

Expressing Number Productively in Mandarin Chinese*

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Abstract

It is generally believed that numeral classifier languages such as Chinese have no productive way to encode the contrast between plurality and singularity. This paper shows that although bare nouns in Mandarin Chinese encode general number, the language uses reduplicate unit words (including classifiers and measure words) to express unit-plurality, and uses non-reduplicate form of unit words to express unit-singularity. Neither way of number-encoding is compatible with a numeral. The paper shows that plural markers in Mandarin Chinese are structurally licensed by certain quantifiers. This work indicates that classifier languages use the morphological forms of classifiers themselves to express the singular-plural contrast productively, a new understanding of the forms of number markers in numeral classifier languages.

Key words: number, plural, singular, classifier, quantifier, Mandarin Chinese

1. Introduction

It has been generally assumed that there is no real plural marker in Mandarin Chinese. The most frequently discussed plural-encoding forms are *xie* ‘some’ (e.g., Iljic 1994) and *–men* (e.g., Li and Thompson 1989: 40, 83; Iljic 1994, 2001; Li 1999). However, *xie* does not encode a contrast to any sense of singularity when it occurs with nouns such as *shui* ‘water’ and *mianfen* ‘flour’ (e.g., *na xie shui* ‘that amount of water’, *na xie mianfen* ‘that amount of flour’). The suffix *–men*, although obligatory for personal pronouns, is restricted to common nouns that are both definite and human-denoting, and thus is not a number marker in general. Indeed, if we consider *xie* and *–men* only, we cannot conclude that there is a systematic number contrast in the language.

However, I will argue that the language does have a productive formal way to encode plurality, an understanding that has not been reached so far, although the relevant facts have been recognized. Productivity here means the recurrence of a certain morphosyntactic pattern in which lexically different subtypes of elements may occur. If productivity counts as an effective criterion for attesting a certain property (i.e., feature), the investigation of this paper will lead to the conclusion that Mandarin Chinese nominals have the property of number. However, I will also show that the identified number markers have a dependency relation with certain quantificational elements. This dependency fact may show that the plural markers represent a link of the grammaticalization chain from quantifiers to independent number markers.¹

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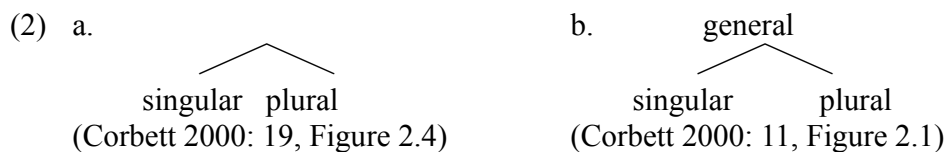
¹ In this paper, following the convention of generative grammar, I use the term *nominal* to cover all levels of elements that have the category [+V, -N], including word, phrase, and word-internal element.

In Section 2 and Section 3, I will argue for the existence of plural and singular markers, respectively, for units in Mandarin Chinese. Based on my conclusions, I will briefly address relevant theoretical issues in Section 4. In the remaining part of this introductory section, I introduce the notions of general number and abundant plural. Both will be shown to be available in Mandarin Chinese.

According to Corbett (2000), nominals that are not specified with either singular or plural express the so-called general number. For instance, in the Fouta Jalon dialect of Fula (in Guinea), we find a three-way system of number (Corbett 2000: 12):

(1)	GENERAL		SINGULAR		PLURAL	[Fula]
a.	<i>toti</i>	‘toad(s)’	<i>totii-ru</i>	‘toad’	<i>totii-ji</i>	‘toads’
b.	<i>nyaari</i>	‘cat(s)’	<i>nyaarii-ru</i>	‘cat’	<i>nyaarii-ji</i>	‘cats’
c.	<i>boofa</i>	‘egg(s)’	<i>woofa-nde</i>	‘egg’	<i>boofa-de</i>	‘eggs’
d.	<i>biini</i>	‘bottle(s)’	<i>biinii-ri</i>	‘bottle’	<i>biinii-ji</i>	‘bottles’

Thus, cross-linguistically, the contrast between singular and plural number can be represented differently. As shown in Corbett (2000: 9-19), languages such as English do not have general number, and therefore, there is a binary contrast: singular vs. plural, as illustrated in (2a). In languages such as Fula, plurality contrasts with not only singularity, but also the general number, as illustrated in (2b). The ternary contrast does not affect the formal status of number feature in the language (See Rijkhoff 1999; 2002 for a typological study of nouns with general number, “transnumeral nouns” in his term).



Many numeral classifier (CL) languages use bare nouns to express general number. So does Mandarin Chinese (Rullmann and You 2006). In this language, bare nouns can denote either singular or plural units, depending on the context. Some possible interpretations of the bare noun *xigua* ‘watermelon’ are listed in (3a), and similarly, some possible interpretations of the bare noun *shui* ‘water’ are listed in (3b).

- (3) a. *Zhuo-shang you xigua.*
 table-on have watermelon
 ‘There is a watermelon on the table.’
 ‘There are watermelons on the table.’
 ‘There is a slice of watermelon on the table.’
 ‘There are slices of watermelon on the table.’
 ‘There is a pile of watermelon on the table.’
 ‘There are piles of watermelon on the table.’
- b. *Zhuo-shang you shui.*
 table-on have water
 ‘There is a drop of water on the table.’
 ‘There are drops of water on the table.’

- ‘There is a cup of water on the table.’
‘There are cups of water on the table.’
‘There is a liter of water on the table.’
‘There are liters of water on the table.’

It has been generally assumed that elements that encode plurality but are optional are not real plural markers (e.g., Acquaviva 2008). In Rijkhoff (2002: 155), the apparent number markers in some CL languages are analyzed as nominal aspect markers, rather than number markers. In Wiltschko (2009) and Butler (2012), optional plural markers are analyzed as adjuncts of DP, n, NP, or nominal root, in certain languages, instead of the head of NumP.

However, such an optionality correlates with the availability of general number. If the general number is available in a language, plural marking cannot be obligatory. In such a language, although plurality is in contrast to singularity, “the distinction is made ‘when it matters’ and not automatically, as in languages like English” (Corbett 2000: 14). This means that in such a language, if the meaning of plurality is not salient in the context, a plural marker does not have to occur. As a consequence, the use of a plural marker is not obligatory. Corbett (2000: 2) states that “If number forms are available, then surely they must be used? This is an Anglo-centric assumption and is quite false.” The number markers in Mandarin Chinese, to be presented in this paper, have consistent forms and consistent meanings, occurring with all types of unit words, even though they are optional.

There are different types of plurals, including paucal plural, which encodes small quantity of plurality, and anti-paucal plural. The latter is called abundant plural. This type of plural denotes many instances of x (Corbett 2000: 30, 87). Abundant plural is found in both material mass nouns and count nouns. For material mass nouns, abundant plural encodes abundant units of the mass. Consider the mass plural examples in (4). As stated in Mathieu, mass plurals “appear neither dividing nor counting. Rather, they appear to denote abundance”, and such plural forms are used “when the exact number is impossible to pinpoint or when it is irrelevant” (Mathieu 2012: 189). Examples of abundant plural of mass nouns have been reported in unrelated languages, including English (4a), French, Hebrew, and Biblical English (see Mathieu 2012: 189 for examples and references). The modern Greek example in (4b) is from Alexiadou (2011: 36), and the Niuean example in (4c) is from Massam (2009: 682; C = common). In St’át’imcets (Davis and Matthewson 1999: 61) and Ojibwe (Mathieu 2012: 184), mass nouns are pluralized freely, to express the abundant meaning. In Persian, mass nouns can also be pluralized to express “a large amount of whatever the noun denotes” (Cowper and Hall 2012: 48; Ghaniabadi 2012). Wiltschko (2012: 153) also reports that mass nouns in Blackfoot and Halkomelem may have plural markers to express this “abundant” meaning.

