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Towards a better understanding of Chinese numeral classifiers

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TOWARDS A BETTER UNDERSTANDING OF CHINESE NUMERAL CLASSIFIERS

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ABSTRACT

Many languages in the world have noun classifier systems. These classifier systems represent a type of categorization, and the study of such systems may contribute to the understanding of the general phenomenon of human categorization.

It is the aim of this research project to gain some insight into the numeral classifier system of Mandarin Chinese. An original analysis of Chinese numeral classifiers is provided. In the first part of the analysis, an overall taxonomic picture of numeral classifiers of Chinese is constructed based on what nouns each classifier categorizes. This analysis subcategorizes the Chinese numeral classifiers into six types. The "individual classifiers" (those that are used to classify individual nouns) appear to be most relevant to the psychological categorization literature. The second part of the analysis focuses on the individual classifier labels. The relation between the labels and the entities classified by these labels is explored. The meanings of the individual classifier labels appear to be related to the meanings of the same characters when they are used as nouns, verbs, or adjectives.

CHAPTER 1 INTRODUCTION

Languages in the world differ in many ways, but there are also many features that are shared by both closely and distantly related languages. For instance, in all languages in the world, there are nouns for objects. Moreover, it is a common phenomenon for a language to classify its nouns into different categories. It is believed that classifier systems represent some type of categorization, and the study of such systems may contribute to the understanding of the general phenomenon of human categorization (Craig, 1986).

It is the aim of this research project to gain some insight into the numeral classifier system (which is one form of a noun classifier system) in mandarin Chinese. In particular, this research is designed to obtain some understanding of the classifier system in Chinese and of the cognitive basis for classifier category membership.

In this thesis, I will first briefly discuss why the study of noun classifiers is of interest to psychologists. I will then review literature on noun classifications to present some linguistic background including the different ways in which noun classifications are realized, the distinctions between noun classes and noun classifiers, and the relationship between classifiers and cognition. Finally, I will provide an original analysis of Chinese

numeral classifiers as a prerequisite for experimental studies. This analysis will consist of two parts. In Part I, I will construct an overall taxonomic picture of numeral classifiers in Chinese. In Part II, I will examine the connection between the classifier category label and the nouns contained in the category.

What Noun Classifiers Are

There are different types of noun classifiers in the languages of the world. It is difficult to give a concise and accurate definition of classifiers which will encompass all types. Allan (1977), however, made an attempt. He suggests that classifiers are defined on two criteria:

1. They occur as morphemes in surface structures under specifiable conditions;
2. They have meaning, in the sense that a classifier denotes some salient perceived or imputed characteristic of the entity to which an associated noun refers (or may refer).

Although this definition is not agreed upon by all researchers in the field (e.g., Dixon, 1982, 1986, suggests a different set of criteria), it does explain what noun classifiers are in an abstract sense. We may be able to get some more concrete idea of what classifiers are by looking at some examples. In English, it is grammatically correct to say "a rope" and "a table." But in many languages in the world, such ideas are expressed in a more complicated way. In Chinese, for instance, one must say *yī tiáo shéngzi for*

"a rope," in which "yī" is the numeral 1, *shéngzi* means "rope," and *tiáo* is a classifier indicating a long thing. So a literal translation would be "one long-thing rope." Similarly, "a table" would be *yī zhāng zhuōzi* in Chinese, which means a "one flat-thing table," where *zhāng* is a classifier denoting something with a flat surface.

If we look at the English language closely, we will find that there are some words in English that function as classifiers, too. For instance, the words "sheet" as in "a sheet of paper," "bar" as in "a bar of soap," "slice" as in "a slice of bread" and "head" as in "a head of lettuce" are all noun classifiers. But, English is not labeled as a classifier language. The main reason is that in a non-classifier language such as English, the number of classifiers is very small, and, more importantly, only a small percentage of nouns in English require the use of such classifiers. As Carpenter (1987) suggests, in English only those mass nouns that cannot be counted directly require a special unitizer to accompany them when they are counted. In classifier languages, however, there are normally classifiers for almost all the nouns in the language. And the use of the classifiers with appropriate nouns is generally mandatory.

Why We Study Noun Classifiers

Many people believe that the noun classifier system represents one type of category, and the study of this system will shed light on possible ways that categories are structured and mentally represented.

Noun classifiers, as a linguistic device, are not unique to only a few languages. They are, in fact, employed in a fairly large number of languages in the world, including most languages in Asia, the Austroasiatic languages (such as Khmer, Brou, Chrau, Vietnamese, Khasi, and Kharia), the Malayo-Polynesian languages, even some of the Indo-Aryan languages (such as Assamese, and Marathi), the Altaic languages (such as Japanese) (T'sou, 1976; Adams & Conklin, 1973; Adams, 1986), and some native American and African languages (Pulman, 1978). Because noun classifiers form an important part of a classifier language, there has always been interest in the study of noun classifiers. There has been a substantial amount of work done on linguistic analyses of noun classifiers, for example, on the semantics of classifiers (Denny, 1976; Denny, 1986; Clark, 1977), on historical semantic development of (Chinese) classifiers (Erbaugh, 1986), on the structure of nominal classifier systems (T'sou, 1976), on syntactic properties of noun classifiers (Denny, 1976), and on the discourse functions of classifiers (Hopper, 1986; Downing, 1986; Sun, 1988). As

these studies suggest, noun classifiers perform various linguistic functions. The study of these functions offers linguists a good opportunity to learn what is unique to classifier languages, and which aspects are language universals.

Recently, there has been a growing interest in the study of mental representation of noun classifier systems. Researchers debate over the issue of whether classifier systems represent a form of conceptual categories. Lakoff (1987a) points out that it might be argued that classifiers are mere linguistic devices and do not reflect conceptual structure. But there is convincing counter evidence (which I will discuss in Chapter 3) suggesting that the assignment of nouns to classifiers is not arbitrary or random. First, some commonalities can be easily observed among nouns that go with the same classifier. Second, native speakers agree with each other on their choices of classifiers for new objects. This suggests that the classifier system is a productive system. Third, there are many semantic and syntactic universals about classifiers among classifier languages in the world. If the classifier system is not an arbitrary one, then it is a system that has in some way been shaped by the speakers of the language. So understanding the nature of the shaping of the classifier system may be in part historical (e.g., no longer actually known to current speakers of the language) and in part current (e.g.,

meaningful to current speakers). The study of classifiers can therefore be approached from either of two points of view: (1) trying to account for why each noun belongs to the group that it is in -- whether because it is meaningful to current speakers or because there is some historical reason involved. (2) asking about how the classifier system is currently represented in the mind of the speaker, that is, finding out what the speaker knows about the groupings, including whether the whole system is meaningful to the speaker or whether part of it is arbitrary.

The second approach actually takes data from the first approach into account, but it is more oriented to the psychological question: what is the representation of categories in the mind of a speaker? The study of Chinese numeral classifiers presented in this thesis adopts the second approach, and it aims at this psychological question.

If what noun classifiers define can be accepted as conceptual categories, then we are faced with further questions: what are the bases for classifier categories (especially those categories which include members that do not seem to be related to each other in any obvious way)? What models can we use to describe those categories? I believe these questions are interesting and important, because they will help us to understand how we mentally carve up the physical world around us, and how we organize our knowledge. As a summary, and as an answer to the

question of why we study noun classifiers, I quote Craig (1986, p.3):

> There is no doubt that the study of classifier systems in natural languages has much to contribute to a better understanding of the nature of categorization in human cognition on the one hand, and to the nature of the semantic structure of language on the other.

CHAPTER 2 FORMS OF NOUN CLASSIFICATIONS

As was pointed out earlier, it is a language universal that nouns are grouped into different categories. However, the way nouns are categorized differ from one language to another. The morphological and syntactic structures employed to mark these noun categories vary from language to language, and there are a variety of semantic bases for the categories. Denny and Creider (1986) suggest that noun categories are realized as noun prefixes in Toba, a language from the Guaykuruan family in South America, as well as in Bantu. But, noun categories are realized as classificatory verb stems in Athapaskan (a language stock of the Na-dene phylum in North America consisting of Apachean Athapaskan, Pacific Athapaska and Dene or Northern Athapaskan), as medials in Algonquian (a dialect of Ojibwa, spoken by an Indian people of the region around Lake Superior and westward), as lexical suffixes in Salishan (a language stock of the Mosan phylum, which is a language phylum of British Columbia and Washington), and as numeral classifiers in Sino-Tibetan, Malayo-Polynesian, Mayan, and some other languages.

Allan (1977) surveyed more than fifty of what he considered to be classifier languages, and he suggested that all the classifier languages can be grouped into four types; I will review these in detail. I will then discuss Dixon's

(1982) arguments for a clear distinction between "classifiers" and "noun classes."

Allan's analysis: Four Types of Classifier Languages

The differences among classifier languages mainly lie in the syntactic and morphological structures and in the semantic bases of the classifiers.

According to Allan (1977), there are four types of classifier languages. These are: (1) numeral classifier languages, (2) concordial classifier languages, (3) predicate classifier languages, and (4) intra-locative classifier languages.

Numeral classifier languages are those languages in which classifiers are obligatory in almost all expressions of quantification. That is, whenever counting of objects is involved, there will be an obligatory use of a noun classifier. Thai, Chinese, and Japanese are good examples of numeral classifier languages. Here are some examples of how numeral classifiers are used. The first example is from Thai (Gandour, Petty, Dardarananda, Dechongkit, and Mukngoen, 1984, p.456):

> *khruu sii khon* 'teacher four person'= 'four teachers' (*khon* is a classifier for a person)

Here is an example from Chinese:

> *yī tiáo shé* 'one long-shape-thing snake' ='one snake' (*tiáo* is a classifier for a long-shape thing)

Here is an example from Japanese (Sanches, 1977, p.52):

> *ju:tan (- a) sanmai* 'carpet three broad flat thing' = 'three carpets' (*mai* is a classifier for a broad flat thing)

Although the syntactic structures of the classifier constructions in these languages are different, the ideas that these classifiers convey are very similar in that they all point out certain inherent characteristics of the objects that they modify.

Concordial classifier languages, as explained by Allan (1977), are languages in which classifying formatives are affixed (usually prefixed) to nouns. Allan suggests that many African (Bantu and Semi-Bantu) and some Australian languages are among concordial classifier languages. Here is an example from Swahili (Allan, 1977, p.286):

> *Vi-su vi-dogo vi-wili hi-vi amba-vi-o ni-li-vi-nunua ni vi-kali sana* '*vi*+knife *vi*+small *vi*+two *vi*+this *vi*+which I+*vi*+bought are *vi*+sharp very' = 'These two small knives which I bought are very sharp.'

