Chinese classifier categorizations and the application to second language acquisition

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Abstract

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Mandarin Chinese is usually considered a numeral classifier language (Del Gobbo, 2014). According to Allan's (1977) definition, a numeral classifier is an independent morpheme that "denotes some salient perceived or imputed characteristic of the entity to which the associated noun refers" (p. 285). The present study first constructs a categorization of Chinese classifiers, and second, an investigation in the acquisition of Chinese Classifiers for L2 learners. To construct the categorization of Chinese classifiers, I will first provide an overview of the categorizations of Chinese classifiers from previous studies and discuss the primary features of the categorizations provided by Chinese and Western scholars. In general, there is no distinction between measure words and classifiers in the categorizations given by Chinese scholars, while most of the Western categorizations do make the distinction. However, the classifiers that are discussed by Western scholars only represent part of a large system of Chinese classifiers. Based on current categorizations, a revised categorization focusing on Chinese classifiers is carried out.

The second part is to explore the acquisition of Chinese Classifiers for L2 learners with the goal of providing some suggestions on teaching and learning Chinese Classifiers that potentially benefits both L2 learners and teachers. First, I will illustrate previous studies of Chinese CLs acquisition for L2 learners in which the difficulties in learning Chinese CLs for L2 learners will also be displayed. Secondly, I will discuss current teaching materials and methods of Chinese CLs. Finally, the revised categorization will be applied in order to propose a more effective approach in teaching and learning Chinese classifiers before the conclusion is addressed.

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Part 1.

Chapter 1. Introduction of Chinese classifiers

Introduction

The languages of the world can be categorized into two groups: classifier language and non-classifier language (Hansen & Chen, 2001). Mandarin Chinese is well-known as a classifier language since it is obligatory to use a classifier between a demonstrative pronoun/ number word and a noun. For example, 'one chair' 一張桌子 *yī zhāng zhuōzi* will be ungrammatical without the classifier 張 *zhāng*. There are various type of CL languages in the world, including numeral classifier languages, concordial classifier languages, and intra-locative classifier languages. The term classifier (henceforward CL) in this paper refers to numeral CL only. As mentioned above, Chinese CLs are needed in many expression of quantity and thus, usually co-occur with numerals (Her & Hsieh, 2010). This paper aims to analyse the previous categorizations of Chinese CLs, from both Chinese and Western scholars' studies. The purpose is to provide some teaching and learning suggestions in Chinese CLs that potentially benefits both L2 learners and teachers.

In this paper, there are two main components that will be discussed. 1) the categorization of Chinese CLs 2) Second language acquisition of Chinese CLs. In the first chapter, the definition, as well as the syntactic and semantic features of Chinese CLs will first be discussed to clarify the scope of the study. Chapter 2 contains a literature review on the classification of Chinese CLs, including Chinese and western scholars' classification of Chinese CLs. In the next chapter, a revised classification of Chinese CLs will be constructed based on the theoretical framework of Chinese and Western classifications discussed in this chapter. The CLs that are discussed in this chapter focus on Mandarin Chinese while the uses of CLs in other Chinese dialects are not included, the grammaticality judgments are based on native speakers from Taiwan and data from Sinica Corpus.

Part 2 deals with the second language acquisition of Chinese CLs. In chapter 4, two experiments and one research on Chinese CLs acquisition for L2 learners will be presented, followed by an overview of current teaching materials and methods of Chinese CLs. Suggestions regarding the teaching methods of Chinese CLs are presented in chapter 5. Finally, the study is concluded with a summary, discussion and future studies in Chapter 6.

1.1 Definition of classifier

The definition and the scope of 'classifiers' are still under debate. While some scholars consider CLs as a subcategory of measure words (Chao, 1968; Liu, Pan & Gu, 1996; He, 2000), Huang, Li & Simpson (2014) emphasize the differences between CLs and measure words (henceforward MW). The classifiers in this paper are often referred to numeral classifiers or sortal classifiers, in contrast with measure words, which indicate massifiers or mensural classifiers. In this section, I will illustrate the definition of CLs in more detail and provide the distinction between CLs and MWs followed by the analysis of the syntactic and semantic features of Chinese CLs.

1.2 Chinese classifiers

'Mandarin Chinese is a numeral classifier language' (Huang, Li & Simpson, 2014, p. 26). According to Allan's (1977) definition, a numeral classifier 'denotes some salient perceived or imputed characteristic of the entity to which associated noun refers' (p. 285). Tai and Wang (1990) also provide their definition as follow:

> 'A classifier categorizes a class of nouns by picking out some salient perceptual properties, either physically or functionally based, which are permanently associated with entities named by the class of nouns' (p. 38).

From the definitions given above, we can observe a salient feature of CLs namely that it points out the permanent characteristic of certain nouns. In order to better understand the properties of CLs, it is important to distinguish CLs from MWs. In the following sections, I will differentiate CLs from MWs and provide the diagnosis to distinguish them.

1.3 Classifiers and measure words

In Chen's (2012) study, she re-examines three representative studies about Mandarin MWs and CLs and finds out that those studies do not differentiate CLs form MWs. For example, Chao (1968) considered CLs as one kind of MWs and named it as 'individual measures'. Li and Thompson (1989) also claimed that every MW can be a classifier. Although CLs and MWs are often studied under the same framework (Tai, 1994), plenty of evidence indicates that there are fundamental differences between CLs and MWs. The target of this section is not to determine the hierarchy relation of CLs and MWs, if there is one, but to present the elemental variation of CLs and MWs.

While CLs denote the 'natural unit' of nouns, MWs create a measure for units that do not come in natural (Del Gobbo, 2014). As in Cheng and Sybesma's (1998) definition, 'a massifier creates a measure for counting, a count-classifier simply names the unit in which the

entity denoted by the noun it precedes naturally presents itself' (p.4). In addition, Tai and Wang (1990) stated that 'a measure word does not categorize but denotes the quantity of the entity named by a noun' (p. 38). For example,

(1) 一斤香蕉/ 豬肉

yī jīn xiāngjiāo/ Zhūròu

'one MW (600g) bananas/ pork'

(2) 一根香蕉/ *豬肉

yī gēn xiāngjiāo/ *Zhūròu

'one CL banana/ *pork'

The measure word in (1) shows the temporary property of banana and pork with their weight, but in (2), the classifier *gēn* indicates the characteristics of the long and firm object, which are the permanent features of banana. These features are considered the cognitive-based distinctions which illustrate the fundamental differences between CLs and MWs.

1.4 Diagnostics

From the definitions provided by many scholars, the conclusion that measure words and classifiers belong to two distinct groups are adopted in this paper. (Tai & Wang, 1990; Tian, Zeng & Hong, 2002; Her & Hsieh, 2010). Since the main focus here is to provide a categorization of Chinese CLs, the first step will be clarifying the scope of the study. In this section, I will introduce the diagnoses of distinguishing CLs from MWs by presenting formal syntactic analysis for CLs and MWs, followed by a review of the diagnosis from previous studies (Chen, 2012; Her & Hsieh, 2010).

According to Her & Hsieh (2010), there are two approaches to analysing the syntactic structure of CLs and MWs. The first approach is to claim that CLs and MWs behave the same syntactically. Tang (2005) and Hsieh (2008) analyse CLs and MWs with the same syntactic structure and claim that CLs and MWs are syntactically alike as heads of classifier phrases (ClP). The second approach, on the other hand, is the analysis in which CLs and MWs have different syntactic properties. Cheng and Sybesma (1998), Borer (2005) argue that CLs are base-generated as the head of ClP, while MWs are base-generated under N and move to C. In both approaches, CLs and MWs occupy the same position eventually which explains why they are mutually exclusive. Since the syntactic features of CLs and MWs do not show striking differences and are still under debate, I will now provide the diagnoses of the CLs and MWs distinctions.

1.4.1 Adjective modification

First, measure words can be modified by adjectives, but classifiers cannot. For example,

(3) 一大箱蘋果

yī dà xiāng píngguǒ

'a big box of apples'

(4) *一大隻狗

*yī dà zhī gǒu

'a big CL dog'

However Her and Hsieh (2010) study argue that there are some counter-examples to this claim. For instance, in (5) and (6), adjectives are inserted between CLs and nouns. Therefore, the constraints of adjective insertion are not merely the CLs and MWs differences. Cheng & Sybesma (1998) and Liang (2009) claim that only certain adjectives can modify certain types of classifiers and the numeral is also a constraint of the adjective insertion. In general, an adjective can only occur with certain CLs if the preceding number word is 一 *yī* 'one'.

(5) 一大顆蘋果

yī dà kē píngguǒ

'a big CL apple'

(6) 一大本書

yī dà běnshū

'a big CL book'

What is important here is the fact that the scope of adjectival modification is different for CLs and MWs (Her & Hsieh, 2010). An adjective preceding an MW only modifies the MW, while an adjective preceding a CL modifies both the CL and the following noun. Therefore, (7) and (8) lead to different interpretation because the adjective in (7) modifies only the MW *xiang*, not the noun when preceding the MW.

(7) 一 大 箱 蘋果

yi da xiang pingguo

one big box apple

'one big box of apples'

(8) 一 箱 大 蘋果

yi xiang da pingguo

one box big apple

'one box of big apples'

- Her & Hsieh, 2010, p. 537

On the other hand, the adjective preceding the CL (9) has the same function as the adjective before the noun (10).

(9) 一 大 顆 蘋果

yi da ke pingguo

one big CL apple

'one big apple'

(10) 一 顆 大 蘋果

yi ke da pingguo

one CL big apple

'one big apple'

- Her & Hsieh, 2010, p. 537

The differences above indicate that in the structure of Num-CL-Noun, an adjective can be placed in both pre-noun and pre-CL position without changing the meaning but not with MWs. Her and Hsieh (2010) explain that this is a result of which an MW blocks the adjectival modification to the following noun and a CL does not.

1.4.2 De insertion

Secondly, some scholar claim that between classifier and noun, it is impossible to insert *de*, while it is possible for measure word. As shown in (11) and (12).

(11) 一箱的蘋果

yī xiāng de píngguǒ

'a box "de" apple'

(12) *一顆的蘋果

*yī kē de píngguǒ

'a CL "de" apple'

However, counter-examples are also found in this test, as shown in (13) and (14). The explanation of is that the complexity in ClP increase the possibility to insert *de* with the assumption that one is the least complex number.

(13) 五百萬 隻 的 鴨子

wubaiwan zhi de yazi

five-million CL DE duck

'five million ducks'

(14) 半 顆 的 蘋果

ban ke de pingguo

half CL DE apple

'half an apple'

- *Her & Hsieh, 2010, p. 537*

1.4.3 Ge replacement

Thirdly, only CLs but not MWs can be replaced by *ge*, the general classifier, without altering its meaning. For example,

(15) 三顆蘋果=三個蘋果

sān kē píngguǒ =sān gè píngguǒ

'three CL apples = three "ge" apples'

(16) 三箱蘋果≠三個蘋果

sān xiāng píngguǒ ≠sān gè píngguǒ

'three boxes of apples ≠ three" ge" apples'

- *Her & Hsieh, 2010, p. 541*

Again, it is not the case that every CL can be replaced by *ge*. For example, *yīgè zhū* 'one *ge* pig' or *yīgè chē* 'one *ge* car' are less acceptable than (15) and (16). Chen (2012) claims that it is because some nouns are the prototype of the semantic categorization, therefore, are less acceptable to be replaced by *ge*.

1.4.4 Mathematical approach

Her (2012) provides a mathematical method of distinguishing classifiers and measure words. The fundamental difference is that the value of classifiers is always 1, whereas measure words represent the proportion that is not 1. The value of a measure word is usually unstable, and it differs in different contexts or circumstances. Therefore, it is cited as "n". For example, the classifier *kē* in (17) has the mathematical meaning of 1. However, in (18), *xiāng* indicates any other numbers except for 1, and the number of apples in the box is not certain.

(17) 三顆蘋果

sān kē píngguǒ

'three CL apples = 3 * 1 apple'

(18) 三箱蘋果

sān xiāng píngguǒ

'three boxes of apples = 3 * n apples'

Given the methods of distinguishing classifiers from measure words, the differences can be identified more precisely.

1.4.5 Essential and accidental features

Another way of distinguishing CLs from MWs is to use the definitions presented in this paper. According to Her and Hsieh (2010), the CLs is restricted to things perceived as inherently discrete, thus countable, while MWs are not. They claim that the differences between CLs and MWs can be clearly explained by the definition of "essential feature" and "accidental feature" in Aristotle's analysis in <Metaphysics>. A CL can point out the built-in feature of a noun, which is the essential feature according to Aristotle's analysis. On the other hand, an MW assigns a temporary feature of a noun, which is the accidental feature in Aristotle's analysis, and such features are not obligatory connect to the noun. For example, in (19), the classifier *bǎ* represents the inherent feature of a knife, which is its handle. However, in (20), the measure word *xiāng* provides extra meaning to the noun, which is an amount. That is to say, only when knives are put into a box then the measure word *xiāng* can be used to descript the amount of those knives, such a feature is considered accidental and temporary.

(19) 一把刀子

yī bǎ dāozi

'a CL knife'

(20) 一箱刀子

yī xiāng dāozi

'a box of knives'

1.5 Ambiguity between classifiers and measure words

The differences between CLs and MWs have been presented in this paper, however, there is not always a clear cut between CLs and MWs (Liang, 2009). 'Whether Chinese classifiers and measure words can be precisely distinguished has been a controversial issue, displayed by the egregious disaccord in the previous inventories of Chinese classifiers' (Her & Hsieh, 2010, p. 527). For example, the classifiers *pain* and *ba* denote different characteristics of nouns as in (21) and (22), *pian* expresses the flat and thin shape of the object and *ba* indicates that the object has a handle.

(21) 一片葉子

yīpiàn yèzi

'one CL leaf'

(22) 一把刀

yī bǎ dāo

'one CL knife'

However, they both can function as MWs at the same time. For example, in (23) and (24), they show the quantity of cloud and rice with different measures like a slice of and a handful of the object. Therefore, such classifiers are difficult to be precisely categorized into either group.

(23) 一片雲

yīpiàn yún

'one CL cloud'

(24) 一把米

yī bǎ mǐ

'one CL rise'

Although there is fuzziness in distinguishing CLs from MWs, in most of the cases they can be differentiated by the diagnosis given above. In this paper, I will use the diagnosis to narrow down the scope of CLs. If any fuzziness occurs, a CL will be included in the analysis as long as it has the function of denoting the inherent feature of a noun.

In this section, I have introduced several diagnoses to differentiate CLs from MWs and pointed out that there is fuzziness when distinguishing them. Among these diagnoses, I will adopt the fundamental features of CLs to distinguish CLs from MWs as it is the most basic and agreeable characteristic. Besides, the *ge* replacement, *de*-insertion, and the mathematical approach will also be used to support the analysis if there is any questionable case. The adjective modification test will not be applied in this paper because there are other factors that determine the grammaticality such as the type of classifier and the preceding number words. In addition, there are constraints on which adjective can be used to modify a certain noun. Therefore, it is difficult to tell if the ungrammatical phrase is causing by the differences between CLs and MWs or other factors.