- (4) a. *the (*three) waters of the Nile*
b. {*hithikan nera* /*hithike nero*} *sto patoma.* [Modern Greek]
dripped water.PL /dripped water on.the floor
‘A lot of water dripped on the floor.’
c. *e tau vai* [Niuean]
ABS.C PL water

For count nouns, the meaning of many instances of x can be found in a bare plural unit word followed by *of* in English, as in (5). The bare plural *years* in (5a), for instance, denotes many years,

instead of just a couple of years.

- (5) a. *After years of hard work,*
 b. *There are bottles of wine in the cellar.*
 c. *There are piles of books in the room.*

The meaning of many instances of x can also be expressed by reduplication of bare nouns, with a preposition such as *after*, *by*, or *upon*, as in (6) (Travis 2001, Jackendoff 2008). Also, as shown in (7a-e), “different size domains can be reduplicated” (Travis 2001: 458), and as seen in (7f), reduplication can apply more than once (Jackendoff 2008: 21). In such reduplicate forms, only *upon* allows the noun to be in a plural form, as seen in (6g).

- (6) a. *Student after student visited the professor on Monday.*
 b. *Gertrude watched program after program all afternoon.*
 c. *Jon washed plate after plate for hours after the party.*
 d. *Eric can drink mug upon mug of coffee in a single hour.*
 e. *The careful artist completed the mosaic tile by tile.*
 f. *In fairy tale after fairy tale, good triumphs over evil.*
 g. *Bag(s) upon bag(s) of marshmallows were stolen this week.*
- (7) a. *cup after cup of coffee*
 b. *cup of coffee after cup of coffee*
 c. *cup after steaming cup of coffee*
 d. *steaming cup after steaming cup of coffee*
 e. *steaming cup of coffee after steaming cup of coffee*
 f. *cup after cup after cup of coffee*

Abundant plural encodes plurality more than two. It is thus not covered by Harbour’s (2011) number features (Singular: [+Singular, -Augmented], Dual: [-Singular, -Augmented], Plural: [-Singular, +Augmented]). A richer feature system is required. But I will not elaborate this. Instead, I will report the existence of abundant plurality in Mandarin Chinese.

2. Unit plurality

2.1. RUWs as unit-plurality markers

In many languages, noun reduplication can express plurality (e.g., Sapir 1921: 76; Rijkhoff 2002: 152). In Mandarin Chinese, however, it is the reduplication of unit words that expresses plurality, and the encoded plurality is unit plurality. This is shown by the underlined parts in (8) (Song 1978: Section 5.4; 1980; Li and Thompson 1981: 34; Guo 1999; Hsieh 2008: 66).²

- (8) a. *He-li piao-zhe (yi) duo-duo lianhua.*
 river-in float-DUR one CL-RED lotus
 ‘There are many lotuses floating on the river.’

² Abbreviations in the Chinese examples: BA: causative marker; CL: classifier; DE: associative marker; DUR: durative aspect; INT: interjection; PRF: perfect aspect; PRT: sentence-final aspect particle; RED: reduplicant.

- b. *Di-shang you yi dui-dui lianhuan.*
 ground-on have one CL-RED lotus
 ‘There are piles of lotuses on the ground.’

I will call a reduplicate unit word RUW. Both *duo-duo* in (8a) and *dui-dui* in (8b) are RUWs. Unlike bare nouns in the language, RUW nominals never allow a singular reading. Song (1978) clearly states that a RUW means ‘many’. Therefore, a RUW can be identified as a plural marker. Accordingly, the word *yi* ‘one’ to the left of a RUW is not a numeral. I will discuss this use of *yi* in Section 2.3.1.

RUWs denote plurality of units, rather than plurality of individuals. In (8a), the individual CL *duo* is reduplicated, and thus the plurality of the lotus units overlaps with the plurality of lotus individuals. In (8b), the collective CL *dui* ‘pile’ is reduplicated, and thus it is lotus piles that are plural.

The plurality type expressed by a RUW is abundant plurality. (8a) may not be accepted if there are only two or three lotuses in the river. I thus add the word ‘many’ in the translation. Similarly, (8b) may not be accepted if there are only two or three piles of lotuses on the ground.

The combination of the above two properties, unit plurality and abundant plurality, is also found in the English examples in (5).

2.2. The productivity

If a certain formal strategy is productive, it is morpho-syntactically systematic. “A productive rule has a variable that can be filled freely by anything that meets its conditions, and so the rule can be applied to novel items” (Jackendoff 2008: 16). All types of mono-syllabic unit words can be reduplicated to express plurality of units in Mandarin Chinese.

- (9) a. *Mingtian qiang-shang hui gua-shang (yi) zhan-zhan ming deng.*
 tomorrow wall-on will hang-up one CL-RED bright light
 ‘There will be many bright lights hung on the wall tomorrow.’ [Individual CL]
- b. *Yani bei-shanglu-chu (yi) tiao-tiao shang-ba.*
 Yani back-on show-out one CL-RED wound-scar
 ‘There are many scars on Yani’s back.’ [Individuating CL]
- c. *Yaunzi-li dui-zhe yi dui-dui xinjian.*
 yard-in pile-DUR one CL-RED letter
 ‘In the yard, there are piles of letters.’ [Collective CL]
- d. *Panzi-li li-zhe yi pian-pianxigua.*
 plate-in stand-DUR one CL-RED watermelon
 ‘In the plate, there stood slices of watermelon.’ [Partitive CL]
- e. *Yani ba yi jin-jin rensen cheng-le-you-cheng.*
 Yani BA one jin-RED ginseng weigh-PRF-again-weigh
 ‘Yani weighed jins of ginseng again and again.’ [Standard measure]
- f. *Zhuo-shang fang-zhe yi ping-ping yao-shui.*
 table-on put-DUR one bottle-RED medicine-liquid
 ‘There are bottles of medicine-liquid on the table.’ [Container measure]
- g. *Huojia-shang bai-man-le zhong-zhong guantou.*
 shelf-on put-full-PRF kind-RED can
 ‘On the shelf are many kinds of cans.’ [Kind CL]

Among these various types of unit words, at least two of them, i.e., standard and contain measures, are open class words. It has been found that in some CL languages, certain apparent plural markers are members of a closed class of quantifiers (e.g., Rijkhoff 1999: 240; 2002: 153). The properties of RUWs in Chinese indicate that they are not quantifiers (although they have interactions with quantifiers, to be discussed in Section 2.3.3).

