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A Cognitive Linguistics Approach to Chinese Classifier Teaching: An Experimental Study

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***Abstract*—Chinese is commonly recognized as a classifier language with an obligatory classifier for any noun with numeral. Based on the fact that in almost all Chinese textbooks the usage of classifiers is introduced by a set of mechanical rules combining a few isolated examples, most students without classifier language background need to learn by rote memorization. This traditional approach overlooks the polysemous properties of Chinese classifiers that the functions of an individual classifier are normally related to a central sense, and the extension of meanings and functions is usually highly motivated. According to the cognitive linguistics approach (CL approach) to language instruction, presenting students with the central sense as well as the motivation underlying meaning extension facilitates students' initial learning, long-term retention, as well as identification of unfamiliar uses of polysemy. Taking the Chinese classifier 道 *dao* as an example, the present study focuses on the effect of CL approach in the Chinese classifier learning of advanced level Chinese learners with English as their first language. Participants were assigned to two groups and received different instructions. The result shows a statistically significant effect, but the benefit of CL approach lies mainly in the ability to identify uninstructed extended uses.**

***Index Terms*—Chinese classifier, cognitive linguistics, polysemy, experimental method**

I. Introduction

Recognized as a classifier language, Mandarin Chinese presents an extensive inventory of 'classifiers' that must be used in combining a numeral with any noun (Jiang, 2012, p. 1).

(1) *san *(ge) ren* 三个人
three Cl person
'three persons'
(Jiang, 2012, p. 2)

There are over 900 classifiers in the language (Zhang, 2007). The most frequently used classifier in Mandarin is 个 *ge*, but many nouns still require special classifiers. Generally, the classifier is determined by the inherent property of the objects and is restricted to a certain type of object (Jiang, 2009, p. 293).

Based on the essential difference between classifier languages and non-classifier languages, Li & Thompson (1981) claimed that 'to a speaker of English, one of the most striking features of the Mandarin noun phrase is the classifier' (p. 104), and 'by and large, which nouns occur with which classifier must be memorized' (p. 112).

Consistent with Li & Thomson's claim, Jiang (2009) investigated Chinese textbooks and found that the usage of classifiers is typically introduced by a set of mechanical rules combining a few isolated examples, such as 条 (*tiao* "branch") is for long things as in *a line* or *a road*, 张 (*zhang* "to stretch") is for flat things, as in *a piece of paper* or *a poster* (p. 307). Therefore, rules concerning the same classifier appear to be arbitrary and unrelated for learners, making rote memorization the only practical way for students to learn Chinese classifiers.

However, it has been repeatedly demonstrated that the functions of individual Chinese classifiers are not as arbitrary as the way they are presented in textbooks. Rather, there is always a semantic relation between a classifier and the associated nouns referenced by the classifier, and the functions of an individual classifier are normally related to a central sense.

Tai & Wang (1990) argued that classifiers in Chinese to a great extent reflect human categorization in Chinese culture.

(2) A classifier categorizes a class of nouns by picking out some salient perceptual properties, either physically or functionally based, which are permanently associated with the entities named by the class of nouns.
(Tai & Wang, 1990)

This claim is in line with the assumption in the framework of cognitive linguistics that language is a reflection of general human cognition and cognitive processes (Lakoff, 1990; Ellis & Robinson, 2008; Boroditsky, 2011; Tyler, 2012, p. 28), and many studies have been carried out along this line to explore the motivations of categorization of Chinese classifiers. For example, Tai & Wang (1990) pointed out in their classic work that 条 (*tiao* "branch") represents some

type of human categorization based on an imputed salient perceptual property of 'extension in length', which actually stems from the original meaning of the character 条 "branch".

In addition, there is normally a certain kind of association between the multiple functions of a classifier. In other words, a semantic network can be captured and individual classifiers can thus be viewed as polysemies in most cases. Cognitive linguistic research on polysemy has suggested that the various meanings of a polysemous item constitute a 'category of senses', which center on a 'prototypical' or 'more representative' sense, from which the others may be derived (Lakoff, 1987, p. 416-419). In support of Lakoff's claim and applied to Chinese classifiers, Jiang (2009) argued that each individual extension of the uses of a classifier has its own historical cognitive basis that can result in a very complicated network structure (p. 294).

