THE ACQUISITION OF CHINESE NOMINAL CLASSIFIERS BY L2 ADULT LEARNERS

by

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To my father, mother, wife, son, and daughter.

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ABSTRACT

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BY L2 ADULT LEARNERS

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The present study explores how L2 adult learners of Chinese acquire Chinese classifiers and provides pedagogical suggestions for more effective teaching of Chinese. 29 native speakers of Korean, 29 native speakers of English and 10 Taiwanese native speakers of Chinese were recruited to take part in three empirical tests to identify L2 learners' acquisition of various classifiers denoting shape, animacy, function, and event. The three tests are 1) Classifier Comprehension Test; 2) Classifier Production Test; 3) Classifier Prototype Test. In the first test, subjects were asked to match an object that can be denoted by a Chinese classifier listed among other classifiers. The second test asked subjects to produce a classifier that can denote the object shown in a picture. In the third test, subjects were prompted with 6 classifiers and asked to list up to 5 entities that can be denoted by the classifier in question. Later on, they were asked to re-rank these entities based on their perception of the prototypicality of the entities for that classifier. Some of the results show that 1) there is a positive relationship between L2 subjects' performance and their Chinese proficiency level (CPL); 2) in general, Korean subjects outperform English-speaking subjects; 3) there is a developmental sequence within shape classifiers and among different types of classifiers; 4) both Korean and English-speaking groups show a certain degree of regression at various stages; 5) with shape classifiers, the most typical objects produced by L1 subjects are also the most typical ones produced by L2 subjects; 6) there is a great extent of overlapping between L1 and L2 subjects' cognitive association of objects with the classifiers tested. Finally, the results are explained and synthesized in light of theories including Stockwell, Bowen, and Martin's Hierarchy of Difficulty model (1965), Krashen's Natural Order hypothesis (1987), VanPatten's Processing Instruction (1993, 1996, 2002), and Rosch's Prototype theory (1973 & 1975). Based on the results in this project and the models examined, several suggestions are made with regard to teaching Chinese classifier systems to L2 adult learners.

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CHAPTER 1

INTRODUCTION

When learning a new language, linguistic features that are obligatory in the target language but not present in the source language present hurdles for learners' progress. For example, for Chinese learners of English, linguistic features such as tense conjugation, the mass-count distinction, using definite articles and others can still be the source of errors even after mastering many other grammatical rules perfectly for years. One such feature in Mandarin Chinese, the classifier system, constitutes a challenge for Indo-European speakers. Not only do L2 learners of Chinese need to memorize the semantics of classifiers, they also need to understand the underlying principles of selecting correct classifiers that varies depending on the contexts. Such guiding principles are intuitive to native speakers but are not so explicable, if not predictable, to L2 learners.

The following example illustrates such a Quantifier + Classifier + Noun construction (henceforth Q + CL + N). It is obligatory that a classifier be inserted between a Number and Noun in modern Mandarin Chinese, e.g., 三隻雞 *sān* *<u>zhī</u>* *jī* 'three chickens':

三	隻	雞
sān	zhī	jī
Num	CL	N
Three	animal-like	chicken

‘three chickens’

The classifier 隻 *zhī* is used when denoting most animal-like things. Likewise, 張 *zhāng* is used when the referents are objects with flat surface. Thus, ‘three tables’ is 三張桌子 *sān <u>zhāng</u> zhuōzi*, ‘three paintings’ is 三張畫 *sān <u>zhāng</u> hùa*, ‘three faces’ is 三張臉 *sān <u>zhāng</u> lĭan* and so on. However, 張 *zhāng* also collocates with 弓 *gōng* ‘bow’, 嘴 *zŭi* ‘mouth’, 琴 *qíng* ‘Chinese zither’ and others that do not have a characteristic of flatness inherently. While some of these collocations can be explained away by historical developments within classifier systems, for others there is not a good account; therefore, speakers simply have to learn such constructions by rote. Not all native speakers can give an explanation with much confidence, but they all have no problem using it. So, how do L2 adult learners of Chinese cope with such somewhat non-rule-like and unpredictable phenomenon and to what extent do their learning patterns in this area differ from that of the development of L1 children learners?

To that end, the current study aims to describe, analyze and explain the acquisition of Chinese classifiers by L2 adult learners. Inspired by Hu (1993), Fang (1985) and others’ studies, the present study employs both production and comprehension experiments to investigate the development and acquisition of Chinese classifiers denoting nouns of different ANIMACY, FUNCTION, SHAPE and EVENT by forty adult L2 learners of Mandarin Chinese. This study will explore 1) the relative order of acquisition of different classifiers; 2) the L2 learners' competence levels of using classifiers at various stages of studying Chinese; 3) the relation between L2 learners' comprehension and production of classifiers; 4) the relation between L2 learners' cognitive abilities and comprehension and production of classifiers; and 5) the possible factors affecting learners' acquisition of classifiers.

The motivation of the current study is to extend the scope of the current literature which emphasizes 1) the nature and construction of classifier systems across language families of the world and 2) the phenomena of classifier acquisition by L1 children learners. That is, the current literature provides ample data and findings about how L1 children acquire Chinese classifiers, but only a few works deal with the phenomenon as exhibited by L2 adult learners of Chinese. By the end of this project, I will answer questions regarding the emergence order of classifiers denoting different semantics domains and sub-domains by L2 learners and the techniques and strategies they employ to acquire this linguistic device. It is envisioned that the results of this study would make a pedagogical contribution to the field of second language acquisition, particularly to that of Chinese language acquisition.

There are several major components in this dissertation. Chapter One contains a literature review that outlines previous research relevant to the current study. Section 1.1.1 reviews human cognitive categorization, which serves as foreground for further discussion. Here, readers are introduced to some major theories about categorization proposed in the past decades. Narrowing down the scope of the literature review, Section 1.1.2 and 1.1.3 deal with classifier systems in general and then particularly in Asian languages. Types and functions of classifier systems previously proposed will first be discussed, followed by some reports on classifier systems in Asian languages such as Japanese, Korean, and Burmese. Finally, in Section 1.1.4, I delve into the classifier system in Mandarin Chinese. Detailed information regarding the origin and historical development of Chinese classifiers is also provided. Section 1.1.5 talks about the semantic and syntactic aspects of classifiers in modern Chinese Sections 1.1.6 and 1.1.7 examine the differences between Mass-Classifiers and Count-Classifiers. Sections 1.1.8 and 1.1.9 talk about the syntactic roles of Chinese classifiers. Finally, the acquisition of the Chinese classifier system by both L1 and L2 learners of Chinese is reviewed in Sections 1.1.10 and 1.1.11, which is the essence of this literature review. It is the findings and claims found in this literature by which the current study is inspired, motivated, and designed to expand our understanding in the acquisition of classifiers by L2 adult learners. Empirical experiments designed to produce such understanding are described in the following chapter.

Chapter Two familiarizes readers with the subjects, materials and procedures involved in the three experiments of the current study. Section 2.1 describes two groups of subject recruited for the experiments. The criteria for both inclusion and exclusion are listed and the reasoning discussed. Also, a brief discussion of L1 subjects and the selection criteria is provided. Section 2.2 contains detailed information about materials needed for the experiments and the procedures of the three tests designed to bring about different constructs that L2 subjects have toward Chinese classifiers. For each experiment, correlated research questions are reiterated and explained as to how the experiment at hand can produce answers to the questions raised. Moreover, the scoring and coding procedures are explained and exemplified in ways that help readers understand how the subjects' performance is organized, evaluated, and analyzed.

Chapter Three is the Results chapter in which the findings from each of the three experiments are described and explained in detail. In Section 3.1, the frequency and percentage of eight different classifiers are presented first followed by a detailed data analysis of various groupings. The data are grouped based on their inherent characteristics and the subjects are grouped based on their first language and their CPL. Section 3.2 follows a similar pattern in analyzing the data gathered from the second experiment of classifiers production test. Section 3.3 first deals with how the data from the third experiment are organized and presented for further analysis. The L1 and L2 subjects' productions are then compared and contrasted to show the similarity and difference between these two groups' mental representation. Finally, Chapter Four concludes the project with a summary, discussion, and implications for future studies relevant to the current project.

1.1 Literature Review

Many researchers believe that linguistic classifications "may be reflexes of basic cognitive categories" (Adams and Conklin 1973: 1). If so, this justifies a study of the relationship between linguistic categorization and human cognitive categorization. In this chapter, the first section discusses issues about human categorization and how different theories posit ways human beings categorize stimuli. Section 2.2 will review studies about classifiers cross-linguistically. Finally, in the third section, I present a more detailed review of Chinese classifier systems and findings about how learners acquire this linguistic feature.

1.1.1 Human Categorization

One of the most important aspects of human cognition is categorization. Jackendoff (1983: 77) pointed out that "an essential aspect of cognition is the ability to categorize: to judge that a particular thing is or is not an instance of a particular category." It involves sorting an infinite numbers of things into various categories with limited cognitive resources. As one of the leading scholars in psychological categorization, Rosch (1977: 1-2) states that "the world consists of a virtually infinite number of discriminably different stimuli, … one of the most basic functions of all organisms is the cutting up of the environment into classifications by which non-identical stimuli can be treated as equivalent". How the human mind functions in terms of categorizing stimuli indeed attracted much attention. Another prominent scholar in categorization, Lakoff (1999) summarizes a traditional western philosophical view which claims that humans inherit a "faculty" of reason that is autonomous and independent of how our bodies function. It is this Cartesian separation of mind and body he claims that distinguishes us from animals. If this were not so, it would be much harder to philosophically tell us apart from all other animals.

However, Lakoff further points out other evidence from cognitive science that does not agree with the above view, but seems to be more viable. Rather than a separation of such fully autonomous faculty from bodily capacities, an alternative and evolutionary view supports a notion that claims bodily capacities grow and cultivate such a faculty of reason.

In order to survive in this world, a large portion of our categorization is formed automatically and unconsciously while a small percentage is formed by conscious acts of categorization. As a result, how we categorize cannot be fully controlled consciously. No matter how hard we try to form new categories deliberately, “our unconscious categories enter into our choice of possible conscious categories” (Lakoff 1999).

Furthermore, Lakoff maintains that whether we categorize is determined by our bodies and brains; they also determine the kinds and structure of categories we will have. The bottom line is that our possibilities for conceptualization and categorization are shaped by the nature of our bodies.

The human brain is capable of processing a virtually infinite numbers of things from birth to death. People use categorization to make the perception processes more efficient. Such cognitive activity involves moving two or more unique entities into one category in order to access knowledge and/or make prediction more effectively. The entities we face daily are numerous, such as artifacts, plants, animals, abstract events, emotions, ideas and so on. To make the issue more complicated, the dimensions of these entities vary in shape, function, color, volume, intensity and so on. There must exist certain organizing principles to achieve optimal results.

For the formation of categories, Rosch (1978) proposes two general and basic principles. “Function of category system” is the first principle, which states that processing the maximum information with the least cognitive effort is the central task of categorization. This involves not only judging incoming stimuli according to whether or not they have equivalent attributes to other stimuli already included in a certain category, but also differentiating them from those that are not in that category. It appears to be to one’s advantage to form as many categories with as many defined distinctions as possible so that the perceived world is less unpredictable. Ironically, this defeats the purpose of forming categorizations, by which we reduce cognitive effort to achieve processing maximum information. Therefore, it is also a consideration to which one must attend: disregarding certain stimuli from other streaming stimuli when such differentiation is unnecessary to the task at hand. When a balance between these two extremes is achieved, one has obtained the optimal function of categorization.

The second proposal Rosch proposed focuses on the structure of the information: she asserts that the perceived world is not organized arbitrarily with unpredictable attributes; rather, it is perceived as structured information. Maximum information with least cognitive effort is achieved by mapping categories with the perceived world structure as closely as possible. In other words, the perceived world is not unstructured but rather highly correlationally structured. Furthermore, different species perceive different types of attributes because of the differences of their physical construction and their functional needs. For example, dogs' motor interaction with the environment is more highly structured in smelling than that of human's because of their sensitive noses. The essence is that what attributes are perceivable depend on one's functional needs or physical advantage in a given physical and social environment. This suggests that people from different cultures might also categorize objects differently based on the environments in which they were raised. In summary, "part of the answer to the categorization question likely does depend on the nature of the world, but part also surely depends on the nature of the organism and its goals" (Medin 1989).

The next question I ask is this: Does there exist a connection between the linguistic phenomenon and the structure of conceptual categorization? If so, are there any empirical data which can support either claim? As Craig (1986: 2) points out, classifiers, on one hand, "offer enough of a challenge to the analysis of the nature of categories that, as pointed out by Lakoff, some may be tempted to say that they are arbitrary forms that do not reflect conceptual structures… On the other hand, however, it is undeniable that classifier systems represent some type of categorization and that their study may contribute to the understanding of the general phenomenon of human categorization."

Such a connection was proven by Tai and Wang (1990) and Tai and Chao's (1994) research. Their work involved the historical development of Mandarin Chinese classifiers as a way to construct the categorical linguistic structure. They concluded that, according to their analysis of Chinese classifiers, the linguistic categorization reflects a great deal of the nature of conceptual categorization (Tai and Wang, 1990:35). Using common, instead of historical, usages of a classifier as the prototypes, Chang-Smith (2000) showed that the linguistic categorization closely resembles conceptual categorization. The members of the linguistic category 輛 *lìang* overlap with the members of the conceptual category VEHICLE. She concluded that "the nature of the linguistic category… is not too much different from that of… the conceptual category… By extension, … the nature of linguistic categorization revealed by Mandarin noun classifiers is perhaps to a great extent based on conceptual categorization." We now turn our attention to this linguistic categorization, the classifier system, in order to better understand the relations between these two categorizations.

1.1.2 Linguistic Classification

The study of the linguistic phenomena of classifier systems did not begin until the 1940's but has since received much attention. It was first examined by Haas' study of numeral classifiers of Thai in 1942. Classifier languages can be found throughout the world with a relatively higher concentration in Asian languages. They belong to language families such as "the Malayo-Polynesian, the Austro-Asiatic, the Sino-Tibetan, the Altaic, the Dravidian and the Indo-Aryan language families" (Senft 2000). The characteristics and structures of classifier systems have long been studied by many linguists whose results brought insight into our understanding of not only human languages but also human cognition.

Many linguists (see e.g.: Allan 1977, Becker 1975, Benton 1968, Berlin 1968, Burling 1965, Denny 1979, Nguyen 1957, the contribution in Craig 1986, Mufwene 1980, Aikhenvald 2000 and others) give general definitions of classifiers, which can be summarized as the "morphemes that classify and quantify nouns according to semantic criteria" (Senft 2000: 21). The central topic of these studies deal with describing, defining and differentiating different types of classifiers. For example, Allan (1977) distinguishes the characteristics of classifiers and identifies four types of classifiers: numeral classifier languages; concordial classifier languages; predicate classifier languages; intra-locative classifier languages. Moreover, he suggests that although there is a typically explicable relationship between the noun and classifier in classifier languages, such a relationship is "not always predictable without extensive knowledge of the relevant language."

Allan (1997), and Tai and Wang (1990) further distinguish between classifiers and measure words, such that a classifier categorizes nouns by identifying salient perceptual properties that are permanently tied to the denoted entities; a measure word simply denote the quantity of the named nouns. Following is a more recent definition by Senft (1996: 6):

> Classifiers classify a noun inherently, i.e. they designate and specify semantic features inherent to the nominal denotatum and divide the set of nouns of a certain language into disjunct classes…..Quantifiers classify a noun temporarily,

> i.e. they can be combined with different nouns in a rather free way and designate a specific characteristics feature of a certain noun which is not inherent to it.

Among the many types of classifiers, the current study focuses on the numeral classifiers. Number classifiers are one type of noun classifier (Allan 1977) and are obligatory when counting entities in classifier languages (Sanches 1977, Shi 1996). In these classifier languages, noun classifiers are used to categorize almost every noun into different groups based on ANIMACY, SHAPE (Adams & Conklin 1973, Clark 1977) and human interactions such as physical interaction, functional interaction and social interaction (Denny 1976). Noun classifiers are found in classifier languages throughout East Asia (Burling 1965, Aikhenvald 2000 and others). The number of classifiers a particular language has is language specific, ranging from two to five hundred (Dixon 1982). We now narrow down our focus to the characteristics of classifiers in Asian languages.

1.1.3 Classifiers in Asian Languages

The earliest work on classifiers in Asian languages was done by Haas (1942), who presented the scope and variety of the numeral classifiers used in Thai. She found that there are some eighty or ninety special classifiers in Thai and some of them do not have other meanings or functions. When referring to human beings, there are five classifiers to be used and the selection depends on the stage in life the individual(s). Other classifiers are used specifically for other animals and objects with a various size, shape, or function which can be a partial guide classifier selection. The function and meaning of another type of classifier, independent classifiers, was also discussed. They are "independent" because they are used with quantifiers, indicators, and adjectives, but never with nouns. These are the words denoting periods of time or indicating the number of times an event takes place.

Based on Haas' (1942) work on Thai classifier and Emeneau's (1956) work on India, Jones (1970) attempted to describe the classifier phenomena found in languages of Southeast Asia. He suggested that "virtually all the languages of Asia use classifiers" but to different extents and exceptions of not using classifiers do exist. Syntactically, there are mainly two types of classifier constructions: 1) Num + CL + N and 2) N + Num + CL. The languages that make extensive use of classifiers include Thai, Burmese, Vietnamese and Chinese. The frequency of classifiers starts to decline to the north, east and south in China. For example, the use of classifiers in Cambodian, Malay, Javanese, Indonesian and the Philippines are relatively rare, or even non-existent. Moreover, the syntactic structures of classifiers in these languages are less stable and have greater variation. Regarding Chinese classifiers, Jones noted that classifiers were extremely rare when they originated, which dates back to as early as the Zhou Dynasty. The structures of classifiers have been changed from type II to type I. However, the sequences of N + Nu and Nu + N without a classifier were quite common in earlier periods.

In her work that surveys Japanese classifier systems, Downing (1996) explored historical, semantic, syntactic, pragmatic and other aspects of the language concerning the use of classifiers. She showed that "they do not constitute a homogeneous lexical category but that within this category important distinctions have to be made" (Downing 1996). Other findings include these: it is obligatory to use classifiers with animates; inanimates that are abstract can be classified either by the general classifier or can be 'unclassified'; concrete inanimates are classified by the general classifier *tsu* and can be further differentiated by "quality-base" classifiers and "kind-classifiers".

With this general idea about classifiers, we turn our attention to a number of characteristics found specifically in Chinese classifier systems. Then I will also make some effort to link these linguistic phenomena to the research questions to be summarized at the end of this chapter. We shall start with a more detailed literature review on the origin and historical development of Chinese classifiers.

1.1.4 Chinese Classifiers

Chinese classifiers first appeared in the Shang/Yin Dynasty (1324-1066 B.C.) (Huang 1964; Liu 1965 and others). The existence was rare and not much had changed for the next millennium through the Zhou Dynasty (1066-221 B.C.) and Qin Dynasty (221-207 B.C.). During this period, only ten classifiers were found in the oracle bone inscriptions and later 42 found in the metal inscriptions of the Zhou Dynasty (Huang 1964). This number increased to 337 in the Wei and Jin Dynasties (220-420 A.D.), and Southern and Northern Dynasties (420-581 A.D.) (Liu 1965). Classifiers were extensively and rhetorically used in 雜劇 *zájù* (operatic writing) seven hundred years later in the Yuan Dynasty (1271-1368 A.D.). During the Ming (1368-1644 A.D.) and the Qing (1644-1911 A.D.) Dynasties, classifiers were also popular in novels. At the turn of the 20th century, the number of classifiers declined thanks to the May-Fourth Movement which pushed for the 白話文 *báihùawén* (plain speech) that replaced classical Chinese in writing. As a result, the use of classifiers started to dwindle.

From a syntactic distribution point of view, Wang (1994) cites Chou (1962) and Shen (1992) who claim that since there were no syntactic structures such as "Numeral (Nu) + Classifier (CL) + Noun (N)" in Proto-Chinese, no genuine classifiers are found there. However, from an etymological point of view, G. Wang (1959), Guo (1962), Guan (1953) and Huang (1964) and other scholars believe in the existence of classifiers in Proto-Chinese in one form or another.

By examining the data from *Jiaguwen* 'oracle bone script' and *Jinwen* 'bronze script', Wang (1994) clarified the origin of 个 *gė*, 丯 *kāi* and of some other classifiers in Proto-Chinese. He provided some evidence of classifier origins in Proto-Chinese. For example 丯 *kāi* often occurred after a numeral in the pattern "N + Nu + 丯 *kāi*" where Nu is a numeral. Also, "in order to avoid quantity confusion in counting", 丯 *kāi* 'shell' is used as a measure word to differentiate plural measure words 朋 *péng* and 珏 *jué*, because a 朋 *péng* or a 珏 *jué* consists of several individual shells of jades.

1.1.5 Semantic aspect of Chinese classifiers

The development of Chinese classifiers continued for several centuries and the classifier has become a linguistic unit that is semantically rich and complex. There are at least three types of relations between classifiers and nouns: 1) in some cases, one classifier can denote entities that have a wide variety of inherent characteristics; 2) different classifiers can coerce different inherent characteristics of a certain entity; 3) entities with different characteristics require different classifiers. I will discuss each relation in more detail below.

In their study that examined the conceptual structure of the classifier 張 *zhāng*, Tai and Chao (1994) showed that this classifier is used to denote objects with four groups of perceptual characteristics. They are objects that are:

1) containing stretchable strings, e.g., 弓 *gōng* 'bow', and 琴 *qíng* 'Chinese zither';

2) made with ropes or having ropes as a component, and these ropes need to be spread out for these objects to be used, e.g., 網 *wǎng* 'net', 帆 *fán* 'canvas', 犁 *lí* 'plow', and 帳篷 *zhàngpéng* 'tent';

3) three-dimensional with a flat surface on the top, e.g., 床 *chuáng* 'bed', 椅子 *yǐzi* 'chair';

4) used with two body parts, e.g., 臉 *liǎn* 'face', and 嘴 *zuǐ* 'mouth'.

All these objects have a flat surface but the four groups are distinguishable according to certain salient, cognitive features.

Another aspect of the semantic functions that Chinese classifiers possess has to do with coercing semantic meanings or attributes out of the denoted nouns that would not be as salient if the nouns stood alone. Huang and Ahrens (2003) challenge the traditional view that nominal classifiers classify individuals only. Rather, they found that classifiers coerce nouns that refer to kinds and events as well. In other words, classifiers do not simply agree with a noun, but instead coerce a particular meaning from nouns they subcategorise with. This suggests that the understanding of the semantics of nouns involves more than simple reference to an individual entity. For instance, the two phrases, 一線電話 *yíxiàndiànhuà* 'one CL-line telephone' and 一支電話 *yìzhīdiànhuà* 'one CL-set telephone', are referring to two different entities although the lexical head noun, 電話 *diànhuà*, is the same. While the former one refers to 'a line/ an account of telephone service', the latter refers to the physical phone set. This is due to the fact the two classifiers 線 *xiàn* and 支 *zhī* coerce different perceptual properties within the noun 電話 *diànhuà* 'telephone'. In short, in Mandarin Chinese, by selecting different classifiers one can refer to different semantic nuances inherent to a certain entity.

Finally, Tai and Wang (1990) demonstrated that many Chinese classifiers are not “an arbitrary linguistic device of categorization but represent some type of human categorization.” That is, objects or entities with different inherent characteristics require different classifiers. They discussed the differences between the classifier 條 *tíao* and its related classifiers 根 *gēn*, and 支 *zhī*. These classifiers all pick up a unique salient perceptual property of length, but the latter two are used somewhat differently. 根 *gēn* refers to long shaped objects that are relatively stiffer and straighter than those denoted by 條 *tiáo*, e.g., 一根香蕉 *yìgēnxiāngjiāo* ‘a CL-stick banana’ vs. 一條線 *yìtiáoxiàn* ‘a CL-line string’. For the classifier 支 *zhī*, it denotes long shape objects that are cylinder-like, such as 筆 *bǐ* ‘pen’, or sometimes hollow objects such as 笛子 *dízi* ‘flute’.

1.1.6 Mass-Classifiers vs. Count-Classifiers

One aspect of Chinese classifiers that scholars pay close attention to is children’s comprehension of count- and mass-classifiers. Cheng and Sybesma (1998) define count nouns as “things that present themselves naturally in discrete countable units” while mass nouns do not. Bloom (1994: 310) makes similar statement that ‘count nouns refer to kinds of individuals’ while ‘mass nouns refer to kinds of portions’. Cheng and Sybesma (1998, 1999) further claim that while mass-classifiers function not only as classifiers but as independent nouns as well, count-classifiers function solely as classifiers. For example, a mass-classifier, 杯 *bēi* in 一杯水 *yì bēi shǔi* ‘a cup of water’, is a classifier as a unit for measuring water and also means a ‘drinking cup’ by itself.

However, a count-classifier, say, the 匹 *pī* in 一匹馬 *yì pī mǎ* ‘a horse’, can only function as classifier that is used specifically for 馬 *mǎ* ‘horse’ and has no other meaning if it stands alone.

They proposed a way to tell count-classifiers apart from mass-classifiers by inserting an adjective between Q and CL. If the insertion is acceptable, the classifier in question is a mass-classifier; no adjective insertion is allowed with count-classifiers. For example, in a phrase 一杯水 *yì bēi shŭi* ‘a cup of water’ that contains a mass-classifier, 杯 *bēi*, can become 一大杯水 *yì dà bēi shŭi* ‘a big cup of water’. However, it is ungrammatical to change 一匹馬 *yì pī mǎ* ‘a horse’ to *一大匹馬 *yì dà pī mǎ* ‘a big CL horse’, since the morpheme 匹 *pī* is a count-classifier. Rather, the adjective should follow the count-classifier as 一匹大馬 *yì pī dà mǎ* ‘a big horse’. Similarly, the morpheme 的 *dė* “an adjectivalizer” can be used to distinguish a mass-classifier from a count-classifier as well. However, the position of insertion is between CL and Noun, rather than between Q and CL. Therefore, the phrase 一杯的水 *yì bēi dė shŭi* is grammatical but the phrase *一匹的馬 *yì pī dė mǎ* is not.

1.1.7 Fuzziness between Classifiers and Measure Words

Unfortunately, the differences between mass- and count-classifiers are not always that easy to tell. This is due to the fact that count-classifiers not only have the function of qualification, they also possess some quantifying function which makes it difficult to determine the membership of the classifiers. That is, certain count-classifiers function as mass-classifiers where both classifying and measuring functions exist in the same linguistic form. For instance, the classifiers 片 *piàn* 'slice', 張 *zhāng* 'flat piece' and 塊 *kuài* 'chunk' are good examples in illustrating the fuzziness between the functions of count-classifiers and mass-classifiers. These count-classifiers collocate with objects that have different shapes. For instance, 一片麵包 *yípiànmiànbāo* 'one-slice-bread: a piece of bread', 一張紙 *yízhāngzhǐ* 'one-flat-paper: a sheet of paper' and 一塊肉 *yíkuàiròu* 'one-chunk-meat: a chunk of meat'. In fact, all of these count-classifiers function both as count-classifier and mass-classifiers at the same time. That is, on the one hand, they depict the shape of an object and therefore act more like a count-classifier. On the other hand, they also show the quantity of an object with various sizes such as slice, sheet, chunk, etc., and therefore can be considered as mass-classifiers. As such, one must be careful in claiming that a count-classifier is used to categorize objects semantically and a mass-classifier is used only to measure objects only. As demonstrated, the functions of count-classifiers and mass-classifiers are not so clear-cut.

Such distinctions are very subtle even to native speakers. No previous study examines whether L1 speakers can tell the differences between these two types of classifiers by correctly inserting certain adjectives or the morpheme 的 *dė* in the correct position under appropriate contexts. The current study will attempt to explore L2 adult learners' understanding and usage of these two kinds of classifiers.

1.1.8 Syntactic Interaction: Insertion of adjectives between Number and Classifier

While the insertion of adjectives between Q and CL is possible in modern Chinese once the type of classifiers is known, there exist strict rules that govern the environments for which, when, and what types of adjectives can be inserted. On the surface, such adjective insertion seems to be quite arbitrary and often causes still another dimension of learning curve for L2 learners. Learners face questions such as: What types of classifiers can be modified by adjectives? Can all or only certain adjectives be selected? Should it appear before or after a classifier? Is the entity a classifier is denoting a restricting factor when inserting adjectives? In principle, there are rules that can be devised to guide the selection of adjective for insertion. I now present a study that systematically organized the rules of adjective insertion in classifier construction.

The starting point was to collect appropriate adjective and classifier combinations. After examining 630 Chinese classifiers, Lu (1987) reported that only 129 of them (about 20%) can collocate with adjective(s). Adjectives can be inserted with three types of classifiers, namely verbal classifiers (9 found), temporal classifiers (3 found), and noun classifiers (117 found); but none can collocate with quantifying classifiers.

Adjectives that occur with these classifiers are 大 *dà* 'big', 小 *xiǎo* 'small', 厚 *hòu* 'thick', 薄 *báo* 'thin', 長 *cháng* 'long', or 整 *zhěng* 'whole'. However, only certain adjectives can collocate with certain type(s) of classifiers. Table 1.1 shows the possible combination of adjectives and classifiers that I have distilled from Lu's study.

Table 1.1 Possible Adjective – Classifier Combination

Adjective (NEED ENGLISH GLOSSES)	**Classifier**
大 *dà*	幫, 場, 泡, 批, 片, 群
小 *xǐao*	撮, 股, 角, 粒, 枝, 株
厚 *hòu*	層
整 *zhěng*	部
大 *dà* /小 *xǐao*	把, 筆, 瓣, 步, 棟, 都, 嚕, 朵, 份, 個, 間, 件, 顆, 沓, 面, 票, 束, 灘, 團, 坨, 丸, 牙, 座
大 *dà* / 厚 *hòu*	冊
大 *dà* / 整 *zhěng*	版, 套, 頭, 只
長 *cháng* / 整 *zhěng*	列
大 *dà* /小 *xǐao* / 厚 *hòu*	沓
大 *dà* /小 *xǐao* / 薄 báo	片
大 *dà* /小 *xǐao* / 長 *cháng*	隊, 節
大 *dà* /小 *xǐao* / 整 *zhěng*	幅, 根, 棵, 塊, 匹, 篇, 張
大 *dà* /小 *xǐao* / 厚 *hòu* / 薄 báo / 整 *zhěng*	本
大 *dà* /小 *xǐao* / 長 *cháng* / 整 *zhěng*	串, 段, 條

Also, the types of quantifier preceding the adjective determines whether or not a numeral classifier can collocate with an adjective. For example,

寫 了 一 厚 本 書	*寫 了 十 厚 本 書
xǐe lė yí hòu běn shū	*xǐe lė shí hòu běn shū*
written one thick book	written ten thick books

The ungrammaticality comes from the fact that the adjective 厚 *hòu* can collocate with a classifier if and only if it follows the quantifier 一 *yí*. This numeral quantifier 一 *yí* turns out to be the most frequently used unit before the Adj + CL construction. In fact, whenever the quantifier 一 *yí* appears before a classifier, one can always insert an adjective between them. Other possible quantifiers that allow adjectives to be inserted are 幾 *jĭ* 'several', 二 *èr* 'two, double', 十 *shí* 'ten', and so on. However, these quantifiers have much stricter constraints for adjectives insertion than the quantifier 一 *yí* does.

Furthermore, the quality of certain entities that a classifier is denoting is also a constraining factor which determines whether adjective insertion is allowed or not. An adjective can be inserted into a certain Q + CL construction when denoting certain entity but is prohibited when the same Q + CL construction is denoting other types of entity. For instance, when the classifier 件 *jiàn* 'CL- item-thing' is denoting an entity 行李 *xínglĭ* 'luggage', adjective insertion is allowed. Thus, 一件行李 *yíjiànxínglĭ* 'one item-thing luggage' can become 一大件行李 *yídàjiànxínglĭ* 'one big item-thing luggage'. However, when the denoted entity is 衣服 *yīfú* 'clothing', such insertion is not allowed. Therefore, 一件衣服 *yíjiànyīfú* 'one item-thing clothing' can not change to *一大件衣服 *yídàjiànyīfú* 'one big item-thing clothing'. That is, types of denoted nouns also play a role in determining whether adjective insertion between Q and CL is allowed or not.

The discussion thus far can be summarized as follows: adjective insertion between Q and CL is possible but with the following constraints: 1) only 20% of

Chinese classifiers can collocate with an adjective; 2) only certain adjectives can be inserted; 3) certain classifier(s) can only collocate with certain adjective(s); 4) the quality of the entity a classifier is denoting also determines if an adjective insertion is possible or not.

It is doubtful that any native speaker without an extensive linguistic background can explain these phenomena with clarity. One of the experiments in the current study is designed to test whether NNSs have a certain degree of control in this area. The differences between NSs and NNSs' performance in this task should help us understand more about L2 learners' acquisition of Chinese classifiers.

1.1.9 The Inseparability of the Verb and the Classifier in the V+C+N Construction in Tone Sandhi

It is a well-known Chinese tone sandhi rule for L2 learners that a third tone becomes a second tone before another third tone (3 → 2 / ___ 3; TS henceforth). For instance, the word 總統 *zǒngtǒng* 'president' consists of two third tone morphemes. When pronounced together, the two morphemes become *zǒng*^{3}*tǒng*^{3} → *zóng*^{2}*tǒng*^{3}. What happens if there were more than two consecutive third tones in a certain phrase/word? In such cases, the TS rule applies first to morphemes that form a close relation when there is a third tone prefix. Using the above word 總統 *zǒngtǒng* 'president' as an example, when a prefix 李 lǐ 'a Chinese last name' is added, there are three third tones in the phrase 李總統 lǐ *zǒngtǒng* 'President Li'. Because the two morphemes in 總統 *zǒngtǒng* are part of the word and hence have a closer relation than with the prefix. Thus the TS rule applies to the word 總統 *zǒngtǒng* first, i.e., 李總統 lǐ^{3} *zǒng*^{3}*tǒng*^{3} → 李總統 lǐ^{3} *zóng*^{2}*tǒng*^{3}. Since there are no two third tones sitting next to each other now, no further derivation is needed.

However, a second step is needed if a suffix is present. For example, again using 總統 *zǒngtǒng* as an example, when a suffix 好 *hǎo* 'good, or used a greeting' is added to the word, we have another phrase with three consecutive third tones 總統好 *zǒngtǒng hǎo* 'Greetings, President!'. According to the rule stated above, the TS rule first applies to 總統 *zǒngtǒng* since they are parts of a word. Therefore, 總統好 *zǒng*^{3}*tǒng*^{3} *hǎo*^{3} → 總統好 *zóng*^{2}*tǒng*^{3} *hǎo*^{3}. However, when there are still two third tones appear next to each other, another TS rule needs to be applied again. We'll call this the second TS rule. Thus, 總統好 *zóng*^{2}*tǒng*^{3} *hǎo*^{3} → 總統好 *zóng*^{2}*tóng*^{2} *hǎo*^{3}. By examining how the TS rules apply to phrases that contain multiple morphemes, one is able to determine which morphemes have a closer relation within or between word boundaries than with other linguistic units. This phonological rule helps us understand how the classifier is closely related to the preceding verb but loosely associated with the following noun, adjective or other linguistic units.

Aiming to explain the inseparability of the verb and the classifier with respect to their corresponding syntax relations, Xu (1999) claims that this inseparability happens "when the classifier loses its host (numeral, demonstrative, or some quantifier), it attaches to the preceding verb in order to function in a sentence." Such inseparability is demonstrated in light of the TS rules discussed above. For example, the quantifier 一 yì 'one' in the phrase 買一把傘 *mǎi yì bǎ sǎn* 'buy a CL-handle umbrella' can be omitted and the phrase is still grammatical, i.e. 買把傘 *mǎi bǎ sǎn* 'buy CL-handle umbrella', which has three third tones in a row. According to our first TS rule, the tone change will apply to the morphemes that form a closer relation. Based on native speaker's intuition, the above phase undergoes a phonological derivation, i.e., 買把傘 *mǎi bǎ sǎn* 333→ 買把傘 *mái bǎ sǎn* 233. Since there are still two third tones that are adjacent to each other, the second TS rule applies: 買把傘 *mái bǎ sǎn* 233 →買把傘 *mái bá sǎn* 223. Here we see that the first TS rule applies to the V + CL rather than CL + N. This is one implication that supports the idea that a classifier is grouped with its preceding verb rather than with following noun.

This can be further exemplified by inserting another third tone adjective between a classifier and its following noun. For example, the above phrase 買把傘 *mǎi bǎ sǎn* 'buy CL-handle umbrella' can be added an adjective 好 *hǎo* 'good' as 買把好傘 *mǎi bǎ hǎo sǎn* 'buy CL-handle good umbrella' has four consecutive third tones. Similar to the previous example, the TS rule first applies to V + CL position, i.e., 買把好傘 *mǎi bǎ hǎo sǎn* 3333→ 買把好傘 *mái bǎ hǎo sǎn* 2333. Since there are three consecutive third tones, the second TS rule can apply to either the first or second third tone. However, because the adjective 好 *hǎo* is syntactically bound to the following noun 傘 *sǎn*, the first TS rule would apply here again. Therefore the derivation then is this: 買把好傘 *mái bǎ hǎo sǎn* 2333 →買把好傘 *mái bǎ háo sǎn* 2323. No further TS rule application is needed since there are no consecutive third tones. The second time the first TS rule was applied as shown above, indicates that the A + N structure has a closer relation than the CL + A structure. Again, such phonological production is very intuitive to NSs but can be very challenging to NNSs.

So, how do we know whether NNSs acquire such phonological understanding and to what extent they manifest such linguistic competence in their speech? No previous study provides empirical data for this question. This study intends to explore that area by employing an experiment that elicits both NSs and NNSs' phonological production on phrases with 3 and 4 consecutive third tones. I suspect that even advanced NNSs will have trouble assigning correct tone marks in the contexts described above since this can be a mentally demanding task even for NSs.

1.1.10 L1 acquisition of Chinese classifiers

Studies concerning L1 children's acquisition of Chinese classifiers examine children's understanding of different aspects of the classifiers and the developmental progress at various ages. These studies have yielded somewhat similar results in certain aspects while some differing findings are reported as well. In terms of methodology, two types of studies are found: Erbaugh's (1982, 1984, 1986) longitudinal approach and the experimental approach used by others (e.g., Gandour et al. 1974; Fang 1985; Ken & Harrison 1986; Loke and Harrison 1986; Chang 1983; Carpenter 1991; Loke 1991; Mak 1991; Hu 1993a, b; Uchida and Imai 1999). These concern issues such as a) the emergence order of classifiers denoting different semantic domains; b) the relation between L1 children's cognitive development and their classifier acquisition, and c) the process of acquisition. Some of the common findings include that a) L1 children have a solid knowledge of the basic syntactic structure of classifiers at a very early age; b) their acquisition of classifier vocabulary is very much delayed compared to noun acquisition; c) although the findings of the order of Chinese classifier acquisition is different, it is very common for children to over-generalize the general classifier *gė* as a 'syntactic place-holder' (cf. Fang 1985, Hu 1993a); d) they are very conservative in using classifiers.

Uchida and Imai (1999) discuss how Japanese and Chinese children learn the meanings of classifiers and explore the lexical nature of numerical classifiers. They view classifiers from another angle which considers classifiers as "closed-class words, rather than grammatical morphemes, and hence their lexical nature is comparable to that of English prepositions." Their study shows that learning a classifier system is a very slow process for L1 children. The complex semantic nature of the classifier system seems to be the cause of the difficulties children face. Even after they acquire a certain amount of classifiers, "children are very conservative in assigning meaning to classifiers." The more semantic complexity they develop, the faster the pace of learning classifiers they exhibit. One of the suggested prerequisites is a certain cognitive ability which makes it possible for children to be "able to extract the complex semantic rules of classifiers on their own."

In analyzing how children acquire noun classifier systems, Erbaugh (1984) finds that shape plays a more influential and stable role in sorting than function does. Later on, Erbaugh (1986) further specifies her findings of both developmental and historical trends regarding acquisition of Chinese classifiers by L1 children. They can be summarized as follows:

1. Valued items before common ones, both before conventionalized sets.
2. Discrete, countable, portable concrete objects before large immovable ones.
3. Measures before special nouns classifiers.
4. Unique reference before prototypical.
5. Abstraction by extension especially rigid, horizontal length, before on a plane. Small size more prominent and earlier than shape, though roundness and squareness become common. Large size unmarked.
6. Classifier with number before demonstrative, near before far. Both before the pro-form.

In terms of shape classifiers, Erbaugh (1986) and Fang's (1985) data show that children acquire classifiers denoting one dimension or length first, then two dimensions or flatness and three dimensions or roundness last. One of the critics of Erbaugh's work focuses on the lack of adequate numbers of subjects which thus might make the findings less representative. Indeed, others' findings show different results. For example, Hu (1993a) suggests that the order of shape classifiers acquisition is two dimensions first, one dimension second and finally three dimension. Still another inconclusive result by Loke and Harrison's (1986) study shows that the order of shape classifiers acquisition is three dimensions first, then one dimension and lastly two dimensions. Their findings are also more in agreement with Clark (1977) and Andersen's (1978) perceptual saliency order which states that three dimensions and smallness were most perceptually salient to children. In short, no final conclusion has been drawn regarding the acquisition order of shape classifiers by L1 children.

The literature so far discussed focuses on L1 speakers' use of classifiers. We do not know whether, or the degree to which, the above findings can apply to L2 adult learners of Chinese classifiers acquisition. The following section briefly summarizes the scant study relevant to this area.

1.1.11 L2 acquisition of Chinese classifiers

While ample research has been done on the understanding of L1 children's acquisition of Chinese classifiers, the current literature provides relatively little, if any, information as to how L2 adult learners acquire Chinese classifiers. One of the two relevant studies was done by Chen (1996) more than a decade ago. His research focuses on the effect of correct feedback (CF) on L2 adult learners acquiring Chinese classifiers. In experiments using different ways of giving feedback on learners' mistakes during and after the learning periods, Chen's findings show that 1) the positive effect of CF can be generalized across different tasks; 2) the short term effect of CF was not sustained; 3) the results strongly support the idea that CF is facilitative in language learning with follow-up activities for maintaining short-term gains. Although the target subjects are L2 adult learners, the goal of this study is to evaluate the effect of applying CF when acquiring Chinese classifiers. Phenomenon such as the order of emergence of classifiers, factors affecting acquisition of classifiers, or cognitive abilities in distinguishing between count- and mass-classifiers and other issues of this nature are not explored in this study.

Some of these questions are answered in Polio's (1994) work that examines 21 English and 21 Japanese adult speakers learning Chinese in Taiwan. These subjects were first asked to view a short film that contains narratives of invisible referents. They were then asked to tell the story in the film to a native speaker of Chinese. The tester then examined their use of classifiers and found that a) NNSs had no problem using a classifier in obligatory contexts; b) they often included too many classifiers which makes it ungrammatical; c) they did use special classifiers, but only occasionally; d) they were able to self-correct the mistakes; e) there were a few cases where NNSs used unacceptable special classifiers.

These findings answered some questions regarding how L2 learners of Chinese develop their understanding and using of Chinese classifier systems; however, much remains unexplored. As Polio herself points out, "there is much potential for research in examining how second language learners classify referents in relation to how first language learners classify referents" (Polio 1994: 63). Based on the literature reviewed thus far, I present the following research questions. By answering these questions I can bring some insight into the understanding of how L2 learners acquire Chinese classifiers and potentially provide pedagogical benefits to both teachers and L2 learners of Chinese.

1.2 Research Questions

A. Classifiers vs. Measure Words

Are L1 speakers and L2 adult learners of Chinese able to differentiate Chinese classifiers from measure words?

B. Specific Classifiers

At what stage do L2 adult learners start acquiring specific classifiers? Unlike children's acquisition of classifiers in which cognitive development is a prerequisite, is it true that L2 adult learners are capable of acquiring classifiers with more complex semantic meanings at an early stage of learning since their cognitive development has long since matured?

C. Developmental Sequences of Acquiring Classifiers

Is there a consistent order in acquiring the classifiers across L2 CPL levels? What are the general patterns? Which types of classifiers are best learned by which group of subjects?

D. Cognitive Typological Representation

When prompted with classifiers denoting different semantic groups such as ANIMACY, FUNCTION, and EVENT, to what extent do NNSs' mental representation typologically represent that manifested by NSs? That is, do NNSs categorize objects/events in ways, to a certain degree, similar to how NSs do? Do L2 subjects with different native languages perform differently? If so, how are they manifested?

E. Factors Influencing the Acquisition of Chinese Classifiers

What are some the factors that seem to contribute to the success/failure of acquiring Chinese classifiers? For example, do these factors, length of studying Chinese, length of living overseas or in Chinese speaking community, L2 learners' major or field of interest, highest levels of education, whether the learners' native language a classifier language or not… and so on, affect how learners acquire Chinese classifiers? These qualitative questions are important in developing effective curriculum for learning Chinese. However, although the answers to these last questions (E) were elicited during the experiments, the results are not analyzed and presented in this project. They will appear in my future projects.

CHAPTER 2

METHOD

In this chapter, detailed explanations will be given about the subjects involved in this study and the methods of eliciting data for answering the research questions. I will first discuss the selection of subjects in the first half of this chapter and then the design of method in the second half.

2.1 Subjects

There are two major groups of subjects in this study: L2 adult learners of Chinese and adult native speakers of Chinese. The use of Chinese classifiers by the first group is the source of data analysis while that of second group's serves as a control for the conventional use of classifiers.

2.1.1 The L2 Adult Learners of Chinese

Ideally, as many subjects as possible should be included in this study. However, in reality, such inclusion of subjects was not practical due to the time and resources available to the researcher. In this study, 58 subjects who are L2 adult learners of Mandarin Chinese, henceforward NNSs, were recruited for this project. These subjects were divided into three groups according to their level of competence in Chinese, with the advanced level in Group I, the intermediate level in Group II and the novice level in Group III. Factors determining the subjects' placement include their highest academic level achieved in learning Chinese, length of studying Chinese, NSs' assessment and others.

In this study, there was an equal number of Korean and English speakers. There were 29 Korean-speaking and 29 English-speaking subjects recruited. The criteria for selecting subjects of L2 learners were that the subject must:

1. be 18 or above;
2. be a non-native speaker of Chinese;
3. have studied Mandarin Chinese for at least one semester;
4. be able to count numbers at least from zero to ten in Mandarin Chinese;
5. have no known visual impairment;
6. be a native speaker of either English or Korean.

Appendix B contains the questionnaire used to gather subjects' information in order to determine if he or she qualified for the experiments. There are other questions in the questionnaire that ask for subjects' personal, academic and social life, such as highest education, numbers of Chinese speaking friends, length of time living in a Chinese-speaking community, that might be factors of their Chinese competence level. However, if any one criterion described above is not met, he or she was excluded from further participation of the experiment.

The recruitment of the subjects for this study was done both in the US and Taiwan. Locally, some universities and colleges in DFW area that offer Chinese courses provided some good candidates for this study. Also, foreign students studying Chinese in various programs in Taiwan and those who work there were potential candidates as well. The goal was to include subjects from as a set of diverse backgrounds as possible.

2.1.2 The L1 Adult Native-Speakers of Chinese

Ten adult native-speakers of Chinese, henceforward NSs, were recruited locally. Their home language was Mandarin Chinese; those who spoke other vernaculars, such as Cantonese or Hakka at home were not included. Also, they must have completed at least a high school education in Mandarin Chinese in their homeland. The use of Chinese classifiers by these adult NSs serves as the control data for this study. Since there are more than thirty thousand Chinese people living in DFW area, the recruitment for this group of subjects did not pose a major problem.

Due to the differences in language use between speakers from mainland China and Taiwan, the selection criteria here exclude those speakers from the former area. There are at least two reasons for such exclusion: 1) with fewer variables to consider, the data would be more controlled and uniform if they were drawn from one group of subjects; 2) since some of the NNSs will be recruited in Taiwan, selecting only NSs from Taiwan is justified as well. This would make the comparison between these two groups of subjects more compatible and meaningful.

Personal contacts were the main source of recruiting NSs for this study. The approval from the university's Human Subject Review board has been obtained with the IRB Protocol number 07.229. These NSs were contacted verbally, first either by phone or through a face-to-face meeting (see Appendix A). If they agreed to participate in the study, the consent letter and questionnaire on the subject's background was delivered to them and a time and location convenient for them for the experiments was determined. All subjects took part in the same experiments individually to maintain the objectivity and originality of their responses. The estimated time needed for the entire experiment was 30 minutes.