Not only the formation of RUWs is productive and RUW nominals may contain any kind of nouns, but also the distributions of RUW nominals are free. In addition to the above non-initial positions, RUW nominals can also occur at the left-peripheral position of a clause, as seen in (10) (for more examples see Liu 1980: 10; Hsieh 2008: 3):

- (10) a. *Ge-ge xuesheng dou you ziji de wangye.* [Individual CL]
 CL-RED student all have-self DE webpage
 ‘All of the students have their own web pages.’
- b. *Yi gu-gu zhengqi cong jiqi pen-le chulai.* [Individuating CL]
 one CL-RED steam from machine spray-PRF out
 ‘Puffs of steam came out of the machine.’
- c. *Shuang-shuang qingren bu-ru hui-chang.* [Collective CL]
 CL-RED lover step-in meeting-place
 ‘Many pairs of lovers stepped into the meeting place.’
- d. *Pian-pian xigua dou hen tian.* [Partitive CL]
 CL-RED watermelon all very sweet
 ‘Every slice of watermelon is sweet.’
- e. *Cun-cun jifu dou ke dedao baohu.* [Standard measure]
 inch-RED skin all can get protection
 ‘Every inch of the skin can get protected.’
- f. *Pan-pan cai dou hen tebie.* [Container measure]
 plate-RED dish all very special
 ‘Every dish is special.’
- g. *Zhong-zhong zacao zhang-man-le yuanzi.* [Kind CL]
 kind-RED weed grow-full-PRF yard
 ‘Many kinds of weed have grown in the whole yard.’

Note that RUWs, when they are not followed by a noun, may also function as pronominal subjects, taking other nominals in the context as their antecedent, as shown by *ge-ge* in (11a), or as adverbials, expressing the meaning of ‘one by one’ or ‘one after another’, as shown by *tiao-tiao* in (11b) (Song 1978, 1980; Guo 1999). In the latter example, the RUW occurs between the subject *e-shang de qing-jin* ‘the blue veins on the forehead’ and the verb *zhan-chu* ‘show-out’, a typical position for adverbials in the language.

- (11) a. *Zhiyu naxie haizi, ge-ge dou hui Fawen.*
 as.for DEM kid CL-RED all know French
 ‘As for those kids, they all know French.’
- b. *E-shang DE qing-jin tiao-tiao zhan-chu.*
 forehead-on DE blue-vein CL-RED show-out
 ‘The blue veins on the forehead became visible, one next to another.’

Since it is well-recognized that functional formatives may have multiple grammatical functions, depending on the syntactic contexts, I will not elaborate these usages of RUWs here. Cross-linguistically, plural markers may be used beyond marking plurality. In Mano, a plural marker may have intensificative, contrastive focus, and even mirative uses. In examples such as (12), “plural markers are placed outside the noun phrase and function similar to an adverb.” (Khachaturyan 2012)

- (12) *lí gbéípié ké vó?* [Mano]
 2SG walk do:IPFV PL
 ‘(How come,) you are taking a stroll? (I thought you always stay at home)’

One therefore should not use examples like (11a) and (11b) to claim that the RUW to the left of a noun is a floating quantifier.

If a RUW nominal does not start with *yi*, it can be definite, especially when it occurs in the subject position, as in (10a). A RUW nominal can also start with a demonstrative-*yi* string, to encode a definite unit-plurality, as seen in (13). Thus, RUWs are underspecified with regard to definiteness.

- (13) *Wo zhongyu kanjian-le na yi zuo-zuo gao-lou.*
 1SG finally see-PRF DEM one CL-RED high-building
 ‘I finally saw those many high buildings.’

2.3. RUWs, *YI* and distributivity

A RUW occurs with either an implicit or explicit *yi* ‘one’, as in (14a), or *dou* ‘all’, as in (15b). If we remove *yi* or *dou* from the RUW sentences, they become unacceptable, as seen in (14b) and (15b).

- (14) a. *Yi zhi-zhi mayi pa-dao-le wo de beizi-li.*
 one CL-RED ant climb-to-PRF 1SG DE cup-in
 ‘Many ants climbed into my cup.’
 b. **Zhi-zhi mayi pa-dao-le wo de beizi-li.*
 CL-RED ant climb-to-PRF 1SG DE cup-in
 (15) a. *Zhi-zhi mayi dou kang-zhe dian shenme-dongxi.*
 CL-RED ant all carry-DUR a.bit some-thing
 ‘All the ants are carrying something.’
 b. **Zhi-zhi mayi kang-zhe dian shenme-dongxi.*
 CL-RED ant carry-DUR a.bit some-thing

In this subsection, I argue that RUWs can be defective plural markers, since they are related to or licensed by certain quantifiers.

2.3.1. *RUWs and the existential quantifier YI.* If RUW nominals are plural nominals, as pointed out by Hsieh (2008: 59), it is not clear why *yi* ‘one’ may occur with them. Unlike other numerals, the *yi* in a RUW nominal may not be replaced by another numeral, as shown in (16) (Steindl 2010: 69).

- (16) {yi/*wu} zhi-zhi xiao ya
 one/five CL-RED small duck
 ‘many small ducks’

Thus, as stated by Steindl (2010: 69), the *yi* in a RUW nominal “does not function as a numeral here”. I claim that this *yi* is an existential quantifier by default, called E-YI (see Zhang 2013: 95-201). E-YI can also be found in examples such as (17):

- (17) Jiaoshi-li yi pian hunluan.
 classroom-in one CL chaos
 ‘There is chaos in the classroom.’

This claim explains the fact that if a RUW nominal is initiated with *yi* ‘one’, it is indefinite, as in (8) and some examples in (9). When a RUW nominal starts with a demonstrative-*yi* string, i.e., *zhe-yi* ‘this-one’, or *na-yi* ‘that-one’, as in (13), the default reading of E-YI is overridden by the demonstrative, and thus a definite reading appears.

However, the occurrence of E-YI with RUWs varies. In certain contexts, e.g., (18) (also (8a)), E-YI is optional, but in some other examples, it is obligatory, as shown by the acceptability contrast between (19a) and (19b) (also see (14)).

- (18) Zhe shi (yi) jian-jian wang shi you yong-shang xintou.
 this time one CL-RED old event again appear-to mind
 ‘At this time, many old events appeared in the mind.’
- (19) a. Yan-qian chuxian-le yi zhang-zhang shuxi de miankung.
 eye-before appear-PRF one CL-RED familiar DE face
 ‘Many familiar faces appeared before the eyes.’
 b. *Yan-qian chuxian-le zhang-zhang shuxi de miankung.
 eye-before appear-PRF one CL-RED familiar DE face

On the other hand, if a kind CL is reduplicated, E-YI may not occur:

- (20) a. Yani kanjian-le (*yi) zhong-zhong qiguai de zhiwu.
 Yani see-PRF one kind-RED strange DE plant
 ‘Yani saw various kinds of strange plants.’
 b. (*Yi) Zhong-zhong zacao zhang-man-le yuanzi. (= (10g))
 one kind-RED weed grow-full-PRF yard
 ‘Many kinds of weed have grown in the whole yard.’

I will propose an account of the occurrence of E-YI with RUWs in (18) and (19), and its impossible occurrence in (20) in Section 2.3.3. At the end of that section, I will also address the issue when E-YI is optional and when it is obligatory.

2.3.2. RUWs and distributivity. In the literature, the plurality encoded by reduplication has been called ‘distributive plural’ in Sanches (1973: 13). Similarly, Li and Thompson (1981: 34) claim that reduplication forms “signify ‘every’” (also see Steindl 2010: 53). Some grammar books in late 50’s and early 60’s (see the review in Song 1980) and Hsieh (2008: 6) also claim that reduplicate CLs

have a distributive reading. In Hsieh (2008: 67), based on the assumed distributive reading, RUW nominals without *yi* are claimed to have a singular, rather than plural, feature.