Chapter 2. Literature review

2.1 Chinese scholars

In most of the studies of Chinese scholars, CLs are treated as a subcategory of MWs and are named as *gètǐ liàngcí* 'individual measure words' or *tiānrán dānwèi* 'built-in unit' (Chao, 1968; Liu et al., 1996; Lü, 1975). In this section, I will illustrate the three different

categorizations proposed by Chinese scholars. Those structures are widely used in traditional Chinese grammars tool books and occur in most of the Chinese learning materials.

2.1.1 Yuen Ren Chao (1968)

In Chao's (1968) book 'A grammar of spoken Chinese', he grouped Chinese MWs into nine categories in which the first categories (Mc) seemingly fits the definition of CLs, as shown in Table 1. Chao named the category Mc as *gètǐ liàngcí* 'individual measure words' and listed fifty-one subjects with corresponding nouns. The characteristics of Mc, given by Chao, is that 1) every noun has its particular Mc (some has more than one Mc) as well as a general one *ge*; 2) *de* cannot be inserted between an Mc and a noun; 3) most of the Mcs are not translated into foreign languages because it is not necessary and not easy.

Table 1: *Classification scheme of Chao*

Categories	Examples
Mc: gètǐ liàngcí (lèi cí): Individual measure word	gè, wèi, liàng
Mc': gètǐ liàngcí (v-o): Individual measure word	jù, kǒu, shǒu
Mg: jíhé liàngcí: Group measure word	duì, dǎ, shuāng
Mp: bùfèn liàngcí: Partial measure word	xiē, fèn, piàn
Mo: róngqì liàngcí: Container measure word	xiāng, píng, bāo
Mt: línshí liàngcí: Temporary measure word	tóu, dì, zhuō
Mm: biāozhǔn liàngcí: Mensural measure word	lǐ, cùn, bàng
Mq: zhǔn liàngcí: Quasi-measure word	guó, biān, tiān
Mv: dòng liàngcí: Verbal measure word	huí, cì, quán

Source: "A grammar of spoken Chinese" by Y. R. Chao & S. X. Lu, 1979, The Commercial Press, p. 263

From the description given by Chao, Mcs behave like CLs as most of them can be tested out with the *ge* replacement and *de*-insertion tests. In addition, the third characteristic shows that Mcs are only used in classifiers language like Chinese but not in English which corresponds to the distinction provided by Tai (1994) that every language has Mws but only classifier languages like Chinese or Thai use CLs.

The second category Mc', according to Chao's description, usually functions as an object. It is similar but different from verbal MWs and is used in V-O structure (Chao, 1968). In this category, many of the MWs are like the 'Temporary measure words' which is also discussed in Chao's own categorization. For example, in (25), s*hou* is used after the verb *xie* 'write', indicating that the subject can write characters well. The same MW is listed in the temporary MWs category as in (26). (25) and (26) show different structure but the MW s*hou* still has similar functions. Chao (1968) stated that temporary MWs are originally nouns and can often be followed by *de*. In addition, they most of the time only accept *yī* 'one' as numeral

words referring to whole and full. Although (25) and (26) are different in structure, they can both have the de-insertion and can only take *yī* as their numeral word.

(25) 寫一手好字

xiě yī shǒu hǎo zì

'Write one SHOU good characters' (write good characters)

(26) 一手油

yīshǒu yóu

'one SHOU oil' (having oil all over one's hands)

Another kind of MWs in this category is with MWs that function as verbal MWs, as shown in (27).

(27) 搭一趟飛機

dā yī tàng fēijī

'Take one TANG flight' (take a flight)

-Chao & Lu, 1979, p. 266

Verbal MWs indicate the number of times of an event or action and they serve as the objects of verbs. Chao (1968) claimed that Mc' occurs in the structure of V-O which is also the basic structure of verbal MWs. In addition, the Mc' *tang* and *shou* occur in the category of Verbal MWs as well. Therefore, those MWs are treated as temporary or verbal MWs which will be discussed in the following section.

In other categorisations, there are some 'MWs' that can actually be treated as CLs. For example, *dui, shuang, fu, lie* in *jíhé liàngcí*. In *jíhé liàngcí* (Mg), most of the Mws can have *de* inserting before a noun except for *dui, shuang, bai, qian, wan,* and *lie*. In those exceptions, *bai* 'hundred', *qian* 'thousand', and *wan* 'ten thousand' behave more like the numeral words than MWs since it is acceptable to insert Mws or CLs after them. For instance, the examples given by Chao are the following:

(28) 五百羅漢

Wǔbǎi luóhàn

'Five hundred arhat'

(29) 三千學生

sānqiān xuéshēng

'Three thousand students'

(30) 十萬兵

shí wàn Bing

‘Ten thousand soldiers’

-Chao & Lu, 1979, p. 267

For each example, the general CL *ge* can easily be inserted after the ‘Mg’ *bai* ‘hundred’, *qian* ‘thousand’, and *wan* ‘ten thousand’. Therefore, it is more plausible that they are numeral words in the given example which the MWs or CLs are omitted. As for *dui* and *shuang*, the fact that they cannot take de between them and the following nouns might indicate that they are more like CLs than MWs. Both *dui* and *shuang* have the meaning of ‘pair’ in English and are usually used when counting objects that normally come in a pair, such as eyes, chopsticks, and shoes. If consider the characteristic of those objects coming in pairs naturally, then it is fair to treat them as CLs rather than MWs. Following this analysis, the Mg *fu* should also be treated as a CL since it has the same meaning as *dui* and *shuang* and can be used to counting things like gloves, earrings, and glasses which usually come in a pair as well. Although Chao did not claim that de-insertion is impossible for *fu*, it is actually not acceptable for phrases like (28), or at least the degree of grammaticality is the same as in (29).

(31) *一副的手套

yī fù de shǒutào

‘a pair of gloves’

(32) *一雙的鞋子

yī shuāng de xiézi

‘a pair of shoes’

Another ‘Mg’ that might be a CL is *lie*, the example provided in Chao’s book is *yīliè huǒchē* ‘A train’. In this phrase, *lie* can be interpreted as ‘row’ in English. Again, if consider a row is a built-in unit for a train then *lie* can be treated as a CL. Other subjects in the category of Mg are considered MWs as they all create measures that quantify the following objects such as *da* ‘a dozen of’ and *qun* ‘a group of’.

Other categories are all excluded from CLs as the measures they create do not represent the natural unit of the following nouns. In addition, the measure does not point to the essential and permanent feature of a noun. In most of the analysis of Chinese scholars, verbal MWs are classified as a subcategory of MWs as well as CLs. However, verbal MWs and other measure words or CLs are different from the semantic, syntactic or mathematic aspect. First, in a CL phrase, CL goes before the noun. In addition, the noun selects specific CL by its character. On the other hand, in a “verbal MW phrase”, an MW follows the verb

(Matthews & Leung, 2001). Secondly, in Paris's (2011) study, Chinese verbal CLs have counterparts in English, while most of the nominal CLs do not. For example, in (33) and (34), *chī yī kǒu*, *qīn yīxià* correspond to "to have a bite", "to give a kiss" in English, but the counterparts of *sān běnshū* 'three books', *liǎng zhāng zhuōzi* 'two tables' in English cannot be found. CLs Thirdly, verbal measure words are used to express the number of times if an action (Chao, 1968) or the duration and degree of a movement (Paris, 2011).

(33) 吃一口

chī yī kǒu

'eat one mouth'= to have a bite

(34) 親一下

qīn yīxià

'kiss one time'= to give a kiss

To sum up, among the nine categories provided by Chao, only the first category 'individual MW' behaves like CLs. The exceptions of the categorization indicate that CLs might have one subcategory as *jihe liangci* (Mg) in which *jihe* means gathering or collective. Moreover, he provided a list of individual measure words with their corresponding nouns that can serve as the data for CLs. However, the classification with the individual measure words still needs further analysis.

2.1.2 Liu, Pan & Gu (1996)

Second, Liu, et al., (1996) gives further analysis on 'measure words' and categorize with three layers, as listed below.

Table 2: *Classification scheme of Liu, Pan & Gu*

Category	**Subcategory**	**Subcategory**	**Example**
Míng liàngcí: Nominal measure words	Zhuānyòng liàngcí: Exclusive nominal measure words	Gètǐ liàngcí: Individual measure word	tiáo、zhāng、kē、lì
		Jíhé liàngcí: Group measure word	fù、duì、shuāng、tào、bāng、qún、pī
		Dùliàngcí: Standard measure word	gōngfēn、gōngshēng、dūn、píngfāng mǐ
		Bùdìng liàngcí: Undetermined measure words	xiē、diǎn
		Zhǔn liàngcí: Quasi-measure word	nián、xīngqí、tiān、fēnzhōng、guó、xiàn
		Fùhé liàngcí: Compound measure word	réncì、jiàcì、miǎo lìfāng mǐ
	Jièyòng liàngcí: Borrowed nominal measure words		wǎn、hú、zhuō、pén、shēn、chē
Dòng liàngcí: Verbal measure words	Zhuānyòng dòng: liàngcí Exclusive verbal measure words		cì、xià、huí、zhèn、chǎng、tàng、gè
	Jièyòng dòng liàngcí: Borrowed verbal measure words		dāo、yǎn、jiǎo、kǒu、quán

Source: " Modern Chinese Grammar " by Y. H. Liu, W. Y. Pan& W. Gu, 1996, p.

Liu, et al., (1996) first distinguish nominal MWs from verbal MWs and categorize both categories with two subcategories: specified and loan MWs. Verbal MWs will not be discussed here as illustrated in the previous section. Within the category of specified nominal MWs, there are six categories in which undetermined MWs and compound MWs are the only two categories that are not mentioned in Chao's (1968) categorization. The undetermined MWs *xiē* and *diǎn* both refer to the measure with an uncertain amount like 'some' and 'a little bit' in English, they are classified into the category of partial MWs in Chao's categorization.

Compound MWs involve with two more aspects of quantification. For example, the *jiàcì* in (35) indicates the number of helicopters at one time.

(35) 直升機三架次

zhíshēngjī sān jiàcì

'helicopters three MW' (Three helicopters a time)

- *Sinica Corpus*

Here, *jià* is the CL for helicopter and *cì* is normally treated as a verbal MW that refers to the number of times. Although there might be CLs in compound MWs, a CL has to be combined with a verbal or a mensural measure word such as *cì* or *lìfāng mǐ* 'cubic meter'. In addition, if a compound MW has a CL as its component, it can often be analysed as a noun phrase with CL only. For example, (35) can be interpreted as *yī cì sān jià zhíshēngjī* 'one time three helicopters' in which *jià* is an individual measure word (CL). Therefore, the compound MWs will not be included in the scope of CLs.

In the classification of Liu, et al., (1996) there is also a classification called *geti liangci* as in the categorization in Chao's. Again, it is the category that fits the definition of CLs. Liu, et al., (1996) stated that individual MWs are used to descript individual objects and can only match with certain nouns. They also pointed out that the use of individual MWs is a special characteristic of Chinese language. Liu, et al., (1996) did not list all the individual MWs but only several examples such as *tiao, zhang, ke,* and *li*.

Same as in Chao's categorization, Liu, et al., (1996) had *jihe liangci* in their categorization and stated that is it used for objects that are formed with more than one individuals. From the examples given by Liu, et al., (1996), *fu, shuang,* and *tao* are considered to be more like CLs than MWs.

(36) 一副對聯

yī fù duìlián

'a pair of couplet'

(37) 一雙筷子

yī shuāng kuàizi

'a pair of chopsticks'

(38) 一套房子

yī tào fángzi

'a TAO house'

- *Modern Chinese Grammar* (Liu, Pan& Gu, 1996)

In (36) and (37), *fu* and *shuang* both have the meaning of 'pair' whereas *tao* is mostly translated into a set in English. Here, *fu* and *shuang* are like CLs as discussed in the previous section. *Tao*, on the other hand, is trickier to deal with. The *tao* in (32) indicates that a house contains several rooms and therefore, can be described as a set. To define whether *tao* can be treated as a CL, we must look into more noun phrases that take *tao* as an MW/ CL. *Tao* is very often used to quantify clothes as in *yī tào yīfú* 'a set of clothes'/ *liǎng tào xīfú* 'two suits' or *yī tào cānjù* 'a set of tableware'. If consider clothes and suit are normally presented in a set, then *tao* can be treated as a CL in those cases. In this paper, I will analyse *tao* as a CL because a house normally has several rooms and suites usually indicate both tops and pants.

2.1.3 He (2000)

Third, He (2000) provides the categorizations in more detail than previous studies, see the list below.

Table 3: *Classification scheme of He*

Category	Subcategory		Example
Míng liàngcí: Nominal measure words	Gètǐ liàngcí: Individual measure word		wèi、yuán、míng、jiān、kē、lì
	Jíhé liàngcí: Group measure word	Dìngliàngcí: Determined measure word	shuāng、duì、fù、dǎ、wǔ、qún、pī
		Bùdìng liàngcí: Undetermined measure word	qún、wō、pī、tuán、céng
	Bùfèn liàngcí: Partitive measure word		jie, pian, kuai, ban
	Zhuānzhí liàngcí: Exclusive measure word		cè、sōu、juǎn、bù
	Jièyòng míng liàngcí: Borrowed measure word		bēi、wǎn、hú、chē、chuán
	Línshí míng liàngcí: Temporary measure word		liǎn、shān、zhuōzi、nǎomén zi
	Dùliànghéng liángcí: Standard measure word		chǐ、cùn、àngsī、kǎlùlǐ
	Jièyòng liàngcí: Borrowed measure word		Wǎn、hú、zhuō、pén、shēn、chē
Dòng liàngcí: Verbal measure words	Zhuānyòng dòng liàngcí: Exclusive verbal measure word		cì、xià、huí、zhèn、chǎng、tàng、gè
	Jièyòng dòng liàngcí: Borrowed verbal measure word		dāo、yǎn、jiǎo、kǒu、quán
Jiānzhí liàngcí: Pluralistic measure words			bǎ、zhèn、pāi、xiē
Fùhé liàngcí: Compound measure words	Compound（Nominal +Verbal measure words）		liàng cì、bāncì、gōnglǐ xiǎoshí
	Selective（Choose one meaning）		miàn gè

Source: " A study of modern Chinese classifiers" by J. He, 2000, Beijing Language and Culture University Press p.30-52

From the list above, we can see that He (2000) provides the most detailed division of measure words. The basic structure is similar to the one in the study of Liu, et al., (1996). In

his categorization, *geti liangci* is no doubt the closest to the definition of CLs, as in the analysis of Chao (1968) and Liu, et al., (1996). What is worth noting is that he categorizes *Jíhé liàngcí* into two groups: *dìngliàngcí* and *bùdìng liàngcí*. As mentioned in the previous section, some of the *Jíhé liàngcí* are considered more like CLs than MWs such as *shuang*, *dui*, and *fu*. From He's (2000) categorization, it is obvious that all of them fall into the category of *dìngliàngcí* in which all 'MWs' present certain fixed quantity. This feature corresponds to the definition that CLs denote the built-in characteristics of nouns which are permanent.