2.2 Materials and Procedures

The study employs three experiments designed for both NNSs and NSs and one interview for NNSs only. The following sections describe the procedures of each experiment and the intended goals and underlying constructs that each experiment attempts to achieve and reveal.

2.2.1 Experiment I: Classifier Comprehension Test

Inspired by Fang (1985), Hu (1993) and others, the goal of this experiment was to investigate NNSs' ability to understand classifiers denoting various shapes, sizes, and textures. The types of shapes can be divided into one dimension (條 *tiáo* and 根 *gēn*, for rigidness), two dimensions (片 *piàn* and 張 *zhāng* for flatness), and three dimensions (顆 *kē,* 糰 *tuán* and 粒 *lì* for roundness, and 塊 *kuài* for cube). There are also subtle differences between classifiers within each dimension group. In the one-dimension group, 條 *tíao* and 根 *gēn* differ in rigidness. For example, 條 *tiáo* co-occurs with 繩子 *shéngzi* 'rope' and 根 *gēn* with 香蕉 *xiāngjiāo* 'banana'. In the two-dimension group, 片 *piàn* denotes objects of irregular shape while 張 *zhāng* denotes objects with square or rectangular shapes. For instance, 一片樹葉 *yípiànshùyè* ‘a leaf’ vs. 一張紙 *yìzhāngzhǐ* ‘a piece of paper’ in which a leaf is irregular in shape while a piece of paper usually has a square or rectangular shape. For three dimensions, 顆 *kē* and 粒 *lì* are usually used with more solid objects whereas 糰 *tuán* co-occurs with objects that are mushy. Furthermore, 顆 *kē* denotes things that are bigger than those denoted by 粒 *lì*. Lastly, 塊 *kuài* denotes objects with a cubic shape. Thus, typical objects denoted by 顆 *kē,* 粒 *lì*, 糰 *tuán*, and 塊 *kuài* are 西瓜 *xīguā* ‘watermelon’, 花生米 *huāshēngmǐ* ‘peanut’, 麵團 *miàntuán* ‘dough’ and 蛋糕 *dàngāo*, ‘cake’. This experiment is intended to reveal whether the subjects understand the subtle differences among these classifiers in denoting different shapes, sizes and textures. The differences between these classifiers are listed in the following table:

Table 2.1 Classifiers examined in Experiment I grouped by dimensions

Shape	**Classifier**	**Salient Feature**	**Denoted Objects**
One-Dimension	條 *tiáo*	slender, flexible, bendable	snake, worm, rope, river, road …
	根 *gēn*	rigid,	banana, cigarette, stick, match…
Two-Dimension	片 piàn	thin w/ irregular edges	leaf, ocean…
	張 zhāng	thin w/ regular edges	paper, ticket, picture, face, table....
Three-Dimension	糰 *tuán*		dough, yarn…
	顆 *kē*	bigger round object	basketball, watermelon, rock, planet…
	粒 *lì*	smaller round object	rice, sesame, sand, grain, marble
	塊 *kuài*	cubical	ice cube, brick, cake, nugget...

Ten objects made of children's modeling clay formed into different shapes and sizes were placed on the table randomly. Eight of these ten objects were each made to fit one and only one characteristic denoted by the eight classifiers discussed above. The other two were foils with irregular shapes and dimensions which prevent subjects from guessing the answers by eliminating the objects already selected. Other characteristics of these objects such as color, weight, and texture were the same. Subjects were told that all these objects have the same name: 黏土 *niántǔ* 'clay', despite having different shapes and sizes. Each object was assigned a number written a small card placed directly above the assigned object.

There were at least two objects in each dimension group. For the one-dimension group, the objects were made to resemble an iron bar and a snake. They were categorized as 1D1 and 1D2 respectively. In the two-dimension group, there were also two objects that resemble a sheet of paper and a leaf. They were categorized as 2D1 and 2D2. Finally, four objects were found in the three-dimension group which have the appearances of a golf ball, a marble, flour dough, and a sugar cube. Again, they were categorized as 3D1, 3D2, 3D3 and 3D4.

Next, eight phrases were presented to the subjects and they were asked to match each phrase with one and only one object based on the classifier found in each phrase. Following are some example phrases:

一條 黏土 ……………………………………………………..( )
yí <u>tíao</u> niántǔ
one CL-long-slender clay

一張　黏土 ……………………………………………………….( )
yí <u>zhāng</u> niántǔ
one CL-flat clay

一糰　黏土 ………………………………………………………( )
yí tuán niántǔ
one CL-dough-like clay

The only variable for all these phrases is the use of classifiers. The correct selection depends on the subjects' understanding of the classifiers provided. After the selection was made by writing down the corresponding number in the parenthesis, the subjects were asked to rate their level of confidence about their selections. The scale ranges from 1 to 5, with 1 being least confident and 5 being most positive about the choice. A sample scale is listed here:

_____ | _____ | _____ | _____ | _____ |
1 2 3 4 5

Scale/衡量表示 :

1 → Definitely Don't Know / 確定不知道
2 → Pretty Unsure / 很不確定
3 → Undecided / 不確定
4 → Pretty Sure / 很確定
5 → Absolutely Sure / 非常確定

2.2.2 Experiment II: Classifier Production Test

This experiment investigated NNSs' ability to produce classifiers with various semantic domains such as ANIMACY, FUNCTION and EVENT. Materials needed for this experiment are ten pictures of various objects/events. For each picture, there was only one type of object/event but the quantity of the object/event in each picture may be more than one. These pictures were shown to the subjects in a random order. Before presenting the pictures, a question sheet that contained 10 questions was given to the subjects. Each of these questions asked: 1). 圖片裡有什麼? *túpiàn lǐ yǒu shénmė*? 'What is it in the picture?'; 2). 圖片裡有多少 XXX? *túpiàn lǐ yǒu duōshǎo* XXX? 'How many XXX are there in the picture?' A sample question is shown here:

Sample Question:

圖片裡是什麼? 圖片裡是 _______ 圖片裡有多少 XXX? 圖片裡有 ___________

Level of confidence / 確定程度 : 1 2 3 4 5

Following these two questions was a scale ranging from 1 to 5 asking about the subjects' confidence level for the answer they just gave. Note that the confidence level was determined by assessing their confidence on the classifiers they were able to produce, not on the objects' name. The objects' name would be given if the subject did not know it.

The objects/events in the pictures were: 1). 老師 *lǎoshī* 'teacher', 狗 *gǒu* 'dog', and 馬 *mǎ* 'horse' for ANIMACY and their corresponding classifiers were 位 *wèi*, 隻

zhī or 條 *tiáo*, and 匹 *pī*; 2). 轎車 *jiàochē* ‘car’, 電腦 *diànnăo* ‘computer’, 梳子 *shūzi* ‘comb’, and 襯衫 *chènshān* ‘shirt’ for FUNCTION and their corresponding classifiers were 輛 *liàng,* 台 *tái*, 把 *bă*, 件 *jiàn*; 3). 火災 *huŏzāi* ‘house fire’, 買賣 *măimài* ‘business trading’, and 婚事 *hūnshì* ‘marriage’ for EVENT and their corresponding classifiers were 場 *chăng*, 樁 *zhuāng*, 門 *mén*. To avoid confusion, the pictures of EVENT will have both Chinese and English texts on the top of the pictures as a prompt. The salient features and the examples of the above mentioned objects/events are listed in the following table:

Table 2.2 Classifiers examined in Experiment II grouped by salient features

Category	Classifier	Salient Feature	Example
ANIMACY	位 *wèi*	for human	teacher
	隻 *zhī*	for animal in general	dog
	匹 *pī*	for horse only	horse
FUNCTION	把 *bă*	for objects with handle	comb
	輛 *liàng*	for transportation/vehicle	car
	台 *tái*	for machinery	computer
	件 *jiàn*	for clothing	shirt
EVENT	場 *chăng*	for events with many participants	fire
	樁 *zhuāng*	for formal events with serious consequences	marriage
	門 *mén*		trading

The objects/events in these pictures should all be denoted with at least one special classifier. In some cases, more than one classifier may be used. For example, the object ‘dog’ can be denoted by the classifier 隻 *zhī* or 條 *tiáo*. The subjects were reminded not to use the general classifier 個 *gė* unless they did not know any special classifier appropriate for the object/event in question. It was expected that the general classifier 個 *gė* would be used extensively, especially for novice NNSs.

After reading the first part of each question, if the subject knew the object's name in Chinese, he/she was asked to write down the name in Chinese character or in Pinyin. Otherwise, the Chinese names of these objects/events would be given by the tester. The subject was then asked to answer the second part of the question. The answers were to be written in Chinese character or in Pinyin as well. Note that no classifier was used in both of the first and second questions. The answer to the second question must contain a classifier although a phrase without its lexical head noun was acceptable. For examples, if the answer to the second question was 'three horses', the response would be 三匹馬 *sānpīmǎ* 'three CL-horse-like horses', or 三匹 *sānpī* 'three CL-horse-like'.

2.2.3 Experiment III: Typological Production Test

Inspired by Chang-Smith's (2000) study, the third experiment aims to investigate the relations between NNSs and NSs' cognitive manifestations of prototypes in the linguistic categorization revealed in Chinese classifiers. Five classifiers belonging to two different categories were selected: three SHAPE classifiers (條 *tiáo*, 張 *zhāng*, 粒 *li*) and two FUNCTION classifiers (台 *tái*, 把 *bǎ*). All these classifiers denote multiple concrete objects that are commonly seen and used in daily life. For example, 輛 *liàng* collocates with land vehicles such as cars, trucks, buses, bicycles, tanks and so on. The goal of this experiment was to examine to what extent the NNSs' cognitive manifestation overlapped with or represented that manifested by NSs.

A six-page booklet was provided to the subjects with the instructions for this experiment on the first page and with the following five pages each containing one of the five classifiers discussed above (see Appendix C). Each of these five pages had two sections, Section A and Section B. The subjects were asked to list up to 5 objects in Section A that could co-occur with the classifier in question. These were immediate responses that the subjects could come up with in a random order. The only criterion to be considered was whether an object was appropriate or not to be denoted by the classifier in question.

A second criterion was applied to objects listed in Section A and the results were listed in Section B. The second criterion asked the subjects to re-rank the objects according to the subjects' judgment on how typical certain objects were to the group denoted by the classifier being questioned. To determine the most typical members, subjects were asked to judge which objects were better examples of, or more representative of, that category than the others. Using the classifier 輛 *liàng*, a classifier denoting land vehicles, as an example, a subject might initially list cars, tanks, trucks, buses, bicycles as appropriate objects for this classifier and list them in Section A. However, they may later feel that the typicality ranking for this category should be cars, bicycles, buses, trucks, tanks and thus list them in Section B.

The subjects were allowed to answer the questions in a random order. They could even come back to the questions previously considered but not yet fully responded to. In general, there was no time limit for each question but subjects were advised not to spend more than three minutes for each question. The answers could be written in Chinese character, pinyin or even in the speakers' native English or Korean languages. Since this was not a vocabulary test, it was not important to find out if the subjects knew certain objects' names in Chinese or not. However, what needed to be clarified was whether or not the subjects were capable of associating these classifiers with appropriate corresponding objects. If there were answers in Korean, they were translated into Chinese or English, using a dictionary or by a translator after the experiment.

2.3 Coding and Scoring

This section explains how both nominal and ordinal data are coded and the criteria and schemes involved. I will first describe the coding process for data extracted from the Background Survey. Next, I present the data coding procedures for Experiment I, Experiment II and then Experiment III respectively.

2.3.1 Coding For Subject Background

A spreadsheet file was created to record the subjects' background information. It includes the following characteristics of each subject:

(1) Gender
(2) Age
(3) Birthplace
(4) First Language

(5) Other Language(s) Learned
(6) Length of Time Studying Chinese
(7) Time First Studied Chinese
(8) Hours of Studying Chinese per Week
(9) Parents' First Language
(10) Length of Time Living in Chinese-speaking Community
(11) Self-appraisal of Current Chinese Level
(12) Frequency of Using Chinese Daily.

Each subject was given an ID tag with a combination of 3 alphabet letters and 3 digits. For example, as seen in the first line of Figure 3.1.1, in the code L2EF01, L2 stands for the subject being a L2 learner of Chinese; E stands for the subject's first language as 'English'; F represents subject's gender as 'Female'; 01 represents the sequential number randomly assigned to each subject within their own group.

Table 2.3 Sample Coding for NNS's Gender, Age, Birthplace, L1 and L2

Code	**Sex**	**Age**	**Birthplace**	**Native Language**	**Other Language**
L2EF01	F	27	Dallas, US	English	Spanish, French, Chinese
L2EF02	F	21	Hereford, UK	English	Chinese

I then further divided the L2 group into 3 subgroups: Beginner, Intermediate and Advanced learners of Chinese. Criteria involved in determining the subjects' Chinese proficiency level (henceforth CPL) include the above listed criteria from (6) to (12). Under each criterion, each subject was assigned a number of either 1, 2, or 3 based on the following schemes. For criterion (6) Length of Time Studying Chinese, the dividing points, based on natural gaps, are 12 months and 24 months. Therefore, those subjects with less than 12 months' length of time studying Chinese received 1 point. Those between 12 and 24 months received 2 points and those with 24 months or more received

3 points. Based on these dividing points, there were 26 subjects who received 1 point, 13 sho received 2 points, and the rest of the 19 subjects received 3 points. The points each subject received under this criterion was classified as INDEX 1 as seen in Figure 3.1.2. This and six other INDEX points will be totaled as the final points to determine the subjects' CPL.

The INDEX 2 resulted from the criterion (7) Time First Studied Chinese. The longer ago a subject first studied Chinese, the greater number of points (1, 2, or 3) were assigned to that subject. The dividing points here are 12 months and 36 months. As such, those who first studied Chinese less than 12 months ago received 1 point, those between 12 to 36 months received 2 points, and those who started 36 months or earlier received 3 points. Of the 58 subjects, 18 of them received 1 point, 23 subjects received 2 points and 17 subjects received 3 points.

Table 2.4 Sample Coding for NNS's Length of Time Studying Chinese

Code	**LnthTmStdChns(Mth)**	**Index 1**	**MonthStChns**	**Index 2**
L2EF01	10	**1**	12.63	**2**
L2EF02	36	**6**	34.90	**3**

For the INDEX 3, the criterion (8) Hours Studied per Week is examined. Those who studied less than 10 hours per week received 1 point, those between 10 and 20 hours received 2 points, those studing more than 20 hours received 3 points. As a result, 25 subjects received 1 point, 17 subjects received 2 points and 16 subjects got 3 points.

For the INDEX 4, more weight was given to the criterion (9) Parent's First Language. Those whose parents' first language is Chinese received 3 points and others received 0 points. These extra points are added because, after talking with them, I felt that all of these subjects could speak Chinese very well, or at least could understand my Chinese perfectly. Although they might not have taken Chinese, it is apparent that their parents have a great impact on their CPL. Based on this assumption, 6 subjects received 3 points.

The criterion (10) Length of Time Living in Chinese-speaking Community provides the baseline for the INDEX 5. Those who have or had lived in a Chinese-speaking community for less than 5 months received 1 point, those between 5 to 12 months got 2 points, and those for 13 or more got 3 points. Based on this standard, there were 22 subjects received 1 point, 21 received 2 points and 15 received 3 points.

Table 2.5 Sample Coding for NNS's Hours Studied/Week, Parental Lang & Time Living in Chinese Speaking Community

Code	**HrsStdied/wk**	**Index 3**	**PrntChns?**	**Index 4**	**LngthLvng C-C(Mth)**	**Index 5**
L2EF01	10	**1**	N	0	12	**3**
L2EM01	28	**3**	Y	3	10	**2**

For the INDEX 6, we examine criterion (11) Self-appraisal of Current Chinese Level in which three levels are reported: Beginner, Intermediate, and Advanced. Assuming the assessment of their Chinese levels is fair and accurate, those assessed as Beginner received 2 points, those as Intermediate received 4 points and 6 points for those who reported as Advanced. Again, the decision to give more weight to this criterion is solely subjective based on personal observation: the subjects tended to underestimate their Chinese levels so that they can avoid potential embarrassment if their testing scores do not come out as desired. For those who reported as Intermediate or better, they tend to have a certain degree of confidence in their Chinese levels and thus should deserve more points. With such rationale, those who reported as Beginner received 2 points, those as Intermediate received 4 points and 6 points are rewarded to those who reported as Advanced. At the end, there were 23 Beginner, 24 Intermediate and 11 Advanced subjects.

For the INDEX 7, we can divide the group by examining the criterion (12) Frequency of Using Chinese Daily which is also a self-report of the subjects' judgment on their daily Chinese usage frequency. There are four levels: those who reported as Occasionally received 1 point, those as Sometimes received 2 points, those as Very Often received 3 points and those as All the Time received 4 points. The distribution of such allocation is as follows: 15 subjects reported as Occasionally, 20 as Sometimes, 17 as Very Often, and 6 as All the Time.

Table 2.6 Sample Coding for NNS's Chinese Level, Frequency Using Chinese & CPL

Code	**Chinese Level**	**Index 6**	**HwOftnSpkChns**	**Index 7**	**Final Point**	**CPL**
L2EF01	Intermediate	4	Very Often	3	**15**	2
L2EF02	Advanced	6	Very Often	3	**22**	3

Finally, with the INDEX 1 to 7 tabulated and accounted for, the scores from each INDEX are tallied as the Final Point for each subject. The final points range from 8 to 25. They are further roughly and evenly divided into three groups based on the following dividing points: those scored 13 or less points receive 1 point as true BEGINNER, those scored between 13 and 18 receive 2 points as true

INTERMEDIATE, and those scored 18 or more points receive 3 points as true ADVANCED learners. With such dividing points, there are 20 beginners, 18 intermediate learners and 20 advanced learners.

2.3.2 Coding For Comprehension Test

The coding and organization of the data from Experiment I are explained in this section. These data are all numeric and are transferred from subjects' answer sheets to a digital format stored in a spreadsheet file. In this file, several columns are created to organize the data. The first column is the subjects' ID, a unique code for each subject. These codes are coded with information that indicates subjects' first language and gender.

Table 2.7 Sample Coding for NNS's Responses on the First Two Questions in Exp. I.

ID	**I-1-1D1**	I-1-C	I-1-S	**I-2-2D1**	I-2-C	I-2-S
L2EF01	**8**	5	0	**10**	4	8
L2EF02	**1**	4	10	**10**	4	8

There are eight questions in the first experiment and each question has three columns created to store three types of information. The first column is named 'I-1-1D1' which contains the answers given by the subjects. The 'I' in this column name represents 'Experiment I'; '1' stands for 'Question #1'; '1D1' stands for '1-Dimensional Classifier Type #1'. Therefore, with such naming convention, one knows that the column 'I-6-2D2' contains subjects' selection that reflects their understanding/knowledge to a classifier appears in Experiment I, Question #6 which is used to denote 2-dimensional objects #2. The following table shows the eight classifiers appearing on the Experiment I with their corresponding Chinese characters, dimension category and the ordinal numbers assigned to them in the actual experiment.

Table 2.8 Classifiers examined with corresponding Assigned Numbers and Symbols

Question No.	Character/PinYin	Dimension	Assigned No.	Symbol
1	條/*tiáo*	1-1	1	
2	張/*zhāng*	2-1	10	
3	糰/*tuán*	3-1	2	
4	根/*gēn*	1-2	8	
5	塊/*kuài*	3-2	9	
6	片/*piàn*	2-2	7	
7	顆/*kē*	3-3	6	
8	粒/*lì*	3-4	3	
Ø	Ø	3-5	4	
Ø	Ø	3-6	5	

The second column created for each question, as seen in Table 2.9, has to do with subjects' confidence levels about their selection. This confidence levels range from '1' being 'Absolute Do Not Know' to '5' being 'Absolutely Sure'. The names for these columns are given using the following method. For example, for column 'I-3-C', 'I' stands for the Experiment I; '3' is the number 3 question within this experiment; and 'C' stands for their 'Confidence Level', as seen in Table 2.9.

Table 2.9 Sample Coding for Confidence Level in Experiment I

ID	I-1-1D1	**I-1-C**	I-1-S	I-2-2D1	**I-2-C**	I-2-S
L2EF01	8	**5**	0	10	**4**	8
L2EF02	1	**4**	10	10	**4**	8

The third column contains subjects' scores for any particular question asked in Experiment I. For example, in Figure 3.1.8, the subject L2EF01 gets a score of 10 for the question No. 7 in the Experiment I. This score of 10 was entered under the column named 'I-7-S'. The derivation of the scores for all of the subjects' eight questions is somewhat complicated and will be discussed in more detail now.

Table 2.10 Sample Coding for Performance Score in Experiment I

ID	I-7-3D3	I-7-C	**I-7-S**	I82-3D4	I-8-C	**I-8-S**
L2EF01	6	1	**10**	9	1	**0**
L2EF02	1	4	**10**	10	4	**8**

To determine this score, it was necessary to reference the L1 subjects' selections for each question. Ten L1 subjects participated in this research experiment and their answers were transferred and coded in ways similar to that of L2 subjects. Based on these L2 subjects' selections, a decision was made as to how many points any given selection was worth. For example, in I-1-1D1, all of the L1 subjects' selection is '1'. That gives this selection '1' a 10-point score and all other nine possible selections would be worth 0 points.

For another example, as seen in Table 2.11, in column I-2-2D1, there were 8 out of 10 L1 subjects who selected No. 10 and the rest of 2 subjects chose No. 7 as their answer. No other selection was made for this question by the L1 subjects. Therefore, for L2 subjects' selections in I-2-2D1, if their selection was No. 10, they would receive a score of 8; they received 2 points if their selection was No. 7; and they received 0 points if their selections were any of the other eight possible selections.

Table 2.11 Sample Final Score for individual classifier in Experiment I

ID	**I-1-1D1**	I-1-S	**I-2-2D1**	I-2-S
L1CF01	**1**	10	**10**	8
L1CF02	**1**	10	**7**	2
L1CF03	**1**	10	**10**	8
L1CF04	**1**	10	**10**	8
L1CF05	**1**	10	**7**	2
L1CF06	**1**	10	**10**	8
L1CM01	**1**	10	**10**	8
L1CM02	**1**	10	**10**	8
L1CM03	**1**	10	**10**	8
L1CM04	**1**	10	**10**	8

Finally, as seen in Table 2.12, two columns were created to sum up the subjects' total points and their score in percentage of total possible points for Experiment I. The names for these two columns are 'I-Score' and 'I-%' respectively.

Table 2.12 Sample Final Total Score and Percentage in Experiment I

ID	I-Score	I-%
L2EM02	23	31
L2EM03	18	24

2.3.3 Coding For Production Test

The task in the second experiment examined subjects' ability to produce Chinese classifiers. Their production forms were either in Chinese characters or in Pinyin. Since the experiment was not concerned about their ability to produce correct characters or Pinyin, either form was considered a valid answer. However, their answers needed to be coded into numeric form for statistical analysis. For this purpose, a word list was created which contained information necessary to first encode the answers into numeric form and later decode the numeric ones back to original answers. Following is the list which shows the Token Number, Character, and Pinyin for each answer found in the subjects' responses. There are 49 tokens found in this experiment.

Table 2.13 Tokens by L2 listed by Token # with corresponding character/Pinyin

Token #	Word/Character	Pinyin
1	個	*ge*
2	輛	*liàng*
3	台	*tái*
4	部	*bù*
5	條	*tiáo*
6	把	*bǎ*
7	支	*zhī*
8	根	*gēn*
9	張	*zhāng*
10	座	*zuò*
11	套	*tào*
12	架	*jià*
13	隻	*zhī*
14	枝	*zhī*
15	只/支	*zhǐ*
16	匹	*pǐ*
17	件	*jiàn*
18	場	*chǎng*
19	次	*cì*
20	陣	*zhèn*
21	事	*shì*
22	案	*àn*

Table 2.13 – *Continued*

23	塊	*kuài*
24	回	*huí*
25	雙	*shuāng*
26	位	*wèi*
27	人	*rén*
28	名	*míng*
39	項	*dǐng*
40	筆	*bǐ*
41	糰	*tuán*
42	顆	*Kē*
43	片	*piàn*
44	粒	*lì*
45	圓錐	*yuánzhuī*
46	錐	*zhuī*
47	屋	*wū*
48	樁	*zhuāng*
49	起	*qǐ*

In this experiment, the subjects provided 49 different classifiers. They were recorded numerically into a SPSS file and then two additional columns were created to record additional information. The first column contains the subjects' confidence level for each answer; the second column recorded their production form for each answer. The following table is a portion of the actual SPSS file that shows three subjects' answers for question No. 1 and their confidence level 'II-1FUNC-C', production form 'II-1FUNC-F' as well as the scores they earned for this question which is under 'II-1FUNC-S'. Note that the 'FUNC' in the column names refers to the classifier under discussion is a FUNCTION classifier; the 'C' stands for 'Confidence Level; the 'F' stands for 'Form'; and the 'S' stands for 'Score'.

Table 2.14 Sample Coding for Confidence Level
and individual classifier score in Experiment II

ID	II-1FUNC/Token #	II-1FUNC-C	II-1FUNC-F	II-1FUNC-S
L2EF01	輛/2	5	Character	9
L2EF08	個/1	1	Character	0
L2EM08	台/3	5	Pinyin	1

The content of the first three columns is very straightforward. What needed to be explained in detail is the derivation for the 'II-1FUNC-S' column. Similar to the scoring method used in the first experiment, the base scores for this column were obtained from native speakers' responses. For example, for question No. 1, nine L1 speakers responded with the character 輛 while only one subject wrote 台 as seen in Table 3.3.2. Therefore, for this question No. 1, NNSs scored 9 points if their answer was 輛, they received 1 point if their answer was 台 and 0 points for any other responses, as seen in Table 2.14.

By the same token, for question No. 5, 8 L1 subjects produced 匹 and the rest of 2 subjects wrote 隻 as their answers. Therefore, L2 subjects' production would be scored according to these base scores. Using this scoring procedure, a column was added for each question to store the scores earned by the subjects for each question. As shown below Table 2.15, records four aspects of subjects' responses for question No. 1: token/token #, confidence level, production form and score.

Table 2.15 Sample Responses & Scored by L1 Subjects

ID	II-1	II-1-S	II-5	II-5-S
L1CF01	輛	9	匹	8
L1CF02	台	1	隻	2
L1CF03	輛	9	匹	8
L1CF04	輛	9	匹	8
L1CF05	輛	9	匹	8
L1CF06	輛	9	匹	8
L1CM01	輛	9	匹	8
L1CM02	輛	9	匹	8
L1CM03	輛	9	隻	2
L1CM04	輛	9	匹	8

After the scores for each question were calculated and recorded, I grouped the scores that belong to the same type of classifiers together and their average scores were recorded in another column. In this experiment, three cognitive categories of classifiers were tested: ANIMACY, FUNCTION and EVENT. Within each group, there were three types of ANIMACY classifiers, four types of FUNCTION classifiers and three types of EVENT classifiers. The total possible points for ANIMACY, FUNCTION and EVENT were 28, 38, and 21 respectively. The grand total possible score for these three groups was 87. The following Table 2.16 shows the grouped and then averaged scores for the three types of classifier by three L2 subjects and their total scores as well as their percentage of points earned.

Table 2.16 Sample scores grouped by types produced by L2 subjects

ID	Animacy	ANIAVE	Function	FUNAVE	Event	EVEAVE	Total	%
L2EF01	20	7	19	5	6	2	45	52
L2EF02	18	6	29	7	0	0	47	54
L2EF03	10	3	9	2	0	0	19	22

2.3.4 Coding For Prototype Test

The third experiment examined subjects' ability to produce names for objects denoted by five Chinese classifiers. Not only they were asked to produce the names of these objects, they were also required to organize these objects in an order based on their judgment of the objects' typicality level for a certain classifier group. These two types of answers were written in two different spaces. Space A was for answers randomly produced while Space B recorded answers based on typicality levels. Each question had two spaces in which up to five responses were allowed in each space.

Since the test was not concerned about subjects' ability to produce the correct forms of Chinese characters, the answers were allowed to be given in the following four forms: Chinese characters, Chinese Pinyin, English alphabets, and Korean characters. Also, blank responses were allowed as well if the subjects could not produce an answer.

To record the answer, each of these answer tokens was transferred and recorded in a column in a spreadsheet file. Next to this column, another column was created to record the form of the answer token. Five numbers were assigned to represent the five possible forms: 1, 2, 3, and 4 each represented Chinese character, Chinese Pinyin, English letter, and Korean characters respectively. When there was no answer given, a 0 was assigned to that spot.

The following table illustrates how the data were organized and recorded. The first column is the subjects' ID. The second column is named 'III-1-A-3a' which stands for the third experiment, questions No. 1, Space A, the third response and its original form. The third column, III-1-A-3b, is identical to the second column in terms of the order of the responses that appeared in the answer sheet. The difference is that it recorded the form of that particular response.

Using this convention, as seen in Table 2.17 column III-1-A-2a, subject L2EF02 wrote 狗 'dog' as her response for the 2nd spot in Space A of No. 1 question in Experiment III. The production form for this response was 1, which was Chinese character as seen in column III-1-A-2b. Her 2nd response for the same question in Space B was 線 'string' produced in Chinese character as well.

Table 2.17 Sample production and production form

ID	III-1-A-2a	III-1-A-2b	III-1-B-2a	III-1-B-2b
L2EF02	狗	1	線	1
L2EF03	kuzi	2	魚	1

CHAPTER 3

RESULTS

This chapter presents a statistical analysis of the coded data drawn from the three experiments by the L2 subjects. The analysis for Experiment I will be discussed first, followed by Experiment II and then Experiment III. The purpose of this data analysis is to describe and analyze the data so they become informative and can eventually provide answers to the research questions set forth in Chapter One.

3.1 Experiment I – Classifier Comprehension Test

3.1.1 Measures of Frequency

To show how often a particular selection was made by both of the L1 and L2 subjects in Experiment I, measures of frequency for each of the eight classifiers are presented and described here. For each classifier question, I will first describe the L1 subjects' selections and then those of the L2 subjects' before moving on to the next classifier question. For each classifier, the data will be presented with a table and a distribution graph that summarize the frequency information.

3.1.1.1 Frequency and Percentage of CL-條 *tiáo*

The classifier 條 *tiáo* is used to denote objects that are one dimensional, slender and flexible. Sample objects that can be denoted by this classifier are snake, rope, river, belt, and so on. Table 3.1 and Figure 3.1 show that while all L1 subjects chose object #1

 as the appropriate object that should collocate with the classifier 條 *tiáo*, only 57% of L2 subject made this selection. The shape of this object #1  is one-dimensional with slender and smooth curves that resembles a snake.

Table 3.1 Selection Frequency and Percentage for CL-條 *tiáo* by L1 & L2 Subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Selection No.	F2	%2	F1	%1
1	33	56.90	10	100
4	1	1.70	N/A	N/A
5	1	1.70	N/A	N/A
7	1	1.70	N/A	N/A
8	18	31.00	N/A	N/A
9	3	5.20	N/A	N/A
10	1	1.70	N/A	N/A

Next to this object #1 , the second most chosen object by L2 subjects was object #8 due to its one dimensional and slender shape. However, this object does not curve like object #1  but has a straight and rigid shape. Close to 1/3 of L2 subjects picked this object which indicated their incomplete understanding of the semantic function of the classifier 條 *tiáo*. However, their understanding of this classifier was much better than those who chose objects other than #1  or #8 . If the object #1  were removed from the selection pool, object #8 would be the best and acceptable choice. In fact, many L1 subjects first chose #8 as their selection but changed to object #1  after they made some efforts to distinguish the differences between these two options.

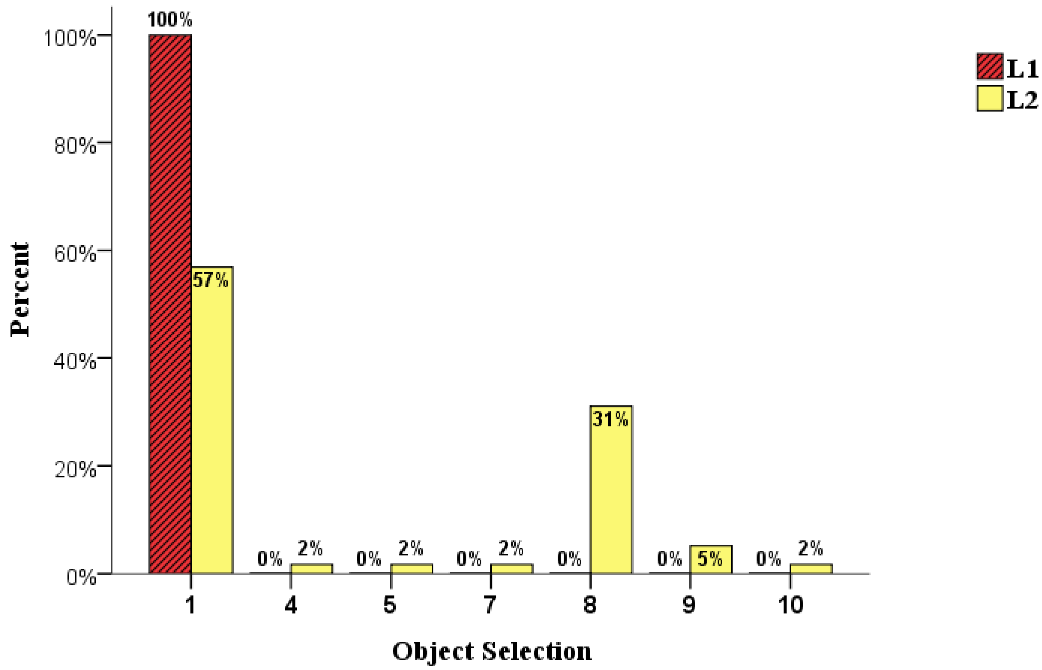


Figure 3.1 Selection Frequency for CL-條 *tiáo* by L1 & L2 subjects

3.1.1.2 Frequency and Percentage of CL- 張 *zhāng*

The second question asked the subjects to choose an object that can collocate with the classifier 張 *zhāng* which denotes objects that are two dimensional and flat with a regular shape. Typical objects in this category are printing paper, business cards, napkins and so on. Those that are two dimensional and flat but do not have a regular shape belong to another category denoted by a classifier 片 *piàn* which will be discussed later in this section. Although the difference is very subtle, they are usually not interchangeable especially with those familiar objects. With less familiar objects that are two dimensional and flat, whether it has a regular shape or not, the use of 張 *zhāng* or 片 *piàn* is both acceptable.

For this classifier, due to the subtle difference just discussed, 80% of L1 subjects chose object #10  and 20% of them chose object #7  as being appropriate. No other objects were considered acceptable as being denoted by this classifier. This confirmed the statement just described earlier that with less familiar objects, which is the case here, using either 張 *zhāng* or 片 *piàn* is possible. However, the majority of the L1 subjects preferred object #10  that has a regular shape over object #7 that has an irregular shape.

Table 3.2 Selection Frequency & Percentage for CL- 張 *zhāng* by L1 & L2 Subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Selection No.	F2	%2	F1	%1
1	2	3.40	N/A	N/A
7	10	17.20	2	20
8	1	1.70	N/A	N/A
9	1	1.70	N/A	N/A
10	44	75.90	8	80

For L2 subjects, as seen in Table 3.2 and Figure 3.2 above, their selections were almost identical to L2 subjects' selections. This showed that they had an excellent understanding of the semantic meanings of the classifier 張 *zhāng*. It is evident that they knew that for the classifier 張 *zhāng*, the best object that could collocate with it is object #10  followed by object #7 . Less than 8% of L2 subjects chose other objects that were either one or three dimensional, which indicated their total lack of understanding of the semantic meanings of this classifier 張 *zhāng*.

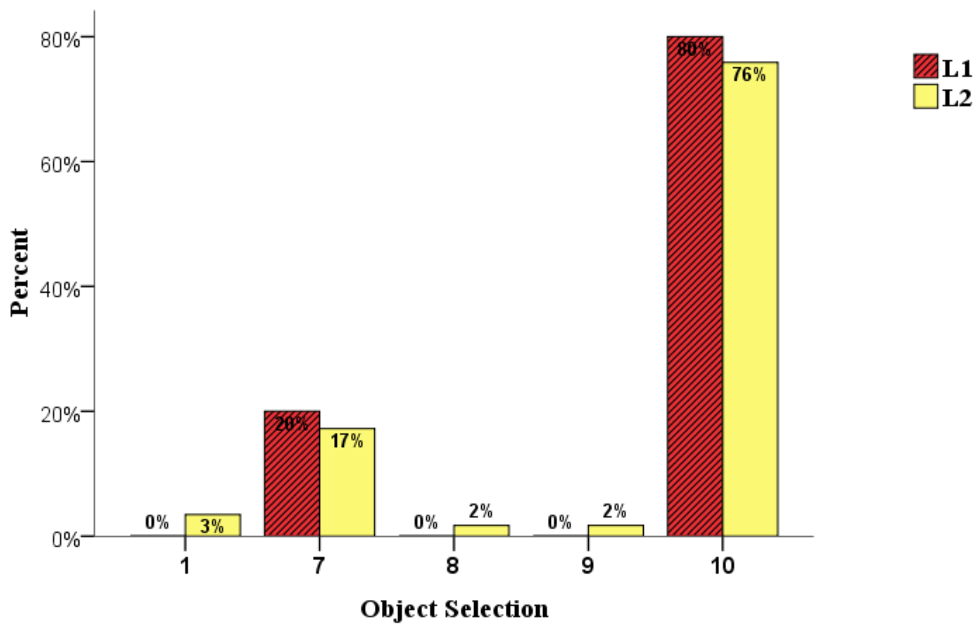


Figure 3.2 Selection Frequency for CL- 張 *zhāng* by L1 & L2 subjects

3.1.1.3 Frequency and Percentage of CL- 糰 *tuán*

The next question examined the classifier 糰 *tuán*, which collocates with objects that are three dimensional with a soft and mushy quality. In this experiment, the object #2  has a three dimensional, round and irregular shape. Since it was made of clay, it was hard in texture after it was dried. However, with its appearance described above, it should still be the best choice for this classifier 糰 *tuán*, especially when compared with other objects presented in this experiment.

Typical objects for this classifier 糰 *tuán* are flour dough, a ball of yarn or cotton. Objects that are three dimensional and round but are not, or do not appear to be, soft or mushy in quality do not belong to this category but should collocate with another three types of classifiers, e.g., 塊 *kuài*, 顆 *kē*, or 粒 *lì*, which will also appear later in this experiment.

Table 3.3 Selection Frequency and Percentage for CL- 糰 *tuán* by L1 & L2 Subjects

All L2 (*N*=58)		All L1 (*N*=10)		
Selection No.	F2	%2	F1	%1
1	1	1.70	N/A	N/A
2	21	36.20	10	100
3	2	3.40	N/A	N/A
4	2	3.40	N/A	N/A
5	4	6.90	N/A	N/A
6	13	22.40	N/A	N/A
7	2	3.40	N/A	N/A
8	1	1.70	N/A	N/A
9	11	19.00	N/A	N/A
10	1	1.70	N/A	N/A

As seen in Table 3.3 and Figure 3.3, all of the L1 subjects chose object #2  as the best object to collocate with the classifier 糰 *tuán*. This not only indicates their uniform understanding of the semantic meanings of this classfier 糰 *tuán* but also confirms my earlier statement about this object #2  -- that it should be the best choice although its actual texture was not soft or mushy. The appearance alone provided enough information for L1 subjects to make the correct selection.

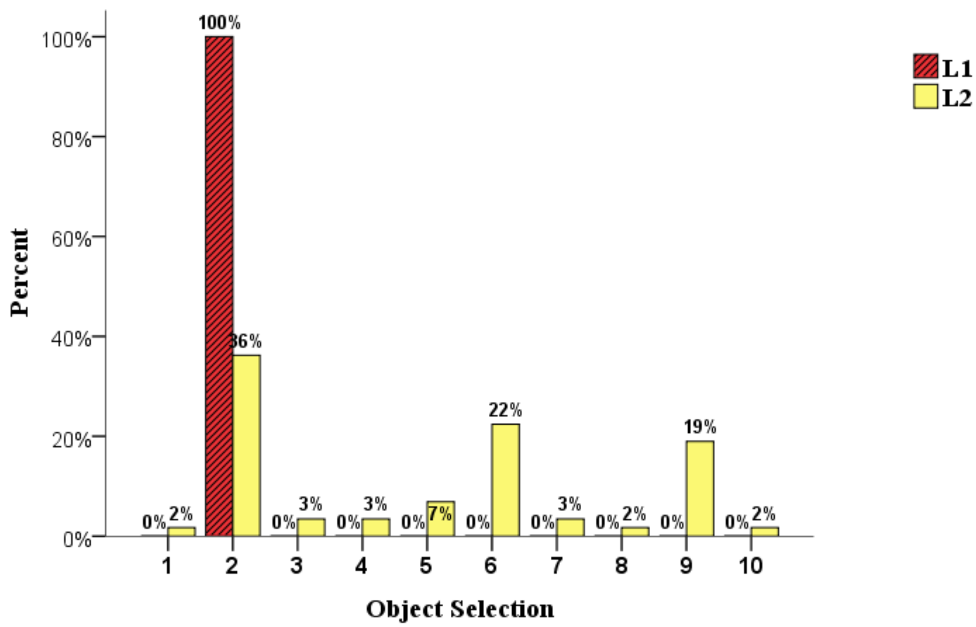


Figure 3.3 Selection Frequency for CL- 糰 *tuán* by L1 & L2 subjects

However, the L2 subjects' selections were not so uniform. Only about 40% of them made the selection of object #2 as their answers. The other 40% chose object #6 and object #9, which are three-dimensional but with a regular shape and which are not soft or mushy in texture and appearance. This showed their partial understanding of the semantic meanings of this classifier 糰 *tuán*. They knew that it denotes objects that are three dimensional but were not certain or did not know how to differentiate the differences between objects denoted by 糰 *tuán* and those three dimensional objects denoted by classifiers 塊 *kuài*, 顆 *kē*, or 粒 *lì*. These latter three types of classifiers will be discussed later in this section. The rest of 20% of the L2 subjects chose randomly, which indicated their total lack of understanding of the semantic meanings of this classifier 糰 *tuán*.

3.1.1.4 Frequency and Percentage of CL- 根 *gēn*

The fourth question asked about subjects' understanding of the semantic meanings of the classifier 根 *gēn*. Similar to the objects denoted by the classifier 條 *tiáo*, the objects denoted by the classifier 根 *gēn* are two-dimensional as well. However, these objects have to be rigid and straight both in texture and appearance in order to be denoted by the classifier 根 *gēn*. Sample objects are a cigarette, a baton, a finger and so on. If these objects were collocated with the classifier 條 *tiáo*, which denotes two dimensional but flexible and curving objects, it would be deemed as inappropriate in most cases by native speakers.

Table 3.4 Selection Frequency and Percentage for CL- 根 *gēn* by L1 & L2 Subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Selection No.	F2	%2	F1	%1
1	3	5.20	N/A	N/A
2	5	8.60	N/A	N/A
3	4	6.90	N/A	N/A
4	10	17.20	N/A	N/A
5	8	13.80	N/A	N/A
6	4	6.90	N/A	N/A
7	1	1.70	N/A	N/A
8	20	34.50	10	100
9	3	5.20	N/A	N/A

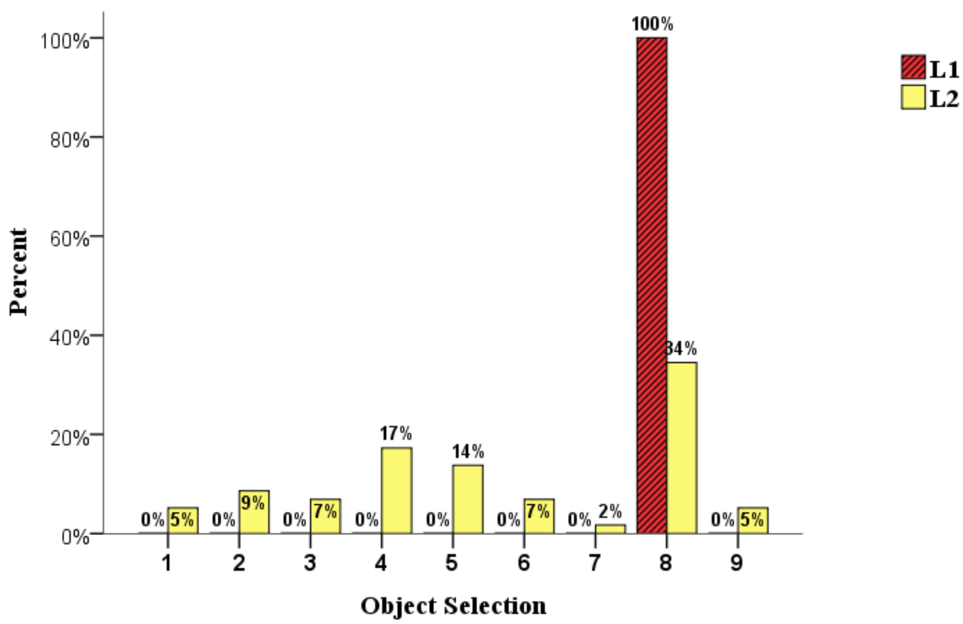


Figure 3.4 Selection Frequency for CL- 根 *gēn* by L1 & L2 subject

Just as expected, as seen in Table 3.4 and Figure 3.4, all L1 subjects chose object #8 as the best object to collocate with this classifier 根 *gēn*. However, L2 subjects' responses were not so definite. Only about 1/3 of them chose object #8 as their answer. Another 1/3 of them chose either object #4 or #5. These two objects were created and presented in this experiment as decoys to prevent subjects from guessing the answers. Their shapes were cylindrical for object #4 and irregular three-dimensional for object #5. The object #4 looked like a finger-sized carrot which was a possible cause for L2 subjects to pick it as the correct answer. To understand this, it is necessary to talk about the original meaning of this classifier 根 *gēn*.

By itself, this character 根 *gēn* means the root of plants. Since the object #4 looked like a carrot, which is the root of carrot plant, it is then logical to assume that L2 subjects connected the appearance of this object with the meaning of this character 根 *gēn* and consequently made such selection. Those who chose #5 also tapped some of the qualities of the referent correct. But the last 1/3 of the L2 subjects chose other objects that showed their total lack of understanding of the semantic meanings of this classifier 根 *gēn*.

3.1.1.5 Frequency and Percentage of CL- 塊 *kuài*

The next classifier 塊 *kuài* denotes objects that are three-dimensional with a square or cubic shape. For example, typical objects for this category are a sugar cube, a block of tofu, a brick and so on. Furthermore, objects that are three-dimensional with an irregular shape can be denoted by this classifier as well, e.g., a chunk of meat, an island and a rock. Finally, it can also denote less typical objects that are two-dimensional such as land, a wood or iron board, and a handkerchief. It should be noted that, whether two- or three-dimensional, these objects usually need to have a cubic or square shape with sharp edges in order to be denoted by this classifier 塊 *kuài*.

Table 3.5 Selection Frequency and Percentage for CL- 塊 *kuài* by L1 & L2 Subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Selection No.	F2	%2	F1	%1
1	1	1.70	N/A	N/A
2	13	22.40	N/A	N/A
3	8	13.80	N/A	N/A
4	5	8.60	1	10
5	2	3.40	N/A	N/A
6	3	5.20	N/A	N/A
7	2	3.40	N/A	N/A
8	2	3.40	N/A	N/A
9	22	37.90	8	80
10	N/A	N/A	1	10

Because of this ambiguity, it is expected that we will see subjects pick two-dimensional objects with a square shape as their appropriate answer. As seen in Table 3.5 and Figure 3.5, one of the ten L1 subjects did show such variation. While the other nine L1 subjects chose object #9  as their appropriate answer, one L1 subject chose object #4 instead. As discussed earlier, this object #4 was a decoy and had an irregular three-dimensional shape. It was selected here partially due to the fact that the classifier 塊 *kuài* could be used to denote objects such as object #4. Nonetheless, the rest of nine L1 subjects did choose object #9  as the most appropriate item to collocate with this classifier 塊 *kuài*.