Indeed, the reading of (21), for instance, is that each of the multiple students has his or her own web page. The example does not mean that some students have this property while others do not, although such a meaning is also a plural meaning.

- (21) *Ge-ge xuesheng dou you ziji de wangye.* (= (10a))
 CL-RED student all have-self DE webpage
 ‘All of the students have their own web pages.’

However, as pointed out by Song (1980: Section 2.2.3) and Guo (1999: 7), the distributive meaning comes from the adverb *dou* ‘all’ in the containing clause, rather than the reduplication itself. They also observe that whenever *dou* is allowed (even though it does not show up), a distributive meaning occurs. In (22), (also (10g), and all of the examples in (9)), there is no *dou* and no distributive reading is attested.

- (22) *Shuang-shuang qingren bu-ru hui-chang.* (= (10c))
 CL-RED lover step-in meeting-place
 ‘Many pairs of lovers stepped into the meeting place.’

Another source for a possible distributive reading of a RUW nominal is the occurrence of certain non-collective adverbial, e.g., *zuge* ‘one after another’, as in (23). Thus the default plural reading of a RUW nominal can be specified into a distributive plural reading in the context.

- (23) *Ta na yi zhuang-zhuang xin-shi jiu zheyang zuge jiechu.*
 3sg that one CL-RED heart-thing then so one.by.one remove
 ‘His worries are removed one after another in this way.’

The fact that RUW nominals do not have an intrinsic distributive reading is seen in their compatibility with collective verbs. In (24a), for instance, the RUW nominal *yi ping-ping jiu* ‘bottles of wine’ is selected by the collective verb *hunhe* ‘mix’. Since collective verbs do not select distributive nominals, the RUWs in (24) are not distributive markers.

- (24) a. *Yani ba yi ping-ping jiu hunhe zai yiqi.*
 Yani BA one bottle-RED wine mix at together
 ‘Yani mixed the bottles of wine together.’
 b. *Yani ba yi pian-pian shuye dui zai yiqi.*
 Yani BA one CL-RED leaf gather at together
 ‘Yani gathered many leafs together.’

The fact that RUWs are compatible with distributive readings also indicates that they are not collective markers. This fact, together with the fact that RUWs are not a closed set, also separates RUWs from apparent plural markers in some CL languages, such as *cov* in Hmong Njua, which Rijkhoff (1999) identifies as a collective marker, rather than a real plural marker.

2.3.3. *RUWs and their licensors.* The co-occurrence of E-YI or *dou* ‘all’ with a RUW leads us to see

that RUWs are different from well-recognized plural markers in some other languages. My hypothesis is that RUWs can be defective plural markers and thus may need a formal licenser. *Yi* and *dou* are such licensers.

Both E-YI and *dou* are quantifiers. The former is a D-type quantifier, and the latter is an A-type quantifier. According to Partee (1995), D-quantifiers are nominal-internal expressions, while A-quantifiers are the ones which typically combine with predicates, e.g., a bound form on a verb stem, an auxiliary, or adverb.

In order to capture the observed co-occurrence relation, I claim that a RUW is associated to either an existential quantifier or the distributive quantifier *dou* ‘all’. For a non-kind CL RUW, the existential-quantifier is E-YI. Thus, in the RUW nominal *yi zhan-zhan ming deng* ‘bright lights’, for instance, *yi* is an existential quantifier, which licences the plural marker *zhan-zhan*. When E-YI is the licenser, the RUW is compatible with either a distributive reading, as in (23), or a collective reading, as in (24). However, when the distributive quantifier *dou* is the licenser of a RUW, only a distributive reading is found.

I have observed that for a kind CL RUW, its existential-quantifier licenser is special. E-YI may not occur with such a RUW. The relevant examples are repeated here as (25):

- (25) a. *Yani kanjian-le* (**yi*) *zhong-zhong qiguai de zhiwu.* (= (20))
 Yani see-PRF one kind-RED strange DE plant
 ‘Yani saw various kinds of strange plants.’
 b. (**Yi*) *Zhong-zhong zacao zhang-man-le yuanzi.*
 one kind-RED weed grow-full-PRF yard
 ‘Many kinds of weed have grown in the whole yard.’

I claim that such a RUW can be licensed by the E-closure introduced by a selecting verb, if it is available. In (25a), *zhong-zhong* is in the E-closure introduced by the verb *kanjian-le* ‘saw’, and thus gets licensed. In (25b), the matrix verb *zhang* ‘grow’ is an unaccusative verb, taking *zhong-zhong zacao* ‘many kinds of weed’ as its argument. The licensing of *zhong-zhong* is achieved when the argument is in its base-position, under the E-closure introduced by the verb.

Note that in some situations, an overt *you* ‘have’ may directly precede a RUW of a kind CL and licenses the latter. (26) is such an example. In this case, the licensing condition is similar to that for an indefinite subject in the language. I leave the specific condition for the choice among the various licensers of RUWs for future research.

- (26) (You) *zhong-zhong jixiang biao ming, Zhong-yi bu kekao.*
 have kind-RED sign show China-medicine not reliable
 ‘Various signs indicate that Chinese medication is not reliable.’

Rijkhoff (1999; 2002) claims that certain apparent plural markers in CL languages should be treated as quantifiers. My research shows that there is indeed a close relation between RUWs and quantifiers. However, RUWs themselves are not quantifiers, instead, they are licensed by certain quantifiers. It is possible that RUWs in Mandarin Chinese represent a link of the grammaticalization chain from quantifiers to independent number markers.

According to Ōta (2003 [1958]: 155), after the CL use of nouns or verbs appeared in the history, the use of RUWs started, and was seen in literature works in the Nan-Bei Dynasty (420-589 AD) and the period of Tang Dynasty (608-907 AD). Later, the form of a RUW with *yi*

‘one’ started to appear. He claims that both bare RUWs and those with *yi* had distributive readings in old works. We can see that since distributives imply plurality, it is natural that they can be on their way to become plural markers. The fact that a RUW needs to be licensed by a quantifier shows that it is still under the grammaticalization process to develop into an independent number marker. In the literature, historical development from collective or distributive markers or quantifiers to plural markers in some other languages is addressed in Rijkhoff (1999: 248-249; 2002: 116, fn.21) and Corbett (2000).

The gradient historical change may correlate with the gradient synchronic variations of the dependency of plural markers on quantifiers in the same language. It is possible that there is a certain gradient transition from a quantifier to an independent plural marker, as illustrated in (27).

- (27) I. plural quantifier => II. plural marker that must be licensed by a quantifier => III. plural marker that is optionally related to a quantifier => IV. independent plural marker

I have shown in Section 2.3.1 that the occurrence of E-YI with RUWs varies. It is possible that for the unit words of the same type, when they are used as number markers, they are in different stages of the gradient grammaticalization process. Thus, the RUW in (18) and the one in (19a) are in stage III and stage II of (27), respectively.

2.3.4. *RUWs and de*. One contrast between RUWs that are licensed by *dou* and those licensed by an existential quantifier is that the former may not be followed by the functional particle *de*, whereas the latter may. This is shown in (28).