Therefore, a conjecture has been ventured that by explaining the meaningful systematicity of the semantic networks of Chinese classifiers, the cognitive linguistics (CL) approach in language teaching potentially lessens Chinese learner's memory load, and thus offers a more teachable and more learnable account of the Chinese classifier system in the second language classroom (Hou, 2006; Jiang, 2009, p. 297-298). However, this conjecture is yet to be supported by empirical evidence. To fill in the gap between theory and practice, the present study focuses on whether the CL approach can facilitate English native speakers' learning of Chinese classifiers, compared to the traditional textbook approach.

II. Vocabulary Teaching and Cognitive Linguistics

In fact, the potential pedagogical implications of a CL approach have already received researchers' attention and are dramatically gaining momentum. Langacker (2008) expressed optimism that language teaching would fare better when guided by notions from cognitive linguistics. He explained, 'compared to other approaches, cognitive linguistics offers an account of language structure that —just from the linguistic standpoint— is arguably more comprehensive, revealing, and descriptively adequate'. Tyler (2012) argues that the CL approach has the potential to provide rich insights into the relatedness of, organization of, and motivation for the core and many "exceptional" uses associated with aspects of lexis and grammar and ultimately, these insights offer language learners a more coherent and explanatory description of the language (p. 18).

Quite a few experiments have been carried out to illustrate the effect of the CL approach to second language learning, especially for English (ESL) and German (GSL). In Huong's (2005) and Verspoor's (2009) studies aiming at instruction of English articles, learners receiving instruction based on the CL approach showed significant gains on an immediate posttest and/or delayed posttest in comparison to learners receiving traditional instruction. In an effect of instruction experiment focusing on English aspect, Niemeier (2008) found that exposing students to the link between English aspect and the notion of boundedness resulted in significant gains in their ability to use the progressive aspect. Boers and Lindstromberg's (2008) edited volume presents numerous recent studies on the applications of the CL approach in learning general vocabulary, idioms and phrasal verbs. As for polysemies and the semantic networks of individual words, Verspoor and Lowie (2003) found that teaching the central meaning of a word first facilitated more accurate interpretation of unfamiliar extended meanings. In their experiment with Dutch-English learners, the cognitive group presented with the core sense of the tested words outperformed the traditional group in both initial learning of meaning extensions and long-term memory of the extended uses. Csábi, S., (2004), Berendi, Csábi & Kövecses (2008) undertook experiments teaching the meanings of *hold* and *keep* to L1 Hungarian learners. The cognitive group that received a teacher's explanation of the polysemy networks and the motivations for the targeted extensions outscored the traditional group in immediate and delayed posttests.

All these experiments provide evidence that systematically alerting students to the central sense and/or the motivation of meaning extension of a polysemy can help promote more appropriate use and long-term retention of L2 lexical items. However, to our knowledge, in the field of Chinese pedagogy, the same type of empirical study is yet to be conducted despite the considerable body of literature theoretically arguing the value of the CL approach in teaching Chinese classifiers (see section 1). Therefore, in accordance with studies in ESL and GSL, the present study aims to fill this gap by testing whether presenting polysemy networks and motivations for extensions can facilitate English speaking learners' initial learning, long-term memory as well as extended use of Chinese classifiers. The hypothesized result is a positive effect of the CL approach exists not only in initial learning and long-term retention, but also in learners' identification of new uses.