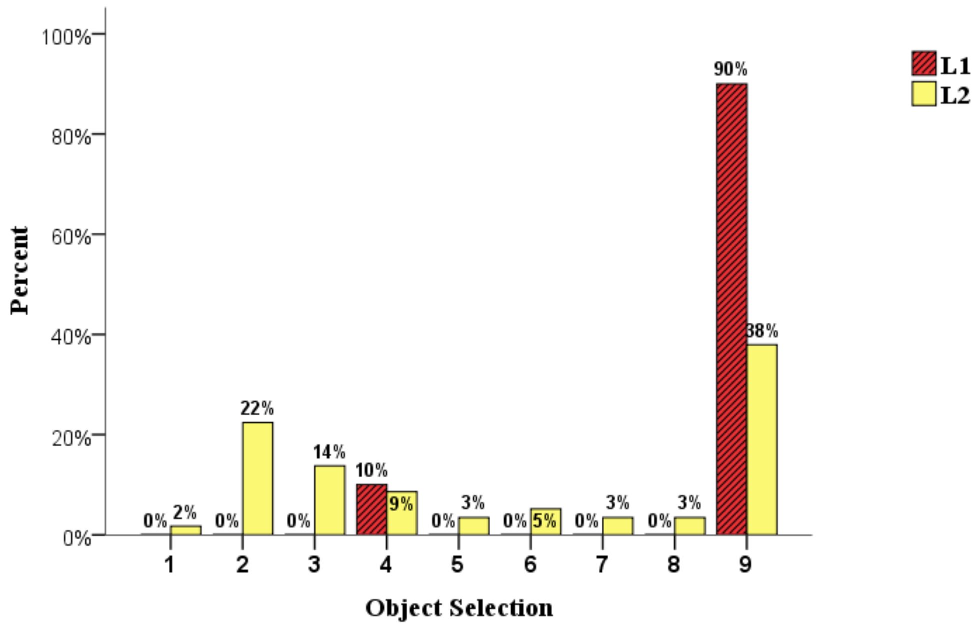


Figure 3.5 Selection Frequency for CL- 塊 *kuài* by L1 & L2 subject

As for the L2 subjects, their selections were once again more widely distributed than their L1 counterparts. Close to 40% of the L2 subjects chose object #9  while about 1/5 of them chose object #2  as their choices. This object #2  is three-dimensional but does not have a square or cubic shape. By native speaker standards, it could not be considered as a correct answer in this experiment. This and other selections by these L2 subjects showed their lack of understanding of the semantic meanings of this classifier 塊 *kuài*.

3.1.1.6 Frequency and Percentage of CL- 片 *piàn*

The sixth question examined subjects' understanding of the classifier 片 *piàn*. It was used to denote objects with a two-dimensional and irregular shape. As discussed earlier, the classifier 張 *zhāng* also denotes two-dimensional objects but with a regular shape, such as object #10  in this experiment. Objects that can be denoted by this classifier 片 *piàn* are a tree leaf, open and flat land, a slice of bread and so on. Note that the classifier 片 *piàn* is more inclusive than the classifier 張 *zhāng*. While most objects denoted by the classifier 張 *zhāng* could also be denoted by the classifier 片 *piàn*, however, not every object denoted by the classifier 片 *piàn* could be denoted by the classifier 張 *zhāng*. For example, for 紙 'paper', one could say either 一張紙 or 一片紙, both mean 'a piece of paper', although the former is more acceptable than the latter. However, for 樹葉 'tree leaf', one could only say 一片樹葉 'a piece of tree leaf', but never *一張樹葉. Thus, due to the inclusiveness of this classifier 片 *piàn*, it is expected to see subjects to pick either object #10  with a regular shape or object #7  with an irregular shape to be an object that could collocate with this classifier 片 *piàn*. Both selections are acceptable if they stand alone. However, in this experiment, since they were presented at the same time, the object #7  is more appropriate for this classifier 片 *piàn* than the object #10  which is more appropriate for the classifier 張 *zhāng*.

Table 3.6 Selection Frequency and Percentage for CL- 片 *piàn* by L1 & L2 Subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Selection No.	F2	%2	F1	%1
1	3	5.20	N/A	N/A
5	2	3.40	N/A	N/A
7	39	67.20	8	80
8	2	3.40	N/A	N/A
9	1	1.70	N/A	N/A
10	11	19.00	2	20

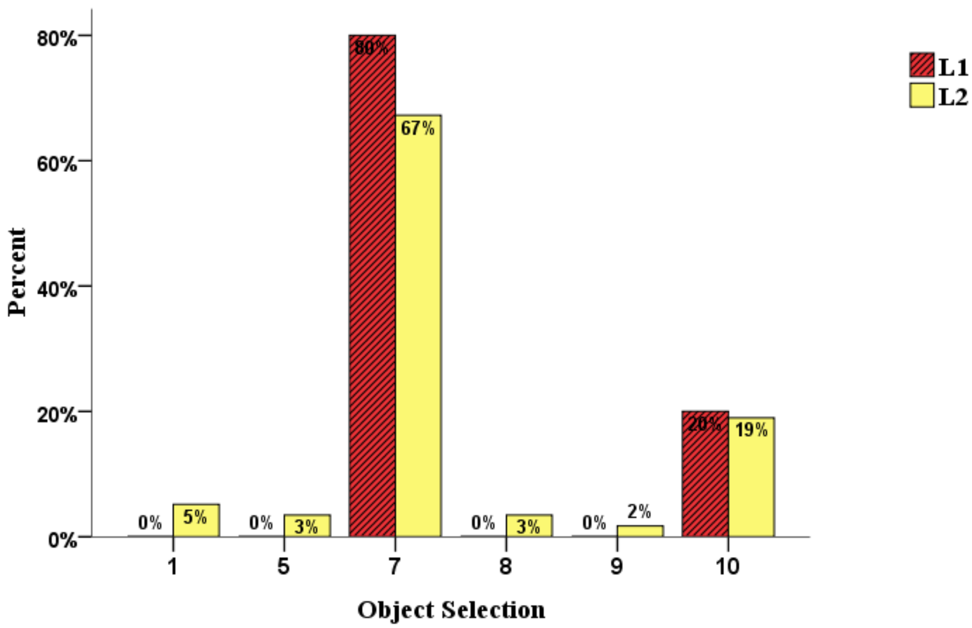


Figure 3.6 Selection Frequency for CL- 片 *piàn* by L1 & L2 subject

As can be seen in Table 3.6 and Figure 3.6, all of the L1 subjects chose objects that are two-dimensional. The most chosen one (80%) was object #7  while 20% of them chose object #10  as their answer. This complies with the above assessment that, for the classifier 片 *piàn*, objects that were two-dimensional with an irregular shape, such as object #7 , would be the best selection while objects that were also two-dimensional but with a regular shape, such as object #10 , would be acceptable but not most appropriate. No other object was chosen by the L1 subjects for this classifier 片 *piàn*.

The L2 subjects' selection pattern is very similar to their L1 counterparts' selection pattern. Close to 70% of the L2 subjects chose object #7  as their answer while about 20% of them chose object #10 . This showed that the great majority of them at least knew that, for this classifier 片 *piàn*, only those objects that were two-dimensional could be considered. Furthermore, the majority of this group of subjects knew object #7  would be a better selection than object #10  due to its irregular shape. They showed a good understanding of the semantic meanings of the classifier 片 *piàn*. On the other hand, more than 10% of the L2 subjects chose other objects that are not two dimensional, which indicated their lack of understanding of this classifier 片 *piàn*.

3.1.1.7 Frequency and Percentage of CL- 顆 *kē*

The next question dealt with subjects' understanding of the classifier 顆 *kē*. This classifier denotes objects that are three dimensional with a round shape. Typical objects for this category are a watermelon, a basketball, a planet and so on. The major different characteristics for this group of objects compared to those denoted by the classifier 糰 *tuán* discussed earlier are that 1) the shape of the former is round while the for the latter it is more irregular; 2) the texture or quality of the former are solid and hard while the latter ones were soft or mushy. Also, there is another classifier 粒 *lì* that denotes objects that are three-dimensional with a round and regular shape as well. However, these are the objects that are relatively smaller than those denoted by the classifier 顆 *kē*. There is no strict and definite guideline that governs the selection of classifiers between these classifiers 顆 *kē* and 粒 *lì* when facing objects that are three-dimensional with a round shape. However, when these classifiers are compared side by side, native speakers would opt for 顆 *kē* over 粒 *lì* when the denoted objects are bigger ones and vice versa. As a result, we would expect to see subjects choosing these two types of objects, object #6 ● or object #3 ●, as their answer in this experiment.

Table 3.7 Selection Frequency and Percentage for CL- 顆 *kē* by L1 & L2 Subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Selection No.	F2	%2	F1	%1
1	2	3.40	N/A	N/A
2	4	6.90	N/A	N/A
3	13	22.40	N/A	N/A
4	9	15.50	N/A	N/A
5	8	12.80	N/A	N/A
6	15	25.90	6	100
7	1	1.70	N/A	N/A
8	3	5.20	N/A	N/A
9	3	5.20	N/A	N/A

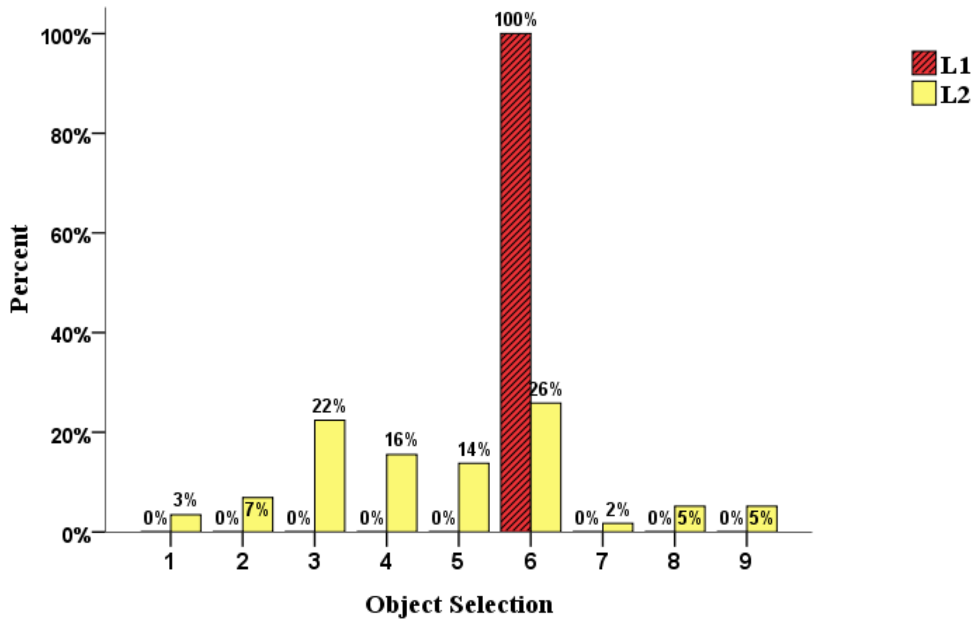


Figure 3.7 Selection Frequency for CL- 顆 *kē* by L1 & L2 subject

However, L1 subjects were unexpectedly unanimous about the semantic meaning of this classifier 顆 *kē*. As seen in table 3.7 and Figure 3.7, L1 subjects' selection showed their solid understanding of the difference between the classifiers 顆 *kē* and 粒 *lì* by choosing object #6 ● but no other selection for the classifier 顆 *kē*. This is further confirmed by their sole selection of object #3 ● as the best answer for the next question that examined the semantic meanings of the classifier 粒 *lì*. Once again, their choices supported the earlier statement that the use of the classifiers 顆 *kē* and 粒 *lì* is interchangeable but when certain circumstances arise, one option is preferred over the other and native speakers are clear about the differences.

This intuition of distinguishing the differences between the classifier 顆 *kē* and 粒 *lì* is not so undivided for L2 subjects. They were quite uncertain about choosing the appropriate object for this classifier 顆 *kē*. This is evidenced by the fact that the percentage of L2 subjects who chose object #3 ● (22%) was almost the same as those who chose object #6 ● (26%). Together, they made up of about ½ of the entire L2 subject pool. That means only one half of the L2 subjects knew that the classifier 顆 *kē* should collocate with objects that were three-dimensional with a round shape. Only another one half of this group of subjects had a solid understanding that only the bigger object #6 ● was a better choice than the smaller object #3 ●.

Finally, about one third of the L2 subjects chose objects #4 and #5 as their selections. These objects were made to be decoys for this experiment and were both three-dimensional with a partially round shape. It may be this partially round shape that prompted L2 subjects to choose these two objects. The rest of the L2 subjects seemed to make their selections randomly, which showed their lack of understanding of the semantic meaning of this classifier 顆 *kē*.

3.1.1.8 Frequency and Percentage of CL- 粒 *lì*

The last question in this first experiment examined subjects' understanding of the classifier 粒 *lì*. As discussed above, this classifier denotes objects that are three-dimensional with a round shape and with a smaller size compared to those denoted by the classifier 顆 *kē*. Some typical objects that fall under this category are rice, pearls, beans and so on. Although the use of these classifier 顆 *kē* and 粒 *lì* is usually interchangeable, it is normal to see that smaller objects be denoted by the classifier 顆 *kē* but it is rare or unusual to see bigger objects being denoted by the classifier 粒 *lì*. For example, it is appropriate to say either 一顆葡萄 or 一粒葡萄 'a grape' but it would be odd to say *一粒行星 'a planet' in normal speech. In this case, 一顆行星 'a planet' will be more appropriate since the denoted object 行星 'planet' is a rather big object. As such, the classifier 顆 *kē* is said to be more inclusive than its counterpart 粒 *lì* in terms of denoting three dimensional round objects.

Table 3.8 Selection Frequency and Percentage for CL- 粒 *lì* by L1 & L2 Subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Selection No.	F2	%2	F1	%1
1	6	10.30	N/A	N/A
2	5	8.60	N/A	N/A
3	16	27.60	10	100
4	4	6.90	N/A	N/A
5	7	12.10	N/A	N/A
6	9	15.50	N/A	N/A
7	1	5.20	N/A	N/A
8	3	5.20	N/A	N/A
9	7	12.10	N/A	N/A
10	1	1.70	N/A	N/A

As seen in Table 3.8 and Figure 3.8, the L1 subjects showed a high level uniformity of interpreting the semantic meanings of this classifier 粒 *lì*. All of them chose object #3 ● as the answer that should be denoted by 粒 *lì*. Their selections for this classifier 粒 *lì* and the previous selection of object #6 顆 *kē* for the classifier 顆 *kē* effectively disambiguated the overlapping notion of these two classifiers previously discussed. That is, although the use of these two classifiers is sometimes interchangeable, however, when they are compared side by side, the classifier 顆 *kē* should denote objects that are relatively larger than those denoted by the classifier 粒 *lì*.

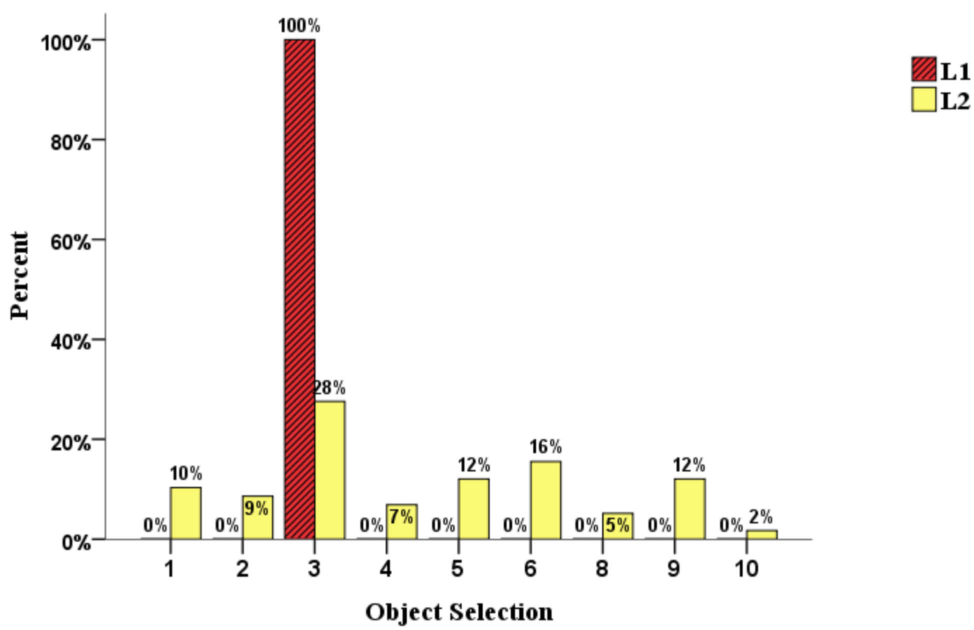


Figure 3.8 Selection Frequency for CL- 粒 *lì* by L1 & L2 subject

Again, on the other hand, the L2 subjects' selections were not so uniform or accurate. Only close to 1/3 of them chose object #3  as their answer. The second most chosen object was object #6  with only 16% of the total L2 subject population. Combining those that chose object #3  or object #6 , less than 40% of L2 subjects knew that this classifier 粒 *lì* denotes objects that are three dimensional with a round shape. The rest of them chose other types of objects that are not three-dimensional suggesting their lack of understanding of the semantic meanings of this classifier 粒 *lì*.

3.1.2 Correlation Between CPL and Performance

After examining the frequencies of both L1 and L2 subjects' selections on these either classifiers, I would like to talk about the correlation between L2 subjects' CPL (Chinese Proficiency Level) and their performance in this experiment. The correlation will be first analyzed using the entire L2 subject population as a whole. Then, the subject pool will be grouped based on their first languages and their CPL. Finally, adding an extra dimension of analysis, their performances are analyzed by the dimension of the classifiers in question. How different groups of subjects performed with different types of classifiers at different stages will be discussed later in this section. I will first start by examining the correlation between the L2 subjects' CPL and their performance as a whole.

3.1.2.1 Correlation Between L2 CPL and Performance in General

As seen in Figure 3.9 below, the scattered plot shows the relationship between the subject's CPL and their experiment scores. Clearly, there is a positive relationship observed between these two variables. The higher the Chinese proficiency level they have, the better they perform. This trend is similar to the trend found in the literature showing that L1 children's performance correlates positively with their ages and cognitive development. The pedagogical implication we can draw from this result is that teachers should teach classifiers to beginners with greater efforts than to more advanced learners.

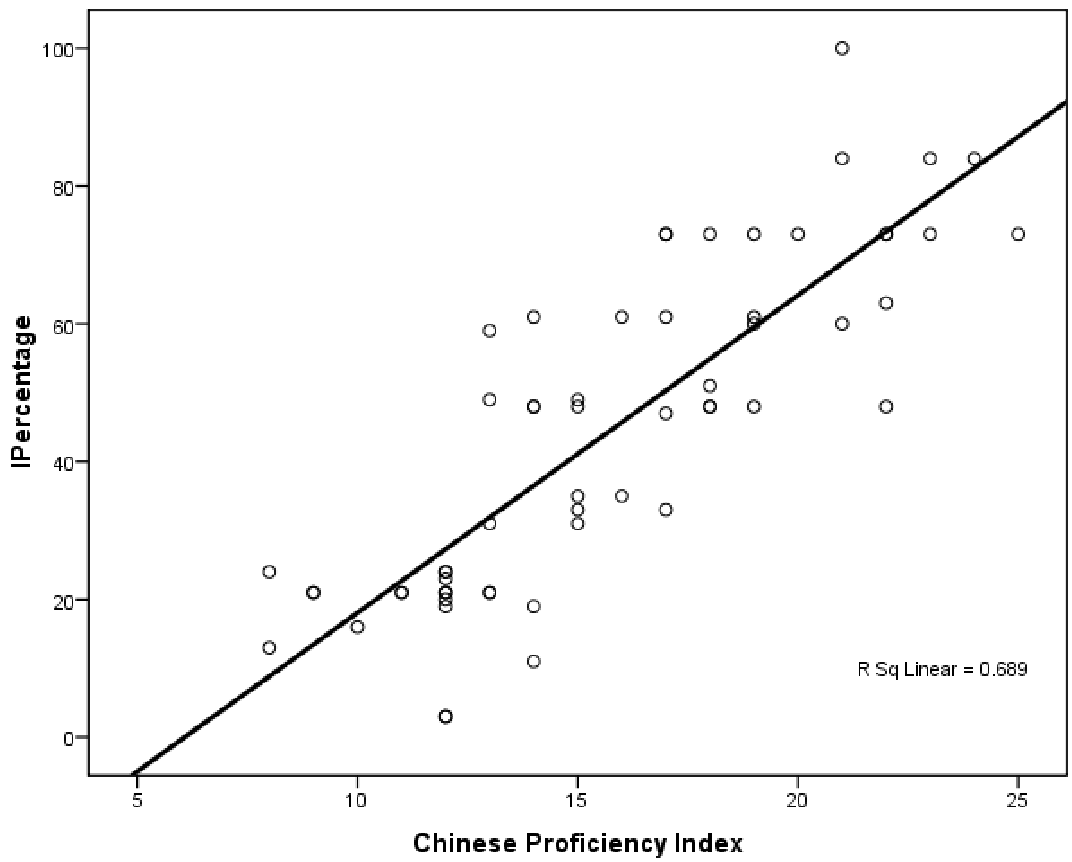


Figure 3.9 Correlation Between L2 CPL and Performance

3.1.2.2 Correlation Between L2 CPL and Performance with Groups Divided by 1st Languages

Next, when the subject group is divided into two subgroups, English and Korean, the previously observed trend remains with some variation. As seen in the Figure 3.10 below, 1) Korean Novice and Advanced subjects do better than their English counterparts, but the difference is quite minimal; 2) English Intermediate subjects unexpectedly outperformed their Korean counterparts. Since Korean is a classifier language and English is not, one would logically assume that Korean subjects should perform much better throughout the three levels. However, the data show otherwise. Not only did Korean intermediate subjects perform substantially worse than their English counterparts, the other two groups outperformed their English counterparts only minimally. The differences were not significant at the novice and advanced levels: between novice Korean and English-speaking groups, the p-value was 0.4615; between advanced Korean and English groups, the p-value was 0.6452. For the intermediate Korean and English groups, the difference was quite significant with a p-value of 0.0027.

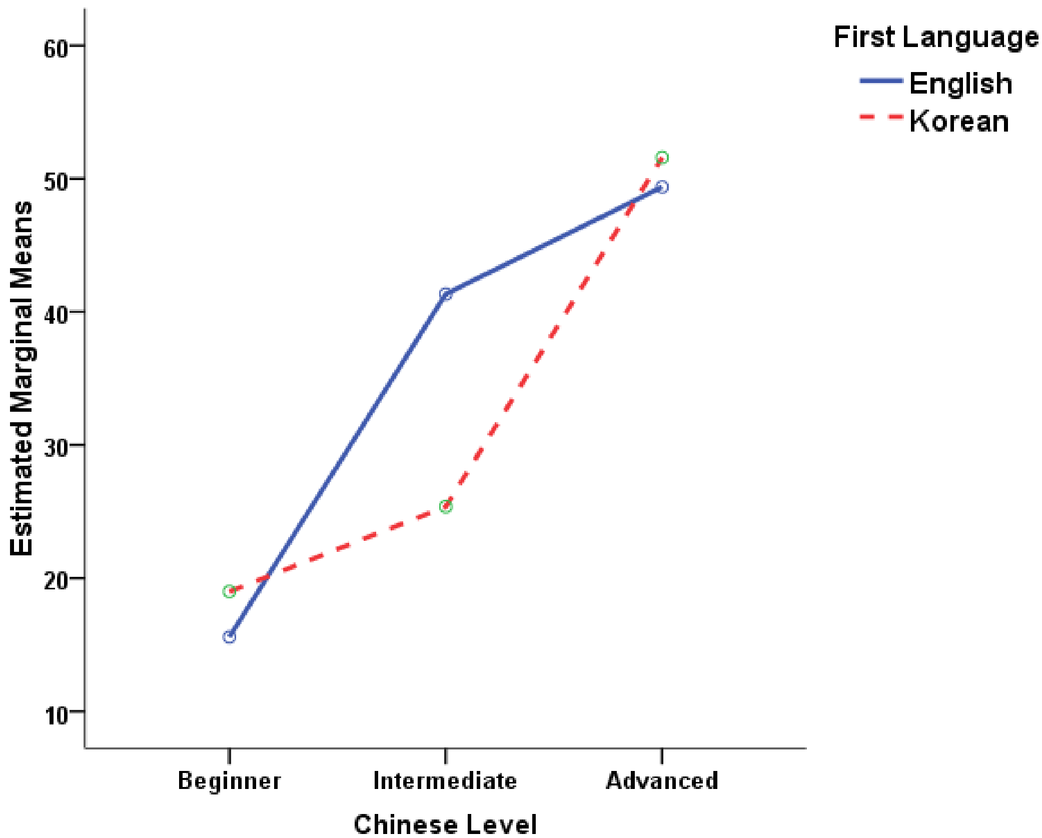


Figure 3.10 Correlation Between L2 CPL and Performance Based on 1st Languages

The cause(s) of these rather counterintuitive results remain to be discovered. One possible explanation for the fact that Korean subjects did not progress as much during the intermediate stage could be that it is caused by their overconfidence of their ability in learning this linguistic feature. Since Korean is also a classifier language, it makes sense to assume that they did not put in as much effort as their English counterparts did. On the other hand, the English subjects viewed it as a challenging task since only measure words, but not classifiers, are found in English. Hence, it required extra time and effort to learn this linguistic feature and consequently they not only caught up with their Korean counterparts but also outperformed them at the intermediate stage.

The implication one can draw from this result is that teachers should pay different amounts 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.

3.1.2.3 Correlation Between L2 CPL and Performance Based on 1st Languages and Grouped by 1- and 3-Dimensional Classifiers

Next, an additional dimension is added to the analysis that further examines this correlation between CPL and performance. When the classifiers used in this experiment were grouped into three groups based on the number of dimensions of the objects they denote, two of them showed similar patterns, while the other one showed an unexpected pattern.

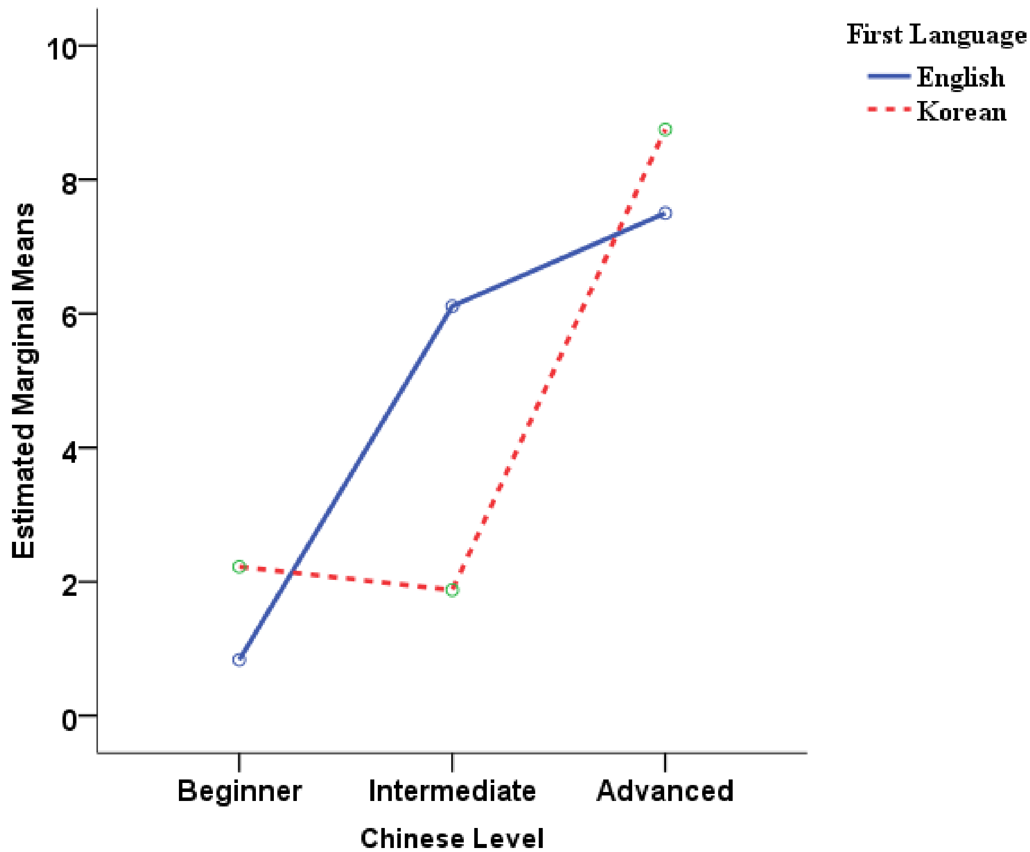


Figure 3.11 Estimate 3D Mean Score Grouped by CPL and 1st Languages

First, as seen in Figures 3.11 and 3.12, when the classifiers were grouped by one- and three-dimensional groups, the correlation between L2 subjects' CPL and their performance was similar to the one discussed earlier where no grouping of classifier was present. They both showed that Korean novice and advanced subjects outperformed their English-speaking counterparts only minimally and English-speaking intermediate subjects significantly outperformed their Korean counterparts.

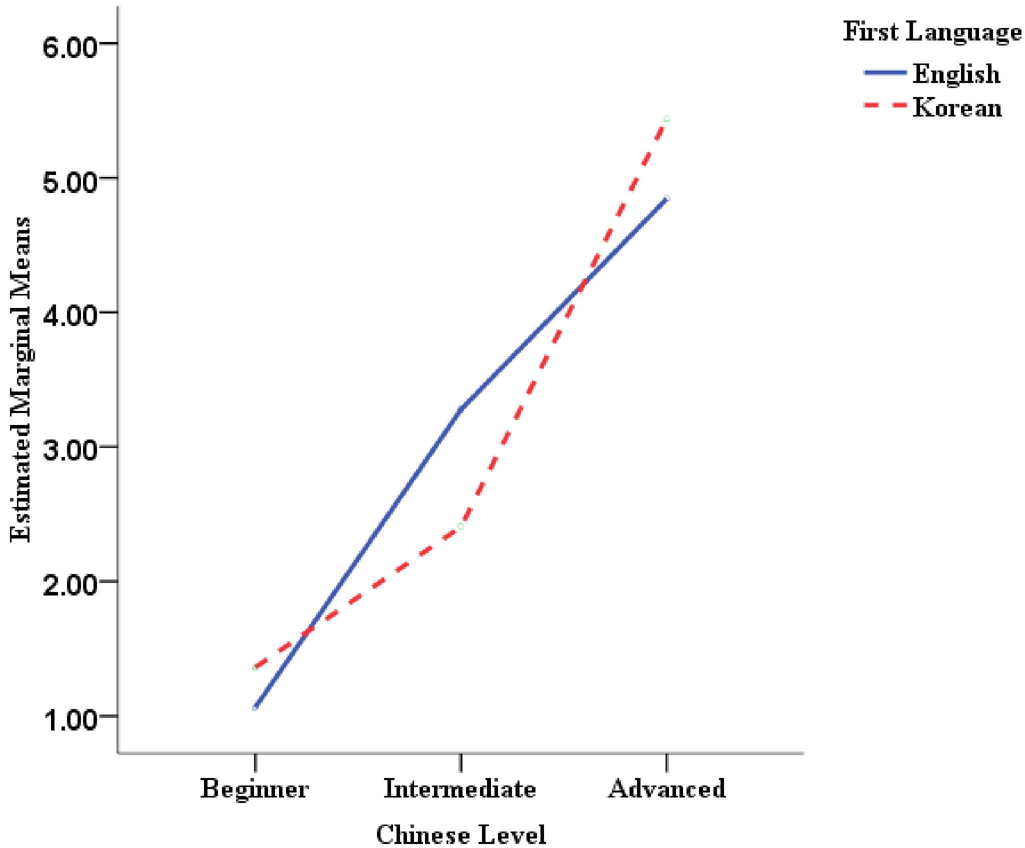


Figure 3.12 Correlation Between L2 CPL and Performance Based on 1st Languages and Grouped by 2-Dimensional Classifiers

3.1.2.4 Correlation Between L2 CPL and Performance Based on 1st Languages and Grouped by 2-Dimensional Classifiers

More unexpectedly, when the classifiers were grouped to denote two-dimensional objects, English-speaking subjects outperformed their Korean counterparts throughout all three CPL stages. As seen in Figure 3.13 below, the difference was not so obvious at the novice level where the p-value is at 0.4353, however, this difference increased rapidly at the intermediate level. The difference at the advanced stage was not so dramatic, with a p-value of 0.0047, but was still relatively significant.

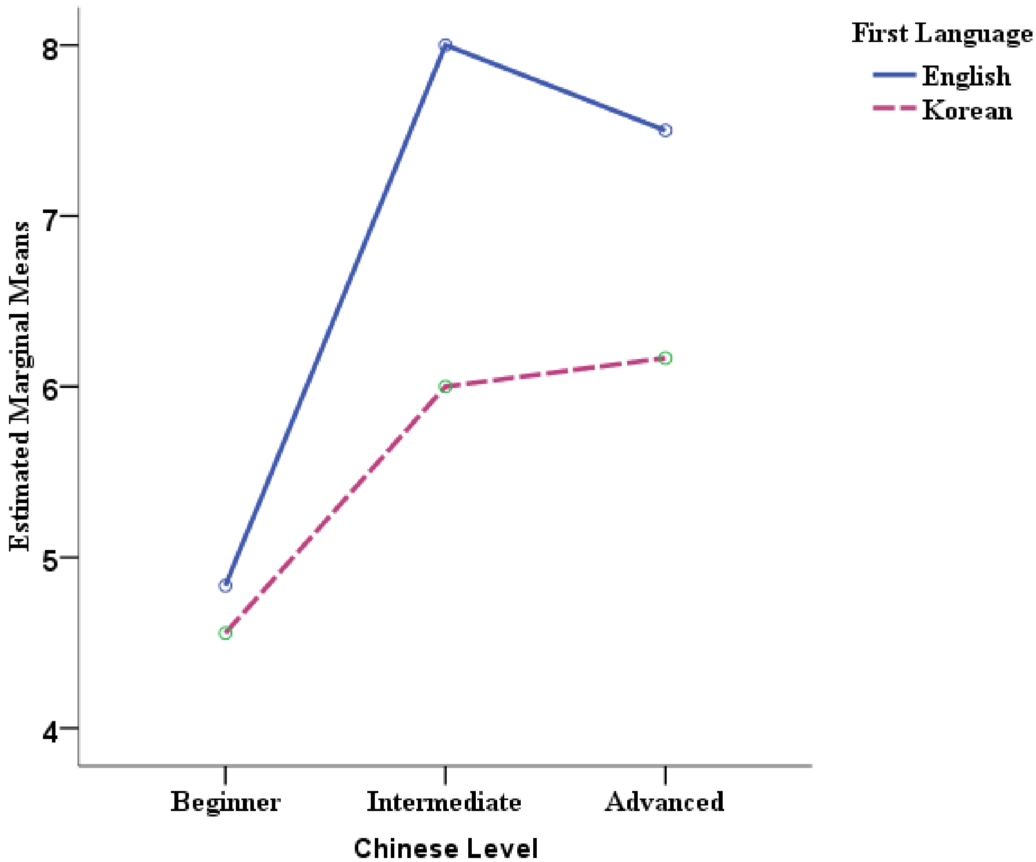


Figure 3.13 Estimate 2D Mean Score Grouped by CPL and Native Languages

Another interesting phenomenon seen from this figure was the reversed U-shape of the English subjects' progression line. The line started lowest at the novice level and peaked at the intermediate stage and finally dived down at the advanced level. This is quite counter-intuitive as one would logically assume that the higher the CPL the better the performance subjects should produce. The actual cause(s) of this phenomenon remain to be investigated. I can only hypothesize that, for some reasons, English-speaking subjects felt that they had mastered this type of classifiers at the intermediate stage and thus paid less attention to differentiating the subtle differences among these classifiers. Again, further investigation is needed to support this or other hypotheses.

3.1.3 The Developmental Sequences

Following on the discussion on the correlation between L2 subjects' CPL and their performance presented above, the next section deals with the developmental sequences of these L2 subjects' acquisition of Chinese shape classifiers. I will first present the findings on their emergence order as a whole. Then, the subjects are divided into groups based on their first languages and CPL levels. Also, the types of shape classifiers are divided into three groups based on the dimensions of the objects they denote.

Before I move on to the discussion of this developmental sequences, it is necessary to clarify and define the notion of developmental sequences presented in this project as opposed to those presented in the literature of L1 classifier acquisition. In the literature, the emergence order is referring to L1 children's development or progression of acquiring Chinese classifiers as they grow older. Researchers either did a longitudinal study that took several years to record subjects' development or a synchronic approach was taken where subjects from different age groups were tested. In these studies, the results of emergence order were derived from comparing subjects' performance on the experiment as their cognitive capacity matured from one age group to the next. Therefore, the independent factors here are their ages with which their cognitive ability developed to a higher level.

On the other hand, the definition of the emergence order referred in my study is somewhat different than those just discussed. Since my subjects were all adults and had all passed the puberty stage, their cognitive development should have stabilized and matured by the time they participated in this experiment. However, their Chinese Proficiency Levels (CPL) progress as they spent time and efforts studying Chinese. This progression of CPL was then used as the independent factor in determining the developmental sequences in this study. In short, in L1 classifier acquisition studies, the progression was based on subjects' cognitive development; in the current study, it was based on L2 subjects' CPL.

As seen in Figure 3.14, when the subjects were not grouped, the 2-dimensional CLs were best learned best followed by 1-dimensional and then 3-dimensional CLs. Notice the difference between 2-dimensional and 1-dimensional CLs is smaller than the difference between 1-dimensional and 3-dimensional CLs.

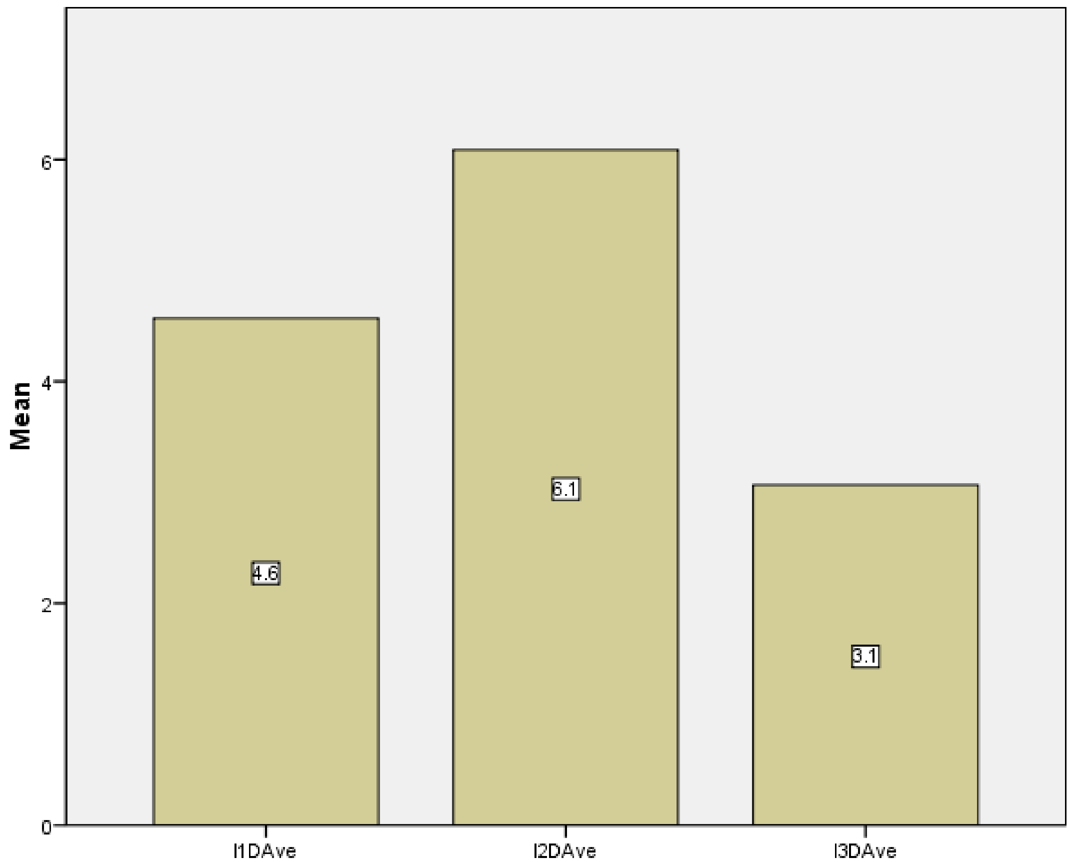


Figure 3.14 CL Developmental Order

This phenomenon is even clearer when the subjects were examined as only two groups based on their 1st languages, especially so for the Korean group. In Figure 3.15 above, after the subjects were grouped into Korean and English groups, the difference between Korean subjects' performance on 2-dimensional and 1-dimensional CLs is relatively smaller than the difference between their performance on 1-dimensional and 3-dimensional CLs. The above discussed emergence order is even clearer with English group than with Korean group. The data from the chart can be summarized as follows:

1) English L2 subjects performed better on 2D CLs but slightly poorer on 1D & 3D CLs than Korean subjects did; and 2) For both groups, 2-D CLs were learned better then 1-D and then 3-D CLs. The implications are that 1) teachers should assist English students more when learning 1-D & 3-D CLs and assist Korean students more when teaching 2-D CLs; and 2) teachers should put more effort into teaching 3-D CLs, followed by 1-D and then 2-D CLs.

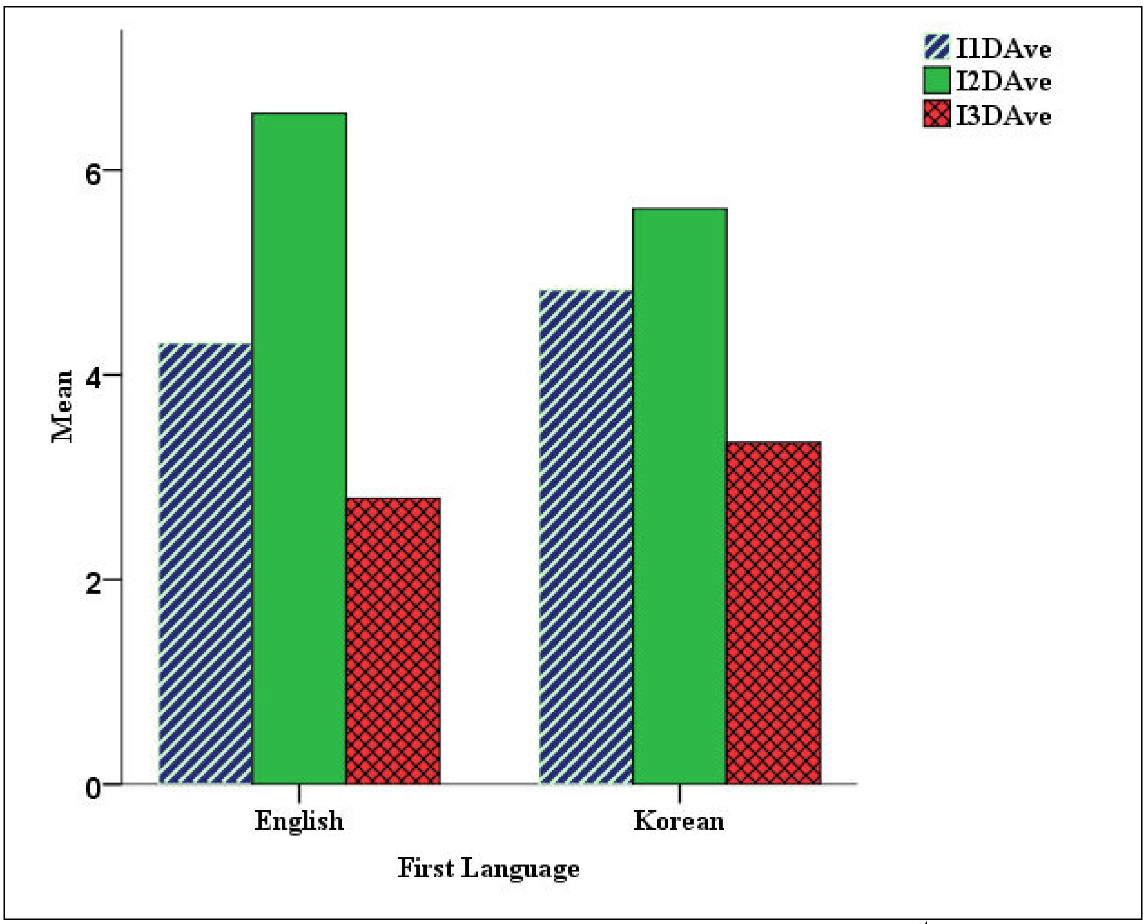


Figure 3.15 NNS Mean Scores Grouped by CL Dimension and 1st language

It will be an interesting topic to find out why is it that both groups performed better with 1D and 2D classifiers than with 3D classifiers. Some possible explanations might be that 3D objects are less commonly found in daily speech or are taught later or less emphasized in the classroom. Further investigation is needed to provide evidence to support these or other claims.

When comparing the emergence order found in this study with those reported in the L1 literature, one L1 study has a similar result to the current study while other studies on the emergence order show incompatible results. For example, Erbaugh (1984) reports that emergence order for L1 children is 1-dimensional first followed by 2-dimensional and then finally 3-dimensional classifiers. On the other hand, Loke & Harrison's (1986) study claim that 3-dimensional CLs were first learned followed by 1-dimensional and then 2-dimensional CLs. In yet another study, Hu (1993) shows that the emergence order is 2-dimensional first followed by 1-dimensional and then 3-dimensional CLs, which is similar to the results of current study.

The discrepancy might be due to the fact that the methodology designed and employed and the subject selection methods were quite different in these studies. For example, in Erbaugh's study, her sample size was rather small, only 4 children were included and their ages were relatively young as well (1;2 to 3;1). Based on findings by other studies, even by age three, children use very few special classifiers. With this limited subject pool, comparing results from this study to other studies, they are not so likely to be compatible. Also, Erbaugh's methodology is the only one that is longitudinal. This factor is very likely the source that contributed to the discrepancies.

In Loke & Harrison's study, on the other hand, their subjects' ages were older than the previous study and the sample size was greater as well. However, in their analysis, they considered the classifier 個 *ge* to be not just a general CL but also a 3-dimensional CL. They argued that in addition to being the classifier for humans and abstract entities, 個 *ge* 'can classify or reclassify *only* 3-dimensional objects since its classification of 1-dimensional and 2-dimensional objects would normally be considered unacceptable or inappropriate by Mandarin speakers' (Loke & Harrison, 1986: 126). Consequently, it is not surprising to see that their results showed that 3-dimensional CLs were learned first followed by 1-dimensional and then by 2-dimensional CLs.

In yet another format, Hu's sample size and method were more comparable to the current study. There were 24 L1 children as subjects in her experiment in which subjects' understandings of three types of dimension shape CLs was examined. With a similar methodology and sample size employed to the current study, her findings, not surprisingly, were more similar to mine than to the others.

3.1.4 Progression Patterns of Different Shape Classifiers

Finally, if I look at how subjects with different Chinese levels perform on different shapes of classifiers, something extraordinary surfaces that is worth further investigating. As can be seen in Figure 3.16 and 3.17, the progression of learning 1-D and 3-D CLs is pretty straightforward: the performance increased as their CPL advanced. However, the progression of learning 2-D CLs is not so logical. The performance progressed initially as they moved from novice to intermediate stages. However, such progress turned downward as their CPL advanced from intermediate to advanced level. The cause(s) of such rather illogical phenomena and the conditions under which this downward U-shaped curve might occur remains to be investigated.

