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CHINESE CLASSIFIER ACQUISITION: COMPARISON OF L1 CHILD AND L2 ADULT DEVELOPMENT

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ABSTRACT

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Chinese classifier acquisition: Comparison of L1 child and L2 adult development

Chairperson: Dr. Tully Thibeau

The context of this thesis is the long-debated issue of whether or not adult second language (L2) development is basically similar to child first language (L1) development. The thesis approaches the issue through research dealing with L1 acquisition of Chinese classifiers and a pilot study of L2 adult classifier acquisition. First, evidence that children acquire specific classifiers earlier than measure classifiers is discussed and explained in light of existing language learning theories. With the aim of providing comparable data regarding L2 adult classifier acquisition a pilot study was conducted in which nine adult English-speaking learners of Chinese were tested on their production of both specific and measure classifiers. The results show that L2 adults overgeneralized use of the general classifier *ge* in a way similar to L1 children, suggesting that both L1 and L2 learners are aware of the syntactic requirement for classifiers, but avoid semantic complexities related to shape and other perceptual features. Despite this apparent similarity, L2 adults differ from L1 children in that they develop measure classifiers more successfully than specific classifiers, indicating that the underlying process of classifier acquisition is influenced by L1 knowledge and cognitive maturation. Overall, these findings provide support for the argument that fundamental differences between L1 child and L2 adult acquisition exist, shed light on methods for successful classifier instruction, and open the door for further exploration into L2 development of classifier languages.

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*	ungrammatical
CL	classifier
Dem	demonstrative
-acceptable	unacceptable
-CL	absence of classifier
±acceptable	partially acceptable
+acceptable	acceptable
+CL	presence of classifier
MW	measure word
N	noun
NP	noun phrase
Num	numeral

CHAPTER 1: INTRODUCTION

1.1 Introduction

The context of this thesis is the long-debated issue of whether adult second language (L2) development is similar to child first language (L1) development. I approach this issue through research dealing with L1 acquisition of Chinese classifiers and a pilot study of L2 adult classifier acquisition based on L1 research design.[1] First, I present an explanation that theoretically supports existing empirical evidence that children acquire specific classifiers earlier than measure classifiers. Next, I report on a pilot study designed to investigate the order in which L2 adults acquire these two types of classifiers. Finally, by comparing L1 and L2 adult acquisition of Chinese classifiers we can see whether L2 adult development is based on the innate language faculty that L1 children rely on, or whether cognitive maturation fundamentally alters how language is acquired.

This chapter first introduces the ongoing debate over L1 and L2 language acquisition in Section 1.2. Then Section 1.3 explains the relevance of studying Chinese classifier acquisition in the context of this debate. Before moving on, Section 1.4 outlines the issues that are discussed in each of the following chapters.

[1] In this thesis "Chinese" is used to refer to the Chinese language in general. While examples given are from Mandarin, research by scholars focusing on other forms of Chinese, such as Cantonese and Min, has also been used. According to Cheng and Sybesma (2005) and Liu (2008), the classifier systems of different dialects share many common features. The differences between dialects that do exist are not explored in this thesis.

1.2 The debate: L1 and L2 language acquisition

In the realms of L1 and L2 language acquisition, the issue of whether adults base their learning on the human language faculty in the same way that children do remains debatable. Linguists of the opinion that L2 adult language development is similar to L1 child language development base their claim on evidence of patterns in early developmental stages, L2 learner systematic staged development and access to Universal Grammar (Dulay & Burt, 1973; Bailey, Madden & Krashen, 1974; Makino, 1980; Ellis, 1994; Flynn, 1996). In contrast, linguists arguing that L1 and L2 language development are essentially different find support in the Critical Period and Fundamental Difference Hypotheses (Lenneberg, 1967; Selinker & Lamendella, 1978; Clahsen & Muysken, 1986; Bley-Vroman, 1989; Johnson & Newport, 1989; Schachter, 1996). This section introduces both positions, beginning with the similarities between L1 and L2 language acquisition and then the differences.

1.2.1 Similarities between L1 and L2 language acquisition

A number of linguists who have engaged extensively with the nature of L1 and L2 language acquisition argue that L1 and L2 language acquisition are similar. This section briefly introduces similarities in L1 and L2 language development.

1.2.1.1 Early stage developmental patterns

L1 and naturalistic L2 learners both go through the same early stages of development: a silent period, the use of formulas, and structural and semantic

simplification (Ellis, 1994).[2]

Both L1 and L2 learners pass through a similar initial stage of language development: a silent period. L1 children experience a long period of listening to language without producing their own language. During this period, it is necessary for the child to experience the use of language in the world around them. In the case of L2 acquisition, the silent period is primarily evident among only some learners. For example, Ellis (1994) points to Hanania and Gradman's (1977) study that a 19-year-old Saudi woman began with a silent period when studying English in the United States. Other research has found that children starting to learn a second language are especially likely to have a silent period (Hakuta, 1976; Saville-Troike, 1988).

After going through a silent period in which they primarily listen, L1 children move to a stage of formulaic speech in which they speak, but most of their utterances are memorized phrases (Krashen & Scarcella, 1978; Ellis, 1994). Such utterances are either whole sentences, such as "I don't know", or partially unanalyzed utterances with one or more slots, such as "Can I have a ____?". As with L1 children, both L2 child and L2 adult learners frequently use formulaic speech as they are beginning to develop a language.

The next stage, called semantic and structural simplification, is more creative than formulaic speech in that speakers start to organize words into their own utterances instead of using only fixed, memorized phrases. In this stage, speakers create phrases that omit

[2] Naturalistic learners are those engaging in "unplanned language use", this term is used in contrast to learners in a controlled classroom environment (Ellis, 1994, p. 82).

content words (e.g. nouns, verbs) or grammatical morphemes, or use a word with broad semantics in place of words with narrow semantics.[3] This kind of simplification is very common in L1 child speech and spontaneous L2 adult speech. An example of semantic simplification that will prove important later in this thesis is that of the Chinese general classifier *ge*. Both L1 children and L2 adults in the early stages of classifier development overuse this classifier because they find that it can replace other specific classifiers with more complex semantics (Loke, 1991; Hu, 1993a; Polio, 1994; Tse, Li, & Leung, 2007).

This developmental pattern, starting with a silent period, then formulaic speech, and next creative speech with simplified structure or semantics, is shared by L1 and L2 learners at early stages of development. Furthermore, not only do L1 and L2 learners share the same early developmental stages, but both groups also have systematic staged development of morpheme acquisition, and they share a similar sequence of acquisition for syntactic structures.

1.2.1.2 Systematic staged development

In the late 1960s and early 1970s, L1 and L2 researchers found consistent patterns in the development of accuracy on English grammatical morphemes across a range of L1 learners, and across groups of L2 learners from different backgrounds (e.g. languages, age, learning conditions, etc.). These research findings indicated that L1 and L2 learners both go through systematic stages of development, which was used to support the argument that L1 and L2 learners both have and make use of the same innate language faculty.

Brown's (1973) longitudinal study of L1 English acquisition focused on the order

[3] Grammatical morphemes are word classes or parts of speech such as inflections, auxiliary verbs, articles, prepositions, and conjunctions (Brown, 1973).

in which three children from different families acquired grammatical morphemes. Brown found that these three children followed roughly the same order in acquiring the fourteen grammatical morphemes. A cross-sectional study by de Villiers and de Villiers (1973) observing the same 14 grammatical morphemes with 21 L1 children yielded similar results. Their findings demonstrate that L1 English children develop grammatical morphology in a similar way regardless of the particular input received.

This systematic staged development of grammatical morpheme acquisition provides support for mentalist and nativist models that claim that children have an innate language faculty consisting of universal principles and universal parameters with open values. In such models the role of language input is to trigger the inborn language acquisition device, meaning that children's innate language faculty, not the input, is the primary factor in language development (Chomsky, 1981; Ellis, 1985; Towell & Hawkins, 1994). The question is then whether or not adult L2 learners still have the ability to use this inborn faculty for human language.

Inspired by this L1 research into acquisition order, L2 researchers carried out similar studies (Dulay & Burt, 1973, 1974; Bailey et al., 1974; Krashen, Butler, Birnbaum, & Robertson, 1978; Makino, 1980). The surprising finding from these studies of grammatical morphology is that L2 learners from different L1 backgrounds, at various ages (children or adults), and under disparate learning conditions (classroom, naturalistic, and mixed environments) develop elements of English grammatical morphology in a similar order.

The further issue of the relationship between L1 and L2 systematic stages of development has also been explored, with some evidence showing that L1 and L2 development can also exhibit similar acquisition orders. For example, in research on the acquisition of English grammatical morphemes empirical studies found that the progressive *–ing* and plural *–s* are acquired very early in both L1 and L2 language development, indicating that the same underlying principles are being used (de Villiers and de Villiers, 1973; Bailey et al., 1974). This research led to the conclusion that L2 acquisition, like L1 acquisition, is determined by the innate language property (Dulay & Burt, 1974; Krashen, 1985; Ellis, 1994.)

Further evidence can be seen in the similarities in acquisition of syntactical structures by L1 and L2 learners. For example, the acquisition of English negative structures (Klima and Bellugi, 1966) and German word order rules (Clahsen and Muysken, 1986) also develop in remarkably similar systematic stages for L1 and L2 learners, regardless of factors such as input, age and language background. This body of research indicates that L2 and L1 language development go through the same well-defined stages, which may mean that both types of development rely on the same underlying human language faculty. A key area of contention regarding reliance on a universal language faculty is that surrounding the concept of Universal Grammar, as introduced in the next section.

1.2.1.3 Full access to Universal Grammar (UG)

Universal Grammar refers to the idea that the underlying similarities in languages

result because human language ability is based on a common set of principles and parameters that limit the possible variations in language (Chomsky, 1981). The concept of Universal Grammar was put forward to account for children's ability to learn their L1. In UG, principles are common to all languages (e.g. all languages depend on having sentence structures), while parameters have limited variations in their setting (e.g. in the head parameter English has a head-first setting (SVO) while Japanese is head-last (SVO)). Children start with an open setting and when they learn they are making connections between the input they receive from a specific language and the universal parameters that already exist in their minds.

The subsequent question for linguists studying UG is whether L2 learners also learn language on the basis of UG, or whether the language settings from their first language carry over into their second language. Some research has indicated that adults learning a second language are able to set new parameters, meaning that they still have access to the underlying principles and parameters of UG that they had when they were children (White, 1989; Flynn, 1996). Take the example of English learners of L2 French setting the head parameter (Towell and Hawkins, 1994). Both English and French have a head-first setting (verb followed by object), but French has a different setting in cases where there is an unstressed pronoun, in such cases French has a head-last setting (object followed by verb). Evidence shows that English speakers learning French go through the same stages as L1 French children do when resetting the head-direction parameter for this special case. Both L1 children and L2 adults first use a head-first setting in all cases, next

they go through a stage where they omit the unstressed pronoun, finally they both successfully set the parameter to head-last for these cases.[4] Flynn (1996) looked at the same issue among Japanese speakers learning English as a second language, and saw that they are able to acquire the head-first parameter (e.g. SVO word order) although their first language has a head-last parameter setting (e.g. SOV word order). These findings suggest that L2 learners have access to UG in the same way that L1 children do.

In summary, some research indicates that L1 and L2 language development are similar. In this view all language learners go through similar systematic stages in their development and are guided by the same underlying principles and parameters. This thesis will examine the process of L1 and L2 development of Chinese classifiers with an eye to finding any comparable similarities. However, other research has found differences in L1 and L2 language development, which much also be taken into consideration. These views are outlined in the following section.

1.2.2 Differences between L1 and L2 language acquisition

While empirical work exists to support the hypothesis that L1 and L2 language acquisition are broadly similar, additional research has found that in a number of areas L1 and L2 learners are remarkably different. Two of the most important concepts arising from these results are the Critical Period Hypothesis and the Fundamental Differences Hypothesis. These two hypotheses account for phenomena which often occur among L2

[4] An alternative explanation for this example is clitic movement. A detailed analysis of the issue is available in Towell and Hawkins (1994, p. 93-97).

learners, but are not an issue for L1 learners, such as transfer, lack of guaranteed success, variability, and fossilization. (Lenneberg, 1967; Bley-Vroman, 1989; Johnson & Newport, 1989; Odlin, 1989; Kwon, 2005)

1.2.2.1 The Critical Period Hypothesis

The Critical Period Hypothesis was first proposed by the psychologist Eric Lenneberg (1967). He stated that there is a critical, biologically determined period of language acquisition between the ages of two and twelve. This hypothesis was later applied to second language acquisition, where it was argued that the critical period explained why adults are no longer able to learn language in the same way that children can (Johnson & Newport, 1989). By observing that human beings have a high capacity for acquiring language in childhood, including second languages, linguists argued that this capacity diminished as humans mature until by some point people simply cannot learn language as naturally, in terms of speed and accuracy, as they did when they were younger.

This hypothesis forms the basis for the view that Universal Grammar is no longer available to L2 adult learners. Rather than fully learning all aspects of a language, L2 adults experience fossilization, meaning that they do not develop the intuitive grammaticality that distinguishes L1 speakers (Towell & Hawkins, 1994). Furthermore, Johnson and Newport (1989) find that incompleteness increases with age, indicating that L2 child learners do have access to UG. Evidence that immigrant children can achieve a native-like level in their second language, but their parents cannot reach the same level

(especially in terms of phonology), is commonly cited as support for this hypothesis (Johnson & Newport, 1989). The following section will introduce factors beyond age which account for differences between L1 and L2 language development.

1.2.2.2 The Fundamental Difference Hypothesis

The Fundamental Difference Hypothesis delves deeper into the causes of the observed differences between L1 and L2 acquisition. The central idea is that the innate system used to acquire an L1 is not entirely available when learning an L2. Instead L2 learners must rely on native language knowledge and general problem-solving skills, such as memorization, analysis and analogy through pattern matching, to understand and use the features that they encounter in their L2 (Bley-Vroman, 1989). Bley-Vroman analyzes how L2 language learning differs from L1 language learning in degrees of success; lack of uniformity in the resulting system; motivational influences, previous language knowledge, and general abstract problem-solving skills. He does not think the same language acquisition system which guides children is available to adults.

According to the Fundamental Difference Hypothesis, instead of the full access to UG that children enjoy, adults only have partial access to Universal Grammar. This access occurs through their L1, so as a result L1 parameter settings are transferred to an L2 which they may or may not match. In terms of UG, L1 learners have 'open' parameter values, while L2 learners have fixed parameter values based on their first language that they initially also transfer to use with their second language. If a parameter setting of the L1 and L2 is the same, this parameter value just needs to be confirmed by target language

input; if the parameter setting of the L2 is different from that of their L1, L2 adult learners will need to either reset their parameter setting, or if this is not possible, use general problem-solving skills to fit their L1 parameter setting to the target language setting (Tsimpli & Roussou, 1991; Tsimpli & Smith, 1991). This L2 task of resetting parameter values appears to be more difficult than the L1 learners' task of setting parameters that do not yet have any setting. (Towell & Hawkins, 1994; Schachter, 1996) On this basis, Bley-Vroman (1989) argues that adults' previous knowledge of a language and general cognitive ability lead to L2 adult fossilization because they are imperfect substitutes for L1 child UG and domain-specific learning procedures. A further possibility is that fossilization occurs because L2 adults have no access to UG, developing language only via general problem-solving skills, an entirely different process than that relied on by L1 children (Selinker & Lamendella, 1978).

In summary, the Critical Period and Fundamental Differences hypotheses indicate that L2 adults can only partially access UG via their first language, or cannot access UG at all. As a result, L2 learners cannot easily set new parameter settings; instead exhibiting indirect access to UG by transferring L1 parameter values to their L2 (Bley-Vroman, 1989; Johnson & Newport, 1989; Tsimpli & Roussou, 1991), or alternatively not accessing UG and instead using general problem-solving skills to fit target language settings (Selinker & Lamendella, 1978). The fundamental basis of these hypotheses is that language learning occurs very differently at progressive maturational stages, contradicting the idea that L1 and L2 development are essentially similar. This thesis

further pursues the questions of similarity and difference in L1 and L2 development outlined above by investigating which side of the debate is supported by research into Chinese classifier development by L1 child and L2 adult learners.

1.3 Chinese classifiers

This thesis will focus on the above-described ideas of L1 and L2 development in relation to Chinese classifiers. This section first discusses the value of studying how Chinese classifiers are learned and used in relation to the broader linguistic debate. Readers are next introduced to the basic features of Chinese classifiers and how these features relate to language development. Finally, the current state of research in this area and the pilot study conducted as part of this thesis are outlined.

1.3.1 Value of studying Chinese classifiers

Typologically, Chinese is a classifier language and English is a non-classifier language. Just as with other typological features [+/- pro-drop] or [+/- null subject], the parameter value pair of [+ /- classifiers] distinguishes between languages such as Chinese and English (c.f. Rutherford, 1987). Since the question of whether L2 learners are able to reset the parameter value of their L1 is central to determining the relation between L1 and L2 language development, observing whether adult English speakers can adjust to the Chinese classifier parameter setting will give insight into the essential similarities and/or differences between L1 child and L2 adult development. One method for investigating this relationship is to look at the emergence order of language features in L1 development

and compare that with the order in which L2 learners develop the same features. Polio (1994) mentions that a great deal of the existing empirical research in the field of second language acquisition focuses on English and other Indo-European languages, suggesting that languages such as Chinese have not received enough attention. In particular, Chinese classifiers are a good candidate for further research because studies into their acquisition by L1 children have not yet been accompanied by comparable work on classifier development by L2 adults.

When a linguistic feature is obligatory in a second language, but not present in a learner's first language, it can pose a significant obstacle to further development (Ellis, 1994). This is true of English speakers learning Chinese classifiers (Liang, 2008). Not only do they need to master a syntactic structure of noun phrases with classifiers for which English does not have an exact equivalent, but they also need to develop the ability to select classifiers based on semantics that are intuitive for L1 speakers, but exceedingly complex for L2 learners. This thesis will consider whether L1 English speakers studying Chinese successfully acquire Chinese classifiers, with an emphasis on how they develop classifier knowledge in terms of both syntax and semantics.

1.3.2 Overview of Chinese classifiers

In Chinese, classifiers are always used in a noun phrase that enumerates countable objects or quantifies other entities, including count and mass substances. The structure of such a noun phrase is 'Num/Dem + CL + N'. For example,

(1) a. *yi/zhe* ***tiao*** *lingdai*[5]
one/this **CL**(long.thin.flexible) tie
'one/this tie'

b. **yi* *lingdai*
one tie
'one tie'

As seen in (1a), classifiers are obligatory in Chinese noun phrases, if omitted as in (1b), the phrase becomes ungrammatical. In addition, specific classifiers, such as *tiao* in (1a), also carry semantic information, for example *tiao* denotes the length, thinness and flexibility of noun referents such as a tie.