III. Method

A. Participants

32 native English speakers were recruited from 300 or 400 level Chinese classes in Institution XX (16 males, 16 females, mean age 27.03)[1]. The reason why we did not include beginning level learners is to guarantee that all participants already had a general idea of classifiers in Chinese and have enough Chinese vocabulary so as not to be

[1] Participants only reported years of age in the background information survey, so no information of months was provided, the same for the length of Chinese study.

distracted by the nouns in the tests. Participants were randomly assigned to a cognitive group and a traditional group, 16 in each group. There are 9 males and 7 females in the cognitive group, mean age 27.94 (there is one 57-year-old participant), mean years of Chinese study 3.88, and the lengths of exposure in Chinese speaking areas vary from none to 6 years (median 1.5 months). There are 7 males and 9 females in the traditional group, mean age 26.13, mean years of Chinese study 3.97, and the lengths of exposure in Chinese speaking areas range from none to 2 years (median 1 month).

B. Procedures

Each participant completed two sessions. A brief language background survey, together with a pretest was given in the first session, followed by an instructional video of 5 minutes and an immediate posttest. The second session was one week later in which participants were asked to complete a delayed posttest. In the immediate posttest as well as the delayed posttest, half of the test items are instructed and half are unfamiliar new ones. The only difference between the cognitive group and the traditional group is how the instructional videos were organized.

C. Instrumentation

1. The classifier 道 *Dao*

Since the purpose of the present study is concerned with the acquisition of polysemous Chinese classifiers, a classifier with a relatively complicated polysemy network, ideally across different domains, is needed for the measurement. If the usage of the tested classifier is too simple, the CL approach may not be necessary for learners to grasp its meanings and functions. Nevertheless, complexity of usage alone may not be enough; for practical reasons there are some other factors that we need to take into consideration.

In the first place, generic classifiers need to be avoided. Though Chinese classifiers 个 *ge* and 只 *zhi* historically featured specific categorical prototypes, they have become so productive that basically all animals but human beings can be classified by 只 *zhi* and all other entities can co-occur with 个 *ge*. Students are free to apply them in different situations without much constraint.

Secondly, frequency is also a concern, not only the frequency of the classifier itself, but also the frequency of the nouns categorized by the classifier. In most cases, for classifiers with complicated networks, there are always some unfamiliar nouns involved.

Last but not least, it is better to have a classifier whose extension is not highly predictable on the surface. In literature, many classifiers other than 道 *dao*, like 条 *tiao* and 张 *zhang*, were also claimed to display complicated polysemy networks (Tai & Wang, 1990; Tai, 1994), but essentially almost all nouns referenced by 条 *tiao* can be profiled by a length-extending shape, while 张 *zhang* is for flat-faced objects. The meaning extensions of 条 *tiao* and 张 *zhang* are pretty transparent in this sense, which cannot raise any real challenge for learning. For this reason, the association between different meanings of the tested classifier should not be too obvious. An ideal classifier for this test should have undergone extension in different directions and have functions in multiple semantic domains.

The classifier 道 *dao* is among the few studied classifiers that generally meet all these requirements. Jiang (2004) summarized the polysemy network of this classifier, together with associated nouns in Figure 1.