In addition, the category *zhuānzhí liàngcí* 'specified MW' is only seen in He's categorization but not in the analysis of Chao (1968) and Liu, et al., (1996). The definition of specified MW, given by He, is that those 'MWs' are specifically used for quantifying certain nouns, and do not have any other function. The example of specified MW given by He is *pi*, the 'MW' for horses. The reason why *pi* is a specified MW is that *pi* can only be used when quantifying horses and vice versas. On the other hand, CLs like *zhang* can be used to quantify objects like tables, tickets, beds, or maps. In addition, it not only denotes the built-in unit of an object but also points out the characteristics of the object. However, He does not provide a clear distinction between individual MWs (CLs) and specified MWs. The definition of individual MWs given by He (2000) is that they can only match with specific countable nouns and cannot have de between individual MW and nouns. He (2000) also claims that individual MWs are the most special category among Chinese MWs since they have distinct features in syntactic and semantic aspects. Furthermore, the use of individual MWs is specific in Chinese not in other Indo-European languages (He, 2000). From the definition above, we can only observe that the use of specified MWs is more restrict than of individual MWs. The specified MW *pi* is also an individual MW in He's categorization, other specified MWs such as *sou*, *suo*, and *juan* all have the feature of individual MWs. He states it himself that specified MWs such as *ce*, *sou*, *feng*, *dao*, ye, etc., are also individual MWs. Therefore, the specified MWs will be treated as CLs as in individual MWs.

Except for nominal and verbal MWs (will not be discussed here as explained in the previous section), He made the distinction of pluralistic MWs and Compound MWs, the later one has already been examined in the previous section, therefore, will not be repeated here. The definition of pluralistic MWs, according to He (2000), is that an MW belongs to more than two categories. For example, *ba* can be a nominal MW (39) or a verbal MW (40).

(39) 一把刀

yī bǎ dāo

'one BA knife'

(40) 拉他一把

lā tā yī bǎ

'pull him one BA'

-He, 2000, p. 48

The specified MWs mentioned above are also pluralistic MWs since they also belong to individual MWs in He's categorization.

In this section, I have reviewed three categorizations from Chinese scholars. It is clear that they all adopt the term measure words to refer to both CLs and MWs in their categorizations. In addition, individual MWs is a category that is distinguished in every categorization and it is the category that fits the definition of CLs the most. We can also notice that CLs can also be found in other categories such as group MWs (or to be more specific, determined group MWs), specified MWs and pluralistic MWs.

2.2 Western scholars

Different from Chinese scholars' categorization, Western studies in Chinese CLs distinguish CLs from MWs in general. In this section, I will present three categorizations from the field of Western linguistic. Allan's (1977) study illustrates the cross-linguistic CL system, and Tai's (1994) categorization focus on the CL system across Chinese dialects; finally, Gao and Malt (2009) provide a categorization that aims at CLs in Mandarin Chinese.

2.2.1 Allan (1977)

Allan's (1977) investigated the classifier systems of classifier languages in general, he identified seven categories of classification: 1) material, 2) shape, 3) consistency, 4) size, 5) location, 6) arrangement, and 7) quanta. Among these seven categories, the first five are used only in classifier languages while the last two categories occur also in languages like English (Allan, 1977). He further on provided the subcategories and the type of nouns which match a certain category for all seven categories in various languages. In this section, I will present the subcategories, examples and the corresponding types of nouns of only the first five categories because they are used specifically in classifier languages and the last two categories do not denote the inherent features of the noun (Allan 1977). Based on the description of each category provided by Allan, the corresponding Chinese examples, if there is one, will be reconstructed. For example, in the animacy category, Allan stated there are classifiers for animal nouns and, in some languages, classifiers for human beings. The corresponding

classifiers in Chinese are like *pi*, *tou*, *zhi* (classifiers for animals), and *wei* (classifier for human).

Table 4: *Classification scheme of Allan*

Category	**Subcategory**	**Description**	**Examples**
Material	animacy	animals, human	pi, tou, zhi, wei
	*abstract and verbal noun	action	gu, ci, xia
	inanimacy	tree and wooden	ke, sou
Shape	one-dimensional	rope-like, trees and wooden	tiao, gen
	two-dimensional	plank-like, fabric- like	pian
	three-dimensional	Fruit	ke
	*prominent curved exterior	hills, humps, heaps, horns	zui, zhi
	*hollow	bottles, drums, tins, pipes, and bamboo	ge, tiao
Consistency	flexible	rope-like, strand-like, fabric-like, and bush-like	tiao, chuan
	hard or rigid	stick-like, plank-like	gen, kuai
	*non-discrete	mud-like, mushy substances	tuo, tan
Size	big	large animals	tou
	small	Small animals	zhi
Location		countries, gardens, fields, villages, and staircases	zuo

Source: "Classifiers" by K. Allan, 1977, Language, p. 297-304

The five categories that are considered CLs in Allan's (1977) study seems possible to be applied to the classification of Chinese classifiers. However, there are some subcategories that do not have corresponding Chinese counterpart. For example, the subcategory of shape: prominent curved exterior refers to classifiers for nouns like hills and horns. In Chinese, the classifier for hills is usually *zuo* which can also be used for nouns like parks, cities, and museums that do not have the prominent curved exterior shape. Similarly, the classifier for horns is *zhi* that can be used for nouns like cell phones, needles, and spoons which do not necessarily have the prominent curved exterior shape.

In addition, there are two categories that are more like MWs than CLs in his categorization, the abstract and verbal noun and the non-discrete from the category of material and consistency. The CL/ MW for abstract and verbal noun should be examined separately because the quantifiers (the term 'quantifier' refers to both MW and CL and will be used when a word is a CL and an MW at the same time or if it is unclear whether a word is a CL or an MW) for verbal nouns have different syntactic and semantic features as mentioned above. The CL/ MW for abstract nouns, one the other hand, is hard to distinguish since the entities and the inherent characteristics of abstract nouns are relatively fuzzy. For example, abstract nouns like news, order, emotion, or relation all have their specific quantifiers that cannot easily be altered but whether these quantifiers present the built-in entities of the nouns is still a puzzling issue.

The five categories presented here are often combined or associated with other categories. In Allan's categorization, he stated that the dimensional subcategories are often associated with consistency whereas the size category usually combines with shape category. For instance, in the one-dimensional category, the CL for 'rope-like' objects is composed of 'saliently one- dimensional' and 'flexible', whereas for 'stick-like' is composed of 'saliently one-dimensional' and 'rigid'. This indicates that the classification and the hierarchy of Allan's categorization can be reorganized.

Allan's (1977) classification is completely different from the categorizations of Chinese scholars' since the classification presented in Table 4 is a sub-division of the "individual measure words" in the Chinese classifications. As mentioned above, Chinese scholars mostly just group CLs into one category without further classification. Allan's classification, on the other hand, presented the subdivision of CLs only. The subdivision of CLs illustrates how a certain CL groups a type of nouns together based on their common features. The same applies to Tai (1994) and Gao & Malt's (2009) categorizations that only focus on CLs, which I will present in the following sections. In general, the classification of Chinese scholars classify quantifiers that come after number words while Western scholars classify the elements in a certain category of Chinese scholars' categorizations.

2.2.2 Tai (1994)

Tai's (1994) categorization was based on Allan's (1977) study, he stated that only the first four categories are relevance to Chinese CL systems since the location category does not apply to Chinese CLs and the arrangement and quanta categories are MWs. Besides the four categories that have been illustrated in Allan's (1977) study Tai added an extra category

‘attributes referring to parts of objects’ and divided each category into several subcategories that are similar but not the same as Allan’s classification, as shown below in Table 5.

Tai (1944) claimed that the CL system reflects conceptual structures and the nature of categorization in human cognition. The conceptual structures and human cognition can be understood as how human beings perceive the world and how this perception is interpreted into languages. The choice of a certain CL is not arbitrary but is a result of one’s cognitive concept.

Table 5: *Classification scheme of Tai*

Category	**Subcategory**	**Examples**
Material	Animacy	zhī, tiáo, pǐ, tóu, kǒu, wěi
	Inaminacy	kē, gēn, zhū, cóng, tiáo
Shape	Longness	tiáo, gēn, zhī
	Flatness	zhāng, kuài
	Round	lì, kē
Size	Big	tóu, zuò
	Small	lì
Consistency	Flexible	tuán, tiáo
	Hard, rigid	kuài, gēn
Partial attributes		tiáo, gēn, zhī, wěi, tóu, kǒu

Source: "Chinese classifier systems and human categorization" by Tai, J. H., 1994, Interdisciplinary studies on language and language change, p. 6-12

In the material category, Tai only distinguished CLs for animacy and inanimacy objects without mentioning the abstract or verbal CLs. The corresponding CLs in these categories are consistent with the description given by Allan (1977) that they are used to quantify animals, human beings, and tree or wooden objects. In the second category, Tai divided it into three subcategories: longness, flatness, and roundness. On the other hand, Allan adopted the dimensional categorizations because they are more suitable for applying to cross-linguistic classification (Tai, 1994). Indeed, the longness does fit the description of the one-dimension category which is for rope-like and tree or wooden objects, so do the flatness and roundness categories. Moreover, the categorization of Tai seems to be more appropriate for Chinese CLs since the description of the two-dimension category, plank-like, and fabric- like do not refer to CLs like *zhang* or *mian* which denote the flat surface of the objects. In the three-dimension category, the claim of Allan that it is mostly used to quantify fruit does not cover all three-dimensional CLs such as *li* for eggs and rice. The size category and its subcategories are consistent with Allan's categorization, as well as the category of consistency. The only difference is that the non-discrete category is not adopted in Tai's classification, probably because it is more like a category for MWs rather than for CLs. The final category presents CLs with attributes referring to parts of objects. For example, CLs in animacy category like *tou, kou*, or *wei* all refer to parts of animals, same as CLs for trees such

as *tiao, gen,* and *zhi* all represent parts of trees. However, from the examples given by Tai, it seems that this category can serve as a secondary class to the material variation.

2.2.3 Gao and Malt (2009)

In Gao and Malt's (2009) paper "*Mental representation and cognitive consequences of Chinese individual classifiers*", They investigate the mental representation of CLs and the cognitive effect for Mandarin speakers. The focus of the study is "to evaluate both the mental representation of classifiers and potential cognitive consequences for speakers of Mandarin Chinese" (Gao & Malt, 2009, p. 1124). They provide a list of 126 common Chinese CLs as a tool to examine their influence on non-linguistic thoughts. Gao and Malt (2009) aim at the 'individual CLs' according to Chao's classification of noun CLs (was named as *geti liangci* 'individual MWs' as illustrated in section 2.1.1).

Gao and Malt (2009) state that individual CLs are used to classify countable objects and within this categorization, CLs can be divided into subcategories regarding their features. Two main categories are identified in this study: Shape and animate/ inanimate entities. Within two broad groups, several subcategories are distinguished. The 126 CLs Gao and Malt's (2009) are presented in Pinyin with the number of frequency, the original meaning, and the corresponding noun. Here, I will only display the categorization and several examples of each category, see Table 6.

Table 6: *Classification scheme of Gao & Malt*

Category	**Subcategory**			**Examples**
Predominantly shape-based	Saliently one-dimensional			duan, gen, gu
	Saliently two-dimensional			mian, pan, pian
	Saliently three-dimensional			ban, di, ke
	Salient feature			ba, ding, gan
Multiple shared features	Animate	Human		dai, ming, ren
		Animal		pi, tou, zhi
	Inanimate	Natural object		duo, ke, pao
		Artifact	concrete	ben, bu, jian
			other	ze, shou, qiang

Source: "Mental representation and cognitive consequences of Chinese individual classifiers" by Gao, M. Y., & Malt, B. C., 2009, Language and Cognitive Processes, 24(7-8), p.1171-1176

Compare to the classifications of Allan (1977) and Tai's (1994), Gao and Malt (2009) demonstrate the simpler categorization with only two main groups which are shape and material regarding previous classifications. That is to say, the size, consistency, location, and partial attributes categories that are including in Allan (1977) and Tai's (1994) classifications are not identified here. This might be caused by the reason that some categories can be the secondary group of other categories such as size and consistency can be the subcategories of shape. Location and partial attributes categorize, on the other hand, are only distinguished in Allan (1977) and Tai's (1994) classifications, respectively, while the first one was considered not applicable for Chinese CLs and the latter can be the subcategory of material. Whether the simplified categorization is clearer is still in doubt, but the overlap over each category is not as much as the previous categorization.

There are both advantage and disadvantage in Gao and Malt's classification. First, in the shape-based category, there are four subcategories in which the first three are dimensional categories that are also identified in Allan's (1997) study, similarly, in Tai's (1994) study as longness, flatness, and roundness. The last sub-group, however, is only classified in Gao and Malt's (2009) paper with no additional explanation. From the examples given by Gao and Malt, the 'Salient feature' category includes *ba*, for things that have a handle, such as umbrella, knife, keys, and scissors; *ding*, for things that have a top, such as cap, hat, and tent; *gan*, for things that have shaft or arm, such as rifle, and flag (Gao & Malt, 2009, p. 1172). The group is made probably because for CLs like *ba*, *ding*, and *gan*, it is hard to define in which dimensional categories it belongs to. However, CLs like *ya*, "something with a shape of a

tooth, indicating a shape of a crescent moon (Gao & Malt, 2009, p. 1172)" and *zhou*, "thread, (a scroll of) Chinese painting (Gao & Malt, 2009, p. 1172)" are both CLs without apparent dimensional feature but are classified into the three-dimensional category. Therefore, the distinction between dimensional categories and the salient feature is still unclear.

Second, although Gao and Malt (2009) claim that only individual CLs are included in their list, there are still some "CLs" that should be excluded because they are more suitable to be determined as MWs than CLs. For example, *pao*, for objects like urine and faeces in inanimate-natural object category; *wo* 'nest', for things like birds, chickens, eggs, and pigs in animate-animal category; *tuo*, for mud in three-dimensional category. As Gao and Malt state themselves, individual CLs are used to classify countable nouns. However, the corresponding nouns for *pao* and *tuo* are not countable and do not have a built-in entity. As for *wo*, even though the nouns it quantifies are all countable nouns, it is not the case that they come naturally in a unit of *wo* and it is also not their inherit feature. Therefore, the subjects that are including in this list still need further examination.

Third, the quantifiers that measure abstract nouns occur in several categories. Gao and Malt do not provide the criteria for determining those quantifiers as individual CLs and do not separate them from other categories. For example, "*ren* 'to hold the post of', for president (of country or institution) mayor, and chairman; *sheng*, 'sound', for gun shot, thunder, shout, crying, coughing, and knocking (Gao & Malt, 2009, p. 1173-1174)". These are quantifiers that create a measure for abstract nouns and are classified in animate-human and inanimate-natural object categories. The same in categories like inanimate-artefact (concrete) and inanimate-artefact (other). Whether or not these quantifiers should be considered as individual CLs should be examined more carefully before a clearer classification is made.

The advantage of their categorization is that within the category of animate, the distinction between human beings and animals are formed which make more specific to what type of nouns a certain CL selects. Moreover, the distinction between natural and artifact objects is also a distinctive classification in their study. If look into more detail, the inanimate-natural object category is mostly for plants such as trees or grass which is consistent with the description of the inanimacy category given by Allan (1977). Another subcategory is the artefact which is divided into two groups: concrete and other. This is comparable to the distinction of abstract and verbal noun subcategory in Allan's (1977) classification since the CLs in this category are very often used to quantify abstract nouns or events such as deals, fights, plays, and art. Similarly, Gao and Malt do not have explicit definition for the distinction between concrete and other and there are some ambiguity in CLs such as "*ban* 'a

work shift', for transportation on fixed schedule, like bus, train, and ship; *dun* 'pause', for meal (Gao & Malt, 2009, p. 1174)". These CLs are all treated as inanimate-artefact (concrete) CLs but are often used to quantify abstract nouns or events. Therefore, the examination is still needed for selected CLs and the classification of Gao and Malt (2009).