While specific classifiers denote some perceptually salient properties or features of the head noun, another type of Chinese classifier, called measure classifiers, do not carry semantic information about the entity referred to by the head noun. Instead, they serve to quantify the entity, as seen below:

(2) *san* ***ping*** *niunai*
three **CL**(bottle) milk
'three bottles of milk'

The classifier *ping* is used here to quantify the mass noun "milk", but *ping* does not denote any features of "milk". Rather, as with many other measure classifiers, *ping* has an equivalent in the English measure word *bottle*. The basic differences between these two types of classifiers are of particular interest to this thesis because English adult speakers may recognize the similarity between Chinese measure classifiers and English measure words, but be less familiar with the concept of specific classifiers. Details of the distinct semantic and syntactic features of these two groups of Chinese classifiers, including the

[5] All English and Chinese data in this thesis are from the author except those cited from other sources.

significance of these features for L1 and L2 acquisition, will be further explained in chapter 2.

1.3.3 L1 development of classifiers

Existing research into L1 child development of Chinese classifiers has indicated that these two types of classifiers are acquired according to a systematic order. The general agreement is that L1 children acquire specific classifiers earlier than measure classifiers (Ying, Chen, Song, Shao, & Guo, 1983; Szeto, 1998; Tse et al., 2007). Up to this point however linguists have not adequately explained the emergence order of these two types of classifiers, mentioning only briefly in their research that it is related to children's cognitive development (Ying et al., 1983; Chien, Lust, & Chiang, 2003; Tse et al., 2007). This thesis will more fully explore theoretical explanations for these findings before moving on to the question of what emergence order, if any, can be observed in L2 acquisition of Chinese classifiers.

1.3.4 L2 development of classifiers: the current pilot study

Previous literature on L2 adult development of Chinese classifiers is limited, and those studies which have been conducted (Polio, 1994; Liang, 2008) have not addressed the issue of emergence order for the two main types of Chinese classifiers. To gain clearer insight into this issue a pilot study was conducted that focused on adult English speakers' development of Chinese specific and measure classifiers. This experiment tested the ability of nine English-speaking college students learning Chinese to produce appropriate

Chinese classifiers. The results present an opportunity to compare findings regarding L2 adult development with existing literature on L1 child development in an area that has up until now received limited attention.

1.4 Outline of the thesis

This chapter has reviewed the current debate regarding similarities and differences in L1 and L2 language development and further proposed that additional research into the development of Chinese classifiers can contribute to this discussion. Chapter 2 provides background regarding the Chinese classifier system, reviews literature on L1 child and L2 adult acquisition of Chinese classifiers, and puts forward my research questions. Chapter 3 reviews child word learning theories in greater depth before applying these theories to the findings of earlier studies on L1 child development of classifiers in order to lay the groundwork for the hypothesis pursued in the current pilot study of L2 adult development. Chapter 4 describes the methodology used in the pilot study, including details of its purpose, subjects, materials, procedures and the coding used to evaluate subject responses. Chapter 5 presents the results of the pilot study and discusses the results within the context of existing theory. Finally, Chapter 6 reviews this thesis, summarizes the significance of this project, and analyzes its implications for the broader field of second language acquisition research, before concluding with suggestions for further study.

CHAPTER 2: REVIEW OF CHINESE CLASSIFIERS AND THEIR ACQUISITION

2.1 Introduction

A considerable body of literature exists regarding Chinese classifiers. This chapter first provides an overview of Chinese classifiers in terms of classifier typology properties and organization into categories in Section 2.2. Section 2.3 focuses on establishing the distinctions between the two main types of Chinese classifiers: specific and measure. Section 2.4 then reviews the basic research into L1 child acquisition of classifiers. Section 2.5 discusses the existing work done on L2 adult acquisition of classifiers and its limitations. Finally, the research questions pursued in this thesis are put forward in Section 2.6.

2.2 Chinese classifier overview

Before focusing on particular aspects of classifiers addressed in this thesis, a broader picture of classifiers is given so that readers will have the background to place later discussions in the appropriate context. The Chinese classifiers discussed in this thesis are noun numeral classifiers. These are morphemes that categorize or quantify noun entities or phenomena. In Chinese they are located between a number or demonstrative and a head noun. A typical classifier would be *zhi* (a classifier for small animals or birds) in the phrase shown below.

(3) *yi* ***zhi*** *yazi*
one **CL** duck
'one duck'

This section explains how Chinese classifiers compare with classifiers in other languages, presents the distinct properties of Chinese classifiers, discusses the different approaches to organization of Chinese classifiers, and lays out the details of the organizational system used in this thesis.

2.2.1 The typology of Chinese classifiers

Across languages a distinction can be made between languages that use classifiers, termed *classifier languages*, and those that do not, termed *non-classifier languages*. Among classifier languages there is a great deal of variety in the role that classifiers have. Across more than fifty classifier languages, Allan (1977) identifies four types of classifier languages: numeral classifier; concordial classifier; predicate classifier and intra-locative classifier. Chinese classifiers belong to the category of numeral classifiers. Within Chinese classifiers there is further division into noun numeral classifiers, verb classifiers and compound classifiers. Noun numeral classifiers are used with nouns to refer to the features of the noun or the quantity of an entity; verbal classifiers enumerate the repetition or duration of an action; and compound classifiers are composed of more than one noun or verbal classifier (Chao, 1968; Hu, 1993a; Tse et al., 2007; He, 2000). Examples of each are shown below:

(4) Noun numeral classifier:

san	***tiao***	*she*
three	**CL**(long.thin.flexible)	snake

'three snakes'

(5) Verbal classifier:

da yi ***quan***
hit one **CL**(fist)
'hit one time with a fist'

(6) Compound classifier:

wu **che** **ci**
five **CL**(vehicle) **CL**(once)
'five cars/buses go five times'

Of these three categories, the majority of Chinese classifiers are of the first type: noun numeral classifiers (Hu, 1993a; He, 2000). Noun numeral classifiers have been the subject of most research on Chinese classifiers, are what is being referred to in the literature when speaking of "Chinese classifiers" and are the focus of this thesis.

A noun numeral classifier is used in expressions of quantity, in deictic expressions (referring to a specific referent), and in anaphoric expressions (making a context-dependent reference). Consider the following examples:

(7) *liang* ***zhi*** *gou*
two **CL** dog
'two dogs'

(8) *zhe* ***zhi*** *gou*
this **CL** dog
'this dog'

(9) *zhe* ***zhi***
this **CL**
'this'

The classifier *zhi* in example (7) shows the enumeration of dogs; in example (8) *zhi* follows the demonstrative *zhe* to refer to a specific dog; and in example (9) indicates a specific small animal or bird depending on the context. This thesis concentrates on

investigating L2 learners' development of classifiers for the enumeration of objects as seen in example (7).

2.2.2 The properties of Chinese classifiers

A classifier in Chinese has the following properties: (1) it is syntactically required between a numeral or a demonstrative (or both) and a head noun (though the noun may sometimes be omitted, as seen in example 9 above), which is described as 'Num/Dem + CL + (N)', (2) it can be either a bound or a free morpheme, and (3) it has semantic meaning which refers to either perceptual features or the quantity of the head noun's referent. (c.f. Chao, 1968; Allan, 1977; Hu, 1993a; Myers, Gong, Shen, & Min-Hsiung, 1999; Zhang, 2007)

Consider the following examples:

(10) *san* ***ben*** *shu*
three **CL**(for books, magazines, etc.) book
'three books'

(11) *san* ***daizi*** *juzi*
three **CL**(bag) orange
'three bags of oranges'

The classifier *ben* in (10) is a bound morpheme. It cannot stand by itself without a number or demonstrative. Semantically *ben* serves as a functional classifier for objects such as books, magazines, and photo albums. Without the classifier *ben*, the noun phrase *san shu* is not grammatical. In the same way, if *daizi* is omitted in example (11), the resulting phrase, *san juzi,* will be ill-formed. However, the classifier *daizi* is different in that it is a free morpheme. Besides functioning as a container unit to measure quantities it

can be used independently as a common noun or content word carrying a specific meaning (Mitchell & Myles, 2004). For example:

(12) *wo yao rendiao zhe ge* ***daizi***
I want throw away this CL **bag**
'I want to throw away this bag'

As seen in (12) *daizi* is a common noun. Just like any other noun it also is preceded by a classifier (in this case *ge*).

Chinese classifiers can be analyzed further based on these central properties. In Section 2.2.3 I will explain how Chinese classifiers can be categorized into a system by using the three properties outlined above.

2.2.3 The system of Chinese classifiers

In the field of Chinese linguistics there is an ongoing debate regarding the boundaries and structure of the Chinese system of classifiers. Chinese textbooks and grammars refer to classifiers as *liangci* or 'measure words' (Hu, 1993a), which are traditionally explained as "words that are used to designate units of measuration" (Li, 2000, p. 1116). This approach focuses on morphemes which function as units for quantifying measurements of weight, length and height. Such a concept of *liangci* does not match common linguistic definitions for classifiers, which emphasize those morphemes which denote perceptual features of noun referents (Allan, 1977). The difference in these terms reflects that Chinese classifiers are a diverse group of morphemes that can be organized in more than one way depending on which of their properties are emphasized. Before investigating how the two main categories of

classifiers are acquired by L1 children and L2 adults, a detailed understanding of the essential differences between the two categories is needed.

2.2.3.1 Two main categories: specific and measure

During the course of intense debate in recent decades researchers have reached general agreement on the existence of two main categories of classifier (Chao, 1968; Lyons, 1977; Tai & Wang, 1990; Lee, 1996; Zhang, 2007; Li, Barner, & Huang, 2008). However, these categories have been described with a variety of different terms, and the boundaries between groups have not always been the same.

The diversity of opinion can be seen in few representative examples. Lyons (1977) uses the term "sortal classifiers" for those which "individuate the referent of the noun in terms of the kind of entity that it is" and "mensural classifiers" for those which individuate in terms of quantity (p. 463). In contrast, Tai and Wang (1990) do not consider measure units classifiers at all, arguing that:

> a classifier categorizes a class of nouns by picking out some salient perceptual properties, either physically or functionally based, which are permanently associated with entities named by nouns; a measure word does not categorize but denotes the quantity of the entity named by a noun. (Tai & Wang, 1990, p. 38)

Hu (1993a) uses the approach of distinguishing between "qualifying and quantifying classifiers" (p. 9). Another method (Cheng and Sybesma, 1998) has been to distinguish between "count classifiers" and "mass classifiers", based on whether they modify count or mass nouns. These approaches all aim to distinguish the fundamental semantic difference between these two main categories. These distinctive semantics will later be

investigated for any relationship that they may have with the process by which classifiers are developed.

In this thesis I use the term 'specific classifiers' (Chao, 1968; Erbaugh, 1986; Loke, 1991) for those classifiers with a qualifying function because they specify a referent's physical characteristics or practical function. Similarly, I use 'measure classifiers' for those classifiers which are primarily units of quantification as the term clearly expresses their role in providing measurement. The methods for clearly distinguishing between these two main categories based on several properties will be further detailed in Section 2.3. First, a brief outline of the subgroups within these broad categories is in order, this will prove valuable in Chapter 4 when the selection of classifiers for use in the pilot study is explained.

2.2.3.2 Subgroups within these categories

Specific and measure classifiers each can be broken down into smaller subgroups, which will prove relevant in Chapters 3 and 4 when the differences in L1 and L2 acquisition among these subgroups will be discussed. Among specific classifiers, it is generally agreed that there are the following distinctions: a general classifier *ge,* which can be used with many objects as a default classifier; specialized classifiers, which can only be used with a fixed noun or a very limited fixed set of nouns (an example is *pi*, a classifier only used for horses), and specific classifiers which are extendable to objects sharing certain features within different semantic domains, such as shape, animacy, and function classifiers (Chao, 1968; Hu, 1993a, 1993b; Lee, 1996; He, 2000). Of particular

interest in acquisition research have been shape and animacy classifiers because their correct use with unfamiliar objects is seen as demonstrating that their underlying semantic meanings are understood by the speaker. Speakers who successfully apply shape and animacy classifiers to unfamiliar objects are generating a rule on the basis of each classifier's semantics. This thesis looks to see in particular whether L2 learners' project the capacity to match such classifiers with unfamiliar objects. Such ability would suggest that L2 learners understand the semantic aspect of specific classifier use. Thus the use of classifiers with unfamiliar objects is essentially a test of whether L2 learners have memorized common classifier phrases, or whether they actually understand the meanings of each classifier. A visualization of the specific classifier subcategories is provided below:

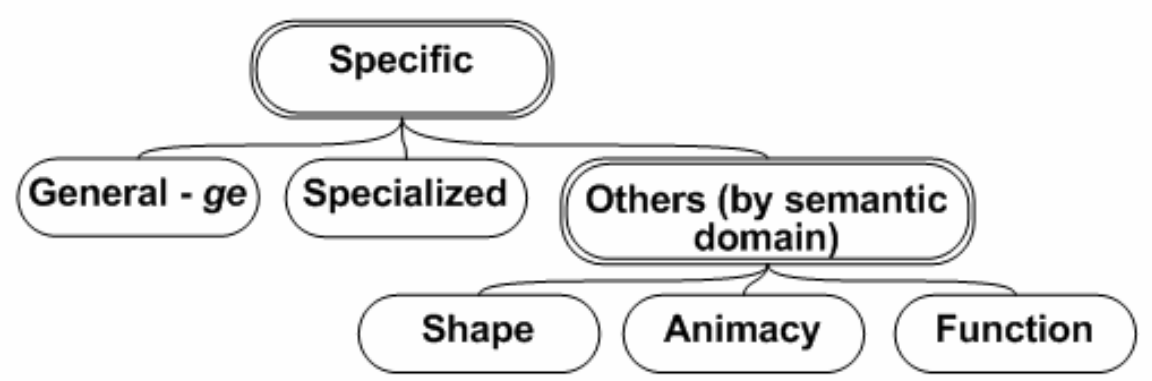

Figure 1: Types of specific classifiers

The measure classifier category contains the following subgroups: the true measure words (e.g. *gongjin* 'kilogram' and *mi* 'meter'); collective classifiers, including both definite amount classifiers (e.g. *dui* 'pair' and *da* 'dozen'), as well as indefinite amount classifiers, (e.g. *qun* 'group' and *xie* 'some'); partial classifiers (e.g. *ban* 'half' and

jie ‘section’), container classifiers (e.g. *bei* 'cup', *wan* 'bowl'); and temporary classifiers (e.g. *lian* 'face' and *shen* 'body') (Chao, 1968; He, 2000; Tse et al., 2007). In this thesis, L2 learners’ development of measure classifiers will be based on the use of container classifiers so as to ease comparison with research on L1 child development that looked at use of the same subgroup of measure classifiers, as explained further in 3.2.1.

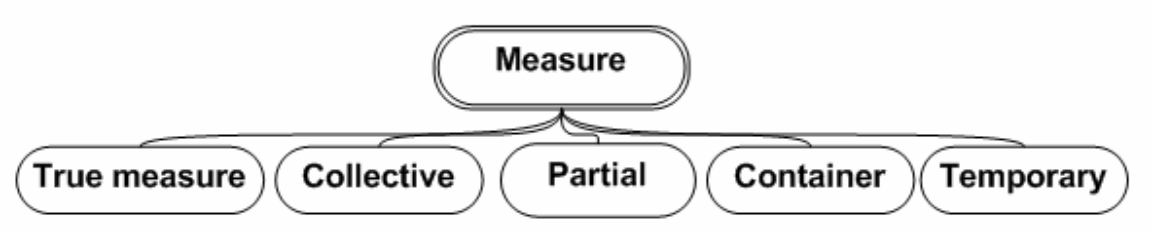

Figure 2: Types of measure classifiers

2.2.3.3 The general classifier *ge*

The general classifier *ge* has a unique place in the system of Chinese classifiers. It is the most commonly used classifier and is often used in place of other specific classifiers (Erbaugh, 1986; Wang, 2008). Further research in this area conducted by Loke (1994) indicates that *ge* is not a default classifier for all semantic domains; rather it also has limits in its use. Loke confirms that *ge* can replace function classifiers, the classifier *zhi* denoting animacy, shape classifiers for large solid global/cubic objects (such as watermelons and basketballs), and hollow objects (such as coffins and caves). However, Loke finds that *ge* cannot replace classifiers for certain “semantically well-defined categories of objects” (p. 40), specifically shape classifiers for long objects (such as *tiao*), flat objects (such as *zhang* and *kuai),* and minutely small and round objects (such as *li* and *ke*). Considering the semantic simplification stage of early development shared by

L1 and L2 learners that was discussed in 1.2.1.1 speakers use simple and general rules to create their own utterances, so it is expected that L2 learners will often prefer to use the general classifier *ge*. In order to investigate whether L2 learners have native speakers' intuition about appropriate use of *ge* in practical situations, Loke's (1994) criteria are used to judge whether the general classifier *ge* is acceptable in place of the expected specific classifier. The pilot study included both classifiers which could be replaced by *ge* in many cases, such as *zhi*, and those which can not be replaced by *ge*, such as *tiao*.

2.3 Distinguishing between specific and measure classifiers

This section details differences between specific and measure classifiers in semantics (2.3.1), syntax (2.3.2) and in terms of word class openness (2.3.3). These differences will have particular relevance in determining why some types of classifiers are developed earlier in L1 and L2 language acquisition.

2.3.1 In semantics

The fundamental semantic differences are the clearest and most commonly cited distinctions between specific and measure classifiers. This can be seen in the following examples (13) and (14):

(13) *yi* ***zhang*** *zhaopian*
one **CL**(flat.thin) picture
'one picture'

The specific classifier structure is: Num + CL + N. The classifier *zhang* in (13) denotes that inherent features of a picture are that it is flat and thin. It is specifying the perceptual features of the noun's referent, classifying the entities which share those features into one

category. For example, paper, pictures and maps use the same specific classifier *zhang,* denoting their common perceptual features: flatness and thinness. However, sometimes the semantics can prove arbitrary. For example, Chinese native speakers also use *zhang* in such phrases as *liang* ***zhang*** *gong* (two CL bow, 'two bows'), *san* ***zhang*** *zui* (three CL mouth, 'three mouths'). It seems that the semantics of *zhang* cannot account for these collocations, which are related to historical associations or word compounds (Tai & Chao, 1994). Still, native Chinese speakers display intuition regarding such prototypical rules for use of specific classifiers, **prototypical rules** being probabilistic and thus impossible to express as unequivocal rule statements (Dekeyser, 1995).

In comparison with example (13), now consider (14) for measure classifiers:

(14) *yi* ***wan*** *mifan*
one **CL**(bowl) cooked rice
'one bowl of cooked rice'

The structure in (14) seems to be identical to the one in (13): Num + CL + N. In semantics, however, the classifier *wan* "bowl" does not have a semantic meaning tied to features (e.g. shape, animacy or function) of the head noun *mifan* 'cooked rice'. Rather, it indicates that the cooked rice amounts to one bowlful. The container classifier *wan* is a measure unit for cooked rice. As this example illustrates, the semantics of measure classifiers are explicit and lend themselves to **categorical rules**, which are rules that are concrete and allow for few exceptions. Such rules are generally easier to learn than the prototypical rules governing choice of specific classifiers (Dekeyser, 1995), and the pilot study directly addresses whether this is the case with adult English speakers studying

Chinese.