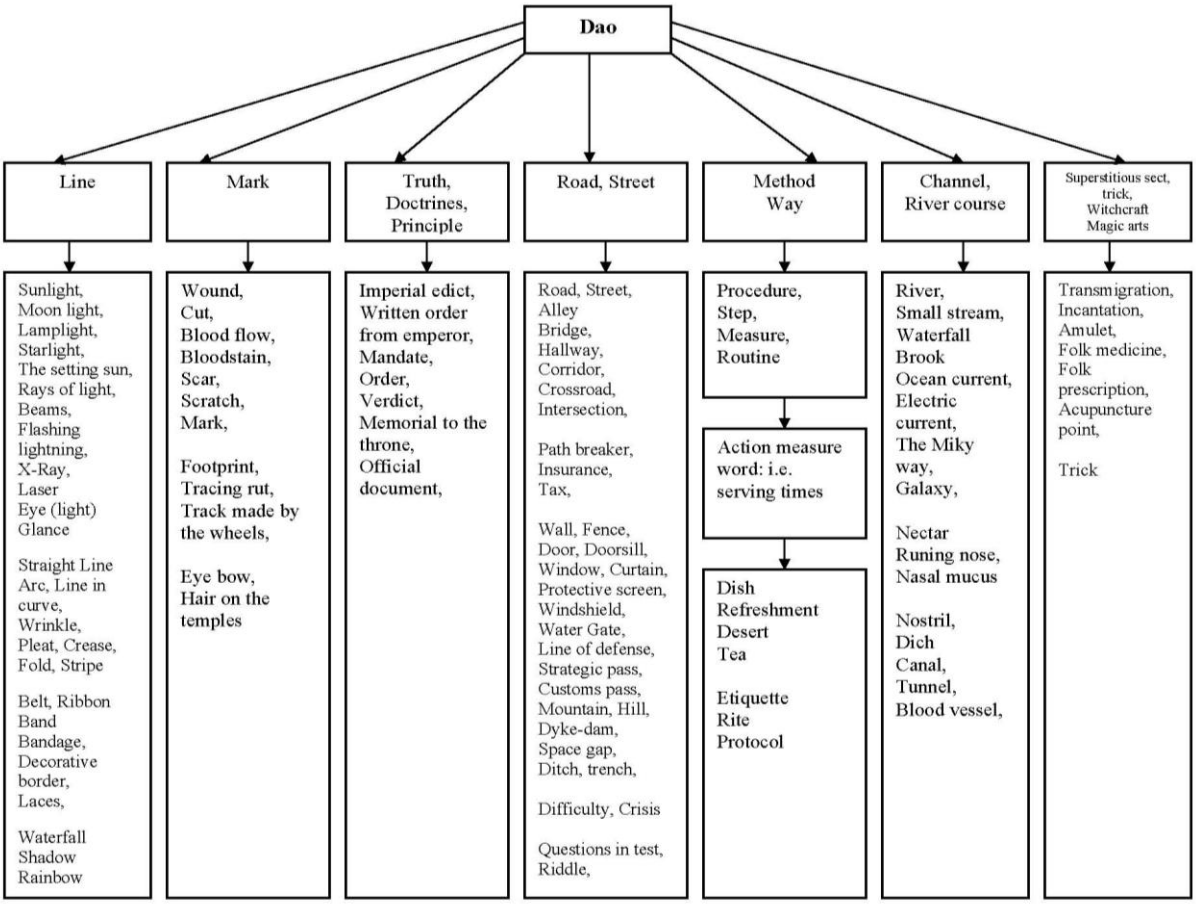

Figure 1. Semantic network of the Chinese classifier 道 *dao*

The classifier use of 道 *dao* is fairly complicated and extends to different domains ranging from tangible objects to geometric figures as well as abstract concepts, which provide us with a rich pool of test items.

2. Instruction materials

Based on the HSK *(Hanyu Shuiping Kaoshi* 'Chinese Proficiency Test', designed by Hanban) Level 1-6 vocabulary guideline[2], which is widely adopted in teaching Chinese as a second language, as a reference for frequency, the present study narrowed test items down to 24 nouns referenced by the classifier 道 *dao*, listed in Table 1.

TABLE I.
TEST ITEMS

No.	Pinyin	Characters	English Translation	No.	Pinyin	Characters	English Translation
1	yídào bùzhòu	一道步骤	a step (in a work)	13	yí dào shǎndiàn	一道闪电	a lightning
2	yí dào cǎihóng	一道彩虹	a rainbow	14	yí dào shāngbā	一道伤疤	a blood vessel
3	yídào cài	一道菜	a course (in a meal)	15	yídào wéiqiáng	一道围墙	an enclosing wall
4	yídào chéngxù	一道程序	a procedure	16	yídào yángguāng	一道阳光	a ray of sunlight
5	yídào guānqiǎ	一道关卡	a check point	17	yídào xuèguǎn	一道血管	a blood vessel
6	yí dào hēixiàn	一道黑线	a black line	18	yídào pùbù	一道瀑布	a waterfall
7	yídào hénjì	一道痕迹	a mark	19	yídào ménfèng	一道门缝	a crack between a door and its frame
8	yídào méimáo	一道眉毛	an eyebrow	20	yí dào kǒuzi	一道口子	a cut
9	yí dào míyǔ	一道谜语	a riddle	21	yídào shǒuxù	一道手续	a formality
10	yídào mìnglìng	一道命令	an order	22	yídào chá	一道茶	a tea course
11	yídào nántí	一道难题	a difficult problem	23	yí dào ménkǎn	一道门槛	a doorsill
12	yí dào shānmài	一道山脉	a range of mountain	24	yídào nánguān	一道难关	A crisis

