with the quantifiers *kaç* (*tane*) ‘how many’, *birkaç* ‘a few’, or *birçok* ‘many’, but not the quantifier *ne kadar* ‘how much’. The last quantifier is for words such as *para* ‘money’ and *su* ‘water’, which may not combine with a numeral (Göksel & Kerslake 2005: 163–164; Görgülü 2010).

- (29) a. *Kaç (tane) kitap oku-du-n?*
 how item book read-PST-2SG
 ‘How many books did you read?’
 b. *Kaç (tane) şehir gez-di-n?*
 how item city travel-PST-2SG
 ‘How many cities did you travel?’
- (30) a. *Ne kadar para harca-di-n?*
 what amount money spend-PST-2SG
 ‘How much money did you spend?’
 b. *Ne kadar su iç-ti-n?*
 what amount water drink-PST-2SG
 ‘How much water did you drink?’

The feature Delimitability is also attested in a parallel way. In Japanese, no noun may combine with a numeral directly, therefore, I do not use nouns of this language to show the different values of Numerability. Nevertheless, it is easy to see the contrastive values of Delimitability in the language. The quantifiers *tasuu* ‘many’ and *shoosuu* ‘a few’ may occur with words such as *isha* ‘doctor’ or *hon* ‘book’, but not with words like *inku* ‘ink’ or *gyunyu* ‘milk’. This contrast is shown in (31a) and (31b). The word *isha* or *hon*, but not *inku* or *gyunyu*, can be modified by a delimitive adjective. Therefore, the quantifiers occur with [+Delimitable] nominals. However, the opposite pattern is seen with the quantifiers *taryoo* ‘much’ and *shooryoo* ‘a little’. They may occur with words such as *inku* or *gyunyu*, but not words like *isha* or *hon*, as shown in (32a) and (32b), and therefore, they occur with [–Delimitable] nominals (Kobuchi-Philip 2011: 307; similar examples have also been provided to me by Yukari Kurita, p.c., Sept. 23, 2010).

- (31) a. {*tasuu/shoosuu*}-no *isha* b. *{*tasuu/shoosuu*}-no *inku*
 many/a few-GEN doctor many/a few-GEN ink
- (32) a. *{*taryoo/shoorryoo*}-no *isha* b. {*taryoo/shooryoo*}-no *inku*
 much/a little-GEN doctor much/a little-GEN ink

The Korean counterparts of the examples show the same contrast (Yi 2010: Sec. 4.4.1).

Adverbs such as *each* may not be in construal with nouns that have [–Delimitable], as shown by the contrast between (33a) and (33b). The Mandarin Chinese adverb *zuge* ‘each’ is subject to the same constraint, as seen in the contrast in (34).

- (33) a. *The balls each fell down off the table.*
 b. **The oil each fell down off the table.*
- (34) a. *Qiqiu zuge xiaoshi-le.*
 balloon each disappear-PRF
 ‘The balloons disappeared one by one.’
 b. **Zhima-you zuge xiaoshi-le.*
 sesame-oil each disappear-PRF

In Chinese, some CLs are sensitive to the delimitable feature of the noun. For instance, no liquid-denoting noun may be modified by a delimitive adjective, as seen in (35a). Such a noun is [–Delimitable]. It can occur with the CL *di*, as seen in (35b). *Di* takes nouns with [–Delimitable] only.

- (35) a. **chang* {*you/shui/xue/niao/yanlei/mo-shui*}
 long oil/water/blood/urine/tear/ink-water
 b. *san di* {*you/shui/xue/niao/yanlei/mo-shui/*putao*}
 three CL oil/water/blood/urine/tear/ink-water/grape
 ‘three drops of {oil/water/blood/urine/tear/ink/*grape}’

In contrast, *putao* ‘grape’ can be modified by a delimitive adjective, as seen in (36a) below. This noun is thus [+Delimitable]. It may not occur with *di*, as seen in (35b) above. Other CLs that reject nominals with [+Delimitable] include *ji* (for liquid medicine), *pao* (for urine), *tan* (for any liquid). I call such CLs (part of Chao’s 1968 partitive measures) individuating CLs, which select [–Delimitable].