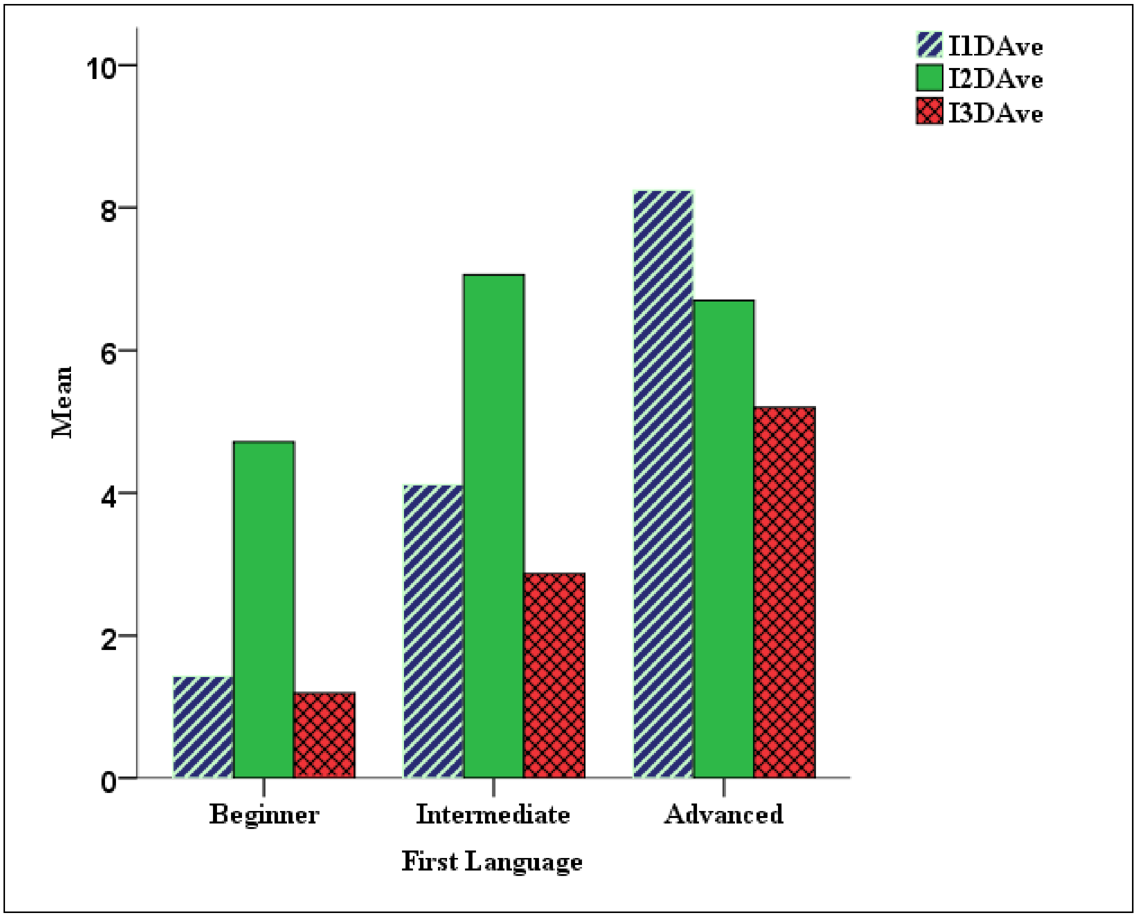


Figure 3.16 NNS Mean Scores Grouped by CL Dimension and CPL

There are many studies that show learners exhibiting this kind of reversed U-shaped learning pattern when learning other types of linguistic units. For instance, Abrahamsson (2003) investigated the relation between consonant deletion and vowel epenthesis in the development of word-final codas in Chinese-Swedish interlanguage. He found that his subjects' acquisition of Swedish codas 'exhibited relatively high accuracy rates at early stages, lower accuracy rates at later stages, and again high accuracy rates at more advanced stage'. Unfortunately, possible causes of this phenomenon were not provided. One of my ongoing research goals is to examine more closely these CLs and test them against other extralinguistic factors that might contribute to causes of these phenomena. Hopefully, this effect can provide suggestions as to what can be done by teachers to assist students to better learn the 2-D CLs.

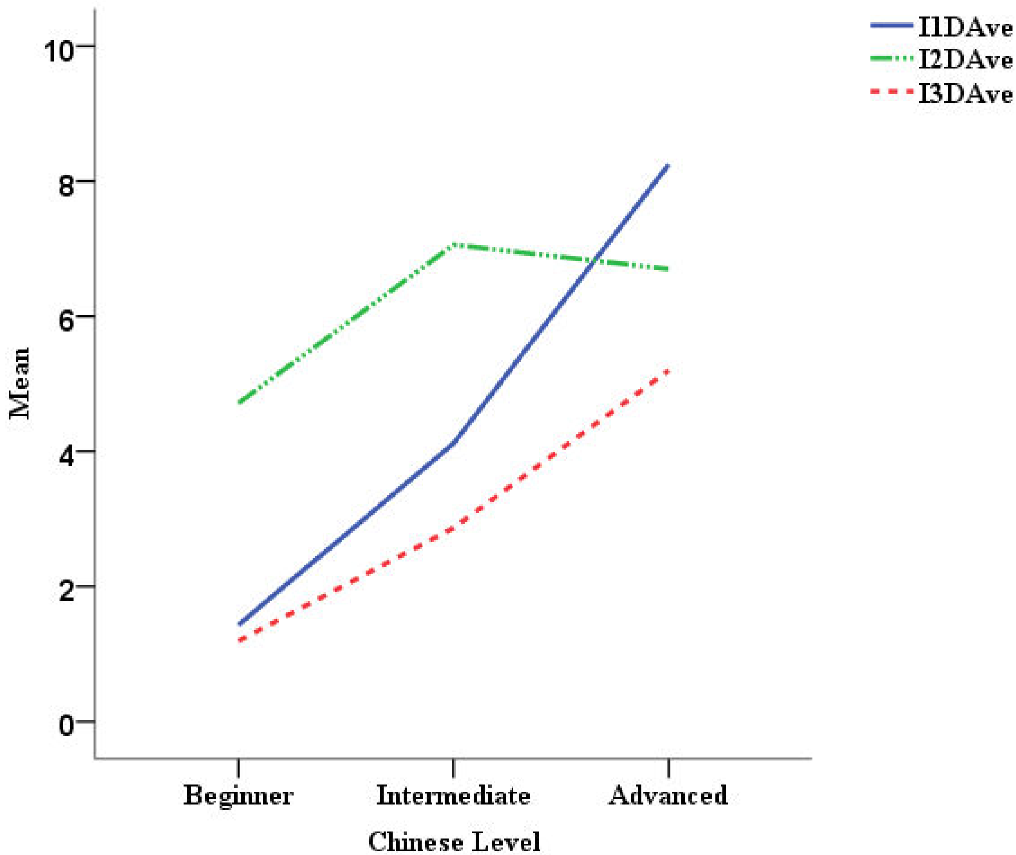


Figure 3.17 Correlation b/t NNS Performance and CPL Grouped by CL Dimension

3.2 Experiment II – Classifier Production Test

The second experiment is a production test that assesses subjects' abilities to produce appropriate classifiers. These classifiers are categorized as ANIMACY, FUNCTION, and EVENT in this study. Associated with each of these three cognitive categories, there exist ten different linguistic categories. They can be grouped based on their association with the linguistic categories as follows:

ANIMACY: there are HUMAN, ANIMAL-HORSE, ANIMAL-NON_HORSE; FUNCTION: there are VEHICLE, MACHINERY, HANDLE, CLOTHING; EVENT: there are BUSINESS, WEDDING

In the first section, based on the order the objects/events were presented in the experiment, descriptive statistics that show both L1 and L2 subjects' production of classifiers are presented. The next section deals with the correlations between subject performance and their CPL. Then, I will discuss the Emergence Order of FUNCTION, ANIMACY, and EVENT classifiers.

3.2.1 Descriptive Statistics

In this section, I will present descriptive statistics of the ten CLs tested in this study in order that appeared in the actual experiment. First, I present a table that contains the responses listed in the first column given by the subjects. The second column records the frequency of each response given by L2 subjects and the third column records its corresponding percentage. The last two columns are for L1 subjects' responses.

The first object shown in the picture was a sedan car, which belongs to the cognitive category of FUNCTION. The appropriate classifier for this object is a VEHICLE classifier 輛 *liàng*, which denotes all land vehicles such as cars, buses, motorcycles, and bicycles. However, two additional VEHICLE classifiers, 台 *tái* and 部 *bù*, can sometimes be used for these objects as well. As can be seen in Table 4.9 and Figure 3.18 below, the majority of L1 subjects wrote 輛 *liàng* as the appropriate classifier for this object and only 10% of them wrote 台 *tái* as the answer. No other classifier was produced.

Table 3.9 Selection Frequency for VEHICLE by L1 & L2 subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Response	*F*	%	*F*	%
個 *ge*	4	6.90	0	0
輛 *liàng*	51	87.90	9	90.00
台 *tái*	1	1.70	1	10.00
部 *bù*	2	3.40	0	0

L2 subjects' production showed a similar trend where close to 90% of them produced the classifier 輛 *liàng* as the most appropriate answer. However, the next most produced classifier was 部 *bù* with 3.4% of frequency and less than 2% wrote 台 *tái*. Another 7% wrote the general 個 *ge* as the answer. Since all these three FUNCION classifiers are possible answers to denote a car, these results provide strong evidence that the L2 subjects in this experiment have a strong understanding about the relationship between the cognitive category of FUNCTION and the linguistic category of VEHICLE.

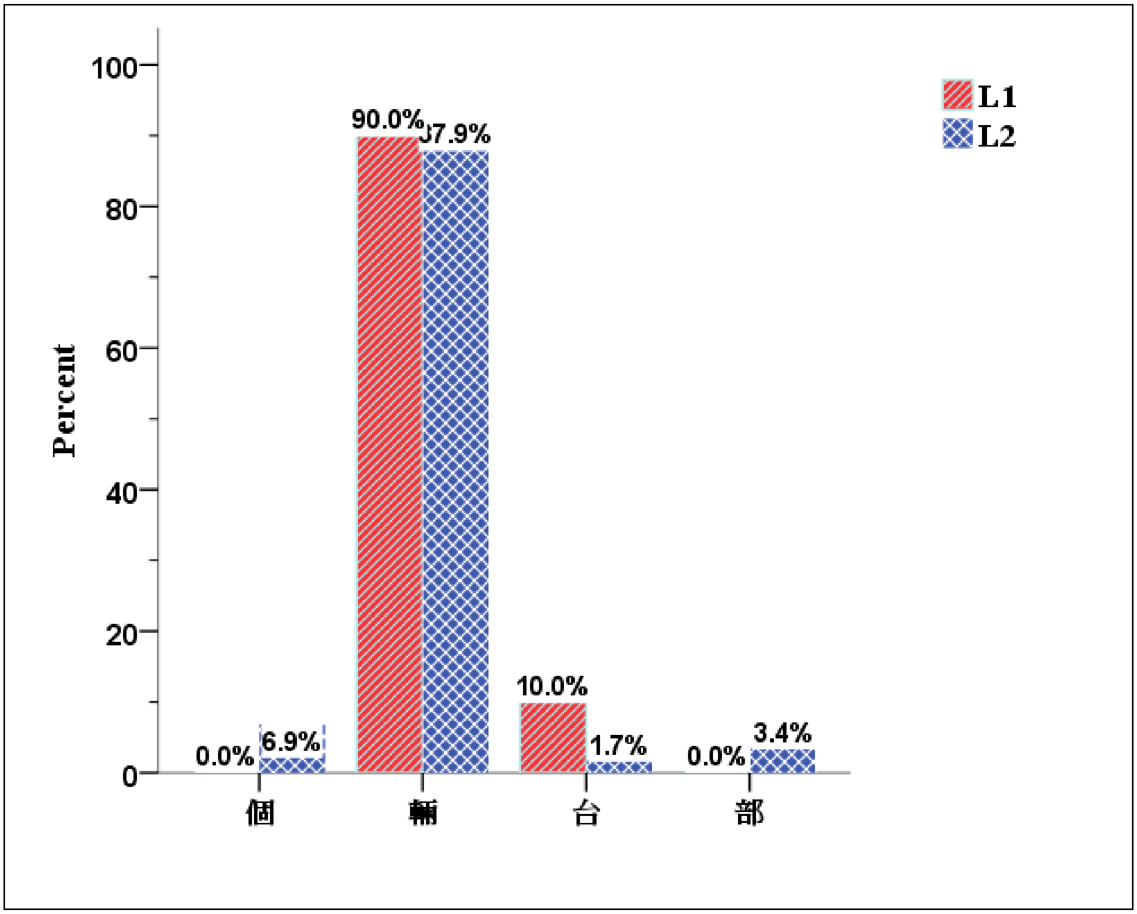


Figure 3.18 Selection Frequency for VEHICLE by L1 & L2 subject

The next object shown to the subjects was a comb. To categorize this object, one looks at its most salient physical feature which is the handle that can be grasped by a hand. Other objects that have this similar feature are handguns, keys, knives and so on. These objects are then linguistically categorized by the classifier 把 *bǎ*. By itself as a verb, this character has a semantic meaning of grabbing or holding on to something. In order to use a comb, one needs to first grab it before combing the hair and that explains why this character 把 *bǎ* is used as the classifier for the comb or other objects that have the similar feature. However, since the comb has a long and slender appearance, a classifier 支 *zhī* is also likely be used to denote this type of objects. Other such long objects are a pen, a cigarette, and a chopstick.

Table 3.10 Selection Frequency for HANDLE by L1 & L2 subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Response	*F*	%	*F*	%
個 *ge*	31	53.40	0	0
條 *tiáo*	9	15.50	0	0
把 *bǎ*	10	17.20	9	90.00
支 *zhī*	6	10.30	1	10.00
根 *gēn*	1	1.70	0	0
張 *zhāng*	1	1.70	0	0

Although there are two possible candidates, as seen in Table 3.10 and Figure 3.19, the L1 subjects overwhelmingly produced the 把 *bǎ* as the most appropriate classifier for the comb which belongs to the linguistic category of HANDLE. Only one out of ten L1 subjects wrote 支 *zhī* as the appropriate answer. No other classifier was provided.

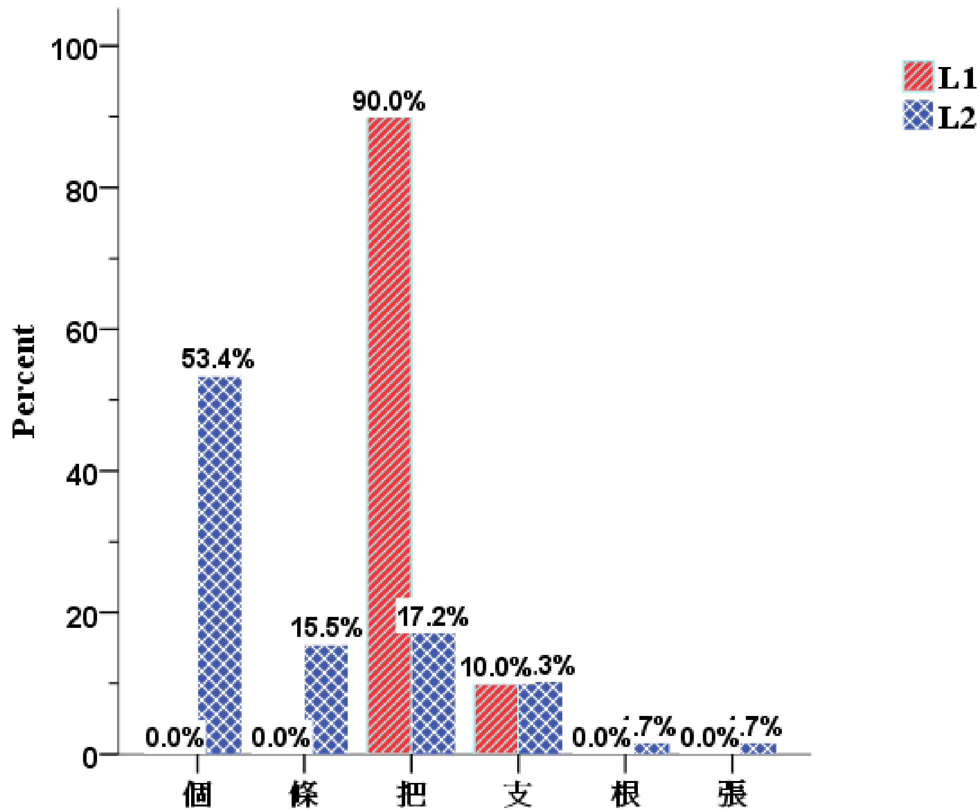


Figure 3.19 Selection Frequency for HANDLE by L1 & L2 subject

On the other hand, the L2 subjects' production was not so consistent. In fact, more than half of them were not so sure which classifier should be used in this context and thus wrote down the general classifier 個 *ge* as their answer. The classifier produced by the next most L2 subjects (about 17%) was then 把 *bǎ*. Almost the same number of subjects wrote the classifier 條 *tiáo* as their answer. Although this classifier 條 *tiáo* is used to denote 1-dimensional long and slender objects as well, however, one additional criterion needs to be present: they must be bendable, flexible, or curvy in shape. Since the comb shown in the picture does not resemble anything so described, it is then inappropriate to use 條 *tiáo* to denote a comb. In short, less than one third of the L2 subjects were able to produce the correct or acceptable classifiers for this HANDLE object.

The next object shown to the subjects was a personal desktop computer. Although other peripherals such as a monitor, a mouse, and a keyboard were also present in the picture, the subjects were instructed to direct their attention to the computer only and to produce a classifier that can collocate with it. For this linguistic category of MACHINERY, the essential characteristics for this type of objects have to be either mechanical or electrical with a certain degree of complexity. Some typical objects are televisions, CD players, refrigerators, and other objects that are typically difficult to move about or have a complicated design. Other possible candidates for this object are 部 *bù* and *zuò* but they are usually used with bigger and more powerful machines.

Table 3.11 Selection Frequency for MACHINERY by L1 & L2 subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Response	*F*	%	*F*	%
個 *ge*	29	50.00	0	0
台 *tái*	21	36.20	10	100
部 *bù*	4	6.90	0	0
座 *zuò*	1	1.70	0	0
套 *tào*	2	3.40	0	0
架 *jià*	1	1.70	0	0

As seen in Table 3.11 and Figure 3.20, the L1 subjects showed a 100% consensus by producing this classifier 台 tái as the best answer for the computer. Despite other possible and acceptable options, no other classifier was produced by the L1 subjects. However, the L2 subjects' production was both uncertain and inconsistent. More than half of them did not know any classifier that is appropriate for this MACHINERY object and only provided the general classifier 個 *ge*. Less than 40% of them produced the alternate suitable classifier 台 tái and the remaining 10% produced other classifiers that are acceptable but not so preferred by the native speakers. The results showed that the L2 subjects did not have a solid knowledge about the relationship between the cognitive category of FUNCTION and the linguistic category of MACHINERY.

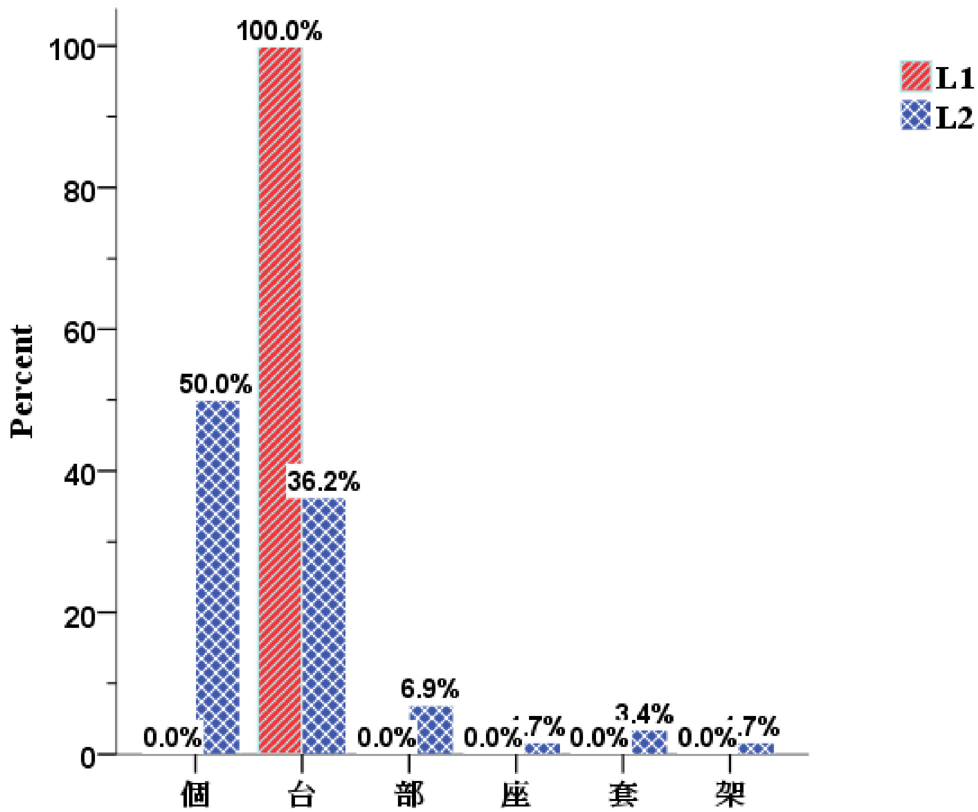


Figure 3.20 Selection Frequency for MACHINERY by L1 & L2 subject

The next object, dog, belongs to the cognitive category of ANIMACY and is classified linguistically as ANIMAL-NON_HORSE. In this category, almost all kinds of animals can be classified by a handful of classifiers such as 隻 *zhī*, 條 *tiáo*, 頭 *tóu*. The first two classifiers, 隻 *zhī* and 條 *tiáo*, are almost interchangeable in almost every situation. However, the classifier 頭 *tóu* is reserved for animals with a relatively larger body, such as elephants, oxen, sheep, and others. As the semantic meaning of this character 頭 *tóu* 'head' indicates, only those animals with a large head can be classified by this classifier. One exception is the horse and wolf, which are classified by a special classifier 匹 *pī* by which no other animals can be denoted.

Between the classifiers 隻 *zhi̱* and 條 *tiáo*, there exists a subtle difference in semantic meanings. The classifier 隻 *zhī* denotes almost all kinds of animals except the horse to be discussed in the following paragraph. However, when the denoted animals have a long, slender and bendable body, the classifier 條 *tiáo*, would be a better choice in this context. For example, while the classifier 隻 *zhi̱* can denote animals like snakes, fish, dogs, and worms, the classifier 條 *tiáo* is a better choice to classify these animals since they all have a salient physical feature of being long and slender.

As seen in Table 3.12 and Figure 3.21, the L1 subjects in this experiment uniformly produced this classifier 隻 *zhī* as the only answer for this object of ‘dog’. Although the L2 subjects were not as certain about using this classifier 隻 *zhī*, close to three fourths of them produced the appropriate classifier, while less than 4% of them produced the classifier 條 *tiáo*. Many of them, 15%, wrote 個 *ge* as their answer which is not an acceptable answer for native speakers. A small portion of them wrote 枝 *zhī* or 支 *zhī* which are used to denote other NON-ANIMACY types of objects although they have the same pronunciation as the classifier 隻 *zhī*.

Table 3.12 Selection Frequency for ANIMAL_NON_HORSE by L1 & L2 subjects

Response	All L2 (*N*=58)		All L1 (*N*=10)	
	F	%	*F*	%
個 *ge*	9	15.50	0	0
條 *tiáo*	2	3.40	10	0
隻 *zhī*	45	77.60	0	100
枝 *zhī*	1	1.70	0	0
支 *zhī*	1	1.70	0	0

The next object also belongs to the cognitive category of ANIMACY, however, a special linguistic category, ANIMAL-HORSE, has to be created for it to associate with the classifier 匹 p*ī*. As such, the most appropriate classifier for this object of horse is 匹 p*ī* but the classifier 隻 *zhī* is also acceptable since it is used to denote all types of animals. As can be seen in figure 4.21, the majority of the L1 subjects produced this classifier 匹 p*ī* to denote horse. The remaining one fifth of them wrote 隻 *zhī* and no other classifiers were produced. This showed their knowledge about the semantic meanings of the classifier 匹 p*ī* and their tolerance for using 隻 *zhī* in this context.

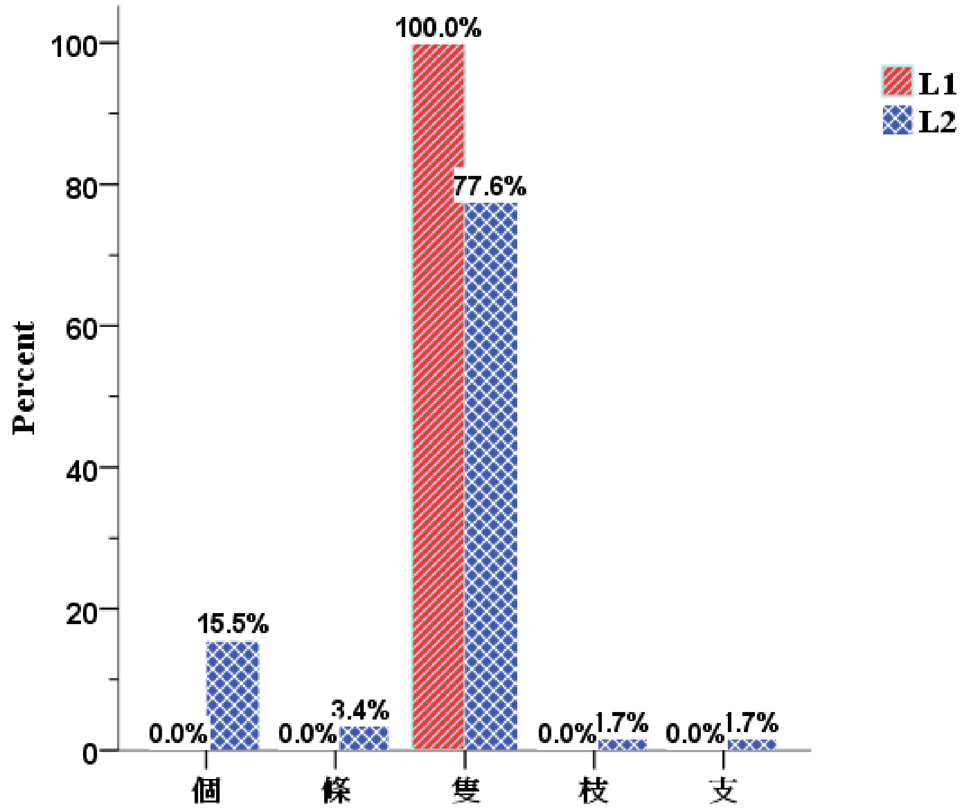


Figure 3.21 Selection Frequency for ANIMAL_NON_HORSE by L1 & L2 subject

As seen in Table 3.13 and Figure 3.22, for the L2 subjects, their knowledge about this classifier 匹 *pī* was not nearly as positive and their use of 隻 *zhī* was two times more frequent as their L1 counterparts. Nonetheless, more than three quarters of L2 subjects were able to produce classifiers that were either accurate or acceptable to denote this object of horse.

Table 3.13 Selection Frequency for ANIMAL_Horse by L1 & L2 subjects

Response	All L2 (*N*=58)		All L1 (*N*=10)	
	F	%	*F*	%
個 *ge*	13	22.40	0	0
隻 *zhī*	*25*	43.10	2	20
枝 *zhī*	1	1.70	0	0
匹 *pī*	19	32.80	8	80

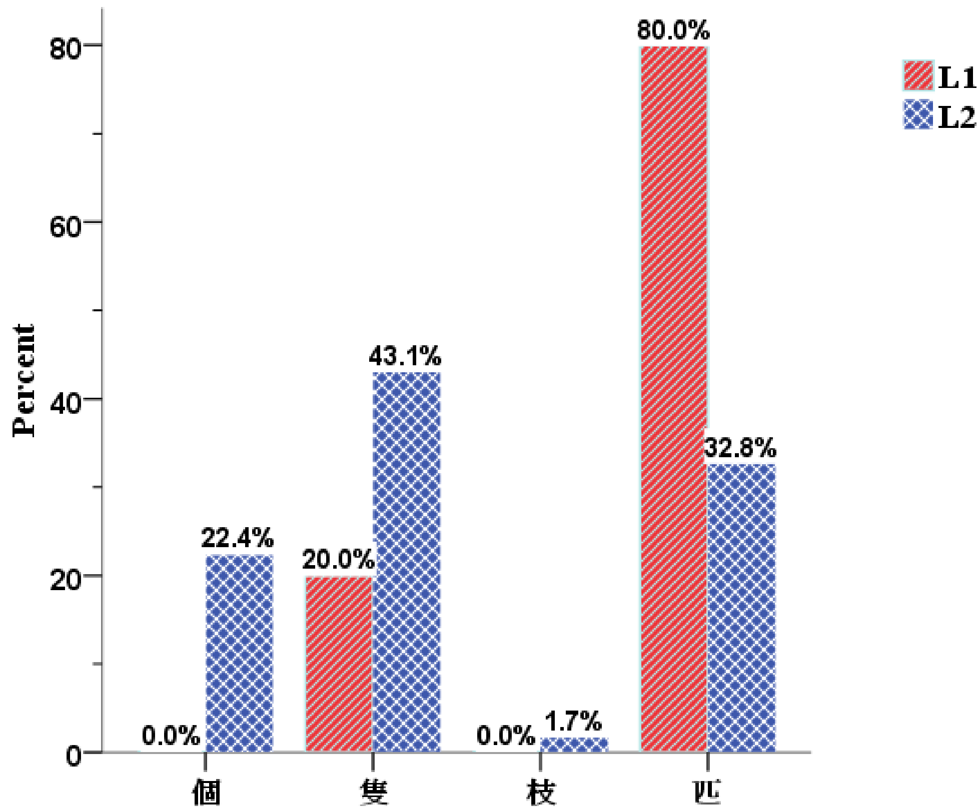


Figure 3.22 Selection Frequency for ANIMAL_Horse by L1 & L2 subject

Further analysis on the L2 subjects' production for this object reveals that the higher their Chinese levels, the more frequently they produced the desired classifier 匹 pī. For the Novice and Intermediate groups combined, only one fifth of them produced the classifier 匹 pī and one fourth of them produced the general classifier 個 *ge*. For the Advanced group, only one seventh of them produced the general classifier 個 *ge* while more than one half of them produced the classifier 匹 pī. It would be equally interesting to find out why some of the Novice subjects were able to produce the correct classifier while some of the Advanced subjects were unable to perform the task.

The next object in the photo presented to the subjects was a white shirt. Different classifiers are required for clothing worn on the upper body than those items worn on the lower body. For example, to denote a T-shirt, coat, sweater, or other such types of clothing, the classifier 件 *jiàn* is used. For lower body clothing such as pants, shorts, or skirts, the classifier 條 *tiáo* is then more appropriate since the objects in this category usually have a salient feature of being long and slender. However, the line is not so clear cut, as the classifier 件 *jiàn* can sometimes be used to denote clothing worn on the lower body. For example, while 一條褲子 *yìtiáokùzi* 'a CL-slender of pants' is the most appropriate expression, 一件褲子 *yíjiànkùzi* 'a CL-piece of pants' is not so natural but is definitely acceptable to native speakers.

It is expected that L2 subjects would perform well on producing this classifiers for two reasons. First, this classifier is taught fairly early on in college level Chinese courses. For example, one the most used textbook – *Integrated Chinese* – presents this classifier in its 9th chapter which is taught in the early stage of the second semester for first-year Chinese courses. The second potential reason for this anticipated high performance is due to prevalence of the object being examined. Since shirts or other such clothing are commonly seen and used objects in daily life, L2 subjects have likely had many chances to hear or use this classifier 件 *jiàn*. The results from the experiment support such a prediction.

Table 3.14 Selection Frequency for FUNCTION by L1 & L2 subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Response	*F*	%	*F*	%
個 *ge*	6	10.30	0	0
條 *tiáo*	*2*	3.40	2	0
張 *zhāng*	4	6.90	0	0
件 *jiàn*	46	79.30	8	100

As can be seen in Table 3.14 and Figure 3.23, all of the L1 subjects produced this classifier 件 *jiàn* to denote the white shirt shown in the photo. There was no other classifier being considered during the test. They were very confident and without much hesitation when producing this classifier. Similarly, a great majority of the L2 subjects also produced this classifier 件 *jiàn*. Not only did they come up with the appropriate classifier, more than one third of them were able to correctly write out the Chinese character for that classifier. This showed their proficient understanding about the usage and form of this particular FUNCTION classifier. Nonetheless, there were still 10% of them who did not appear to know this classifier and produced the general classifier 個 *ge* instead.

The next object shown in the photo is a female teacher standing in front of a blackboard. To denote human beings, the general classifier 個 *ge* is usually used unless special situations call for a special classifier. For example, to show respect to a person who is a senior or has a superior social status, the classifier 位 *wèi* is much more appropriate than the general classifier 個 *ge*, especially in a formal context or in written language where politeness is a necessary strategy for appropriate communication.

Other than this special classifier that shows respect to human beings, there is only one other special classifier, 名 *míng*, that has a similar semantic meaning but is being used much less frequently in daily life. Therefore, one needs only to learn two classifiers to be able to denote most human entities. This explains why the performances for both of the L1 and L2 subjects on producing these classifiers were very consistent and showed high scores. For L1 subjects, they unanimously produced the classifier 位 *wèi* for this entity of teacher. Although the classifier 名 *míng* would be acceptable in this situation, the fact that the L1 subjects were disposed not to use it supports the earlier claim that the classifier 位 *wèi* is much more preferred than the classifier 名 *míng* by native speakers when denoting respected or honorable human figures.

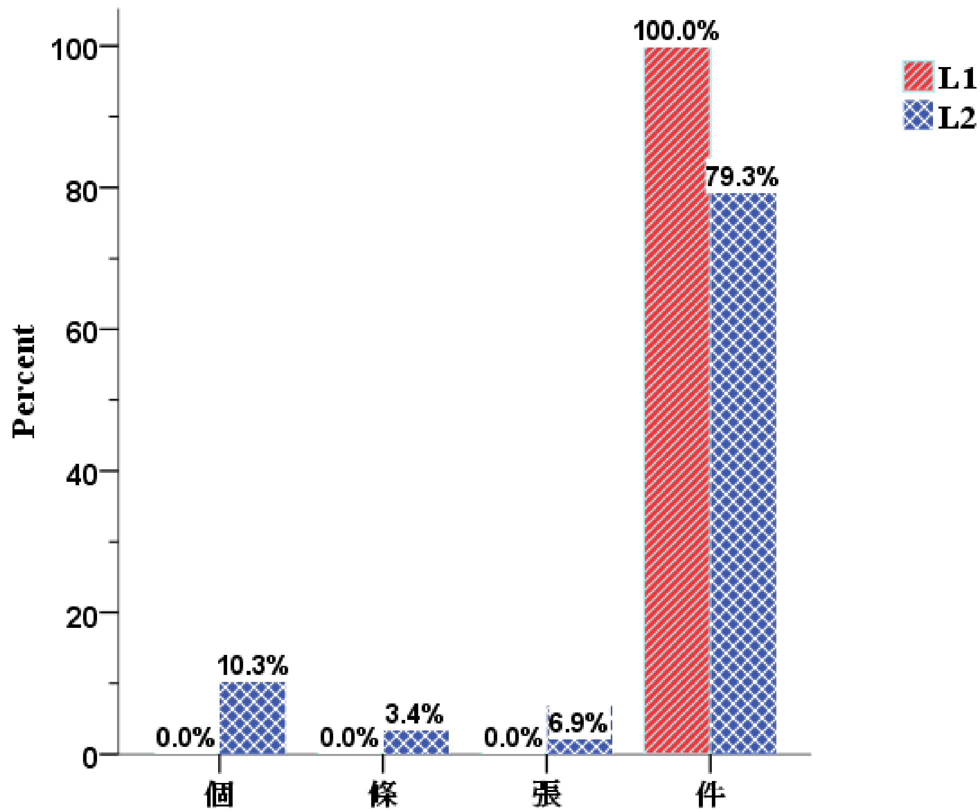


Figure 3.23 Selection Frequency for FUNCTION by L1 & L2 subject

As seen in Table 3.15 and Figure 3.24, such preference was also observed in L2 subjects' results in which about 90% of them produced the classifier 位 *wèi* and only one L2 subject produced the classifier 名 *míng*.

Table 3.15 Selection Frequency for ANIMACY_Human by L1 & L2 subjects

Response	All L2 (*N*=58) *F*	All L2 (*N*=58) %	All L1 (*N*=10) *F*	All L1 (*N*=10) %
個 *ge*	4	6.90	0	0
位 *wèi*	52	89.70	10	100
人 *rén*	1	1.70	0	0
名 *míng*	1	1.70	0	0

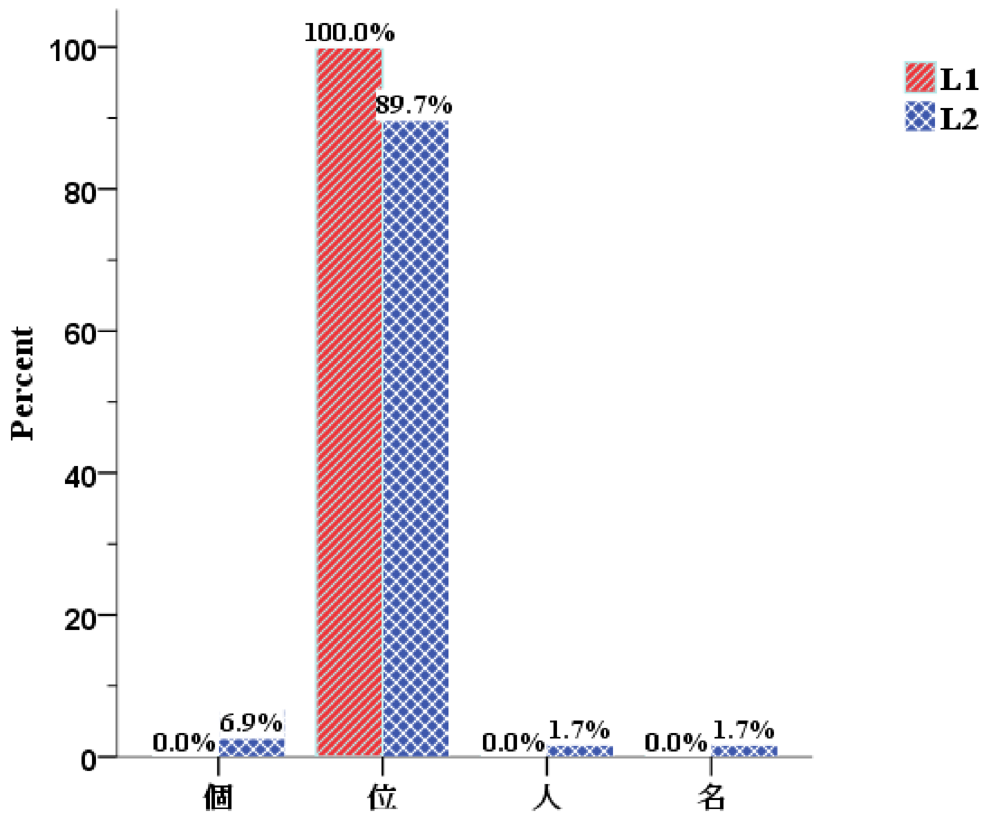


Figure 3.24 Selection Frequency for ANIMACY-Human by L1 & L2 subject

Further analysis shows that the general classifier 個 *ge* was used minimally across the three Chinese proficiency levels: 10% of Novice and 8% of Intermediate subjects and no Advanced L2 subjects produced the general classifier 個 *ge*. That is, the frequency use of the general classifier 個 *ge* was decreasing as their Chinese proficiency levels advanced.

So far, the items shown in the pictures have been concrete and tangible objects. In this experiment, however, there are three event classifiers denoting abstract notions of events that would examine subjects' understanding of these types of classifiers. These are the events of fire, business transaction, and marriage. Depending on the number of participants involved and the length of time of the events in question, some event classifiers can be used in multiple situations while others are appropriate only in limited settings. For example, the classifier 場 *chǎng* can not only denotes events that involve more than two or three people and the duration of such events are usually longer, e.g., 會議 *huìyì* 'meeting', 電影 *diànying* 'movie', 革命 *gémìng* 'revolution', and so on. It is also used in tragic events such as 車禍 *chehuò* 'car crash' and in natural disaster such as 暴風雨 *bàofengyu* 'storm'. On the other hand, the event classifier 件 *jiàn* can only denotes events that involve fewer people and are usually momentous and isolated, e.g., 交易 *jiaoyì* 'business transaction', 事情 *shìqíng* 'matter/occurrence', and so on. However, such limitations are not strictly followed by native speakers as these event classifiers do not obscure the semantic meanings of the NUM + CL + N phrase as much as the shape classifiers do if they are used in less commonly seen situations.

One factor about these event classifiers that might have a negative effect on the L2 subjects' performance in this experiment is the fact that these event classifiers are usually taught to the students at a latter stage in the Chinese curriculum. For example, one of the best-selling textbooks for Chinese language courses in the American university level, *Integrated Chinese* by Liu et al (2008), contains 22 classifiers in its Level 1 Part 1 edition. Of these 22 classifiers, none of them is an event classifier. In its Level 1 Part 2 edition (Liu et al 2009), another 20 or so classifiers are introduced but none of them are event classifiers either. Therefore, unless taught as supplementary vocabulary, L2 adult learners of Chinese in American classroom using these textbooks would not encounter event classifiers even after two years of formal learning.

Another aspect of these event classifiers that might also have a negative bearing on L2 subjects' performance in this experiment is the low frequency occurrence of these event classifiers in daily communication. Unlike those concrete objects denoted by shape classifiers, these abstract events are not only intangible but are also less frequently used. According to Dew's (1999) vocabulary frequency handbook, which contains more than 6000 words based on a study done in Beijing in the mid 1980s, all shape, animate, and function classifiers have higher rankings than event classifiers. Following are the frequency rankings (in parenthesis) distilled from the handbook grouped by four categories:

A. SHAPE CL: 條 (141), 塊 (266), 張 (404), 片 (455), 根 (704);
B. ANIMATE CL: 位 (255), 隻 (239), 匹 (1928);
C. FUNCTION CL: 件 (302), 把 (658), 台 (749), 輛 (1036);
D. EVENT CL: 場 (1419), 筆 (2695), 樁 (4809).

Since the event classifiers are less frequently used in daily communication by native speakers, L2 subjects are then less likely to encounter them and therefore are less likely to learn them, at least at the early stage of learning Chinese.

Based on these observations, we would expect to see that, across the three levels of Chinese proficiency, the L2 subjects' performance on these event classifiers would be poorer than on the classifiers denoting concrete and tangible objects. It is also expected that the Novice group would not be able to produce appropriate responses since it is unlikely that they had learned any of these event classifiers at the time of taking the experiment. With these observations in mind, the L2 subjects' performance on the three event classifiers is discussed below.

The first of the three events to be discussed is a fire. In the picture, what subjects saw was a house on fire and thick smoke was also present. After the subject was told that the Chinese term for the event of the picture is 火災 huo3zai1 'fire', they were asked how many fire events there are in the picture. Since this is a tragic event that would usually involve many participants and the duration is relatively long, the event classifier 場 *chăng*, would be the most appropriate choice.

As can be seen from the above Table 4.16 and Figure 4.25, 90% of the L1 subjects produced this classifier while the other 10% produced this classifier 起 *qi*ˇ

which is less frequently seen. The great majority of tht L1 subjects agreed that the event classifier 場 *chăng* is the most appropriate choice in this context.

Table 3.16 Selection Frequency for EVENT_Accident by L1 & L2 subjects

	All L2 (*N*=58)		All L1 (*N*=10)	
Response	*F*	%	*F*	%
個 *ge*	31	53.40	0	0
件 *jiàn*	14	24.10	0	0
場 *chăng*	6	10.30	9	90
起 *qǐ*	0	0	1	10
次 *cì*	1	1.70	0	0
陣 *zhèn*	1	1.70	0	0
事 *shì*	1	1.70	0	0
案 *àn*	2	3.40	0	0
塊 *kuài*	1	1.70	0	0
屋 *wū*	1	1.70	0	0

For the L2 subjects, more than half of them could not produce any special classifier but the general classifier 個 *ge*. About one fourth of the L2 subjects produced the classifier 件 *jiàn* which is used more often by native speakers in events that are shorter in duration with fewer participants. This response is not incorrect though it is less appropriate than the classifier 場 *chăng* which was produced by only 1/10 of the L2 subjects. Interestingly, the rest of the L2 subjects produced a handful of responses that are special but not event classifiers. This indicates that at least half of them understand that a special classifier, instead of the general classifier 個 *ge*, is required for this event.

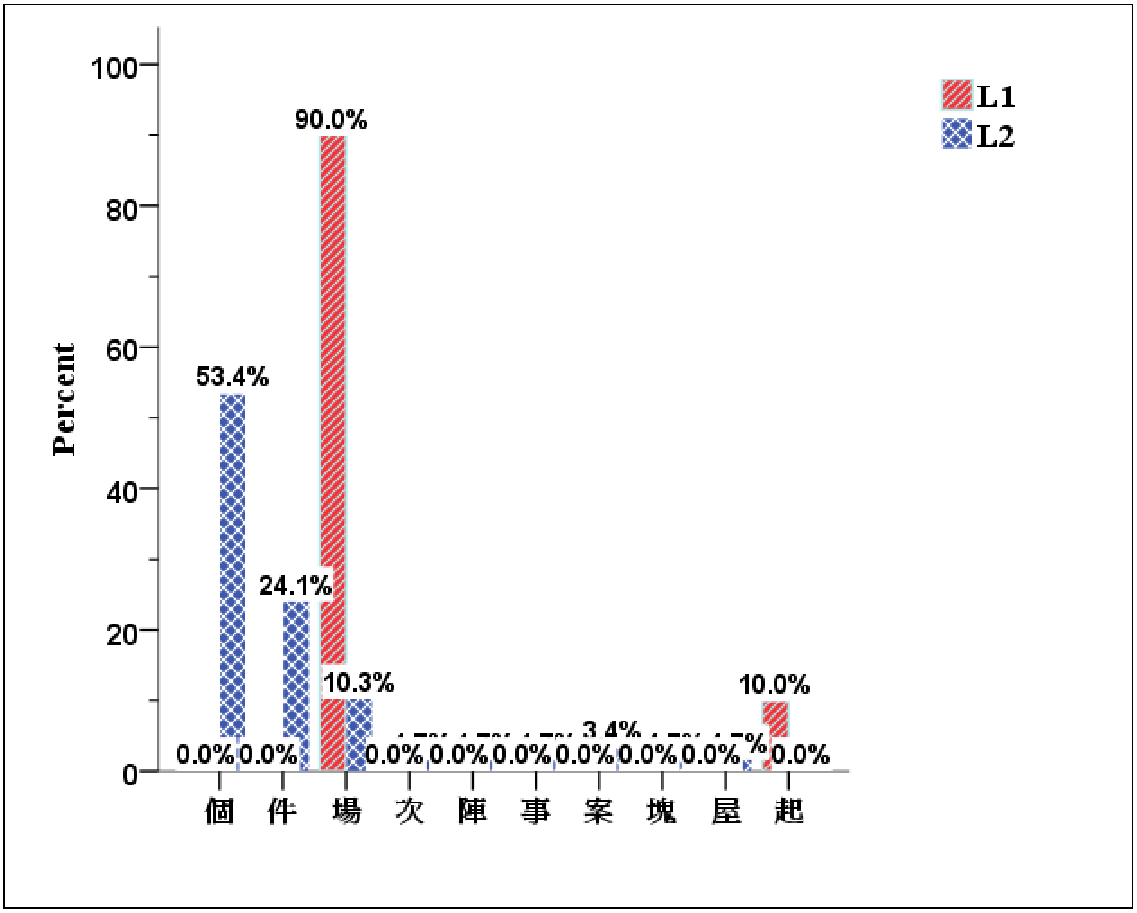


Figure 3.25 Selection Frequency for EVENT-Accident by L1 & L2 subject

Further analysis shows that, of those that were able to produce the appropriate response, 66% of them are Advanced learners and 33% are Intermediate. No Novice subjects produced the desired response. This further supports the previous prediction that the event classifiers would not be learned until a later stage of the learning process.

The next event shown in the picture was a business transaction in which two businessmen are exchanging a handshake over some documents laying on a desk in an office setting. The Chinese term for this event was given to the subjects as 買賣 *mǎimài* 'business transaction'. This is an event that usually involves less than two or three key participants and the duration is relatively short with a beginning and ending. Several event classifiers can be considered as appropriate to denote this event such as 樁 *zhuāng*, 筆 *bǐ*, 場 *chǎng* or, 件 *jiàn* and so on.