2.3.2 In syntax

While measure and specific classifiers have distinct semantics, their syntax appears identical. However, a closer inspection indicates that this similarity is superficial and that the underlying syntactic structures in fact exhibit some differences. Two of these distinctions, regarding use with the modifier marker *de* and with adjectives, have been explored by Chao (1968), Cheng and Sybesma (1998), He (2000), and Li et al. (2008). The first syntactic distinction is seen in the ability to use the modifier marker *de* after a classifier. The semantics of *de* when inserted after a measure classifier are that it allows an alternative interpretation, focusing on the amount of the entity referenced rather than on the container used to measure the entity. As in the following example:

(15) a. *yi tiao (***de**) she*
one CL **DE** snake
'one snake'

b. *yi dai (**de**) she*
one CL **DE** snake
'one bag of snakes'

As (15a) shows, the modifier marker *de* cannot be inserted between the specific classifier *tiao* and the noun *she* 'snake', whereas *de* is acceptable for insertion between the measure classifier *dai* and *she* 'snake'. In (15b) the insertion of *de* means that this phrase could also be glossed as 'one bag's worth of snakes' as the use of *de* emphasizes the amount of snakes concerned, regardless of whether the snakes are actually in a bag. So, one way to test whether a classifier should be categorized as specific or measure is to

check whether the addition of *de* will cause the phrase to be ungrammatical.

The next syntactic distinction regards the insertion of an adjective between a numeral and a classifier. Most measure classifiers can be preceded by certain adjectives (e.g. *da* 'big', *xiao* 'small'), but specific classifiers do not allow this placement.[6] Consider the following:

(16) a. *liang (*da) zhi gou*
two **big** **CL** dog
'two big dogs'

b. *liang da dai pinguo*
two **big** **CL**(bag) apples
'two big bags of apples'

The noun phrase in (16a) is ungrammatical when the adjective *da* 'big' is inserted between *liang* 'two' and the specific classifier *zhi*, but in (16b) *da* is permitted between *liang* and the measure container classifier *dai* 'bag'. If the speaker wants to modify the noun *gou* 'dog' and *pingguo* 'apple', an adjective such as *da* 'big' can precede them. The resulting phrases are shown below:

(17) a. *liang zhi da gou*
two **CL** **big** dog
'two big dogs'

b. *liang da dai da pingguo*
two big **CL** **big** apples
'two big bags of big apples'

As the examples (15) to (17) show, specific classifiers have a closer relation to the

[6] To be precise, I want to emphasize that this applies to the following subgroups of the measure classifier category: partial, container, and temporary classifiers, some measure classifier subgroups, including non-individual classifiers such as *xie* 'some' and true measure words such as *ke* 'gram', cannot be preceded by these adjectives.

head noun than do measure classifiers. The closeness of the relation in syntax corresponds to their semantic relations: specific classifiers are tied with the inherent features of the head noun, but the measure classifiers do not encode any features of the head noun. This syntactic difference may also impact L2 learners' recognition and use of classifiers.

2.3.3 Open class and closed class

The final feature that distinguishes between specific and measure classifiers is the question of the relative size and openness of each category. Specific classifiers are a closed word class made up of bound morphemes that can not be used independently (Hu, 1993a). For example, the classifier *liang* must be used with a number such as *yi liang* 'one (vehicle)', a demonstrative, such as *zhe liang* 'this (vehicle)' or a noun *che liang* 'vehicles'. The total number of specific classifiers is limited, though it is difficult for scholars to agree on an exact count. Chao (1968) lists around forty classifiers. Erbaugh (1986) finds that only 22 specific classifiers are used frequently by native speakers. Hu (1993a) mentions a total of 70 specific classifiers. In sum, specific classifiers are a closed word class, without equivalent in English, which may make it harder for English adult learners to develop them. At the same time, being a closed class also means that there are a limited number of specific classifiers that need to be learned, which may also help L2 learners who use a strategy of consciously studying these terms.

By way of comparison, many measure classifiers such as container and temporary

classifiers are borrowed from common nouns or content words to create a measure unit for a head noun (also evident in examples (11) and (12) above). For example,

(18) a. *wu* ***wan*** *shui*
five **CL**(bowl) water
'five bowls of water'

b. *wu* *ge* *da* ***wan***
five CL(general classifier) big **bowl**
'five big bowls'

In (17a) *wan* functions as a measure classifier. It provides a measure unit to denote the quantity of water; in comparison, *wan* in (17b) is a common noun which is modified by the number *five* and the classifier *ge and* an adjective *big*. Thus measure classifiers are an open class and any noun has the potential to be borrowed for use as a measure classifier, making it impossible to count all morphemes that belong to this category of classifiers (Adams & Conklin, 1973; Hu, 1993a; Zhang, 2007). It is also important to note that as content words measure classifiers often have equivalents across many different languages (Mitchell & Myles, 2004), so L2 learners can match their first language knowledge with their second language vocabulary. To a certain extent, this transfer should reduce the difficulty English adult speakers face when developing measure classifiers.

The various differences between specific and measure classifiers are outlined systematically in Table 1 below.

Table 1: Specific and measure classifiers

Areas	Types	specific classifiers	measure classifiers
Semantics	quantifying	√	√
	qualifying (natural partitioning)	√	-
Syntax	Num + CL + *de* + N	-	√
	Num + Adj + CL + N	-	√
Word class	closed class	√	-
	open class	-	√

These distinctions play an important role in determining the level of difficulty encountered by L1 and L2 learners as they develop Chinese classifiers. If L1 child and L2 adult language development are similar in their reliance on the innate language faculty, these two types of classifiers should be acquired in the same order. However, the expectation outlined in Section 3.4 is actually that measure classifiers with explicit semantics should be easier than specific classifiers with implicit semantics for English adult learners to learn. The question of these two types of classifiers in L1 child development will be explored in the next section along with examples of how particular classifier properties relate to language development.

2.4 L1 child acquisition of Chinese classifiers

In this section, previous research on children's acquisition of Chinese classifiers is briefly overviewed and explained. In particular, in order to compare L1 and L2 language developmental patterns, existing literature related to the order in which specific and measure classifiers are developed is summarized and analyzed. Finally, this section discusses the need for a more complete explanation of the empirical evidence showing

that L1 children acquire specific classifiers earlier than measure classifiers.

2.4.1 Areas of general agreement

Various aspects of children's acquisition of Chinese classifiers have been studied in recent decades. However, linguistic interest focuses heavily on specific classifiers because of the idea that linguistic classifications may reflect basic cognitive categories (Adams & Conklin, 1973). In terms of methodology, there are two primary types of studies: longitudinal studies, such as Erbaugh's study (1986), and experimental ones, such as those by Fang (1985), Loke and Harrison (1986), Loke (1991), Hu (1993a, 1993b), Chien et al., (2003) and Tse et al., (2007). These studies usually concern the following issues (as summarized by Hu (1993a) and Liang (2008)): (1) the emergence order of classifiers denoting different semantic domains; (2) the relation between L1 children's cognitive development and their classifier acquisition; (3) the process of acquisition.

These research studies have generally concurred on three primary points: (1) L1 children acquire the syntactic structure of classifiers very early; (2) the general classifier *ge* is overgeneralized by children; (3) children's use of specific classifiers increases and use of *ge* decreases as they grow older. Evidence that, relatively speaking, the semantics of classifiers is mastered later than the syntax of classifiers in noun phrases is provided by Erbaugh (1986), Fang (1985), Hu (1993a, 1993b) and Tse et al. (2007). For example, Hu (1993b) found that three-year-olds have acquired the structures of noun numeral

classifier phrases but that they used specific classifiers at a low frequency or used the wrong specific classifiers. Similarly, in Fang's (1985) study, he found that all of the four-year-olds have already mastered the correct classifier syntax in enumerating noun phrases but used appropriate specific classifiers at a low rate.

Evidence for the overgeneralization of *ge* is widespread (Loke, 1991; Hu, 1993a, 1993b; Wong, 2000; Chien et al., 2003; Tse et al., 2007). The idea is that *ge* is used as a syntactic place-holder by children who know that a classifier is syntactically required but do not know which specific classifier to use. However, as they get older, children gradually reduce their use the general classifier *ge* and improve their use of other specific classifiers (Fang, 1985; Loke, 1991; Hu, 1993a; Szeto, 1998; Tse et al., 2007). For example, Tse et al. (2007) studied three-, four-, and five-year-olds and found that the variety and number of classifiers used was higher for four-year-olds than for three-year-olds, and still higher for five-year-olds.

2.4.2 Emergence order of specific classifiers and measure classifiers

Although most research look primarily at the use of specific classifiers, rather than measure classifiers, evidence can be found indicating the relative order in which specific and measure classifiers are developed. The majority of the research indicates that L1 children acquire specific classifiers earlier than measure classifiers (Ying et al., 1983; Szeto, 1998; Tse et al., 2007). A good example is Ying et al. (1983), which studied the process of acquisition of classifiers by four- to seven-year-old children. The results show

that four-year-olds and five-year-olds primarily use specific classifiers, while six- and seven-year-olds start to use significant numbers of measure classifiers. This research did not seek to explain why the subjects developed specific classifiers first but did mention that the subjects' measure classifier development was constrained by general cognitive development, an example of the lack of detailed analysis of emergence order findings that this thesis will address in Section 3.3.

Other literature supports Ying et al's (1983) findings. Szeto (1998) studied the development of the entire classifier system in children under the age of four and found that children used more specific classifiers than measure classifiers. In a similar study Tse et al. (2007) found that nine of the top ten classifiers that the young children produced were specific classifiers. Similarly, Li et al. (2008) tested child comprehension of the syntactic distinctions between specific classifiers and measure classifiers. The subjects (4-year-olds, 5-year-olds and adults) were presented two choices (e.g. a whole CD and a broken piece of a CD) and asked them to match two phrases. The first one is 'one CL small N' and the second one is 'one small CL de N'. If the subjects are sensitive to the syntactic differences between these two structures (as discussed in 2.3.2), they will match a whole CD with the first structure, and the small piece of a broken CD with the second one to express the partial measure function. The results show that children under six comprehend the syntax of specific classifiers (the first structure) better than that of measure classifiers (the second structure).

A notable exception to the consensus on order of acquisition of specific and

measure classifiers is Erbaugh's (1986) finding that one of her four subjects developed measure classifiers earlier than specific classifiers, but the sample size in this study limits its significance (Liang, 2008). Further, Chien et al. (2003) conducted two comprehension experiments to test Chinese children's understanding of specific and measure classifiers. Their findings show that the children deal with specific and measure classifiers in a comparable way, comprehending both types of classifiers at around the same time. Given evidence that children's comprehension of classifiers exceeds their ability to use the classifiers (Hu, 1993a), Chien et al's findings do not directly compare to the research cited into child production of specific and measure classifiers.

In conclusion, the general consensus that L1 children acquire specific classifiers earlier than measure classifiers is firmly supported by the existing evidence (Ying et al., 1983; Szeto, 1998; Tse et al., 2007). Unfortunately, the literature does not adequately explore the reasons why L1 children acquire classifiers in the order that they do. In Chapter 3 this issue will be addressed by examining the underlying reasons for this emergence order and demonstrating its significance to our understanding of child classifier development. This foundational knowledge of the central factors in L1 child acquisition of classifiers provides the grounding against which we can then compare the results of L2 adult classifier acquisition research.

2.5 L2 adult acquisition of Chinese classifiers

There is currently limited research on L2 adult acquisition of Chinese classifiers. This section first introduces the two existing studies, Polio (1994) and Liang (2008), and

then outlines the significance of their work as well as the limitations of their research methodology in answering the questions posed in this thesis.

2.5.1 Comparing learners with different L1s

In Polio's (1994) study, she recruited 21 English and 21 Japanese speakers learning Chinese in Taiwan at three different proficiency levels. She was particularly interested in whether Japanese speakers, whose language is also a classifier language, would be able to use classifiers more successfully than English speakers. She adopted Erbaugh's (1986) method of showing her subjects a silent film and then asking them to retell the story to a native speaker of Chinese. Polio then analyzed their use of classifiers and found that (1) L2 learners rarely omit classifiers in noun phrases but sometimes ungrammatically use two classifiers in a single noun phrase; (2) L2 learners primarily use the general classifier *ge* and rarely use other specific classifiers; (3) Japanese speakers have some beneficial transfer from their L1, but also are negatively influenced by cases where Japanese and Chinese share the same characters, but they carry different meanings.

Similarly Liang (2008) recruited speakers of two different L1s, in this case the subjects were composed of 29 English and 29 Korean adults with various Chinese proficiency levels. The experiment focused on the acquisition of eight shape classifiers denoting one-, two- and three-dimensional objects. Subjects were asked to match objects made of clay with a noun numeral classifier phrase that best denoted the shape of objects. Liang's findings are that (1) a subject's Chinese proficiency is clearly related to their

ability to perform this task, (2) the emergence order of the three types of shape classifiers is 2-dimensional, 1-dimensional and then 3-dimensional classifiers and (3) Korean students did not clearly benefit from having a classifier L1.

2.5.2 Significance and limitations of these two studies

Polio (1994) provides evidence that L2 adults are very similar to L1 children in that they both easily master the structure of classifier noun phrases. Both groups develop the syntax of classifiers first, and the semantics later. In addition, Polio (1994) and Liang (2008) both found that L2 learners whose L1 is a classifier language do not show a distinct advantage when learning Chinese classifiers when compared with English-speaking learners.

These findings indicate some essential similarities in L1 and L2 acquisition of Chinese classifiers, yet they also show areas that would benefit from further research. For example, while Liang (2008) found evidence of an L2 emergence order of shape classifiers, she did not further explore what this may indicate about L2 language acquisition devices, such as whether L2 adults develop classifiers based on the inborn faculty for human language or general problem-solving skills. Meanwhile, Polio (1994) and Liang (2008) both ignored use of measure classifiers in their research, without which it is hard to see a complete picture of L2 learners' Chinese classifier acquisition process.

2.6 Research questions

Based on the literature reviewed above gaps exist in current research regarding (1)

the theoretical basis for L1 child early acquisition of specific classifiers and later development of measure classifiers; (2) L2 learner development of Chinese specific and measure classifiers; (3) underlying similarities and differences in L1 child and L2 adult development of these two classifier types. This thesis seeks to bridge these gaps by posing and beginning to develop answers for the following six research questions, the first of which focuses on L1 child acquisition while the remaining five deal with issues of L2 adult acquisition:

1. What theoretical frameworks best explain the classifier acquisition patterns observed in L1 child research?
2. Do L2 adults exhibit similar or different patterns from those seen when L1 children develop classifiers, especially in terms of an emergence order of specific and measure classifiers?
3. Is it easier for adult native English speakers to understand and make use of the semantics of measure classifiers or of specific classifiers?
4. How accurately do L2 learners select classifiers when encountering unfamiliar objects?
5. If L2 adult English speakers omit classifiers, do they omit specific classifiers more often than measure classifiers?
6. What overgeneralized role does the general classifier *ge* have in L2 adult classifier development?

CHAPTER 3: ANALYSIS OF L1 CHILD ORDER AND EXPECTATIONS FOR L2 ADULT ACQUISITION

3.1 Gaps in existing explanations of L1 acquisition

As introduced in Chapter 2, the majority of the existing research on L1 child acquisition of Chinese classifiers agrees that L1 children acquire specific classifiers before measure classifiers (Ying et al., 1983; Szeto, 1998; Tse et al., 2007; Li et al., 2008). Despite producing evidence of this pattern, these researchers do not focus on explaining why L1 children learn classifiers in this order within the context of current word learning theories. This lack of explanation is primarily because most of the research does not focus on comparing development of specific and measure classifiers and thus only briefly notes that the emergence order is related to children's cognitive development. One of the goals of this thesis, and the first research question in Section 2.6 above, is to provide a more complete theoretical explanation for findings that children acquire specific classifiers before measure classifiers. Once the factors involved in L1 child classifier acquisition are clearly explicated, they can then be used as a basis for research examining the L2 adult classifier acquisition process. Comparable evidence on the development of the same language features by L1 children and L2 adults can be used to evaluate arguments in the current debate over similarities and differences in L1 and L2 acquisition.

This chapter is laid out in the following way: Section 3.2 briefly reviews existing theories on early child language development. Section 3.3 incorporates these theories to

account for evidence of L1 Chinese children's early acquisition of specific classifiers and later development of measure classifiers. Finally, in Section 3.4 a theoretical understanding of L1 child acquisition is used to formulate a hypothesis regarding the order in which L2 adult English speakers acquire these two groups of classifiers.

3.2 Synopsis of early child language development

This section summarizes early child language development hypotheses beneficial to understanding the nature of L1 child classifier acquisition. A theory of universal semantics, with detailed focus on evidence for universal semantic categories, is presented in Section 3.2.1 to provide background for the analysis of specific classifier acquisition. Next, research into the connections between cognitive development and language development is reviewed in Section 3.2.2 for the purpose of grounding discussion of measure classifier acquisition.

3.2.1 Universal semantics and universal semantic categories

First, access to universal semantics is part of early L1 acquisition (Clark, 1972, 1977; Carey, 1978; Pinker, 1984, 1987). The process by which this works is described in Pinker's Semantic Bootstrapping Hypothesis. Semantic Bootstrapping proposes that children first acquire semantic concepts naturally by experiencing the real world; and second use these semantic concepts to map a word to features that they observe perceptually. For example, children learn to map entities to nouns and actions to verbs. So children start their word learning process with non-linguistic knowledge based on

their observations of the world around them. Pinker further proposes that the semantic properties in words are built on salient perceptual features in physical objects. A salient feature is one that is basic to the nature of an entity and is readily noticed when encountering a new object for the first time. Childhood awareness of salient features proceeds on the basis of a biological schedule, moving from simple to complex over time. The essence of universal semantics is that young children perceive certain salient features of objects before they actually encounter the word for the object.

Second, young children's cognitive capacity allows them to perceive the salient features of an object because they already have an innate understanding of how universal semantic categories work. Clark (1977) found that the semantics of a classifier system is strikingly similar to the child's emerging knowledge about word meanings. She examined systems of classification across languages and found that the primary semantics of classifiers include animacy (to distinguish animate and inanimate) and shape (three basic shapes: round, long and flat). Besides these primary semantic areas, many classifiers also denote secondary physical properties such as rigid/flexible, relative size, etc. (Clark, 1977). Clark concluded that the basic categorization of classifier systems relies on the visual form of the entities being classified, finding that other methods of classification, such as those based on function, was language-specific and culturally limited (Clark, 1977).