- (28) a. *Yi tiao-tiao de shang-ba chuxian zai ta de jianbang-shang.*
 one CL-RED DE wound-scar appear at 3SG DE shoulder-on
 ‘Many scars appeared on {his/her} shoulders.’
 b. *Tiao-tiao (*de) shang-ba dou zai liu-xue.*
 CL-RED DE wound-scar all DUR flow-blood
 ‘All the scars are bleeding.’

Generally speaking, when *de* occurs between two nominal elements, the left one is the modifier of the right one. In (28a), *yi tiao-tiao* ‘one CL-RED’ is a quantificational modifier of *shang-ba* ‘wound-scar’. The acceptability of (28a) is not a surprise. If *de* occurs in (28b), however, the licensing relation between *dou* and *tiao-tiao* is blocked. *Dou* never has a dependency with a nominal to the left of *de*. In (29a), *dou* is associated with *liang ge fangzi* ‘two houses’. In (29b), the same string precedes *de*. *Dou* then fails to link to the string. Instead, it links to *men* ‘door’. The meaning of this sentence is that all of the doors of the houses, rather than the houses themselves, are big.

- (29) a. *Liang ge fangzi dou hen da.*
 two CL house all very big
 ‘The two houses are both big.’
 b. *Liang ge fangzi de men dou hen da.*
 two CL house DE door all very big
 ‘The doors of the two houses are all big.’

Thus, since *dou* in (28b) is not able to license the RUW preceding *de*, and there is no existential quantifier to license the RUW, either, the *de*-version of the sentence is not acceptable. We thus see that the *dou*-licensing is subject to certain general locality condition. In (28a), however, the RUW is licensed by the E-YI locally, and thus the licensing is not affected by *de*.

2.4. The interactions between numerals and number markers

RUWs are incompatible with numerals in Mandarin, as shown by (30):

- (30) a. *Zhuo-shang bai-zhe {*jiu/yi} ben-ben xin shu.*
 table-on put-DUR nine/one CL-RED new book
 ‘There are many new books on the table.’
 b. (**Liu*) *pian-pian xigua dou hen tian.*
 six CL-RED watermelon all very sweet
 ‘Every slice of watermelon is sweet.’

The unacceptable versions of the two examples in (30) show the interaction between the RUWs and the numerals. Without the RUWs, the relevant nominals are perfect numeral expressions:

- (31) a. *Zhuo-shang bai-zhe jiu ben xin shu.*
 table-on put-DUR nine CL new book
 ‘There are nine new books on the table.’
 b. *Liu pian xigua dou hen tian.*
 six CL watermelon all very sweet
 ‘The six slices of watermelon are all sweet.’

RUWs reject not only numerals, but also elements that must be licensed by numerals, such as *yue* ‘roughly (for a numeral)’, *zonggong* ‘total’, and *zuzu* ‘as many as’:

- (32) a. **He-li piao-zhe yue (yi) duo-duo lianhua.*
 river-in float-DUR roughly one CL-RED lotus
 b. **He-li piao-zhe zonggong (yi) duo-duo lianhua.*
 river-in float-DUR total one CL-RED lotus

Based on these observations, I propose my account for the incompatibility between a RUW and a numeral: because a RUW is licensed by a specific quantifier (e.g., E-YI or *dou*), it excludes other kinds of quantifiers, in Mandarin Chinese. Cardinal numerals are also quantifiers. If RUWs have a certain dependency with certain types of non-numeral quantifiers, they may not be able to establish a relation with another kind of quantifiers. In (30a), since the RUW *ben-ben* is licensed by the E-YI, it is not able to establish a relation with *jiu* ‘nine’. In (30b), since the RUW *pian-pian* is licensed by *dou*, it is not able to establish a relation with *liu* ‘six’.

Cross-linguistically, plural markers interact with numerals in various ways. In Purépecha, the plural marker *-mu* must be hosted by a numeral (Vázquez Rojas 2012: 62). In many languages, however, plural markers are not compatible with numerals. But the incompatibility might have different sources, cross-linguistically. In the Hungarian examples in (33), the plural marker *-k* may not occur with the numeral *három* ‘three’ (Csirmaz and Dekany 2010: (88)). The same constraint is

also found in Turkish, Western Armanian (Bale et al. 2011) and Bangla (Dayal 2011: 4).

- (33) a. *három takaró-(*k)* b. *három kutyá-(*k)* [Hungarian]
 three blanket-PL three dog-PL
 ‘three blankets’ ‘three dogs’

In Oromo, a non-CL language, an apparent plural marker is also incompatible with a numeral. Rijkhoff (1999: 233) argues that the apparent plural marker is in fact a collective marker, and provides his account for the incompatibility. He claims that such an apparent plural marker can be treated as a nominal aspect marker (Rijkhoff 2002: 155). More such languages are listed in Rijkhoff (2002: 38ff). In Indonesian, a CL language, both mass nouns and non-mass nouns can be reduplicated (Dalrymple and Mofu 2012: 236). Reduplicate mass nouns, as in (34a) and (34b), encode multiple units of massive objects (similar to the examples in (4)), and reduplicate non-mass nouns, as in (35a), encode plurality. Like in Hungarian (see (33)) and Bangla (Dayal 2011), in Indonesian, plurality in the form of reduplication does not go easily with numerals. In (35b) (Sato 2009: 10; also see Dalrymple and Mofu 2012: 234), the numeral *tiga* ‘three’ may not occur with the reduplicate form.

- (34) a. *Mereka telahkemasukan air laut terlalu banyak dan air-air*
 they have ingested water sea excessive many and water-RED
 itu sudah berhasil dikeluarkan. [Indonesian]
 that already successfully Pass.exit.Kan
 ‘They have ingested too much sea water, and those [amounts of] water have
 successfully been taken away.’
 b. *Minyak-minyak itu muncrat dari manhole kapal dan membeku setelah*
 oil-RED that stream from manhole ship and solidify then
 membentuk seperti sabu dan mengotori pantai sekitar.
 form like bubble and make.dirty beach around
 ‘The [streams of] oil streamed from the manhole of the ship and solidified, and
 then formed bubbles and polluted the beach.’
 (35) a. *siswa-siswa* b. *tiga siswa-(*siswa)*
 student-RED three student-RED
 ‘students’ ‘three students’

In Hmong Njua, also a CL language, an apparent plural marker, *cov*, is also incompatible with a numeral. Rijkhoff (1999: 241, and the references therein) shows that *cov* is actually a collective marker, and provides his account for the incompatibility.

Nouns with a plural marker in English may occur with a numeral. One may find a very different pattern of interaction between numerals and plural markers in English, however. Examples like those in (36) are discussed in Saka (1991: 279):

- (36) a. *1.0 pianos* b. **1.0 piano*
 c. **one pianos* d. *one piano*
 e. *0.5 pianos* f. *zero pianos*

Saka (1991: 278) states that “[C]ontrary to conventional wisdom, the meaning of plurality is

not ‘more than one’. Rather, in English it means ‘other than one’.” But numerals other than *one*, including *1.0*, do not seem to form a semantic natural class. It seems that a plural marker must occur if a numeral other than *one* is present. *One* can be a singulative, rather than a cardinal numeral (Huddleston and Pullum 2002: 386). It does not represent the general properties of numerals. It is possible that an English numeral must occur with a plural marker in a numeral expression, with *one* as an explainable exception.