Table 3.17 Selection Frequency for EVENT_Wedding by L1 & L2 subjects

Response	All L2 (*N*=58)		All L1 (*N*=10)	
	F	%	*F*	%
個 *ge*	40	69.00	0	0
根 *gēn*	2	3.40	0	0
場 *chǎng*	1	1.70	3	30
樁 *zhuāng*	0	0	1	10
次 *cì*	3	5.20	0	0
座 *zuò*	1	1.70	0	0
件 *jiàn*	7	12.10	6	60
位 *wèi*	2	3.40	0	0
項 *xiàng*	1	1.70	0	0
筆 *bǐ*	1	1.70	0	0

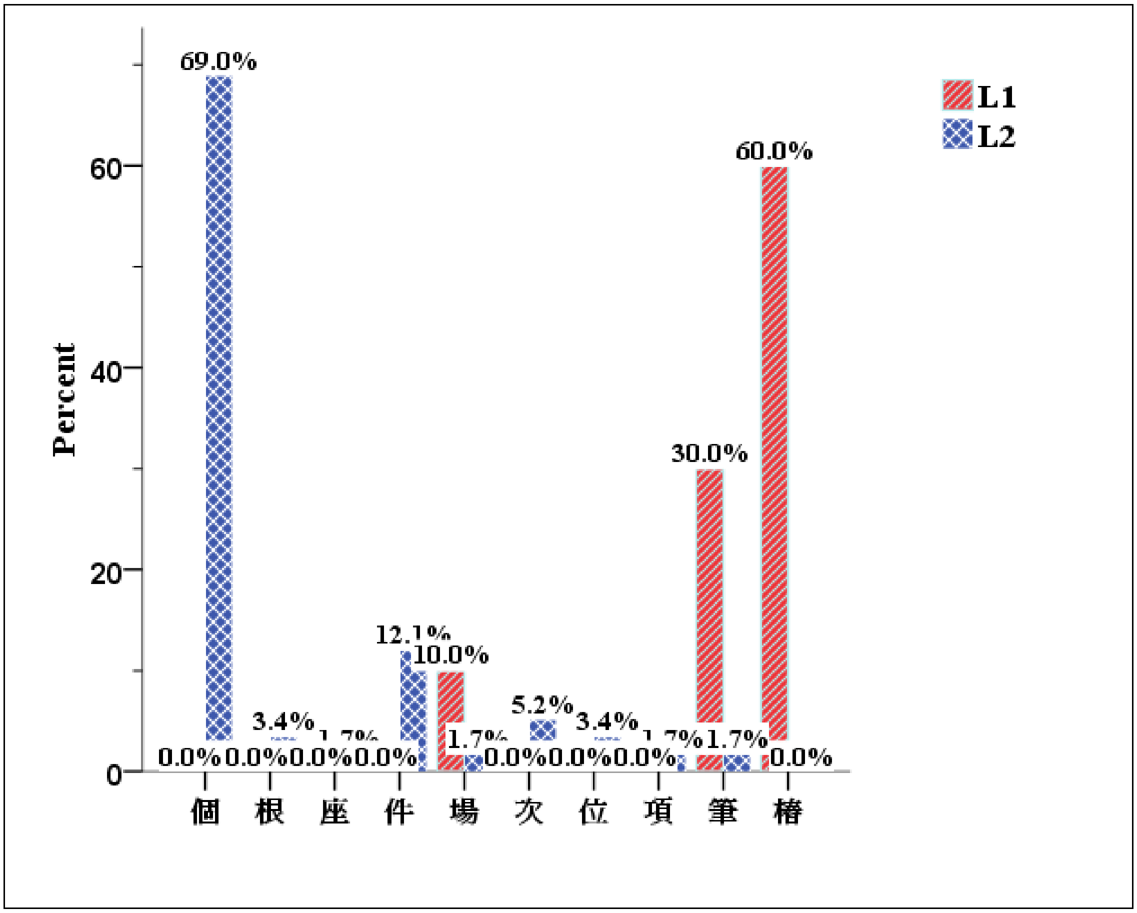


Figure 3.26 Selection Frequency for EVENT-Wedding by L1 & L2 subject

As seen in Table 3.17 and Figure 3.26, the L1 subjects of this experiment produced only three different event classifiers: 樁 *zhuāng*, 筆 *bǐ*, and 場 *chǎng*. The majority of the them (60%) preferred the event classifier 樁 *zhuāng* while the next preferred classifier, 筆 *bǐ*, was produced by 30% of them. The third classifier 場 *chǎng* was produced only by one subject. These results indicate that the L1 subjects had a strong preference for the classifiers 樁 *zhuāng* and 筆 *bǐ* over the other possible candidates mentioned above.

The L2 subjects, however, were not so clear as to what event classifiers were appropriate for this event of business transaction. This is evident by the high production of the general classifier 個 *ge* by the L2 subjects (close to 70%). The rest of them produced eight different classifiers but less than 4% of the entire L2 subjects produced event classifiers that were also produced by the L1 subjects. The other classifiers were either inappropriate event classifiers or non-event classifiers such as 根*gen*, 座 *zuò*, 位 *wèi* which are function classifiers. The only two appropriate event classifiers they produced were 件 *jiàn* (12.1%) and 場 *chăng* (1.7%). As mentioned above, however, only one L1 subject produced the event classifier 場 *chăng* and none of them even produced 件 *jiàn*. In short, this high frequency of the general classifier 個 *ge* and low frequency of appropriate event classifiers produced by the L2 subjects indicate that their knowledge of the semantic meanings of these event classifiers was very inadequate, even for the Advanced learners.

The last event in the experiment, 婚事 *hunshì* 'marriage', was prompted by a picture of a couple wearing their wedding gown and suit during a wedding ceremony. For this particular event that is not regularly seen in daily life, native speakers might not come to a strong consensus as to which event classifier is the most appropriate for this event. Some equally possible candidates are 門 *mén*, 樁 *zhuāng*, 場 *chăng*, or 件 *jiàn*, and some less preferred ones are 段, 項, 頭, 起, 宗, and so on. As a native speaker of

Chinese myself, my personal preference is first 門 *mén* and then 樁 *zhuāng*. However, the L1 subjects' responses in this experiment did not agree with my preference.

As can be seen in the above Table 3.18 and Figure 3.27, close to 2/3 of the L1 subjects produced the event classifier 件 *jiàn* as their choice while the rest of them produced either 場 *chăng* (30%) or 樁 *zhuāng* (10%) as their responses for this event. None of them even mentioned 門 *mén*, which is my first choice. The fact that 30% of them produced the event classifier 場 *chăng* indicates that it was an acceptable, if not interchangeable, response other than the most preferred event classifier 件 *jiàn*. The event classifier 樁 *zhuang* was the least appropriate choice by the L1 subjects based on the results shown above. These inconsistent choices imply that different results may be obtained if the subject pool included more people from more diverse backgrounds. The point needs to be made clear here is that for the event of marriage, no one event classifier is predominantly a better choice than the others.

For the L2 subjects, again, the majority of them (53.4%) showed a lack of knowledge of a suitable event classifier for this context by producing the general classifier 個 *ge*. While it was produced by more than half of the L2 subjects, about ¼ of them produced the event classifier 件 *jiàn* as their L1 counterparts did. The next most produced event classifier by the L2 subjects is 次 *cì*, which is not so appropriate as it is used to denote the amount of time a certain action takes place. Combining the rest of the special event classifiers produced by the L2 subjects, the results show that at least close to half of them knew that this event calls for a special classifier, however, many of the classifiers produced were not appropriate, or were even unacceptable, for this event.

Further analysis shows that there exists a positive trend between the L2 subjects' CPL and their production of this event classifier. This trend is similar to that observed in the previous case with the event of fire, however, it is not as positive. Here, of those L2 subjects who produced this event classifier 件 *jiàn*, 27.3% of them were Novice learners and the rest of them were evenly distributed among Intermediate and Advanced learners with an equal percentage of 36.3. This implies that this event classifier 件 *jiàn* was better learned by the L2 subjects than the previously discussed event classifier 場 *chăng* across the three levels of CPL. When teaching event classifiers, language teachers should then design their lesson plans accordingly.

3.2.2 Correlations between Performance and CPL

In this section, I will first examine the general trend of the subjects' performance on producing correct classifiers as a whole. Next, I will compare and contrast the results based on the subjects' Chinese proficiency levels and their first language groups respectively.

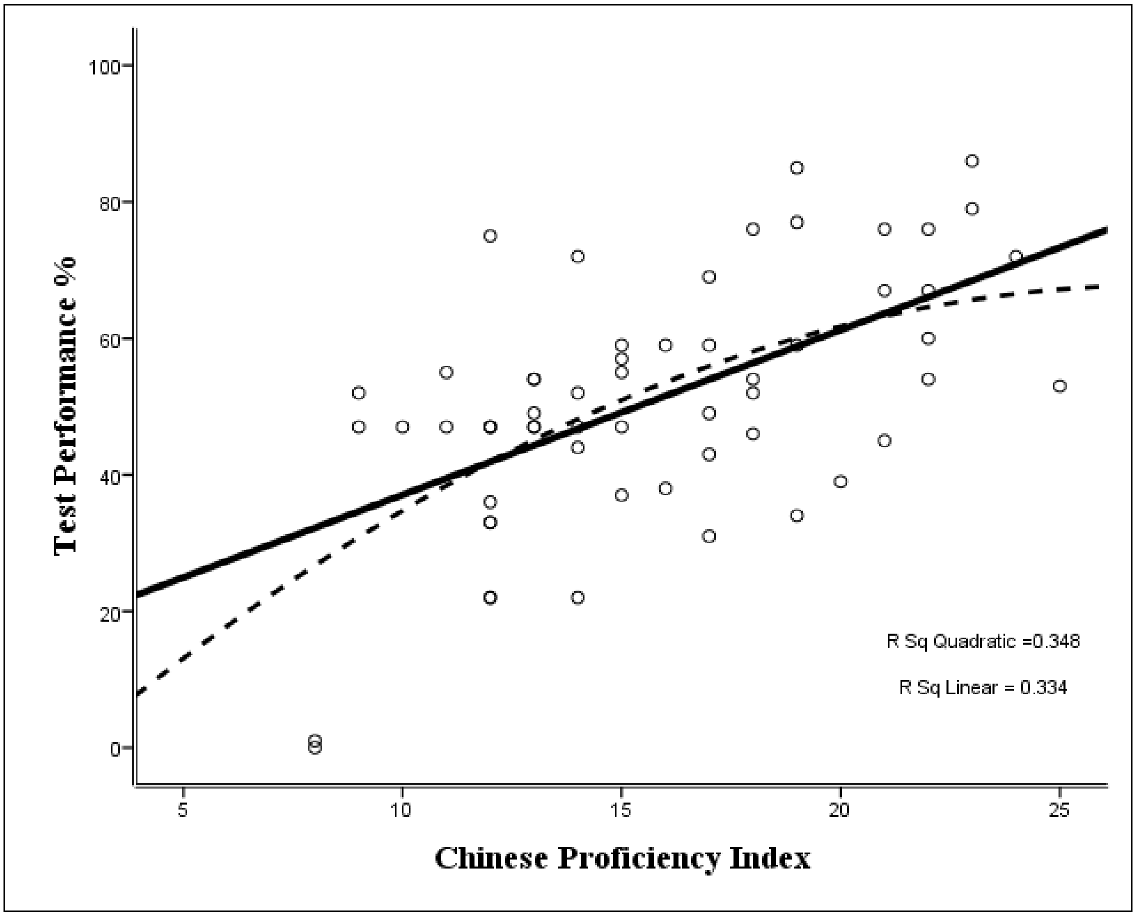


Figure 3.27 Correlation between CPL and Test Performance

As seen in Figure 3.27, there exists a positive relationship (the R Sq Linear is 0.334) between the subjects' Chinese proficiency levels and their overall performance on classifier production. The more advanced the Chinese levels of the subjects, the higher scores they performed. However, when examining the dotted line, which represents the R Sq Quadratic of 0.348, this positive relationship is more strongly observed among the Novice and Intermediate CPL subjects than among the Advanced group. It is predicted that such a positive relationship will disappear when subjects' CPL progresses to an even higher level.

3.2.3 Developmental Order

In this section, I will first show the general developmental orders for the Korean and English groups respectively. Then the developmental orders will be examined from different perspectives with FUNCTION, ANIMACY, and EVENT classifier groups respectively. Finally, each classifier will be examined to show how subjects acquire these ten classifiers.

First, as seen in Figure 3.28, when the subjects are divided into two groups based on their first languages, their performances continue to correlate positively with their Chinese proficiency. Although both groups' performance improved with their CPL, the Korean subjects performed better throughout the three CPL levels. Unlike the results shown in the first perception experiment where the Intermediate English-speaking subjects outperformed their Korean counterparts, the Korean subjects in this production experiment consistently outperformed their English counterparts. The pedagogical implication is that teachers need to pay more attention to English-speaking students across the three levels when they are learning to perceive and produce Chinese classifiers.

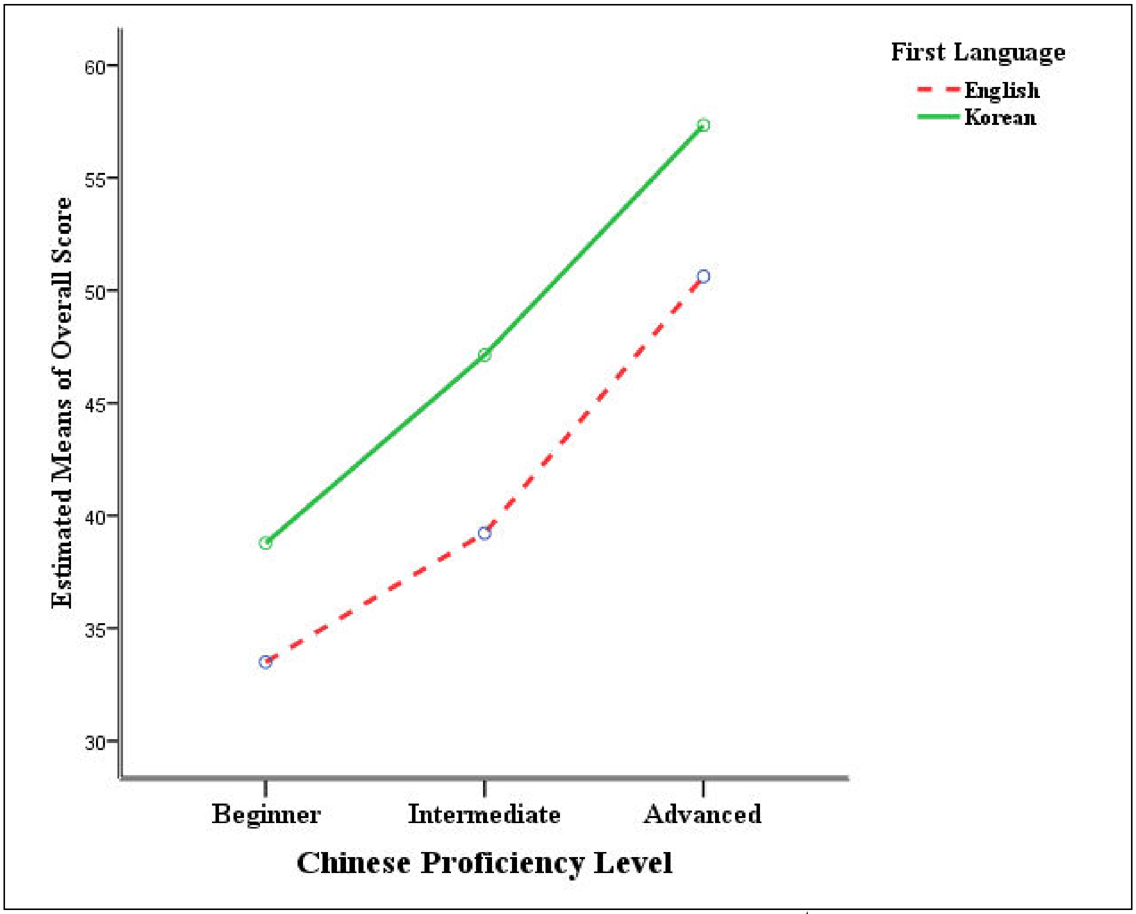


Figure 3.28 Developmental Order Grouped by 1st Languages

Next, when the tested classifiers are grouped into ANIMACY, FUNCTION and EVENT categories, a positive correlation relationship is again observed among the subjects, as seen in Figure 3.29 below. Although all subject groups performed increasingly better for the three kinds of classifiers as their CPL advanced, their performance on EVENT classifiers is significantly worse than with the other two types of classifiers. The results shown here further support the assertion illustrated earlier that L2 learners will perform much poorer with EVENT classifiers than with FUNCTION or ANIMACY classifiers.

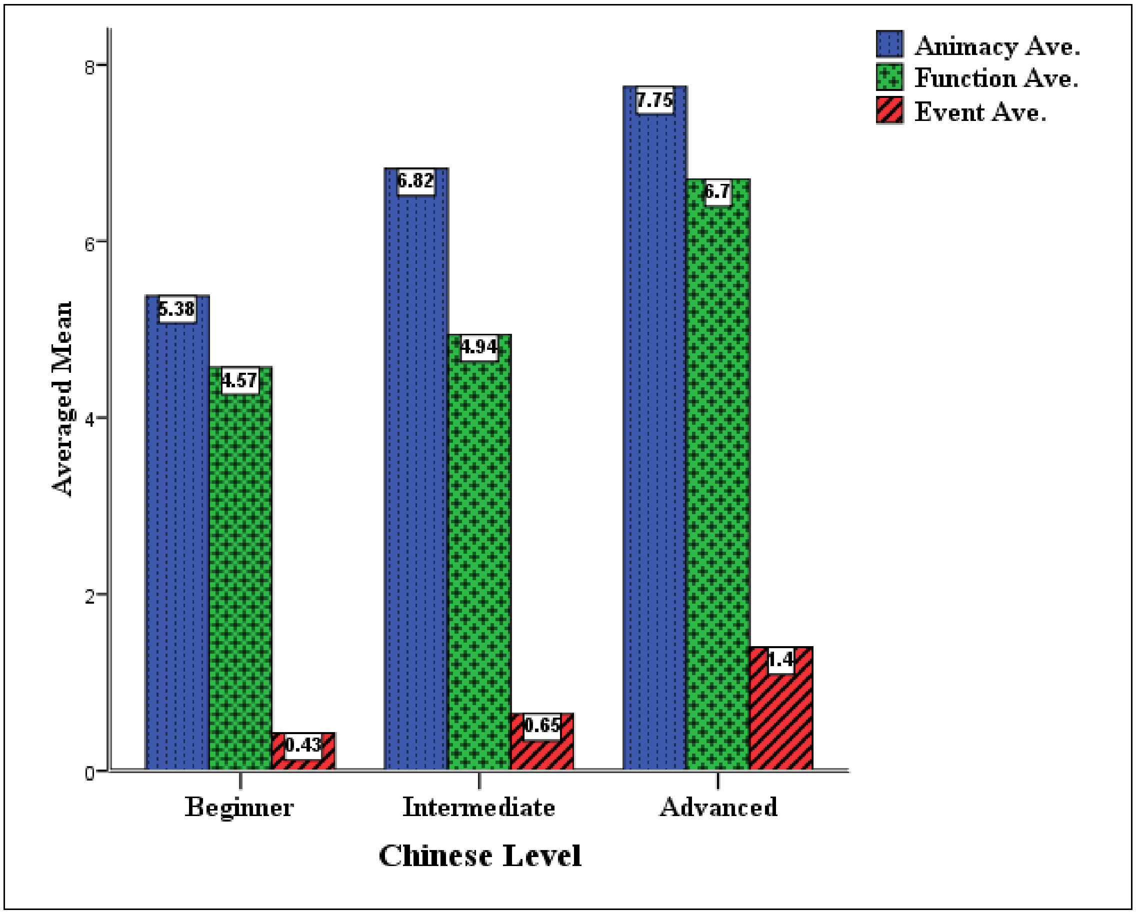


Figure 3.29 Developmental Order of ANIMACY, FUNCTION and EVENT CLs Grouped by CPL

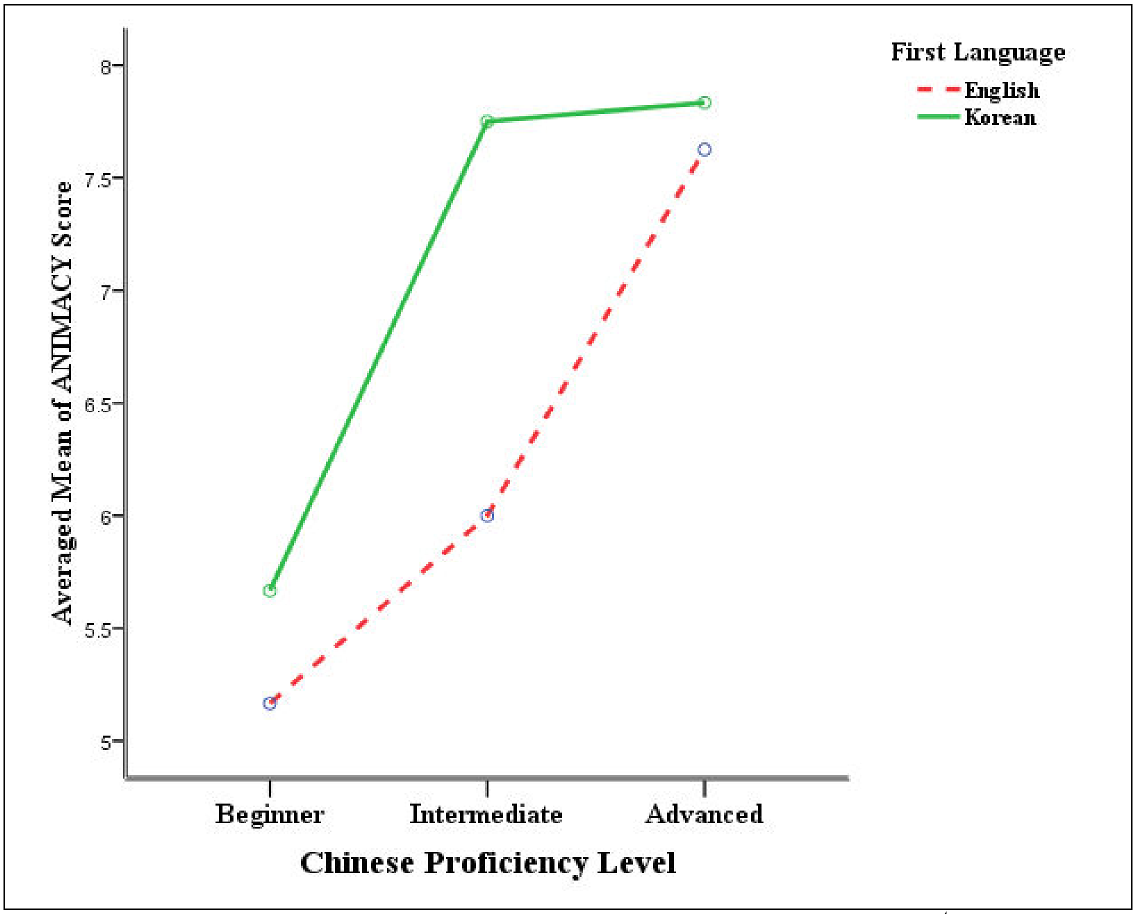


Figure 3.30 Estimate ANIMACY Mean Score Grouped by CPL and 1st Languages

Overall, as discussed earlier, the Korean subjects outperformed their English counterparts throughout the three CPL levels. I will further analyze this trend by grouping the classifier based on the cognitive categories of ANIMACY, FUNCTION and EVENT. In ANIMACY classifier production, as seen in Figure 3.30 below, the intermediate Korean students performed much better than the English subjects. However, the differences between the novice and advanced Korean and English subjects' performances are not so noticeable.

In FUNCTION classifier production, the Korean and English subjects' performances are more parallel (see Figure 3.31).

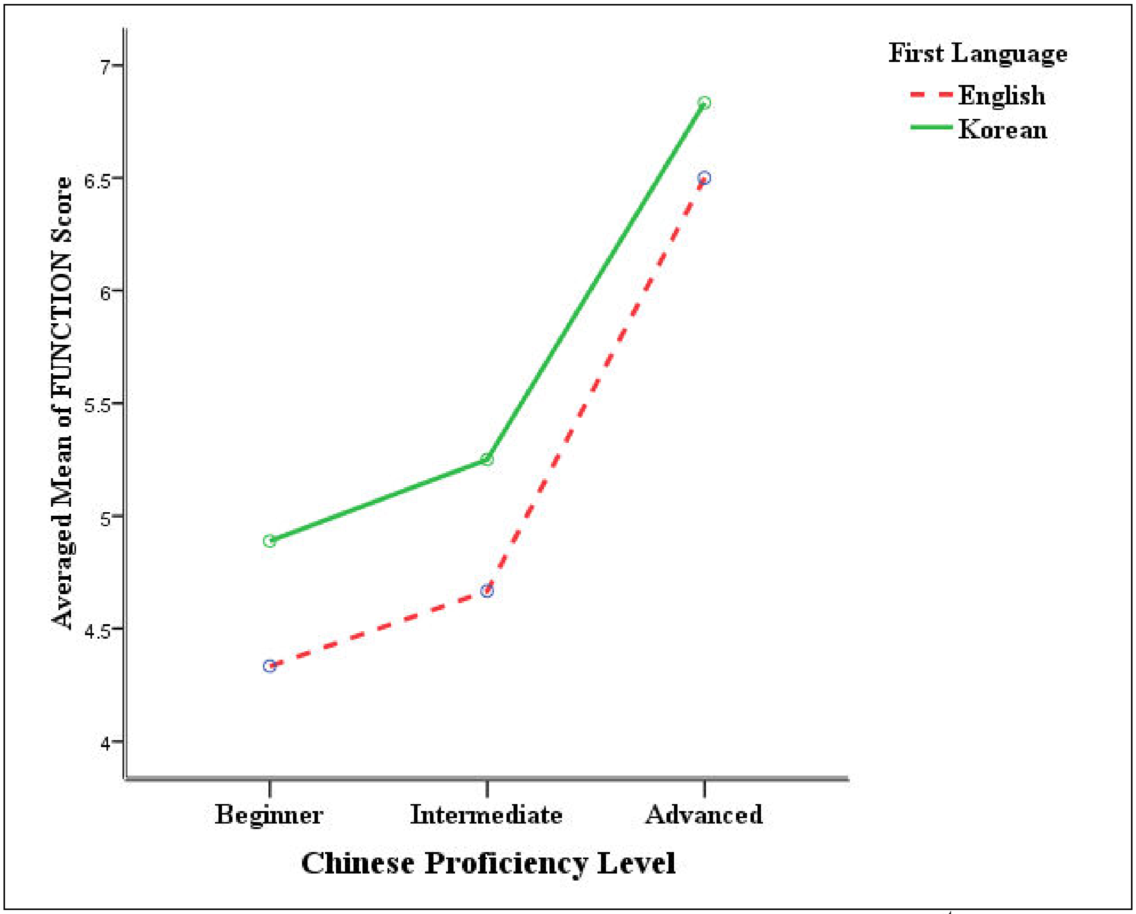


Figure 3.31 Estimate FUNCTION Mean Score Grouped by CPL and 1st Languages

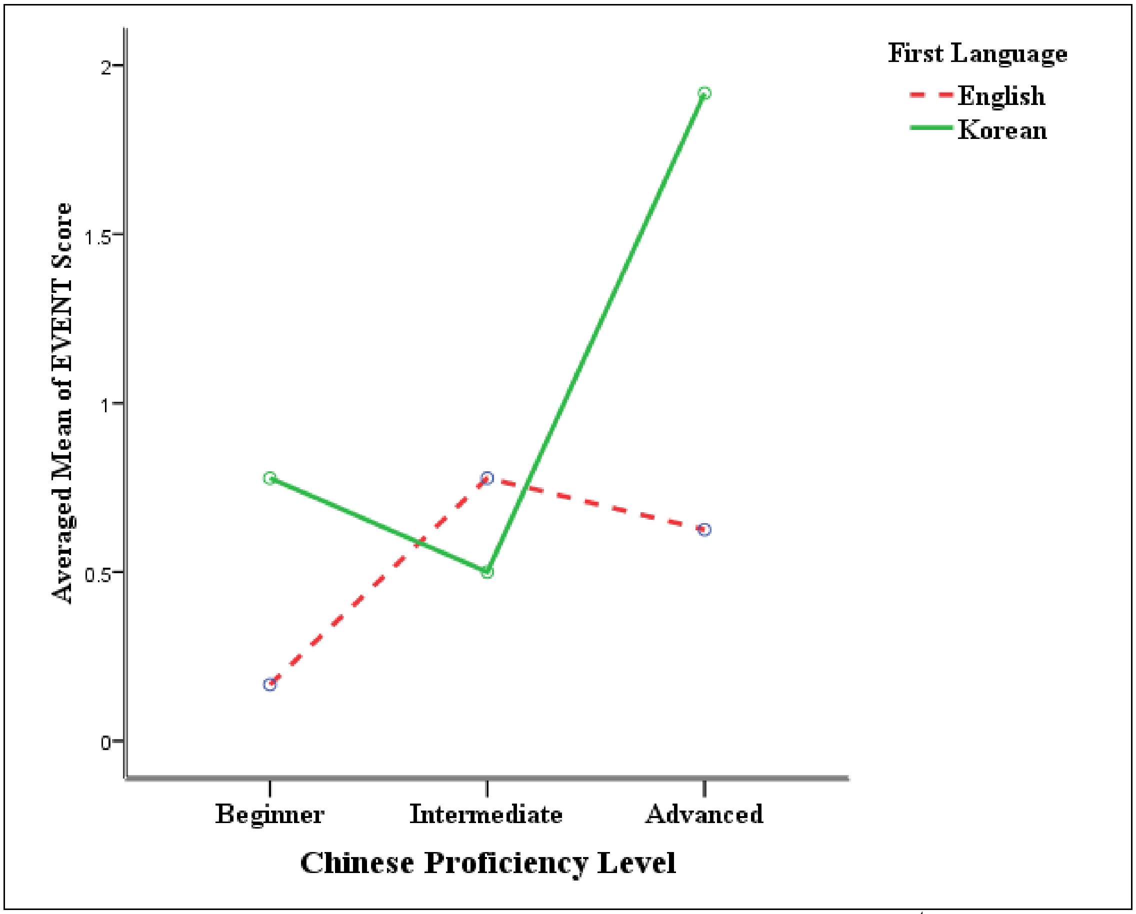


Figure 3.32 Estimate EVENT Mean Score Grouped by CPL and 1st Languages

Compared to the other two types of classifiers, both Korean and English subjects performed poorly in the EVENT classifier production. Also, both groups showed a U-shaped progression pattern where the Korean subjects' performance regressed from Novice to Intermediate level and the English subjects' regression point started at the intermediate level. Further investigation is needed to make any reliable claim, but these rather illogical patterns are very likely derived from the possibility of random guessing by the L2 subjects since most of them had not learned many EVENT classifiers.

L2 subjects' performance on each CL under FUNCTION, ANIMACY, and EVENT grouped by CPL and native language are illustrated and presented in Appendix D.

3.3 Experiment III – Typological Classifier Test

In the third experiment, L2 subjects were tested to show how they first identify prototype objects associated with five Chinese noun classifiers and then re-categorize them according to the prototypicality of each object. Their results are then compared and contrasted with L1 subjects' production. Following a description of data organization and arrangement, a discussion and implication will be presented based on the findings.

There are two types of classifiers in the third experiment: SHAPE classifiers and FUNCTION classifiers. I will first analyze the SHAPE classifiers which consist of 條 *tiáo*, 張 *zhāng,* and 粒 *lì*. They each represent one-, two-, and three-dimensional classifiers respectively. For the FUNCTION classifiers, there are 把 *bǎ* and 台 *tái* which denote objects with a handle and objects that are machine-like respectively. Before presenting the results and discussion, it is necessary to go over the procedures involving how the data are categorized and organized in ways that one can compare and contrast the data produced by the L1 and L2 subjects.

3.3.1 Data Processing

Before going into the details of the data, I would like to first explain the measurements to be discussed and how they are derived at. As seen in Table 3.18, the first column contains the responses produced by the subjects with the highest frequency one listed in the first row. The second column indicates the frequency of a certain response produced by the L2 subjects. This frequency is denoted as (*F2*). The next column, denoted as (1^{st} A), contains the frequency of first response recorded in the Space A in the experiment. This Space A, as discussed in 3.3.4, stores the immediate responses produced by the subjects when they were asked to produce objects that can be denoted by a certain classifier listed in the experiment. Below this Space A, Space B is where the subjects would re-rank the objects recorded in Space A based on the typicality of the responses to the classier being questioned. The frequency of the first response recorded in Space B is then stored in (1^{st} B) column in the table. Each of the responses in Space B was given a rank score to indicate its ranking position. Ranging from 1 to 5, the first response was assigned the score of 1 and the last response's score is then 5. In the cases where less than 5 responses were produced by any particular subject, the rank score would be given only to those that were produced. That is, if a subject gave only 3 responeses for a particular classifier, only 3 rank scores would be assigned. These rank scores are used to derive (*R2*) scores in the following tables.

Table 3.18 Responses for 張 *zhāng* (CL for 2-dimension)

	All L2 (*N*=58)				All L1 (*N*=10)		
Response	*F2*	$(1^{st} A)$	$(1^{st} B)$	*R2*	Response	*F1*	*R1*
紙 'paper'	45	24	34	1.33	紙 'paper'	10	1.30
桌子 'table'	28	13	7	2.33	桌子 'table'	8	2.25
照片‘photo'	28	9	9	2.00	床 'bed'	3	3.00
畫 'painting'	10	2	2	2.50	照片‘photo'	3	3.33
床 'bed'	8	0	0	2.37	椅子 'chair'	3	3.66
報紙 'newspaper'	7	1	1	2.50	畫 'painting'	2	4.00
衛生紙 'toilet paper'	5	0	0	3.60	衛生紙 'toilet paper'	1	2
票 'ticket'	5	1	1	2.75	報紙 'newspaper'	0	N/A
椅子 'chair'	4	1	1	3.66	票 'ticket'	0	N/A
3: 木板 'woodboard', CD, 名片 'business card', 地圖 'map'. 2: 鈔票 'dollar bill', 郵票 'stamp', 明信片 'post card', 文件 'document', 考卷 'test paper', 臉 'face'. 1: 支票 'check', 嘴 'mouth', 報告 'report', 牌子 'ad sign', 飛機票 'plane ticket', 唱片 ‘music record', 日曆 'calendar', 海報 'poster', 牆 'wall'. *: 白板 'white board', 護照 'passport', 雜誌 'magazine', 證明書 'proof', 比薩 'pizza', 玻璃 'glass', 日曆 'calendar', 唱片 'record', 布 'clothe', 有腳物 '?? ', 頁 'page', 門 'door', 蛋餅 'egg roll', 衣服 'clothing', 手錶 'watch', 毛巾 'towel', 卡通 'cartoon', 木板 'wood board'.					3: 海報 'poster' 2: 臉 'face', 餅/薄餅 'pancake', 1: 駕照 'driver’s license', 卡片'card', 麵糰 'flour dough', 草蓆 'straw mat', 罰單 'fine ticket', CD, 名片 'business card', 文件 'document', 考卷 'test paper', 沙發 'sofa', 證件 'certificate'.		

The next column in the table is denoted as (*R2*), which measures the mean rank position of each response. To derive this measure of a certain response, I first added up the rank scores assigned to that response and then divided the result by the total *F* of that response. For example, the response 路 *lù* appeared 26 times in the first position (26 X 1 = 26), 14 times in the second position (14 X 2 = 28), 2 times in the third position (2 X 3 = 6), 1 time in the fourth position (1 X 4 = 4) and 0 times in the fifth position (0 X 5 = 0). The *R2* mean rank position is then derived by first adding up these multiplied numbers and then dividing by the total frequency of *F2*:

R2 = (26 + 28 + 6 + 4 + 0) / 43 = 1.48.

Ideally, the most typical object would have a mean rank score of 1. The above *R* measure thus indicates how close a certain response is to the most typical object for a particular linguistic category associated with the noun classifier being discussed. Therefore, for each response, the closer its *R* is to the score of 1 the more typical object it represents. For L1 subjects, only their frequency *F1* and mean score position *R1* will be presented as a base for L2 subjects' results to be compared to.

The responses are ordered based on their frequency starting from the highest one. Not all responses will be given the detailed information for further analysis. At a certain point, the responses will be only listed in groups based on their frequency. For these grouped responses, no detailed information is given as their frequencies are too small to have any significance for this study. They are listed here as a reference so that the reader has a general idea as to what are the objects also produced by the subjects. In addition, the responses that are incompatible with being denoted by the classifier in question are grouped and labeled as either * or **. When the responses are ungrammatical for a certain classifier, they are grouped together and labeled as *. For the classifier 把 *bǎ*, both * and ** are used because this classifier can be considered as a classifier as well as a measure word. Since this study only concerns typical objects that are associated with classifiers, those responses that are produced to be associated with 把 *bǎ* as a measure word are labeled as *. Those that are produced ungrammatically are grouped and labeled as **.

The cutting point mentioned earlier varies from classifier to classifier. This is mainly because the number of relevant objects produced by the subjects is inconsistent across the five classifiers. For example, for the classifier 條 *tiáo* and 張 *zhāng*, their highest *F2* scores are 43 and 45 respectively. As a result, up to 10 responses are included for further analysis. On the other hand, under the classifier 粒 *lì*, only 5 responses are analyzed because the highest *F2* score is only 7. Therefore, the cutting point here is set based on the number of higher *F2* scores for each classifier. The more numbers of higher *F2* scores, the more responses would be included for further analysis.

In addition, if a response has a high *F1* score but does not have an *F2* score at all, it would still be included as a part of analysis. This is so that one can contrast L1 and L2 subjects' typological perceptions toward certain linguistic categories. For instance, for the classifier 條 *tiáo*, the response 毛巾 'towel' is not produced by any of the L2 subjects but is ranked as the highest *F1* and *R1* by the L1 subjects. To reveal this difference, it is necessary to include it as a part of analysis.

The processes of analyzing these data are outlined below. First, I will compare and contrast the results between L1 subjects as one group and L2 subjects as the other. This will give us a general idea as to how similarly or differently these two groups of subjects behave. Next, the L2 subjects are grouped based on their CPL and then their *F2* scores are compared with those of L1's. The goal of this grouping is to find out if there exist certain trends among these three groups of subjects which might provide answers to the research questions. Thirdly, the L2 subjects are grouped based on their first languages and then their *F2* scores are again compared within the L2 groups. Again, the patterns distilled from comparing these two groups of subjects will shed some light on how Korean and English speakers develop their typological association with certain classifiers tested in this study.

3.3.2 General Patterns

In this section, I will first present the results and discussion for the shape classifiers experimented with in the current study. Due to their similar patterns of results, the two-dimension classifier 張 *zhāng* and the three-dimension classifier 粒 *lì* are arranged and discussed together before the one-dimension classifier 條 *tiáo* is discussed. Then, the function classifiers are discussed later in this section.

3.3.2.1 Shape Classifiers: 張 *zhāng*, 粒 *lì*, and 條 *tiáo*

As shown in Tables 3.18 and 3.19, certain responses appear more frequently and earlier in the response sequence for both 張 *zhāng* and 粒 *lì*. For the classifier 張 *zhāng*, the highest *F2* (45/290 = 16%) response produced by L2 subjects is 紙 *zhǐ* and it also has the lowest *R2* score of 1.33. For the classifier 粒 *lì*, the most frequently produced response (7/290 = 2%) is 米 m*ǐ* and its *R2* score is 1.80.

A similar pattern of results can be found when comparing these results with those produced by L1 subjects. As seen in Column 6 of both Table 3.18 and 3.19, the most frequently produced responses with the lowest *R1* score are also 紙 *zhǐ* and 米 m*ǐ* respectively for classifier 張 *zhāng* and 粒 *lì*. It surely is not a coincidence that both L1 and L2 subjects' highest frequent response for these two classifiers are the same ones.

The next higher ranking responses by L2 subjects are also produced by L1 subjects although the ranking positions are not in exactly the same order. For example, for the classifier 張 *zhāng*, some of the higher ranking responses produced by L1 are 照片 'photo', 桌子 'table', 畫 'painting', and 床 'bed'. They appear in L1 subjects' results in this order, 桌子 'table', 床 'bed', 照片'photo', and 畫 'painting'. For the classifier 粒 *lì*, some of the higher ranking responses by L1 are 藥/藥丸 'pill', 沙子 'sand', 糖果 'candy', and 珍珠 'pearl'. For L2 subjects, they appear in this order: 珍珠 'pearl', 藥/藥丸 'pill', 沙子 'sand', and 糖果 'candy'. Again, they do not appear in the exact same order but do show a certain degree of similarity.

The next observation that is worth discussing is that the majority of the responses produced by L1 subjects are also produced by L2 subjects. For the classifier 張 *zhāng*, out of the 21 token responses, only 8 of them are not produced by L2 subjects. For the classifier 粒 *lì*, 7 out of 18 token responses produced by L1 subject are not produced by L2 subjects. For the classifier 條 *tiáo*, 7 out of 22 token responses are not produced by L2 subjects. This overlapping is even clearer with function classifiers.

For the classifier 把 *bǎ*, 3 out of 11 token responses are not produced by L2 subjects. For the classifier 台 *tái*, only 1 out of 14 token responses are not produced by L2 subjects. This suggests that there is a great extent of overlapping, between L1 and L2 subjects, in cognitive association of objects with these classifiers.

The third pattern observed is the extensive amount of incompatible responses produced by L2 subjects for these shape classifiers. Not only are these responses not produced by L1 subjects, they are considered ungrammatical due to the fact that their salient permanent perceptual characteristics do not belong to the category of the classifiers in question. For instance, for the classifier 張 *zhāng*, one L2 subject produced an incompatible response 護照 'passport', which should be denoted by another classifier 本 *běn*. This 護照 'passport' object might have a flat surface like other grammatical objects that are denoted by the classifier 張 *zhāng*, however, it has more than one layer and therefore belongs to a category that contains books, magazines, journals, etc.

Table 3.19 Responses for 粒 *lì* (CL for 3-dimension)

	All L2 (*N*=59)				All L1 (*N*=10)		
Response	*F2*	*(1st A)*	*(1st B)*	*R2*	Response	*F1*	*R1*
米 'rice'	7	6	4	1.85	米 'rice'	5	1.80
藥/藥丸 'pill'	6	4	4	1.20	珍珠 'pearl'	4	3.00
沙子 'sand'	6	0	0	3.40	種籽 'seed'	4	3.00
糖果 'candy'	4	2	2	1.80	藥/藥丸 'pill'	3	4.33
珍珠 'pearl'	3	1	1	2.33	豆子	3	2.66
					葡萄 'grape'	3	2.66
					沙子 'sand'	2	2.40
					糖果 'candy'	0	N/A
2: 種籽 'seed', 蘋果 'face', 紅豆 'red bean', 鑽石 'diamond', 滴水 'water drop'. 1: 葡萄 'grape', 柚子 'grapefruit', 土豆 'potato', 棒球 'baseball', 地球 'earth', 子彈 'bullet', 足球 'soccer ball', 李子 'plum', 石頭 'stone', 桃子 'peach', 花生米 'peanut', 豆子 'bean', 柚子/文旦 'grapefruit', 水果 'fruit', 土豆 'peanut', 棒球 'baseball', 玉米 'corn', 麥子 'wheat', . *: 團體 'group', 會議 'meeting', 眼鏡 'eye glasses', 地球 'the earth', 子彈 'bullet', 足球 'soccer ball', 錢幣 'coin', 輪胎 'tire'.					2: 花生米 'peanut', 水餃 'dumpling', 麥子 'wheat'. 1: 芝麻 'sesame', 星塵 'dust', 貢丸 'meatball' , 眼屎 'eye wax', 紅豆 'red bean', 鑽石 'diamond', 水果 'fruit', 石頭 'stone'.		

Other objects that are even more incompatible are also found in L2 subjects' production. For example, one subject produced 卡通 'cartoon' for the classifier 張 *zhāng*, which is by no means related to the category denoted by this classifier. This and other incompatible responses show that, for some L2 subjects, they have not developed the knowledge necessary to distinguish the salient feartures of certain objects from others in order to include or exclude them from certain categories denoted by corresponding classifiers.

Unlike those observed in the shape classifier 張 *zhāng* and 粒 *lì*, L2 subjects' responses in the classifier 條 *tiáo* is rather inconsistent compared to those produced by L1 subjects. As seen in Table 3.20, the most frequent response by L2 subjects is 路 'road' ($F2$ = 43) but this is not produced at all by L1 subjects. On the other hand, the second most frequent response produced by L1 subjects is 毛巾 'towel' (F1 = 5) which is not produced at all by L2 subjects. These contradicting results indicate that there is a great discrepency about what the most typical objects should be for this shape classifier 條 *tiáo* for L1 and L2 subjects.

Also, L2 subjects produced a relatively greater amount of incompatible responses for this classifier as well. Out of the 50 total response types, 16 of them are incompatible. Sometimes, the incompatibility is caused by subtle differences within the potential candidates. For instance, in order to be denoted by this classifier 條 *tiáo*, the denoted objects must be one-dimensional, thin, and flexible. Some L2 subjects mistakenly categorized one-dimensional, thin but inflexible objects, such as 原子筆 'ballpoint pen' and 筷子 'chopstick', into the category denoted by the classifier 條 *tiáo*. On the other hand, some subjects produced objects that are not even close to being considered a good candidate for this category, e.g., 停車位 'parking spot', 手錶 'watch', and 大廳 'hall'. None of these objects has a salient feature of being one-dimensional, thin, and flexible. Based on this and the above-mentioned observations, L1 and L2 subjects seem to have less of an overlapping of perceptual association of this classifier 條 *tiáo* than with the other two shape classifiers discussed earlier.

Table 3.20 Responses for 條 *tiáo* (CL for 1-dimension)

	All L2 (*N*=58)				All L1 (*N*=10)		
Response	*F2*	(1^{st} *A*)	(1^{st} *B*)	*R2*	Response	*F1*	*R1*
路 'road'	43	20	26	1.48	線 'string'	9	2.55
河 'river'	34	13	11	2.09	毛巾 'towel'	5	1.80
褲子 'trouser'	20	3	5	2.50	魚 'fish'	5	3.00
魚 'fish'	15	5	2	3.00	褲子 'trouser'	3	3.00
線 'string'	16	1	4	2.73	蛇 'snake'	3	3.00
蛇 'snake'	10	4	0	3.55	河 'river'	2	1.50
裙子 'skirt'	5	1	2	1.80	皮帶 'belt'	2	2.50
皮帶 'belt'	1	1	1	1.00	裙子 'skirt'	0	N/A
蟲 'worm'	1	0	0	5.00	蟲 'worm'	2	3.00
毛巾 'towel'	0	0	0	N/A	路 'road'	0	N/A

4: 狗 'dog', 腿 'leg'.
3: 新聞 'news', 原子筆 'pen', 橋 'bridge'.
2: 油條 'fried stick', 彩帶 'ribbon', 香煙 'cigarette', 領帶 'necktie', 棒/棍子 'stick/club', 香蕉 'banana', 鐵路 'railroad'.
1: 電線 'wire', 街 'street', 消息 'message', 意見 'opinion', 麵包 'bread', 歌兒 'song', 瀑布 'waterfall', 公路 'highway', 巷子 'alley', 麵 'noodle', 肉 'meat', 龍 'dragon', 絲瓜 'guard', 瀑布 'water fall', 皮帶 'belt'.
*: 原子筆 'ballpoint pen', 刀子 'knife', 外套 'coat', 衣服 'clothing', 筷子 'chopstick', 日光燈 'fluorescent light', 頭髮 'hair', 停車位 'parking spot', 巷子 'alley', 大廳 'hall', 歌兒 'song', 手錶 'watch', 桿子 'pole', 襯衫 'shirt', 陽/雨傘 'umbrella', 火車 'train'.

3: 棉被 'blanket'.
2: 麵包 'bread', 電線 'wire', 皮帶 'belt'.
1: 木瓜 'papaya', 牙膏 'toothpaste', 項鏈 'necklace', 手環 'bangle', 柱子 'column', 黏土 'clay', 狗 'dog', 新聞 'news', 香蕉 'banana', 棒/棍子 'stick/club',

3.3.2.2 Function Classifiers: 把 *bǎ*, and 台 *tái*

Producing compatible objects for function classifiers seems to be an even more challenging task for L2 subjects than for shape classifiers. As seen in Table 3.21, the first three highest ranking responses produced by L2 subjects are positioned lower in L1 subjects' production, except 梳子 'comb' and 刀子 'knife'. The other responses by L2 are either lower in L1 subjects' production ranking or none exists at all. These are indications that L2 subjects' mental representation of the objects for this classifier 把 *bǎ* is quite different than that of L1 subjects. Nonetheless, L2 subjects were able to produce quite a few correct responses for this classifier 把 *bǎ*. This is, in fact, quite impressive as this classifier is not used as often as shape classifiers and learners have to know that it is reserved for objects with a physical part that can be grabbed on to. It can be a challenging task even for L1 subjects. As shown in Table 3.18 to 3.20, L1 subjects were able to produce it close to 50 times as a correct response for each of the classifiers tested in this study. However, for this classifier 把 *bǎ*, they were able to produce only 27 correct responses. It is then not surprising to see a greater disprepency between L1 and L2 subjects' production.