In sum, we can observe that the shape and material categories are identified in all three categorizations of Western scholars. Tai (1994) identified five categories with the first four categories present the similar structure as Allan's (1977) categorization (material, shape, size, consistency) while the first to categories are also adopted in Gao and Malt's classification with different subcategory in each category. In addition, the fifth category of Allan's classification, location, is not included in Tai (1994) and Gao and Malt's (2009) studies because it does not apply to Chinese CLs, according to Tai (1994). However, the description of location category: countries, gardens, fields, villages, and staircases, does lead to a Chinese CLs *zuo*, which is usually used to quantify location or mountains. Also, in Gao and Malt's classification, some categories are divided into more detail such as human/ animal and concrete/ other distinction which presents the specific features the CLs denote. Therefore, the reorganized classification in this paper will adopt the categories that are commonly identified in Allan (1977), Tai (1994), Gao and Malt's (2009) categorizations as well as the fifth category of Allan's categorization, and the subcategories in Gao and Malt's (2009) study.

Chapter 3. An innovative approach to Chinese classifiers categorization

From the overview of Chinese and Western scholars' categorization of Chinese CLs, it can be observed that Chinese scholars might be aware of the differences between MWs and CLs although both CLs and MWs are named as MW in their categorizations. Most of the CLs are grouped into the category called individual MWs. However, there is no further classification for CLs that can explain how CLs can group a certain type of noun together and how CLs denote the features of a group of nouns. These categorizations lead to the disadvantage that the main and subcategories cannot separate CLs with different properties (e.g. shape, size, etc.). Take the classification of He (2000) as an example, within the category of *Gètǐ liàngcí* 'individual MWs', there are CLs like *wèi, yuan, míng, jiān, kē*, and *lì*, in which significant differences can still be found. For instance, *wèi, yuan,* and *míng* can only be used to count human beings, not things or animals.

Western categorizations, on the other hand, first distinguish CLs from MWs then identify distinct categories based on the type of nouns a certain CL selects which seems to be a solution to the disadvantage of Chinese categorization. However, the structure of classifier is not very systematic. Some categories are actually subcategories of others, like size and consistency can be considered subcategories of shape. This leads to the result that a certain classifier end up belongs to several categories, causes the confusion of its usage. Therefore, some adjustment regarding the hierarchy of the classification should be done. For example, the category of shape and size in Tai's study can be considered as subcategories of animacy and inanimacy. If one wants to know which classifier should be chosen for cows, the procedure will be to define whether that is an animacy or not and then select the right classifier by its shape or size.

Moreover, in both Chinese and Western classifications, there is no clear explanation on the usage of *ge*. Traditionally, *ge* is called *tongyong liangci* 'general MW' in Chinese(Chao, 1968), many linguists also named it as "default classifiers" (Myers, 2000), which is also the most common way of explaining the property of *ge* since it is considered to be a CL that can be used for a wild range of nouns. However, *ge* has to occur with some specific nouns and the abuse of using it will cause grammatical mistakes. For example,

(41) 一位教授/一個教授

yī wèi jiàoshòu/yīgè jiàoshòu

'one CL professor/ one GE professor'

(42) 一張沙發/一個沙發

yī zhāng shāfā/yīgè shāfā

'one CL sofa/ One GE sofa'

(43) 一張紙/?*一個紙

yī zhāng zhǐ/? *yīgè zhǐ

'One CL paper/? *One GE paper'

(44) 一頭牛/?*一個牛

yītóu niú/? *yīgè niú

'one CL cow/? *One GE cow'

Another issue is the categorization of abstract quantifiers. In the studies of Western scholars, only Allan (1977) identified the subcategory: abstract and verbal noun within the material category. However, it was not adopted by Tai (1994) and Gao and Malt (2009). As stated earlier, Gao and Malt include some abstract quantifiers in their list and categorize them

into different categories together with other CLs for concrete nouns. This might lead to a misunderstanding of the target to which a certain quantifier is referring. For instance, *ban*, 'a work shift', for transportation on fixed schedule, such as bus, train, ship, and airliner, refers to the shifts of transportation not to quantify the transportation itself.

Finally, an appropriate list of CLs is yet to be composed. Gao and Malt's classification is the only one that provides a list of CLs. However, the selection of CLs includes many that are more like MWs, as discussed in the previous section. Therefore, the targets of the present study still need to be determined.

To sum up, both Chinese and Western classifications will be the basis of the revised classification. For Chinese ones, although no subcategory is identified in the individual MWs category, there are some exceptional CLs that are put in categories like group MWs and exclusive MWs and pluralistic MWs that indicate the classification of CLs. On the other hand, Western classifications can be altered to have a clearer hierarchy. In addition, the selection of CLs needs to be re-examined as well as the use of *ge*.

3.1 Approach

After reviewing the categorizations of both Chinese and Western classifications, a revised categorization of Chinese CLs will be constructed in this section. The revised classification is based on the framework of the categorization discussed in the previous sections. Among the categorizations that were reviewed in this paper, Western scholars' classifications scheme will be the foundation of present categorisation because the scope of categorizations focuses of CLs which matches the present study to the greatest extent. In addition, the categories related to CLs that are identified by Chinese scholars will also be taken into account. The approach of constructing a new categorization is to first select a list of Chinese CLs along with the associated meanings and corresponding nouns. Next, the selected CLs will be analysed by the categorizations provided in previous studies, followed by the examination of the classification. The judgment will be made by the degree of completion and overlapping of the categorization. The goal is to construct a more efficient and well-covered categorization.

3.2 Subject: Frequently used classifiers

As mentioned above, the essential task of revising and rebuilding a Chinese CL system is to first define the targets. Since the aim of the study is to propose a more effective approach in teaching and learning Chinese CLs for L2 learners, only frequent used CLs will be selected. To provide the implementation for the present study, I will compile a list of Chinese CLs as

well as their major features and the corresponding nouns. The list is based on CLs selected by Gao and Malt (2009) before compared to sources included other dictionaries of commonly used Chinese CLs/ MWs. There are several reasons why the list from Gao and Malt's (2009) studies is adopted here. First, unlike most of the Chinese dictionaries, most of the MWs were separated from CLs in Gao and Malt's list which makes more suitable for the present study. Second, only familiar CLs of Mandarin Chinese are selected by Gao and Malt and all subjects are marked with the degrees of frequency, whereas some dictionaries do not exclude those CLs that are rarely used or only used in certain dialects (e.g. Duan & He, 1991; Liu, 2013). Third, they provide the main characteristics that are denoted by the CLs with its original meaning. Therefore, the list of CLs provided by Gao and Malt will be presented and examined first, followed by the comparisons with other sources before the final list is determined.

3.2.1 Gao and Malt (2009)

The term 'individual classifiers' is used in Gao and Malt's (2009) paper, indicating the classifiers that classify individual objects. This feature is consistent with the definition of Chinese CLs discussed in the earlier section that they denote the built-in entities of objects. There are 126 familiar Chinese CLs that are selected in their study with the degree of frequency rounded off to the 7th decimal place. According to Gao and Malt (2009), "Numbers of frequency are measured when a word is used in sentences as a CL, derived from a corpus of approximately 10 million words which contained texts from newspapers, literature, and oral language material (drama). Frequencies are the number of occurrences divided by 1,000" (p.1171). Here, the numbers of frequency will be rounded off to the 3rd decimal place since CLs with a frequency lower than the 3rd decimal place are rarely used in discourses, books, or newspapers. For example, *zhan* and *long*, are CLs with the frequency of 0.0008149. In the database of Sinica corpus, there is no use of *zhan* and *long* as CLs or MWs in any kind of media or any type or article. Therefore, any CLs in the list of Gao and Malt (2009) with the frequency of 0% after rounding off to the 3rd decimal place will not be included which leads to a total amount of 109 CLs, as listed in Appendix A.

As mentioned above, although Gao and Malt (2009) claim that only individual CLs are included in their list, there are still some CLs that should be excluded because they are more suitable to be determined as MWs than CLs. After excluding quantifiers that are not considered CLs, 79 CLs is selected.

In Table 6, I have compared the list of familiar Chinese individual classifiers by Gao and Malt (Appendix A) with the 178 most common used MWs presented by Jiao (2001) and

the 138 common used MWs presented by Luo (2004) (no distinction between CLs and MWs is made in their works), and found out 19 common used CLs that are not included in Gao and Malt's (2009) list, as shown in Table 7.

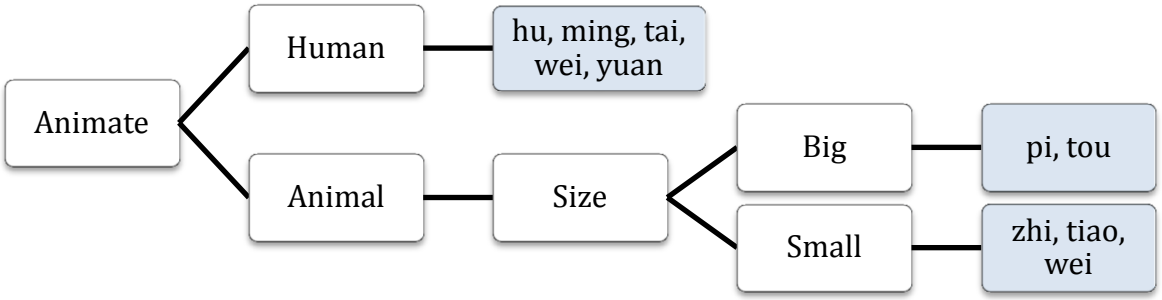
Table 7: *The list of classifiers selected from commonly used measure words provided by Jiao and Luo*

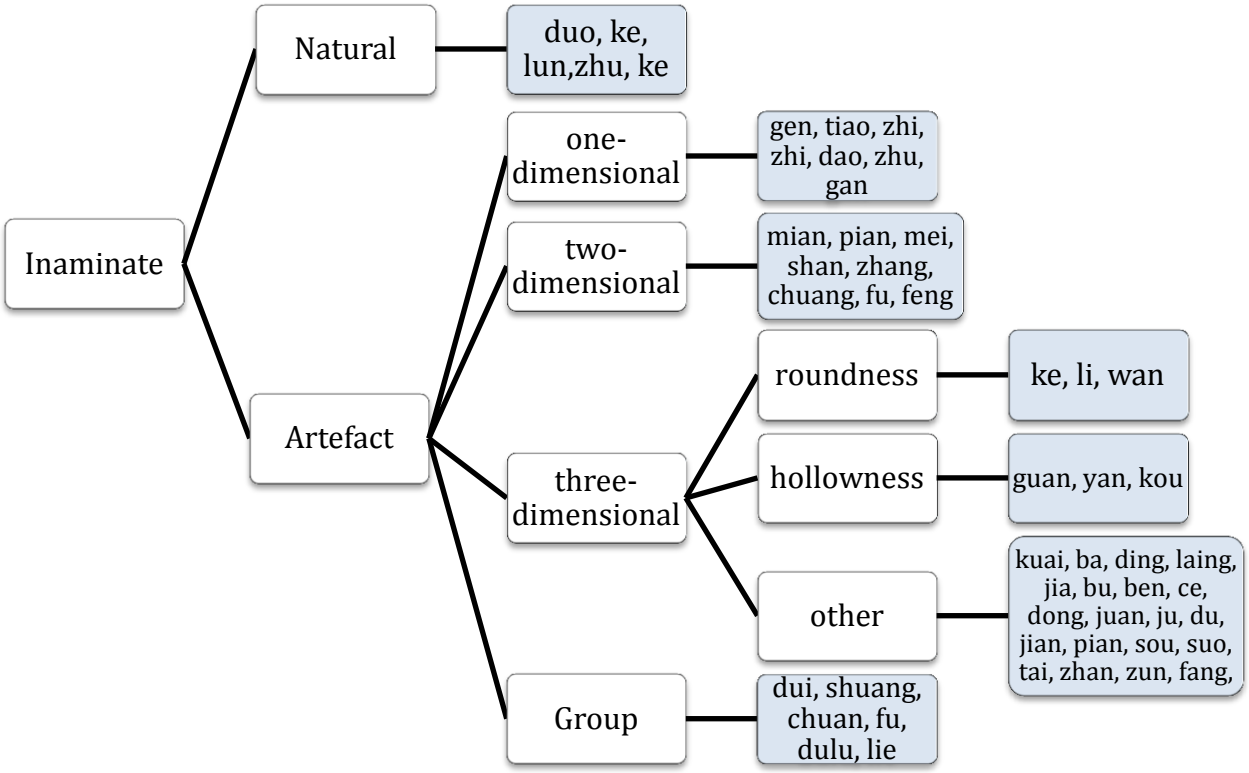
	CLs	Original meanings and associated nouns
1.	bu	[step] for number of steps or movement in chess playing
2.	chuan	[string] for a number of things growing or attached closely together, such as keys, necklace
3.	dangzi	matters
4.	dulu	similar to *chuan*. used colloquially
5.	fen	[divide, part] for part of a whole, mostly for abstract nouns, such as hope, ability, mistakes
6.	hang	for things in lines or rows, such as footprints, tears, poems
7.	ju	games, competitions
8.	ke	[visitor, guest] for an order of food or drink, such as fried rice, desert
9.	ke	[lesson] classes, subjects, lessons
10.	tong	[open, through] telephones, telegrams
11.	wei	[tail] fish
12.	yuan	[person, member] military officer, person with great ability
13.	zhu	[wick, to burn] incense sticks
14.	dui	[mutual, opposite] for a pair, such as wings, eyes, earrings, couples, pillows
15.	shuang	[pair, both] for a pair of things that are usually used together, like wings, chopsticks, hands, gloves, shoes
16.	fu	for a set of things, like cards, gloves, chess, glasses, earrings
17.	piao	[ticket] business, trade
18.	fang	[square]seals, handkerchief
19.	lie	[arrange, list] for a series or row of things, such as trains

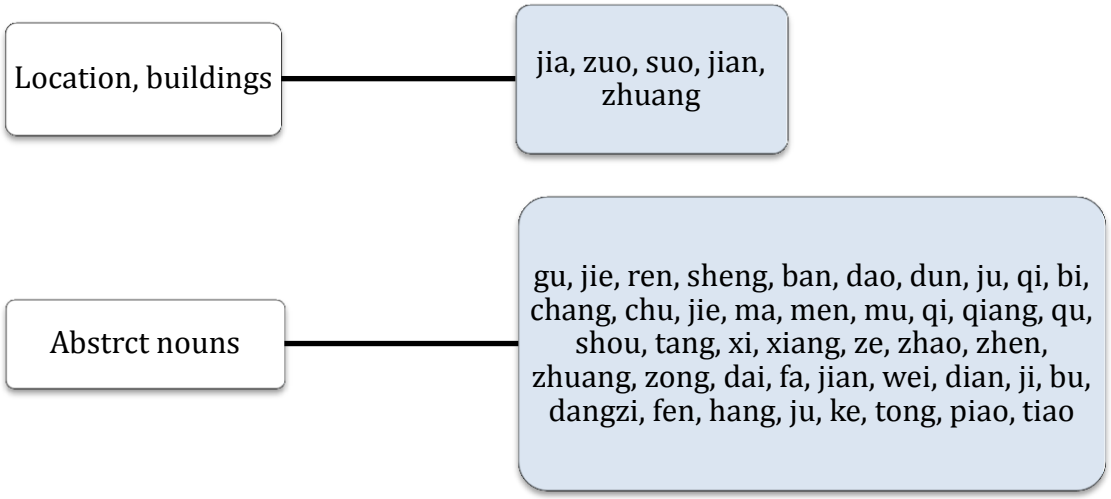
Source: "Han Ying liangci cidian 'A Chinese-English dictionary of measure words' " by Jiao, F., 2001, Beijing: Huayu jiaoxue chubanshe;" Qing song xue liang ci" by Luo, Qiuzhao., 2004, Taibei Shi: Wu nan tu shu chu ban gu fen you xian gong si.