My above explanation predicts that RUWs are not compatible with any quantifiers beyond their licensors. This is true. A RUW nominal may not start with a quantificational D-element such as *suoyoude* ‘all’, *henduo* ‘many’, *renhe* ‘any’, *daliang* ‘a lot’, *haoji* ‘several’, and the interrogative *na* ‘which’. In (37a), for instance, since the RUW *ben-ben* is licensed by the E-YI, it is not able to establish a relation with any of these quantificational D-elements.

- (37) a. *Zhuo-shang bai-zhe {yi/*suoyoude/*henduo/*renhe/*na} ben-ben xin shu.*
 table-on put-DUR one/ all many/ any/ which CL-RED new book
 ‘There are many new books on the table.’
 b. *(*Suoyoude/*Henduo/*Renhe/*Na) ben-ben shu dou hen gui.*
 all/ many/ any/ which CL-RED book all very expensive
 ‘Every book is expensive.’

Numerals, non-numeral quantifiers, and number markers are all associated with quantity in language (Rijkhoff 2012: 5). It is not surprising that different languages have different ways in the interactions among these different but closely related types of formatives.

In summary, a RUW is identified as a plural marker in Mandarin Chinese and it has the following formal properties:

- (38) a. It denotes unit plurality, exclusively;
 b. It is attested in all types of unit words;
 c. It is underspecified with regard to definiteness;
 d. It is not compatible with a numeral.

Other properties include the following:

- (39) a. It is licensed in a quantificational context (e.g., with E-YI or *dou* ‘all’);
 b. If it occurs with *dou*, a distributive meaning emerges (Song 1980);
 c. It never follows a quantificational D-element other than E-YI, such as *suoyoude* ‘all’, *renhe* ‘any’, and *na* ‘which’;
 d. The semantic type of the denoted plurality is abundant plurality.

3. Unit singularity

I have just shown that Mandarin Chinese has plural markers, they are special morphological forms of unit words, and are not compatible with any numerals. Recall that bare nouns in the language express general number, which is underspecified with regard to either singular or plural reading. In this section, I show that Chinese may encode singularity by forms that are different from both bare nouns and plural markers. Moreover, both singular and plural markers exhibit parallel basic syntagmatic properties, such as incompatible with numerals.

3.1. *SUWs as unit-singularity markers*

In Mandarin Chinese, a CL that neither shows up in a reduplicate form nor occurs with a numeral encodes singularity consistently, a fact noted by Li and Liu (1978: 4), among many others.

Compare the examples in (40) and (41). In (40), the numeral *san* ‘three’ precedes the CL *ben* in all the examples. It is the initial element of the object in (40a), but it follows another element elsewhere: the proximal demonstrative *zhe* in (40b), the universal quantifier *mei* ‘each’ in (40c), and the interrogative determiner *na* ‘which’ in (40d). In (41), there is no numeral. In each of the examples in (41), the absence of the numeral to the left of the CL correlates with a consistent singular reading.

- | | | | |
|---------|---|----|---|
| (40) a. | <i>Yani mai-le san ben shu.</i>
Yani buy-PRF three CL book
‘Yani bought three books.’ | b. | <i>zhe san ben shu</i>
this three CL book
‘these three books’ |
| c. | <i>mei san ben shu</i>
every three CL book
‘every three books’ | d. | <i>Na san ben shu?</i>
which three CL book
‘Which three books?’ |
| (41) a. | <i>Yani mai-le ben shu.</i>
Yani buy-PRF CL book
‘Yani bought a book.’ | b. | <i>zhe ben shu</i>
this CL book
‘this book’ |
| c. | <i>mei ben shu</i>
every CL book
‘every book’ | d. | <i>Na ben shu?</i>
which CL book
‘Which book?’ |

I will call a simple form of unit word that is followed by a noun but not preceded by a numeral, such as the CL *ben* in (41a) through (41d), Simple Unit Word (SUW).

In Mandarin Chinese, no noun may be next to a numeral directly. It is a unit word that links a numeral and a noun. In this context, the unit word functions as a counting unit in counting. In SUW nominals, no numeral occurs, but they encode exactly one unit. In (41), for instance, the CL *ben* occurs, without any numeral, but the meaning of a single book is expressed. I thus claim that the SUW is a singular marker.

According to Bisang (1999, 2012b: 19), CLs in CL languages have various extended uses, including as focus markers, possession markers, or modification markers, in the absence of a numeral. Rijkhoff (1999: 237) also shows that CLs can be used as possessive-markers in Hmong Njua. This can be a phenomenon of syncretism (e.g., *that* is a demonstrative or finite complementizer; *for* is preposition or nonfinite complementizer). We now see an extended use of CLs in Mandarin Chinese: as a number marker, in the absence of a numeral. This extended use of CLs is not seen in Japanese, since, as stated in Watanabe (2012: 4), “classifiers in Japanese must be accompanied by a numeral”. In Mandarin Chinese, plurality is expressed by the reduplication of CLs and singularity is expressed by the simple form of CLs, in the same syntactic context, i.e., in the absence of a numeral.

3.2. *The productivity*

Any kind of unit word, including standard measure, may show up as a SUW, expressing unit singularity, as seen in (42).

- (42) a. *Wo xiang mai ben shu.* [Individual CL]
 I want buy CL book
 ‘I want to buy a book.’
- b. *Wo gang chi-le kuai ji-rou.* [Individuating CL]
 I just eat-PRF chunk chicken-meat
 ‘I just ate a slice of chicken-meat.’
- c. *Wo xiang mai ping jiu.* [Container measure]
 I want buy bottle wine
 ‘I want to buy a bottle of wine.’
- d. *Mai mu di jiao ta qu zhong cai ba!* [Standard measure]
 buy mu land ask 3SG go grow vegetable INT
 ‘Buy a mu of land and ask him to grow vegetables!’ (1 mu = 0.667 hectares)
- 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 jus meet-PRF group robber
 ‘I just met a group of robbers.’
- g. *Tamen zhao dao-le zhong hen tebie de zhiwu.* [Kind CL]
 they find-PRF kind very special DE plant
 ‘They found a kind of very special plant.’

In the examples in (42), a SUW occurs in a nominal-initial position. In this case, the nominal is indefinite in Mandarin Chinese. Such an indefinite nominal typically occurs as an object of a transitive verb, as seen in (41a) and (42). A SUW may also follow a demonstrative, as in (41b), the universal quantifier *mei* ‘every’, as in (41c) (D. Yang 1996; Cheng and Sybesma 1999: 530; R. Yang 2001: 66, among others), or the question word *na* ‘which’, as in (41d). In this case, the nominal may occur in any argument position. Thus, there is no intrinsic restriction on the syntactic function of SUWs as singular markers (See R. Yang 2001: 72-76 for further discussion of morphological properties of SUWs).

The free combination of a SUW with various kinds of quantifiers reminds us of the constraint on RUWs (see (37)). The asymmetry can be accounted for by the grammaticalization chain illustrated in (27). It is possible that singular markers in the language are more developed and thus more independent number markers than the plural markers in the language. The latter are still dependent on certain types of quantifiers.

The experimental studies of Huang and Lee (2009) show that children between three and a half and five years of age are already sensitive to the quantificational difference between bare nouns and SUW nominals, and they also understand the singular reading of such SUW nominals.