Another important element that Clark sees in child word learning is a universal overextension period. Clark sees overextension of a feature as evidence that it is a

perceptually salient feature, meaning that children have been using it to structure their view of the world before they begin to acquire the words that denote those features. Overextension demonstrates how children see and organize the world around them according to criteria such as shape, movement, size, texture, sound and taste. Many of these properties are based at least in part on visual perceptions, though Clark found it notable that color did not appear to be a perceptually salient feature in classifier systems. In addition, children produce a few overextensions that are based on functional associations. Animacy (based on the property of movement) and shape (particularly round and long) showed the greatest amount of overextension, indicating that they are also the most salient features for children.

Overextension demonstrates that in the beginning stage of acquiring lexicon children only have general semantics. That is, they miss specific semantic features of words. Clark's (1972) Missing Semantic Features Hypothesis claims that mental representations of words are composed of distinctive features with binary opposition which are gradually added on to the lexical specification of a word. Based on this hypothesis, Clark predicted that the word learning process is from simple to complex, that is, words with fewer features will be acquired first and words with more features will be acquired later. This phenomena results from the way that children at an early word learning stage consider words that share a single feature to be synonymous. To investigate a child's understanding of spatial adjectives, Clark conducted the Ippo and Oppo experiment. She recruited two groups of children: three-year-olds and six-year-olds

who were asked to play “the opposite game”. She showed each child puppets named Ippo and Oppo, telling them that Oppo always says the opposite of what Ippo says. Then she gave Oppo to the child to operate while she kept Ippo. She would then say spatial adjectives such as *tall* and *long*, and the child would respond with an opposite term. For example, if Ippo says *high* Oppo would say *low*. The findings are that three-year-olds use *small* and *little*, representing zero dimensions (0D) at a high percentage in response to different opposing spatial adjectives such as *tall, long* and *thick*; while the 6-year-olds use more specific spatial adjectives representing one dimension (1D) and two dimensions (2D). These results support the idea that younger children first acquire simple spatial words (0D) and gradually add more specific features (1D, 2D) to the lexical specification of a word as they grow older. As these missing features are added to words the lexical network of a particular semantic domain, like shape, becomes increasingly complex.

3.2.2 Cognitive maturity and language development

Although children can access universal semantics and can perceive the most salient features of an object (e.g. shape and animacy), their limited cognitive development blocks them from quickly recognizing more complicated semantic properties. Sinclair, Sinclair, and Marchellus (1971) argue that mastery of cognitive operations is tied to the development of linguistic skills and grammar. A study conducted by Katz, Baker and McNamara (1974) demonstrates this relationship.

In this study, when dolls were presented to seventeen-month-old girls the girls

were able to distinguish between proper and common nouns when referring to the dolls. The girls seemed to recognize that the syntactic clue ‘a’ before a noun indicated that it was a common noun, while the absence of ‘a’ before a noun indicated that it was a proper noun. However, when researchers conducted the same experiment with boxes instead of dolls the girls failed to distinguish between the proper noun and the common noun, even though the same syntactic clue ‘a’ was used. The difference lies with the features of the objects used. More specifically, perceptual features of dolls (human-being-like, basic animacy primary property) let them use presence or absence of “a” to fast-map a word into a syntactic category: either proper noun or common noun (Carey, 1978). This fast-mapping procedure is essentially that described by Pinker’s Semantic Bootstrapping Hypothesis, as introduced in Section 3.2.1. In the case of the boxes, the girls did not have geometric knowledge, so they did not perceive salient distinctions between boxes, and as a result they could not map between semantics and syntax to recognize that a proper noun is being used.

The issue of cognitive development as it relates to the development of measure classifiers is especially addressed by research into the role of age in how children conceive of quantification. Piaget’s (1952) research in this area led to the use of the term *conservation* to refer to the understanding that a quantity of entities remains stable despite changes in containers or other features. It was found that children do not fully grasp this cognitive capability until they are around seven to nine years old. According to a biological schedule, children at younger ages observe concrete physical features such as

shape, but do not have comparable understanding of abstract concepts such as quantity.

3.3 Incorporation of L1 theory into explanations of classifier acquisition

Research into the nature of L1 child language development can be used to understand the emergence order exhibited by L1 children when acquiring Chinese classifiers. Because classifiers are used for counting, quantifying, and referring to objects, L1 children receive input that includes classifiers frequently at an early period (Hu, 1993a). However, they do not learn to comprehend and use different kinds of classifiers at the same time. The research into child word learning processes and the role of universal semantics, universal semantic categories and cognitive development, reviewed in Section 3.2.1 and 3.2.2, can explain the process of L1 child classifier acquisition.

3.3.1 How do L1 children acquire specific classifiers?

Children's ability through universal semantics to perceive the salient perceptual features of an object is essential to the development of specific classifiers. Each specific classifier denotes a certain set of intrinsic, perceptual features common to the noun referents that it describes. Through their sensorimotor development young Chinese children have already perceived many of these features before encountering the specific classifier that denotes those particular features. When they then learn the specific classifier they can quickly make a connection, often referred to as fast-mapping, between the features that the classifier denotes, and the salient features that they notice in the objects around them.

Clark's universal semantic categories and Missing Semantic Features Hypothesis help to account for the process by which L1 Chinese children acquire specific classifiers. In terms of universal semantic categories, the features that Clark found to be important are also prominent in the Chinese classifier system. The semantics of specific classifiers is closely tied to the salient features of associated noun referents, especially in the semantic domains of shape, animacy, and function. In terms of relative saliency of classifiers findings suggest that animacy and a few basic shape features are most salient (Hu, 1993a). In terms of semantic features, each classifier denotes not only a primary property, but also secondary properties that are less easily categorized because they require specific language information. For example *tiao* and *gen*, which both refer to long one-dimensional objects, differ in their secondary features, with *tiao* indicating that the object is thin and flexible, and *gen* indicating that it is thin and rigid.

The complex semantics of these classifiers go beyond the features that are prominent in universal semantic categories, meaning that children cannot acquire all features of all specific classifiers right away. Instead, children acquire simple specific classifiers first, and complex ones later, a progression in agreement with what Clark's Missing Semantics Feature Hypothesis would expect. This is particularly clear in the early acquisition and overgeneralization of the general classifier *ge*, which is the classifier with the least restrictive semantic meaning. In many cases, *ge* can replace other specific classifiers, so reliance on it is a very successful strategy for children to pursue before they have made the necessary connections between other specific classifiers and more

complex perceptual features (Fang, 1985; Tse et al., 2007). However, the success of this strategy of relying on *ge* may also discourage children from figuring out the semantics of other specific classifiers since using *ge* is not a barrier to most of their communication needs.

The end result is that children go through a three period process when acquiring Chinese specific classifiers. In the first period they rely on universal semantics to make the connection between the features they have observed in the world and the basic semantic role of classifiers in using these features to categorize objects. Once children recognize that classifiers exist, they quickly master the syntactic structure, in terms of order and form, within which the classifiers are used. Only after learning the consistent syntax of classifier noun phrases are children able to gradually acquire the language-specific, secondary level of classifier semantics with its established conceptual representations. This process explains the empirical evidence (Ying et al., 1983; Szeto, 1998; Tse et al., 2007) indicating early child acquisition of specific classifiers. The next section will explore how the above-described process differs for acquisition of Chinese measure classifiers, which research indicates are learned later by children than are specific classifiers.

3.3.2 Why do L1 children acquire measure classifiers later?

The semantics of measure classifiers are more complex than that of specific classifiers, leading children to learn them later in their development. One reason is that

measure classifiers do not display any semantic connection with the salient features of the noun referents; they simply quantify them. Compared with the ability to recognize shape and animacy features (as when using specific classifiers), the concept of using one common noun to quantify semantically unrelated common nouns is much more complicated. In addition, the quantifying ability of conservation may not be available to younger children. The impact that these factors have on child acquisition of measure classifiers demonstrates the connection between cognitive development and language development.

The role of cognitive development is evident in Ying et al's (1983) experiment. This study finds that children under six years old used very few measure classifiers, while six-year-olds showed increased use of measure classifiers. This result suggests that around six years of age children start to realize the relation between the container measure classifier and the object. They start to know that they need to use the container to quantify the object; in particular Ying et al.'s subjects became able to deal well with familiar containers related to food like *wan* 'bowl'. However, their understanding of quantification remained limited and sometimes they were still confused by familiar measure classifiers. For example, some of the six-year-olds knew water can be held by *wan* 'bowl'. When they saw a glass of water in a picture, they did not know that they needed to change the measure classifier to match the different container. They produced such phrases as *beizi li fangman le yi wan shui* "the glass is filled with a bowl of water" (Ying et al., 1983, p. 30). However, the seven-year-olds in the experiment had very few

such problems producing appropriate measure classifiers. This evidence indicates that children's cognitive quantifying capacity constrains their early development of measure classifiers and shows how that cognition develops with age.

3.3.3 Summary

This section provided detailed theoretical support for findings that children acquire specific classifiers first and measure classifiers later. The reason children develop specific classifiers earlier is that young children can access universal semantics and have the inborn ability of universal semantic categorization. This ability leads them to perceive the salient features of an object that Chinese specific classifiers denote. However, measure classifiers are more complicated for young children because they do not have quantifying cognition until they are around seven years old, and their limited cognitive capacities slow their development of measure classifiers. The inconsistent syntax and lack of a relationship between noun referent features and measure classifier semantics make it hard for young children to master measure classifiers.

In contrast, L2 adults already know at least one complete well-established language, they have passed the critical period, and they are cognitively mature, so they are starting with a complete set of semantic features. As a result, they should not have difficulty using one common noun to quantify another common noun. On this basis we can expect that L2 adult learners, empowered by cognitive maturity, will have few problems with the quantification aspect of measure classifiers. Section 3.4 explores

possibilities for how these factors could affect the process of L2 adult developing classifiers.

3.4 Looking for an L2 adult classifier learning process

After analyzing the reasons why children develop specific classifiers first and measure classifiers later, I found that the process of L1 child development of classifiers reflects the underlying nature of L1 learners' language development. I hypothesize that L2 adults use a process very different from that of L1 children when learning Chinese classifiers. This hypothesis is based on the Critical Period Hypothesis and the Fundamental Difference Hypothesis, which both argue that L1 child language development is different from L2 adult language development. In particular, my argument is that when dealing with Chinese classifiers L2 learners will develop measure classifiers first and specific classifiers later, primarily on the basis of cognitive maturity.

3.4.1 Factors in development of classifier syntax

While learning a second language, L2 learners still have a mental language representation based on their first language. When they are learning their second language, some of their L1 language knowledge may transfer to their L2 language or be used as an analogy for features that they encounter in their L2. If L1's parameter value is the same or similar to L2's, this transfer effect is positive. L2 learners do not need to reset a parameter value they just need to get confirmation from their L2 input that it is the same as their L1.

Chinese measure classifiers resemble English measure words, so English native speakers learning Chinese classifiers may benefit from positive transfer or analogous knowledge from English. Specifically speaking, in syntax, the noun phrases (NPs) of Chinese measure classifiers match the surface structure of English mass noun phrases (NPs) with measure words. For example:

(19) *yi* ***ping*** *shui*
one **CL**(**bottle**) water
'a bottle of water'

The Chinese container measure classifier *ping* 'bottle' indicates the amount of water. The syntactic structure is Num + container CL + N. The English phrase 'a bottle of water' displays the structure Num + container MW + of + N, where only the inclusion of the preposition 'of' is clearly different from the comparable Chinese noun phrases. However, as mentioned in Chapter 2, measure classifiers can be followed by the modifier marker *de* in a NP, which is analogous to 'of' in an English NP. Therefore, Chinese NPs with measure classifiers resemble English mass NPs with measure words on the surface, although their deep structure differs in that the head of Chinese measure classifier NPs is the noun, while the head of English mass NPs is the measure word. On the basis of surface similarities English adult learners may transfer their L1 English knowledge about the word order of measure words and the corresponding meaning of measure words to Chinese measure classifiers. It is also possible that what takes place is not transfer but use of analogy to match similar word orders. These two possibilities account for why English adult learners will not find Chinese measure classifier noun phrase syntax difficult to

understand.

However, it is possible that English adult speakers will find it hard to acquire specific classifiers because there is no equivalent in English. English speakers cannot use their first language knowledge to help them to understand this language feature. They have no access to Universal Grammar and must use their general cognitive problem-solving skills when encountering specific classifiers.

In syntax, to enumerate count nouns, the structure of English NPs is Num + N, but in Chinese, a classifier is obligatorily inserted between Num and N. The structure is Num + CL + N. This syntactic difference could add to the difficulty of acquiring specific classifiers, but according to Polio's study, L2 learners did not have problems acquiring the syntactic structure of specific classifiers. I propose that because the syntax rules of classifiers generally remain constant for specific and measure classifiers, English adult learners can use a learning strategy based on memorization and analysis and reliance on the general classifier *ge* to master it without much effort.

3.4.2 Factors in development of classifier semantics

In semantics, measure classifiers are not tied to the features of the noun referent. Instead, they express the quantification of the entities. Since L2 adults already have developed the concept of quantification, they are directly able to understand how to use a measure word to quantify an object as long as they know how to say the word in their L2, so the meaning of measure classifiers is extrinsic. Furthermore, the meaning of measure

classifiers is not repeated anywhere else in the phrase, and if it is omitted the phrase often becomes unclear. For example, if a person wants to describe a quantity of books or water they can say, “a box of books” or “two bottles of water”. The addition of these measure words is necessary information and not semantically redundant.

However, the hindrance for English adult speakers could be the semantics of specific classifiers. For example, redundant material (such as specific classifier semantics) generally escapes early development. A specific classifier encodes the perceptual features of an object referred to by a noun. Without the use of a specific classifier, an L2 learner might say **liang she* (two snake; ‘two snakes’), a form which Chinese people could still understand, though it is ungrammatical. The correct form *liang* ***tiao*** *she* (two **CL** snake; ‘two snakes’) is grammatical, but the semantics are redundant. If the redundancy of specific classifiers allows L2 learners to communicate effectively in many cases without the use of specific classifiers, it may be that some learners would regard specific classifiers as unnecessary and would omit them as a result.

A further issue for L2 learners in their development of specific classifier semantics may be their age, the critical period, and the resultant lack of access to universal semantics that may occur. The Maturational State Hypothesis, one version of the Critical Period Hypothesis, states that young children have a superior ability to acquire languages, but that this ability, especially in terms of functional categories, will decline or disappear as people mature (Johnson & Newport, 1989). So a lack of access to the semantic categories that children rely on may also hinder adult acquisition of specific

classifiers.

3.4.3 Open class and closed class

Another important element is that measure classifiers, as mentioned in 2.3.3, are an open word class, derived from the lexical category of common nouns or content words. In contrast, specific classifiers are a closed class, a functionary category, often called 'function words' (Mitchell & Myles, 2004). The important distinction in this instance is that content words are universal, while function words are typically language-specific grammatical words, such as the English determiner *the*. Part of being universal means that when L2 learners learn a content word like 'bottle', they have a mental picture of what a bottle looks like that is linked to the real world, and they can transfer this knowledge to other languages with the subconscious expectation that other languages will have an equivalent word for 'bottle'. This knowledge is helpful in the context of learning measure words because once learners memorize a content word they do not need to memorize another new word as a measure classifier, the content word and the measure classifier are the same. Functional words are more problematic in that their meaning is language-specific and L2 learners cannot make a direct connection between an L1 function word and an L2 function word (Mitchell & Myles, 2004). Thus, because many specific classifiers are unique to Chinese, L2 learners both have to understand the basic concept behind specific classifiers and also learn the new vocabulary and semantics associated with them, a more difficult task than transferring existing knowledge for use

with measure classifiers. Such complex tasks can be expected to be acquired later and at a lower level of accuracy.

3.4.4 Summary

In sum, L2 adult English speakers are assumed to develop measure classifiers first because of the effect of their English measure word knowledge and the properties as an open class. When L2 adult learners are learning measure classifiers, they may benefit from either positive transfer of English mass noun phrase word order and measure word semantics or, perhaps more plausibly, the general problem-solving ability to form analogies between L1 and L2 features through pattern matching. This L1 influence will limit the difficulties they face when developing measure classifiers. However, it is predicted that L2 adult English speakers find it hard to develop specific classifiers because of an absence of positive transfer from English and an inability to make use of universal categories to learn function words. They need to reset their value for the classifier parameter, but this is difficult without an innate capability to perceive the perceptual salient features of different entities. As a result, adult English speakers will find it difficult to master the use of specific classifiers. The experimental design discussed in the following chapter will test the validity of the hypothesis that L1 knowledge and cognitive maturity lead L2 learners to develop measure classifiers earlier than specific classifiers.

CHAPTER 4: METHODOLOGY

This section reviews the purpose, introduces the subjects, describes the materials and presents the data elicitation procedures used in this pilot study. Finally, a detailed explanation of the data coding and scoring used for analysis is presented.

4.1 Purpose

This pilot study investigates whether measure classifiers are acquired earlier than specific classifiers by adult English speakers. In particular, the study design focused on observing any trend in the generation of appropriate classifiers when encountering unfamiliar nouns. It is expected that subject familiarity with English measure phrases will lead to a pattern of mastering measure classifiers earlier than specific classifiers, reversing the pattern seen in comparable studies of L1 children. Relating the results of this study to the existing research provides insight into the question of whether L1 and L2 language development are essentially similar, or fundamentally different.

4.2 Subjects

Participants in this study were recruited from a current 202-level Chinese class at the University of Montana. Initially, eleven L2 college learners of Chinese participated in this experiment. In order to focus on the impact of transfer from a non-classifier L1 when learning a classifier L2, two participants who were native speakers of Japanese (a classifier language) were removed from the sample. The remaining nine participants were all native English speakers between the ages of 19 and 23 years old. The gender of the

subjects was nearly evenly divided with five male and four female subjects. (See Appendix A for detailed subject demographic data) All nine are pursuing a minor in Chinese, which may indicate a shared level of interest in Chinese and a common motivation for study. Their class meets four days a week (Monday to Thursday) for a total of four hours and twenty minutes of class time a week. At the time of this study they were in the middle of their fourth semester of Chinese. This class level was chosen based on the exposure to Chinese classifiers that subjects had received by this point in their Chinese studies, ensuring that participants were familiar with the classifiers used in the study.

The final sample of subjects consisted of individuals who met the following revised criteria (adapted from Liang, 2008):

1. be 18 or above
2. be a speaker whose first language is not Chinese
3. be a speaker whose first language is English
4. have studied Mandarin Chinese for at least two semesters
5. be able to count from 1 to 10 in Mandarin Chinese
6. have no known visual impairment

Prior to conducting the study, in order to be familiar with my subjects, I observed as a non-participant three classes and participated on three occasions in informal language conversation events, called China Table. These sessions are organized by 202-level students to practice Chinese with native Chinese speakers (two of the subjects in the

study also attended some of these China Table conversations). To recruit subjects, I contacted their professor and visited the class to call for volunteers. Students were made aware that participation was purely voluntary without any bearing on their class grade. Volunteers were given the chance to select suitable times over a three day period for individual appointments. Appointments lasted between 15 and 25 minutes. Participants who had completed their interview were instructed not to share the details of the experiment with classmates who had later appointment times.