- (36) a. *da putao*
 big grape
 ‘big grape’
 b. *san ke putao/*you/*zhi/*zheng-qi/*xue/*rou/*bu/*qian/*yanlei*
 three CL grape/oil/paper/steam-air/blood/meat/cloth/money/tear

Words like *putao*, which are [+Delimitable], can be selected by another kind of CLs, individual CLs (called individual measures in Chao 1968: 585). The CL *ke* in (36b) is such a CL. CLs such as *ben* (for books), *tou* (for animals such as cows), and *zhi* (for animals such as chickens) are also individual CLs. Moreover, collective CLs, such as *zu* ‘group’, *qun* ‘crowd’, *da* ‘dozen’, *shuang* ‘pair’, *dui* ‘pair’, and partitive CLs, such as *ye* ‘page’, *duan* ‘paragraph’, and *zhang* ‘chapter’ (they all belong to Chao’s 1968 partitive measures), also occur with nouns with [+Delimitable] only.

2.2.4. Attesting the two features in pronominalization

The English proform *one* can only take a count noun as its antecedent (Schütze 2001; Barbiers 2005; Ojeda 2005: 404). The same constraint is seen in the Afrikaans proform *een* ‘one’ (Corver & van Koppen 2011: 376). This constraint indicates that such pronominalization is sensitive to the feature Numerability.

- (37) a. *Would you like a red bike or a white one?*
 b. **Would you like red wine or white one?*

In Mandarin Chinese, the word *liaoliaowuji* ‘few’ can be used as a pronoun. Like other pronouns, it can function as an argument independently, taking another nominal in the context as its antecedent. The antecedent of the pronoun *liaoliaowuji* must be a noun that is able to be modified by a delimitive adjective. In (38a), the antecedent of *liaoliaowuji* is *mao-bi* ‘brush-pen’, which can be modified by a delimitive adjective such as *chang* ‘long’. In contrast, in (38b), the antecedent of *liaoliaowuji* is *mo-shui* ‘ink-water’, which, as shown in (35a) above, cannot be modified by a delimitive adjective. The pronominalization in (38b) fails. The acceptability contrast in (39) exhibits the same pronominalization constraint.

- (38) a. *Wo yiqian mai-guo henduo mao-pi,*
 1SG before buy-EXP many brush-pen
xianzai shengxia liaoliaowuji.
 now remain few
 ‘I bought many brush-pens before, but few of them remain now.’
- b. *Wo yiqian mai-guo hendu mo-shui,*
 1SG before buy-EXP many ink-water
 **xianzai sheng-xia liaoliaowuji.*
 now remain few
 ‘I bought much ink before, *but few of them remain now.’
- (39) a. *Women guji daliang youke hui lai zheli,*
 1PL estimate a.lot tourist will come here
keshi zhi jin zhi lai-le liaoliaowuji.
 but up.to today only come-PRF few
 ‘We estimated that a lot of tourists would come here, but up to today only a few have come.’
- b. *Women guji daliang zheng-qi hui cong zhe ge kong*
 1PL estimate a.lot steam-air will from DEM CL hole
*mao-chulai, *keshi zhi mao-chulai-le liaoliaowuji.*
 rise-outbut but only rise-out-PRF few
 Intended: ‘We estimated that a lot of steam would come out of this hole, but only little came out.’

The contrast between (38a) and (38b) and the one between (39a) and (39b) indicate that pronominalization of *liaoliaowuji* is sensitive to the feature Delimitability.

2.2.5. Attesting the two features in shifts

In this subsection, I argue that the two features are also attested in the input and output of three shifts: Universal Grinder, Universal Packager, and Universal Sorter.

Universal Grinder

Imagine we have a big grinder. We can put things in and what we get is a massive object, which does not have a shape intrinsic to the property of the input. This is the so-called effect of Universal Grinder (Pelletier 1979 [1975]: 6). Compared with the word *apple* in (40a), the word *apple* in (40b) denotes a massive object.

- (40) a. *There is an apple on the table.* b. *There is apple in the salad.*

Universal Grinder has been viewed as an effect of changing a “count” noun into a “mass” noun. I claim that it is an effect of blocking the projection of the feature [+Delimitable], in a specific context. In other words, the output of the shift must be [–Delimitable]. For instance, the word *apple* in (40b) may not be modified by the delimitive adjective *small*, as shown in (41a) (Bunt 1985: 207). (41b) shows the same point.

- (41) a. *There is (*small) apple in the salad.*
b. *There wasn't much (*long) cucumber in the salad.*

The effect of the Universal Grinder is also seen in Chinese:

- (42) a. *Wo yu bu chi-le.*
1SG fish not eat-PRF
A: ‘I will not eat the whole fish anymore.’
B: ‘I will not eat the fish meat anymore.’
b. *Wo da de yu bu chi-le.*
1SG big DE fish not eat-PRF
✓A: ‘I will not eat the whole big fish anymore.’
✗B: ‘I will not eat the (big) fish meat anymore.’