In this example, *vi-* is the classifier for the plural inanimate object.

The third type of classifier language that Allan suggests is the predicate classifier type. That is, different suffixes are attached to the classificatory verb stem rather than to the noun or noun phrase when objects of different characteristics are talked about. For instance, in Navajo a sentence which states: "money (of round entity) is lying there," means "a coin is lying there." But "money (of flat flexible entity) is lying there," will indicate "a

note (bill) is lying there" (Allan, 1977, p.287). And the indication of round entity or flat flexible entity is shown by the suffixes to the verbs.

The last type of classifier language, according to Allan's (1977) analysis, is the intra-locative classifier language. What is special about this type of language is that the location of the object in question, as well as the state which the object is in, affects the noun classification. That is, the same object in a different location, or appearing in a different state will require different classifiers. For instance, in Toba, a South American language, there are a set of locative noun-prefixes for objects "coming into view," "going out of view," "out of view," and "in view" (Allan, 1977). Furthermore within the category of "in view," there are three prefixes which will classify accompanying nouns into "vertical (extended) object in view," "horizontal (extended) object in view," and "saliently three-dimensional object in view." For example, in Toba, when someone wants to express the idea that "the fruit is good," he or she will have to make a distinction between a fruit which is already picked from the plant or tree and a fruit which is still hanging on the plant or tree (Denny, 1986). In the former case, the classifier *ni* is required, which indicates that the fruit is "non-extended" (e.g.. "three dimensional), but in the latter case, the speaker will need the classifier *ra*, which denotes that the

fruit is "vertical." Similarly, when the same two noun classifiers are used with the noun "girl," one will indicate "a seated girl" (non-extended), and the other will mean "a standing girl" (vertical). To Allan's knowledge, there are only two other intro-locative classifier languages in the world. They are Eskimo and Dyirbal (a northeastern Australian language).

Dixon's Analysis: Noun Classes Versus Noun Classifiers

In the previous section, we looked at the four types of classifier languages that Allan (1977) specified. We can see that Allan defines classifiers using the criteria I quoted earlier (see Chapter 1). He calls any language a classifier language if it has, in the surface structure, morphemes that classify nouns according to certain inherent characteristics or temporary state of the objects that the nouns refer to. And it does not seem to matter what forms these morphemes take, whether they are prefixed to nouns or suffixed to verbs.

Dixon (1982, 1986), however, proposes a quite different point of view. To him, many of the classifier languages defined by Allan (1977) only have "noun classes," but they do not have "classifiers," and therefore they should not be called classifier languages. Dixon argues for a clear distinction between "noun classes" and "classifiers." Dixon

claims (1986, p.105):

> It is important to distinguish between two phenomena which can fill similar semantic roles in a language, but have quite different grammatical statuses. These are the grammatical category of noun classes (including most types of gender system) and the lexico-syntactic phenomenon of noun classification (including numeral classifiers).

Dixon (1982) offers a detailed discussion of the characteristics of noun classes and classifiers, and the differences between the two. Dixon (1986) further explicitly suggests three criteria for distinguishing between noun classes and classifiers. They are size, realization, and scope.

First Criterion: "Size"

In my opinion Dixon has, in fact, included three separate points in the first criterion. First, Dixon suggests that the number of noun classes in a given language is normally small, ranging from 2 to around 115 and showing a normal distribution with a mean of 4 or 5. But classifier sets in classifier languages are usually much larger, ranging from 2 to perhaps 400 or 500. They probably show a normal distribution with a mean of 50-100 (Dixon, 1982, p.215).

Second, in languages with noun class systems it is always the case that all the nouns in the language get classified into a relatively small number of classes. But,

in classifier languages, there are always certain nouns that do not take any classifiers. For instance, in Chinese, some names for time units, such day and year, do not take any classifiers. Also a large number of abstract terms, such as beauty, freedom, bravery, socialism, and capitalism, never take any classifiers.

Third, in languages with noun classes, each noun belongs to one class only (with very few exceptions). In other words, no matter who uses it or in what context it is used, the noun stays in the same noun class. In classifier languages, however, it is common for certain nouns to go with more than one classifier, sometimes with a change in meaning and sometimes without. Here are two examples in Chinese to illustrate this point:

> *yī gēn shéngzi* 'one long-shape-thing rope'='one rope'

and also

> *yī tiáo shéngzi* 'one long-shape-thing rope' ='one rope'

Here, in this particular context, both *gēn* and *tiáo* are classifiers indicating a long-shape object. Therefore, the two noun phrases have the same meaning. Let us look at another example:

> *sān gè júzi* 'three general-classifier orange' = 'three oranges'

but,

> *sān bàn júzi* 'three segment orange' = 'three segments of orange'

In this example, *gè* is a general classifier, which indicates a whole orange. But the classifier *bàn* denotes something which has a shape of a segment of an orange (the same classifier can be used to describe a segment of a head of garlic). Obviously, the two noun phrases in this example are very different.

Second Criterion: "Realization"

Again, within this criterion, Dixon makes two distinctions. First, Dixon (1986, p.106) suggests that

> "noun classes always constitute a closed grammatical system, on a par with number and case and tense (where any member can be specified as the complement of the other members of the system, e.g., 'not masculine or neuter' must be 'feminine' in Latin).

In some languages, such as Indo-European languages, there is a strong correlation between the three grammatical genders and semantic categories of animateness and sex. For instance, 'gender' in languages like Greek, Latin, and French is regarded as one form of noun class. In these languages, there are just two or three classes and there is a considerable semantic correlation with sex.

Second, there are some morphological differences. In most cases, noun classes are indicated by affixes, which form a morphological unit with the noun. Such affixes are bound morphemes; they must be attached to the words they modify, and they cannot be used alone. In some other cases,

noun classes may be coded as separate grammatical words or clitics such as articles, but these grammatical words must always be used in presence of the nouns they modify. In contrast, noun classifiers are free morphemes. By free morphemes, it is meant that a classifier qualifies a specific noun, but it never forms a morphological unit with the noun -- it is always a separate constituent. And, in context, it can be used alone without the presence of the noun it modifies. Here is an example in Chinese:

A: *nǐ* *yǒu* *jǐ* *zhāng* *piào?*
you have how many classifier ticket?
How many tickets do you have?

B: *sān* *zhāng.*
three classifier.
Three (tickets).

Third Criterion: "Scope"

In languages with noun class systems, the indication of the presence of a noun class is normally not limited to within the single noun word, but is often also reflected in other words in the sentence as well. For instance, in Swahili, the marking of a noun class is also attached to demonstratives, numerals, adjectives, as well as nouns, and sometimes the verbs. In classifier languages, however, the classifier appears in the same noun phrase as the noun that it qualifies. The presence of the classifier is never reflected anywhere else in the sentence outside of the noun

phrase.

In summary, we can see from the above discussion that classifier languages do possess characteristics that are absent in non-classifier languages. Researchers, such as Allan and Dixon, have offered detailed analyses of classifier languages. But due to the difference in the way they define classifiers and classifier languages, they have grouped and labeled classifier languages differently. Classifier languages by Allan's (1977) definition seem to include all the languages that have, in the surface structure, some morphemes that classify nouns according to certain inherit characteristics or temporary state of the objects that the nouns refer to. And it does not seem to matter whether these are bound or free morphemes. Dixon (1982, 1986), however, argues that noun classes, a grammatical system, and noun classifiers, a lexical set, can fill similar semantic roles in a language, but have quite different grammatical statuses. In this thesis, noun classifiers are used in the sense that is defined by Dixon, with a special emphasis on numeral classifiers, the paradigm type.

CHAPTER 3 CLASSIFIERS AND COGNITION

One important issue in the study of noun classifiers is whether the use of classifiers, by native speakers of the language, reflects any categorization processes. To some people, especially those who speak a non-classifier language and have had little contact with classifiers, noun classifiers seem to be redundant and arbitrary. However, a careful and systematic study of noun classifiers will show the cognitive process reflected in the use of particular classifiers. In this chapter, I will discuss issues concerning noun classifiers and cognition.

Concepts and Categories

Children, from a very early age, are exposed to a huge array of objects including artifacts, animals and plants. Each kind of object may come in numerous sizes, colors and shapes and can be encountered in all different positions and activities (Markman, 1989). The fact that people can readily, and continuously, take in new information and retrieve any part of it when it is needed demonstrates that there must be a very good system in memory that organizes the ever-increasing amount of information in a systematic way. Concrete objects are categorized. Concepts are formed, modified, and reinforced all the time.

Medin (1989) proposes that concepts and categories serve as building blocks for human thought and behavior. He suggests that a concept can be roughly defined as an idea that includes all that is characteristically associated with it. And, a category is a partitioning or class to which some assertion or set of assertions might apply. He explains that "concepts need not have real-world counterparts (e.g., unicorns) and ... people may impose rather than discover structure in the world" (p. 1469). Although different theories have been posited to explain the nature of concepts, what makes a category a "category" is still unclear.

One of the first theoretical approaches has been referred to as the classical view. It is organized around the very compelling idea that all instances or examples of a category have some fundamental characteristics in common that determine their membership (Medin, 1989). The classical view assumes that mental representations of categories consist of a set of defining features -- necessary and sufficient features (Katz & Fodor, 1963). Three claims can be made based on this view. First, all categories have defining features. Second, all members of a category are equally good examples of the category. And, third, there are no unclear cases (either an object is a member of a particular category, or it is not). According to the classical view, once an individual has learned a

category, he or she should be able to determine whether or not any particular object is a member of the category simply by determining whether the object possesses the particular set of defining features. For instance, if one wants to decide whether a geometric shape belongs to the category of triangle, one only needs to check to see whether the shape is a closed geometric form, whether it has three sides, and whether the interior angles sum to 180 degrees as these are considered to be the defining features for triangles (Medin, 1989).

The classical view has been challenged because research results showed instances contradictory to the assumptions claimed by the classical view. Researchers find, for instance, the category "game" does not have a set of features that all games share (Wittgenstain, 1953; Rosch & Mervis, 1975). Another problem is that decisions about category membership are influenced by how typical the item is (Smith, Shoben, & Rips, 1974). For instance, a robin is judged to be a better example of bird than an ostrich is, and the reaction time for category membership decision tasks is faster for good examples than for poor examples. Thus, the classical view is seriously undermined. (Although some researchers, e.g., Armstrong, Gleitman & Gleitman, 1983, suggest a more cautious interpretation of typicality effects.)