In summary, the subjects studied are all adult native speakers of English, a non-classifier language. None of them learned Chinese as children or were raised in a Chinese-speaking environment. When recruited they were in their fourth semester of a university Chinese program (the 202 level), making them an intact group with exposure to similar amounts of formal Chinese instruction.

4.3 Materials

In the experiment subjects viewed images in a slide show and answered questions with noun phrases that were expected to include classifiers. This section explains the selection of the classifiers tested in the study, and introduces the images and equipment used in the experiment.

4.3.1 Selection of eight classifiers

Four specific classifiers and four container classifiers were chosen from the textbooks employed in the Chinese courses of this university, a series titled *Integrated*

Chinese - Traditional Character Edition Textbook, edited by Yao and Liu (2005). The series includes two level 1 textbooks (part 1 for Chinese 101 and part 2 for Chinese 102), and only one level 2 textbook for the four higher level courses (Chinese 201, 202, 301, and 302). Classifiers were selected, as will be discussed below, from among those introduced in the course texts on the basis of previous studies into classifier acquisition and in consideration of which classifiers subjects could be expected to be most familiar with.

For specific classifiers this study used shape and animacy classifiers. Research on L1 child development indicates that these two subgroups are acquired by L1 children earlier than other types of specific classifiers (Ying et al., 1983; Erbaugh, 1986; Hu, 1993a, 1993b; Tse et al., 2007). Their ease of acquisition by children made these two types of classifiers good candidates for this study in that it would provide a direct comparison between L1 child and L2 language development. In addition, once L1 children master specific classifiers they are then able to generate rules about classifier use with unfamiliar objects. In order to test whether L2 adults master the semantics of specific classifiers, or just memorize them, shape classifiers and non-human animacy classifier are also suitable because they have distinct semantics that can be extended for use with unfamiliar entities that exhibit matching perceptual features. If subjects are able to extend classifiers to use with unfamiliar objects, that is an indication that they understand the underlying semantics of classifiers. Other types of specific classifiers were considered inappropriate for inclusion in this study because they are (i) applied by default

(the general classifier *ge*), (ii) applied to a fixed set of nouns (specialized classifiers), or (iii) can be extended, yet appear to be acquired later by children because the features that they denote are harder to identify. For example, functional classifiers are not related to basic perceptual features, rather classifying objects by what they are used for, such as for vehicles or instruments.

In light of limited research into children's acquisition of different types of measure classifiers, I chose to focus on the use of container classifiers several reasons. One is that Ying et al. (1983) found that while all types of measure classifiers were acquired later than specific classifiers, container classifiers were acquired earlier than other measure classifier subgroups (such as collective classifiers). In addition, container classifiers share some common features with shape classifiers. For example, Tai and Wang (1990) argue that container classifiers have a clear visible shape although they do not express inherent properties of the object they modify. In the phrase *yi ping shui* (one CL-bottle water, 'a bottle of water'), *ping* is a measure unit for water, yet Tai and Wang (1990) argue that the container classifier *ping* also demonstrates the temporary shape of water. In this case, container measure classifiers are more comparable with specific classifiers denoting shape than other groups of measure classifiers. The close parallels between container classifiers and English equivalents also made them candidates for transfer of L1 knowledge by L2 learners. The existence of transfer is one criterion that distinguishes L2 acquisition from L1 acquisition (Selinker, 1971; Odlin, 1989; Towell & Hawkins, 1994), and container classifiers are a suitable subgroup to use for testing for the existence of

transfer.

The next step was to investigate the classifiers to which students were exposed in the *Integrated Chinese* textbooks and to identify those which fit into the subgroups selected for this study. The level 1, part I textbook covers 24 noun classifiers, of which four were specific classifiers denoting space or animacy, and two were measure classifiers referring to containers. The first classifier appearing in the text (and the one repeated most often) is the general classifier *ge*. The remaining classifiers belong to a variety of other subgroups (including collective classifiers, partial classifiers, and specialized classifiers). In the level 1, part II textbook, 37 classifiers are used, most of which had already been introduced in the part I textbook. In addition, two new space or animacy classifiers and two new container classifiers are introduced. Finally, in the level 2 textbook, 32 classifiers appear in the main texts and dialogues (25 carried over from the level 1 textbooks), with two new space and animacy classifiers and three new container classifiers among the additional classifiers.

The three shape classifiers and the non-human animacy classifier which were used most often in their textbooks *Integrated Chinese* were selected for use in this study because they would be most familiar to the subjects based on the frequency of course-based input. The textbook appearances and semantic features of the selected specific classifiers are outlined in the table below:

Table 2: Specific classifiers studied

Specific Classifier (Type)	**Features**	**Textbook Appearance**
zhang (shape)	flat, thin objects	Level 1 (I & II) and Level 2
tiao (shape)	long, thin, flexible objects	Level 1 (I & II) and Level 2
kuai (shape)	flat, thick, cubical objects	Level 1 (II) and Level 2
zhi (non-human animacy)	small animals/birds	Level 1 (I & II) and Level 2

The four container classifiers making most frequent appearance in the *Integrated Chinese* textbooks were also selected and are as follows:

Table 3: Measure classifiers studied

Measure Classifier (Type)	**English equivalent**	**Textbook Appearance**
ping (container)	bottle	Level 1 (I & II) and Level 2
bei (container)	cup or glass	Level 1 (I & II) and Level 2
wan (container)	bowl	Level 1 (II) and Level 2
pan (container)	plate	Level 1 (II) and Level 2

4.3.2 Selection of images as stimuli

One of this study's goals is to test whether L2 adult learners can generate rules about classifier use based on semantic features that can be extended for use with less familiar or unfamiliar objects. This ability was tested by presenting participants with images and eliciting numeral noun phrases containing classifiers about the objects in the images. In this production study I selected a total of 32 stimuli pictures (four for each of the eight classifiers). The entities depicted were chosen so that two familiar objects and

two less familiar or unfamiliar objects would appear for each of the classifiers.[7] Determination of the levels of familiarity of objects was made by considering Hu's (1993a, 1993b) test materials and Snodgrass and Vanderwart's (1980) standardized set of 260 pictures, in addition to looking at the frequency of objects in their textbooks and consulting with the Chinese 202 course professor. The expectation as to which classifier should be used was based on textbook appearances and adult native Chinese speakers' use of classifiers. The expected classifiers and their matching stimuli are listed in the table below.

Table 4: Classifiers and matching stimuli

Expected Classifier	**Classifier Type**	**Meaning of Classifier**	**Stimuli**	
			Familiar	**Less familiar and unfamiliar**
zhang	shape	flat, thin	papers; table	face; fishnet
tiao	shape	long, thin, flexible	pants; dress	tie; snake
kuai	shape	flat, thick, cubical	tofu; soap	watch; beef
zhi	animacy	small animals/birds	cats; dogs	mice; hawk
ping	container	bottle/bottleful	water; coca-cola	soy milk; soy sauce
bei	container	cup/cupful or glass/glassful	coffee; tea	lemon juice; rice alcohol
wan	container	bowl/bowlful	rice; soup	Chinese medicine; cherries
pan	container	plate/plateful	fried fish; dumplings	green beans; peanuts

The 32 stimuli pictures were found either online or among my personal picture files. Based on practical necessity some pictures were modified in size or background so as to reduce the distraction from the intended stimuli. The Paint software program was

[7] The less familiar or unfamiliar objects were those to which subjects had limited textbook or classroom exposure, meaning that the Chinese terms for these objects, and thus relevant noun phrases including appropriate classifiers, were not common in the input that subjects received.

used to revise pictures and to add text (Simplified Chinese characters, pinyin - the phonetic form of Mandarin Chinese, and English translation). This text was added to make sure that subjects could readily identify the objects shown without struggling to recall less familiar noun terms. During the interview itself a Compaq Presario laptop with a 17-inch screen was used to show the image slideshow to the subjects using the Picasa Photo Viewer program. A portable H2 Zoom audio recorder was used to record the production test.

4.4 Procedures

This section describes the three part procedure of each subject appointment: 1) filling out informed consent and survey forms 2) practicing the test procedure in a brief pretest and 3) the actual test.

The methodologies of previous studies included two types: one type sought production in response to stimuli in a controlled setting, while the other observed speech in a natural setting. The controlled setting procedures used in this study were adapted from Loke (1991) and Hu (1993a, 1993b). In Loke's (1991) experiment, he asked children *zhe shi shenme*? “What’s this?” about an object, the children identified the object, and then he asked *duoshao*? “How many or how much?”. The children were expected to count the items shown and respond with a full numeral noun phrase ‘Num + CL + N’ or at least the structure “Num + CL”, which is also grammatical. In Hu's (1993a, 1993b) experiment, she asked each child to look at a picture and then tell her how many items were in the picture with a full noun numeral structure “Num + CL + N”. If a child

failed to provide this structure spontaneously, Hu would say *zhe shi shenme*? "What's this?" to get the children to identify the object in the picture. In these two experiments, the question *duo shao?* was used so that researchers would not provide any classifier clues to the children. This pilot study used the same two questions. Subjects were asked *zhe shi shenme*? "What's this?" and this was followed up by the question *duoshao*? "How many or how much?"

4.4.1 Introduction and forms

At the start of each interview appointment the subject was asked to fill out the informed consent, personal information and demographic survey forms. The purpose of this was to explain the experiment to the subjects, to make sure that they understood and agreed to the terms of their participation, to be able to contact subjects in case the researcher needed to clarify any responses after the conclusion of the appointment, and to collect general information about time spent using Chinese in daily life. Information gathered included time spent studying Chinese outside of class, time spent with Chinese-speaking friends, and other languages spoken. (See Appendix B for details of subject responses)

4.4.2 Pretest

Next, a pretest was conducted. The purpose of this practice period was to use items in the room to familiarize subjects with the procedure of the actual test so that they had an idea of the type of questions asked and how they were expected to respond. The

use of a pretest was intended to prevent problems during the actual test if participants did not understand clearly what types of answers they were expected to provide to the questions. A similar procedure was used by Li et al. (2008), in which feedback was provided for incorrect responses during a practice test. Loke (1991) took a different approach by prompting children who did not respond appropriately during tested tasks.

In this pretest, I first asked subjects to count from one to ten. Participants were then asked about real objects in the room, such as two books on the table, a map on the wall, a plate of jelly beans, or a bowl of chocolate balls (a plate and a bowl were intentionally chosen to hold the snacks provided). The researcher asked them to identify the object in Chinese. If a subject indicated that they were confused about what was going on, the researcher translated the question *zhe shi shenme* "what is this?" into English. If the subject answered *yi ben shu* "one book", then the researcher did not ask the followup question *duoshao?* "how many / how much?" and could directly move to another object. The question *duoshao?* for a plate of jelly beans or a bowl of chocolate balls was more difficult for participants to answer. It was common for subjects to respond to this question with *henduo* "many". In this situation I first tried using hand gestures to indicate the whole plate or bowl. If subjects still could not answer appropriately, they were asked how they would say "a plate of jelly beans" in Chinese. At this point, if the participant remained unsure, saying for example, "I forget how to say plate", the researcher would supply the correct answer. The purpose was to make sure that subjects understood that they should avoid vague answers such as *haoduo* or *henduo* "many"

when presented with many items in a container.

4.4.3 Actual test

After the subject expressed their understanding of the procedure, the actual test began. The researcher and the subject sat next to each other in front of a table with the laptop and audio recorder. The stimuli for the test were shown in a slide show on the laptop. Pictures were shown in a fixed order so that the stimuli matching a given classifier were not grouped together. The two questions *zhe shi shenme*? "What's this?" and *duoshao*? "How many/how much?" were mainly used at the beginning of each interview. Once subjects were familiar with the procedure they often responded to the initial question *zhe shi shenme?* spontaneously with a full numeral noun phrase after looking at the picture. If I could not hear or understand a response because of volume or pronunciation, they were asked to repeat their answer. In order to create a more relaxed and natural language environment, extra comments were made about stimuli pictures or additional relevant questions were asked. For example, when a plate of dumplings was presented, I would ask whether they liked dumplings. If a subject responded that they liked dumplings I would ask a follow up question, such as whether they could finish eating all of the dumplings in the picture. These side conversations took place in both Chinese and English in order to encourage naturalistic production of phrases and reduce the anxiety that subjects might feel.

To summarize, during the course of the actual test, 32 pictures were shown to the

subjects. They were expected to answer in a numeral noun phrase structure ‘Num + CL + N’. If the subjects did not answer with a complete structure, such as only giving ‘Num’, they were asked to answer again and were prompted with the name of the object or I would go back and ask them again about an example that they had answered appropriately earlier in the interview. If a subject's answers consisted of the structure 'Num + N' or if subjects used a classifier that did not match the stimulus, I did not give feedback to indicate that they had made a mistake and did not ask them to repeat their answers.

4.5 Coding

After all appointments had been completed, the audio recordings of each test were transcribed, and all classifiers and noun numerical classifier structures produced by the subjects were identified. This production data was coded in order to produce descriptive statistics.

4.5.1 Goals of coding

The data was coded to produce the following: 1) descriptive statistics (mode, mean, and median) at the group and individual level for scores of correct use of specific and measure classifiers and for scores of correct use of classifiers with familiar objects and less familiar or unfamiliar objects; and 2) frequency (number and percent of total) of each classifier, especially the use of the expected classifier for each image in comparison to the use of the general classifier *ge.*

The coding was based in an operational definition using four simple stages of language development: pre-emergence is no production; emergence is interlanguage production; post-emergence is near native production; and target-like is native production. Each instance of subject production was given a value from one to five on the basis of where the level of proficiency that it represented fit within these stages of development.

4.5.2 Accuracy ratios

Accuracy ratios provide one way to describe the variability in use of classifiers. This test sets a value scale ranging from 1 to 5 based on the accuracy levels of the classifiers that the subjects produced. In the following section, the basis for the value scale in the developmental sequence is explained, focused in particular on evaluating the appropriateness of the use of the general classifier *ge*.

4.5.2.1 The developmental sequence

The developmental sequence is inferred from accuracy ratios by Zobl (1984, 1985) and Lightbown and Spada (1990). In this framework a series of stages is used to describe the learners' gradual acquisition of the ability to produce the target language. J. White's (1998) study, on the use of the agreement rule for possessive determiners by Francophone learners of English, exemplifies how to look at this sequence in a research setting, classifying subject performance as pre-emergent, emergent, post-emergent, and target-like. White argues that these steps "are qualitatively different and that together they

represent an acquisitional sequence" (p. 105). Based on White's L2 developmental sequence framework, I analyzed the data and assigned values according to four systematic stages: pre-emergence, emergence, post-emergence, and target-like.

Pre-emergence and emergence are in the initial two stages. Stage I is a state of pre-emergence. Learners avoid using classifiers in a phrase where a classifier is syntactically required. Such usage was assigned a score of 1. Stage II is a state of emergence. At this stage there are two distinct varieties. The first variety is one in which learners ungrammatically use two classifiers where only one is acceptable. This variety was assigned a score of 2. The second variety is the one in which learners master the syntax of classifier phrases, but struggle with the semantic connection between classifiers and head nouns. Learners use a classifier that does not match the noun used and which adult native speakers would never consider acceptable. For example, **yi shuang kuzi* (one CL(pair) pants; 'a pair of pants'). This example would show that both semantic and surface structure transfer occurred from the subject's L1 English. The correct form is *yi tiao kuzi* (one CL (long.thin.flexible) pants; 'a pair of pants'). This also includes incorrect use of the general classifier *ge*. For example, **yi ge zhi* (one CL paper; 'a piece of paper'). Although *ge* can be used in many circumstances, according to the criteria outlined in 4.5.2.2 below it would be unacceptable in this case. This variety was assigned a score of 3.

Stage III is a state of post-emergence which is nearer the target language. It was assigned a score of 4. Learners have mastered the syntax of noun classifier structures. In

semantics, classifier use is close to native speakers' use, meaning that the classifier chosen is acceptable for use with the given noun in some cases. One typical example is that the subjects overgeneralize using the general classifier *ge*. Sometimes native-speakers use *ge* informally when counting animals to replace an expected classifier such as *zhi* (small animals, birds), so the general classifier *ge* is acceptable, but in a formal situation or on a written test it would still be considered inappropriate. Another example is when the classifier could match the head nouns, but it does not match the specific stimulus shown in the slideshow. For example, the classifier *pian* in the phrase *yi pian doufu* (one CL(flat.thin.small) tofu; 'a slice of tofu') is appropriate if the tofu in question is flat, thin, and small. However, the stimuli picture used in the test shows a large, thick, cubic piece of tofu. In this case the correct answer is *yi kuai doufu* (one CL(cubic shape) tofu; 'a chunk of tofu').

Stage IV is the state of target-like performance. This stage shows error-free application of classifier rules. It was assigned a score of 5. Learners produce the correct noun numeral classifier phrases syntactically (Num+ CL + N) and semantically (specific classifiers match the correct features of shape and animacy; container classifiers match the containers pictured).

The four stages of the subjects' developmental sequence are illustrated in table 5 below:

Table 5: Developmental stages and scores

Stage	I: Pre-emergence	II: Emergence		III: Post-emergence	IV: Target-like
Criteria	[-CL]	[+2xCL]	[+CL; −acceptable]	[+CL; ±acceptable]	[+CL; +acceptable]
Score	1	2	3	4	5

4.5.2.2 Scoring use of the general classifier *ge*

In this pilot study, use of the general classifier *ge* has been scored differently depending on the situation. Where *ge* is unacceptably chosen to replace a specific classifier it is scored 3. If the replacement is acceptable, it is scored as a 4. In accordance with Loke's findings (described in detail in Section 2.2.3.3), it was considered acceptable in this study for subjects to use *ge* in place of the animacy classifier *zhi,* but generally unacceptable to use it in place of the other three specific classifiers tested (*tiao, zhang, kuai*). In three cases (with the head nouns *lingdai* 'tie', *zhuozi* 'table', and *shoubiao* 'watch) native speaker judgment (that of the 202-level instructor and myself) conflicted with this strict criteria. In these cases it was considered acceptable (score of 4) for subjects to use *ge* in place of the expected specific shape classifier.

Therefore, within the value scale established for scoring responses, uses of *ge* could be assigned either a score of 3 or 4 depending on how acceptable it was in combination with each head noun. This distinction was made primarily on the basis of Loke's research (1994), though exceptions were made in cases where native speaker intuition indicated that *ge* was acceptable even though it did not meet Loke’s criteria.

CHAPTER 5: RESULTS AND DISCUSSION

5.1 Pilot study results

This section presents the following descriptive statistics based on subject use of classifiers in the pilot study: (1) In Section 5.1.1, the mean, median and mode scores of correct use of specific (shape and animacy) and measure (container) classifiers; (2) in Section 5.1.2, the mean, median and mode scores of specific and measure classifiers with familiar objects and less familiar or unfamiliar objects and (3) in Section 5.1.3, a comparison of how frequently expected specific classifiers which mean that are selected to test the subjects, expected measure classifiers, and the general classifier *ge* are used.