Adding the extra 19 CLs to the list leads to a total of 98 CLs as the final list (Appendix B). In the next section, I will construct a categorization of Chinese CLs and apply the 98 selected CLs in Appendix B to the new categorization.

3.3 Chinese classifiers categorization







Based on the categorizations discussed earlier, I have constructed an altered classification. For main categories are identified: animate, inanimate, location, and abstract. The first two categories are recognized by all three western scholars mentioned in previous sections while the last two categories are identified only by Allan (1977). Within the animate category, human and animals are determined as two subcategories. According to Allan (1977), among languages that have the distinction between animate and inanimate, some have only one CL for all animate objects while others have CLs for both human beings and animal, separately. From the chart above, we can see that Chinese is obviously the later one since there is clear distinction between human and animal CLs with almost no overlap. One exception could be the CL *tiao*, which can also be used for human beings but only with very restricted objects, such as *yi tiao hanzi* 'one CL (strong or brave) man'. The category of animal can be divided by the size of the objects, and be group into two groups: small and big. For example, *zhī* is usually used to descript smaller animal like cats and dogs while *pī*、tóu are used for bigger animals, such as horses and cows.

The subcategories within inanimate include natural and artifact, which are consistent with the categorization of Gao and Malt. The CLs for natural objects, mostly plants, are first classified in one category, like *zhī*, *kē*, *duǒ*. Within the artifact category, I first adopt the dimensional categorizations from several studies and divided it into three different dimensions (Tai, 1994; Gao & Malt, 2009; Tien, Tzeng & Hung, 2002). Second, group CLs are distinguished as the fourth subcategory of artifact category. Within the dimensional categories, one-dimensional category contains CLs that are used for long items, such as *tiao*, for ropes; *gen*, for sticks. In the two-dimensional category, CLs that denote the flat surface of the objects

are selected. The three-dimensional category includes three subcategories: roundness, hollowness, and other.

The third main category is identified by Allan (1977), which was associated with nouns like countries, gardens, or fields. Here, CLs for buildings are also classified in this group. One might argue that objects like hospitals, restaurants, or hotels can also fit in the three-dimensional category. However, these CLs are separated from inanimate category because the distinct feature that they can be preceded by directional verbs, such as *qu*, *dao*, and *hui*.

The last category, abstract nouns, is also distinguished in Allan's (1977) classification. The CLs selected here are those that are used for countable abstract nouns. The countability of abstract nouns is investigated in Noonan (1978) and Burge's (1972) studies where abstract count nouns are distinguished from abstract mass nouns. Burge (1972) stated that "most of the grammatical criteria for concrete mass nouns apply to a class of nouns which are not clearly concrete: information, merit, color" (p. 264). The criteria refer to characteristics of mass nouns that "they resist pluralization, the indefinite article, and phrases like 'how many'" (p. 263). Since there is no distinction between the use indefinite article and phrases like how much/ how many in count and mass nouns in Chinese. I will adopt the criteria of pluralization to identify abstract count nouns from the abstract mass noun.

In Chinese, abstract nouns can be divided into two kinds; ones that only accept one or restricted number words and others that have no constraint on the use of numbers. For example, in (45) and (46), it is impossible to have other numbers except for one. On the other hand, for (47) and (48), any numbers can be placed before the quantifiers.

(45) 一片寂靜

yīpiàn jìjìng

'one PIAN silence'

(46) 一臉笑容

yī liǎn xiàoróng

'one face smile'

(47) 一齣戲

yī chū xì

'one CHU play'

(48) 一則消息

yīzé xiāoxī

'one ZE message'

Based on this criterion, only quantifiers like *chu* and *ze* are included in the present study and will be classified into the abstract nouns category.

The classification presented in this section is the result after examining both Chinese and Western scholars' classification. From the classifications of Chinese scholars, we can observe the differences between CLs and MWs as well as the classification of CLs such as individual CL and group CL. In general, the present classification is based on the categorizations of Western scholars, in which several aspects are adjusted. First, compared to previous categorizations of Western scholars, the number of main categories has been reduced as a result of the reorganization of the hierarchy in previous categorizations. As stated earlier, some categories that are identified in previous categorizations are secondary categories of another category. Therefore, the dimensional categories are now treated as the subcategories of the artifact category; the shape categories (roundness and hollowness) are grouped into the three-dimensional category. The rearrangement can decrease the duplication of a certain CL in several categories and better represent the characteristics of CLs. For example, the size category that is identified in Allan (1977) and Tai's (1994) classifications contains CLs for small objects, like *zhi*; and for big objects, like *tou*. With this classification, we cannot tell that *zhi* and *tou* can only be used for animals and they do not apply to all the small and big objects.

Second, the location/ buildings and abstract nouns categories are identified in this categorization although Tai claimed that they do not apply to Chinese CLs. The benefits of classifying these categories is that, for location/ buildings category, the CLs have the syntactic feature of being able to follow directional verbs, as discussed above; for abstract nouns, they do not belong to other categories and they can mostly be easily replaced by *ge*, which I will discuss in the next section.

Third, the unclearness between saliently three-dimensional and salient feature are fixed by divided three-dimensional category into three subcategories: roundness, hollowness, and other. As mentioned above, it is not logical that Gao and Malt (2009) identify *ya*, and *zhou* as CLs of the three-dimensional category while they are both CLs without an apparent dimensional feature. In the revised category the inanimate- artefact objects that do not belong to one- and two-dimensional categories are all grouped into the three-dimensional category. Within the category, two obvious features are identified: roundness and hollowness which are also identified in Tai (1994) and Allan's (1977) studies, respectively. After making the distinction within the three-dimensional category, it is clear that CLs like *ya* or *zhou* does not belong to roundness and hollowness category, and therefore, are classified into other category.

Finally, a more complete list of Chinese CLs are presented in the present categorization. In Allan's (1997) and Tai's (1994) study, there is no list of CLs that is used to examine their classifications. Therefore, there is no way to tell whether certain CLs do not fit into the classifications or whether some categories do not apply to Chinese CL systems. In Gao and Malt's (2009) classification, a list of 126 commonly used CLs is presented, however, many of those are MWs which should be excluded in the classification. Moreover, there are still some frequently used CLs that were left out in their list. The present categorization first rules out the MWs in their list and then includes those commonly used CLs that are not in the list by examining two other dictionaries of Chinese MWs.

3.4 The use of Ge

In the classification, *ge* is not included in any category but the usage of *ge* will be clarified here. Traditionally, *ge* is called general CL (Chao, 1968), since its range if use is considered very wide. Hseih (2008) also agree with the term general CL, he claims that "*ge* is a powerful CL that may occupy certain places in the four categories (human, animacy, function, and shape)" (p. 48). These categories correspond to the human, animal, and three-dimension categories in the present classification. However, in those categories, some CL-N phrase still cannot be replaced by *ge*. Hsieh points out that if a noun is the prototype of the category it is usually not acceptable for *ge* replacement. For example, *zhi* in the animal category has cat or dog as its prototype noun, therefore, it is less acceptable for ge to replace the CL. In contrast with nouns like monster which is not the prototype of the *zhi*, its CL can be easily replaced by *ge*. Hsieh's opinion is consistent with Gao and Malt's (2009) explanation that "*ge* is generally used for nouns that do not have a special CL" (p. 1177). Except for the three categories mentioned above, we will now examine the possibility of *ge* replacement in other categories. Frist, in the natural category, the substitution of *ge* is less natural than in the three categories.

(49) ?*一個樹

yīgè shù

'one GE tree'

(50) ?*一個草

yīgè cǎo

'one GE grass'

(51) 一個月亮

yīgè yuèliàng

'one GE moon'

In (49) and (50), the use of *ge* instead of *ke* and *zhu* seems to be less acceptable than the replacement of *lun* in (51). The plausible explanation might be that *lun* denotes the round shape of the noun and moon is not the prototype noun of *lun*. If searching the use of *lun* as a CL in Sinica corpus, the most frequent use is for abstract nouns like games, and competitions. The combination of *lun* and moon mostly occurs in the literature texts. It is likely that *ge* replacement is less acceptable for the natural category, especially for plants.

The acceptability of dimensional categories seems to behave similarly to one another. For one and two-dimensional categories, CLs are not possible to be replaced by ge unless the associated nouns are not the prototype of the CL. For example, the one-dimensional category includes CLs like *tiao, zhi,* and *gen* with corresponding nouns snakes, pens, and needles, respectively. These CL-N phrases are not natural when replacing by *ge*. Hseih (2008) states that a snake represents that most typical member of CL *tiao,* therefore, it is not acceptable for *ge* replacement. Similarly, pencils and needles are also typical members of *zhi* and *gen* thus are unacceptable to be substituted by general CL. However, for nouns like candles and straw which are less typical members of CL *gen*, *ge* replacement is acceptable.

For the location/ buildings category, most of the CLs can allow *ge* substitution no matter the corresponding noun is the typical member or not.

Finally, the abstract noun category can often be replaced with *ge* despite the type of the noun. According to Hseih (2008), ge is sometimes used to give a boundary to an abstract noun to form a unit. For example, *yīgè mèng* 'one GE dream'. For abstract nouns that have their own CLs, *ge* can still be used to replace the CL since it is used to create a discrete unit.

In sum, the use of *ge* is highly related to the relation between a noun and its CL. The degree of acceptability of *ge* replacement differs in various categories also for different CL and its corresponding nouns. Only in the location/ buildings and the abstract nouns category can allow *ge* replacement to a great degree.

3.5 Conclusion

In this part, I have examined the classification of Chinese CLs from both Chinese and Western studies. By introducing the categorization of Chinese studies, we can first conclude the drawback of mixing CLs and MWs together, as well as determining verbal measure words as classifiers. From Western classifications, the basic framework of separating animate from inanimate is formed, along with the dimensional categories. However, there is no general agreement to the categories of the classification and the hierarchical relationship between

each category. Based on these findings, I have proposed a new categorization with a list of commonly used CLs as well as the use of general CL *ge*. In the next part, I will explore the acquisition of Chinese CLs and apply the new categorization to the proposal of teaching and learning CLs.

Part 2.

Chapter 4. Second language acquisition of Chinese classifiers

Introduction

Much research has been focusing on the acquisition of Chinese CLs by L1 learners. However, only a few are related to how L2 learners acquire the use of Chinese CLs (Liang, 2008). As illustrated in the first part, the use of CLs between nouns and its preceding number words is obligatory for classifier languages like Chinese. This linguistic feature makes Chinese very different from other non-classifier languages and thus becomes a cause of difficulties for L2 learners. In this chapter, I will illustrate and discuss the acquisition of Chinese CL by L2 adult learners. The goal is to provide a teaching and learning proposal that potentially benefits to both L2 learners and teachers.

The part contains the following components. First, I will present previous studies on the acquisition of Chinese CLs for L2 learners, including the difficulties in learning Chinese CLs for L2 learners. Second, representative teaching methods and textbooks will be examined. Third, a proposal and some suggestions regarding the acquisition of Chinese CLs will be proposed before the conclusion is addressed.

4.1 Literature review

Many studies contend that acquiring the use of Chinese CLs/ MWs has always been a difficulty for foreign learners (Zhao, 1989; Dai, 1999; Guo, Cai & Yu, 2007). Dai (1999) illustrates the reasons in her study, she first classifies nominal MWs and verbal MWs and states that the use of nominal MWs is more complicated than verbal MWs. However, research on nominal MWs has not received much attention. This might cause the frustration in teaching and learning nominal MWs (Dai, 1999). The CLs and their classification presented in the first part is within the scope of nominal MWs. This indicates that more attention needs to be given on how to learn and teach Chinese CLs in a more effective way. To that end, we have to understand how Chinese CLs are acquired by L2 learners and what are the common mistakes they make while using Chinese CLs. In addition, we have to re-examine the current teaching methods and materials to find out what should be improved. In the following sections, I will present previous research on second language development of the Chinese CLs system and the current teaching methods and materials.

4.1.1 The differences in learning various dimensional Chinese classifiers

Liang's (2009) study examined how L2 learners acquire various CLs denoting the dimensional objects. Eight shaped CLs were selected in his study, including one-dimensional CLs: *tiao*, *gen*; two-dimensional CLs: *pian*, *zhang*; three-dimensional CLs: *tuan*, *ke*, *li*, *kuai*. Participants were adult speakers of English and Korean with various Chinese proficiency levels and they were asked to choose a CL that best matches the ten objects made by clay. The result shows that "1) a positive relationship exists between subjects' Chinese levels and their performance in this task; 2) Korean subjects minimally outperformed their English counterparts only at certain stages; 3) 2- dimensional classifiers are best learned followed by 1-dimensional and then 3- dimensional classifiers" (p. 309). Based on the result of his experiment, some suggestions regarding teaching Chinese CLs are made:

> "1) Teachers should pay different amount of attention to students at various stages with different backgrounds. At novice and advanced stages, English students would need more attention. At the intermediate stage, it is the Korean students who need an extra push when learning Chinese classifiers. 2) Teachers should assist English students more when learning 1-D & 3-D CLs and more with Korean students when teaching 2-D CLs; and teachers should put more efforts on teaching 3-D CLs, followed by 1-D and then 2-D CLs" (p. 322-323).

These findings provide insight in the relation between L2 learners' proficiency, nationality, and their performance of learning various kinds of Chinese CLs (1-3 dimension). In addition, it points out what improvement should be done in teaching Chinese CLs.

4.1.2 Common mistakes in using Chinese classifiers

Polio (1994) examines both English and Japanese speakers' use of CLs. 21 English and 21 Japanese speakers were asked to view a film first. Then they were asked to descript the story to a Chinese speaker and their use of CLs in their description was examined by the examiner. The result shows that

> "1) NNSs had no problem using a classifier in obligatory contexts; 2) they often included too many classifiers which makes it ungrammatical; 3) they did use special classifiers, but only occasionally; 4) they were able to self-correct the mistakes; 5) there were a few cases where NNSs used unacceptable special classifiers" (Liang, 2009, p. 31).

These findings indicate that to learn the Num-CL-N structure is not a problem for NNSs. However, several types of mistakes are found when using CLs, especially in special CLs.

Tang's (2008) study illustrates the common mistakes L2 learners make. She investigates the exams, homework, and papers done by foreign students and analysed five commonly observed mistakes while using CLs: 1) misuse of the general CL *ge*, 2) CLs with

same pronunciation, 3) CLs with similar meanings, and 4) CLs that refer to one object, or 5) lacking the use of CLs while needed and using CLs while it is not needed. She also demonstrates the interference of L1 and presents the common mistakes produced only by Korean learners. She explains that these common mistakes of Korean learners are caused by the CLs use in Korean since there are both similarity and diversity compared to Chinese CLs. These mistakes indicate that certain types of CLs are more difficult to use accurately than others (CLs with same pronunciation, CLs with similar meanings) and that CLs acquisition is influenced by speakers' L1.