The probabilistic view, which rejects the notion of

defining features, was posited to deal with the shortcomings of the classical view. According to the probabilistic view, members of a category do not have to share exactly the same set of features. Although a category is still defined in terms of features, it is assumed that the features need only be associated with the category with some probability. Good members of a category have more characteristic properties than poorer ones. According to the probabilistic view, categories are organized according to a family resemblance principle. People may use a prototype, a summary representation (or the central tendency) of a category, to decide category membership (Medin, 1989). This view accepts borderline cases as cases that have relatively few features that are exhibited by the prototype.

However, the prototype model is also faced with a few problems. One of the them is that prototype theories treat concepts as context-independent. This idea is inconsistent with research findings (Roth and Shoben, 1983; Barsalou, 1985, 1987, cited in Medin 1989) which indicate that typicality judgments vary as a function of particular contexts.

More recently, Medin (1989) argues strongly for the idea of knowledge-based categorization. He suggests that "classification is not simply based on a direct matching of properties of the concept with those in the example, but rather requires that the example have the right 'explanatory

relationship' to the theory organizing the concept" (p. 1474). He says that one of the more promising aspects of this approach is that it begins to address the question of why we have the categories we have or why categories are sensible. Coherence can be achieved without any obvious source of physical similarity among examples. He quotes an example from Barsalou (1983). Out of context, it would be difficult to imagine a category that may contain children, money, photo albums, and pets. But if a label such as "things to take out of one's house in case of fire" is used, the category becomes sensible. What is more, people could easily make judgments about whether new examples belonged to the category.

Lakoff (1987b) suggests "radial structures" to explain some category memberships. According to Lakoff, "a radial structure is one where there is a central case and conventionalized variations on it that cannot be predicted by general rules (p. 75)." He stresses that variations in a radial structure are conventionalized and have to be learned. The example he discusses is the Japanese classifier *hon* (see a more detailed illustration later in this chapter). He proposes that although the things that are classified by *hon* are not predictable, they are nonetheless not arbitrary. The inclusion of these seemingly very different objects in the same category can be explained by way of extensions. That is, the non-central members of

the category can be regarded as extensions from the central members of the category. Image-schema transformations, conceptual metonymies, and conventional mental images may be needed to account for the extensions. That is why different things such as sticks, lines, martial art contests, shots in basketball, telephone calls, letters, and movies can be put in the same category.

Recently, in discussing word meaning and word use, Malt (1991) suggests that one route to investigating aspects of word meaning is through studying the set of entities that a word is used to label. Her data on "water," for example, indicate that people do not use "water" to label things simply according to how much H_2O there is in the liquid. Contrary to many people's intuitive beliefs, whether an entity is labeled "water" depends much on factors such as source, location, use to humans, and importance to humans. Based on an analysis of the data on word use, Malt proposes a number of possible similarity relationships among the entities that are called by a common name. Among these are physical similarity, similarity of origin, similarity of method of preparation, and similarity of function in the culture. In addition, the factor of relative importance to the culture and having a particular historical relationship to something called by a given name may also affect the way an entity is labeled.

The search for a better way to explain human

categorization is still going on. Because of the scope of this study, I will not discuss the details of many other models. But the brief discussion presented in this section should be sufficient to give the reader some idea about some key issues involved in research in mental representation of categories. The message here is that people may categorize things for a particular reason in a particular context. Categories thus formed may look odd to people who are not familiar with the reason and context.

The study of noun classifier system is the study of one type of category. Apparently, many classifiers categorize objects in ways that are not familiar to researchers in the field. By examining how noun classifiers are used, we, as researchers, hope to be able to learn possible ways that categories are structured and mentally represented.

Now I will discuss some general characteristics of noun classifier categories that bear on the question of how they are mentally represented.

Predictability of Classifier Category Memberships

If one wants to claim that noun classifiers define categories that have some psychological reality, one must be ready to provide evidence which supports the claim. In other words, one must show that what is said to be true of categories in general is also true of classifier categories.

However, this is no easy task. One of the things that causes controversy about classifier categories is the heterogeneity of classifier category memberships, a notion perhaps unacceptable to some Western linguists and anthropologists. To quote Adams and Conklin (1973, p. 2), "it is not always possible to find a semantic lowest-common-denominator for an given class." Mainly because of this phenomenon, some people are opposed to the idea that numeral classifiers define categories. Greenberg (cited in Adams, 1986), for instance, claims that a major difference between classifiers and quantifiers that occur in the same syntactic position is that classifiers add no information or have no meaning other than "unit" in a numeral phrase. He believes that classifiers are shown to be redundant when translated into a non-numeral classifier language such as English. However, I will argue in later sections that the heterogeneity does <u>not</u> mean that the groupings are arbitrary or meaningless.

Of course, people who are against the idea that classifiers define categories should also be aware of the fact that some ordinary taxonomic category labels in English (e.g., "game") include very diverse objects, too, with no obvious category boundaries. From this point of view, perhaps they should not be startled to see the heterogeneity of classifier categories.

Heterogeneity of Classifier Categories

In this section, I illustrate with concrete examples what it is meant by heterogeneity of classifier category memberships. The Japanese classifier *hon* is a good example. According to Lakoff (1987a, p. 104) and Downing (1984, p. 13), *hon* classifies long, slender objects, such as sticks, lines, threads, canes, pencils, candles, trees, ropes, hair. We really do not have difficulty visualizing these objects as long, slender objects. But, *hon* is also used to classify martial arts contests (with staffs or swords), hits (and sometimes pitches)in baseball, shots in basketball, serves in volleyball and rallies in ping pong, judo matches, contests between a Zen master and student (in which each attempts to stump the other with Zen koans), rolls of tape, telephone calls, radio and TV programs, letters, movies, and medical injections.

A similar example is found in Chinese. The Chinese classifier *tiao* is also mainly used for long, slender objects (Chen, Chen, Chen, and Zhang, 1988). Among the nouns that *tiáo* classifies are ropes, lines, trousers, snakes, fish, roads, streams, rivers. However, *tiáo* is also used to modify skirts (including mini-skirts), brave or true men, news, and experience; things which do not readily present themselves visually as long, slender objects.

From the above two examples we can see that although

both the Japanese classifier *hon* and the Chinese classifier *tiao* are defined as a classifier for long, slender objects, they are also used for objects that are not long in shape, at least not to the eye of an outside observer. What makes the matter more complicated is that some objects which are clearly long and slender in shape are not included in the categories defined by *hon* and *tiao* respectively. For instance, "swords" are not included in the category defined by *hon* in Japanese, and "pencils" are not included in the category defined by *tiáo* in Chinese. It is this feature of classifiers that makes prediction of new category members very difficult.

Nonarbitrariness of Classifiers

However, classifiers' category members are far from arbitrarily grouped together. Classifiers do have meaning. Allan (1977) has suggested three ways of deciding whether or not classifiers have meaning, that is, whether they denote perceived or imputed characteristics of the entity (or entities) to which the associated noun refers. The suggested three ways are: (1) using native-speaker intuition; (2) using a foreign observer's intuition about the composition of the noun classes revealed by classifiers; (3) introducing new words and objects to a number of native speakers and observing what classifiers they use with them.

According to Allan (1977), there is strong evidence that native speakers tend to be consistent in the classifiers they choose when speaking about novel objects. Their choice of classifiers tends to be based on the observed characteristics of the objects. This ability is demonstrated in a diversity of languages (Allan, 1977). Native speakers will always know the proper use of classifiers within fairly narrow margins (T'sou, 1976).

Another phenomenon that supports the notion that classifiers are meaningful is discussed by Adams (1986). He points out that alternation of the classifier morphemes with nouns and their objects is not unusual. In other words, it is common to see a particular noun systematically used with different classifiers in different contexts. For instance, in Burmese (Becker, 1975, cited in Adams, 1986) there are two classifiers used with the noun "river," one referring to a line on a map indicating a river, the other appearing with the Irrawaddy itself. Becker also notes that in some languages, there are several classifiers for humans graded according to some social considerations. A speaker might elevate the person or persons under discussion by the use of a classifier. It is also possible for a speaker to choose a classifier tyically for animals to describe a person. Such an effect can only be achieved when classifiers have meaning.

In sum, I suggest that classifier categories are often

heterogenous, but their associations with nouns, for the most part, are by no means arbitrary. Generally, a noun is classified according to certain characteristic of the referent. And such a characteristic may be one that is easy for people from all cultures to observe, or it may be something that is uniquely observed by people speaking a particular language.

Semantics of Classifier Categories

Studies of the semantics of classifier categories further illustrate the non-arbitrary nature of classifier categories. The cognitive psychologist, Peter Denny is interested in the concepts which classifiers express and the usefulness of these concepts in the daily life of speakers of the languages in question. Denny (1976, p. 122) states:

> the semantic function of noun classifiers is to place objects within a set of classes different from and additional to those given by the nouns. These classes are concerned with objects as they enter into human interaction.

He proposes that categories named by nouns indicate what the objects are in a traditional sense, but the categories defined by noun classifiers tell something about human interactions with the objects so defined. He suggests that there are mainly three kinds of human interactions that are conveyed by noun classifiers. They are physical interaction, functional interaction, and social interaction.

To explain briefly, categories that reflect physical interaction are those that are concerned with configuration and strength and that arrange objects according to the sort of things humans can do to them when they are physically manipulated (e.g., whether the objects are flat, rigid, or flexible). By functional interaction, Denny means to point out that many classifiers group objects according to the functions that the objects are made to perform. For instance, in Burmese, there is a classifier which indicates "transport," and another one which denotes "clothing for the body (but not headgear or footwear)" (Denny, 1976, p. 128). By social interaction, it is meant that some classifiers make distinctions significant in human social interactions with other people or objects. For instance, in Burmese, there are five classifiers that group animate beings, and some objects associated with them, into a five-level social hierarchy (Denny, 1976, p. 129). The first and highest level includes Buddhas and their pagodas, relics, images and words. The second level is for spirits, clergy, and royalty. The third level is designated for people of status. The fourth level contains ordinary people. And the last and lowest level is reserved for defective people, children, animals, ghosts, and corpses.

In sum, categories defined by classifiers may be more closely linked to human functioning, whereas those expressed by nouns may be more concerned with the objects themselves.

Now I will turn to the discussion of semantic bases for classifier categories. Researchers on classifiers find that although the specific criteria by which classifier categories adopt their members vary from language to language, there are a few parameters used as the basis for categories that appear to be universal to all classifier languages. The most represented three parameters of semantic categories are animateness, function, and shape. They are often referred to as primary criteria; in other words, each of them can be the sole basis for defining a category, while secondary criteria (which will be discussed later in this chapter) cannot be the sole basis for defining a category (Adams & Conklin, 1973; Carpenter, 1987).