For the first 16 of these 24 test items, two instructional videos of 5 minutes were edited using Powerpoint, one for the cognitive group and the other for the traditional group. Both videos contain slides of the test items, combined with pictures and an audio recording as shown in Figure 2, and all slides are played twice. The only difference between the two videos is the way in which slides are organized.

[2] The designers of HSK claimed the selection of words is based on frequency, the principle of economy and efficiency (Zhang, *et al*. 2000).

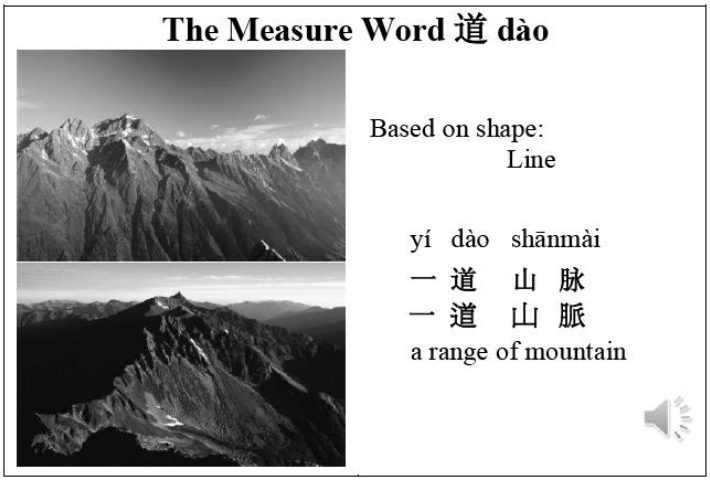

Figure 2: A sample slide of the instructional video

Jiang's simplified polysemy network (2004) was adopted in the organization of the cognitive group instructional video, thus the sixteen instructional items were categorized into classification based on shape and classification based on function. In order to design the traditional group instructional video, we studied 4 widely used series of textbooks with the expectation of finding some textbook treatments[3]. Much to our disappointment, the classifier use of 道 *dao* is just mentioned once, in the case of 一道菜 *yi dao cai* 'a course (in a meal)', in one textbook, which forces us to rely on dictionary definitions. *Xiandai Hanyu Cidian* [*The Contemporary Chinese Dictionary*] listed 4 senses of the classifier 道 *dao*.

(3) ① FOR LONG AND NARROW THINGS;
② FOR OBSTACLES, BARRIERS, OR OBSTRUCTIONS ON A PATH;
③ FOR EVENTS/THINGS CONSISTING OF SEQUENTIAL ITEMS;
④ FOR A STEP IN A PROCEDURE.

The first three senses are related with our test items, and were adopted in the design of the traditional group instructional video. Therefore, the flow charts of the instructional videos are as follows:

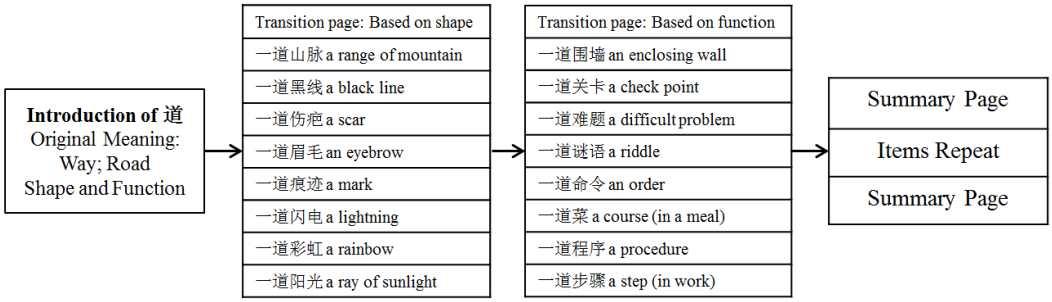

Figure 3. Flow chart of cognitive group instructional video

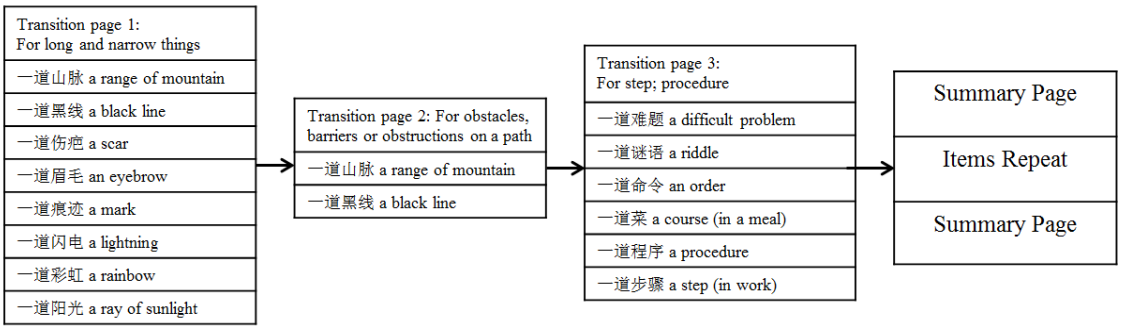

Figure 4. Flow chart of traditional group instructional video

[3] The four series of studied textbooks are: *Integrated Chinese* (Level I, Part I - Level II, Part II), Tao-chung Yao & Yuehua Liu. Boston: Cheng & Tsui Company, 2008; *Xin Shiyong Hanyu Keben* [*New Practical Chinese Reader*] (Book 1-2). Xun Liu. Beijing: Beijing Language and Culture University Press, 2002; *Interactions: A Cognitive Approach to Beginning Chinese* (Book 1-2), Margaret Mian Yan & Jennifer Li-chia Liu. Bloomington and Indianapolis: Indiana University Press, 1998; *Chinese Link*. Sue-mei Wu, Yueming Yu, Hanhui Zhang & Weizhong Tian, 2007 (Level 1 Part 1- Level 2 Part 2).

The summary pages of both videos are shown in Figure 5 and Figure 6 respectively:[4]