Table 3.21 Responses for 把 *bǎ* (CL for handle)

	All L2 (*N*=58)				All L1 (*N*=10)		
Response	*F2*	*(1^{st} A)*	*(1^{st} B)*	*R2*	Response	*F1*	*R1*
椅子 'chair'	17	12	9	1.33	梳子 'comb'	6	2.00
傘 'umbrella'	13	7	8	2.00	槍 ‘gun’	6	2.33
鑰匙 'key'	7	5	6	2.33	刀子 'knife'	5	1.66
掃把 'broom'	6	0	0	2.37	椅子 'chair'	4	4.50
刀子 'knife'	6	2	2	2.50	劍 'sword'	3	2.66
棒/棍子 'stick'	4	0	3	2.50	鑰匙 'key'	3	3.33
門把 'door knob'	4	1	0	2.75	傘 'umbrella'	3	1.00
梳子 'comb'	4	1	0	3.60	掃把 'broom'	0	N/A
槍 ‘gun’	1	0	0	N/A	棒/棍子 'stick'	0	N/A
劍 'sword'	1	0	0	N/A	門把 'door knob'	0	N/A
3: 叉子 'fork', 拖把 'mop'.❝ 2: *筆 'pen', *錢 'money', *請事 'matter'. 1: * 原子筆 'ballpoint pen', *黏土 'clay', *米 'rice', 刷子 'brush', 扇子 'fan', 牙刷 'tooth brush', *沙子 'sand', *筷子 'chopstick', *手提箱 'briefcase', *事物 'things', 梯子 'ladder', *書 'book', *手機 'cell phone', 杓子 'ladle', *針 'needle', *橡皮擦 'eraser', *錢幣 'coin', 茶壺 'teapot', 槍 ‘gun’, 劍 'sword'. **: 手錶 'watch', 衣服 'clothing', 電視機 'TV', 鐵杆 'iron rod', 球拍 'racket', 幹 'pole?', 槓桿 'lever', 孩童 'child', *掌 'palm', 郵票 'stamp', 桌子 'table'.					4: *泥土 'dirt'. 3: *青菜 'vegetable'. 2: *頭髮 'hair', *火 'fire', 尺 'ruler', 1: *糖果 'candy', *麵 'noodle', 吹風機 'hair dryer', *石頭 'rock', 電風扇 'electric fan', 弓箭 'bow', *湯匙 'spoon'.		

As discussed earlier, since this classifier 把 *bǎ* can also be considered as a measure word denoting the quantity of certain objects, it would not be unexpected to see some responses produced for that reason. For example, L1 subjects produced *泥土 'dirt', *青菜 'vegetable', *頭髮 'hair', and other words that belong to the category denoted by 把 *bǎ* as a measure word. L2 subjects also produced similar responses such as *米 'rice', *沙子 'sand', *筷子 'chopstick', and others that can be translated as 'a handful of …'. These responses show that both L1 and L2 subjects have this knowledge of using this word 把 *bǎ* as a classifier as well as a measure word.

Furthermore, when the distribution of the response tokens produced by L1 subjects is compared with those produced by L2 subjects, a clear pattern of overlapping is found. Out of the 11 response tokens produced by L1 subjects, only 3 of them are not found in the L2 subjects' production pool. This indicates that there is a great extent of overlapping between L1 and L2 subjects' mental representation of objects that can be denoted by this classifier.

The next observation that I would like to mention briefly is the production of incompatible responses for this classifier 把 *bǎ* by L2 subjects. There are 11 responses that fall into this ** group. Some of these responses, e.g., 鐵杆 'iron rod', 槓桿 'lever', and 球拍 'racket', deserve a special attention. These objects all have a portion of their physical body that can be grabbed on to and thus can be considered as a potential candidate to be denoted by this classifier 把 *bǎ*. However, they are in fact denoted by at least two other classifiers based on other salient perceptual characteristics that each of these objects has. For example, 鐵杆 'iron rod' should be denoted by 根 *gēn* because it is one-dimensional, long, thin, inflexiable, AND rigid or hard in texture. Notice that the physical portion of this object to be grabbed on to is not one of the most salient features. Because of this and its texture, which separate it from other similar one-dimensional objects, it is categorized into another group denoted by this classifier 根 *gēn*, instead of 把 *bǎ*. In addition, another possible classifier for this object is 枝 *zhī* when this denoted object 鐵杆 'iron rod' is relatively thinner and shorter.

Another plausible explanation is that certain combinations are used almost idiomatically by native speakers and no apparent or logical explanation can be definitely given. For this type of classifier-object association, L2 learners will probably have to memorize them case by case. When running into situations like this, personal preference usually dictates which classifier is to be used. There is not much attention given to which one is the most appropriate choice as there is no absolute and definite guideline one can follow.

Now, let me move on to the next function classifier 台 *tái*. More similar patterns are observed when comparing L1 and L2 subjects' results with classifier 台 *tái* than with classifier 把 *bǎ*. As seen in Table 3.22, for both of the L1 and L2 groups, the first two highest ranking responses are exactly the same, 電腦 'computer' and 電視機 'TV'. Not only are their frequencies high, but their *R* scores are fairly low as well. The following higher ranking responses are in similar positions except for the response of 腳踏車 'bicycle', which is only produced once by L2 subjects but ranked the third highest response by L1 subjects. Overall, in terms of response frequency, L2 subjects' results to a great extent resemble those produced by L1 subjects.

Moreover, the distributions of their responses overlap overwhelmingly as well. While L1 subjects produced 14 different responses tokens, only one of them was not produced by L2 subjects. This particular response, 隨身聽 'walkman', was produced once by an L1 subject and is rarely seen or heard nowadays although it was a popular item some twenty years ago. This might be the reason that it did not show up in the L2 subjects' list as these L2 subjects are mostly college students. In short, in terms of response frequency and token distribution, L2 subjects' results to a great extent resemble those produced by L1 subjects.

Table 3.22: Responses for 台 *tái* (CL for 2-dimension)

	All L2 (*N*=58)				All L1 (*N*=10)		
Response	*F2*	*(1st A)*	*(1st B)*	*R2*	Response	*F1*	*R1*
電腦 'computer'	24	10	9	1.83	電腦 'computer'	9	1.88
電視機 'TV'	19	9	13	1.42	電視機 'TV'	8	2.75
收錄音機 'radio'	10	0	1	3.44	腳踏車 'bicycle'	8	3.50
冰箱 'refrigerator'	9	1	2	2.88	汽車/車 'car'	6	3.00
汽車/車 'car'	7	2	2	2.33	洗衣機 'washer'	2	2.50
電視頻道 'TV station'	4	3	2	1.75	收錄音機 'radio'	2	3.00
照相機 'camera'	4	1	1	2.00	冰箱 'refrigerator'	2	4.00
洗衣機 'washer'	4	0	0	3.75	電視頻道 'TV station'	0	N/A

3: 機器 'machine', 冷氣 'air conditioner'.
2: 飛機 'airplane', 印表機 'printer'.
1: 電風扇 'electric fan', 鋼琴 'piano', 腳踏車 'bicycle', 電子字典 'electronic dictionary' 暖氣機 'heater', 印表機 'printer', 暖氣機 'heater'.
*: 電話 'telephone', 日光燈 'fluorescent light', 大廳 'hall', 桌子 'table', 表演 'performance', 廣播電臺 'radio station', 玩具 'toy', 船 'ship', 台中 'Taichung', 台灣 'Taiwan', 台北 'Taipei',

2: 照相機 'camera', 機器 'machine', 冷氣 'air conditioner', 電風扇 'electric fan'.
1: 飛機 'airplane', 隨身聽 'walk man', 鋼琴 'piano',

Table 3.22 – *Continued*

字典 'dictionary', 傢俱 'furniture', 直升機 'helicopter'.

Lastly, as observed previously, L2 subjects produced some imcompatible responses for this classifier as well. Some of them, such as 電話 'telephone', 船 'ship', and 直升機 'helicopter', have the physical characteristic of being machine-like but are denoted by other classifiers. For instance, 船 'ship' is denoted by 艘 *sōu* since it is a vehicle used on water and 直升機 'helicopter' is denoted by 架 *jià* because it is used in the air. Unless they have specifically learned these two classifiers, it is logical to categorize these two responses into the group denoted by this classifier 台 *tái* since these two objects are very much machine-like. However, there are a few responses that are totally out of the question. For example, 台中 'Taichung', 台灣 'Taiwan', and 台北 'Taipei' are place names and have nothing to do with machinery. Further investigation is needed to unveil the reasoning for producing these incompatible responses.

So far, I have gone over the general trend and pattern that L2 subjects exhibit in producing responses that can be associated with these five classifiers. However, who these subjects are that perform better than the other groups with what type of classifiers, and to what extent they outperform their counterparts are not discussed in detail yet. To answer these questions, in the next two sections, L2 subjects' results are analyzed by grouping their responses based on their CPL and 1st languages. I will start with subject data grouped by three different CPL levels, followed by subject data grouped by the two different 1st languages.

3.3.3 Data Grouped by CPLs

In this section, L2 subjects' results are grouped into three columns in the following Tables 4.3.8 to 4.3.12 based on their CPL levels. The data arrangement for these tables is slightly modified to reveal L2 subjects' response patterns. In each table, the first column contains the names of the responses produced by the subjects. These responses are arranged according to L1 subjects' response frequencies, listed under Column (*F1*). From highest to lowest, when this *F1* score drops to 0, the appearance order is then based on L2 subjects' total response frequencies (*F2*), which is listed in the last column. L2 subjects' responses are arranged into three groups based on their CPLs and are listed in the third, fourth, and fifth columns of each table.

At the bottom of each table, after all the responses are listed, five rows of data are presented for further analysis. The first and second rows record the total numbers of correct and incompatible/incorrect responses respectively given by the subjects. The third row contains the numbers of total responses. Based on these numbers, the numbers for the last two rows are computed, which is the percentage of correct and incompatible/incorrect responses.

Lastly, in the first column, those responses that are incompatible for the classifier in question are labeled as *. The total response frequencies for this type of responses are also summed up and listed at the very bottom of the tables. In the case of classifier 把 *bǎ*, there are two types of incorrect responses. The first type is those responses produced when 把 *bǎ* is treated as a measure word. Since only classifiers are of concern in this study, this type of responses is considered incompatible and labeled as *. The second type of responses is labeled as ** when the responses are entirely ungrammatical no matter whether the word 把 *bǎ* is considered as a measure word or a classifier. These two types of responses are summed up together as one big "incompatible" group at the bottom of that table.

For the purpose of analyzing the results in a more systematic manner, I will discuss two patterns that can be distilled from each of the following five tables. These patterns are 1) the order, from lowest to highest, of the percentage of grammatical responses produced by L2 subjects; 2) the distribution scope of correct response tokens by L2 subjects. Presumably, the first pattern will reveal the emergence order of correct production frequency by L2 subjects. The hypothesis is that subjects in the more advanced level would produce a higher frequency of responses because they have acquired more Chinese classifiers and are more experienced in hearing and using these classifiers.

The second pattern would inform us of the correlation between L1 and L2 subjects' response scopes. I hypothesize that the response scope by L2 subjects in the more advanced CPL level would again mirror more closely those produced by L1 subjects than those by lower CPL subjects.

As seen in Table 3.23, which is derived from Tables 3.18 to 3.22, the percentage of correct responses for each classifier by both L1 and L2 subjects is displayed. The data in this table show a clear pattern. Out of these five classifiers, four of them show a pattern of the Novice group being the one that produced the lowest percentage of correct responses followed by the Intermediate group and then the Advanced group. These are the classifiers of 粒 *lì*, 條 *tiáo*, 把 *bǎ*, and 台 *tái*. The only exception that does not show this similar pattern is that of 張 *zhāng*, which has a pattern which shows the Intermediate group being the lowest percentage followed by Advanced and then Novice groups.

Table 3.23 Correct Responses % Grouped by CPL

	All L1 (*N*=10)	All L2 (*N* = 58)			
	F1	Novice	Intermediate	Advanced	Total
Classifier		*F2*	*F2*	*F2*	*F2*
粒 *lì*	100%	61%	94%	95%	83%
條 *tiáo*	96%	78%	84%	95%	86%
把 *bǎ*	64%	66%	70%	81%	73%
台 *tái*	100%	72%	85%	93%	86%
張 *zhāng*	100%	92.3%	91%	92%	91%

The latter pattern is not so different from the previous four if the data are examined more closely. The correct response percentages for this classifier 張 *zhāng* by Novice, Intermediate, and Advanced groups are 92.3%, 91%, and 92% respectively. These percentages are almost identical and should be interpreted as no significant difference between these three groups in terms of their percentages of correct production. Furthermore, four out of the five incorrect responses produced by Intermediate subjects are 護照 'passport', 雜誌 'magazine', 比薩 'pizza', and 玻璃 'glass'. The common characteristics of these objects share are 1) their shapes are all 2-dimensional; 2) they all have a flat surface. Therefore, it is logical for the Intermediate subjects to mistakenly categorize them under this classifier. However, these objects take other classifiers since these above-mentioned characteristics are not their most salient inherent features. For instance, 護照 'passport' and 雜誌 'magazine' are denoted by 本 *běn* because the most salient feature for these objects is being book-like. For 比薩 'pizza' and 玻璃 'glass', they are denoted by 片 *piàn* since their salient feature is having an irregular shape. In short, because the correct response percentages are almost identical among the three L2 subject groups and some of the incorrect responses produced by Intermediate and Advanced groups are not so far off for being considered correct ones, the emergence order for this classifier is not as apparent and clear as those observed in the other classifiers.

Table 3.24 Total Response Token Frequency Grouped by CPL

	All L1 (*N*=10)	All L2 (*N* = 58)			
	F1	Novice	Intermediate	Advanced	Total
Classifier		*F2*(%)	*F2*(%)	*F2*(%)	*F2*
台 *tái*	15	10(30)	11(33)	12(36)	33
把 *bǎ*	11	12(31)	13(34)	13(34)	38
粒 *lì*	17	8(25)	13(41)	10(32)	31
條 *tiáo*	20	16(32)	13(26)	21(42)	50
張 *zhāng*	21	19(33)	17(29)	21(36)	57

Next, in terms of subjects' scope of response tokens, the trend is not so clear. These token numbers for each group in each classifier are derived by counting the numbers of token appearances of each group and listing them based on their CPL. As seen below, the general trends are inconsistent among the five classifiers. When the groups are arranged in the order of Low, Mid, and High, the token frequency order for each classifier is as follows:

Classifier	Novice	Intermediate	Advanced
台 *tái* (Func):	Low	Mid	High
把 *b*ǎ (Func):	Low	Mid	Mid
粒 *lì* (Shape_3D):	Low	High	Mid
條 *tiáo* (Shape_1D):	Mid	Low	High
張 *zhāng* (Shape_2D):	Mid	Low	High

While the patterns found in function classifiers are similar, those in shape classifiers are more inconsistent. For the function classifiers 台 *tái* and 把 *b*ǎ, the order of token range is mostly from Low to Mid to High. This means that, with function classifiers, L2 subjects produced an increasing wider range of response tokens as their CPL advances from Novice to Advanced. For L1 subjects, these function classifiers are relatively lower in number of occurrences compared to shape classifiers (See Tables 3.25 to 3.29). For the shape classifiers 粒 *lì*, 條 *tiáo*, and 張 *zhāng*, there is no clear pattern one can claim except that the Intermediate group tends to have a lower token diversity while the Advanced group tends to have a higher token diversity. Notice also that these shape classifiers have a relatively higher number of occurrences compared to function classifiers.

Why do the data have these patterns? One possible explanation is that since function classifiers are less often used and their corresponding objects are less commonly seen in daily life, the diversity of response tokens produced by L1 subjects is then naturally lower than those of shape classifiers. Since these objects are less commonly found in daily life, only more advanced L2 subjects will have the knowledge and experience based on using them in daily speech and acquiring them as part of their language competence.

On the other hand, since the shape classifiers and their corresponding objects are more commonly used and seen in daily life, the diversity of response tokens produced by L1 subjects is then logically higher than those of function classifiers. Since these objects are more commonly found in daily life, L2 subjects in all three CPL groups are more likely to have been exposed to these classifiers and their corresponding objects are thus more likely to have equal ranges of token diversity.

Table 3.25 Responses for 張 *zhāng* Grouped by CPL (CL for 2-dimension)

Response	All L1 (*N*=10)	All L2 (*N* = 58)			
	F1	Novice *F2*	Intermediate *F2*	Advanced *F2*	Total *F2*
紙 'paper'	10	14	15	16	45
桌子 'table'	8	8	7	13	28
照片 ‘photo'	3	14	7	7	28
椅子 'chair'	3	0	1	3	4
床 'bed'	3	5	2	1	8
海報 'poster'	3	1	0	0	1
畫 'painting'	2	2	3	5	10
臉 'face'	2	0	0	2	2
餅/薄餅 'pancake'	2	0	1	0	1
衛生紙 'toilet paper'	1	1	0	4	5
駕照 'driver’s license'	1	0	0	0	0
卡片'card'	1	1	2	2	5
麵糰 'flour dough'	1	0	0	0	0
草蓆 'straw mat'	1	0	0	0	0
罰單 'fine ticket'	1	0	0	0	0
CD	1	2	2	0	4
名片 'business card'	1	1	2	1	4
文件 'document'	1	0	1	2	3
考卷 'test paper'	1	0	2	1	3
沙發 'sofa'	1	1	0	0	1
證件 'certificate'	1	0	0	0	0
報紙 'newspaper'	0	2	2	2	6
票 'ticket'	0	2	0	2	4
木板 'woodboard'	0	0	1	1	2
地圖 'map'	0	0	1	2	3
鈔票 'dollar bill'	0	1	0	1	2
郵票 'stamp'	0	0	1	1	2
明信片 'post card'	0	2	0	0	2
支票 'check'	0	1	0	0	1
嘴 'mouth'	0	1	0	0	1

Table 3.25 – *Continued*

報告 'report'	0	1	0	0	1
牌子 'poker card'	0	0	1	0	1
飛機票 'plane ticket'	0	0	0	1	1
唱片 'music record'	0	0	0	1	1
日曆 'calendar'	0	1	0	0	1
牆 'wall'	0	0	0	1	1
*卡通 'cartoon'	0	0	0	2	2
*白板 'white board'	0	1	0	0	1
*護照 'passport'	0	0	1	0	1
*雜誌 'magazine'	0	0	1	0	1
*證明書 'proof'	0	0	0	1	1
*比薩 'pizza'	0	0	1	0	1
*玻璃 'glass'	0	0	1	0	1
*布 'clothe'	0	1	0	0	1
*有腳物 '?? '	0	0	1	0	1
*頁 'page'	0	0	0	1	1
門 'door'	0	1	0	0	1
*蛋餅 'egg roll'	0	1	0	0	1
*衣服 'clothing'	0	0	0	1	1
*手錶 'watch'	0	0	0	1	1
*毛巾 'towel'	0	1	0	0	1
Total Correct:	48	60	51	69	180
Total*:	0	5	5	6	16
Total F:	48	65	56	75	196
Correct %:	100%	92.3%	91%	92%	91%
*%:	0%	5%	8%	7%	8%

Table 3.26 Responses for 粒 *li* Grouped by CPL (CL for 3-dimension)

Response	All L1 (*N*=10)	All L2 (*N* = 58)			
	F1	Novice *F2*	Intermediate *F2*	Advanced *F2*	Total *F2*
米 'rice'	10	3	1	3	7
沙子 'sand'	7	1	2	3	6
珍珠 'pearl'	4	1	0	2	3
種籽 'seed'	4	0	2	0	2
藥/藥丸 'pill'	3	1	2	3	6
豆子 'bean'	3	1	0	1	2
葡萄 'grape'	3	0	1	0	1
花生米 'peanut'	2	0	0	0	0
水餃 'dumpling'	2	0	0	0	0
麥子 'wheat'	2	0	0	1	1
芝麻 'sesame'	1	0	0	0	0
星塵 'dust'	1	0	0	0	0
貢丸 'meatball'	1	0	0	0	0
眼屎 'eye wax'	1	0	0	0	0
紅豆 'red bean'	1	0	1	0	2
鑽石 'diamond'	1	1	1	0	2
水果 'fruit'	1	0	1	0	1
石頭 'stone'	0	0	1	0	1
糖果 'candy'	0	2	2	0	4
蘋果 'apple’	0	0	1	1	2
滴水 'water drop'	0	0	0	2	2
柚子 'grapefruit'	0	0	0	2	2
土豆 'potato'	0	0	0	1	1
李子 'plum'	0	0	1	0	1
桃子 'peach'	0	0	1	0	1
玉米 'corn'	0	1	0	0	1
*棒球 'baseball'	0	1	0	0	1
*地球 'the Earth'	0	1	0	0	1
*子彈 'bullet'	0	0	0	1	1
*足球 'soccer ball'	0	1	0	0	1

Table 3.26 – *Continued*

*會議 'meeting'	0	1	0	0	1
*團體 'group'	0	1	0	0	1
*眼鏡 'eye glasses'	0	0	1	0	1
*錢幣 'coin'	0	1	0	0	1
*輪胎 'tire'	0	1	0	0	1
Total Correct:	47	11	17	19	47
Total*:	0	7	1	1	9
Total F:	47	18	18	20	56
Correct %:	100%	61%	94%	95%	83%
*%:	0%	38%	5%	4%	16%

Table 3.27 Responses for 條 *tiáo* Grouped by CPL (CL for 1-dimension)

Response	All L1 (*N*=10)	All L2 (*N* = 58)			
	F1	Novice *F2*	Intermediate *F2*	Advanced *F2*	Total *F2*
線 'string'	9	3	3	10	16
毛巾 'towel'	5	0	0	0	0
魚 'fish'	5	1	8	6	15
褲子 'trouser'	3	7	7	6	20
蛇 'snake'	3	2	3	5	10
棉被 'blanket'	3	0	0	0	0
麵包 'bread'	2	0	0	0	0
電線 'wire'	2	1	0	0	1
河 'river'	2	9	15	10	34
皮帶 'belt'	2	1	0	0	1
蟲 'worm'	2	0	0	1	1
木瓜 'papaya'	1	0	0	0	0
牙膏 'toothpaste'	1	0	0	0	0
項鏈 'necklace'	1	0	0	0	0
柱子 'column'	1	0	0	0	0
狗 'dog'	1	0	2	2	4
新聞 'news'	1	1	0	2	3
香蕉 'banana'	1	1	0	1	2
手環 'bangle'	1	0	0	0	0
絲瓜 'guard'	1	0	0	0	0
*黏土 'clay'	1	0	0	0	0
*棒/棍子 'stick/club'	1	1	1	0	2
腿 'leg'	0	0	3	1	4
橋 'bridge'	0	1	1	1	3
油條 'fried stick'	0	0	0	2	2
彩帶 'ribbon'	0	0	1	1	2
香煙 'cigarette'	0	1	1	0	2
領帶 'necktie'	0	1	0	1	2
消息 'message'	0	1	0	0	1
鐵路 'railroad'	0	2	0	0	2

Table 3.27 – *Continued*

街 'street'	0	12	10	21	43
意見 'opinion'	0	0	0	1	1
麵包 'bread'	0	0	1	0	1
歌兒 'song'	0	0	1	1	2
瀑布 'waterfall'	0	0	1	0	1
公路 'highway'	0	0	0	1	1
巷子 'alley'	0	0	0	1	1
龍 'dragon'	0	0	0	1	1
公路 'highway'	0	0	0	1	1
*麵 'noodle'	0	0	1	0	1
*肉 'meat'	0	0	1	0	1
*原子筆 'pen'	0	2	1	0	3
*刀子 'knife'	0	0	2	0	2
*外套 'coat'	0	2	0	0	2
*衣服 'clothing'	0	2	0	0	2
*筷子 'chopstick'	0	1	0	1	2
*日光燈 'f'lscnt light'	0	0	0	1	1
*頭髮 'hair'	0	0	0	1	1
*大廳 'hall'	0	1	0	0	1
*手錶 'watch'	0	1	0	0	1
*桿子 'pole'	0	0	1	0	1
*襯衫 'shirt'	0	1	0	0	1
*陽/雨傘 'umbrella'	0	0	1	0	1
*火車 'train'	0	0	0	1	1
*停車位'prkng spot'	0	1	0	0	1
Total Correct:	47	43	56	76	175
Total*:	2	12	10	4	28
Total F:	49	55	66	80	203
Correct %	96%	78%	84%	95%	86%
*%:	3%	21%	15%	4%	13%

Table 3.28 Responses for 把 *bǎ* Grouped by CPL (CL for Handle)

Response	All L1 (*N*=10)	All L2 (*N* = 58)			
	F1	Novice *F2*	Intermediate *F2*	Advanced *F2*	Total *F2*
梳子 'comb'	6	2	1	1	4
槍 ‘gun’	6	0	1	0	1
刀子 'knife'	5	2	2	2	6
椅子 'chair'	4	2	5	10	17
*泥土 'dirt'	4	0	0	0	0
劍 'sword'	3	0	1	0	1
鑰匙 'key'	3	2	4	1	7
傘 'umbrella'	3	3	3	7	13
*青菜 'vegetable'	3	0	0	0	0
尺 'ruler'	2	0	0	0	0
*頭髮 'hair'	2	0	0	0	0
*火 'fire'	2	0	0	0	0
電風扇 'electric fan'	1	0	0	0	0
吹風機 'hair dryer'	1	0	0	0	0
弓箭 'bow'	1	0	0	0	0
*糖果 'candy'	1	0	0	0	0
*麵 'noodle'	1	0	0	0	0
*石頭 'rock'	1	0	0	0	0
*湯匙 'spoon'	1	0	0	0	0
掃把 'broom'	0	3	1	2	6
*棒/棍子 'stick'	0	1	2	1	4
門把 'door knob'	0	2	0	2	4
叉子 'fork'	0	1	2	1	4
拖把 'mop'	0	1	1	1	3
桌子 'table'	0	1	1	1	3
*筆 'pen'	0	2	0	0	2
*錢 'money'	0	1	1	0	2
*請事 'matter'	0	2	0	0	2
刷子 'brush'	0	0	0	1	1
扇子 'fan'	0	0	0	0	1
牙刷 'tooth brush'	0	1	0	0	1

Table 3.28 – *Continued*

杓子 'ladle'	0	0	0	1	1
*原子筆 'b'lpnt pen'	0	0	0	1	1
*黏土 'clay'	0	0	1	0	1
*米 'rice'	0	0	1	0	1
*沙子 'sand'	0	0	1	0	1
*筷子 'chopstick'	0	1	0	0	1
**事物 'things'	0	1	0	0	1
**書 'book'	0	1	0	0	1
**手機 'cell phone'	0	1	0	0	1
**針 'needle'	0	0	0	1	1
**橡皮擦 'eraser'	0	1	0	0	1
**掌 'palm'	0	0	0	1	1
**錢幣 'coin'	0	0	1	0	1
**手錶 'watch'0	0	1	0	1	2
**衣服 'clothing'	0	0	1	0	1
**茶壺 'teapot'	0	0	1	0	1
**電視機 'TV'0	0	1	0	1	2
**鐵杆 'iron rod'	0	0	0	1	1
**球拍 'racket'	0	0	0	1	1
**幹 'pole?'	0	0	0	1	1
**槓桿 'lever'	0	0	0	1	1
**孩童 'child'	0	0	1	0	1
Total Correct:	27	19	23	30	72
Total *:	15	7	5	2	14
Total **:	0	4	6	6	16
Total F:	42	30	34	38	102
Correct %:	64%	63%	67%	78%	70%
*%:	5%	36%	32%	21%	29%

Table 3.29 Responses for 台 *tái* Grouped by CPL (CL for Function)

	All L1 (*N*=10)	All L2 (*N* = 58)			
Response	*F1*	Novice *F2*	Intermediate *F2*	Advanced *F2*	Total *F2*
電腦 'computer'	9	5	6	11	24
電視機 'TV'	8	4	7	9	19
腳踏車 'bicycle'	8	0	0	1	1
汽車/車 'car'	6	1	2	4	7
洗衣機 'washer'	2	0	1	3	4
收錄音機 'radio'	2	1	3	2	6
冰箱 'refrigerator'	2	2	1	5	8
照相機 'camera'	2	0	1	3	4
機器 'machine'	2	0	2	1	3
冷氣 'air conditioner'	2	1	1	1	3
電風扇 'electric fan'	2	0	0	0	0
暖氣機 'heater'	1	0	0	1	1
飛機 'airplane'	1	1	0	1	2
隨身聽 'walk man'	1	0	0	0	0
鋼琴 'piano'	1	0	0	0	0
電視頻道 'TV station'	0	0	4	0	4
印表機 'printer'	0	1	0	0	1
電子字典 'elec. dnry'	0	1	0	0	1
電話 'telephone'	0	1	1	0	2
*日光燈 'flrsc'nt lite'	0	0	1	0	1
*大廳 'hall'	0	1	0	0	1
*桌子 'table'	0	0	0	1	1
*表演 'performance'	0	0	1	0	1
*廣播電臺 'radio st'n'	0	0	1	0	1
*玩具 'toy'	0	0	0	1	1
*船 'ship'	0	1	0	0	1
*台中 'Taichung'	0	1	0	0	1
*台灣 'Taiwan'	0	1	0	1	1
*台北 'Taipei'	0	1	0	0	1
*字典 'dictionary'	0	1	0	0	1

Table 3.29 – *Continued*

*傢俱 'furniture'	0	1	0	0	1
*直升機 'helicopter'	0	0	1	0	1
Total Correct:	49	18	29	42	89
Total *:	0	7	4	3	14
Total F:	49	25	34	45	103
Correct %:	100%	72%	85%	93%	86%
*%:	0%	27%	14%	6%	13%

3.3.4 Data Grouped by 1st Languages

In this section, the data are grouped based on L2 subjects' 1st languages. The format of the tables in this section is similar to those presented in the previous section. After listing the entire set of responses produced by both of the L1 and L2 subjects, the total correct, total incorrect, total frequency, correct response percentage, and incorrect responses percentage are listed at the bottom of each table. Of these five rows of data, the correct response percentage is extracted and listed in Table 3.30 followed by a brief discussion. Next, L2 subjects' response token frequencies are counted and listed in Table 3.31 and followed by a discussion.

A hypothesis is proposed first here followed by a plausible explanation. Since the Korean language is also a classifier language and English is not, the logical hypothesis is that the Korean subjects would perform better in producing a higher percentage of correct responses than their English-speaking counterparts would. Hypothetically, then, we should see higher percentage scores by Korean subjects across the five classifiers tested.

However, as seen in Table 3.30, the results are not so consistent. For example, with the function classifiers 把 *bǎ* and 台 *tái*, Korean L2 subjects produced a higher percentage of correct responses than their English-speaking counterparts did. On the other hand, it is the English-speaking L2 subjects who produced the higher percentage of correct responses with shape classifiers. The only exception is found with the classifier 條 *tiáo* where the two groups of subjects produced a virtually equal percentage of correct responses.

Table 3.30 Correct Responses % Grouped by 1st Languages

Classifier	All L1 (*N*=10) *F1*	All L2 (*N* = 58) Korean *F2*	English *F2*	Total *F2*
把 *bǎ*	70%	79%	72%	83%
台 *tái*	100%	88%	86%	87%
條 *tiáo*	96%	88.54%	88.34%	88%
張 *zhāng*	100%	89%	94%	91%
粒 *lì*	100%	76%	95%	83%

The latter result, in part, contradicts my hypothesis but can be explained by further examining the learnability of function classifiers and shape classifiers. As mentioned in the previous section, since function classifiers and their corresponding objects are less commonly seen and used in daily life, they would be harder for L2 learners to acquire. On the other hand, since shape classifiers and their corresponding objects are more commonly seen and used in daily life, they would be easier for L2 learners to acquire. Therefore, it is not so surprising to see that English-speaking subjects could equal or even surpass Korean subjects with shape classifiers since these classifiers are easier to acquire. On the other hand, with function classifiers, Korean subjects consistently outperformed their English counterparts because they already have some knowledge and experience using Korean classifiers and these function classifiers are more difficult to acquire for L2 learners.

Next, the pattern of L2 subjects' response token diversity will be discussed. As seen in Table 3.31, the number of response tokens for each of the five classifiers produced by both of the L1 and L2 subjects are counted and listed in the table. In addition, the L2 subjects' results are grouped based on their 1st languages and the percentage for each classifier is provided in parenthesis.

Table 3.31 Total Response Tokens Grouped by 1st Languages

Classifier	All L1 (*N*=10) *F1*	All L2 (*N* = 58) Korean *F2*(%)	English *F2*(%)	Total *F2*
把 *bǎ*	11	13(51)	12(48)	25
台 *tái*	15	12(48)	13(51)	25
條 *tiáo*	20	19(48)	20(51)	39
張 *zhāng*	21	19(44)	24(55)	43
粒 *lì*	17	14(50)	14(50)	28

In general, two observations can be drawn. First, for L1 subjects, the response tokens are higher in number with shape classifiers than with function classifiers. The numbers of token for function classifiers are 11 and 15 for 把 *bǎ* and 台 *tái* respectively. For shape classifiers 條 *tiáo*, 張 *zhāng*, and 粒 *lì*, the numbers of token are 20, 21, and 17 respectively. This indicates that, for L1 subjects, the scope of response token would be wider for shape classifiers, which are more commonly seen and used; for function classifiers, which are less commonly seen and used, the scope of response token would be narrower. More similar results can be found in Tables 3.32 to 3.36.

This observation is also found in the literature of L1 prototypes evidenced in Chinese classifiers. The current experiment in this study employed a similar method to that done by Chang-Smith (2000) in which 33 native speakers of Chinese were tested with 1 function classifier 輛 *liàng*, 3 shape classifiers 條 *tiáo*, 張 *zhāng*, and 支 *zhī* and 2 specific classifiers 場 *chǎng* and 門 *mén*. Of the four function and shape classifiers, two of them, 條 *tiáo* and 張 *zhāng*, are also used in this current study. After counting the response tokens produced by Chang-Smith's 33 L1 subjects, there are 25 tokens for the function classifier 輛 *liàng*. For the shape classifiers 條 *tiáo* and 張 *zhāng*, the token numbers are 55 and 56 respectively. The response tokens in Chang-Smith's study are also higher in number with shape classifiers than with function classifiers. These further reinforce the earlier claim that the scope of response tokens would be wider for shape classifiers, which are more commonly seen and used; for function classifiers, which are less commonly seen and used, the scope of response tokens would be narrower.

The second observation found in this table is that there is no apparent pattern as to which of theL2 subject groups has a higher token percentage. Most of the Korean subjects' token percentages are virtually the same as their English-speaking counterparts. The only exception is with the classifier 粒 *lì* where Korean subjects had a much higher token percentage than English speakers. Nonetheless, in general, there is no significant difference between Korean and English-speaking subjects' token diversity. That is, regardless of types of classifiers, Korean and English-speaking subjects' token diversities are similar. This is an indication that both L2 groups have not developed the semantic competence that L1 subjects have, such that their token scope would be narrower with function classifiers and be wider with shape classifiers.

This seems to be an important skill that L2 learners need to develop in order to better associate objects with Chinese classifiers. In her experiment that examined how linguistic categorization might influence cognitive categorization, Kuo (2003) found that "Mandarin speakers classify objects based on shape more often than English speakers." This is partially due to the fact that "English nouns group taxonomic associates while Mandarin classifiers group shape associates" (Kuo 2003). The findings from Chang-Smith, Kou and my study suggest that, when learning Chinese noun classifiers, L2 learners of Chinese would benefit from developing a cognitive representation of shape associates that closely mirror L1 speakers' mental representation of shape. The pedagogical implication for educators is that not only do the semantic association of classifiers and denoted nouns needs to be taught, the salient features of the denoted nouns perceived by native speakers also need to be explained and exemplified with other similar nouns. Although this will not eliminate the need to learn and memorize exceptions, L2 learners would have higher confidence and accuracy using Chinese noun classifiers correctly after receiving instruction on how native speakers use classifiers.

This recommendation is supported by Chen's (1996) findings, where the effect of corrective feedback is examined. Chen gave different types of corrective feedback (CF) to L2 subjects when they made errors performing a computer-mediated exercise on Chinese classifiers. He found that there were positive effects of CF on L2 subjects' accuracy when the subjects were given not only the correct answers but also some explanation on why certain classifiers were picked over the others. However, after a six-week interval, the short-term effect of CF was not sustained. As Schmidt (1994:19) maintains "it must be conceded that studies showing an advantage for explicit learning generally have not found a lasting effecting for such learning". It is necessary then to incorporate such instructions throughout the curriculum in order to sustain learners' knowledge and understanding of classifiers.

Another issue that I would like to discuss here has to do with the effects Korean subjects' first language have on their production in this experiment. As speakers of a classifier language, Korean subjects' results showed an initial sign of evidence that there was some negative influence on Korean subjects' production. This negative influence can be found by examining the Korean classifier 개. Similar to the Chinese general classifier 個 *ge*, this Korean classifier 개 is used as a general classifier to denote entities that do not call for special classifiers. However, it is much more prevalently used in Korean than the Chinese general classifier 個 *ge* is used in Chinese. Because of this prevalence of use, Korean subjects tended to produce more variety of ungrammatical responses than English subjects. For example, with the classifier 粒 *lì*, some of the correct responses produced by Korean subjects, e.g., 種籽 'seed', 紅豆 'red bean', 石頭 'stone', 玉米 'corn', are denoted by the Korean classifier 개. They then mistakenly categorized the following entities, e.g., 棒球 'baseball', 地球 'the Earth', 足球 'soccer ball', 會議 'meeting', 團體 'group', 眼鏡 'eye glasses', 錢幣 'coin', and 輪胎 'tire', into the same group mentioned earlier, since this latter group of entities is also denoted by the Korean classifier 개. This can be seen throughout the responses within the five classifiers tested in this experiment. This suggests that negative transfer seems to be at work on Korean subjects' performance. However, current study does not lend a strong support of this claim and further research is needed to confirm or discredit such claim. If a future study can show that some correct and incompatible responses for a certain Chinese classifier are actually all correct ones for a certain Korean classifier, then L1 negative transferring can be said to be at work. If this does happen, then one can claim that Korean subjects' knowledge of Korean classifier may sometimes have negative effects on learning Chinese classifier. At this stage, I can only suggest that it is possible that Korean subjects' knowledge of Korean classifiers may be a source of negative influence when learning Chinese classifiers.

Table 3.32 Responses for 張 *zhāng* Grouped by 1st Language (CL for 2-dimension)

Response	All L1 (*N*=10)	All L2 (*N* = 58)		
	F1	Korean *F2*	English *F2*	Total *F2*
紙 'paper'	10	23	22	45
桌子 'table'	8	13	15	28
照片 ‘photo'	3	14	14	28
椅子 'chair'	3	2	2	4
床 'bed'	3	5	3	8
海報 'poster'	3	1	0	1
畫 'painting'	2	5	5	10
臉 'face'	2	2	0	2
餅/薄餅 'pancake'	2	0	1	1
衛生紙 'toilet paper'	1	5	0	5
駕照 'driver’s license'	1	0	0	0
卡片'card'	1	2	3	5
麵糰 'flour dough'	1	0	0	0
草蓆 'straw mat'	1	0	0	0
罰單 'fine ticket'	1	0	0	0
CD	1	0	3	3
名片 'business card'	1	0	3	3
文件 'document'	1	2	0	2
考卷 'test paper'	1	1	1	2
沙發 'sofa'	1	0	1	1
證件 'certificate'	1	0	0	0
報紙 'newspaper'	0	5	2	7
票 'ticket'	0	3	2	5
木板 'woodboard'	0	2	1	3
地圖 'map'	0	0	3	3
鈔票 'dollar bill'	0	1	1	2
郵票 'stamp'	0	0	2	2
明信片 'post card'	0	0	2	2
支票 'check'	0	1	0	1
嘴 'mouth'	0	0	1	1
報告 'report'	0	0	1	1
牌子 'poker card'	0	0	1	1

Table 3.32 – *Continued*

飛機票 'plane ticket'	0	0	1	1
唱片 'music record'	0	0	1	1
日曆 'calendar'	0	1	0	1
牆 'wall'	0	1	0	1
*卡通 'cartoon'	0	2	0	2
*白板 'white board'	0	1	0	1
*護照 'passport'	0	0	1	1
*雜誌 'magazine'	0	0	1	1
*證明書 'proof'	0	1	0	1
*比薩 'pizza'	0	1	0	1
*玻璃 'glass'	0	1	0	1
*布 'clothe'	0	0	1	1
*有腳物 '?? '	0	1	0	1
*頁 'page'	0	1	0	1
*門 'door'	0	0	1	1
*蛋餅 'egg roll'	0	1	0	1
*衣服 'clothing'	0	1	0	1
*手錶 'watch'	0	0	1	1
*毛巾 'towel'	0	1	0	1
Total Correct:	48	89	91	180
Total *:	0	11	5	16
Total F:	48	100	96	196
Correct %:	100%	89%	94%	91%
*%:	0%	10%	5%	8%

Table 3.33 Responses for 粒 *lì* Grouped by 1st language (CL for 3-dimension)

Response	All L1 (*N*=10)	All L2 (*N* = 58)		
	F1	Korean *F2*	English *F2*	Total *F2*
米 'rice'	10	2	5	7
沙子 'sand'	7	3	3	6
珍珠 'pearl'	4	2	1	3
種籽 'seed'	4	1	1	2
藥/藥丸 'pill'	3	6	0	6
豆子 'bean'	3	0	2	2
葡萄 'grape'	3	0	1	1
花生米 'peanut'	2	0	0	0
水餃 'dumpling'	2	0	0	0
麥子 'wheat'	2	0	0	1
芝麻 'sesame'	1	0	0	0
星塵 'dust'	1	0	0	0
貢丸 'meatball'	1	0	0	0
眼屎 'eye wax'	1	0	0	0
紅豆 'red bean'	1	1	1	2
鑽石 'diamond'	1	1	1	2
水果 'fruit'	1	0	1	1
石頭 'stone'	0	1	0	1
糖果 'candy'	0	3	1	4
蘋果 'apple'	0	2	0	2
滴水 'water drop'	0	1	1	2
柚子 'grapefruit'	0	1	1	2
土豆 'potato'	0	1	0	1
李子 'plum'	0	0	1	1
桃子 'peach'	0	0	1	1
玉米 'corn'	0	1	0	1
*棒球 'baseball'	0	1	0	1
*地球 'the Earth'	0	1	0	1
*子彈 'bullet'	0	0	1	1
*足球 'soccer ball'	0	1	0	1

Table 3.33 – *Continued*

*會議 'meeting'	0	1	0	1
*團體 'group'	0	1	0	1
*眼鏡 'eye glasses'	0	1	0	1
*錢幣 'coin'	0	1	0	1
*輪胎 'tire'	0	1	0	1
Total Correct:	48	26	21	47
Total*:	0	8	1	9
Total F:	48	34	22	56
Correct %:	100%	76%	95%	83%
*%:	0%	23%	4%	16%

Table 3.34 Responses for 條 *tiáo* Grouped by 1st Language (CL for 1-dimension)

Response	All L1 (*N*=10)	All L2 (*N* = 58)		
	F1	Korean *F2*	English *F2*	Total *F2*
線 'string'	9	6	10	16
毛巾 'towel'	5	0	0	0
魚 'fish'	5	7	9	16
褲子 'trouser'	3	8	13	21
蛇 'snake'	3	5	6	11
棉被 'blanket'	3	0	0	0
麵包 'bread'	2	0	0	0
電線 'wire'	2	1	0	1
皮帶 'belt'	2	0	1	1
河 'river'	2	2	14	36
蟲 'worm'	2	0	1	1
木瓜 'papaya'	1	0	0	0
牙膏 'toothpaste'	1	0	0	0
項鏈 'necklace'	1	0	0	0
柱子 'column'	1	0	0	0
狗 'dog'	1	0	4	4
新聞 'news'	1	2	1	3
香蕉 'banana'	1	0	2	2
手環 'bangle'	1	0	0	0
絲瓜 'guard'	1	0	0	0
*黏土 'clay'	1	0	0	0
*棒/棍子 'stick/club'	1	0	2	2
腿 'leg'	0	3	1	4
橋 'bridge'	0	2	1	3
油條 'fried stick'	0	2	0	2
彩帶 'ribbon'	0	1	1	2
香煙 'cigarette'	0	2	0	2
領帶 'necktie'	0	1	1	2
消息 'message'	0	1	0	1
鐵路 'railroad'	0	0	2	2

Table 3.34 – *Continued*

街 'street'	0	21	22	43
意見 'opinion'	0	1	0	1
麵包 'bread'	0	1	0	1
歌兒 'song'	0	0	1	1
瀑布 'waterfall'	0	0	1	1
公路 'highway'	0	1	0	1
巷子 'alley'	0	1	0	1
龍 'dragon'	0	0	1	1
公路 'highway'	0	1	0	1
*麵 'noodle'	0	0	1	1
*肉 'meat'	0	0	1	1
*原子筆 'pen'	0	3	0	3
*刀子 'knife'	0	1	1	2
*外套 'coat'	0	1	1	2
*衣服 'clothing'	0	1	1	2
*筷子 'chopstick'	0	2	0	2
*日光燈 'f'lscnt light'	0	1	0	1
*頭髮 'hair'	0	0	0	1
*大廳 'hall'	0	0	1	1
*手錶 'watch'	0	0	1	1
*桿子 'pole'	0	0	1	1
*襯衫 'shirt'	0	0	1	1
*陽/雨傘 'umbrella'	0	1	0	1
*火車 'train'	0	1	0	1
*停車位'parking spot'	0	0	1	1
Total Correct:	48	85	91	180
Total*:	2	11	12	23
Total F:	50	96	103	203
Correct %:	96%	88.54%	88.34%	88%
*%:	3%	11%	11%	11%

Table 3.35 Responses for 把 *bǎ* Grouped by 1st Language (CL for Handle)

Response	All L1 (*N*=10)	All L2 (*N* = 58)		
	F1	Korean *F2*	English *F2*	Total *F2*
梳子 'comb'	6	2	2	4
槍 'gun'	6	0	1	1
刀子 'knife'	5	3	3	6
椅子 'chair'	4	9	18	17
*泥土 'dirt'	4	0	0	0
劍 'sword'	3	0	1	1
鑰匙 'key'	3	1	6	7
傘 'umbrella'	3	11	2	13
*青菜 'vegetable'	3	0	0	0
尺 'ruler'	2	0	0	0
*頭髮 'hair'	2	0	0	0
*火 'fire'	2	0	0	0
電風扇 'electric fan'	1	0	0	0
吹風機 'hair dryer'	1	0	0	0
弓箭 'bow'	1	0	0	0
*糖果 'candy'	1	0	0	0
*麵 'noodle'	1	0	0	0
*石頭 'rock'	1	0	0	0
*湯匙 'spoon'	1	0	0	0
掃把 'broom'	0	4	2	6
*棒/棍子 'stick'	0	4	0	4
門把 'door knob'	0	1	3	4
叉子 'fork'	0	4	0	4
拖把 'mop'	0	2	1	3
桌子 'table'	0	2	1	3
*筆 'pen'	0	2	0	2
*錢 'money'	0	1	1	2
*請事 'matter'	0	0	2	2
刷子 'brush'	0	0	1	1
扇子 'fan'	0	1	0	1

Table 3.35 – *Continued*

牙刷 'tooth brush'	0	0	1	1
杓子 'ladle'	0	1	0	1
*原子筆 'b'lpnt pen'	0	1	0	1
*黏土 'clay'	0	0	1	1
*米 'rice'	0	0	1	1
*沙子 'sand'	0	0	1	1
*筷子 'chopstick'	0	0	1	1
**事物 'things'	0	0	1	1
**書 'book'	0	1	0	1
**手機 'cell phone'	0	1	0	1
**針 'needle'	0	1	0	1
**橡皮擦 'eraser'	0	1	0	1
**掌 'palm'	0	1	0	1
**錢幣 'coin'	0	0	1	1
**手錶 'watch'0	0	1	1	2
**衣服 'clothing'	0	0	1	1
**茶壺 'teapot'	0	1	0	1
**電視機 'TV'0	0	1	1	2
**鐵杆 'iron rod'	0	0	1	1
**球拍 'racket'	0	0	1	1
**幹 'stem'	0	1	0	1
**槓桿 'lever'	0	0	1	1
**孩童 'child'	0	0	1	1
Total Correct:	35	39	42	81
Total *:	15	8	7	15
Total **:	0	7	9	16
Total F:	50	54	58	112
Correct %:	70%	72%	72%	72%
*%	29%	27%	27%	27%

Table 3.36 Responses for 台 *tái* Grouped by 1st Language (CL for Function)

Response	All L1 (N=10)	All L2 (N = 58)		
	F1	Korean *F2*	English *F2*	Total *F2*
電腦 'computer'	9	14	8	24
電視機 'TV'	8	14	6	19
腳踏車 'bicycle'	8	0	1	1
汽車/車 'car'	6	4	3	7
洗衣機 'washer'	2	0	4	4
收錄音機 'radio'	2	4	3	7
冰箱 'refrigerator'	2	6	2	8
照相機 'camera'	2	2	2	4
機器 'machine'	2	2	1	3
冷氣 'air conditioner'	2	2	1	3
電風扇 'electric fan'	2	0	0	0
暖氣機 'heater'	1	1	0	1
飛機 'airplane'	1	0	2	2
隨身聽 'walk man'	1	0	0	0
鋼琴 'piano'	1	0	0	0
電視頻道 'TV station'	0	1	3	4
印表機 'printer'	0	0	1	1
電子字典 'elec. dnry'	0	1	0	1
電話 'telephone'	0	2	0	2
*日光燈 'flrsc'nt lite'	0	1	0	1
*大廳 'hall'	0	1	0	1
*桌子 'table'	0	1	0	1
*表演 'performance'	0	0	1	1
*廣播電臺 'radio st'n'	0	0	1	1
*玩具 'toy'	0	1	0	1
*船 'ship'	0	0	1	1
*台中 'Taichung'	0	0	1	1
*台灣 'Taiwan'	0	0	1	1
*台北 'Taipei'	0	0	1	1
*字典 'dictionary'	0	1	0	1

Table 3.36 – *Continued*

*傢俱 'furniture'	0	1	0	1
*直升機 'helicopter'	0	1	0	1
Total Correct:	49	53	37	90
Total *:	0	7	6	13
Total F:	49	60	43	103
Correct %:	100%	88%	86%	87%
*%:	0%	11%	13%	12%

CHAPTER 4

CONCLUSION

In this final chapter, several aspects of this study are summarized and discussed to draw the current work to a logical but temporary end. To be addressed are the goal of the study and research questions, the summary, the discussion, and finally the limitations and future studies.