Animateness

According to Adams and Conklin (1973), numeral classifier systems always make some category distinctions on the basis of animateness. Animateness may distinguish humans from all non-humans, or separate animals and humans from all non-animate objects. Adams and Conklin suggest that this distinction is the most basic categorization in numeral classifier languages when counting objects is involved. It is found even in minimally developed classifier systems, in which there are only two or three classifiers.

In some languages, this animateness distinction can be further subcategorized. Adams and Conklin (1973) point out that humans can be categorized according to social rank or kinship (but not both in one language), with the former being more common. The classification based on social rank may convey secondary information about age, wealth, occupation, nobility, and sacredness. Vietnamese is found to have the most complex system of numeral classification for human beings. In most cases, to classify an individual, all three dimensions of age, sex, and occupation are used at the same time. Carpenter (1987) noted that in Tarascan (a language spoken in Southwestern Mexico), human infants before they speak are not classified as human beings.

How a particular human being is classified is often language-specific, depending very much on cultural values and mythology. The classification on kinship may reflect the generation of the individual with relation to the speaker. For instance, in Lisu (Adams and Conklin, 1973, p. 4) (a dialect of Lolo language, spoken by a Tibeto-Burman people inhabiting the Yunnan-Burma borderlands), when counting individuals, there are classifiers denoting whether the individual in question is a female kin one generation away, or a male kin one generation away. Separate classifiers will indicate all lateral kin, and all kin two generations away. Again, the degree of such kinship classification differs from culture to culture.

Animals are also frequently subcategorized. According to Adams and Conklin (1973), of the classes that deal strictly with animals, the important secondary criteria are status or cultural significance (e.g., in Laotin, one of the two classifiers for animals is reserved for elephant because of its religious importance in this society), size (large or small), habitat (air, land, or water), and function (e.g., some animals are used for transportation or in agriculture). In many classifier languages, animals also occur in other classes defined by shape. For example, in Chinese, both fish and snake (and others) are categorized as "a long-shaped thing."

Function

The second most acknowledged parameter on which numeral classification is based is function. Classifiers of this nature will indicate the functions of the objects they define. For instance, in Chinese the classifier *liàng* defines ground vehicles, including bikes, motorcycles, cars, jeeps, buses, trucks, trains, and tanks. In this case, it does not matter what size or what shape the object is. As long as it is a ground vehicle of some sort, it will be modified by *liàng* when counting of the object is involved.

Adams and Conklin (1973) noted that function can be used as the sole basis for a category, or it may be combined with

the parameter of shape to form classifier categories. One special characteristic of function-based classifiers is that they tend to be language-specific. Adams and Conklin point out, for example, there are a surprisingly large number of classifiers associated with written and oral speech. Written materials may be categorized according to the type of material, e.g., book, newspaper, or magazine. They may also be grouped according to various parts of books, various forms of presentation, e.g., bound versus unbound, or according to various literary forms, e.g., a play versus a poem. Units of speech can be classed as "long" in one language, and "flat" in another, and as a "loop" in still another (Adams & Conklin, 1973, p. 7).

Adams and Conklin also made an interesting observation about the relative frequency of certain function-based classifiers. They noticed that in the classifier languages they studied, there are a surprisingly large number of classifiers related to written and oral speech. There are several classifiers for weapons. But there are surprisingly few classifiers that group tools together by use. One explanation for this is that a lot of tools are categorized by shape. "Shape" will be the focus of next section.

Shape

Among all the parameters used universally to construct

classifier categories, shape is recognized as a very important criterion used to define classifier categories. There are three basic shapes that can be the sole basis for a category. They are long, flat, and round, which are sometimes referred to as being one-dimensional, two-dimensional, and three-dimensional. According to Adams and Conklin (1973), secondary features include rigidity or flexibility, relative size, empty versus full, irregularity versus regularity in shape, part versus whole, horizontal versus vertical, and edgedness, with the latter two applicable to length only. Of all the secondary features, the distinction of flexible and inflexible things is most frequently observed. None of these secondary features can be the sole basis for a classification; they can be used in combination with primary features.

To illustrate this point briefly, in Thai (Gandour, Pretty & Dardarananda, 1984, p.466) there are different classifiers for each of the following long objects: a long, pointed object, a long, smooth, rigid object, a long-handled object, and a long, solid object extended vertically. And in other languages (Pulman, 1978), we may find classifiers for long objects (such as a tree), long and flexible objects (such as a rope), long, round and solid objects (such as a bamboo); we find classifiers for round objects (such as the sun), round and large-size objects (such as a fruit), round and small-size objects (such as a bead), and round and empty

objects (such as a ring); we may also find classifiers for flat objects (such as a mat), flat and round objects (such as a coin), and flat, long, and thin objects (such as a mattress).

All researchers on noun classifiers acknowledge the importance of shape. However, there are two different views interpreting in what way shape is important. Greenberg (see Carpenter, 1987) holds one view, which suggests that shape provides the broadest possibilities for generalization because it is the only thing that otherwise heterogeneous physical objects have in common. Carpenter states that Greenberg's approach attributes the importance of shape in linguistic categorization to the nature of the things being categorized rather than to the human beings who are doing the categorizing. To Greenberg, shape is an important property of physical objects, rather than human perception. Similarly, Friedrich (cited in Carpenter, 1987) suggests shape should be viewed as a basic grammatical category having a linguistic status that is similar to person, number, voice, case, tense and aspect. He is against the idea of considering shape as directly dependent on human perception. Instead, he argues, shape should be considered a semantic feature or component in its own right, and independent of cognitive status.

On the other hand, Lakoff (1987, p. 110) points out that no matter what their precise cognitive status is, rules of

language are part of our cognitive apparatus, and "whether one wants to dignify them with the term 'conceptual' or not, linguistic categories are categories within our cognitive system and a study of all categories within our cognitive system will have to include them." Adams and Conklin (1973), having analyzed 37 Asian classifier languages, concluded that "One of the most fascinating facts of numeral classification is its dependence on the visual feature of form" (p. 8) and they further emphasized the importance of shape by stating "It is <u>form</u> and not such visual features as color which is salient" (footnote). Pulman (1978) carried out a similar survey for the native languages of the North American continent, focusing on the dimension of shape. In the concluding statement, Pulman is also clearly in favor of a psychological explanation for the universal features of shape in classifying languages.

Erbaugh (1984) proposes that classification by shape rather than by function is reinforced by several factors. One of them is informativeness. Erbaugh suggests that classifying objects by shape is reliably informative rather than arbitrary. She noted that adults commonly describe unfamiliar objects by shape rather than function. She also notes that this phenomenon coincides with American Sign Language, in which new objects are also classified by shape. Another factor is reinforcement from natural forms. Erbaugh states that the natural world is full of objects with shapes

that classifiers commonly describe, such as flat objects, objects of vertical forms, and round or spherical-shape objects. Erbaugh (1984, p. 42) claims "Classifiers develop out of a universal, biologically-structured experience with the world rather than from purely linguistic subroutines which are peculiar to a minority of world languages."

Allan (1977) points out:

> That language should classify entities along similar lines is not surprising if one takes the view that human perceptions are generally similar, and that they stimulate a cognitive classification of the world which is reflected by linguistic categories and classes.

Children and Classifiers

The argument that classifier categories do reflect fundamental cognitive processes can be further supported by research done with children. Empirical evidence concerning young children's use of noun classifiers and children's early word meanings strongly suggests that cognitive processes are involved in the use of noun classifiers.

Children's Use of Classifiers

Both literature on children's acquisition of classifiers and my own observation of young Chinese children's use of classifiers indicate very clearly that this acquisition process is a long one, which goes well beyond the point

where children are already fluent in their native language. Carpenter (1987) notes that the acquisition of the numeral classifier system of Thai is also a slow process. Her research results (p. 111) show that, on experimental classifier items, two-year-olds produced only 10% correct responses, and although performance does improve steadily with age, the correct responses by nine-year-olds were no better than around 80%.

Fang (1985) reports his study on the use of classifiers by four to six year-old Chinese children. Among other things, he found a significant age effect. Four-year-olds show a mastery of only four classifiers (25% of total pre-selected test items), while six-year-olds demonstrate a mastery of nine classifiers (75% of total test items). In the second part of his study, Fang tests the hypothesis that the use of many classifiers require the cognitive ability of generalization. The test items were sets of novel-shaped objects made of modeling clay. Some foreign-sounding names were given by the experimenter to the objects. The children were expected to talk about the objects as instructed with appropriate classifiers. And when a classifier was produced by a child, he or she was asked to explain why that particular classifier was used. The results showed that most of the four-year-olds were unable to use any of the anticipated classifiers, while the six-year-olds' correct use of the four anticipated classifiers ranged from 83.3% to

100%. Many of the six-year-olds, when asked to explain their choice of a particular classifier, were able to give answers, such as "because it's thin, and flat, ... like a sheet of paper," or "because it's long, and thin, and looks like a snake."

Fang's study suggests that there is a developmental sequence of classifiers acquisition; some classifiers tend to be learned earlier than others. According to Fang's analysis, those classifiers with a high frequency of occurrence tend to be learned earlier than those with a lower frequency. Those shape classifiers tend to take longer time to learn. This may imply that different classifiers require different levels of cognitive ability for their acquisition.

Young children perhaps learn the first few high frequency classifiers by imitating adults. There may be some arbitrary associations at the initial stage. At the age of four, they demonstrate a poor ability to use shape classifiers for novel objects. Six-year-olds perform significantly better in their use of shape classifiers. Clearly, the ability is linked to their ability to generalize. As children get older, they are able to generalize the meaning of each classifier from concrete objects they are familiar with, and to apply the classifier to unfamiliar objects.

Children's Overextensions and Classifiers

Clark (1977) states that children use words to classify objects in their surroundings as they begin to map language onto what they already know about the world. But what often happens in the process of child language acquisition is that children come up with categories that are different from the adult's. Children tend to include too many items in their noun categories. This is the phenomenon that is referred to as overextension. For instance, English-speaking children may call all four-legged animals "doggies."

Clark (1977) suggests that children's overextensions are perceptually based. And the most frequent basis for overextensions appears to be shape. According to this theory, children may call a sheep a dog, because a sheep looks like a dog in that they both have four legs.

Clark (1977) also finds an interesting connection between children's overextensions and classifier categories. She claims that the shapes selected by classifiers often coincide with the very shapes children use in overextensions. Clark and Clark (1977) illustrate with examples that two of the three basic shapes used in classifier systems, round and long, are frequently used by children in overextensions ("flat" shape does not seem occur as often in overextensions, but it may be because "flat" is really only a special case of "long"). On the other hand,

color alone never seems to be used as a basis for overextension, and that again coincides with what Adams and Conklin (1973) found out about classifiers -- no classifiers in the languages they surveyed ever used color as a basis for categorization.