The findings above indicate that although there is various performance from learners with different language background, as well as differences in using CLs of various dimensions and different features, L2 learners' use of Chinese CLs does improve throughout the learning process in general. However, the advantage of classifier language learners in learning Chinese CLs was not as obvious as expected (Liang, 2008). In addition, certain types of CLs are more difficult to acquire for L2 learners. Despite the fact that learners have become more aware of the mandatory use of CLs in certain contexts, failures in selecting the suitable CL still occur very often while using the language.

4.2 Current teaching approaches

Previous studies indicate that the teaching methods of Chinese CLs can be and need to be examined and improved (Liang, 2008; Polio, 1994; Tang, 2008). Hence, we have to first understand how CLs is taught and learned nowadays and reveal the problems. In this section, I will criticize several aspects in current Chinese CLs teaching which are considered deficient based on theoretical and empirical analysis in second language acquisition (Dai, 1999; Liao2010; Tang, 2008).

Firstly, there is no distinction between CLs and MWs while teaching Chinese CLs. The reason why the distinction is important is illustrated in several studies. Wang (2004) states that non-individual MWs are commonly used in most of the languages while individual MWs are specially used in Chinese. Therefore, most L2 learners can find the corresponding MWs of non-individual MWs in their native languages, but not for individual MWs. The individual MWs refer to CLs as stated in the first chapter. Chen (2012) also claims that the acquisition of Chinese MWs is not difficult because, although there are many MWs, learners can apply the use of MWs in their native languages and understand the concept of Chinese MWs. On the other hand, the use of Chinese CLs should be emphasized since there is no or only a few counterparts in learners' native languages.

Secondly, the current teaching methods have no variation regarding learners' language background since most of the Chinese courses do not divide students with different language backgrounds but only group them with their L2 proficiency which might lead to inefficient learning progress. Tang (2008) specifically states that in the beginner level, the interference of L1 in learning Chinese CLs is severe. For example, in Korea and Japan, there is overlap in the use of certain CLs which consists slight differences. For example, CL *tou* in Chinese is used for large animals, such as cows, sheep, and pigs but not for horses since horses have their specific CL *pi*. Whereas in Korea, *tou* can be used for horses as well. On the other hand, for most European learners, the use and functions of CLs are unfamiliar. Therefore, instructors will have to explain the obligatory of CLs between number words and count nouns. Hypothetically, Korean student s should have the advantage of learning Chinese CLs easier and faster. However, there is no specific teaching or learning methods given by instructors when it comes to learners with different language background. This might be one explanation of why in Liang's (2008) study Korean learners only minimally outperformed their English counterparts at certain stages despite the advantage in the use of CLs in their L1.

Thirdly, Guo, Cai, & Yu (2007), Dai (1999), and Tang (2008) claim that although some CLs are mentioned in textbooks, the explanations are incomplete and inadequate because most of the instructors focus on the explanation of the syntactic rules instead of the practical use in different contexts. The most common approach is to demonstrate the basic syntactic structure 'Number + CL + Noun' and learners have to memorize the correlations between classifiers and nouns they encounter in different levels. In Dai's (1999) study, she investigates two representing Chinese learning materials on how Chinese MWs are introduced. She concludes that the textbooks focus on the syntactic aspect of MWs and do not put much attention on the relationships between CLs and their associated nouns. Dai (1999) argues that learners will have to memorize the use of CLs because of their lack of knowledge in the relationships between CLs and their associated nouns.

Finally, the current teaching methods is insufficient in communicative practice (Dai, 1999; Liao, 2010). Tang (2008) claims that current teaching methods focus on the mechanical practice and repetition and might lead to the inaccurate use of CLs in authentic contexts. In addition, Dai (1999) states that the use of Chinese CLs not only involves in learners' grammatical competence but also their sociolinguistic competence, like the appropriate use of the CL *ge*. Many L2 learners would use *ge* whenever they do not know or they are not certain about which CL they should use, this is acceptable in some but not all contexts (Lau, & Grüter, 2015). For example, one can say use *wèi* or *gè* when indicating one teacher, as in (7) and (8).

However, in most formal or written contexts, *wèi* is more appropriate then *ge* as *wèi* has the expression of politeness. If changing the object into a thief, then *wèi* is incorrect no matter in written or oral language (see (9) & (10)), as well as in formal or in formal contexts.

(1) 一位老師

Yī wèi lǎoshī

'A teacher'

(2) 一個老師

Yīgè lǎoshī

'A teacher'

(3) 一*位小偷

Yī *wèi xiǎotōu

'A thief'

(4) 一個小偷

Yīgè xiǎotōu

'A thief'

In addition, the selection of certain CLs for a noun is usually not fixed when they are not used in real context. For example, the CL for fish can be *tiao*, *wei*, *kuai*, and *pian* in different contexts (Dai. 1999), learners have to learn how to select the proper CL in a certain context. Therefore, after establishing the syntactic structure of CLs and nouns, the instructors must provide learners the opportunity to practice and apply the use of CLs in authentic contexts.

The discussion so far focuses on the teaching methods of Chinese CLs and indicates that there are several aspects need to be improved. They can be summarized as follows: 1) the distinction of MWs and CLs should be applied while teaching; 2) different teaching methods should be used for learners with various language background; 3) CLs teaching should focus on not only syntactic but also semantic aspect as well as the relationships between CLs and nouns.

4.3 Representing teaching material

Teaching and learning materials have had a profound influence on the study of Chinese CLs are acquired. As mentioned in the previous section, there is no distinction between MWs and CLs when teaching Chinese CLs, this could possibly be due to the fact that MWs and CLs are not identified clearly in most of the Chinese learning materials. Guo, Cai, & Yu. (2007) and Dai (1999) argue that there is a lack of systematic teaching method in Chinese CLs. In general, instructors introduce CLs disorderly whenever a CL occurs in textbooks (Guo, 2008). Moreover, the number of CLs that are introduced in the representing textbooks is insufficient Gao (2008). In Guo's (2008) study, the inadequacy of MWs/ CLs in learning materials is reported. Based on the research of NOTCFL (China National Office for Teaching Chinese as a Foreign Language), an *outline ranking Chinese vocabularies* was composed, which indicates that Chinese learning materials should include 136 quantifiers in total. However, in three frequently used materials: *New Practical Chinese Reader, Chinese for Beginners*, and *Bridge*, there are only 58, 48, and 23 quantifiers used, respectively. The calculation made by Guo (2008) indicates that the quantifiers that are introduced in currently used materials were much less than expected. Nevertheless, the number of quantifiers in each material does not include MWs and CLs. Therefore, whether the insufficiency also occurs in CLs still needs to be examined. In this section, I will present the amount and distribution of Chinese CLs in the representing Chinese textbook *Practical Audio-Visual Chinese* (henceforward PAVC). PAVC contains series of five levels designed for adult non-native learner and is widely used in universities and Chinese learning institutes in Taiwan.

According to Chen (2012), the order of Chinese CLs in PAVC accommodates the text and the goal of the lesson without a systematic organization, which means that the occurrence of CLs is not according to the degree of difficulty. In addition, there are only 46 CLs in PAVC, whereas in Gao and Malt's (2009) list of CLs there are 126 commonly used CLs. The insufficiency in Chinese CLs in PAVC is consistent with the argument that the CLs presented in textbooks are less than expected. The distribution of CLs in PAVC is shown in Table 8.

Table 8: *The distribution of CLs in PAVC*

	Beginner	**Intermediate**	**Advanced**
CLs	ben, jian, jian, suo, wei, zhang, fen, jia, liang, sou, zhi, zhi, ge, jia, lie, tiao, zuo, ke, pian, tou, feng, ke, zhan, kuai, duo, tian, jie, dian (zhong), chang, bu, fen	pian, gen, dong, ba, ti, ding, mian, juan, shou, chu, tong, ren, bi, tia, chuang, ban	None
Total amount	31	16	0

Source: "Measure words and classifiers: Introspective viewpoints and suggestions in teaching Chinese as a second language" by Chen, Y. R., 2012, PhD diss., p.87-88

In Table 8, we can see that the number of CLs is much less than the list presented in chapter 3. In addition, the arrangement of CLs is not applicable to the degree of difficulty each CL represents (Chen, 2012). Nevertheless, how can we determine the degree of difficulty for each CL? Dai (1999) states that CLs should be grouped into three different levels while teaching and learning. The first level should contain CLs that can only be used for a specific type of nouns. For example, *liang* for vehicles and *sou* for ships. In the second level, a CL that can be used for several types of nouns can be introduced to learners. For example, *zhang*, can be used for objects with a flat surface, such as paper or table, and can also be used for objects that can be opened, such as a mouth and a bow. In a more advanced level, CLs for abstract nouns should to be taught as well as some cultured use of CLs. For example, *bi* is used for abstract nouns like business or trade; *lun* is used for full moon but mostly in the literary style of texts.

Chen (2012) also states that CLs should be divided according to their degrees of difficulty, she provides three aspects of CLs that decide how difficult it is to acquire a certain CL and assigns scores to each CL bases on the characteristics, as shown in Table 9.

Table 9: *Scoreboard of the degree of difficulty for CLs*

Score **Characteristic**	**3**	**2**	**1**
Degree of abstractness	Only for concrete nouns	For abstract and concrete nouns	Only for abstract nouns
Range of use	Wide	Medium	narrow
Frequency of use	High	Medium	Low

Source: "Measure words and classifiers: Introspective viewpoints and suggestions in teaching Chinese as a second language" by Chen, Y. R., 2012, PhD diss., p.73-74

In Table 9, the higher the score is the easier the CL is. If a CL can only be used for concrete nouns then it is easier to be acquired. For example, *wei* can only be used for concrete nouns like fish or shrimps, thus it scores 3 in the degree of abstractness. *Xiang*, On the other hand, is used for abstract nouns like tasks or projects, therefore, is scored only 1. The range of use depends on the variety of nouns a CL selects. According to Chen (2012), the narrower the range of use is the more difficult a CL is to be acquired. For example, *zhi*, a CL for a branch of tree or pencil, is classified in the category if inanimate-shape-one-dimension-hard, which is considered a specific CL with a narrow range of use. Therefore, is scored with 1. *Tiao*, on the other hand, can be used for animate and inanimate nouns, as well as abstract and concrete nouns, thus is considered a CL with a wild range of use and is scored the highest. The frequency of use is calculated by the database in *Word List with Accumulated Word Frequency in Sinica Corpus*. Each CL is evaluated by the word frequency after being set as a CL. The rate of the first to 27th frequent used CL is scored the highest while the 28th to 55th scored with 2 and the 56th to 80th scored with 1.

From the discussion of Dai (1999) and Chen (2012), we can see that they both agree on the argument that CLs for abstract nouns is most difficult to acquire. However, an opposite opinion on the range of use of CLs occurs in their studies. While Dai (1999) claims that a CL with a narrower range of use should be introduced first, whereas Chen (2012) argues that they have the higher degree of difficulty and thus, should be taught after those CLs with a wider range of use. The relationship between the degree of difficulty and the range of use of CLs will not be discussed in this paper. Due to the conflict, I will only adopt the degree of abstractness and the frequency of use to determine the level of CLs. The score of each CL listed in Appendix B will be presented in the next section.

In sum, the representing teaching material only presents a part of Chinese CLs and the order of the CLs is not consistent with the degree of difficulty. After discussing the teaching approaches and materials of Chinese CLs we can observe that there are several aspects can be improved. Based on the discussions, some suggestions regarding the teaching methods of Chinese CLs will be addressed in the next section.

Chapter 5. Suggestions

Based on the reviews given in previous sections and the recommendations for second language instruction provided by Geeslin & Long (2014), Fang (2003)and Liao (2010), I have constructed four suggestions regarding the teaching approach of Chinese CLs.

5.1 Arrange appropriate teaching order

The teaching order here refers to not only the order within CLs but also the order of MWs and CLs. As stated earlier, it is important to separate MWs from CLs while teaching and learning CLs. Especially for those learners who have no use of CLs in their native language. Lado (1957) stated that grammatical constructs which are the same in L1 and L2 language would be automatically produced correctly, therefore, only areas of difference needed to be taught in language classrooms. This indicates that the use of MWs should be easier for L2 learners to acquire since it is commonly used in both classifier languages and non-classifier languages (Liao, 2010; Wang, 2004).

Within CLs, the order should be arranged according to the degree of frequency and abstractness as presented in the previous section. Wang (2004), Tang (2008), Chen (2012) and Tsai (2016) state that to teach certain CLs at the appropriate level is important in teaching and learning Chinese CLs efficiently. Tsai (2016) argues that the content of CLs in each level should first be determined, and the order should be from the easiest to the most difficult ones. Therefore, the score of each CL is calculated and presented in Appendix C.

First, the frequency of each CL from the database of Word List with Accumulated Word Frequency in Sinica Corpus is presented. The rate of the first to 33rd frequent used CL is scored the lowest while the 34th to 66th scored with 2 and the 67th to 98th scored with 3. Second, the degree of abstractness is examined and scored from 1 to 3 based on the categorization scheme presented in chapter 3. The final score is a result of adding the first two score together. This list can serve as a reference while arranging the order of CLs teaching and learning. Although neglecting the factor of a range of use for CLs, the score of each CL presented in Appendix B should be able to serve as a reference when arranging the teaching order of Chinese CLs.

5.2 Apply the CL categorization

To extend the first suggestion, instructors can apply the categorization presented in chapter 3 to help L2 learners better understand the characteristic of each CL. This does not mean to display the complete scheme to learners in the beginning but to explain the features

of a CL by its categorization and thus help learners to apply a CL on different nouns by their own. For example, when teaching the CL *ke*, teachers can illustrate the features of the nouns it selects, like inanimate and roundness. With the description, learners can understand why it is suitable for nouns like apples or eggs. In addition, they can apply the CL to nouns that have the same features, such as rocks, candy, and balls. In a more advanced level, the complete scheme can help learners to summarize the CLs they have learned so far and strengthened their knowledge in Chinese CLs.

5.3 Be aware of learners' language background

Current teaching method has no variation regarding learners' language background, which might lead to inefficient learning progress. For European language speaking Chinese learners, the characteristics of CLs as well as their syntactic properties need to be presented whereas for classifier language speaking learners, the basic knowledge of how and when to use CLs are inherited in their L1. Tang (2008) specifically states that in the beginner level, the interference of L1 in learning Chinese CLs is severe. For example, in Korea and Japan, there is overlap in the use of certain CLs consist with slight differences. On the other hand, for most European learners, the use and functions of CLs are totally unfamiliar. With different language background depicted above, teaching method should be adjusted when applying to learners with diverse knowledge in CLs. The advantage of building new knowledge upon what learner has already know is mentioned by Geeslin & Long (2014) and Lado (1957). Before instructors construct the knowledge of Chinese CLs on the basis of learners known knowledge, it is important to be aware of the feature of learners' first language regarding the use of CLs. As MacWhinney's (2008) study states, "it is impossible to construct a model of second language learning that [does] not take into account the structure of the first language" (p. 342). We can see that the influence of the first language is very strong in learning a second language. Instructors should bear in mind that the contents, materials, and exercises that are given to learners should suit their language background and benefit on the basis of known linguistics knowledge.