4.1 Goal and Research Questions

The major goal of this study is to contribute to the field of Chinese pedagogy as an increasing number of students are enrolling in Chinese courses from elementary schools to colleges. The field of teaching Chinese as a foreign language thus deserves more attention to provide a theoretical ground for language teachers to develop more effective curriculum. The study's more immediate and specific goal, then, is to provide insight into how L2 adult learners of Chinese acquire Chinese nominal classifiers so that the results can benefit both educators and learners in teaching and learning this complex linguistic feature. While many studies have explored various aspects of acquiring Chinese classifiers by L1 child learners, much remains to be studied about L2 adult learners' acquisition of Chinese classifiers. While the results and claims drawn from this study may be under scrutiny for further validation and examination, they nonetheless will lay the foundation for understanding the nature of L2 learners' acquisition of this linguistic function.

The motivation for this study came from my personal experience as a Chinese teacher: Having witnessed the problems that advanced L2 learners face in learning Mandarin Chinese, I found that mastering the tones, recognizing and writing Chinese characters, and using Chinese classifiers were always among some of the most difficult aspects of Chinese to master. Since the first two problems have been dealt with extensively, I was particularly intrigued by the third problem as I did not know it could be so challenging for L2 learners. Also, since there are only a handful of studies focusing on this issue, exploring issues relevant to acquiring this linguistic feature seemed to be justifiable and meaningful.

With this background in mind, my research questions focus on quantifiable aspects of noun classifier acquisition:

1. In the classifier perception test with shape classifiers, I explore the relationship between L2 subjects' performance and their level of Chinese language proficiency (using the CPL). Questions addressed include: Which type of classifier is learned best and which type least well? How do Korean subjects' performances differ from their English-speaking counterparts? What are the relationships between L2 subjects' Chinese proficiency levels and their performance on the tests?

2. In the classifier production test, we asked if subjects perform better with function classifiers, animate classifiers, or event classifiers. Does their production

correlate with their CPL? Do Korean subjects perform better than their English counterparts across the three types of classifier?

3. In the typological testing, we explored the extent to which L2 subjects' production of typical objects mirror those produced by L1 subjects. To what extent do L1 and L2 subjects' cognitive associations of objects overlap? To what extent does the distribution of response tokens produced by L1 subjects overlap with those by L2 subjects? Do shape classifiers have a higher number of response tokens compared to function classifiers? Do Korean subjects produce a higher percentage of correct responses than English subjects? Is the Korean subjects' knowledge of Korean classifiers a positive or negative influence when learning Chinese classifiers?

4.2 Summary

The current study employed three empirical methods to elicit 58 L2 subjects' understanding of Chinese nominal classifiers. The first experiment examined their perception of Chinese classifiers, while the second one tested their production of Chinese classifiers. The third experiment explored their mental representation of objects that are denoted by five different classifiers. The findings are summarized as follows:

In the classifier perception test, the data show that 1) there is a positive relationship between L2 subjects' performance and their CPL; 2) Korean Novice and Advanced subjects performed better than their English-speaking counterparts, but English-speaking Intermediate subjects outperformed their Korean counterparts; 3) in general, two-dimensional CLs are best learned, followed by one-dimensional and then three-dimensional CLs; 4) with two-dimensional CLs, L2 subjects' performance regressed as their CPL advanced from Intermediate to Advanced level.

In the classifier production test, the data show that 1) there is a positive relationship between L2 subjects' overall performance and their CPL, although this relationship gradually disappeared as their CPL advanced to higher levels; 2) Korean subjects performed better than English-speaking subjects throughout the three CPL levels; 3) L2 subjects' performances were much better with ANIMACY and FUNCTION classifiers than with EVENT classifiers; 4) both Korean and English-speaking groups showed a certain degree of regression at various stages.

In the typological representation test, the data show that 1) with shape classifiers, the most typical objects produced by L1 subjects were also the most typical ones produced by L2 subjects; 2) there is a great degree of overlap between L1 and L2 subjects' cognitive association of objects with the CLs tested; 3) there is a great discrepancy concerning what the most typical objects should be for the shape classifier 條 *tiáo* between L1 and L2 subjects; 4) there is also less overlapping of perceptional association of the classifier 條 *tiáo* than with the other two shape classifiers; 5) overall, in terms of response frequency, the L2 subjects' results to a great extent resemble those produced by L1 subjects; 6) the distributions of response tokens overlap overwhelmingly between L1 and L2 subjects; 7) L2 subjects produced an increasingly wider range of response tokens as their CPL advanced; 8) shape classifiers generated a relatively higher number of response tokens compared to function classifiers; 9) Korean subjects produced a higher percentage of correct responses with function classifiers than English-speaking subjects; 10) English-speaking subjects produced a higher percentage of correct responses with shape classifiers than Korean subjects; 11) there was a shred of evidence that some negative L1 transfer was at work for Korean subjects in this test.

4.3 Discussion

In this section, I will discuss three issues related to the methods and findings found in this project. The first issue has to do with the notion of the Chinese Room proposed by Searle. This notion helps us understand what the human mind is by explaining what the human mind is not. The second issue is about lexical, semantic, and collocational competence discussed by various researchers. The third issue concerns the Prototype Theory proposed by Rosch and others.

4.3.1 The Chinese Room Thought Experiment

One of the goals of this project is to gain insight into how L2 learners learn the Chinese classifier system; since this involves higher cognitive processes, it is then necessary to talk about how the human mind works. To this end, Searle's (1980) notion of the Chinese Room helps us understand partially what the human mind is by providing an argument of what the human mind is not. Opposing the idea of "strong AI," Searle argued that, a highly sophisticated "understanding" system does not understand language because it is a mere symbol-manipulator. It is not capable of knowing what the input symbols *mean*. He argued that the so called "strong AI" is fundamentally not correct since it assumes that thinking is nothing more than manipulating symbols according to formal rules. Searle proposed the following hypothetical experiment to support his argument. Imagine a person who is a monolingual English speaker and is locked in a room. This person is given a large batch of Chinese writing (this is called “a script”), a second batch of Chinese script (so-called “questions”), and a set of rules in English. This set of rules is for correlating the second batch with the first batch. The rules are used to correlate one set of formal symbols with another set of formal symbols. The meaning of formal symbols is that the person, by examining the shapes of the symbols, can identify the symbols. With these symbols and instructions, the person can thereby produce “certain sorts of Chinese symbols with certain sorts of shapes in response” (Searle 1980). Although the person knows nothing about the program and Chinese, he becomes very good at following the instructions by reading and following the rules. Eventually, the person appears absolutely the same as those Chinese speakers outside of the room. The answers are produced by manipulating formal symbols: the person simply behaves like a computer. However, replacing the person with himself, Searle argues that it's “quite obvious . . . I do not understand a word of the Chinese stories. I have inputs and outputs that are indistinguishable from those of the native Chinese speaker, and I can have any formal program you like, but I still understand nothing” (1980: 418). As such, he concluded that a computer understands nothing of any stories since “the computer has nothing more than I have in the case where I understand nothing” (1980: 418). Therefore, it does not matter how intelligently a computer or a program behaves, since the symbols are meaningless to them. The process and the results are not really intelligent. This type of processing is not the same as human thinking since its internal states and processes are purely syntactic and lack semantics and therefore it cannot said to be intentional (Hauser 2006).

What can be inferred from this notion of the Chinese Room is that when teaching or learning the Chinese classifier system, which involves a linguistic unit that is rich in semantics, focus should be on understanding and processing the relationships between the classifiers and the referents. Unlike L1 acquisition of classifiers that is characterized by hearing and forming the construct unconsciously, L2 learners should be given chances to make connections between the forms and meanings by examining their relationships. This approach would be more efficient because L2 adult learners are intelligent beings with minds capable of processing complex issues. The next question then is how the human minds understand meaning(s) in words and acquire semantic competence. The following subsection will provide some explanation.

4.3.2 Lexical, Semantic, and Collocational Competence

The findings in this project show clear patterns that L1 and L2 subjects have a different understanding about Chinese classifier systems. That leads one to wonder what is it that L2 speakers lack in order to perceive and produce Chinese classifiers and their denoting referents grammatically or naturally. It is one thing to learn the form of a word; it is quite another to learn its meaning(s) and function(s). To answer that question, it is necessary to first investigate the so-called lexical, semantic, and collocational competence and what role they play in our understanding and use of language. Only then it is possible to formulate solutions to enhance L2 speakers' knowledge so that they can understand and apply Chinese classifier systems correctly.

Marconi (1997) states that lexical competence is the "ability to use words, is an essential ingredient of semantics." It involves two abilities. On one hand, between a word and other words, there is a network of connections. One needs to have access to this network in order to know that trees are plants, or to eat something one has to open his/her mouth and so on. On the other hand, the element necessary in order to understand and use a word is the ability to connect lexical items with the real world. The former is the ability of *naming* and the latter *application*. Naming, or inferential ability, is a process of "selecting the right word in response to a given object or circumstance" while *application*, or referential ability, is "selecting the right object or circumstance in response to a given word" (Marconi 1997).

These two elements are separate, independent but cooperating systems. One concerns word-word relations and the other applies the lexicon to the world. Putnam (1975) called it the "division of linguistic labor" in which he states that language is used in a community that is divided into many subsets. There are different meanings and extensions for each word in any given language. These different meanings and extensions are formed based on the word's references and the occasions on which it is used. An expert in a certain field may know all facets of the words in that field and be able to distinguish them. However, for average speakers, things will not be the same because they neither know all the exact extensions nor are able to distinguish all the differences. The way they use the word is only accepted by the subset of the community they belong to. For this reason, Putnam argues that social factors at least partly determine the extension of each term rather than those factors in the mind of the individual speaker. "Every linguistic community exemplifies the sort of division of linguistic labor just described, that is, possesses at least some terms whose associated 'criteria' are known only to a subset of the speakers who acquire the terms, and whose use by the other speakers depends upon a structured cooperation between them and the speakers in the relevant subsets" (Putnam 1975: 228). The essence of this notion is that whatever sense is inside of a person's brain is not sufficient to determine the meaning of terms they use unless one also examines the experiences that they had with the referent that led to his or her acquisition of the terms.

Does this mean that one can never communicate with others unless the past experiences with each word uttered are carefully examined and understood? Do all the associated criteria of a subset of the target language need to be known before one can competently use any given term? Some researchers (Moravcsik 1981, Wilks 1982, and others) argued that referential competence is not a necessary part of semantic competence. There are many instances where we know the meanings of certain words well enough for us to communicate yet we are unable to identify those words' referents. For instance, Wilks (1982) described how he had enough knowledge of the meaning of the word *uranium* to be able to use it effectively. However, he could not recognize uranium (i.e., the substance, not the word) and neither could anyone he knew. Thus, referential ability is not necessary a required element for semantic competence.

Furthermore, not only is it difficult to fully examine one's interlocutor's past interaction with certain words, one can't often spell out his/her own criteria for recognizing something. For instance, one can define 'square' as 'a plane rectangle with four equal sides and four right angles'. However, how does one define 'yellow' so that it would represent the same psychological state stored in everyone's mind? Marconi argued that "we are not aware of which features of a kind of object … actually play a role in our recognition of them" (Marconi 1997: 66). Even if we are partially aware of them, when judging a sequence of words to be grammatical or not, we are not aware of the procedures by which a judgment is made. Wettstein's explanation of semantics stated that "perfectly competent speakers are often in no position … to specify the rules that determine the references of expressions" (Wettstein 1986: 203). This lends support to the idea, in connection with acquiring Chinese classifiers, that extensive and detailed explanations of meanings and functions are unnecessary and may, in fact, be impossible.

Recall that one of the problems reviewed in the first chapter - that L2 learners of Chinese have in using Chinese classifiers - is that there seems to be no strict guideline or logic in selecting appropriate classifiers. They know this linguistic unit is obligatory and needs to be inserted between Number and Noun. They further know that there are different types of classifiers to be used to denote different types of referents. They also understand that a classifier denotes a group of entities that share a certain similar salient and inherent characteristic. However, these characteristics are usually not so obvious and they become salient only when learners are taught how native speakers perceive these characteristics in question. Sometimes the logic is apparent and easy to understand. For example, in denoting two-dimensional objects such as paper, photos, or business cards, one should use the classifier 張 *zhāng*. However, often times, the explanation is not so apparent or it can be perceived as arbitrary to L2 learners. Using the same classifier 張 *zhāng* as an example, why is it that objects such as 弓 *gōng* 'bows', 網 *wǎng* 'net', 嘴 *zǔi* 'mouths', 琴 *qíng* 'Chinese zither', and 犁 *lí* 'plows' are also members of this two-dimensional shape group since none of these objects seem to have the characteristic of being two dimensional? One of the plausible explanations for including these objects is that this word 張 *zhāng* has the meaning of extending or stretching as a verb. This character 張 consists of two radicals 弓 'bow' + 長 'to make long', which indicates the meaning of 'to extend'. Since all these latter objects all have this salient feature of being extended or stretched in some way or another in order to function properly, they take the classifier 張 *zhāng* as their denoting classifier.

The point here is that there is no way that L2 learners can derive such criteria or explanation without receiving formal instruction. In fact, most native speakers are not aware of this and other procedures or criteria by which they produce grammatical utterances. Nonetheless, the fact that they are not aware of these criteria does not hinder them from communicating successfully and effectively. This leads one to wonder: how do native speakers acquire this linguistic competence, and should L2 learners model the ways L1 speakers learn the classifiers?

Who can better answer these questions than the native speakers and their teachers who have successfully learned and taught this linguistic unit? Most laypersons might be able to explain the criteria that are obvious and logical. However, unless trained in Chinese linguistics, when encountering collocations that are more complicated or not so self-explanatory, they tend to be unable to provide any explanation without a certain degree of uncertainty. When running out of words to explain, they would often advise that L2 learners not worry about "why" and just memorize the collocation combinations. In reality, this is still a common practice among elementary Chinese teachers in Taiwan. I had a chance to ask about this issue with two instructors who have both been teaching for more than 10 years. The first one, Ms. Huang, has been teaching elementary school students in Taiwan for more than 15 years and her strategies for teaching Chinese classifiers include filling in the blanks and having the students recite the texts repeatedly. "All you have to do is to lead them reading the texts repeatedly… We sometimes would categorize the classifiers into different groups but we seldom explain why. The key is to practice often and the students would get familiar with the use of the classifiers eventually," said Ms. Huang (Huang, 2009).

Another teacher, Ms. Chiu, responded similarly but with some more insight. Based on her own experience and that of other teachers that she had talked to, she reports that:

> There are no specific ways to teach the students the "concepts" because Chinese is the students' native language. The concept is already acquired. The students come into the classroom with the concepts of quantifying certain nouns with specific quantifier. The teachers are just teaching the corresponding Chinese characters -- namely, the kids are learning how to write the words correctly.
>
> The teachers basically follow the textbook (as you can see in the attachment -- Chinese lesson). The lesson contains some quantifiers. The teachers will go through them without specific explanation, because that's not what troubles the students. But most of the time, in the integrative activity part of the lesson, there would be some sort of deeper/broader hand on activities (as in the other two attachment files).
>
> In oral activities, the teachers would also suggest better quantifiers that correspond to the nouns being modified. For example, the kids might say -- 一隻馬, and the teacher would tell them -- 可以, 但是一匹馬更好 (It's OK, but 一匹馬 is better). This only happens in lower and middle grades not upper grades though.
>
> The educational bureau compiled a dictionary just for that. And there are some online resources teachers can use. But they all just serve for resources for the teachers not really for the students. There is not a big discussion on that. (Chiu, 2009)

In short, Ms. Chiu also confirms Ms. Huang's pedagogical methods in teaching Chinese classifiers in that 1) the grammatical functions and meanings of classifiers are usually not explained in classroom; 2) many intensive hands-on activities are designed and implemented to solidify students' collocational knowledge about classifiers and their corresponding referents. In her account, Ms. Chiu suggested that since Chinese is the students' first language and they have acquired the concepts of classifiers already, there is no need to explain them in detail. What they need to learn are the forms of the classifiers or other more appropriate classifiers for objects with similar salient features. This implies that L2 learners might need different approaches to learn classifiers as Chinese is not their first language; moreover, for adult learners, whose cognitive development is mature, the concept of classifiers can and should be explained more explicitly for faster acquisition. Lesson plans with the knowledge of collocational competence might be helpful. It is then appropriate to briefly discuss what collocations are linguistically.

The nature of collocations and the benefits of teaching collocations have been widely studied. Cruse describes "Collocations" as "sequence of lexical items which habitually co-occur" (1986: 40). According to Firth (1968: 181), "collocations of a given word are statements of the habitual or customary places of that word." He maintained that every word is a new word when entering a new context. Halliday (1966) and Sinclair (1966) proposed an integrated lexical theory in which they stressed the importance of collocations that consist of lexical items. These are mainly items like adjective-noun and verb-noun collocations. They suggested that "there are virtually no impossible collocations, but some are more likely than others" (Sinclair 1966: 411). A lexical item whose collocations are being studied is referred to as *Node*; the number of lexical items on either side of the node that are relevant is called *Span*; those items that are within the span are called *Collocates* (Sinclair 1966:415). "Lexical sets" are sets of words that have similar collocational restrictions. For example, for the word 'moon', its frequent collocates are ‘bright’, ‘shine’ and ‘light’ that can be categorized into the same lexical set (Halliday 1966: 156). When determining if a certain item should enter a lexical set, its syntagmatic relation, rather than its paradigmatic relation, is used as the criterion. These lexical items do not have to have any formal relationship in order for them to collocate.

So, what are the roles of collocations in second language acquisition? The studies to be reviewed next show that teaching collocations to second language learners is important. In fact, it is necessary to include collocations in the second language curriculum for the development and competence of L2 vocabulary, communication, and performance (Gitsaki 1999). In a traditional view of vocabulary learning, accumulating and memorizing lists of word definitions, followed by gap filling exercises, have been emphasized for a long time (Robinson 1989: 276). However, Nation (1990) argues that applied linguists have suggested that a new approach to vocabulary teaching is needed as they realized that vocabulary skills involve more than just being able to define a word. This new approach would, rather than emphasizing words in isolation and learning word definitions, examine the syntagmatic relations of collocation between lexical items. This is a skill that is considered intuitive and apparent for the adult native speakers of any language but is lacking for L2 learners (McCarthy 1984:14-16; Carter 1987: 38; Sinclair 1991).

Many linguists and language teachers have recommended teaching and learning of collocations in the L2 classroom. They emphasize the importance of collocations for the development of L2 vocabulary and communicative competence. For example, Hornby (1974) included collocations in his dictionary for advanced learners of English. Brown (1974) also claimed that by increasing student's knowledge of collocations, their oral and listening comprehension and their reading speed would also improve. Others claimed that students' problems of vocabulary, style and usage could be overcome by the teaching of collocations (Leed & Nakhimovsky 1979; Smith 1983). Some reported that there is evidence that, of all errors committed by L2 learners, collocational errors make up a high percentage of overall errors (Marton 1977; Arabski 1979). Korosadowics-Struzynska (1980) reported that collocational errors are still prevalent among advanced students even though they have considerable fluency of expression in a foreign language. Korosadowics-Struzynska therefore suggested that, rather than learners' knowledge of single words, it is more essential to focus on the teaching and learning of collocations for production and it should be regarded as an indication of their progress (Korosadowicz-Struzynska 1980: 111). Ellis (1996) has also considered collocations to be an important part of L2 lexical development.

It is clear then that the learning of "prefabricated language patterns" should be advocated in the classroom. This is especially true for the early stages of L2 learning that teaching phrase-patterns may help vocabulary expansion (Twaddell 1973; Korosadowicz-Struzynska 1980). Furthermore, Twaddell (1973: 63) suggested that vocabulary expansion should take place from the intermediate stages of L2 learning and onward. He also suggested that "the most habitual parts of language use" such as phrase-patterns and sentence patterns should be "practiced and established as early as possible."

These findings support the idea that Chinese classifiers should also be taught early on and throughout the subsequent learning stages. This is mainly because the Chinese classifier systems are prevalent in the language and are not so easy to acquire for L2 learners. As the researchers suggested, collocational knowledge would increase learners' vocabulary and communicative competence, classifier knowledge should also be emphasized since it is highly collocational. Furthermore, since the system is rather complicated compared to other features, L2 learners should be given chances to revisit the subject in more advanced stages. This would provide them with opportunities to develop their lexical, semantic, and collocational competence so that it becomes closer to that of native speakers. Later in this chapter, I will provide some theoretical findings to suggest some ways that language teachers can consider in teaching Chinese classifiers.

4.3.3 The Prototype Theory

In the third experiment, I examined how L2 subjects' prototypical representation of certain linguistic categories resembles that of L1 subjects' mental representation. One can gain more insights into the findings discussed in Section 4.2 by examining Prototype Theory. Through the lens of prototypicality, suggestions can be made to assist language teachers in helping learners to acquire Chinese classifiers.

Prototype theory is characterized as a graded categorization in cognitive science. This notion that natural categories have a prototypic structure is in opposition to the 'Aristotelian' view that every category is associated with a fixed set of membership criteria. This latter notion holds a definition based model, e.g., BIRD is defined as elements with necessary and sufficient features such as [+feathers], [+beak] and [+ability to fly]… and so on. Any entity that satisfies all the criteria is a member of this category and all members of that category have the same membership status. On the other hand, any entity that fails to meet any of the criteria is excluded from the category.

Two issues from this view were challenged by Rosch (1973 & 1975) and others in the 1970's who proposed the Prototype principles. First, they maintained that it is virtually impossible to list a set of necessary AND sufficient criteria for most natural categories. Necessary criteria would usually fall short of sufficient criteria. Secondly, they opposed the idea that all members in a category enjoy the same level of membership privilege. Instead, they claim that the prototypical members should have a more privileged status than peripheral members. Their experiments showed that subjects judged certain members of a category to be better examples than the others. For instance, in the category of BIRD, they judged robins as better examples than ostriches; in the category of VEHICLE, cars are more prototypical members than scooters; in the category of FRUIT, apples are central members as figs are peripheral ones. Further experiments resulted in more evidence that some members of a category are more privileged than the others. These experiments examined the judging process from different perspectives involving three kinds of tasks:

> 1. *Response Times*: Experiments were designed to measure the time subjects took in responding to stimuli that belong to a certain category. Prototypical members would elicit faster response times than for peripheral members, e.g., a robin to a bird would take less time than an ostrich.
>
> 2. *Priming*: Subjects were faster and more accurate in identifying and responding when the response is semantically related to the stimulus (e.g., pen-pencil) than when the response is semantically unrelated to the stimulus (e.g., pen-car).
>
> 3. *Exemplars*: When subjects were asked to name a few exemplars belong to a certain category, the more prototypical items came up more frequently.

The third Exemplars method is adopted in my third experiment in this study. Recall that in the experiment, subjects were asked to first list up to five objects that can be denoted by a certain classifier and then re-rank their order based on their judgment of prototypicality of each object just listed, i.e., the more typical ones were assigned higher ranking, from 1 to 5. The findings show that those items listed by subjects more frequently are also those with higher rankings. For example, as seen in Table 4.1, two observations are noted here: 1) for L2 subjects, the first two most frequently mentioned objects, 紙 'paper' and 桌子 'table', are also ranked as the highest two responses; 2) these highest ranked responses, 米 'rice', 紙 'paper', 桌子 'table', and others, produced by L2 subjects are also those listed as highest ranked objects by L1 subjects. This indicates that L1 and L2 subjects share similar prototypical mental representations.

Table 4.1 Sample Responses from 張 *zhāng* & 粒 *lì*

Response	All L2 (N=58) *F2*	(1st A)	(1st B)	*R2*	Response	All L1 (N=10) *F1*	*R1*
紙 'paper'	45	24	34	1.33	紙 'paper'	10	1.30
桌子 'table'	28	13	7	2.33	桌子 'table'	8	2.25
米 'rice'	7	6	4	1.85	米 'rice'	5	1.80

However, not all responses produced by L2 subjects mirror those by L1 subjects under different types of classifiers. For example, as seen in Table 4.2, the most frequent and highest ranked objects produced by L2 subjects for the classifier 條 *tiáo* are 路 'road', 河 'river', and 褲子 'trouser'. However, these objects are ranked No. 10, No. 4, and No. 6 respectively by L1 subjects. On the other hand, the first three highest ranked objects by L1 subjects are 線 'string', 毛巾 'towel', and 魚 'fish'. Their rankings in L2 subjects' responses are No. 5, No. 4 and No. 10 respectively. These results indicate that, for some linguistic categories, there may exist a certain degree of discrepancy between L1 and L2 subjects' prototypical mental representations.

This discrepancy provides some clues as to how to enhance teaching plans to help L2 learners better learn Chinese classifiers. This involves first determining both the prototypical and peripheral entities of a certain linguistic category. Once these entities are identified for each linguistic category, teachers then can spend more (or less) time and resources on teaching the relationships between these entities and their corresponding classifiers.

Table 4.2 Responses for 條 *tiáo* (CL for 1-dimension)

	All L2 (N=58)					All L1 (N=10)		
Response	*F2*	*(1st A)*	*(1st B)*	*R2*		Response	*F1*	*R1*
路 'road'	43	20	26	1.48		線 'string'	9	2.55
河 'river'	34	13	11	2.09		毛巾 'towel'	5	1.80
褲子 'trouser'	20	3	5	2.50		魚 'fish'	5	3.00
魚 'fish'	15	5	2	3.00		褲子 'trouser'	3	3.00
線 'string'	16	1	4	2.73		蛇 'snake'	3	3.00
蛇 'snake'	10	4	0	3.55		河 'river'	2	1.50
裙子 'skirt'	5	1	2	1.80		皮帶 'belt'	2	2.50
皮帶 'belt'	1	1	1	1.00		裙子 'skirt'	0	N/A
蟲 'worm'	1	0	0	5.00		蟲 'worm'	2	3.00
毛巾 'towel'	0	0	0	N/A		路 'road'	0	N/A

In determining the prototypical and peripheral entities of a certain classifier, I suggest using a set of comprehensive procedures that include the three methods discussed above, namely, Response Times, Priming, and Exemplars. For example, since the third experiment of this study was done using the Exemplars method, its results can serve as a base for further refinement. From these results, some of the highest ranked entities can be extracted for further examination that involves Response Times and Priming. In the Response Times procedures, these extracted entities could be presented as stimuli to subjects and their response times would be measured to determine which entities might have faster response times and should accordingly be categorized as more central entities than others that have slower response times. Finally, the Priming method is applied to eventually determine the final prototypical ranking of a certain classifier. It is not hard to imagine that these processes could get very complicated quickly. A set of well-defined and carefully designed procedures is necessary to produce valid and useful results. The task is not described in detail here but the results can have a positive influence both for language teachers and learners of Chinese classifiers.

4.4 Implications and Future Studies

The implications are drawn based on the findings in this study and the following three models. The first one is the Hierarchy of Difficulty model proposed by Stockwell, Bowen, and Martin (1965) and the second one is the Natural Order Hypothesis most prominently discussed by Krashen (1987). Finally, I will discuss the Processing Instruction framework proposed by VanPatten (2004) and others.

4.4.1 The Hierarchy of Difficulty Model

Throughout the three experiments in this project, the results have shown that whether the classifier system is present or not in the L2 subjects' source language plays an important role in affecting how well they acquire this linguistic unit. For example, for both the Comprehension and Production tests, Korean subjects outperformed their English-speaking subjects most of the time, presumably because Korean is also a classifier language. These phenomena can be accounted for by the Hierarchy of Difficulty model (Stockwell, Bowen, and Martin 1965), which assumes that some linguistic features of a language are more difficult to master than others. When a learner attempts to match or translate a correspondence from source language to target language, there is a difference in difficulty among different linguistic units. Stockwell et al. distinguished these units by categorizing them into obligatory, optional, or no (zero) choices at the phonological level. A scale of eight difficulties in connection with English and Spanish was arrived as follows (from most to less difficult):

	English	Spanish
1	No Choice	Obligatory
2	No Choice	Optional
3	Optional	Obligatory
4	Obligatory	Optional
5	Obligatory	No Choice
6	Optional	No Choice
7	Optional	Optional
8	Obligatory	Obligatory

Of these 8 difficulties, the two most difficult instances were described as when 1) a grammatical rule in one language has no corresponding rule in the other; and 2) the level of complexity of a linguistic feature in one language is not the same as that of a linguistic feature in the other language. These instances are, not surprisingly, found in the current study. For example, in the first instance, since English is a non-classifier language therefore Chinese classifiers would be very difficult to learn for English-speaking subjects. That is also why their performance is poorer than Korean subjects for the most of the time. On the other hand, in the second scenario, Korean is a classifier language but its classifier system is less complex than that of Chinese. Therefore, it can be quite challenging for them to master Chinese classifiers but, as the results have shown, it is not as difficult as what their English-speaking counterparts would have to face.

Stockwell et al. also talk about one of the benefits of identifying the hierarchy of difficulty in that, once determined, it can serve as a set of predictions to benefit both language learners and teachers. However, textbook authors should view such a hierarchy of difficulty only as raw materials and they should distinguish it from a "Valid Pedagogical Sequence" (Stockwell, Bowen, and Martin 1965: 292), which is developed by considering a number of other components.

Furthermore, there are bipolar views of how one should utilize the hierarchy to arrange the pedagogical sequence. On one hand, according to Stockwell et al. (1965: 292), some authors believe that the target structures that are most like the source structures should be taught first, i.e., from the easiest to the most difficult ones. This is so that the students can have a sense of accomplishment and have more confidence in dealing with more difficult structures in the future. On the other hand, some educators feel that it is critical to introduce the structures that are most unlike source structures so as to avoid the dangers of negative transfer and fossilization. Stockwell et al. (1965: 292) provided a combining approach where some of the difficult structures and some of the more easily transferred patterns are presented in the early lessons. The purpose is to give students confidence on one side and still help them become aware of the structural differences that are more difficult to learn in the target language.

4.4.2 The Natural Order Hypothesis

Some of the findings found in the first and second experiments of this project clearly show that there are developmental patterns in acquiring Chinese CLs. For example, 1) in the Comprehension test, two-dimensional CLs are best learned followed by one-dimensional and then three-dimensional CLs; 2) in the Production test, L2 subjects' performances were much better with ANIMACY and FUNCTION classifiers than with EVENT classifiers. These developmental sequences can be accounted for by the notion of Natural Order Hypothesis promoted by Krashen (1983, 1987, 1988), which was based on research findings by several researchers (Brown 1973; Dulay & Burt 1974; Fathman 1975). One of the leading researchers in this field is a psychologist Roger Brown. He recorded the utterances of 3 young children at several stages in their language development. Brown (1973) found that there were regularities in the order of acquisition of several "grammatical morphemes" such as 'the', 'of', or 'is', and the 's' of the genitive, the plural, and the 3PS and others. He discovered that when children did acquire these items, they appeared in the same order in all cases. Brown concluded that "the developmental order of the fourteen morphemes is quite amazingly constant across these three unacquainted American children" (Brown 1973: 272).

In addition, similar patterns also observed in Second Language Acquisition. Studies by Terrell (1977, 1981), Dulay and Burt (1974) and Krashen (1987) show that, regardless of the source languages, all learners of EFL follow an order of acquisition for a number of grammatical morphemes. For example, learners would acquire the 's' of plural nouns earlier, then the 's' of the third person singular of verbs in the present tense is acquired later. Krashen then hypothesized that there is a "natural order" that is predictable for any given language in acquiring its grammatical structures. Some grammatical structures tend to be acquired earlier than the others. Also, this order is independent of the learners' age, L1 background, and conditions of exposure.

Three implications can be drawn based on the Hierarchy of Difficulties model and the Natural Order Hypothesis for learning Chinese classifiers: 1) teachers should be aware of differences in their students' linguistic backgrounds that would cause one group of students acquire certain linguistic feature faster than the other groups of students; 2) teachers should at least be aware of some developmental sequences in acquiring different types of classifiers; 3) they should teach a mixture of classifiers that are easier to learn as well as those that are more difficult to acquire and allow chances for advanced learners to re-visit the materials introduced earlier.

For the first point, since it is not practical to group students based on similar backgrounds for language teaching, teachers should be more understanding with students who are learning certain grammatical units that are not present or similar in their source language. In the case of learning Chinese classifiers, students from the Indo-European language speaking regions would need more time and efforts to understand and acquire than those from speaking languages from Sino-Tibetan families. Secondly, it is clear that there are developmental sequences for different types of classifiers but few, if any, have been identified until now. These developmental sequences need to be made known to language teachers for them to incorporate into their teaching materials. Teachers should be trained to be able to first differentiate classifiers from measure words. Then to be able to categorize classifiers into shape, animacy, event, function, action, verbal, sortal, and other categories and then understand that there are differences among and within these groups in terms of levels of difficulty in learning them. Finally, they should be informed of the benefits of teaching easier classifiers, e.g., shape classifiers, along with more difficult ones, e.g., event classifiers. That said, one needs to keep in mind that those classifiers identified in this study represent only a minor portion of the whole picture: more studies are needed to reveal other developmental sequences within different (sub)types of classifiers.

Another suggestion presented in the model of Hierarchy of Difficulties is Symmetry of Presentation, which states that "closely related structures should be presented together" (Stockwell et al. 1965: 293). This is because these related structures are usually similar in form and distribution. The implication of this Symmetry of Presentation in teaching Chinese classifiers is that closely related structures such as Chinese numbers and demonstratives should be taught together with Chinese classifiers since they are usually similar in form and appear right next to each other. For example, 'three sheets of paper' in Chinese is 三張紙 where 三 is Number, 張 is Classifier, and 紙 is Noun. To understand and produce this phrase correctly, not only do L2 learners need to know the semantic meanings of these characters, they also need to understand their grammatical relationship and the word order of this phrase structure. Note that this phrase would be ungrammatical if the Classifier is absent, but the Noun can be optional. This indicates that, based on the Symmetry of Presentation principle, when learning numbers or demonstratives, learners should also learn the classifiers at the same time. Since these two former elements and all Chinese classifiers are monosyllabic and usually appear in a sequence, learning them together would help learners understand

and internalize the structures and functions of these three elements more easily. Otherwise, if they were learned in disjointed lessons, learners would need to make extra efforts to connect these elements to produce grammatical forms and functions.

Table 4.3 List of Classifiers introduced in Integrated Chinese & Chinese Link

1st Yr I.C.		2nd Yr I.C.		3rd Yr I.C.		1st Yr C.L.		2nd Yr C.L.	
Lssn #	CLs	Lssn #	CLs	Lssn #	CLs	Lssn #	CLs	Lssn #	CLs
2	口	11	輛	2	棟	4	本	1	層
3	號	13	本		層	6	輛	2	把
6	位	16	片		台		隻		齣
	節	18	把	3	頓	9	通	3	棟
	門		套	5	門		位	6	種
7	支	19	束	6	間	10	門	8	部
	張	21	家	7	部	11	双		
8	封	22	座	18	枝	13	件		
	篇	23	件				條		
9	種						張		
	條								
	件								
	枝								
	頂								
	双								
10	次								

Unfortunately, most textbooks that are currently used in US universities do not arrange the classifiers in this manner. They appear unpredictably and disjointedly throughout different levels. For example, Table 4.3 lists the classifiers that are introduced in two textbooks that are widely used in U.S. universities. Both of these textbooks, *Integrated Chinese* (I.C.) and *Chinese Link* (C.L.), are widely used by Chinese teachers at university and high school levels.

As seen in Table 4.3, after two years of instruction, these two textbooks would have introduced around 20 Chinese classifiers, which is moderately adequate if one needs to use the language in a more formal setting. However, one doubts how well learners can learn and internalize these new classifiers since they are presented disjointedly. For example, first of all, not every lesson introduces classifiers, which might cause learners to simply forget what they have learned earlier because each lesson usually takes about two weeks to cover. Secondly, for those lessons that introduce classifiers, there are only 1 to 3 classifiers being taught at a time. Although the frequency is not high enough, those being taught often belong to the same category and thus do provide students with opportunities to compare and contrast different types of classifiers. For instance, in Lesson 8 of 1st year Integrated Chinese, the two classifiers, 封 and 篇 are introduced. These two are used to denote written texts with the first one collocating with 信 'letter' and the latter with 文章 'article'. Another example can be found in Lesson 2, 3rd year Integrated Chinese where 棟 and 層 are introduced. These two classifiers are used to denote man-made structure with the first one collocating with a whole building such as 'house' or 'skyscraper' and the latter one with a layer of a building such as 'a story of a building'. However, this is not the case all the time, i.e., many lessons introduced classifiers that are not related preventing one from comparing and contrasting.

Nonetheless, there is one particular exception that can serve as a good example that future textbooks should follow. In Lesson 9 of 1st year Integrated Chinese, 6 classifiers are introduced. Some of these classifiers are related to each other and thus learners get a chance to find out the differences and similarities between these classifiers. The topic of this lesson is about shopping, where students learn the names of several objects and they also learn how to negotiate. With different objects found at the store, students have the chances to learn the semantic meanings of these new words and to develop collocational competence for connecting the classifier with appropriate referents. Also, these classifiers reappear in latter lessons and thus give students chances to internalize them more effectively. In short, these textbooks provide some sufficient materials for learning Chinese classifier but they would be more effective if more classifiers that denote similar referents were added and the distribution of these classifiers were more congregated.

4.4.3 The Processing Instruction

In most second language acquisition theories, the crucial role of input has been greatly recognized (Gass 1997). However, researchers have not yet reached a consensus on a number of issues such as frequency, salience, and comprehensibility of input. The acquisition of some features in any given language is affected by their input frequency and saliency when exposed to learners. Some researchers showed that low-frequency features are difficult to acquire (Ellis 2002) while others showed that some high-frequency features with low salience and/or high redundancy are also late and/or difficult to learn (VanPatten 2004). Other factors that might affect acquisition are whether the unit being learned is a full syllable or bound morpheme (Wode 1981), or whether it occurs in an initial, medial, or final position in a sentence (Meisel, Clahsen, & Pienemann 1981; Pienemann 1999; VanPatten 2004). In addition, first language patterns may have a role in affecting how learners perceive patterns in the L2 lexicon and morphosyntax (Kellerman 1983; Schachter 1974; Zobl 1980).

Another aspect of language acquisition has to do with comprehensibility. Krashen (1985) proposed the *i*+1 model in which input that is comprehensible to the learners plus the information just beyond the learner's current interlanguage will provide the conditions for acquisition to take place. Sharwood-Smith (1986) distinguished between input for comprehension and for acquisition, an idea that suggests that not everything in the input becomes intake for acquisition, nor does it lead to changes in learners' interlanguage. VanPatten (1996) defined intake "as input that learners pay attention to and from which form-meaning connections have been made." He also showed that while learners' attention was focused primarily on meaning they had difficulty focusing on language form (VanPatten 1990). He then proposed the idea of Processing Instruction (PI) as a way to make it more likely that learners would better make correct form/meaning connections.

Processing Instruction (PI) emphasizes form instruction that is predicated on a model of *input processing* (VanPatten 1993, 1996, 2002; Chaudron 1985) by which learners make connection between grammatical forms with their meanings. The goal of PI is to help L2 learners glean richer intake from the input they are exposed to. This is done by engaging learners in structured input activities and by so doing pushes them away from the previous strategies they used to connect forms and meanings. The three major characteristics of PI are these:

> (1) Explicit information about the target structure: information is given to learners as to how the linguistic form/structure in question works;
>
> (2) Explicit information about processing strategies: learners are informed about a certain IP strategy that may lead to (in)correct input processing;
>
> (3) Structured input activities: manipulated input is given so that learners are pushed away from less-than-ideal strategies. (Wong 2004)

Compared to other "focus on form" techniques, PI differentiates itself from others in that it first identifies what some of the processing strategies are that learners use which prevent them from processing a particular form or structure correctly. Only when this process is accomplished is it possible to design activities to help learners process input more efficiently. Following is a brief listing of steps for developing Structured Input (SI) activities (Wong 2004: 37-38):

Developing SI Activities

Step 1: Identify the Processing Problem or Strategy: Why are learners having problems processing a particular form?

Step 2: Follow Guidelines for Developing SI Activities:

1. Present one thing at a time.
2. Keep meaning in focus.
3. Move from sentences to connected discourse.

Based on these steps, SI activities designed to enhance L2 learners' understanding and semantic/collocational competence of Chinese classifiers can be developed and used in the classroom. For instance, a teacher might dedicate a length of time to solely present the structure and use of classifiers. A list of classifiers would be introduced first followed by relating these classifiers with corresponding objects shown in a set of photos. After repeating this process several times, the teacher can then embed these Number + CL + Noun phrases into complete sentences and eventually use them in connected discourse. Further details of this task are not part of this project and I leave it to future practitioners to explain or illustrate how to utilize these steps in teaching Chinese classifiers. Nonetheless, I believe this will be a fertile ground for future studies to develop effective methods in teaching Chinese classifiers.

4.4.4 The Limitations

Due to the time and resources given to finish this study, there are several limitations that made this study less than ideal. First, many other classifiers were not included in the experiments but are equally representative or more frequently used than those selected in this study. For instance, the classifier 枝 *zhī*, which denotes one-dimensional and long slender objects such as branches and pencils, is a very commonly seen and used classifier but is not examined in this study. In future studies, researchers should include such classifiers to see if similar results can be drawn.

Secondly, future studies should also include more types of classifiers to expand our understanding of developmental sequences beyond those already explored in this project. The current study examined only shape, function, and animate classifiers. Other types of classifiers such as verbal, sortal, and event classifiers deserve equal attention in future studies.

The third limitation has to do with the selection of L2 subjects. Ideally, these L2 subjects should have similar learning experiences in acquiring Chinese. These include such factors as using the same textbooks and employing similar strategies in learning classifiers. In reality, the L2 subjects in this study came from different parts of the world and adopted various ways of learning Mandarin Chinese. These may be factors that could affect the validity of the results, but they are also unavoidable problems when the pool of participants is so heterogeneous.

4.4.5 Future Studies

For future studies, the results would have more credibility if more classifiers within each category were included in the experiment. For example, within one-dimension shape classifiers, 線 *xian*, 支 *zhi*, and 枝 *zhi* are good candidates to test if future subjects' results would be similar to the current study's results. Also, other types of classifiers should be considered, e.g. classifiers for abstract nouns, actions, and sorts. However, these are much less frequently used in daily speech and thus are less likely to be acquired by novice or even intermediate level students. One should focus, then, not only on developmental order but on the extent to which L2 learners' mental representations of these events or actions overlap with native speakers' mental representations.

Also, in this study there are several occasions where it appeared that L2 subjects' performance on the classifier tasks regressed as their CPL advanced. This is rather counter-intuitive, as one would logically hypothesize otherwise. Since such phenomena are seen only with certain types of classifiers, further study is needed to confirm the results found in this study. Finally, with the typological test, a certain degree of L1 negative transfer of Korean classifier knowledge is observed. However, the evidence found in this study does not provide strong support for such claims. Future study with methodologies specifically designed to address this issue is needed. It would be interesting to see if this is truly the case and, if so, with which types of classifiers Korean learners are most likely to be affected by negative L1 transfer effect. Again, if such a study could be conducted and reliable results were to be produced, both educators and learners of Mandarin Chinese would benefit greatly when designing curriculum or learning strategies.

Thirdly, the factors that influence L2 learners' acquisition of Chinese classifiers should be explored and examined. These factors can be linguistically or extralinguistically motivated. For instance, linguistically, to what extent does L2 learners' native language play a role in acquiring Chinese classifiers? Is there any evidence that would support the claim that L2 learners' native language is a positive or negative influence because it is a (non-)classifier language? On the other hand, extralinguistically, do factors such as length of time living in Chinese-speaking areas, frequency of using Chinese language, motivation of learning the language, textbooks used, and so on, have a role in shaping learners' acquisition? If so, in what ways and to what extent do they affect acquisition of these forms?

Last but not least, future studies should continue to explore and refine the prototypical or peripheral entities for the linguistic categories manifested by Chinese classifiers examined in this study and others that have not been examined. Once these entities are identified and confirmed to be valid, teaching materials can then be created so that L2 learners can develop a mental perception that is closer to that of native speakers. Only when a mental representation is constructed, can one better develop the collocational competence that is highly required when learning and using Chinese classifier systems.

APPENDIX A

CONSENT LETTER

Consent Letter

A.1 English Version

The University of Texas at Arlington

Department of Linguistics and TESOL

The purpose of this letter is to obtain your consent in participating a study, which is part of my PhD dissertation. The goal of this project is to understand how adult learners of Chinese acquire a specific linguistic feature of Mandarin Chinese. To maintain the objectivity of this study, details of the experiments can not be discussed in advance. However, if you are interested, details about the feature examined and the results will be provided at the end of the experiments. Following paragraphs inform you what the study will involve and you are invited to sign at the end of this letter should you agree to participate.

The study employs five experiments. Two groups of subjects will be elicited for this study: native and non-native speakers of Chinese. All subjects will have the same experiments. The native subject group serves as a control group for the conventional use of the linguistic feature to be examined. The experiment will be administered individually as there are places in the experiments independent responses are critical to the study.

For the first experiment, you will be asked to pick out an object made of clay dough according to the experimenter's oral instruction. Approximately ten questions will be presented. No written or oral responses are required here.

The second experiment involves answering two questions orally about the pictures to be shown to you. The questions will be asked in Chinese and they are: 1.) what is it in the picture; 2.) how many are there? There will be 12 pictures in this experiment.

In the third experiment, you will be asked to judge if a phrase in Chinese is grammatical or not. There will be 10 phrases and they will be written on the questionnaire as well as read out loud to you, both in Chinese, by the experimenter. You are only asked to answer either Yes or No.

The fourth experiment asks you to list three to five nouns based on the instruction given by the experimenter. The answers can be written in Chinese (characters or Pinyin) or in English.

The fifth experiment tests your phonological understanding about certain combinations of phrases. There are six Chinese phrases (with pinyin) and you are asked to read them individually. Then, you are asked to note the tone for each character in that particular context. So, for a phrase that has five words, your answer would look something like this: 23323. Each phrase contains less than five words and it'll take about ten minutes for this test.

The final procedure is a survey in which you will be interviewed by the experimenter on how you learned this particular linguistic feature. Note that only non-native speakers of Chinese are to be interviewed.

The entire experiment will be less than 60 minutes and will be tape-recorded. I will conduct the experiments according to a time and location that are convenient for you. You bear no obligation should you decide, during or after the experiments, to withdraw from this study for any reason. You have the right to deny answering any question in the questionnaire or in the experiments. Any background information provided and all responses, whether tape-recorded or written, will be kept confidential. At no time your identity will be revealed in either published results or in presentations of the study.