Erbaugh (1984) supports this theory. She reports that in her study of Chinese children's use of classifiers, she found many instances of classifiers getting overextended. Among them, there was only a single example of overextension by function, and all other instances were based on shape.

One question might be raised, that is, if young children tend to group objects according to perceptual features, why do four-year-olds perform so poorly in tasks (such as second part of Fang's study) where they are expected to apply shape classifiers to novel objects? I think there are two reasons. First, although numeral classifiers are necessary linguistic elements in a language like Chinese, they are not the most essential elements. Children can make themselves understood without a good command of classifiers. In other words, children can communicate fairly well with adults if they have the right content words, such as nouns and verbs. I suggest, because of this reason, the whole classifier system (including shape classifiers, of course) is learned relatively late in the process of language acquisition. Second, the classifier system is a complex one. There are no clear-cut rules as to how each of the classifiers should

be used. Even though shape classifiers are supposed to categorize objects according to the general perceptual features of objects, because of the heterogeneity nature of many classifier categories (which was discussed earlier in this chapter), it may be very difficult for young children to learn the full usage of a particular shape classifier.

Summary

Noun classifiers clearly define heterogenous categories. However, these categories are not arbitrary to the speaker of a classifier language. As exemplified by native speakers' agreement on the choice of classifiers for new objects, the semantic universals in classifier categories, and children's overextensions, the categories identified by noun classifiers must be a reflection of certain basic cognitive capacities.

CHAPTER 4 CHINESE NUMERAL CLASSIFIERS I

In this chapter, I focus on an analysis of Chinese numeral classifiers. I will first give a general description of Chinese numeral classifiers. Then I will propose a taxonomy of Chinese classifiers. But before the actual analysis, I feel it necessary to provide some general information about the Chinese language so that the reader will have a better idea of which part of the Chinese language is being studied.

The word "Chinese," when referred to the language, is a vague term, because, in theory, all the dialects spoken by Chinese people as their mother tongue can be called "Chinese." There are many different dialects currently spoken in China, many of which are so different from one another that they are mutually unintelligible (Li & Thompson, 1981). But there is only one form of written Chinese for all the different spoken dialects. That is, people who speak mutually unintelligible dialects can easily understand each other in writing. The different dialects are usually classified into seven major groups[1]. Within each group, there are mutually intelligible dialects, mostly marked by accents and variations in object labeling. The

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[1]. The seven major dialect groups in Chinese are: Mandarin, Wu, Xiang, Gan, Hakka, Min, and Yue (Li & Thompson, 1981, p. 3).

largest of the seven groups is Mandarin[2]. It is spoken by about 70% of the entire Chinese population (Ramsey, 1987; Li & Thompson, 1981; Kaplan, Sobin & deKeijer, 1985), mainly in North China. Mandarin is based on the Peking dialect (DeFrancis, 1976), and is the official language of China.

The term "Chinese numeral classifiers" (or "Chinese noun classifiers") used throughout this thesis refer to classifiers in Mandarin Chinese. The Romanization system adopted here to represent standard pronunciation of Mandarin is generally known as "Pinyin," which has been the official spelling system of Mainland China since 1958 (Ramsey, 1987).

Chinese is written in the form of logographic characters. One character represents one morpheme and one syllable (Taylor, 1983). Chinese words may consist of one or more bound or unbound morphemes. Each syllable is further defined by one of five tones: level, rising, rising and falling, falling and "light.[3]" There are tens of thousands of characters in the language, but there are only

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[2] The word "Mandarin" is an established linguistic term in the West (Ramsey,1987). It is an unfamiliar label to most speakers of Mandarin in China. Mandarin is known as "Putonghua" (which means "the common language") in mainland China, and as "Guoyu" (which literally means "national language") in Taiwan. The other six dialect groups are: Wu, Xiang, Gan, Hakka, Min, and Yue (Li & Thompson, 1981).

[3] The classic example used to illustrate the Chinese tones is the syllable "ma". When "ma" is pronounced in first tone (a level tone), it means "mother". When it is pronounced in second tone (a rising tone), it means "numb" or "hemp". In third tone (a falling-rising tone), "ma" means "horse", and fourth tone (a falling tone) means "to scold". "Light" is an unstressed syllable.

slightly more than 400 syllables (without the four tones) with which to pronounce them. As a result, there are a large number of words that have the same spelling, but different tones, as well as words that have the same spelling and the same tone. In some cases, a single syllable, or the same spelling, can represent more than 100 different written characters (Kaplan, et al., 1985, p.643). Therefore, when Chinese words, including classifiers, are represented in the form of Pinyin romanization in this thesis, homonyms can not be differentiated. That is, the distinctions between homonyms can only be shown in the form of characters.

Description of Chinese Numeral Classifiers

As indicated earlier, Chinese is a numeral classifier language, but classifiers do not appear with all nouns all the time. The use of noun classifiers is obligatory only in phrases of quantification involving the use of numerals, such as "two birds," "five chairs," and "ten students," and in phrases involving the use of demonstratives, such as "this bird" and "those two chairs."

Chinese numeral classifiers have been called "measures" (Zhao, 1968; Ramsey, 1987) (Zhao lists "classifiers" as a subgroup of "measures"), "measure words" (Chu, 1983) and "measure markers" (Tiee, 1986) or "classifiers" (Norman,

1988), presently the term of choice. Although all the different labels refer to roughly the same group of words in the language, they seem to suggest a shade of difference in emphasis. People who use "measures," consciously or not, stress the point that these words provide units of measurement in counting objects, while people who prefer "classifiers" indicate that these words categorize objects in the process of counting. I believe, classifiers perform both of these functions, but as it is the "classifier" function that I explore in this thesis, the term "classifier" is used here.

Total Number of Chinese Numeral Classifiers

Because of the nature of numeral classifiers (and noun classifiers in general), it is difficult to specify the exact number of classifiers currently used in the Chinese language. As old ones die out, new ones are created. Many nouns (which are not generally used as classifiers) can readily be used as classifiers in the right context. For instance, there was a recent newspaper report in the official Chinese government newspaper ("Dunhuang[4] qingxi."

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[4] Dunhuang, a 2,000-year-old town, is located in the northwest desert corridor of Gansu Province, China. It was once an important caravan stop on the Silk Road linking Central Asia with China. It is the site of one of the most priceless troves of Buddhist art the world has ever known -- the Mogao Caves. Most of the cave walls are covered with vivid murals (Kaplan, et al., 1985).

1990), in which the word *ku* (meaning "cave") is used as a classifier for murals. Its meaning (which is "a 'caveful' of") is very clear in the context, although this is the first time I have ever seen it used as a classifier. (*Ku* is not found in Chen et al., 1988.)

Although Chen et al. (1988) have listed about 800 Chinese classifiers, they have, in fact, included all the words that can fit into that syntactic position which is normally taken by a classifier. Moreover, a large number of the classifiers listed can only be found in classical Chinese and are no longer used in modern Chinese. To my knowledge, Y.R. Zhao (1968) is the only scholar who has offered a list of classifiers used in modern Chinese. His list has 393 "measures" in total, divided into nine groups[5]. But only the first two groups (with a total number of 71) are actually labeled as classifiers. Zhao regards the list to be "fairly complete" (p.589). This list is also often quoted by other researchers as a fairly complete list of Chinese classifiers.

Other researchers are only able to provide a rough estimate of the number of classifiers in Chinese. For

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[5] There are 51 Individual Classifiers, 21 Classifiers Associated with Verb-Object Constructions, 46 Group Measures, 39 Partitive Measures, 36 Container Measures, 14 Temporary Measures, 46 Standard Measures, 100 Quasi-Measures, and 40 Measures for Verbs of Action (Zhao, 1968, pp.584-620).

instance, Li and Thompson (1981, p.105) believe that there are several dozen, Fang (1985, p.389) suggests that there are over a hundred, and Erbaugh (1984, p.41) claims that modern Chinese dictionaries list about 150 classifiers, but two years later, Erbaugh (1986, p.403) states that "a common dictionary lists one hundred and twenty in current use." It is not indicated what type of classifiers are included in that count.

Different Types of Classifiers

Because researchers define classifiers differently, there is no agreement in the literature regarding how many types of classifiers there are in Chinese. To my judgment, Chinese numeral classifiers can be subcategorized into six types: (1) individual classifiers, (2) group classifiers, (3) container classifiers, (4) standard measures, (5) temporary classifiers, and (6) verb classifiers.

Individual classifiers are those that are used to classify individual nouns. They are either used very specifically for a small number of nouns (e.g., *zhǎn* 盏 is used only for lamps, or electric lights), or they are used for a large number of nouns that share certain features in common (e.g., *tiáo* 条 is used for long-shape objects that can be animals, and can be inanimate objects). In general, individual classifiers categorize countable nouns.

Group classifiers refer to those that classify objects

in groups. That is, every group classifier signifies a group, which can be as small as a group of two (e.g., *duì* 对 means "a pair," so *yī duì qínglǚ* means "a pair of lovers"), or as big as a group of hundreds or thousands (e.g., *qún* 群 means "group," "crowd," or "flock," so *yī qún miányáng* means "a flock of sheep"). Generally, group classifiers do not categorize objects according to inherent characteristics of the objects, but, instead, they can be used for anything that can be counted in the kind of groups that the group classifiers specify. For instance, the same classifier used in talking about "a flock of sheep" can be used in *yī qún fēijī*, which means "a group of airplanes."

Container classifiers are those that denote containers of all kinds. In Chinese, it is common to measure the quantity of certain objects by the unit of a specific container. It is especially useful when people want to count the quantity of objects that are labeled by uncountable nouns, such as water, beer, and rice. For example, "bēi" means "glass," and "yī bēi píjǐu" means "a glass of beer." As long as a particular object can be put into a specific container, that object can be measured, or classified, by using that container classifier. For instance, *chēpí* (车皮 "vehicle skin") means "railroad (cargo) car," and it can be used as a container classifier to quantify the things that it carries in it. For instance, *yī chēpí xīguā* is "one carload of watermelons" and *liǎng*

chēpí jiājù is "two carloads of furniture."

Standard measures refer to those units of standard measurement used for measuring things, such as inch, meter, kilogram, and liter. For example, *gōngjīn* (公斤) means "kilogram," and *sān gōngjīn yú* is "three kilograms of fish." Apart from the internationally used units of measurement, there are also some units that are used in Chinese only. For example, *jīn* (斤) is a unit of weight of 500 grams (it is used in Chinese as "pound" is used in American English). *Yī jīn báitáng* means "one pound of white sugar."