The word *yu* ‘fish’ in (42a) is ambiguous. Reading A is attested when the speaker has a plate of whole fish in front of him, and Reading B is attested when the speaker is in front of a plate of processed fish meat (e.g., fish

slices or chunks). The meat reading is an effect of Universal Grinder. However, in (42b), the adjective *da* ‘big’ occurs, and then *yu* must have the whole fish reading. Note that only delimitive modifiers can bring about the blocking effect. In (43), the modifier is not a delimitive one and thus the ambiguity remains (in this case, the Universal Grinder effect is observed even in a complex nominal. Cf. Acquaviva 2010: 9).

- (43) *Zuotian mai de yu wo bu chi-le.*
 yesterday buy DE fish 1SG not eat-PRF
 A: ‘I will not eat the whole fish that {was/were} bought yesterday.’
 B: ‘I will not eat the fish meat that was bought yesterday.’

We can see that the presence of the delimitive adjective correlates with the atomicity reading. The fact that the output of the Universal Grinder may not allow a delimitive adjective means that the output of the shift is not only [–Numerable], but also [–Delimitable].

Examples of the effect of the Universal Grinder in Chinese, such as (42), are easy to find (contra Cheng et al. 2008; and Cheng 2012; See de Belder 2011a: 91, or 2011b: 198, for a discussion of the markedness of examples like *There is dog all over the wall*, and her pragmatic account). The experimental studies in A. Huang (2009) and A. Huang & Lee (2009) also show that Chinese has Universal Grinder effects. (44) gives us another pair of such examples (if we change *jidān* ‘egg’ in (44) into *pingguo* ‘apple’, we get a parallel effect).

- (44) a. *Panzi-li you jidan.*
 plate-in have egg
 A: ‘There are whole eggs in the plate.’
 B: ‘There is scrambled egg in the plate.’
 b. *Panzi-li you da jidan.*
 plate-in have big egg
 ✓A: ‘There are big whole eggs in the plate.’
 ✗B: ‘There is big scrambled egg in the plate.’

Now let us turn to the input of the shift. The word *furniture* is [–Numerable] (see (10b)). After an earthquake, for example, when items of furniture pieces such as legs of chairs and tops of tables are all over a place, one can say (45), and thus the Universal Grinder effect is also available.

- (45) *There is furniture all over the place.*

In Chinese, no noun may combine with a numeral directly and thus all nouns are [–Numerable] (Section 2.3.1), but the Universal Grinder effect is still available. Considering both the Chinese examples in (42a), (43), (44a), and the English example in (45), we can see that the input of the shift is not restricted to [+Numerable]. So the shift is not a shift from a count noun to something else, since the input can be a non-count noun.

The above discussion shows that the input of Universal Grinder is specified with [+Delimitable] only, but the output is the negative values of both features.

- (46) Universal Grinder:
 $[\alpha \text{ Numerable}, +\text{Delimitable}] \rightarrow [-\text{Numerable}, -\text{Delimitable}]$

The two features are thus attested in a more precise description of the shift.

Universal Packager

In a perspective different from the Universal Grinder, all kinds of the material type of massive objects can be put in containers or be apportioned in a certain way, and after doing so, the massive objects become discrete portions and thus can be counted. For instance, the word *water* and *beer* in (47a) each occur with a numeral and are thus [+Numerable], i.e., countable.

- (47) a. *Give me two waters and one beer.*
 b. *I'll have another {beer/wine/whiskey}.*
 c. *I had too many {beers/wines/whiskeys} already.*

This is the so-called effect of Universal Packager (Pelletier 1979; Bach 1986: 10; Jackendoff 1991; 1997: 53). It has been viewed as an effect of changing a “mass” noun into a “count” noun, since the massive objects become “the individuations based on the glasses or servings thereof” (Ojeda 2005: 405). This conventional unit or portion reading is commonly found (Corbett 2000: 37). In fact, it is a contextually induced Numerability effect. The denoted entity must be quantized in a certain way in the context. The discourse context specifies the exact unit of counting. The feature [+Numerable] emerges in the context where the noun occurs with a numeral, as in (47a), or with a determiner or quantifier that occurs with a noun that exhibits [+Numerable], such as *another* and *many* (see Section 2.2.3), as in (47b) and (47c) (cited from Ojeda 2005: 404).