The singular interpretation of SUW nominals is also observed in other CL languages or dialects, such as Suzhou Wu dialect of Chinese (Shi and Liu 1985), Hmong Njua, Nung, Vietnamese (Rijkhoff 1999: 238), and Bangala (Simpson et al. 2011: 188).

3.3. The problems of the numeral-deletion analysis

It has been generally assumed that a SUW nominal is derived by the deletion of the numeral *yi* ‘one’ (e.g., Lü 1944; S. Wang 1989: 109), and therefore, clauses containing SUW nominals are treated as *yi*-gapping constructions. Cheng and Sybesma (1999: 525-526) and X. Li and Bisang

(2012: 344) try to falsify the *yi*-deletion analysis. In this section, new arguments are presented to argue against the *yi*-deletion analysis of SUW nominals, leading to the same conclusion that Cheng and Sybesma and Li and Bisang have tried to reach.

First, the assumed deletion has no antecedent, and thus violates the basic identity condition of ellipsis. For instance, the numeral *qi* ‘seven’ is available in the first conjunct in (43a), and one thus should expect the deletion of *qi* in the second conjunct to be possible, contrary to the fact. On the other hand, SUW nominals may be uttered out of the blue, without a context-support, to encode singularity consistently. In (43b), *yi* does not occur anywhere, but the SUW nominal *ben zazhi* ‘CL magazine’ denotes singularity. If deletion needs an antecedent to satisfy the recovery condition (e.g., Chomsky 1965: 144), (43b) cannot be the result of deletion.

- (43) a. **Yani mai-le qi ben xiaoshuo, wo mai-le ~~qi~~ ben zazhi.*
 Yani buy-PRF seven CL novel I buy-PRF seven CL magazine
 Intended: ‘Yani bought seven novels and I bought seven magazines.’
 b. *Yani mai-le qi ben xiaoshuo, wo mai-le ben zazhi.*
 Yani buy-PRF seven CL novel I buy-PRF CL magazine
 ‘Yani bought seven novels and I bought one magazine.’

Second, the assumed deletion cannot be a lexical-specific operation. Trying to describe SUWs, but realizing the impossibility of the numeral deletion in examples like (43a), R. Yang (2001: 71) states that “as a descriptive generalization, I suggest that the only numeral that can be optionally omitted from the [Num-CL] complex is *yi* ‘one’.” If one assumes that the numeral *yi* is so special that its deletion does not need an antecedent, we still cannot explain why it may not be deleted in other contexts. One wonders why the deletion fails in the four examples in (44).

- (44) a. *Yani chi-le san-fenzhi-~~{yi/*}_~~ pian yao.*
 Yani eat-PRF three-part-one CL pill
 ‘Yani took one third of a medicine pill.’
 b. *Yani ba chengji tigao-le ~~{yi/*}_~~ bei.*
 Yani BA score increase-PRF one time
 ‘Yani doubled the scores.’
 c. *Yani he-le di ~~{yi/*}_~~ bei shui.*
 Yani drink-PRF ORD one cup water
 ‘Yani drank the first cup of water.’
 d. *Qing jin ~~{yi/*}_~~ hao fangjian!*
 please enter one number room
 ‘Please enter Room No. 1!’

It is clear that the alleged deletion fails exactly in the contexts of numerals. According to Wiese (2003), numerals have three uses: cardinal, as in (44a) and (44b), ordinal, as in (44c), and proper-name-like nominal, as in (44d). Obviously, when *yi* occurs as a real numeral in all of these uses, it may not be deleted. I conclude that numerals in Mandarin Chinese may not be deleted, and SUW nominals have not undergone any numeral-deletion operation.

Numeral deletion, as illustrated in (43a), is not possible cross-linguistically (Kayne 2012; Cinque 2012: Section 2.1). (45b) is acceptable, but not at all with the interpretation of (45a) (Kayne 2012: 78). Law (2012: 112-115) also shows that numerals may not be deleted in Mandarin Chinese

and Naxi.

- (45) a. *Mary has written four papers, whereas John has only written four squibs.*
 b. *Mary has written four papers, whereas John has only written squibs.*

Third, SUW constructions may not contain numeral-oriented adverbs such as *zuzu* ‘as many as’, *zhangzheng* ‘total’, or partitives such as *duo* ‘more’ or *ban* ‘half’, which must be licensed by a numeral. If *zuzu* were syntactically licensed by an implicit *yi*, (46b) would be acceptable.

- (46) a. *Yani {zuzu/zhengzheng} chi-le yi xiang juzi.*
 Yani as.many.as/total eat-PRF one box orange
 ‘Yani ate as much as one box of oranges.’
 b. **Yani {zuzu/zhengzheng} chi-le xiang juzi.*
 Yani as.many.as/total eat-PRF box orange

Cross-linguistic facts also falsify the numeral deletion analysis of SUWs. In Suzhou Wu Chinese, SUW nominals may occur in certain positions where no numeral is allowed. One such a position is to the right of a reduplicate verb, which denotes a tentative aspect, as in (47a). Since no numeral may follow such a verb, Shi and Liu (1985: 163) correctly point out that there is no numeral deletion for the SUW nominal. Another position where no numeral is allowed but a SUW nominal may occur is to follow a pronoun or a proper name, as seen in (47b). In this case, the SUW nominal functions as an apposition to the preceding nominal (Shi and Liu 1985: 164).

- (47) a. *nɛ k'ø-k'ø tsoŋ zãmi* \square *k'ø!* [Suzhou Wu Chinese]
 2SG look-RED CL scene look
 ‘Have a look at the scene!’
 b. *nɛ tsaʔ siæ ts'iaʔlæ.*
 2SG CL small devil
 ‘You, small devil.’

I claim that like RUW nominals, SUW nominals do not have a syntactic position for a numeral. Therefore, there is no numeral to be deleted.

In Mandarin Chinese, a CL may follow a demonstrative directly, as seen in (48a). But in a numeral expression, a CL follows a numeral directly, as seen in (48b). Greenberg (1990a [1972]: 168) states that “[S]yntactically also there is variability in that the classifiers need not be confined to numerical constructions. In Mandarin and other languages the classifier is required with demonstratives even in non-numeral phrases.”

- (48) a. *zhe ben shu* (= (41b)) b. *zhe yi ben shu*
 DEM CL book DEM one CL book
 ‘this book’ ‘this book’

However, examples like (48a), which are used to support Greenberg’s statement, show a semantic constraint: their interpretations must be singular. This is pointed out by Greenberg (1990a [1972]: 188) himself: “in Mandarin the classifier *ben* required with *shu* ‘book’ with any number (e.g., *i ben shu* ‘one book’, *san ben shu* ‘three books’) occurs with the demonstrative also (*che ben shu* ‘this

book’) but only in the singular.”[sic.] In my analysis, such examples are SUW nominals, which are singular unit-denoting nominals, without a syntactic position for a numeral.³ Thus, indeed, a CL does not have to follow a numeral. When it does, as in (48b), it functions as a counting unit. But when it does not, as in (48a), it is a singular marker instead. In (48a), the number marker function of the CL is one of the extended uses of CLs.