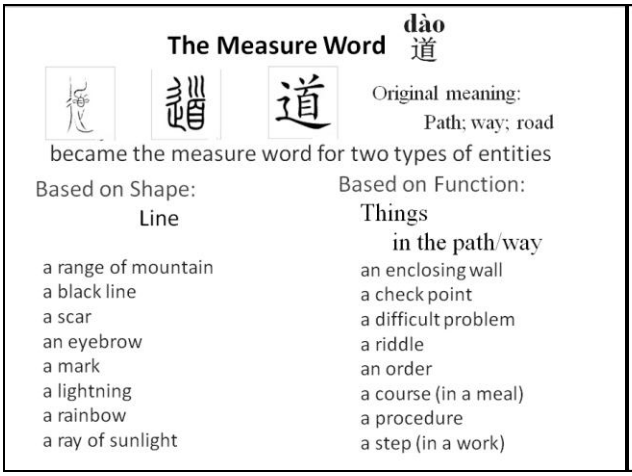

Figure 5. Summary page of cognitive group video

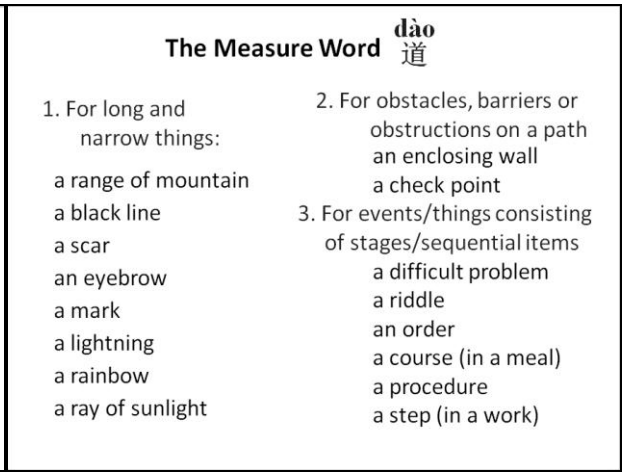

Figure 6. Summary page of traditional group video

In the summary page of the cognitive group instructional video, in order to highlight the original meaning of 道 *dao* and the motivation for its meaning extension, items disappear and the instructional video ends with the original meaning: "path, way, road".

3. Test materials

A pretest, an immediate posttest and a delayed posttest were designed, all with fill-in-the-blank questions with the pattern 'Number (Classifier) Noun'. The pretest covers test items No.1-16 in Table 1, the same as the instructional videos. Whereas the immediate posttest covers items No.1-8 and No.17-24, and delayed posttest covers items No.9-24, so that each test has 16 test items and there are 8 instructed items together with 8 new ones in the two posttests. The 16 test items are mixed with 24 different fillers in all three tests. Pinyin, Chinese characters, as well as English translations were given, as shown in (4), and participants were instructed to fill in the blank with either the Chinese character or Pinyin, avoiding 个 *ge* or 只 *zhi* (the two generic classifiers mentioned above) if possible.

(4)

yī（ ）zuǐ
一（ ）嘴
a mouth

IV. Results

Subject means for the pretest, immediate posttest, and delayed posttest are graphed in Figure 7.

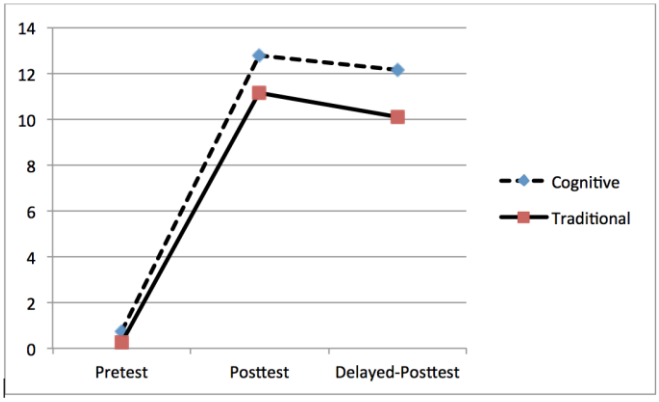

Figure 7. Graphic of scores on the three tests for both groups

It can be observed that participants basically had no knowledge of the classifier 道 *dao* before instruction. The means for the cognitive group and the traditional group in the pretest are 0.75 and 0.25 respectively. A two-tailed Mann-

[4] The term 'measure word' instead of 'classifier' was used because 'measure word' is more frequently used in Chinese textbooks and classroom teaching. Most participants are not familiar with the term 'classifier' at the time of testing.

Whitney U test (assumptions for *t*-test not met) shows there is no significant difference between these two groups. U = 82, $p = .08726$. The critical value of U at $p \leq 0.05$ is 75.

For the immediate posttest and delayed posttest, independent group *t*-tests were carried out and revealed the cognitive group scored significantly higher than the traditional group at $p < .05$ on the immediate posttest, as well as on the delayed posttest. For the immediate posttest, $t(30) = 2.31$, $p = .0279$, while for the delayed posttest, $t(30) = 2.59$, $p = .0148$. Cohen's *d*s are also calculated to estimate the effect sizes, precisely $d = 0.8168$ in the immediate posttest and $d = 0.9142$ in the delayed posttest, both of which can be considered fairly large.

However, when we look only at the instructed items in the two posttests, surprisingly, there is no significant difference between the two groups, as shown in Table 2.