5.1.1 Correct use of specific classifiers and measure classifiers

In order to look into which type of classifiers developed first, I focused on the mean scores of correct use of both types of classifiers overall. The value scores from one to five were used to measure the accuracy of each response based on the coding outlined in Section 4.5. A score of one indicates the lack of any use of classifiers. Each higher score shows use of classifiers at an increasingly accurate level, with a score of five indicating that use of classifiers was fully acceptable, equivalent to native speaker use. As seen in Figure 3, the subjects' mean score for correct use of measure classifiers (4.78) is nearly at the target, native-like level of use. The mean score for correct use of specific classifiers (3.78) shows a lower level of accuracy, indicating that subjects' use of specific classifiers is still at an emergent stage of development. The distinction between correct

use of measure and specific classifiers can be seen further in the mode values for each type (in Table 6). The most common score for measure classifiers is the target-like value of five, while the most common score for specific classifiers is the emergent value of three.

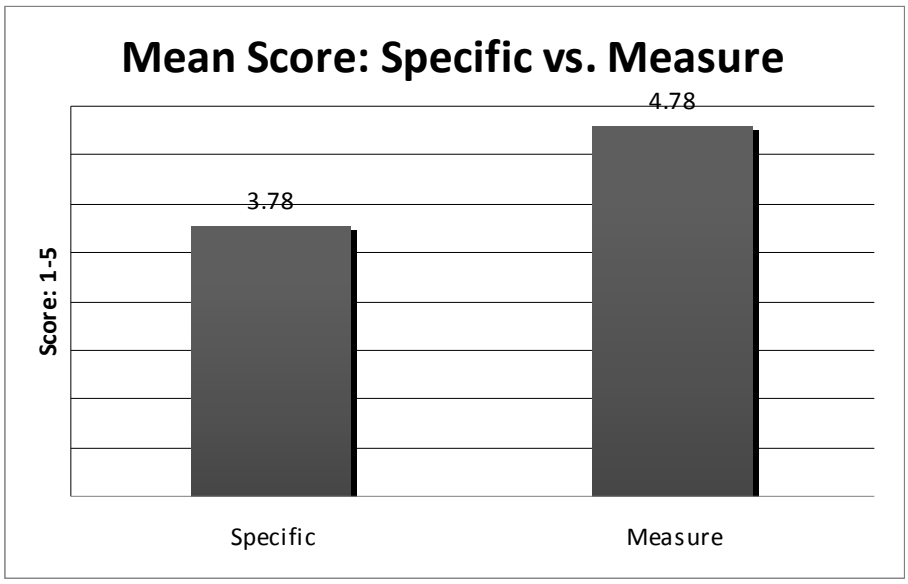

Figure 3: Mean scores of specific and measure classifiers

Table 6: Descriptive statistics of correct use of specific and measure classifiers

	Mean	Median	Mode
Specific classifiers	3.78	4	3
Measure classifiers	4.78	5	5

5.1.2 Correct use with familiar and less familiar objects

In order to investigate whether L2 adults can understand the semantics of classifiers well enough to use them with unfamiliar objects as L1 children do, I further divided the data into four parts: specific classifiers with familiar objects; specific classifiers with unfamiliar objects; measure classifiers with familiar objects and measure

classifiers with unfamiliar objects. The mean scores of specific and measure classifiers with familiar objects and unfamiliar objects are presented in Figure 4. For specific classifiers there is a slightly lower level of correct use when subjects encounter less familiar and unfamiliar objects (3.65) than with familiar objects (3.90). A larger data sample would be needed to determine the significance of this difference. On the other hand, there is no meaningful difference in the mean score for correct use of measure classifiers when applied to familiar (4.79) and less familiar or unfamiliar objects (4.78). This result indicates that English adult speakers do not have difficulty using measure classifiers for novel objects. The median and mode scores shown in Table 7 did not show a difference between familiar objects and unfamiliar objects.

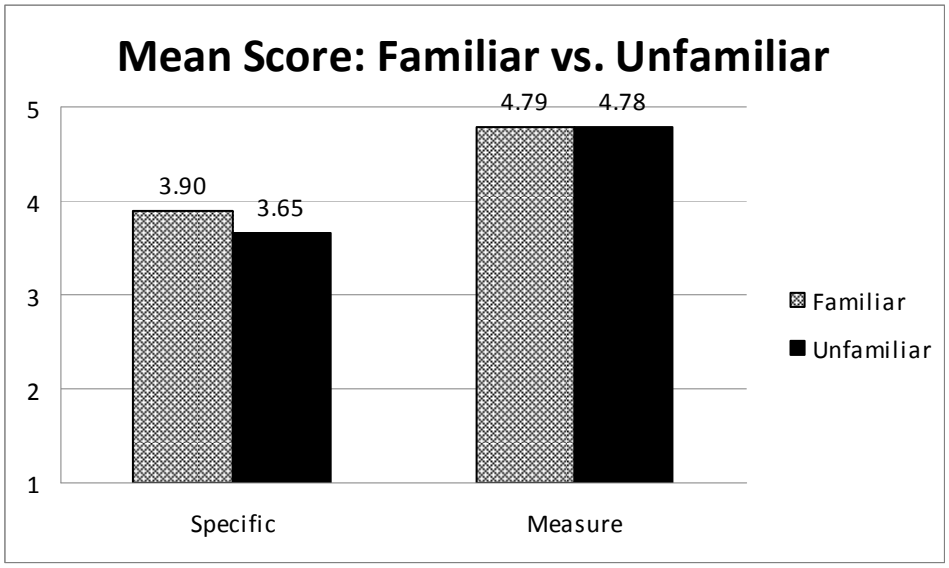

Figure 4: Mean scores of specific and measure classifiers with familiar and unfamiliar objects

Table 7: Descriptive statistics of correct use of specific and measure classifiers with familiar and unfamiliar objects

	Mean	Median	Mode
Specific classifiers - familiar	3.90	4	3
Specific classifiers - unfamiliar	3.65	4	3
Measure classifiers - familiar	4.79	5	5
Measure classifiers - unfamiliar	4.79	5	5

5.1.3 Frequency of use of expected classifiers and the general classifier *ge*

The statistics in 5.1.1 and 5.1.2 above include scores given for the use of unexpected classifiers, the general classifier *ge*, and the absence of classifiers. In particular, the high rate of use of the general classifier *ge* in place of expected specific classifiers is not separately identifiable in the mean scores provided. The high use of *ge* is important in that it indicates the lack of a semantic correlation between specific classifiers and the noun referents. To produce a more precise picture of the classifiers used I reanalyzed the data to differentiate between the use of accurate expected specific and measure classifiers, the general classifier *ge,* and other types of responses.

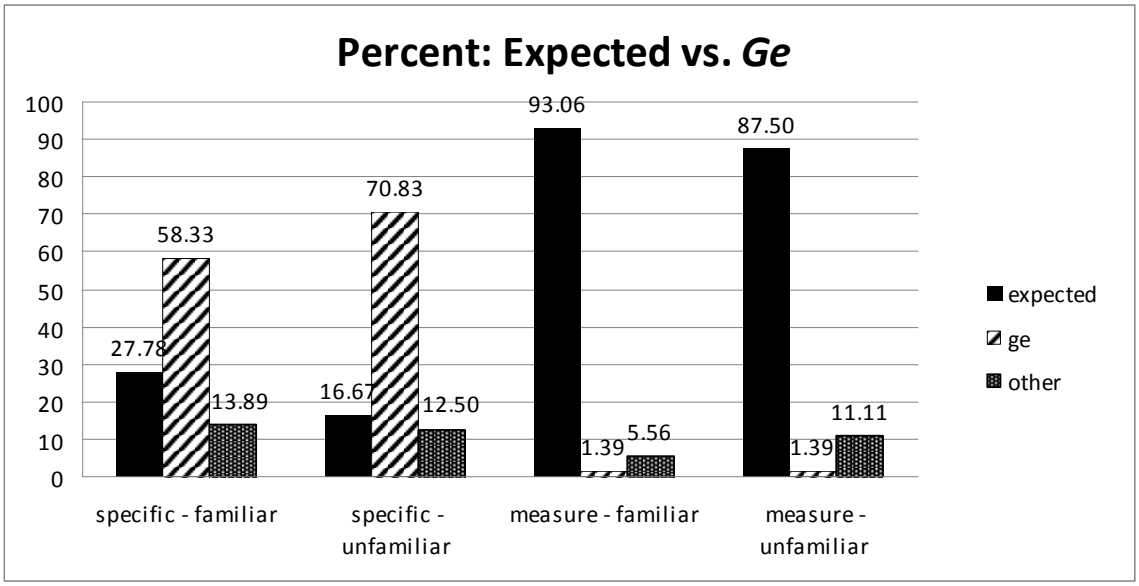

Figure 5: Use of expected classifiers and the general classifier ge

5.1.3.1 Use of expected classifiers: specific vs. measure

If use of the general classifier *ge* is excluded, the distinction between production of expected specific classifiers and expected measure classifiers becomes sharper, with far fewer uses of expected specific classifiers than of expected measure classifiers. For example, for familiar objects the expected specific classifier was used 27.78% of the time, while expected measure classifiers were used 93.06% of the time. The relationship is very similar for less familiar and unfamiliar objects where expected measure classifiers were used 87.50% of the time, but expected specific classifiers were only used 16.67% of the time. The difference between the expected use of classifiers and the actual use shows that the English adult speakers use measure classifiers with much less difficulty than specific classifiers.

5.1.3.2 Use of expected classifiers for less familiar objects

From Figure 4 we can conclude that English adult speakers apply measure classifiers to less familiar or unfamiliar objects freely and accurately, but a lack of statistical significance prevents a clear conclusion about their ability to use specific classifiers for less familiar or unfamiliar objects. However in Figure 5, when we distinguish between the use of expected specific classifiers and the general classifier *ge*, we see a stronger indication that the subjects have more difficulty using expected specific classifiers for less familiar or unfamiliar objects than for familiar objects.

First, as seen in Figure 5, subjects were unable in most cases to use expected specific classifiers for familiar objects, using the expected specific classifiers 27.78% of

the time. This low rate of use is evidence that subjects had not mastered the semantic rules of specific classifier use. Furthermore, the use of expected specific classifiers was even lower for less familiar or unfamiliar objects, only being used 16.67% of the time. This difference suggests that English adult speakers have low generative capacity to apply the semantics of classifiers for use with less familiar or unfamiliar objects.

Next, taking a look at expected measure classifiers, there is also a lower rate of use for less familiar and unfamiliar objects than for familiar objects, but subjects still used the expected measure classifier the vast majority of the time. This high rate of accurate use of measure classifiers indicates that the subjects have a clear concept of the quantifying function of containers for all kinds of objects.

5.1.3.3 Overgeneration of the general classifier *ge*

Because it has very flexible semantics and can acceptably take the place of many other specific classifiers, some overgeneralization of the general classifier *ge* was expected. In addition, it is worth noting that subjects' use of *ge* is consistent with the understanding that *ge* is a general specific classifier and is not suitable for use in place of measure classifiers. As seen in Figure 5, while subjects used *ge* a majority of the time when a specific classifier was expected (58.33% for familiar and 70.83% for less familiar objects), they very rarely (1.39% of the time for familiar and less familiar objects) used *ge* in place of a measure classifier.

Another interesting phenomenon is that *ge* was not used uniformly in place of all specific classifiers. It seems to imply that the subjects overgenerated the general classifier

ge based on different conditions. Figure 6 compares the percentage of use of each expected specific classifier and the percentage at which it was replaced with the general classifier *ge*. Here we can see that among the four specific classifiers tested, the classifier *tiao* was used most successfully (38.89% of the time). Two other classifiers were used at slightly lower rates (27.78% for *zhang* and 22.22% for *zhi*). In sharp contrast, the classifier *kuai* was not used at all by subjects, instead they relied primarily on the general classifier *ge*. From Figure 5 and 6 we can conclude that *ge* was used to the greatest extent in cases where the objects shown were less familiar to the subjects, or where the expected specific classifier was itself unfamiliar to the subjects, such as the classifier *kuai*.

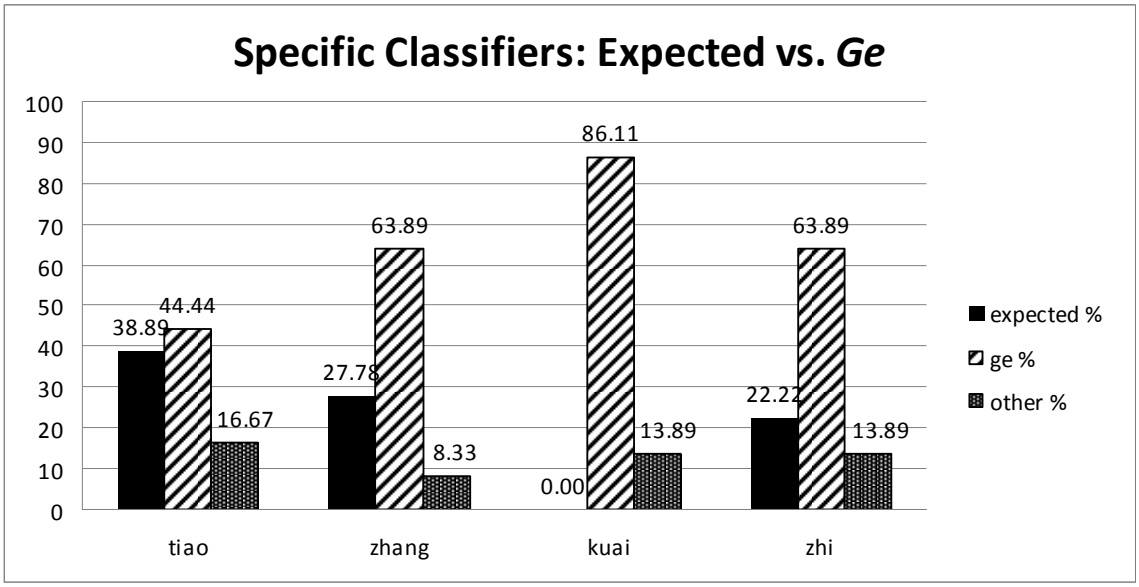

Figure 6: Use of expected specific classifiers and the general classifier ge

The results suggest that adult speakers of English learning Chinese develop measure classifiers earlier than specific classifiers. Instead of mastering the semantics of specific classifiers, most subjects overgeneralize the use of the general classifier *ge*,

which was used in the majority of cases where another specific classifier was expected. As for measure classifiers, subjects used them accurately at a high rate and clearly grasp the quantifying function of the measure classifiers. With regard to the general classifier *ge*, subjects relied on it the most when encountering less familiar or unfamiliar objects or when they were less familiar with the expected specific classifier.

5.2 Discussion of classifiers produced

This experiment explored how English speaking adults develop Chinese classifiers. In particular, I was interested in the emergence order of specific classifiers and measure classifiers. Section 5.1 outlined the primary results of this pilot study, and suggested their relevance to most of the original research questions. This section revisits the research questions and the relevant results in greater detail, using them as a basis for discussing larger issues in the area of L1 child and L2 adult language acquisition.

In order to review, the research questions from Section 2.6 are presented again below. The first of these questions, with its focus on L1 acquisition, was addressed in Chapter 3. The remaining five, relative to L2 acquisition, will be discussed in the sections that follow:

1. What theoretical frameworks best explain the classifier acquisition patterns observed in L1 child research?
2. Do L2 adults exhibit similar or different patterns from those seen when L1 children develop classifiers, especially in terms of an emergence order of specific and measure classifiers?

3. Is it easier for adult native English speakers to understand and make use of the semantics of measure classifiers or of specific classifiers?
4. How accurately do L2 learners select classifiers when encountering unfamiliar objects?
5. If L2 adult English speakers omit classifiers, do they omit specific classifiers more often than measure classifiers?
6. What overgeneralized role does the general classifier *ge* have in L2 adult classifier development?

5.2.1 Emergence order of specific classifiers and measure classifiers

Research questions two, three and four are discussed together here, as the answers to the third and fourth questions are related to the evidence of an emergence order. The data in this study show that the semantics, rather than the surface NP word order, of the two types of classifiers is the key to determining which one will first be acquired by L1 speakers of English. Subjects used the expected noun phrase structure (Num + CL + N) to an overwhelming degree regardless of the type of object or classifier, indicating that they had mastered the basic classifier syntax.

The result of this study shows that English adult speakers acquire measure classifiers before specific classifiers. This success appears to be the result of adult native English speakers readily grasping the semantics of measure classifiers while struggling to understand the semantics of specific classifiers. The evidence for this lies in subject

responses when encountering unfamiliar objects. So far, the results are in accordance with my expectations. The broader reasons for this emergence order (which is the opposite of that observed among L1 children) are the effects of transfer and the critical period as explained and discussed in the following subsections.

5.2.1.1 The role of transfer and general problem-solving skills

The uniformly high rate of accurate use of measure classifiers indicates that all subjects had achieved mastery in this area. The subjects mean scores for correct use of measure classifiers ranged from 4 to 5, with only small gaps between individuals. The mode and median scores were both 5, indicating that all subjects have almost reached the native level of use. This success bears striking resemblance to a feature associated with L1 language acquisition: everyone is capable of reaching the target-like level of production. This level of guaranteed success is not considered typical of L2 development, where varied levels of success are more common, as discussed in Section 1.2.2.

However, the subjects in the study did exhibit two types of errors. One error is that they occasionally (four uses by three individuals) produced two classifiers in a noun numeral phrase: Num + *ge* (CL) + measure CL + N. This is a syntax error that I will discuss further in Section 5.2.2. The other error is a vocabulary issue. Some of the subjects had trouble remembering the Chinese terms *wan* 'bowl' and *pan* 'plate', or mixed up the two terms. The reason may be frequency of input as these two classifiers appear later (and less frequently) than *bei* 'cup' and *ping* 'bottle' in their textbooks. Still, the speakers understood the semantic correlation between a measure classifier and an

object very well. An example is that when the speakers saw a stimuli picture with five bottles of water of different sizes and shapes, they were not confused instead readily using the container measure classifier *ping* to quantify water. So, in terms of the acquisition of measure classifiers, the subjects behave much like native speakers, despite limited measure classifier use in one of their primary sources of input, their textbooks.

One plausible explanation for subjects' uniform success in use of measure classifiers is transfer. As explained in chapter 3, English measure words resemble Chinese measure classifiers in semantics and in apparent structure. When English adult speakers first receive measure classifier input they notice the resemblance between English and Chinese. Once they find similarities in this area between their L1 and their L2 they transfer the surface word order and corresponding meaning of English measure words to their use of Chinese measure classifiers without much effort. The other possibility is that deep structure syntactic differences between English and Chinese NPs prevent transfer. In this case, English adults make use of general problem-solving skills such as analogy to match the similar patterns between measure words and measure classifiers. This strategy of analogous pattern matching may effectively help English adult learners to fit measure classifiers to their L1 parameter setting without any transfer actually taking place.