One supporting fact to distinguish a SUW with a demonstrative, as in (48a), from a numeral expression with a demonstrative, as in (48b), is given by one of the anonymous reviewers and confirmed by my informant: in Mandarin Chinese, both constructions are acceptable, but in Wu dialect of Chinese, only the former construction is possible.

In summary, the following four major properties are shared by the plural number feature of RUWs and the singular number feature of SUWs:

- (49) a. The number feature denotes the number of the unit, rather than that of the individual denoted by the associate noun;
- b. It is attested in all types of unit words;
- c. It is underspecified with regard to definiteness;
- d. It is not compatible with a numeral.

4. Theoretical discussion

The empirical issue investigated in this paper leads to the theoretical issue of the relationship between CLs and plural markers. The so-called Sanches-Greenberg Generalization states that “[N]umeral classifier languages generally do not have compulsory expression of nominal plurality, but at most facultative expression.” (Greenberg 1974: 25; also see Sanches 1973) Indeed, in CL languages such as Japanese, Thai, and Korean, reported plural markers are not systematic (Mizuguchi 2004: 18, 145, among others). The Sanches-Greenberg Generalization has been extended into a complementary distribution relation between CLs and plural markers in T’sou (1976), Doetjes (1996, 1997), and Chierchia (1998). It has been assumed that a language has either CLs or plural markers, and if a language has both systems, a CL does not occur with a plural marker in the same construction (e.g., Borer 2005: 95).

However, it has been observed that there are numeral CL languages in which number marking is obligatory, e.g., Ejagham (Watters 1981) and Kana (Ikoro 1994, 1996) (see Bisang 2012a: 24-26). In Northern Kam, CLs must have number inflection, regardless of whether a numeral occurs, as in (50), or no numeral occurs, as in (51) and (52) (Gerner 2006: 243-244, 249), although general number is expressed by bare nouns in the language (Bisang 2012a: 37).

- | | |
|---|--|
| (50) a. i^{45} jiu^{22} na^{45}
one CL:SG river
‘one river’ | b. ham^{11} t_{iu}^{22} na^{45} [Norther Kam]
three CL:PL river
‘three rivers’ |
|---|--|

³ A demonstrative may also be combined with a reduced *yi* ‘one’, deriving *zhei* (*zhe* + *yi* ‘this + one’) and *nei* (*na* + *yi* ‘that + one’) (Chao 1968: 650). However, because of reanalysis, *zhei* and *nei* can also function as a pure demonstrative, followed by a numeral other than *yi* ‘one’. So (i) is acceptable (see Chao 1968: 650; Bisang 1999: 145). The opaque function of *yi* in *zhei* in (i) is similar to the opaque function of *et* ‘and’ in the phrase *and etcetera*, where two conjunctions (*and*, *et*) occur in a row, and *cetera* means ‘the rest’.

(i) *zhei san feng xin*
 this three CL letter
 ‘these three letters’

- (51) a. *wəi*³¹ *tu*³³
 CL:SG garment
 ‘a garment’
- b. *məi*³¹ *tu*³³
 CL:PL garment
 ‘garments’
- (52) a. *va*⁵⁵ *hoŋ*²²
 CL:SG loom
 ‘a loom’
- b. *ʔa*⁵⁵ *hoŋ*²²
 CL:PL loom
 ‘looms’

Allan (1977: 294) and Aikhenvald (2003: 100-101; 249) also report the cases where CL languages have number markings. See Bisang (2012a) for further discussion of the issue.

Although, as pointed out in Doetjes (2012: 2), the Sanches-Greenberg generalization does not go the other way, i.e., it does not make any claim about non-CL languages, one still finds the co-occurrence of CLs and plural marking in non-CL languages. Krifka (2008: 7) claims that the German examples in (53) can show this. It has also been claimed that Persian (Ghameshi 2003: 55-56; Gebhardt 2009: 191-192) and Hungarian (Csirmaz and Dékány 2010: 13) allow a plural marker and a CL to occur in the same nominal, regardless of whether they are CL languages. If these claims are true, the allegedly complementary distribution relation between CLs and plural markers is also weakened.⁴

- (53) a. *zwanzig Stück Semmel-n* [German]
 twenty CL bread.roll-PL
 ‘twenty bread-rolls’
- b. *fünf Mann Mensch-en*
 five CL person-PL
 ‘five people’ (title of a play by Jandl and Mayröcker)

There are also languages that have neither CLs nor plural markers, such as Karitiana (Müller et al. 2006) and Dëne (Wilhelm 2008). The existence of such languages is beyond the empirical coverage of the allegedly complementary distribution relation between CLs and plural markers.

For languages that have general number, as I mentioned in Section 1, the use of a plural marker cannot be compulsory. Nevertheless, it is still possible for the languages to encode the contrast between singularity and plurality systematically in certain morpho-syntactic ways. I have used Chinese to show this possibility.

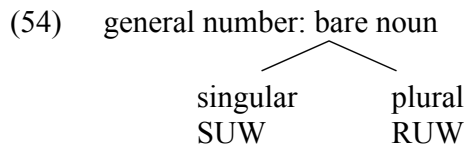
I have shown that CL languages also have a productive way to encode the notion of plurality. Cognitively speaking, the fact that CL languages also have productive ways to encode the notion of nominal plurality indicates that the contrast between singularity and plurality is not restricted to non-CL languages. Acquisition studies also show that Mandarin Chinese and Japanese children “were not delayed relative to English-learning children for 1 versus 4 comparisons” (Li et al. 2009b: 1651), suggesting that children of the CL languages are conceptually sensitive to the singular-plural contrast.

Instead of the Sanches-Greenberg Generalization, which tries to link the lack of obligatory number markers with the availability of CLs, Bošković (2012: 5) tries to link the lack of obligatory number markers with the lack of articles in the relevant languages. In this new perspective, languages that have no articles may have general number. Indeed, Mandarin Chinese has no articles, indicating a support to Bošković’s new generalization.

⁴ One anonymous reviewer states that the claims about CLs in languages such as Hungarian and German are highly questionable.

5. Summary

In this paper, I have identified the number system in Mandarin Chinese, a CL language. The system is composed of a general number, which is expressed by bare nouns, a singular number, which is expressed by SUWs, and a plural number, which is expressed by RUWs. The system is summarized in (54):



The existence of general number means that in this language, plural entities do not have to be expressed by plural markers. When the contrast between plurality and singularity of units is salient in the context, the former is expressed by RUWs and the latter is expressed by SUWs, in the absence of any numeral. The basic properties of the number markers are summarized in (55):

- (55) a. The number feature denotes the number of unit;
 b. It is attested in all types of unit words;
 c. It is underspecified with regard to definiteness;
 d. It is not compatible with a numeral;
 e. Plural markers are structurally licensed by certain quantifiers;

The facts discussed in this paper show that first, CL languages do have systematic ways to encode the contrast between singularity and plurality. Second, the number marker function of CLs is one of the extended functions of CLs. Plural markers also have extended usages in other languages (e.g., the adverbial function in (12)). The extended uses of plural markers may even include that of counting unit, similar to the function of CLs in CL languages (Acquaviva 2006: 1879; 2008: 188ff, on the possibility in Irish). Third, when the same formatives occur in different syntactic structures and thus have different functions, they exhibit different formal properties. When a formative used as a counting unit in a numeral expression, it is next to a numeral, however, when it is used as a number marker, it rejects a numeral, in Mandarin Chinese.

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