There is no direct or significant benefit to you as a result of your participation. However, a small gift will be given to you as a token of thanks and you may gain more knowledge about this linguistic feature at the end of the experiments.

If you decide to participate, please sign the consent statement at the end of this letter, detach and return it together with the completed questionnaire in the enclosed envelope. If you have any questions now or at a later time, you can reach me at (972) 943-1161 or email me at: nealliang@yahoo.com.

Thank you for your interest in this study.

Sincerely yours,

Szu-Yen Liang

I have read and understand the above experiment and am willing to participate.

Name: ______________________ Gender: _____ Birth Year: ______

Signature: ___________________ Date: ___________________

Consent Letter

A. 2 Chinese Version

中文參與同意書

德州大學阿靈頓分校

Department of Linguistics and TESOL

本信的主旨是為了要得到您的同意以成為我博士論文研究計劃中的受測人之一。此研究計劃的目的是為了更加了解外國人如何習得漢語中之某項語言要素。 為了確保本實驗之客觀性，實驗內容細節在此暫不討論。然而，您若有興趣，所有細節及研究結果將在本計劃結束時提供給您。以下為本研究之大致內容。 您若同意參與本實驗，請在信末簽署您的大名。

本研究將有五個實驗。受測人可分為兩類組： 1). 以普通話(即國語)為母語者和 2). 母語非普通話(即國語)者。 所有受測人都會接受相同之測驗。 以普通話(即國語)為母語者所提供之回答將作為另一類組人回答正確與否之標準。每一受測人將各別接受測試，此乃為避免受測人在作答時互有干擾而影響研究結果之客觀性。

在第一個實驗裡，測試人將請您根據他的要求挑選出一樣以黏土做成的物體。大約有十道這樣的問題，您不須要寫下或說出任何答案，只需挑選出正確的物件即可。

第二個實驗會請您先看一張圖片，然後測試人會以中文問您兩個有關該圖片的問題：1). 圖片裡有什麼？2). 有多少？這裡大約有十二張圖片。

第三個實驗會請您判斷您所聽到或讀到的中文句子是否符合中文語法。您只需回答‘是’或‘不是’即可。

第四個實驗會請您根據測試人之要求寫下三到五個名詞。您可以中文或英文寫下您的答案。

第五項實驗是有關語音方面的測試。在本測試中，您將看到六個中文詞組。測試人將請您逐句讀出每個詞彙，並寫下該詞彙的讀音音調。即一聲，二聲，三聲或四聲。這六道題大約需時十分鐘。

最後一個步驟是幾個問答題所組成的，測試人將問您是如何習得此一漢語語言要素的。只有母語非漢語(即普通話)者才須回答此部份之問題。

本實驗將佔您大約六十分鐘的時間並且將全程錄音。我將按照您方便的時間與場所進行本實驗。在本實驗進行前，中，後的任何時候，您若感到任何不妥，都可以隨時退出本實驗。您有權拒絕回答在問卷或實驗中之任何問題。您所提供的背景資訊或對實驗問題所寫下或錄下的回答，我保證將不會對外公開。您的姓名將不會在本論文或其他專刊報告中提及。

雖然您對本實驗的參與並不會使您得到直接且可觀的益處，但您將得到一份小禮物以示感謝。再者，您的參與可能使您對此一漢語語言要素有更深入的了解與認識。

現在如果您願意參與本實驗，請在本信末簽下您的大名並填寫隨信附上的受測人背景資料表。最後請以附上之信封盡速寄給我，我將從速與您聯繫以決定實驗的時間與場所。您若有任何問題，請打電話給我。我的電話號碼是 (972) 943-1161，或是寄電郵給我: nealliang@yahoo.com.

非常感謝您的參與及協助!

梁思彥　　　　　　　　　　　　　　　　　二零零七年五月二十日

我已讀過並了解本信所提之有關參與成人漢語發展的研究實驗。我願意參與此實驗接受測試。

姓名: ________________。性別: _______。 出生年份: ____________。

簽名: _____________________ 。 簽名日期: _____________________________。

APPENDIX B

QUESTIONNAIRE ON SUBJECT BACKGROUND

B.1 English Version

Please answer the following questions:

1. Sex: ☐ M ☐ F , Year of Birth: ________,

   Birthplace: _________________________________(city, country).

2. Your first language: _______________________________,

   Other language(s): _______________________________________.

3. How long have you studied Mandarin Chinese? _____Months or ______ Years.

   When did you first take the Chinese lesson? _____Month ______ Year.

   Did you ever have a non-native speaker of Chinese as your instructor?

   ☐ Yes ☐ No ☐ Don't Know

   How often and how long do you study Chinese now: _____________________.

4. Are either of your parents a native speaker of Chinese? ☐ Yes ☐ No

5. Are your married? ☐ Yes ☐ No (If "No", skip to Question #6.)

   If "Yes", is your spouse a native speaker of Chinese? ☐ Yes ☐ No

   Do you talk to your spouse in Chinese? ☐ Yes ☐ No

   If "Yes", where and how often: ______________________________________.

6. What is the highest level of education that you have completed?

   ☐ Middle School ☐ High School ☐ Bachelor

   ☐ Master ☐ PhD ☐ Other

7. Have you lived in a Chinese-speaking community? ☐ Yes ☐ No

If "Yes", for how long: ______ Months _______ Years.

Where? ____.

8. Did you have to use Mandarin Chinese for any kind of work? ☐ Yes ☐ No

   If "Yes", what was your job title and what do you do?

   ____.

9. Are you currently living in a Chinese-speaking community? ☐ Yes ☐ No

   If "Yes", for how long? ______ Months ______ Years;

   Where: ____.

   How long do you plan to stay here? ______ Months _______ Years;

   Are you currently taking any Chinese class? ☐ Yes ☐ No

   If "Yes", what is your current class level? ___________________________.

10. Do you have any sensory impairment: ☐ Yes ☐ No

    If "Yes" ☐ Vision, ☐ Hearing.

11. What is your occupation? _____________. What is/was your major? _________.

12. How often do you speak Chinese?

    ☐ all the time ☐ very often ☐ sometimes ☐ occasionally ☐ never

    To whom do you speak to (list all that apply)? ___________________________.

13. Have you taken any Chinese evaluation test? ☐ Yes ☐ No

    If "Yes", what is the name of the test? _________________________________.

What was your highest passing score/level? ______________________________.

14. Can you count from 0 to 10 in Chinese? ☐ Yes ☐ No

    With difficulty? ☐ Yes ☐ No

15. When learning Chinese, what are some of the feature(s), e.g., tones, writing characters, or others pose a greatest challenge to you (rank in the order of difficulty)? ____.

16. What are some of the easiest feature(s) to you in learning Chinese (rank in the order of difficulty)? ____.

受測人背景問卷調查表
(QUESTIONNAIRE ON SUBJECT BACKGROUND)

B.2 中文版 (Chinese Version)

請回答以下問題:

1. 您的性別? ☐ 男 ☐女; 出生年份? ________年

出生地? ____(城市, 國家).

2. 您的母語為何? _____________, 您會的其他語言/方言? ________________。

若您的母語不是中文國語(亦即臺灣國語)，請停止回答下列問題。

3. 您的父親或母親的母語是漢語普通話 (亦即國語)嗎? ☐ 是 ☐不是

4. 您結婚了嗎? ☐是 ☐ 不是

若"是"，您配偶的母語是漢語普通話 (亦即國語) 嗎? ☐ 是 ☐不是

您與您的配偶最常以普通話 (亦即國語) 交談嗎? ☐ 是 ☐ 不是

若“是”，在何時及何處你們會以普通話 (亦即國語) 交談呢?

____。

若“不是”，你們會以何種語言交談呢?

____。

5. 您的最高學歷為何? ☐ 中學 ☐ 高中 ☐ 大學 ☐ 碩士

☐ 博士 ☐ 其他

6. 您是否曾住在非使用漢語的地區或國家? ☐ 是 ☐ 不是

若“是”, 那是在什麼地方? ____。

您在那兒住了多少個 ____ 月 ____ 年。

7. 您現在所住的地方是使用漢語的地區或國家嗎? ☐ 是 ☐ 不是

您在這兒住多久了? ____ 月 ____ 年。

8. 您是否有任何視覺上的障礙呢? ☐ 有 ☐ 沒有

9. 您的職業為何? ______________。您在校時的主修為何? _________。

10. 您現在多常說普通話 (亦即國語) 呢?

☐	☐	☐	☐	☐
總是	經常	有時候	偶爾	絕不

11. 通常您與誰說普通話 (亦即國語) 呢 (請列出所有交談對象)?

____。

TRANSLATION OF QUESTIONNAIRE ON
SUBJECT BACKGROUND

B.3 English Translation

Please answer the following questions:

1. Your Chinese Name: ___________, Gender: ________, Birth Year: ________,

   Birth Place: ___________(City, Country).

2. Your native language: __________, Other language/ dialect: ____________.

   Please stop proceeding to the following questions if your native language is NOT Mandarin Chinese.

3. Are your parents' native language also Mandarin Chinese: ____ Yes, ___ No.

4. Are you married: ____ Yes, ___ No.

   If yes, is your spouse's native language Mandarin Chinese:

____ Yes, ___ No.

Do you talk to your spouse mostly in Mandarin Chinese:

____ Yes, ___ No.

If yes, when and where do you use Mandarin Chinese:

____.

5. What is your highest education: ___ Middle School, ___ High School,

___ College, ___ Master, ___ PhD, ___ Others.

6. Have you ever lived in a non-Chinese speaking area/country: ___ Yes, ___ No.

If yes, where: ___________。

How long had you lived there:______ Month, _____ Yeas.

7. Are you now living in a non-Chinese speaking area/country: ____ Yes, ___ No.

How long have you lived here: _____ Year.

8. Do you have any visual impairment: ____ Yes, ___ No.

9. What is your occupation: _____________.

What was your major at school: _________.

10. How often do you speak Mandarin Chinese now: ___ Always, ___ Often,

___ Sometimes, ___ Once a while, __ Never.

11. To whom do you usually speak Mandarin Chinese to (list all that apply):

____.

QUESTIONNAIRE ON SUBJECT SPEAKER'S BACKGROUND

B.4 한국어 버전 (Korean Version)

다음 따르는 질문에 대답해 주세요:

17. 성별: ☐ 남 ☐ 여, 출생년도: ________,

    출생 장소: ________________________________(도시, 지역).

18. 모국어: ______________________________,

    그 외 말할 수 있는 다른 언어:
    ______________________________________.

19. Mandarin 중국어를 배우지 얼마나 됩니까? _____개월 혹은 ______년.

    언제 처음으로 중국어를 배웠습니까? ____년도 _____월

    중국어를 비원어민 강사한테 배운 적 있습니까?

    ☐ 있다 ☐ 없다 ☐ 잘 모르겠다

    현재 일주일에 몇 번 중국어를 공부합니까? _______________________.

    현재 하루에 몇 시간 중국어를 공부합니까? _______________________.

20. 부모님 중 한 분이 중국어 원어민입니까? ☐ 예 ☐ 아니오

21. 기혼입니까? ☐ 예 ☐ 아니오. ("아니오" 인 경우 6 번 질문으로 가세요)

    "예"라고 답한 경우, 배우자가 중국어 원어민 입니까? ☐ 예 ☐ 아니오

    당신은 배우자와 중국어로 말합니까? ☐ 예 ☐ 아니오

" 예"라고 답한 경우, 어디서, 얼마나 자주 말합니까:___________________.

22. 당신의 교육 수준은 어느 정도입니까?

☐ 중학교 졸업 ☐ 고등학교 졸업 ☐대학교 졸업

☐석사 ☐박사 ☐그 외

23. 중국어를 말하는 지역에 산 적이 있습니까? ☐예 ☐아니오

"예"라고 답한 경우, 얼마나 살았습니까? ______년______개월

어디서 살았습니까?

____.

24. 근무를 위해서 중국어를 사용해야 했습니까? ☐ 예 ☐ 아니오

"예" 라고 답한 경우, 당신의 직업은 무엇이며, 어떤 일을 했습니까?

____.

25. 현재 중국어를 말하는 지역에 살고 있습니까? ☐ 예 ☐아니오

"예"라고 답한 경우, 얼마 동안 살고 있습니까? ______년_____개월

어디서 살고 있습니까: ____.

얼마나 더 살 계획입니까? ______년 ____개월

현재 중국어 수업을 듣고 있습니까? ☐예 ☐아니오

"예" 라고 답한 경우, 현재 수업 수준은 어느 정도 입니까? ______________.

26. 당신은 감각 기간에 문제가 있습니까? ☐예 ☐아니오

☐ ☐

"예" 라고 답한 경우, 시력 청력

27. 당신의 직업은 무엇입니까?

______________________________________.

28. 당신의 전공은 무엇입니까? (무엇이었습니까?) ______________________.

29. 얼마나 자주 중국어를 말합니까?

☐ 항상 ☐ 매우 자주 ☐ 자주 ☐ 가끔 ☐ 전혀 안 씀

누구와 말합니까? (대화 상대를 적어 주세요)

30. 중국어 실력 테스트를 본 적 있습니까? ☐ 예 ☐ 아니오

"예" 라고 답한 경우, 테스트의 이름은 무엇입니까? ___________________.

가장 높은 점수(수준)은 몇 점 이었습니까? ___________________________.

31. 당신은 중국어로 0 부터 10 까지 셀 수 있습니까? ☐ 예 ☐ 아니오

어렵습니까? ☐ 예 ☐ 아니오

32. 중국어 학습 시, 가장 어려운 점은 무엇입니까? (예를 들면, 톤, 한자쓰기 등등) 5 개까지 나열하고, 가장 어려운 것부터 1 번에 적어 주세요.

1. ____
2. ____
3. ____
4. ____
5. ____

33. 중국어 학습 시, 가장 쉬운 점은 무엇입니까? 5 개까지 나열하고, 가장 쉬운 것부터 1 번에 적어 주세요.

1. ____
2. ____
3. ____
4. ____
5. ____

APPENDIX C

CLASSIFIER TYPOLOGICAL TEST

C.1 Instruction for Experiment III (English Version):

This experiment investigates your knowledge about five Chinese classifiers that are commonly used in daily life. For each classifier, you are asked to first write down as many as object names that can co-occur with that particular classifier. Ideally, three to five object names should be produced for each classifier. For example, for classifier 輛 *liàng*, you probably would list 汽車 *qìchē* ‘cars’, 卡車 *kǎchē* ‘trucks’, 巴士 *bāshì* ‘buses’, 腳踏車 *jiǎotàchē* ‘bicycles’, 坦克車 *tǎnkèchē* ‘tanks’ as corresponding members for this group. After writing down all the object names that you can think of for this classifier in the section A, you are now to reconsider these names and rank them according to your judgment as to how prototypical certain objects are to the classifier being questioned. To determine the most prototypical members, you are asked to judge which objects are better examples, or more representative of, the category than others. Using the above example, you might change the order of 汽車 *qìchē* ‘cars’, 腳踏車 *jiǎotàchē* ‘bicycles’, 巴士 *bāshì* ‘buses’, 卡車 *kǎchē* ‘trucks’, 坦克車 *tǎnkèchē* ‘tanks’ based on your judgment on how representative they are when the classifier 輛 *liàng* is used.

Please write down 3-5 nouns that can go with the follow classifiers:

1. 條 *tiáo*
2. 把 *bǎ*
3. 粒 *lì*
4. 張 *zhāng*
5. 台 *tái*

C.2 Instruction for Experiment III (Chinese Version):

本實驗將探究您對下列五個在日常生活中常見的量詞的了解。請您寫下所有能和這些量詞組合成詞的名詞。在理想的情況下，您至少應寫下三到五個名詞。例如，如果問題裏的量詞是 輛 *liàng*, 可能與此量詞組合成詞的名詞有 汽車 *qìchē* ‘cars’, 卡車 *kǎchē* ‘trucks’, 巴士 *bāshì* ‘buses’, 腳踏車 *jiǎotàchē* ‘bicycles’, 坦克車 *tǎnkèchē* ‘tanks’ 等。 請您將這些名詞寫在 A 欄裏。然後，請您對這些列在 A 欄裏的名詞重新考慮，看看哪一個最具代表性並將它列在 B 欄裏的第一位，然後以次類推將其他列於 A 欄裏的名詞，以此方式列入 B 欄裏。比方說，以上的名詞裏‘汽車’最具代表性，所以您可將它列在列在 B 欄裏的第一位。其次是 ‘腳踏車’, ‘巴士’, ‘卡車’, ‘坦克車’ 等.

請各列舉 3-5 個可與下列量詞組合成詞的名詞:

1. 條
2. 把
3. 粒
4. 片
5. 輛

C.3 Instruction for Experiment III (Korean Version):

이 연구는 생활에서 흔히 쓰이는 5 개의 중국어 분류사에 관한 당신의 지식을 알아 보는 것입니다. 각각의 분류사에 대해서, 그 분류사와 쓰일 수 있는 물건의 이름을 가능한 많이 나열해 주세요. 예를 들면, 분류사 輛 liàng 와 같이 쓰일 수 있는 물건에 대해서, 汽車 qìchē '자동차', 卡車 kǎchē '트럭', 巴士 bāshì '버스, 腳踏車 jiǎotàchē '자건거', 坦克車 tǎnkèchē 탱크' 이렇게 쓰시면 됩니다. 영역 A 에 그 분류사와 같이 쓸 수 있는 물건을 쓴 후, 그 물건이 분류사와 얼마나 적합하게 (전형적으로) 쓰일 수 있는지 다시 한번 생각하시고, 순위를 매겨주십시오. 적합성을 결정하기 위해서, 어느 물건이 다른 물건보다 더 전형적인지 결정해 주십시오. 예를 들면, 분류사 輛 liàng 은 qìchē '자동차', 腳踏車 jiǎotàchē '자건거', 巴士 bāshì '버스', 卡車 kǎchē '트럭', 坦克車 tǎnkèchē '탱크'중 어느 것과 가장 전형적으로 쓰일 수 있는 지(어느 것과 가장 어울리는지) 순위를 매겨 주십시오.

Please write down 3-5 nouns that can go with the follow classifiers:

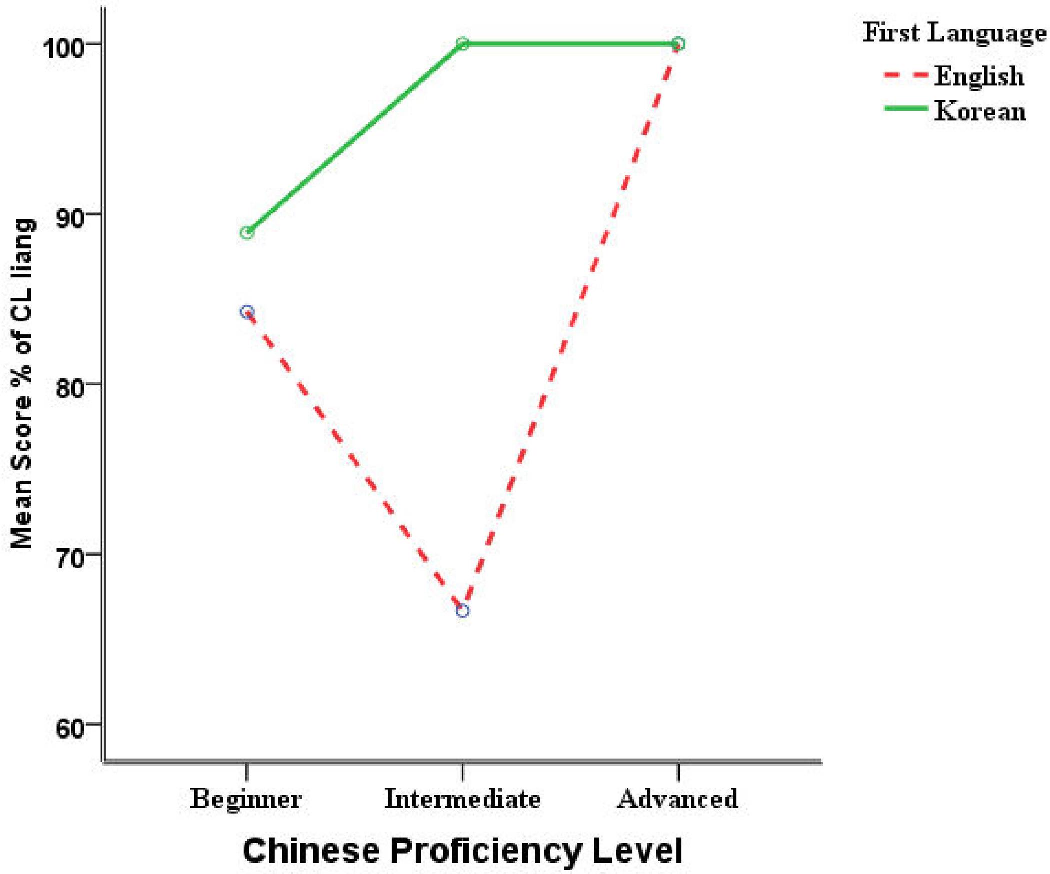
다음에 따르는 분류사와 잘 어울리는 물건을 3 개에서 5 개 적어 주세요.

1. 條
2. 把
3. 粒
4. 片
5. 輛

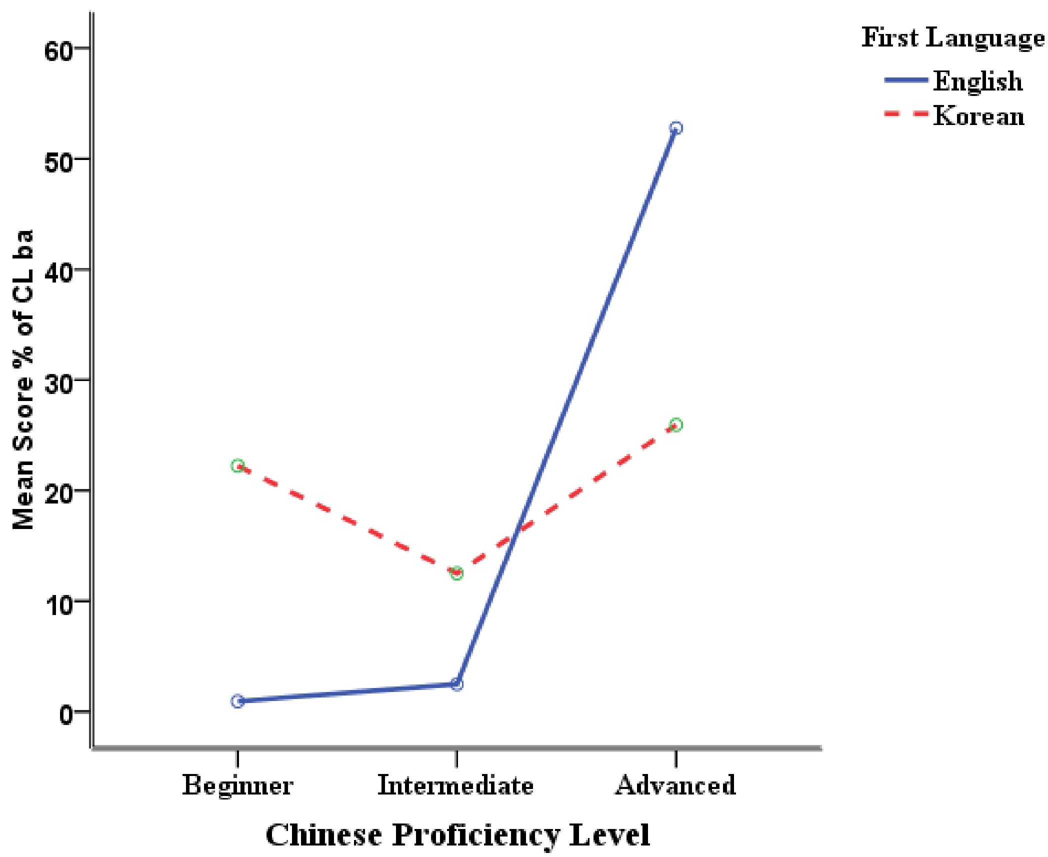
APPENDIX D

INDIVIDUAL DEVELOPMENTAL SEQUENCES

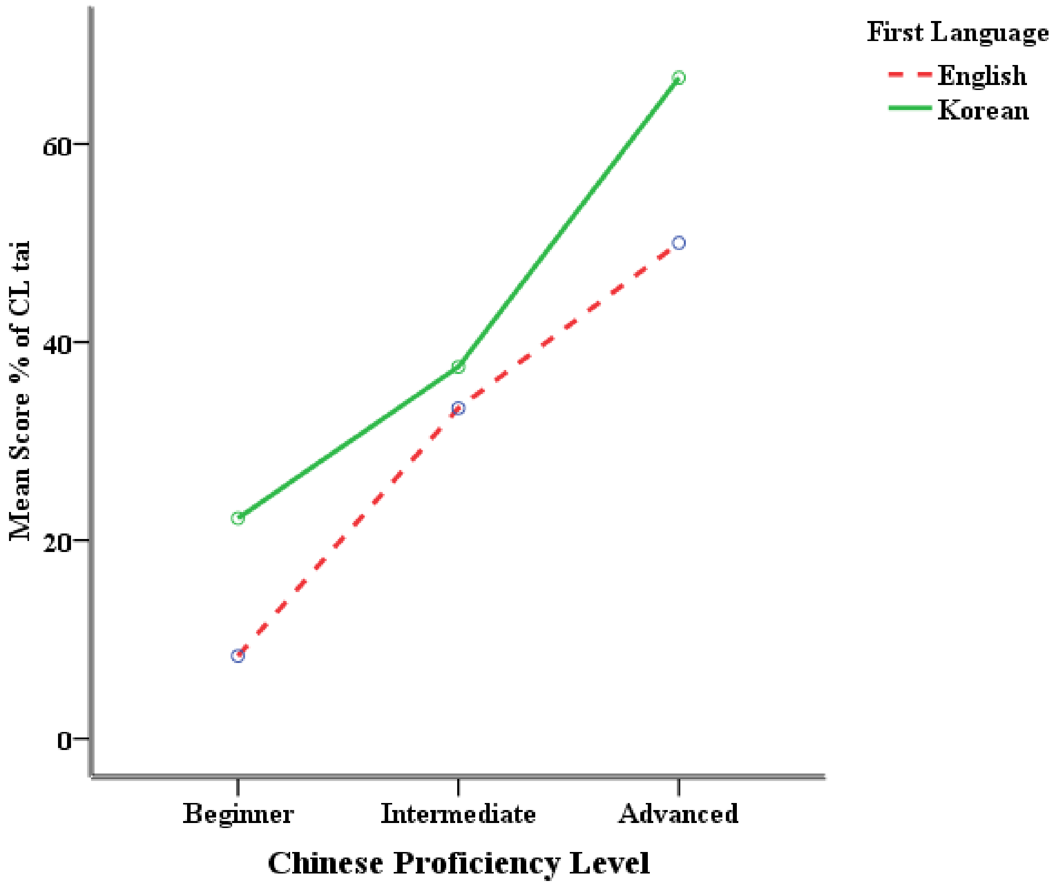
OF CLASSIFIERS IN PRODUCTION TEST



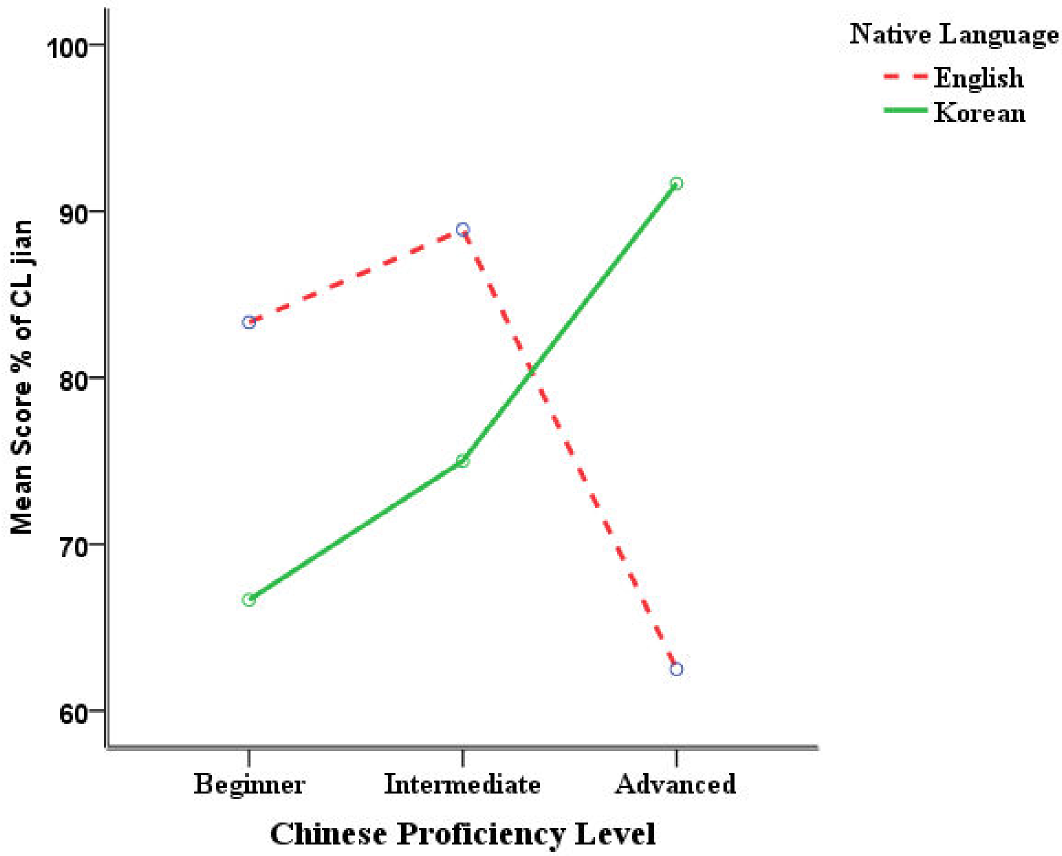
FUNCTION CL for vehicle 輛



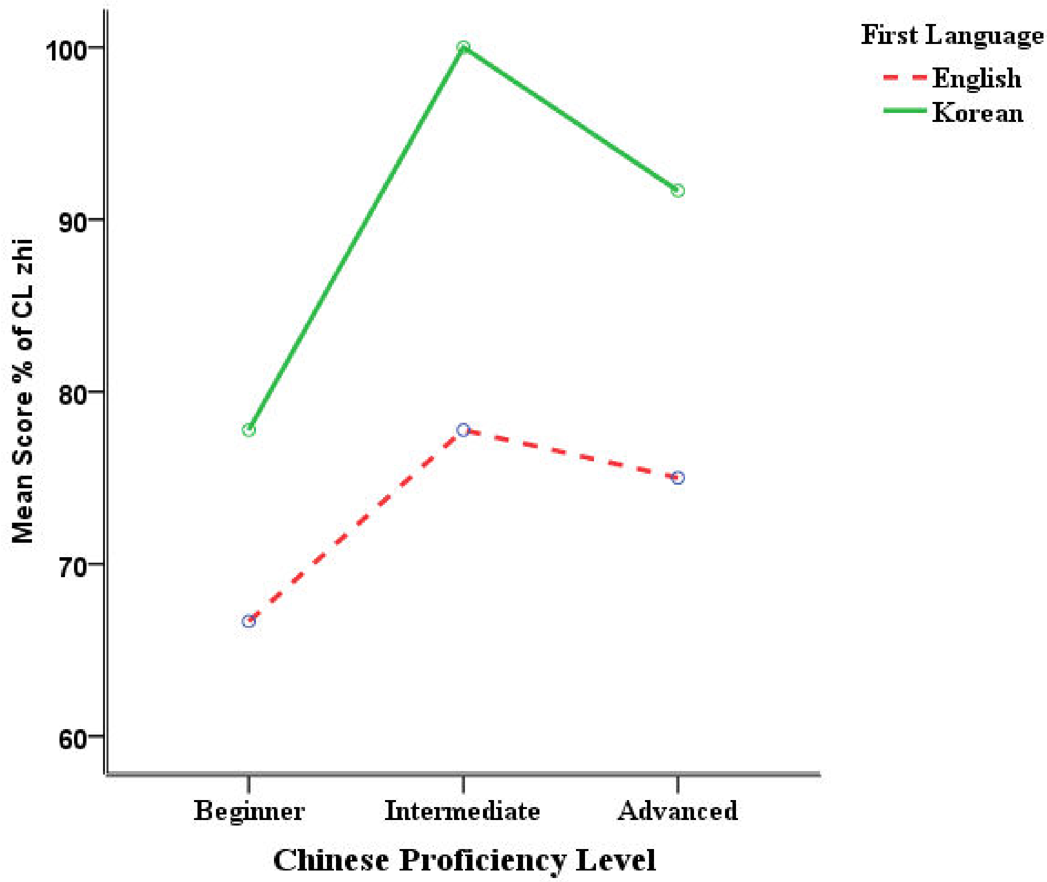
FUNCTION CL for tool 把



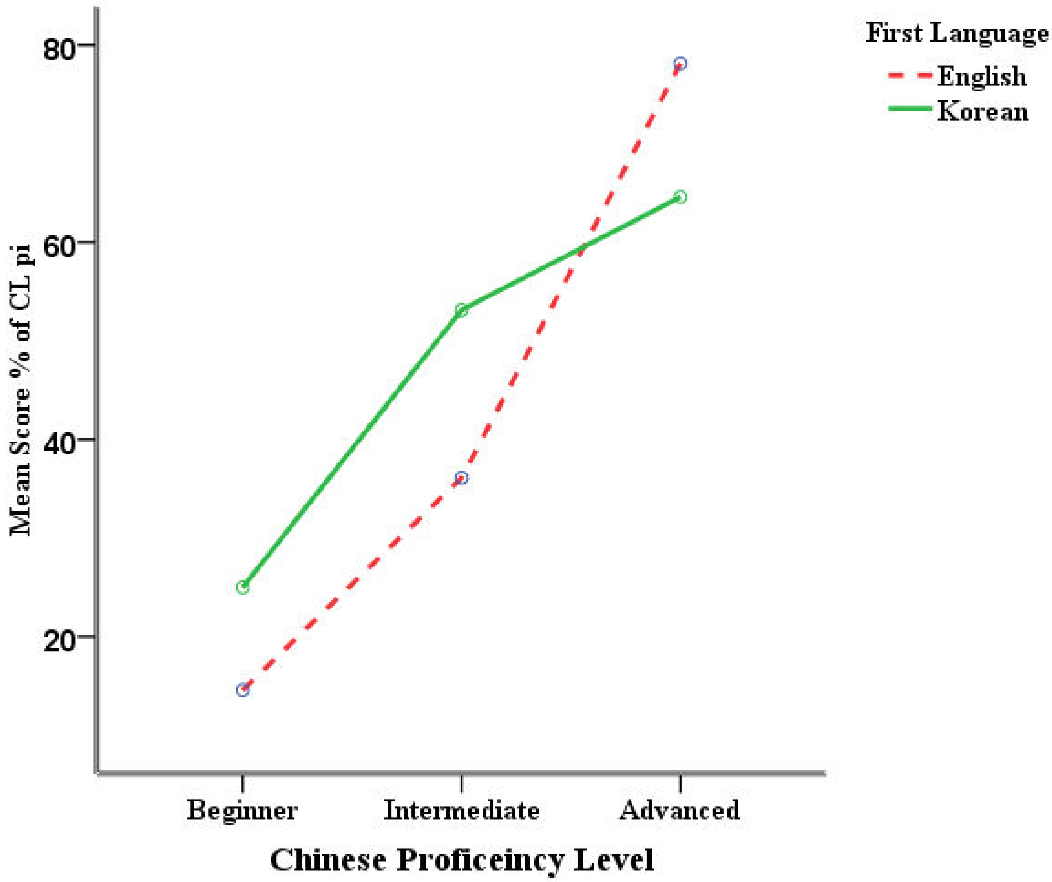
FUNCTION CL for machine 台



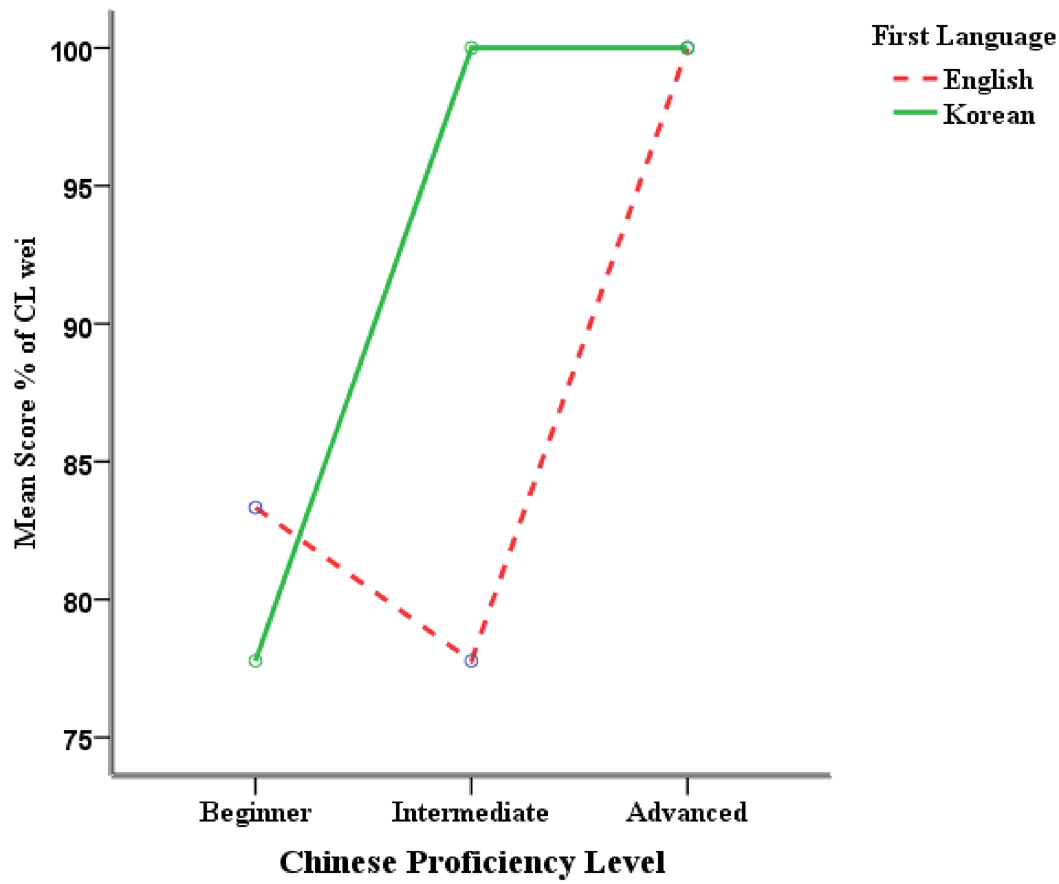
FUNCTION CL for clothing 件



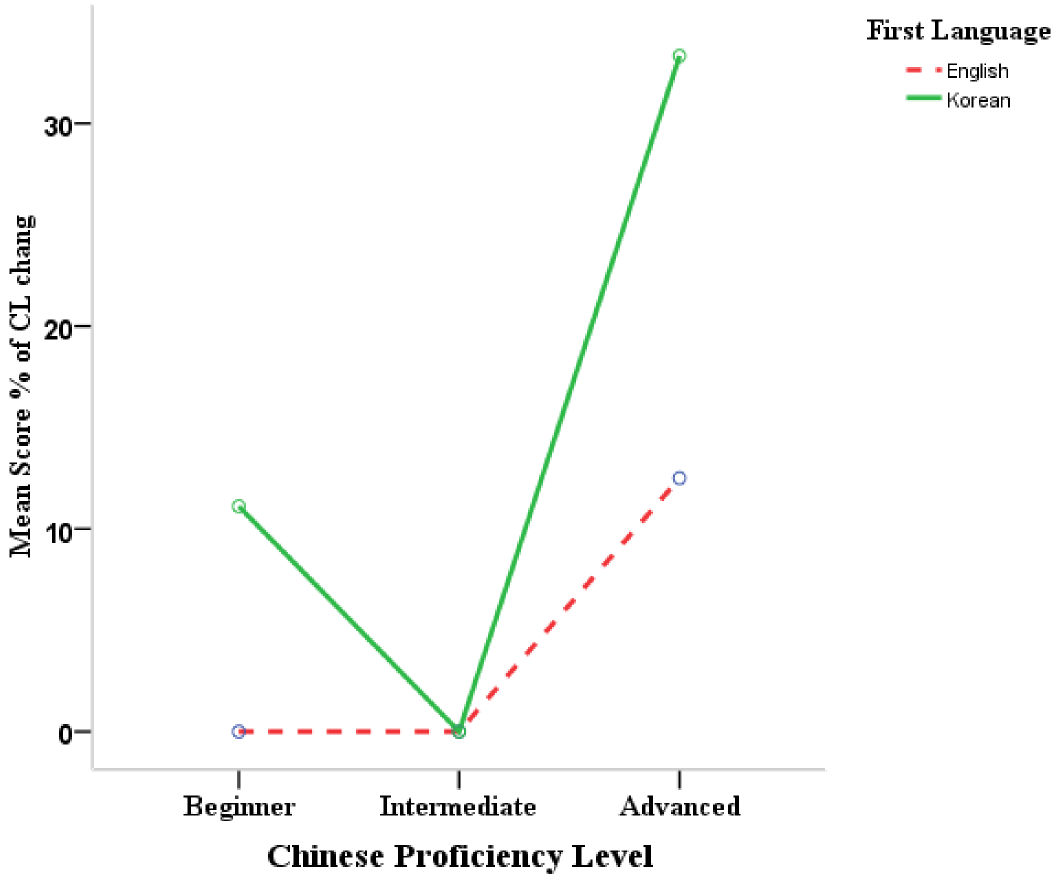
ANIMACY CL for animal 隻



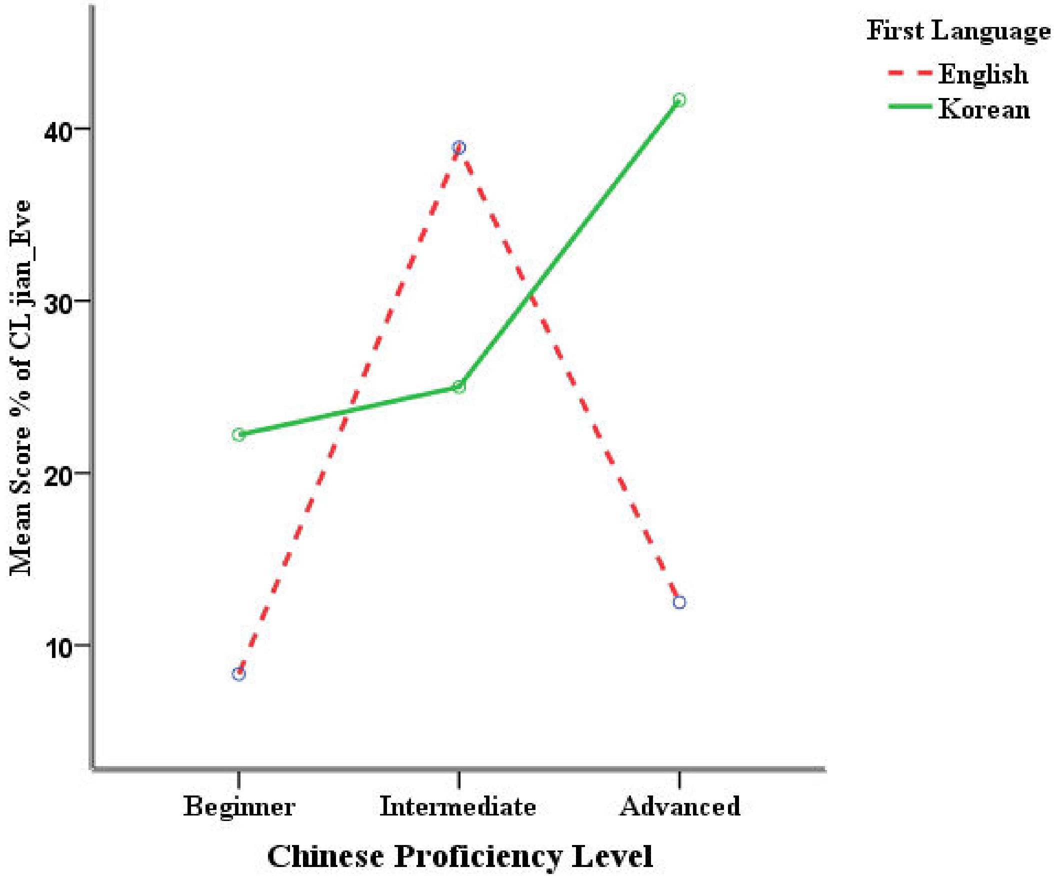
ANIMACY CL for horse 匹



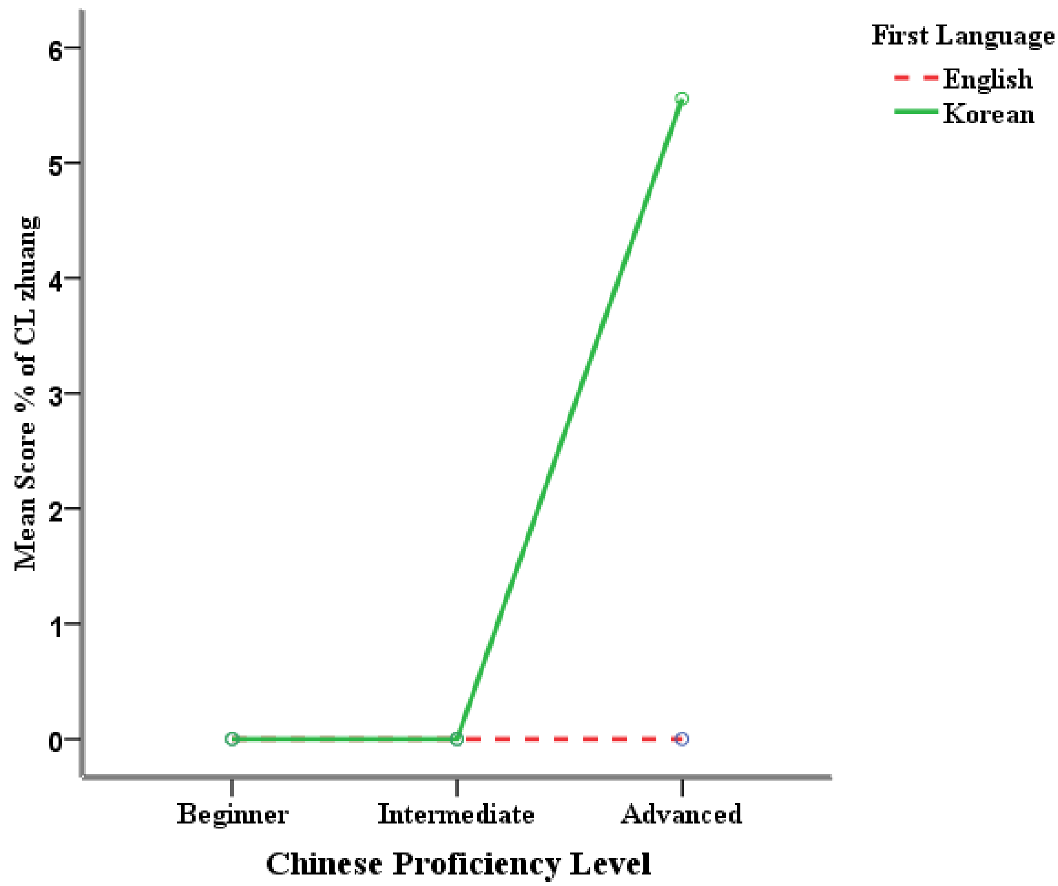
ANIMACY CL for human 位



Event CL for fire 場



Event CL for business 件



Event CL for wedding 椿

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BIOGRAPHICAL INFORMATION

The author received his doctorate in Linguistics from The University of Texas at Arlington in August 2009. He was born and raised in Hualien, Taiwan and graduated from Hualien High School. He has a Bachelor of Art in Mass Communications from University of Utah. He took some courses in MIS from The University of Texas at Dallas and worked in IT for 3 years before entering the Ph.D. program. His career goals include teaching Chinese language and culture as a foreign language, developing Chinese major/minor programs, providing training for teachers of Chinese language. His research interest lies in the areas of L2 Chinese language acquisition/pedagogy/testing, cognitive linguistics, Chinese classifiers, semantics, and etymology.