TABLE II.
MEAN SCORES ON IMMEDIATE POSTTEST AND DELAYED POSTTEST

Group	Immediate Posttest All items (out of 16)	Immediate Posttest Instructed items only (out of 8)	Delayed Posttest All items (out of 16)	Delayed Posttest Instructed items only (out of 8)
Cognitive group	12.75	7.50	12.13	7.19
Traditional group	11.13	7.50	10.06	7.19

Therefore, it is possible to claim that the difference between the two groups lies in the identification of extended uses, but not in the memorization of instructed items, which is exactly the condition as shown in Figure 8. The cognitive group performed noticeably better than the traditional group on the uninstructed items both times, but the advantage is not seen for instructed items.

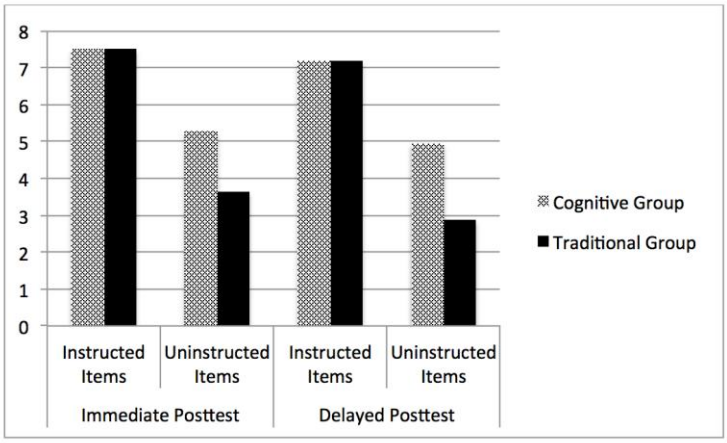

Figure 8. Graphic of scores of instructed items and uninstructed items on posttests

V. CONCLUSION AND DISCUSSION

The present study supports our hypothesis that the CL approach, specifically presenting polysemy network and the underlying motivations, can facilitate Chinese classifier learning. However, by contrast to our hypothesis, the benefit can only be observed in the ability to guess unfamiliar new uses, not in retention of instructed items. This finding is also different from previous studies (Huong, 2005; Verspoor, 2009; Berendi, Csabi & Kovecses, 2008). A possible explanation is that the number of test items and/or participants is too limited to produce a difference, which is a limitation of the present study.

It is also noteworthy that there is no measurement of general cognitive ability such as working memory in the present study, but working memory seems to be an important factor affecting the results, especially the memorization of instructional items in the immediate posttest. So a working memory test such as a reading span task may be a remedy for this limitation.

Despite the limitations noted above, what is definitely exhibited by our result is the superior ability of the cognitive group in the extension of instructed knowledge to uninstructed items. This finding is consistent with Verspoor and Lowie's (2003) study in the sense that introducing the central meaning of a word first facilitates more accurate interpretation of unfamiliar extended meanings. According to them, the semantic link between a core sense (the original meaning of 道 *dao*: 'path; way; road', in the present study) and a figurative sense (e.g., 'for long and narrow things' or 'for obstacles on a path') is usually one that can be readily (re)discovered and understood, but the link between two

figurative senses may not be so clear. So providing the core meaning and the motivation for meaning extension equips learners with the big picture of a radial category instead of a few unrelated mechanical rules. When learners encounter uninstructed new items, identifying items within a category seems to be easier than judging whether unrelated mechanical rules apply. In this sense, the uninstructed items are not totally 'new' to learners who have received instruction based on the CL approach.

Last but not least, there is an additional benefit of the CL approach involving Chinese character teaching and learning. In most cases, the central sense of a Chinese classifier bears some relationship to its character form, whose complexity is argued to be the biggest challenge for learners with an alphabetic first language (Allen, 2008; Bell, 1995; DeFrancis, 1984; Everson, 1988; Guder, 2005; McGinnis, 1999). With the CL approach, the central sense and meaning extension of Chinese classifiers are normally introduced through the characters, making the character an indispensable medium instead of an extra burden. Instruction of individual characters can be rendered more coherent and explanatory at the same time.

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