5.4 Communicative competence

One of the drawbacks of current teaching approaches is that most instructors focus on the syntactic structure of CLs and neglect the semantic and pragmatic aspects. Dai (1999) states that after learning the basic structure of CLs and nouns, learners must be able to select right CL in a certain context. Many of the CLs have more than one type of corresponding

nouns. Similarly, some nouns can be quantified by more than one CLs. Dai (1999) points out that the selection of correct classifiers must rely on the application in the genuine discourse which is consistent with the importance of communicative competence stated by Geeslin & Long (2014). They claim that "it is essential not to replace opportunities for communication with metalinguistic information about how language works"(p. 271). As mentioned in the previous section, the current teaching method focuses on providing the metalinguistic information and is insufficient in providing in communicative practice in different contexts. However, the selection of a certain CL is often relay on the context, as discussed in the previous section. Therefore, bringing more authentic communicative contexts for learners to apply Chinese CLs they have learned in class is necessary, instructors should be able to provide opportunities for L2 learners to develop their abilities to use correct CLs in different contexts.

Part 3.

Chapter 6. Conclusion

6.1 Summary

In the present paper, I have first presented the differences between CLs and MWs from semantic and syntactic aspects and illustrated the diagnoses of distinguishing MWs from CLs. Then, I provide an overview of the categorizations of Chinese classifiers from previous studies and discuss the primary features of the categorizations provided by Chinese and Western scholars (Chao, 1968; Liu et al., 1996; He, 2008; Allen, 1977; Tai, 1994; Gao & Malt, 2009). In general, there is no classification within the category of CL in the categorizations given by Chinese scholars (Chao, 1968; Liu et al., 1996; He, 2008), while most of the Western categorizations do make the classifications (Allen, 1977; Tai, 1994; Gao & Malt, 2009). However, the classifiers that are discussed by Western scholars only represent part of a large system of Chinese classifiers and the hierarchy of their classifications is not systematic. A revised classification is constructed based on the findings in previous categorizations.

The primary goal of this study is to provide an instructional suggestion for a more efficient teaching of Chinese CLs. Hence the second part is to explore the acquisition of Chinese CLs for L2 learners. After discussing the teaching approaches and materials of Chinese CLs we can observe that 1) the distinction of MWs and CLs should be applied while teaching; 2) different teaching methods should be used for learners with various language background; 3) CLs teaching should focus on not only syntactic but also semantic aspect as well as the relationships between CLs and nouns; 4) only a part of CLs are mentioned in the representing teaching materials; 5) the order of CLs is not consistent with the degree of difficulty. To that end, a systematic categorization of Chinese CLs is required for learners to understand and apply the use of CLs more efficiently. The revised categorization is used to help learners to better understand the characteristics of CLs and also to determine the degree of difficulty of CLs. Based on the findings, suggestions regarding the teaching approaches of Chinese CLs are addressed.

6.2 Limitations

Due to the time and words limits given to this study, there are some limitations that could be improved to make it more ideal. First, the categorization of Chinese CLs presented in this study is not the ultimate classification and some categories can be classified into more

details. For example, in the three-dimensional category, the subcategory other can be further classified into subcategories, such as tools or books. In addition, the overlap of a CL in different categories is not presented in this study. For example, CL *tiao* belongs to more than one classifications, including animate, inanimate, artefact, and abstract nouns. In future studies, researchers can display the duplication and determine the range of use of certain CLs.

Secondly, there is only one Chinese learning material that is used to examine arrangement of CLs in textbooks. PAVC is used by many universities and institutes that teach Chinese as a second language in both China and Taiwan (Chen, 2012). However, there are many other materials that are frequently chosen by L2 learners of Chinese, like *New Practical Chinese Reader* by *Liu Xun*; *Chinese for Beginners* by *Lu Jianji*; and *Bridge* by *Chen Zhuo* (Guo et al., 2007). Therefore, the claim that the distribution of CLs is not appropriate in current teaching materials could be confirmed by investigating more representing materials.

Thirdly, the suggestions given in this study have not been attested by L2 learners. The advice regarding the teaching methods is stated based on the results from previous studies and second language acquisition theory, also, from concluding the suggestions given by other scholars. Whether or not the proposal is more efficient than original teaching approaches still require to be tested out.

6.3 Future studies

For future studies, the pedagogical suggestions could be more reliable if being examined in a genuine teaching experiment. Researchers could conduct an experiment that compares the traditional teaching approaches to the adjusted teaching method to examine whether the suggestions given in this paper is practical and efficient. After the suggestions are confirmed to be valid, teaching methods and materials can be adjusted based on the results so that L2 learners can acquire Chinese CLs in a more efficient way.

Moreover, the CLs categorization presented in this study is for the application to second language acquisition, thus, only frequent used CLs are included. Future studies that focus on Chinese CLs can include other CLs to provide a more complete study on Chinese CLs. For example, in Tai's (1994) study of Chinese CLs, he focused on the relationship between cognition and language, also between culture and language. Thus, the subjects of his study include CLs that are used in different dialects, as he stated " it is important to methodically collect as much data as possible from as many locations as possible in China in order to answer many important questions regarding the cognitive basis of the Chinese

language" (p. 14). Therefore, future studies should re-examine the scope of CLs to better apply to the aspect one focuses on.

Finally, future studies should keep refining the categorization and teaching approaches of Chinese CLs. For example, the influence of L1 on Chinese CLs learning should be explored since the present study only points out the crucial effects of learners' language background, the differences between learners' with different background still need to be investigated. In addition, a concrete proposal on the teaching procedure of Chinese CLs in different levels for learners with various language background, including the suitable CLs for each level, the contexts, and exercises for various CLs and the examination for testing the learning effects.

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Appendix

Appendix A. The list of familiar Chinese individual classifiers by Gao and Malt

Predominantly shape-based			
A.	*Saliently one-dimensional*		
1.	*duan	0.159	[a section of something that extends saliently in one dimension] rope, stick, road, railway, speech, article, life, experience
2.	gen	0.092	root (of a plant), indicating a stick-shape object] stick chopstick, straw, candle, finger, hair, needle, thread, rope, nerve, pencil
3.	*gu	0.087	[strand] thread, rope, water, flood, airstream, cold current, warm current, fragrant smell, offensive odour
4.	*jie	0.014	[section, length] something that consists of natural sections in length, or something that is often cut into sections, such as train car, cell battery, stick, rope, pipe, chalk, period of lesson (in school)
5.	*jie	0.012	[to cut (into halves)] an arbitrarily cut section of something that extends in one dimension, used for wood, stick, wire, bamboo pole, road
6.	*liu	0.001	[tuft, lock, skein] thread, knitting wool, hair
7.	*lu	0.016	[wisp, strand, lock] thread, hemp, smoke, sunlight, moonbeam
8.	*shu	0.007	[to tie, to bundle up] something in a long shape of a bundle, bunch, sheaf, used for fresh flowers, straw, sunlight, flash light
9.	*si	0.021	[a thread-like thing] hair, vision, breeze, smile, warmth
10.	tiao	0.894	[a slender, long-shape thing, often flexible] rope, line, plait, snake, fish, stream/brook, river, canal, towel, road, trousers, skirt, blanket, slogan, news, experience, life, brave/true man
11.	zhi	0.009	[tree branch, twig] tree branch, match, pencil, pen, cigarette, arrow, gun
12.	zhi	0.155	[a stick-like long thing] candle, pencil, pen, cigarette, flower, thermometer, gun, pistol, spear, arrow, hand, arm, feather, troop
B.	*Saliently two-dimensional*		
13.	mei	0.055	coin, badge, medal, stamp, missile

14.	mian	0.046	[surface] mirror, silk banner, flag, wall, big drum
15.	*pan	0.021	[a plate] magnetic audio tape, video tape, mosquito-repellent incense (coiled in a shape of a plate), grinding stone, chess match
16.	pian	0.211	[a flat, thin piece, slice, or a stretch of land] bread, meat, tree leaf, snow flake, farming field, desert, forest, white/dark cloud
17.	shan	0.017	[a leaf-shape thing] used door, window, sail, partition
18.	zhang	0.277	[to spread open/flat] paper-like things, or something that has a flat surface, including paper, photo, ticket, diploma, certificate, stamp, postcard, phonograph record, carpet, cattle hide, pancake, desk, table, bed, mouth, bow, fishing net
C.	*Saliently three-dimensional*		
19.	*ban	0.001	[a segment/section (of an orange, etc.)] orange, mandarin, tangerine, garlic
20.	*di	0.022	[to drip (in drops)] water, oil, tear, blood, sweat, saliva, soup, vinegar
21.	ke	0.101	[something small and roundish in shape] pearl, soy bean, button, tooth, mine, bullet, bomb, star, (man-made) satellite
22.	kuai	0.464	[a lump-shape thing] soap, candy, cake, meat, stone, wrist watch, cloth, handkerchief, lawn, farming field, white/dark cloud
23.	Li	0.013	[a grain-like thing] rice, salt, sand, grain, seed, sweat, button, bullet
24.	*quan	0.031	[a circle] water, grease stain, hills, mountains, wreath
25.	*tuan	0.022	[a collection of something in a ball shape] cotton, thread, knitting wool, paper, wire, hemp, dough, fire, smoke, dark cloud
26.	*tuo	0.001	[a big lump] iron bar, lead bar, mud
27.	wan	0.051	[a ball, pellet] Chinese medicine, marble
28.	*zuo	0.004	[a tuft] hair, beard
D.	*Salient feature*		
29.	ba	0.151	[a handle] things that have a handle, such as umbrella, pistol, teapot, knife, screwdriver, scissors, pliers, hammer, spoon, broom, violin, chair, key, ruler
30.	ding	0.008	[crown of the head, top] something that has a top, such as cap, hat, straw hat, tent, mosquito netting, umbrella
31.	gan	0.001	[shaft or arm] things that have shaft or arm, such as rifle, steelyard,

			flag, pen, pencil
32.	jia	0.017	[a frame, stand] things that have a frame, such as airplane, space shuttle, helicopter, ladder, eye glasses, machine, piano, accordion, electronic keyboard, camera
33.	kou	0.045	[mouth] something has a shape of a mouth, such as pot, bell, water well, person, pig, coffin, knife
34.	yan	0.058	[an eye] things that have a big opening, such as water well, water spring, roof window, cave house
Multiple shared features, animate vs. inanimate			
A.	*Animate/Human*		
35.	dai	0.164	[generation] emperor, people
36.	hu	0.115	[household] family, residents
37.	ming	0.449	[name] people of different professions, such as teacher, professor, nurse, doctor, scientist, lawyer, journalist, worker, student, writer, soldier, actor/actress, politician, policeman, sailor
38.	ren	0.008	[to hold the post of] president (of country or institution), mayor, chairman, company/factory head
39.	tai	0.001	[fetus] boy, girl, twins, also used for animals, such as piglets, puppies, etc.
40.	wei	1.091	[an individual, a person] professor, teacher, mister, miss, parent, policeman, comrade [politer than the general classifier ge]
B.	*Animate/Animal*		
41.	pi	0.021	horse, mule, cloth (a bolt of)
42.	tou	0.061	[a head] big animals, such as pig, deer, cattle, donkey, lion, elephant, garlic (a head of)
43.	zhi	0.330	[single, alone, one of a pair] bird, fly, mosquito, bee, chicken, goat, sheep, tiger, elephant; also used for hand, foot, leg, eye, ear, shoe, sock, boat, watch, suitcase, music/tune
C.	*Inanimate/Natural object*		
44.	duo	0.024	flowers, white cloud
45.	ke	0.068	all plants with stems and leaves (the whole plant), such as tree, grass, corn, cabbage
46.	lun	0.026	[a wheel] the sun and the moon only (especially, red sun, and

			bright moon)
47.	*pao	0.008	urine, shit
48.	*tan	0.003	[to spread (on the ground) a small pool of liquid, mud] water, blood, mud, shit
49.	zhu	0.014	[stalk and the part of the root that is above the ground] plants only, small tree, big tree, seedling
50.	sheng	0.154	[sound] gun shot, thunder, shout, crying, coughing, knocking
D.	*Inanimate/Artifact (concrete)*		
51.	ban	0.014	[a work shift] transportation on fixed schedule, such as bus, train, ship, airliner
52.	ben	0.119	[a book (a bound copy of printed materials)] book, magazine, pictorial, novel, dictionary
53.	bu	0.159	[part] film, literary work (especially one of good quality, and in a form of a book), long novel, telephone
54.	ce	0.047	[copy, volume] book
55.	chuang	0.003	[bed] quilt, cotton-padded mattress, bedding
56.	dao	0.075	[way, course, path] wall, fence, door, gate, defence line, dish, procedure, sun rays
57.	dong	0.013	building
58.	du	0.004	[to block up] wall, fence
59.	dun	0.078	[pause] meal
60.	fa	0.003	[to fire] bullet, artillery shell
61.	fen	0.171	[share, portion/part of a whole] newspaper, magazine, exam paper, homework, meal, gift, job
62.	feng	0.092	[to seal] letter, telegram
63.	fu	0.050	[the width of cloth (a bolt of)] picture, painting, ad, poster, map
64.	*ji	0.003	[a dose] Chinese herbal medicine, decoction of medicinal ingredients
65.	jia	0.443	[family, home] household, store, restaurant, hotel, supermarkets, bank, cinema, hospital, factory, company, news agency, travel agency, publishing house

66.	jian	0.100	[room] any rooms, including bedroom, living-room, kitchen, bathroom, study, office, classroom, workshop
67.	jian	0.372	[a piece] clothes, shirt, coat, overcoat, jacket, sweater, luggage, matter/thing, work/job, case
68.	ju	0.367	[sentence] speech, talk, poem
69.	ju	0.002	[utensil, apparatus] corpse, coffin
70.	juan	0.082	[book, volume] book, writings/works (in a form a book)
71.	liang	0.119	all ground vehicles including bus, car, truck, bicycle, jeep, tractor, train, tank
72.	pian	0.101	[a complete article] article, report, editorial, commentary, review, novel, prose
73.	qi	0.040	[scheduled time/date] magazine (one issue of), pictorial, training class, students/trainees (in one training class), project
74.	*shen	0.055	[body] suit, clothes, dress, strength, skills in martial arts, foreign flavor/Western style
75.	sou	0.025	all ships (especially big in size) including speedboat, ocean liner, warship, oil tanker
76.	suo	0.001	[cartridge clip] bullet
77.	suo	0.077	[location] house, villa, residence, school, kindergarten, university, hospital, club, church
78.	tai	0.124	[platform, stage, stand, support] for machine, TV set, recorder, radio, computer, locomotive, tractor, performances
79.	*tang	0.070	[(frequency of) scheduled transportation] regular bus, train, ship, ocean liner, airliner
80.	wei	0.002	[taste, flavour] ingredient (of a Chinese medicine prescription)
81.	*ye	0.041	[page, leaf] paper, book, text, article, novel, document
82.	zhan	0.008	[a small cup] oil lamp, bulb lamp, fluorescent lamp
83.	*zhang	0.040	[chapter] book, novel, thesis, dissertation
84.	zhuang	0.042	building
85.	*zhuo	0.012	[table] used for food, feast, people, guests
86.	zun	0.007	[respect] statue of a Buddha, artillery piece
87.	zuo	0.213	[seat, stand, pedestal, base] bell, stone tablet, pagoda, bridge, house, temple, building, factory, church, grave, reservoir, forest, mountain,

			village, city
E.	*Inanimate/Artifact (other)*		
88.	bi	0.074	[pen/pencil] (business) deal, sum of money, cash, fund, expense
89.	chang	0.224	[arena, field] battle, fight, war, illness, storm, rain, disaster, nightmare, film, concert, dancing ball, opera, play, ball (basketball, football, volleyball, tennis ball, etc.) match
90.	chu	0.017	[a big section/episode of a legend] a dramatic piece, including opera, play
91.	dian	0.022	[spot, dot, indicating a point (as in a point of view), and a tiny amount] view, suggestion, criticism, request, ink spot/stain, blood spot/ stain
92.	Ji	0.009	[a collection of literary works, volume, part, used for film, TV play
93.	jie	0.286	[due time] something that occurs in a fixed sequence, such as congress, president, students (enrolled in the same year), Olympics, the Asian Games
94.	*ma	0.013	[number symbols] matter
95.	men	0.035	[branch, class, category] branch of learning, knowledge, art, subject, course, craftsmanship, artillery piece
96.	mu	0.023	[curtain] (an act of) play, reminiscence of an earlier event
97.	qi	0.033	(an occurrence of an) accident, theft, robbery, burglary, murder
98.	*qiang	0.007	[(thoracic) cavity] love, regret, warmth, enthusiasm, anger, hatred
99.	qu	0.009	[tune melody] song, music, melody, solo, duet, trio, quartet, etc.
100.	shou	0.046	song, poem, nursery rhyme
101.	*tang	0.002	[hall] lesson (as in school), furniture
102.	*xi	0.013	[feast] banquet, talk, conversation (with someone)
103.	*xian	0.011	[thread] hope, light, life/energy
104.	xiang	0.562	[item] plan, suggestion, decision, order, decree, measure, task, work, activity, invention, discovery, result (of an experiment), cause, (business) deal record
105.	ze	0.008	[norm, rule] a piece of writing, such as news, ad, commentary, fable
106.	*zhao	0.003	[a move (in chess)] move (in chess), good idea
107.	*zhen	0.078	[(a short) duration of time] wind, rain, cold spell, laughter, applause, footsteps, knockings (on the door), gun shots