In contrast, subjects' weaker performance in use of specific classifiers may partially reflect the absence of similar positive transfer from English to Chinese. Subject mean scores on accurate use of specific classifiers range from 3.4 to 4.2. The median score is 4 and the mode score is 3. These statistics demonstrate that the subjects were still

struggling with the semantic use of specific classifiers matching the noun referents. This difficulty appears to be particularly apparent when we consider the overextension of *ge*. Measure classifiers and specific classifiers look alike in syntax, but subjects did not have information to transfer from their L1 to support the semantic uses of specific classifiers. Because specific classifiers as a functional category are completely new knowledge for adult speakers of English, their correct use proves difficult. The lack of positive transfer leaves learners dependent on general problem-solving skills which do not work well when dealing with prototypical rules, such as the probabilistic ones governing specific classifier use.

The ambiguous nature of specific classifier semantics was briefly introduced in Section 2.3.1. The underlying issue is that besides their basis in primary properties such as shape, animacy and function and secondary properties such as size or texture, the use of specific classifiers is also influenced by factors such as history, culture and lexical taxonomy. For example, while recognition that *tiao* refers to long, thin and flexible entities explains its use with *kuzi* 'pants', this semantic profile would not help learners know that *tiao* is also used with *duan ku* 'shorts' which are not long, but share a relationship through the morpheme *ku* with *kuzi*. In this case, use of the classifier *tiao* is not based on perceptual properties of the entity but rather on lexical taxonomy. In other cases, the use of classifiers may appear to contradict their accepted semantic meanings. For example, *tou fa* 'hair' is not modified by *tiao*, but rather by *gen*, which is more commonly applied to long, thin and rigid objects. This degree of unpredictability prevents

L2 learners from mastering the probabilistic rules of specific classifier use solely on the basis of memorization and analysis, as a result developing specific classifiers more slowly than measure classifiers.

To summarize, the differing results for use of measure and specific classifiers provides empirical evidence that transfer and the skill of pattern matching through analogy play important roles in L2 learners' language development. L1 children have no chance to benefit from such positive transfer or analogy, which helps explain why English speaking adults studying Chinese develop measure classifier knowledge faster than do Chinese children (Towell & Hawkins, 1994). The evidence from L2 development coincides with the arguments that L2 adults lack full access to Universal Grammar. However, the difficulty in identifying actual occurrence of transfer means that it remains to be seen whether the actual process more closely resembles the description of L2 adult learning as being based on both first language knowledge and general problem-solving skills (Bley-Vroman, 1989), or the argument that learning occurs only on the basis of general problem-solving skills (Selinker & Lamendella, 1978). In this case, English adult speakers may make use of their English measure word knowledge to successfully acquire Chinese measure classifiers, but more clearly rely on general problem-solving skills such as observing, comparing, and analyzing to make sense of specific classifiers.

5.2.1.2 The role of the Critical Period

The Critical Period is another key cause of different results in development of measure and specific classifiers. My subjects are all over 18 years old, beyond the critical

period. Compared with L1 children, they have no difficulty comprehending the quantifying function of a container. When they saw a picture with something in a container they knew that they should use the container as a measure classifier to quantify the entity. Therefore, their mature cognition regarding quantification actually helps them to acquire measure classifiers earlier than L1 children who have not developed this quantifying cognition until they are around seven to nine years old (Piaget, 1952; Piaget & Inhelder, 1969; Sinclair et al. 1971).

However, it is also because of adults' mature cognition that they seem unable to access universal semantics to perceive the features of objects that are salient for L1 children. Evidence for this is their low overall percentage of use of expected specific classifiers and their reliance on the general classifier *ge* in place of expected classifiers. This indicates that the subjects did not grasp a correlation between the semantics of classifiers and the features of objects, but it is also possible that they just did not know or remember these specific classifiers. The data shows evidence for both possibilities. Subject A1 uses the highest percentage of expected classifiers, for example accurately using the specific classifier *tiao* (long.thin.flexible) in phrases such as *si* ***tiao*** *ku zi* 'four pairs of pants' (familiar object) and *liang* ***tiao*** *lingdai* 'two ties' (unfamiliar object). However, this subject also produced the unacceptable phrase *si* ***tiao*** *xiangzao* 'four bars of soap'. The correct form is *si* ***kuai*** *xiangzao* as the classifier *kuai* denotes a cubic shape and rigid features. This example demonstrates that while A1 can accurately generalize use of *tiao* to some objects based on perceptual features, it is still difficult to accurately apply

all aspects of the semantics of the classifier *tiao*. Another example is subject L11's reliance on *ge* in place of expected specific classifiers in all cases except one, the noun phrase *liang* ***zhang*** *zhi* 'two pieces of paper'. In this case, it seems that the subject has little knowledge of specific classifiers, relying only on a memorized chunk in order to apply *zhang* (flat.thin) since the correlation between *zhang* and *zhi* appears frequently in their textbook. This example likely shows a subject in the early stages of development presented in Section 1.2.1.1. Such examples agree with Johnson and Newport's (1989) study about the critical period resulting in a reduced ability to learn functional categories. The abstract nature of specific classifier semantics and the fact that they are a closed class of morphemes may cause further difficulty for adult learners.

In particular, because of the critical period, subjects dealt with unfamiliar objects differently when using measure and specific classifiers. As mentioned above, the subjects could deal with unfamiliar objects well when using measure classifiers because they understood the quantifying cognition and knew they should use one container as a measure classifier to quantify an entity. However, the adult subjects are not able to use the perceptual features that they see as L1 children do. As a result, they cannot fully understand the semantic correlation of specific classifiers and the objects. Instead, they memorize or consciously analyze the correlation between specific classifiers and different nouns. When they saw new objects, most subjects chose the general classifier *ge* to avoid an inappropriate match between classifier and noun, but some subjects also tried using familiar classifiers for unfamiliar objects, with some success, which may be hypothesis

testing as described by Towell and Hawkins (1994). For example, some subjects used the classifier *tiao* (long.thin.flexible) to apply to less familiar objects such as *she* 'snake' and *lingdai* 'tie' correctly. The one-dimensional (1D) nature of *tiao* may relate to the ease with which the relevant features of these objects are perceived. However, almost no subjects used the correct classifier *zhang* (flat.thin), which refers to two-dimensional (2D) properties, for the less familiar entities *yuwang* 'fishnet' and *lian* 'face'. Overall, while the complexity of semantic features involved with different classifiers may have been a factor, this study did not include a sufficient variety of specific classifiers to lead to any conclusions in this area.

In sum, the results of the study show that L2 adult speakers produce a low percentage of specific classifiers because they cannot match them to the perceived features of objects or simply have not memorized this closed class of words. These features both support the maturation of cognitive abilities as an important distinction between L1 child and L2 adult language development. Cognitive maturation can have both positive and negative results. For adult speakers of English their mature cognitive development helps them develop measure classifiers more readily than L1 children, but it hinders their ability to develop specific classifiers in the way that children do.

5.2.2 Acquisition of classifier syntax

The pilot study results indicate that subjects largely mastered the Chinese noun numeral phrase structure with its obligatory classifier. In subject responses two types of

syntax errors were noted. The first of these is omission of classifiers, which will be discussed in detail in 5.2.2.1. The second type of syntax error was the use of two classifiers instead of one, to be discussed in Section 5.2.2.2. However, these errors were rare, together representing only 3.5% of all responses. So, 96.5% of all responses were syntactically correct. This confirms that English adult speakers acquire Chinese classifier word order quickly, as do L1 children, though the process of acquisition may be different. L1 children acquire syntax early on through semantic bootstrapping while English adults use first language knowledge and conscious analysis to remember the same structure. Despite their rarity, it is still of interest to see what the different types of syntax errors indicate about the classifier development process.

5.2.2.1 Omission of classifiers

Omission of classifiers would be a clear indicator that learners were having trouble acquiring classifiers. In posing research question five I wanted to see if omission of classifiers would reveal anything about the relative ease or difficulty of acquiring specific classifiers relative to measure classifiers. The limited number of omission errors in the pilot study precludes a clear answer to this question.

Classifiers were omitted in six responses, in five cases where specific classifiers were expected and in one case where a measure classifier was expected. Subject B2 omitted specific classifiers three times when the classifier *zhi* (small animals or birds) was expected. However, this subject also added the adjective *xiao* 'small' between the number and the noun in these cases, perhaps treating *xiao* as a classifier or otherwise

recognizing that the sentence required some morpheme between the number and the noun. Subject G7 omitted specific classifiers twice, but in each case recognized that a classifier was needed, saying for example "I don't know what word to use for this". While this subject used the general classifier *ge* in other cases, in this case *ge* apparently did not seem appropriate, so the subject may have been discerning when *ge* is acceptable and when *ge* is not acceptable. The omission of the measure classifier by subject L11 was also a case where the subject said that they could not remember the Chinese word to use.

From these examples we can see that the subjects were aware of the requirement for classifiers in Chinese NPs, but sometimes did not know what classifier to use. In such cases, some subjects chose to omit a classifier. Such omission of classifiers does not represent a lack of mastery of classifier syntax, but instead occurs as a result of limited vocabulary knowledge or as part of a strategy for dealing with unfamiliar objects. Evidence of L1 children's omission of classifiers is similar, with Erbaugh (1986) recording that her subjects very rarely omitted specific classifiers.

5.2.2.2 Two classifiers instead of one

The other case of syntax error was also rare with four cases in which subjects used two classifiers instead of one. These were all examples where subjects used *ge* in combination with a measure classifier instead of using the measure classifier by itself. For example, H8 produced this phrase **si* ***ge ping*** *kele* (four CL-*ge* CL(bottle) Cola; 'four bottles of Coca Cola'). It is worth noting that the three subjects H8, J10, and K11 who made this type of error were also the three subjects who relied most heavily on the

classifier *ge* (for example, all three used only *ge* for unfamiliar objects when other specific classifiers were expected). It may be that this strategy resulted from the idea that the general classifier *ge* is bound to the number, a kind of inseparable form: Num + *ge*. Still, in most cases they did not use *ge* with measure classifiers.

L1 children rarely exhibit such double classifiers. Erbaugh (1986) did note some such two classifier structures in specific classifier noun phrases. For example, one of her subjects produced the following sentence:

(20) **Na wo yao zhe **ge** **zhang***
then I want this CL(general CL) CL(thin.flat)
'Then I want this-one sheet'
(Erbaugh, 1986, p. 425)

In (20), the L1 child uses the general classifier *ge* and the specific classifier *zhang* together after the demonstrative *zhe*. The context of this sentence is that this child wanted a sheet of paper. The correct form should be *zhe* ***zhang*** instead of **zhe* ***ge*** *zhang*. Thus, L2 adults and L1 children both rarely make this kind of error, and when it does take place it is normally caused by the overuse of *ge*.

5.2.3 The role of the general classifier *ge*

The final research question concerns the role of the general classifier *ge* in L2 adult classifier development. Many pilot study subjects overused *ge* in place of other specific classifiers, and a few subjects relied on *ge* in almost all cases where a specific classifier was expected. Selinker (1992) argues that the overgeneralized use of a target language feature is a cognitive strategy. This section summarizes how and when L2

learners use the general classifier *ge* in comparison with its use by L1 children.

First, the results show that the general classifier *ge* plays an important role in acquisition of specific classifiers but not of measure classifiers. It shows that L2 learners treat the general classifier *ge* as a kind of default specific classifier. In other words, L2 learners treat the general classifier *ge* as a categorical rule that applies across the board instead of selecting specific classifiers, a prototype, one that applies probabilistically (Dekeyser, 1995). Meanwhile, L2 learners are able to draw a cognitive distinction between situations requiring specific classifiers and those requiring measure classifiers.

Next, for both familiar and unfamiliar objects, the general classifier *ge* was used significantly more frequently than other specific classifiers. For L2 learners who do not remember other specific classifiers and may not recognize a connection between a given specific classifier and perceptual features, the general classifier *ge* is a simple choice. In these cases *ge* appears to function as a "syntactic placeholder" (Hu, 1993a). Learners know that syntax requires a classifier, but they do not know what classifier to use and select *ge* to fill the space between numeral and noun. This indicates that L2 learners are fully aware that Chinese noun phrase syntax requires a classifier.

These results show that the use of the general classifier increased when subjects saw unfamiliar objects or when they could not remember which other classifier they should use. Essentially L2 learners adopted a strategy to help them communicate without worrying about classifier semantics. Learners may know that *ge* is not the perfect choice, but they also know that using it will not hinder communication, and so treat it as a safe

way to overcome limited knowledge of other specific classifiers.

Hu's (1993a) research noted the following features of L1 child acquisition of *ge*: 1) overgeneralized use of *ge*; 2) taking *ge* as a "syntactic placeholder"; 3) treating *ge* as a default classifier without specified semantic meaning; 4) the use of *ge* decreases with age and increased knowledge of specific classifiers. The first three characteristics are shared by the adults in this pilot study, but an examination of the fourth feature would require a different research approach than that used in this pilot study. Testing the fourth feature could show whether L2 adults have the potential to reach a native adult level of classifier use as is uniformly achieved by L1 children, or experience fossilization and remain in a state of incomplete development. Suggestions for such a research project are presented in Section 6.3.

One factor influencing both L2 adult and L1 child use of *ge* is input frequency, a feature of target language input processed by general cognition. As Erbaugh (1986) observed in a long term study, Chinese native speakers only use around 20 specific classifiers in daily life, *ge* being the most common one. Similarly, for the pilot study subjects, *ge* is the most frequently used classifier in their textbooks, and likely in classroom and informal conversational settings as well. In summary, L2 adult use of *ge* is broadly similar to that of L1 children, as are the causes for this overuse.

5.3 Summary

This chapter presents the results of the pilot study, contrasts subject use of measure and specific classifiers, looks at how subjects approached unfamiliar objects,

and analyzes the phenomenon of overgeneralized use of the general classifier *ge*. Based on the research questions posed in Chapter 2 the analysis also looked at the pilot study results in light of existing L1 research. Evidence for an L2 adult emergence order of measure and specific classifiers that is the opposite of the L1 emergence order points to underlying differences in L1 and L2 language development, particularly in terms of transfer, general cognition and a critical period. However in at least one area, the overgeneralization of the general classifier *ge*, L2 adults and L1 children share several features. The implications of these findings for language acquisition theory and suggestions for future research in this area are outlined in Chapter 6 below.

CHAPTER 6: CONCLUSION AND IMPLICATION

6.1 Review

By comparing L2 adult and L1 child development of Chinese classifiers, this thesis contributes to the ongoing debate over whether L1 child and L2 adult language development are essentially similar or fundamentally different. This comparison was made on the basis of existing research with L1 children and a new pilot study based on L1 research design with English speaking adults learning Chinese. The focus was on determining the processes by which Chinese specific and measure classifiers are acquired.

Before digging deeply into Chinese classifiers, Chapter 1 first overviewed two different schools of thought in the field of language acquisition. One school argues that L1 and L2 learners both follow a natural order of language acquisition (Dulay & Burt, 1973; Krashen et al., 1978; Makino, 1980). According to this view L2 learners are able to fully access Universal Grammar and can use the innate language device that L1 children use (Flynn, 1996). The other school of thought argues that L1 and L2 language acquisition are fundamentally different (Fathman, 1975; Andersen, 1977, 1978; Selinker & Lamendella, 1978; Bley-Vroman, 1989; Johnson & Newport, 1989). In this view factors such as transfer of L1 knowledge and a critical period cause L2 adult language development to differ from L1 child language development.

Next, Chapter 2 provided background with regard to the typology, properties and

system of organization of Chinese classifiers. The differences between the two main groups of Chinese classifiers (specific and measure) were discussed in terms of semantics, syntax, and word class. Measure classifiers resemble English measure words, making them more familiar to English speakers than specific classifiers. Not only do most Chinese specific classifiers lack English equivalents, but in addition they display semantics that are intrinsic and can be probabilistic. The order in which these two types of classifiers are developed by L1 children and L2 adults, a central focus of this thesis, was next discussed in light of the existing literature. While previous research generally agrees that L1 children develop specific classifiers earlier than measure classifiers, it does not provide detailed theoretical explanations for such an emergence order. Furthermore, the literature on L2 adults acquiring Chinese classifiers is limited in this area, focusing solely on the acquisition of specific classifiers. Upon concluding this literature review the two goals of this thesis were established: to provide a theoretical explanation for the emergence order of L1 child Chinese classifier acquisition and to test whether English adult speakers exhibit a similar or different emergence order. Six research questions were put forward to address these goals, focusing on the features of L2 classifier development and the factors behind them.

Guided by the first of the two goals, Chapter 3 delves further into the emergence order of the two main types of Chinese classifiers among L1 children. I argue on the basis of work by Clark (1972, 1977), Carey (1978), and Pinker (1984, 1987) that children develop specific classifiers through access to universal semantics and innate knowledge

of universal categories. At the same time their immature cognition in terms of quantification blocks them from developing measure classifiers at an early age. Based on this analysis, I put forward the hypothesis that the emergence order of L2 English adult speakers developing classifiers will be the reverse of the L1 child order. In order to test this hypothesis a pilot study was designed and carried out.

Chapter 4 described the methodology of this study, broken into explanations of the subjects, materials, procedures, and coding used. Chapter 5 then presented the results of the study, which supported my thesis by indicating that English adult speakers develop measure classifiers earlier than specific classifiers. The results provide further evidence that L1 influence, general problem-solving skills and the critical period play important roles in L2 language development. These findings agree with arguments that L2 adult development is fundamentally different from that of L1 children. In this case, L2 adults lack the full access to Universal Grammar relied on by L1 children, though the results of this pilot study do not conclusively indicate whether partial access through first language knowledge plays a role, or whether adults actually have no access to UG and depend solely on general problem-solving skills. This final chapter concludes the thesis by discussing its significance and implications, and suggesting areas for further research.

6.2 Significance and implications

Do L2 adults develop language based on the innate language devices that L1 children use, or through general problem-solving skills? This thesis suggests that general problem-solving is at the center of L2 development, a finding that is relevant in the areas

of L1 and L2 language acquisition theory, Chinese language acquisition research, and Chinese language pedagogical practice. Each of these areas is discussed in its own subsection below.

6.2.1 L1 and L2 language acquisition

In the field of L1 and L2 acquisition, this thesis contributes evidence that English adult speakers transfer English knowledge about measure words to their L2 Chinese when using measure classifiers, while relying on general problem-solving skills to learn specific classifiers. These findings agree with Bley-Vroman's (1989) Fundamental Difference Hypothesis and Johnson and Newport's (1989) arguments concerning a Critical Period in L2 language learning. In addition, this thesis found that cognitive development is closely tied with the development of linguistic skills, much as argued by Sinclair et al. (1971).