A temporary classifier is a word that functions as a temporary unit for counting or measuring things. For example, the word *liǎn* (meaning "face") can be used as a classifier to talk about what is there temporarily on someone's face, such as sweat, water, blood, dust, or mud. For example, *yī liǎn tǔ* means "a faceful of dust." Similarly, words for foot, hand, arm, leg, body, floor, desk, etc, may all be used as temporary classifiers. For example, *liǎng zuōzi wénjiàn* (in which *liǎng* = two, *zuōzi* = table or desk, and *wénjiàn* = document) means "two deskful of documents."

A verb classifier is a classifier used to count the action performed by the verb. For instance, the word *quán* (meaning "fist") is commonly used as a classifier to count the action of hitting someone with the fist. For example,

wǒ	*dǎ*	*le*	*tā*	*liǎng*	*quán*
I	hit/punch	aspect marker	him/her	two	fist

"I hit/punched him/her twice with the fist."

In a similar way, to express the idea of "kicking someone once or twice, three times, etc." in Chinese, the word *jiǎo* (足角 meaning "foot") is used as a verb classifier.

Some may disagree this way of subcategorizing Chinese numeral classifiers because the definition of classifiers in the literature is still somewhat controversial. Some people, such as Allan (1977), treat all those words which fit into the syntactic position generally taken by classifiers simply as classifiers. Other people, such as Downing (1984) and Pe (cited in Downing, 1984), however, argue very strongly for a distinction between "classifiers" and "quantifiers." Pe suggests that a classifier is a word that "indicates a particular quality, or the absence thereof, in the noun classified." Therefore, according to Pe, many of the items (such as container classifiers and group classifiers) which I have given the label of "classifiers" should not be considered to be classifiers, but should be called "quantifiers" instead. Chinese linguists and grammarians define classifiers in a similar way as Allan (1977) does. When analyzing Thai numeral classifiers, Carpenter (1987, p. 35) points out that in Thai (and I believe it is also true in Chinese), "the noun is understood to be the name of a category, rather than an

individual, and a classifier is obligatory to indicate the units by which the collection is to be individuated." For example, in English the word "shoe," without the plural morpheme -s, carries the idea of "a single/certain shoe." But in Chinese, the word *xié*, which means "shoe," is more of a category name for all the shoes in the world rather than a label for any particular shoe. That is, a countable noun, such as *xié*, in Chinese is treated very much like an uncountable noun, such as "paper," in English, when counting is involved. If we want to quantify "paper" in English, we need to employ a unit of quantity, such as "sheet," "piece," "pad," "stack," etc.; we cannot simply say *"a paper" to mean a sheet of paper. Similarly, we cannot say **yī xié* (*yī* = one) in Chinese. We will have to say *yī zhī xié* to mean "a single shoe," or *yī shuāng xié* to mean "a pair of shoes." And we need to do the same for almost all the nouns in Chinese. Chinese grammarians tend to put diverse classifiers such as those mentioned above into one general category of classifiers suggesting that they all perform the same grammatical function.

I have recently compiled a list of Chinese classifiers for this project, with a total of 136 classifiers. Because I am only interested in the use of individual noun classifiers in this analysis, I tried to exclude from the list all group classifiers, container classifiers, standard measures, temporary classifiers, and verb classifiers. The

sources of my list of classifiers include Chinese books, newspapers (mainly People's Daily, Overseas Edition), dictionaries (e.g., Chen, et al., 1988; Xiàndài Hànyǔ Cídiǎn, 1984; Hàn Yīng Cídiǎn, 1980), native Chinese speakers'[6] casual conversations, and my own knowledge about the use of Chinese classifiers. During the whole classifier collecting period, which was about ten months, I tried to add to the collection every classifier I observed that would fit the criteria for individual classifiers, those that categorize countable nouns.

Questionnaire.

The 136 classifiers were collected according to my personal judgment. In order to confirm my claim that these classifiers are indeed currently used in Mandarin Chinese, I compiled a questionnaire (see Appendix A), which contains 136 classifiers accompanied by some examples of nouns that each of the classifiers may classify. Six native Chinese speakers[7] were paid to be my subjects to complete the questionnaire by answering the same question to each of the

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[6] Mainly Chinese graduate students (from mainland China) studying at Lehigh University and their spouses.

[7] Because people from different parts of China do vary in their use of classifiers, I restricted my subjects to people from Beijing only. Two subjects were male, and four were female. Three of them were graduate students at Lehigh University, and the other three (spouses of graduate students at Lehigh) had college degrees.

listed classifiers "Is the classifier familiar to native speakers of modern Mandarin Chinese?"

The result was that only the classifiers *guàng* (桄) (used for sewing thread, or knitting wool), and *dāo* (刀) (used for paper, especially a loose pad of toilet tissues cut in a square shape) were rated as "unfamiliar" by two subjects. The classifier *wěi* (尾) (for counting fish) was indicated as "unfamiliar" by one of the same two subjects. It is interesting to note that these two subjects were the youngest (both in their mid twenties) of the six subjects. Perhaps it is because the shape of sewing thread (wound in a big loop, and then tied in a knot when sold in stores) that *guàng* classifies, and the shape of toilet tissues that *dāo* classifies, are disappearing in Beijing area. The two youngest subjects are possibly too young to remember them. There were also a few other cases where all the subjects judged that a particular classifier is commonly used one, but indicated that one of the listed examples is a bad one. For instance, all the six subjects accepted *suǒ* (所) as a commonly used classifier, but three of them said that it is not used in counting cities.

One hundred and thirty-three classified were accepted by all the six subjects as "familiar" classifiers. However, after further examining the whole list, I decided to remove another seven classifiers from the list, because they (which include *dá* (打) meaning "a dozen," *dá* (沓) meaning "a

pad," *chuàn* (串) meaning "a string" or "a bunch," and *pǐ* (疋) meaning "a batch") should have been treated as group classifiers in the first place. I use the remaining 126 classifiers as the basis for my analysis of Chinese numeral classifiers.

I must point out that although the total number of classifiers in Chinese is well over 100, in people's daily conversations perhaps only two or three dozen are used. Erbaugh (1986) reports that there were 22 classifiers that emerged to be the core classifiers in her particular study. I believe, in general, there should be a positive correlation between the number of specific classifiers employed in speech, the speaker's level of education, and the formal or informal nature of the speech. The more formal the speech is, the more classifiers are likely to be used. The number of classifiers used can also be affected by the range of conversation topics. Many classifiers are restricted to one particular noun, and if that noun is never part of the conversation, the classifier going with it will be very unlikely to be evoked.

Syntactic Structure of Chinese Classifiers

The syntax of classifiers is not the main interest of this thesis, but a brief description may add to the reader's general understanding of classifiers.

In the literature on numeral classifier languages, the structure in which the demonstrative and/or numeral, the classifier, and the noun appear together is often referred to as the "numeral classifier construction" (Carpenter, 1987; Adams & Conklin, 1973). Researchers, such as Allan (1977), Adams and Conklin (1973), and Greenberg (1972), point out that the constituents of the numeral construction can only occur in one of these four orders across all classifier languages:

Numeral-Classifier-Noun
Noun-Numeral-Classifier
Noun-Classifier-Numeral
Classifier-Numeral-Noun

There is some syntactic universal about the orders of these elements. That is, the numeral and the classifier are never separated; they always occur contiguously.

The order used in Chinese is the first of the four orders listed above. For example, the idea of "those three horses" will be expressed in Chinese like this:

Demonstrative + Numeral + Classifier + Noun

nà	*sān*	*pǐ*	*mǎ*
those	three	classifier (for horses)	horse

"those three horses"

Based on the phenomenon that the numeral and the classifier always occur adjacent to each other, we may argue that the numeral and the classifier are more closely tied together as a syntactic unit than the classifier and the noun. This argument can be supported by the fact that

numeral classifiers can often be used anaphorically, unaccompanied by nouns (Carpenter, 1987; Downing, 1986; Downing 1984). In other words, they can be used as "noun substitutes" (Downing, 1986, p. 345). Here is an example in Chinese:

wǒ yǒu liǎng běn zìdiǎn, yī běn dà, yī běn xiǎo

I have two Cl.[8] dictionary, one Cl. big, one Cl. small

"I have two dictionaries, one big, one small."

This anaphoric use of classifiers enables the speaker to avoid using the full noun repeatedly in the same sentence, or in adjacent sentences.

Taxonomy of Chinese Numeral Classifiers

As pointed out earlier, the purpose of this thesis is to understand to nature of Chinese classifier categories, that is, to find out what aspects of objects are picked out by classifiers as the basis of classifier categorization. I believe a taxonomic analysis of Chinese numeral classifiers will be helpful in this endeavor. But such an analysis is lacking in the literature. In this section, I develop a taxonomy of Chinese numeral classifiers as a starting point for the analysis.

In this thesis, I will not attempt to settle the

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[8] "Cl." stands for "classifier".

controversy as to what are true classifiers, and what not. My analysis focuses instead on individual classifiers as they reveal best the cognitive processes involved in the use of classifiers. Figure 1 shows an general taxonomic picture of Chinese classifiers with special attention given to individual classifiers. I have made a separate list (see Appendix B) which contains all 126 classifiers and as many examples as possible of nouns that each of the classifiers is used for.

How to Understand the Tree Diagram

In the following section, I discuss the difficulty of assigning a particular classifier to a branch of this tree diagram.