108.	zhuang	0.016	[stake, pile] (big/small) matter, case, (business) deal, worry/concern
109.	zong	0.004	[ancestor, faction/sect] business deal, (a large sum of) money

Source: "Mental representation and cognitive consequences of Chinese individual classifiers" by Gao, M. Y., & Malt, B. C., 2009, Language and Cognitive Processes, 24(7-8), p.1171-1176

Note: "Bracketed information is the meaning of the classifier word when used as a noun, verb, or adjective". The "" marks in front of the CLs indicate that the quantifier is dubious to be considered as a CL, as discussed in section 1.2.2.3 (p.1171).*

Appendix B. The final list of CLs selected for the present study (after re-examined Gao & Malt's list and the dictionaries of Jiao (2001) and Luo (2004))

	CLs	Original meanings and associated nouns
1.	gen	root (of a plant), indicating a stick-shape object] stick chopstick, straw, candle, finger, hair, needle, thread, rope, nerve, pencil
2.	tiao	[a slender, long-shape thing, often flexible] rope, line, plait, snake, fish, stream/brook, river, canal, towel, road, trousers, skirt, blanket, slogan, news, experience, life, brave/true man
3.	zhi	[tree branch, twig] tree branch, match, pencil, pen, cigarette, arrow, gun
4.	zhi	[a stick-like long thing] candle, pencil, pen, cigarette, flower, thermometer, gun, pistol, spear, arrow, hand, arm, feather, troop
5.	mei	coin, badge, medal, stamp, missile
6.	mian	[surface] mirror, silk banner, flag, wall, big drum
7.	pian	[a flat, thin piece, slice, or a stretch of land] bread, meat, tree leaf, snow flake, farming field, desert, forest, white/dark cloud
8.	shan	[a leaf-shape thing] used door, window, sail, partition
9.	zhang	[to spread open/flat] paper-like things, or something that has a flat surface, including paper, photo, ticket, diploma, certificate, stamp, postcard, phonograph record, carpet, cattle hide, pancake, desk, table, bed, mouth, bow, fishing net
10.	ke	[something small and roundish in shape] pearl, soy bean, button, tooth, mine, bullet, bomb, star, (man-made) satellite
11.	kuai	[a lump-shape thing] soap, candy, cake, meat, stone, wrist watch, cloth, handkerchief, lawn, farming field, white/dark cloud
12.	Li	[a grain-like thing] rice, salt, sand, grain, seed, sweat, button, bullet
13.	wan	[a ball, pellet] Chinese medicine, marble

14.	ba	[a handle] things that have a handle, such as umbrella, pistol, teapot, knife, screwdriver, scissors, pliers, hammer, spoon, broom, violin, chair, key, ruler
15.	ding	[crown of the head, top] something that has a top, such as cap, hat, straw hat, tent, mosquito netting, umbrella
16.	gan	[shaft or arm] things that have shaft or arm, such as rifle, steelyard, flag, pen, pencil
17.	jia	[a frame, stand] things that have a frame, such as airplane, space shuttle, helicopter, ladder, eye glasses, machine, piano, accordion, electronic keyboard, camera
18.	kou	[mouth] something has a shape of a mouth, such as pot, bell, water well, person, pig, coffin, knife
19.	yan	[an eye] things that have a big opening, such as water well, water spring, roof window, cave house
20.	dai	[generation] emperor, people
21.	hu	[household] family, residents
22.	ming	[name] people of different professions, such as teacher, professor, nurse, doctor, scientist, lawyer, journalist, worker, student, writer, soldier, actor/actress, politician, policeman, sailor
23.	ren	[to hold the post of] president (of country or institution), mayor, chairman, company/factory head
24.	tai	[fetus] boy, girl, twins, also used for animals, such as piglets, puppies, etc.
25.	wei	[an individual, a person] professor, teacher, mister, miss, parent, policeman, comrade [more polite than the general classifier ge]
26.	pi	horse, mule, cloth (a bolt of)
27.	tou	[a head] big animals, such as pig, deer, cattle, donkey, lion, elephant, garlic (a head of)
28.	zhi	[single, alone, one of a pair] bird, fly, mosquito, bee, chicken, goat, sheep, tiger, elephant; also used for hand, foot, leg, eye, ear, shoe, sock, boat, watch, suitcase, music/tune
29.	duo	flowers, white cloud
30.	ke	all plants with stems and leaves (the whole plant), such as tree, grass,

		corn, cabbage
31.	lun	[a wheel] the sun and the moon only (especially, red sun, and bright moon)
32.	zhu	[stalk and the part of the root that is above the ground] plants only, small tree, big tree, seedling
33.	sheng	[sound] gun shot, thunder, shout, crying, coughing, knocking
34.	ban	[a work shift] transportation on fixed schedule, such as bus, train, ship, airliner
35.	ben	[a book (a bound copy of printed materials)] book, magazine, pictorial, novel, dictionary
36.	bu	[part] film, literary work (especially one of good quality, and in a form of a book), long novel, telephone
37.	ce	[copy, volume] book
38.	chuang	[bed] quilt, cotton-padded mattress, bedding
39.	dao	[way, course, path] wall, fence, door, gate, defence line, dish, procedure, sun rays
40.	dong	building
41.	du	[to block up] wall, fence
42.	dun	[pause] meal
43.	fa	[to fire] bullet, artillery shell
44.	fen	[share, portion/part of a whole] newspaper, magazine, exam paper, homework, meal, gift, job
45.	feng	[to seal] letter, telegram
46.	fu	[the width of cloth (a bolt of)] picture, painting, ad, poster, map
47.	jia	[family, home] household, store, restaurant, hotel, supermarkets, bank, cinema, hospital, factory, company, news agency, travel agency, publishing house
48.	jian	[room] any rooms, including bedroom, living-room, kitchen, bathroom, study, office, classroom, workshop
49.	jian	[a piece] clothes, shirt, coat, overcoat, jacket, sweater, luggage, matter/thing, work/job, case

50.	ju	[sentence] speech, talk, poem
51.	ju	[utensil, apparatus] corpse, coffin
52.	juan	[book, volume] book, writings/works (in a form a book)
53.	liang	all ground vehicles including bus, car, truck, bicycle, jeep, tractor, train, tank
54.	pian	[a complete article] article, report, editorial, commentary, review, novel, prose
55.	qi	[scheduled time/date] magazine (one issue of), pictorial, training class, students/trainees (in one training class), project
56.	sou	all ships (especially big in size) including speedboat, ocean liner, warship, oil tanker
57.	suo	[cartridge clip] bullet
58.	suo	[location] house, villa, residence, school, kindergarten, university, hospital, club, church
59.	tai	[platform, stage, stand, support] for machine, TV set, recorder, radio, computer, locomotive, tractor, performances
60.	wei	[taste, flavour] ingredient (of a Chinese medicine prescription)
61.	zhan	[a small cup] oil lamp, bulb lamp, fluorescent lamp
62.	zhuang	building
63.	zun	[respect] statue of a Buddha, artillery piece
64.	zuo	[seat, stand, pedestal, base] bell, stone tablet, pagoda, bridge, house, temple, building, factory, church, grave, reservoir, forest, mountain, village, city
65.	bi	[pen/pencil] (business) deal, sum of money, cash, fund, expense
66.	chang	[arena, field] battle, fight, war, illness, storm, rain, disaster, nightmare, film, concert, dancing ball, opera, play, ball (basketball, football, volleyball, tennis ball, etc.) match
67.	chu	[a big section/episode of a legend] a dramatic piece, including opera, play
68.	dian	[spot, dot, indicating a point (as in a point of view), and a tiny amount] view, suggestion, criticism, request, ink spot/stain, blood spot/ stain
69.	Ji	[a collection of literary works, volume, part, used for film, TV play
70.	jie	[due time] something that occurs in a fixed sequence, such as congress,

		president, students (enrolled in the same year), Olympics, the Asian Games
71.	men	[branch, class, category] branch of learning, knowledge, art, subject, course, craftsmanship, artillery piece
72.	mu	[curtain] (an act of) play, reminiscence of an earlier event
73.	qi	(an occurrence of an) accident, theft, robbery, burglary, murder
74.	qu	[tune melody] song, music, melody, solo, duet, trio, quartet, etc.
75.	shou	song, poem, nursery rhyme
76.	xiang	[item] plan, suggestion, decision, order, decree, measure, task, work, activity, invention, discovery, result (of an experiment), cause, (business) deal record
77.	ze	[norm, rule] a piece of writing, such as news, ad, commentary, fable
78.	zhuang	[stake, pile] (big/small) matter, case, (business) deal, worry/concern
79.	zong	[ancestor, faction/sect] business deal, (a large sum of) money
80.	bu	[step] for number of steps or movement in chess playing
81.	chuan	[string] for a number of things growing or attached closely together, such as keys, necklace
82.	dangzi	matters
83.	dulu	similar to *chuan*. used colloquially
84.	fen	[divide, part] for part of a whole, mostly for abstract nouns, such as hope, ability, mistakes
85.	hang	for things in lines or rows, such as footprints, tears, poems
86.	ju	games, competitions
87.	ke	[visitor, guest] for an order of food or drink, such as fried rice, desert
88.	ke	[lesson] classes, subjects, lessons
89.	tong	[open, through] telephones, telegrams
90.	wei	[tail] fish
91.	yuan	[person, member] military officer, person with great ability
92.	zhu	[wick, to burn] incense sticks
93.	dui	[mutual, opposite] for a pair, such as wings, eyes, earrings, couples, pillows
94.	shuang	[pair, both] for a pair things that are usually used together, like wings, chopsticks, hands, gloves, shoes

95.	fu	for a set of things, like cards, gloves, chess, glasses, earrings
96.	piao	[ticket] business, trade
97.	fang	[square]seals, handkerchief
98.	lie	[arrange, list] for a series or row of things, such as trains

Appendix C. The scoreboard of CLs

No.	CLs	Frequency	Rate of frequency	Degree of abstractness	Final score
1.	dangzi	0	1	1	2
2.	ke	0	1	1	2
3.	dai	2	1	1	2
4.	wei	7	1	1	2
5.	ji	12	1	1	2
6.	qu	29	1	1	2
7.	mu	57	1	1	2
8.	zong	58	1	1	2
9.	zhuang	59	1	1	2
10.	qi	71	1	1	2
11.	lun	65	1	2	3
12.	chu	81	2	1	3
13.	tong	83	2	1	3
14.	ren	92	2	1	3
15.	ju	99	2	1	3
16.	piao	116	2	1	3
17.	dun	144	2	1	3
18.	men	146	2	1	3
19.	ze	166	2	1	3
20.	ban	172	2	1	3
21.	hu	212	2	1	3
22.	ju	251	2	1	3
23.	gan	0	1	3	4
24.	dulu	0	1	3	4
25.	wan	1	1	3	4

26.	suo	1	1	3	4
27.	zhu	1	1	3	4
28.	ke	8	1	3	4
29.	tai	21	1	3	4
30.	chuang	21	1	3	4
31.	du	23	1	3	4
32.	wei	23	1	3	4
33.	fa	29	1	3	4
34.	zun	43	1	3	4
35.	shan	44	1	3	4
36.	ding	45	1	3	4
37.	zhan	45	1	3	4
38.	lie	50	1	3	4
39.	chuan	52	1	3	4
40.	yuan	62	1	3	4
41.	zhu	70	1	3	4
42.	zhi	72	1	3	4
43.	pi	73	1	3	4
44.	fang	75	1	3	4
45.	hang	139	2	2	4
46.	tou	231	2	2	4
47.	mian	263	2	2	4
48.	dao	299	2	2	4
49.	bi	378	3	1	4
50.	sheng	481	3	1	4
51.	shou	513	3	1	4
52.	pian	528	3	1	4
53.	qi	531	3	1	4
54.	jie	562	3	1	4
55.	bu	564	3	1	4
56.	fen	818	3	1	4
57.	ju	1171	3	1	4
58.	chang	1604	3	1	4

59.	xiang	3298	3	1	4
60.	juan	82	2	3	5
61.	li	85	2	3	5
62.	ce	93	2	3	5
63.	duo	114	2	3	5
64.	chuang	135	2	3	5
65.	jia	141	2	3	5
66.	mei	145	2	3	5
67.	yan	148	2	3	5
68.	sou	152	2	3	5
69.	shuang	153	2	3	5
70.	fu	168	2	3	5
71.	feng	184	2	3	5
72.	dong	205	2	3	5
73.	ke	239	2	3	5
74.	tai	264	2	3	5
75.	liang	297	2	3	5
76.	gen	322	2	3	5
77.	fu	323	2	3	5
78.	ba	370	3	2	5
79.	kou	429	3	2	5
80.	pian	984	3	2	5
81.	fen	1095	3	2	5
82.	jian	1647	3	2	5
83.	tiao	1718	3	2	5
84.	dian	1738	3	2	5
85.	dui	369	3	3	6
86.	suo	370	3	3	6
87.	jian	387	3	3	6
88.	ke	454	3	3	6
89.	zhi	546	3	3	6
90.	bu	701	3	3	6
91.	ben	758	3	3	6

92.	zuo	959	3	3	6
93.	zhang	1017	3	3	6
94.	kuai	1042	3	3	6
95.	zhi	1208	3	3	6
96.	jia	1835	3	3	6
97.	ming	2243	3	3	6
98.	wei	5983	3	3	6