Furthermore, this thesis extends L2 acquisition research beyond the Indo-European languages most commonly studied, as encouraged by Polio (1994):

> "We need to examine a wide variety of languages so that we can look at how different features, particularly those not found in Indo-European languages, are acquired by second language learners. Certainly, Chinese has many of these features, one of them being nominal classifiers. Furthermore, there are very few data-based papers, in English language journals at least, on how second language learners learn Chinese or what their interlanguage looks like… While those experienced at teaching Chinese might have some intuitive sense of what is difficult for second language learners, there is little empirical evidence available." (Polio, 1994, p. 51)

This pilot study starts to bridge this gap by adding to our understanding of how L2 adults

develop Chinese classifiers, a language feature that as of yet has not received much attention in terms of second language acquisition processes. In particular, this study is the first research project to focus on the order in which L2 adults learn measure and specific classifiers and to compare this order with that found in research on L1 child acquisition. This research project provides insight of interest to both L1 and L2 researchers about the relationship between L1 child and L2 adult language development, including suggestions for further research as outlined in 6.3 below.

6.2.2 L1 Chinese language development

In the area of L1 child acquisition of Chinese classifiers a rich body of research already exists though it focuses primarily on the development of specific classifiers. Studies such as those by Ying et al. (1984), Szeto (1998), Chien et al. (2003), Tse et al. (2007), and Li et al. (2008) noticed that L1 children use specific classifiers more frequently than measure classifiers, yet did not fully explain these results in terms of research into cognitive development and universal semantics. This thesis developed the relationship between L1 child acquisition findings and broader research on the relative roles of semantics and syntax in the process of language learning. My research indicates that acquisition of specific classifiers is eased by child perception of universal categories, while acquisition of measure classifiers is limited by children's incomplete development of the semantics of quantification.

6.2.3 Chinese language pedagogy

The results from the study also have implications for how Chinese specific and measure classifiers are taught to L2 adult learners. Current Chinese grammar books, such as *A Practical Chinese Grammar for Foreigners* (Li & Chen, 2003), and textbooks, such as the *Integrated Chinese* series, treat these two types of classifiers in the same way. However, this thesis implies that these two types of classifiers are acquired differently, and that there are advantages to helping students make a distinction between them. First, it will reduce the sense among L2 learners that there are too many complex classifiers to learn (He, 2000). Since measure classifiers are an open class, they represent a large portion of any combined list of classifiers. By separating measure classifiers and helping learners take advantage of L1 knowledge to develop them quickly, we can then help learners focus more carefully on a smaller set of the most common specific classifiers, this resembles the teaching approach suggested by Wang (2004) of focusing on simple classifiers first. Another advantage is such a separation will help teachers tailor their approaches to these two types of classifiers. Dekeyser (1995) finds that explicit instruction helps with simple and concrete categorical rules, like those involving use of measure classifiers, yet neither explicit nor implicit instruction is effective when dealing with prototypical rules, such as those guiding use of specific classifiers. Therefore, when teaching these two types of classifiers adjusting instructional strategies may result in a better distribution of time and energy.

Another important finding from this study is that English adults overgeneralized

the general classifier *ge* when seeing both familiar and unfamiliar objects. This is a good strategy for avoiding syntactic error, but as learners seek to achieve intermediate and advanced levels of spoken and especially written Chinese it becomes important for them to learn to use more appropriate specific classifiers. I suggest that after L2 learners have mastered the classifier structure (partly by relying on *ge* and on their L1 knowledge of measure words) that teachers and textbooks should then focus on providing more input and practice with other specific classifiers. In this way learners can progress along a path from easiest to most difficult, in accordance with principles of logical learning.

6.3 Suggestions for further research

While this pilot study does provide useful evidence regarding the emergence order of English adult speakers in developing specific and measure classifiers, further work in this area is needed. The pilot study was limited by a number of important factors, including the small group of subjects and selection of classifiers from only a few subgroups of the two main types of classifiers.

Further research would benefit from a larger group of subjects that included students with different levels of Chinese proficiency. By including students at both higher and lower levels of Chinese study than the subjects in this pilot study, researchers could learn more about the very early stages of L2 classifier development, as well as the long-term results for advanced students. Focusing on students with high levels of proficiency would also be advantageous because it would allow researchers to focus more closely on the projective capacity to extend use of known specific classifiers to unfamiliar objects.

In the current study many subjects had difficulty using specific classifiers for familiar objects, implying that they were not yet very familiar with some of the classifiers and objects that they had been exposed to in their class and textbooks. As a result, the test could not clearly examine whether they could use familiar specific classifiers for unfamiliar objects based on the perceptual features denoted by the specific classifier.

Besides increasing the variety and number of subjects tested, lengthening the time-span covered by the research study would provide valuable data. In particular, a longitudinal study would indicate whether fossilization takes place in L2 adult development of Chinese classifiers. Such findings would delineate a key difference from L1 children, who are uniformly successful in achieving an adult native level of classifier use.

The diverse range of classifier subgroups present in Chinese provides researchers with numerous opportunities for further investigation. By focusing on only the space and animacy subgroups of the specific classifier category and only the container classifiers of the measure classifier category, this pilot study may have missed important distinctions in how other types of classifiers are developed. The acquisition of subgroups such as specialized classifiers, function classifiers, collective classifiers, and partial classifiers were not included in the study, as I explained in Section 4.3.1, but their acquisition likely differs from that of the subgroups chosen. If more advanced subjects are chosen, a wider selection of subgroups of classifiers may also be appropriate.

A particularly intriguing direction for future research could be to compare

English-speaking adults and children (preferably below six years old) acquiring Chinese classifiers. The goal would be to see whether they differ in their acquisition process, and to test the relation between cognitive maturity and the development of linguistic skills. Johnson and Newport (1989) found that "Human beings appear to have a special capacity for acquiring language in childhood, regardless of whether the language is their first or second"(p. 95). This type of study would be able to test this possibility. How will English children behave? Are they like Chinese children in access to universal semantics? Will they acquire specific classifiers first? Will English knowledge about measure words influence their use of measure classifiers, as with L2 adults, or will they be limited by immature cognition?

In conclusion, much space remains for exploration of Chinese classifiers. Through the window of Chinese classifiers, researchers can not only expand their understanding of L2 learning processes, but also take advantage of an opportunity to further the broader debate regarding the relationship between the underlying factors at work in L1 and L2 development. This thesis argues that the nature of L2 adult development is fundamentally different from that of L1 children, while also uncovering similarities in the strategies used when first learning Chinese classifiers. It is my hope that the present study provides a meaningful basis for further research in this area.

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APPENDIXES

Appendix A: Subject demographic data

ID	Age	Gender	Length of Chinese study
A1	23	Male	around one and a half years
B2	22	Female	around one and a half years
C3	21	Male	around one and a half years
F6	21	Male	around one and a half years
G7	19	Female	around one and a half years
H8	21	Male	around one and a half years
I9	20	Female	around one and a half years
K10	22	Female	around one and a half years
L11	20	Male	around one and a half years

Appendix B: Subject language background

ID	Time spent studying Chinese outside of class every week	Do you have Chinese friends to practice your Chinese?	Time spent with Chinese friends every week	Other language spoken
A1	12-18 hours	yes	2-3 hours	none
B2	3-4 hours	yes	1 hour	none
C3	2 hours	no	-	Spanish
F6	3 hours	no	-	none
G7	5 hours	yes	1-2 hours	none
H8	4-5 hours	no	-	none
I9	2 hours	no	-	none
K10	2 hours	yes	30 minutes by Skype	Spanish
L11	more than 10 hours	yes	4 hours	Thai

Appendix C: Detailed scores of all subject responses

The tables in this appendix list the scores assigned to each subject response on the basis of the system of coding outlined in Section 4.5.

C1: Specific classifiers with familiar objects

	tiao: dress	**tiao: pants**	**zhang: paper**	**zhang: table**	**kuai: soap**	**kuai: tofu**	**zhi: cat**	**zhi: dog**	**Mean**
A1	5	5	5	5	3	4	5	5	4.63
B2	5	5	5	5	3	3	1	5	4.00
C3	3	5	5	5	3	3	4	4	4.00
F6	5	5	3	4	3	3	4	4	3.88
G7	1	3	4	3	3	3	5	5	3.38
H8	3	3	5	5	3	3	4	4	3.75
I9	5	5	4	5	3	3	4	5	4.25
J10	3	5	3	4	3	3	4	4	3.63
K11	3	3	4	5	3	3	4	4	3.63
Mean	3.67	4.33	4.22	4.56	3.00	3.11	3.89	4.44	3.90

C2: Specific classifiers with less familiar and unfamiliar objects

	tiao: snake	**tiao: tie**	**zhang: face**	**zhang: fishnet**	**kuai: beef**	**kuai: watch**	**zhi: hawk**	**zhi: mouse**	**Mean**
A1	3	5	3	3	4	3	5	5	3.88
B2	5	5	3	5	3	3	1	1	3.25
C3	4	5	3	3	3	4	4	4	3.75
F6	4	5	3	3	4	3	4	4	3.75
G7	3	4	1	3	3	4	5	5	3.50
H8	4	4	3	3	3	4	4	4	3.63
I9	5	5	3	3	3	4	4	4	3.88
J10	5	4	3	3	3	3	4	4	3.63
K11	4	4	3	3	3	4	4	4	3.63
Mean	4.11	4.56	2.78	3.22	3.22	3.56	3.89	3.89	3.65

C3: Measure classifiers with familiar objects

	bei: coffee	**bei: tea**	**ping: Coke**	**ping: water**	**wan: rice**	**wan: soup**	**pan: dumplings**	**pan: fried fish**	**Mean**
A1	5	5	5	5	5	5	5	5	5.00
B2	5	5	5	5	5	5	4	5	4.88
C3	5	5	5	5	5	5	5	5	5.00
F6	5	5	5	5	5	5	5	5	5.00
G7	5	5	5	5	5	5	5	5	5.00
H8	5	5	2	5	5	5	5	5	4.63
I9	5	5	5	5	5	5	4	5	4.88
J10	5	5	3	5	5	5	2	5	4.38
K11	2	5	5	5	5	5	4	4	4.38
Mean	4.67	5.00	4.44	5.00	5.00	5.00	4.33	4.89	4.79

C4: Measure classifiers with less familiar and unfamiliar objects

	bei: lemon juice	**bei: rice alcohol**	**ping: soy milk**	**ping: soy sauce**	**wan: cherries**	**wan: Chinese medicine**	**pan: green beans**	**pan: peanuts**	**Mean**
A1	5	5	5	5	5	5	5	5	5.00
B2	5	5	5	5	5	5	5	5	5.00
C3	5	5	5	5	4	5	5	5	4.88
F6	5	5	5	5	4	5	5	5	4.88
G7	5	5	5	5	5	5	5	5	5.00
H8	5	5	5	5	5	5	5	5	5.00
I9	5	5	5	5	5	5	4	5	4.88
J10	3	5	5	5	1	5	5	5	4.25
K11	5	5	4	5	4	2	4	4	4.13
Mean	4.78	5.00	4.89	5.00	4.22	4.67	4.78	4.89	4.78

C5: Specific and measure: combined familiar and unfamiliar scores

	Specific Classifiers					**Measure Classifiers**				
	tiao	**zhang**	**kuai**	**zhi**	**Mean**	**bei**	**ping**	**wan**	**pan**	**Mean**
A1	4.5	4	3.5	5	**4.25**	5	5	5	5	**5.00**
B2	5	4.5	3	2	**3.63**	5	5	5	4.75	**4.94**
C3	4.25	4	3.25	4	**3.88**	5	5	4.75	5	**4.94**
F6	4.75	3.25	3.25	4	**3.81**	5	5	4.75	5	**4.94**
G7	2.75	2.75	3.25	5	**3.44**	5	5	5	5	**5.00**
H8	3.5	4	3.25	4	**3.69**	5	4.25	5	5	**4.81**
I9	5	3.75	3.25	4.25	**4.06**	5	5	5	4.5	**4.88**
J10	4.25	3.25	3	4	**3.63**	4.5	4.5	4	4.25	**4.31**
K11	3.5	3.75	3.25	4	**3.63**	4.25	4.75	4	4	**4.25**
Mean	**4.17**	**3.69**	**3.22**	**4.03**	**3.78**	**4.86**	**4.83**	**4.72**	**4.72**	**4.78**

Appendix D: All classifiers used in subject responses

Subject responses were divided into three categories: use of the expected classifier, use of the general classifier *ge*, and all other responses, including omission of classifiers, the use of multiple classifiers, and the use of unexpected classifiers.

D1: Specific classifiers with familiar objects

	tiao: dress	**tiao: pants**	**zhang: paper**	**zhang: table**	**kuai: soap**	**kuai: tofu**	**zhi: cat**	**zhi: dog**	**exp.**	**exp. %**	**ge**	**ge %**	**other**	**other %**
A1	jian	tiao	pian	zhang	tiao	pian	zhi	zhi	4	50.00	0	0.00	4	50.00
B2	tiao	tiao	zhang	zhang	ge	ge	null	tiao	4	50.00	2	25.00	2	25.00
C3	ge	tiao	zhang	zhang	ge	ge	ge	ge	3	37.50	5	62.50	0	0.00
F6	tiao	tiao	ge	ge	ge	ge	ge	ge	2	25.00	6	75.00	0	0.00
G7	null	ge	ge	ge	ge	ge	zhi	zhi	2	25.00	5	62.50	1	12.50
H8	ge	ge	zhang	zhang	ge	ge	ge	ge	2	25.00	6	75.00	0	0.00
I9	jian	tiao	zhang	ge	ge	ge	ge	tiao	2	25.00	4	50.00	2	25.00
J10	ge	shuang	ge	ge	ge	ge	ge	ge	0	0.00	7	87.50	1	12.50
K11	ge	ge	zhang	ge	ge	ge	ge	ge	1	12.50	7	87.50	0	0.00
exp.	2	5	5	4	0	0	2	2	20					
exp. %	22.22	55.56	55.56	44.44	0.00	0.00	22.22	22.22		27.78				
ge	4	3	3	5	8	8	6	5			42			
ge %	44.44	33.33	33.33	55.56	88.89	88.89	66.67	55.56				58.33		
other	3	1	1	0	1	1	1	2					10	
ot. %	33.33	11.11	11.11	0.00	11.11	11.11	11.11	22.22						13.89

D2: Specific classifiers with less familiar and unfamiliar objects

	tiao: snake	**tiao: tie**	**zhang: face**	**zhang: fishnet**	**kuai: beef**	**kuai: watch**	**zhi: hawk**	**zhi: mouse**	**exp.**	**exp. %**	**ge**	**ge %**	**other**	**other %**
A1	zhi	tiao	ge	tiao	pian	tiao	zhi	zhi	3	37.50	1	12.50	4	50.00
B2	tiao	tiao	ge	zhang	ge	tiao	null	null	3	37.50	2	25.00	3	37.50
C3	ge	tiao	ge	ge	ge	ge	ge	ge	1	12.50	7	87.50	0	0.00
F6	ge	tiao	ge	ge	ge	ge	ge	ge	1	12.50	7	87.50	0	0.00
G7	zhi	ge	null	ge	ge	ge	zhi	zhi	2	25.00	4	50.00	2	25.00
H8	ge	ge	ge	ge	ge	ge	ge	ge	0	0.00	8	100	0	0.00
I9	tiao	tiao	ge	ge	ge	ge	ge	ge	2	25.00	6	75.00	0	0.00
J10	ge	ge	ge	ge	ge	ge	ge	ge	0	0.00	8	100	0	0.00
K11	ge	ge	ge	ge	ge	ge	ge	ge	0	0.00	8	100	0	0.00
exp.	2	5	0	1	0	0	2	2	12					
exp. %	22.22	55.56	0.00	11.11	0.00	0.00	22.22	22.22		16.67				
ge	5	4	8	7	8	7	6	6			51			
ge %	55.56	44.44	88.89	77.78	88.89	77.78	66.67	66.67				70.83		
other	2	0	1	1	1	2	1	1					9	
ot. %	22.22	0.00	11.11	11.11	11.11	22.22	11.11	11.11						12.50

D3: Measure classifiers with familiar objects

	bei: coffee	**bei: tea**	**ping: Coke**	**ping: water**	**wan: rice**	**wan: soup**	**pan: dumplings**	**pan: fried fish**	**exp.**	**exp. %**	**ge**	**ge %**	**other**	**other %**
A1	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
B2	bei	bei	ping	ping	wan	wan	wan	pan	7	87.50	0	0.00	1	12.50
C3	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
F6	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
G7	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
H8	bei	bei	ge ping	ping	wan	wan	pan	pan	7	87.50	0	0.00	1	12.50
I9	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
J10	bei	bei	ge	ping	wan	wan	ge pan	pan	6	75.00	1	12.50	1	12.50
K11	ge bei	bei	ping	ping	wan	wan	pan	pan	7	87.50	0	0.00	1	12.50
exp.	8	9	7	9	9	9	7	9	67					
exp. %	88.89	100	77.78	100	100	100	77.78	100		93.06				
ge	0	0	1	0	0	0	0	0			1			
ge %	0.00	0.00	11.11	0.00	0.00	0.00	0.00	0.00				1.39		
other	1	0	1	0	0	0	2	0					4	
ot. %	11.11	0.00	11.11	0.00	0.00	0.00	22.22	0.00						5.56

D4: Measure classifiers with less familiar and unfamiliar objects

	bei: lemon juice	bei: rice alcohol	ping: soy milk	ping: soy sauce	wan: cherries	wan: Chinese medicine	pan: green beans	pan: peanuts	exp.	exp. %	ge	ge %	other	other %
A1	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
B2	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
C3	bei	bei	ping	ping	pan	wan	pan	pan	7	87.50	0	0.00	1	12.50
F6	bei	bei	ping	ping	pan	wan	pan	pan	7	87.50	0	0.00	1	12.50
G7	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
H8	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
I9	bei	bei	ping	ping	wan	wan	pan	pan	8	100	0	0.00	0	0.00
J10	ge	bei	ping	ping	null	wan	pan	pan	6	75.00	1	12.50	1	12.50
K11	bei	bei	bei	ping	ge wan	bei	wan	wan	3	37.50	0	0.00	5	62.50
exp.	8	9	8	9	5	8	8	8	63					
exp. %	88.89	100	88.89	100	55.56	88.89	88.89	88.89		87.50				
ge	1	0	0	0	0	0	0	0			1			
ge %	11.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00				1.39		
other	0	0	1	0	4	1	1	1					8	
ot. %	0.00	0.00	11.11	0.00	44.44	11.11	11.11	11.11						11.11

D5: Percentage data by expected classifier

	Specific Classifiers				**Measure Classifiers**			
	tiao	**zhang**	**kuai**	**zhi**	**bei**	**ping**	**wan**	**pan**
expected %	38.89	27.78	0.00	22.22	94.44	91.67	86.11	88.89
ge %	44.44	63.89	86.11	63.89	2.78	2.78	0.00	0.00
other %	16.67	8.33	13.89	13.89	2.78	5.56	13.89	11.11

D6: Percentage data: familiar, unfamiliar and combined

	Specific Classifiers			**Measure Classifiers**		
	familiar	**unfamiliar**	**combined**	**familiar**	**unfamiliar**	**combined**
expected %	27.78	16.67	22.22	93.06	87.50	90.28
ge %	58.33	70.83	64.58	1.39	1.39	1.39
other %	13.89	12.50	13.19	5.56	11.11	8.33