Rationale of the Tree-Classification

First, the main underlying principle for this tree-classification is that a classifier is put into a certain subcategory according to the nature of the nouns that it classifies. For instance, if all the nouns that appear in a particular classifier category are plants, then the classifier for that category will be put in the category of "Natural Objects" under "Inanimate Classifiers." In cases where one classifier category contains nouns of different natures (e.g., animals vs. artifacts -- human-made objects),

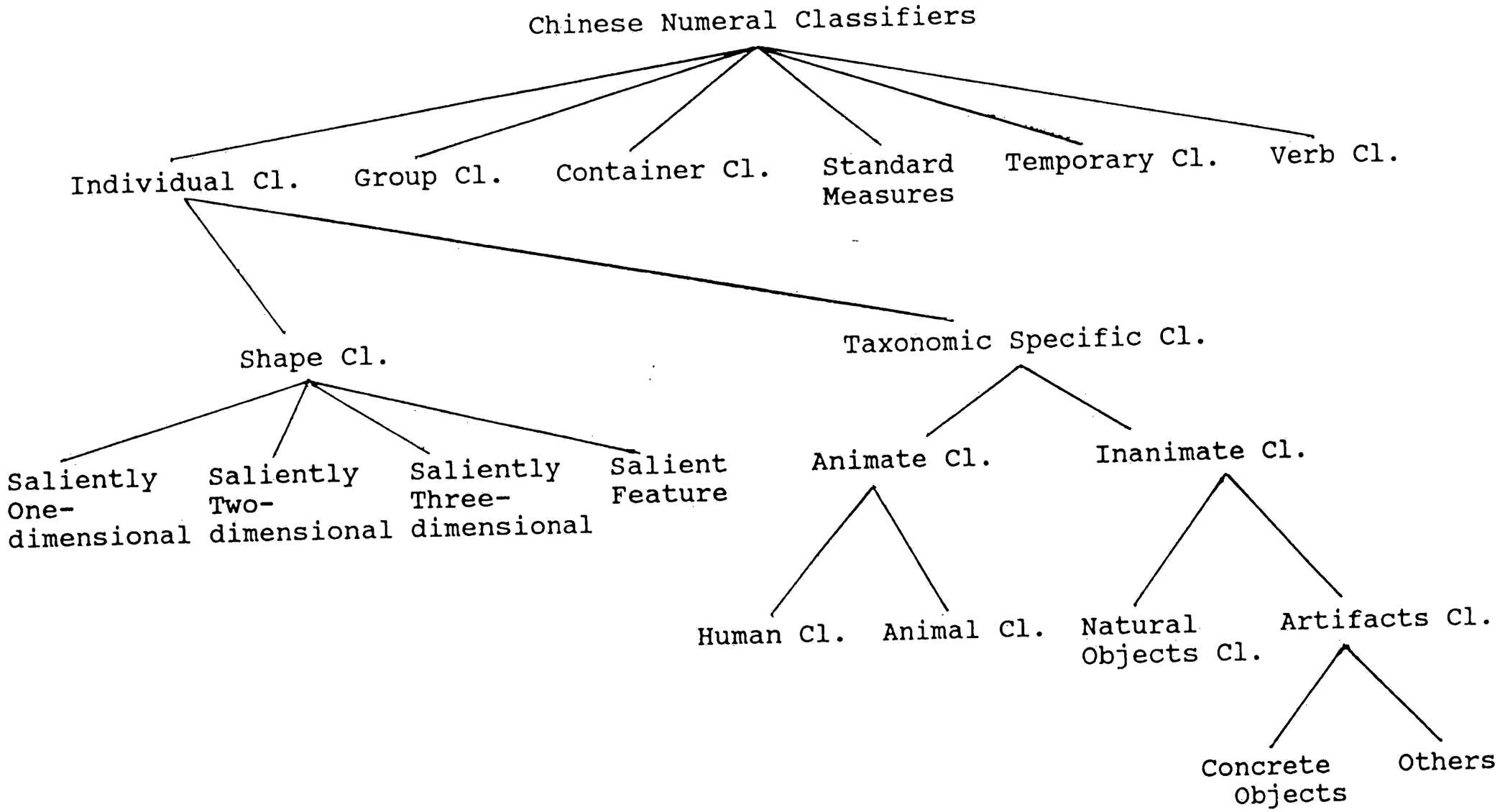

Figure 1 A Taxonomic Picture of Chinese Numeral Classifiers

the classifier will be categorized according to the nature of the dominant members of the category. For example, *zhī* (只) is used for both animals and artifacts, but the dominant members of the category are animals, so *zhī* is put in the "Animal Classifiers" under "Animate Classifiers." The observation that some classifiers classify a relatively homogeneous set of entities, while others are used with a more diverse set, will be discussed in more detail in Chapter 5.

Second, some classifiers that seem to classify objects of a similar nature are put into different subcategories. For instance, most classifiers that classify written materials are put into the "Concrete Objects" subcategory (item 1.2.2.3.1, Appendix B), because they normally appear in a form of a bound book of some sort. However, the classifier *zé* (item 1.2.2.3.2.18) which can also be used to classify a piece of writing, such as a fable, is put into the "Others" subcategory (item 1.2.2.3.2). The writings that *zé* classifies are often short, such as an ad, or a piece of news, which are more often heard than read. The items that *zé* categorizes are less concrete than a novel, for example. That is why *zé* is put in the category of "Others," under "Artifacts Classifiers," separated from "Concrete Objects."

Third, all shape classifiers convey a clear message of what shape they indicate. In other words, the literal

meanings of the characters (when they are used as nouns, for example) and the meanings they indicate as classifiers are almost identical (this point will be further illustrated in Chapter 5). But the connections between taxonomic-specific classifiers and the nouns they classify are not always so obvious. Some seem to have an obvious connection. For example, *mù* (item 1.2.2.3.2.9, Appendix B), meaning "curtain" when used as a noun, is used in counting the number of acts in a play, probably because there is a direct relationship between the number of times the curtain is drawn and the number of acts there are in a play. But there are also other classifiers that are difficult to explain. For instance, *zhuāng* (item 1.2.2.3.2.22) literally means "stake, or pile" as a noun, but the same word is used as a classifier to categorize "a matter, case, or a business deal."

Fourth, some people may question the legitimacy of a few classifiers being considered to be individual classifiers. For instance, *zhèn* (item 1.2.2.3.2.21) means "a (short) duration of time," and most of the nouns it classifies are in plural forms. So *zhèn* appears to be more a group classifier than an individual classifier. But, if we examine those nouns more closely, we will find that those phenomena (such as rain, wind, laughter, applause, etc.) usually last a short duration of time whenever they take place. *Zhèn* in Chinese simply denotes "one occurrence of,"

when the counting of such things as rains and laughters is involved. That is why I have treated it as an individual classifier rather than a group one.

Finally, if a classifier is generally used a temporary classifier, but can also be used as an individual classifier, I have also included such a classifier in the list (Appendix B). For instance, *shēn* (身) (item 1.2.2.3.1.30), which means "body," is often used as a temporary classifier to talk about what is temporarily on the body, such as water or dust. But it is also used to classify clothes which are necessarily on the body. For example, if we want to say "I am going to buy a new suit tomorrow," we will use *shēn* in Chinese as a classifier for a suit, which is clearly nowhere close to the body at that moment.

Classifiers within each specific category in Appendix B are listed alphabetically according to Pinyin (romanization system).

A Few Characteristics

When we examine the diagram (Figure 1) and the list of classifiers (Appendix B) more closely, we can easily discover a few interesting facts about Chinese classifier categories.

First, there are nouns that fall into a category other than the one specially labeled for them. For instance, not

all animals are found in the animal classifier categories. Some animals get into a shape classifier category. Fish and snake, for example, get classified by *tiáo* (条), indicating a long-shape thing.

Second, there are nouns that appear in more than one classifier category, sometimes with a change in meaning and sometimes without. This is, in fact, one of the things that make classifiers different from noun classes (as was already illustrated in Chapter 2).

Third, many categories embody heterogenous memberships. There is no readily observable common basis for the category memberships, at least not to an casual outside observer. For instance, the classifier *kuài* (块), generally associated with a lump-shape, three-dimensional object, may be used to classify stone, soap, cake, candy, and meat, but it is also used in counting watches, plots of land, lawns, cloth, and handkerchiefs.

It is the aim of this project to explore the underlying principles behind the classifier categories.

CHAPTER 5 CHINESE NUMERAL CLASSIFIERS II

In Chapter 4, I proposed a taxonomic picture of Chinese numeral classifiers largely based on what nouns each classifier categorizes. In this chapter, I will analyze the same set of classifiers from a different perspective. I want to find out why a given Chinese character was chosen to be a label for a particular classifier category, and what information this label carries. In other words, I will examine the connection between the classifier category label and the nouns contained in the category.

What Dictionary Definitions Reveal

In the process of collecting and analyzing the Chinese classifiers, I have noticed that different classifiers tend to reveal to me different kinds of information. Some classifiers readily evoke the image of a certain object or a particular action; some do not reveal anything at all. This observation led me to investigate the dictionary definitions of these classifiers in a hope to find out more about what these 126 characters (used as classifiers) mean to a speaker of Chinese. I mainly consulted the Modern Chinese Dictionary (Xiàndài Hànyǔ Cídiǎn, 1984).

From this search, I found that of the 126 characters only 19 of them, about 15% of the total, are used solely as

classifiers; they do not have any other meanings or grammatical usage. The remaining 107 words are used chiefly either as a noun or as a verb (or as an adjective in only one case), with their usage as a classifier listed as a minor usage of the word. In most cases, I can find a direct or a less direct connection between the meaning of a given word when it is used as a noun or a verb and the nouns it classifies when it is used as a classifier (this is explained in detail later in this chapter). I, therefore, propose that, although there are some exceptions, most classifiers are related to noun or verb meanings. The following table shows the different types of classifier formations, based on dictionary definitions:

Type	Number	Percentage
Cl. only	19	15.08%
Noun-based Cl.	93	73.81%
Verb-based Cl.	13	10.32%
Adjective based Cl.	1	0.79%
Total	126	100%

How Meaningful Classifiers Are

One important point to note is that because of the nature of this study, I am not trying to trace the historical roots of each classifier. Instead, in this analysis I am trying to assess how meaningful each

classifier is to a current speaker of Chinese by looking at to what extent the classifier meaning is related to the meaning of an existing noun, verb, or adjective. That is why I have mainly consulted the Modern Chinese Dictionary (Xiàndài Hànyǔ Cídiǎn, 1984).

In this section, I look more closely at the connection between the meaning of each of the 126 classifiers when used as a noun and the nature of the nouns that use the same classifier. I have found that there are connections of varying degrees: direct, indirect, or no obvious connection. Figure 2 illustrates the possible connections.

As illustrated in Figure 2, I have subcategorized individual Chinese numeral classifiers into four groups: (1) classifier only, (2) noun-based classifiers, (3) verb-based classifiers, and (4) adjective-based classifier. The specific assignment of each of the 126 classifiers to these groups is listed in Appendix C.

Rationale of the Analysis

First, the initial assignment of a classifier to one of the four groups (see Appendix C for details) is based on dictionary definitions. For instance, if the definition reveals that a given word is primarily used as a noun, or a verb, with the classifier meaning listed as a minor usage, then the classifier concerned is placed in the "noun-based

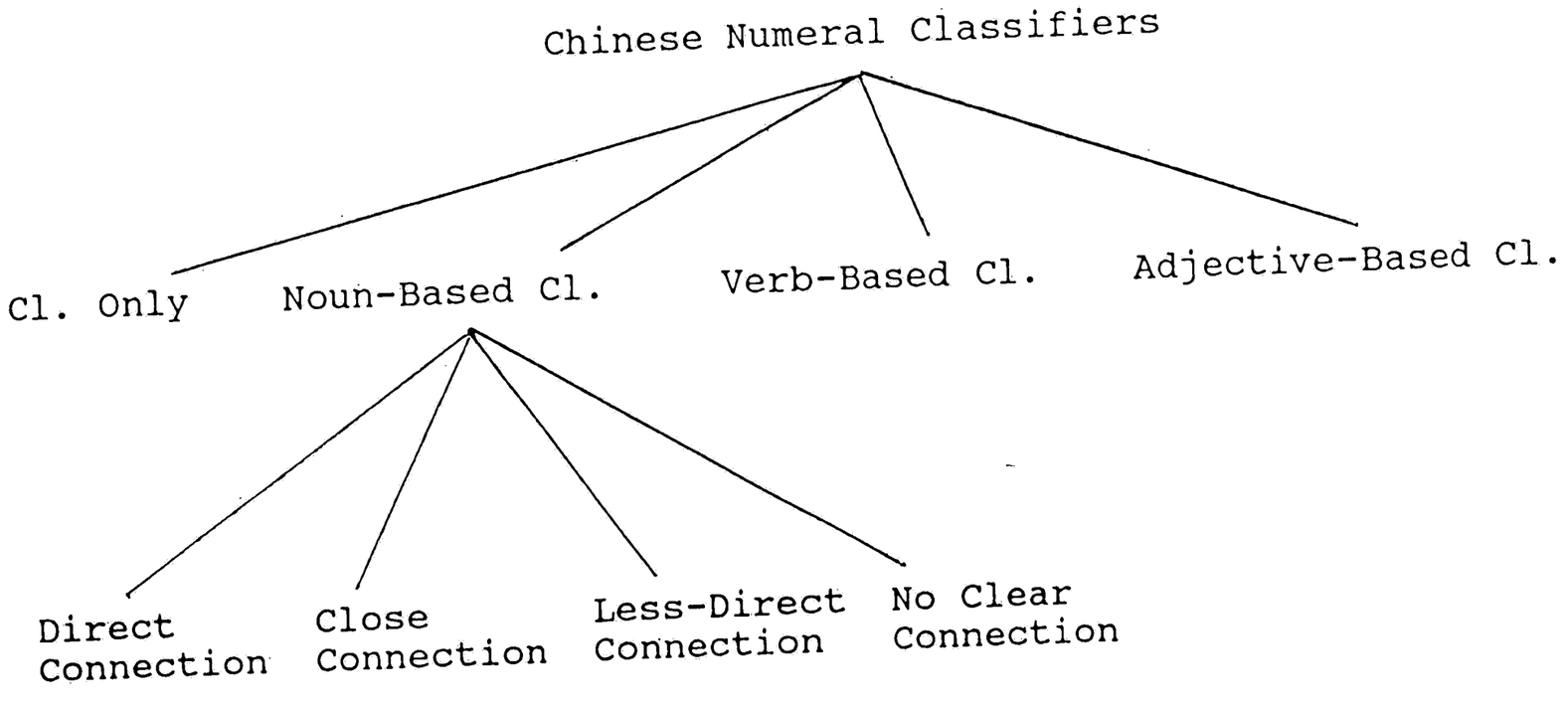

Figure 2 Relation Between Classifier Meanings and Noun, Verb, and Adjective Meanings

classifiers" or the "verb-based classifiers" categories accordingly.

Second, if a given character is used both as a noun and a verb (as well as a classifier), the meaning that is closer to the classifier usage is chosen to be the basis for its position in the classification. If the noun form of a character has several meanings listed, the one closest to the classifier usage is chosen for the analysis.

Third, in order for a word to qualify to be a "classifier only," it must have a separate entry specifying that it is only used as a classifier. However, some characters have more than one entry in the modern Chinese dictionary, which suggests that the different entries are treated as separate words, or homographs. If one of these entries indicates that the word concerned is only used as a classifier, then it can still be put into the "classifier only" category.

Fourth, within the category of "noun-based classifiers," there are four subcategories indicating different degrees of connections between the meaning of the character as a noun and the nature of the nouns it categorizes when it is used as a classifier. The decisions as to where a particular classifier should go are made based on my judgment of the degree of connection.

Fifth, within each specific category (see Appendix C), all the classifiers are listed alphabetically based on

Pinyin.

Illustrations of the Analysis

Now I will illustrate what I mean by "classifier only," "noun-based classifiers," "verb-based classifiers," and "adjective-based classifier."

Classifier Only

As explained above, a "classifier only" is one that has no other grammatical usage, but is used only as a classifier. For example, *liàng* (车两) is used solely as a classifier for all ground vehicles, and *sōu* (舟叟) is only used a classifier for ships. *Shǒu* (首) is a classifier used for poems and songs. Although it has another entry in the dictionary, which means "head," the two meanings (the classifier meaning and the noun meaning) are totally unrelated. I am unable to find in the secondary literature any information about where these classifiers might have got their meanings that they have. It is beyond the limits of this study to trace the semantic function and etymology of each classifier through 3000 years of Chinese literature. From a psychological perspective, however, it appears clear that these classifier morphemes do not have any meaning related to an existing noun, verb, or adjective, for the modern speaker of Chinese

Noun-Based Classifiers

Noun-based classifiers, I propose, are those that are related to the noun meanings of the same characters. And they are subcategorized into four groups.

First, by "Direct Connection," I mean that the meaning of a given character when used as a noun is very directly connected to the nouns that are categorized by the same character when it is used as a classifier. For example, *tiáo* (条), when used as a noun, means "a long-shape thing," and most of the objects that get classified by *tiao*, when it is used as a classifier, are long-shape objects. Another example is that *qǔ* (曲) means a "music" or "tone" as a noun, and the nouns it classifiers are music and songs. We can see that the two meanings (the noun meaning and the classifier meaning) are almost identical.

Second, "Close Connection" means that the connection between the noun meaning of the character and the noun it classifies when it is used as a classifier is very close, although not as direct as the first group. For example, *chuáng* (床) means a "bed" when used as a noun, and it is used to classify "quilts, blankets, cotton-padded mattresses, and beddings." We can see that the things classified here are all closely associated with "bed."

The third group has the label of "Less-Direct Connection." What is meant here is that the meaning of the character when used as a noun and the nouns being classified

are less directly connected than in the first two groups. For example, *bān* (班) means "a work shift" when used as a noun, and it is used to categorize transportation on a fixed schedule, such as "bus, train, ship, airplane." We can see that both meanings have something to do with a timetable.

The last group is called the "No Clear Connection" group, because no clear connection between the noun meaning and the classifier meaning can be readily established. For instance, *jù* (具) literally means "utensil, apparatus" when used as a noun, but the same character is used as classifier for "corpses, and coffins." Here is another example, *zhuāng* (桩) means "stake, and pile," but used as a classifier to categorize "matters, (business) deals," etc. There might have been some historical reasons for such connections, but they are no longer evident in dictionaries of modern Chinese.

Verb-Based Classifiers

I call verb-based classifier one that is closely related to the meaning of a verb. For example, *fēng* (封) means "to seal" as a verb, and it is used to classify "letters and telegrams" when used as a classifier. So "four letters" in Chinese is *sì fēng xìn*, literally meaning "four seal letters." Another example is *fā* (发), which means "to fire" or "to send out" as a verb, and used to classify "bullets and artillery shells." A literal translation of

"one bullet" from Chinese into English would be "one fire of bullet."

Adjective-Based Classifier

An adjective-based classifier is one that is related to the meaning of the adjective usage of the same character. Of the 126 classifiers, there is only one classifier that is adjective-based. It is *zhǐ* (只). It means "single, alone" as an adjective. And according to the dictionary definition (Xiàndài Hànyǔ Cídiǎn, 1984, p.1480), it is used as a classifier for objects that are "one of a pair." For example, it used to classify "eyes, ears, hands, legs, feet, socks, shoes," etc. Thus, we can see a clear connection between the adjective meaning and classifier meaning of the same character. However, *zhǐ* is also used to classify many animals (see item 1.2.1.2.4, Appendix B for details). For example, "one cat" in Chinese will be *yī zhǐ māo* (in which *yī* = one, and *māo* = cat), and "one dog" will be *yī zhǐ gǒu* (where *gǒu* = dog). Perhaps the reason that *zhǐ* is also used to count many animals is that any particular one animal can be regarded as one of the male-female pair. But this needs to be further researched.

Some Observations and Discussion

Judging from the dictionary definitions of the 126

classifiers, most classifiers are related in meaning to nouns and verbs. Of all the 126 classifiers, only 19 of them are used as classifiers only in modern Chinese. For these 19, there is little point in asking how they became to used as labels for classifier categories. Asking such a question, I feel, would be similar to asking "Why do we call a desk 'desk'?" I will not, however, exclude the possibility that historically they probably did derive from other nouns, verbs, or adjectives. But such a connection is no longer transparent to modern Chinese speakers. Again, tracing the historical roots of classifier meanings is beyond the scope of this study.

Another observation is that some classifiers classify a very homogeneous set of entities or a relatively homogeneous set, while others are used with a more diverse set. For example, all the things that get classified by *kē* (棵) and *zhū* (株) are plants, all the things that are classified by *sōu* (艘) are ships, including spaceships, and all the things classified by *liàng* (辆) are ground vehicles, including army tanks and children's tricycles. But, (as previously mentioned in Chapter 3), there are many other classifiers that are characterized by the heterogeneity of the category memberships. *Kuài* (块) is a good example (see item 1.1.3.4, Appendix B).

It appears that both "verb-based classifiers" and those used as classifiers only tend to classify a relatively

homogeneous set of entities. For instance, there are 13 verb-based classifiers in my analysis. Six of them are shape related, and the other seven are taxonomic-specific classifiers. What is special about the seven taxonomic-specific classifiers is that each of them tends to be used for a very restricted number of nouns. For instance, *tiē* (贴) is used for only one noun (medicated plasters), *fā* (发) is used for "bullets, and artillery shells" only, and *fēng* (封) is only used for "letters, and telegrams." Those that are used as classifiers only seem to present a characteristic of a similar kind. There are 19 of them, five of which classify objects according to shapes. Among the remaining 14 classifiers, 11 of them are used for a very restricted number of nouns, often one or two.

The picture presented by the noun-based classifiers, however, seems to be a more complicated one. There is no clear correlation between homogeneity or heterogeneity of classifier category memberships and the degree of connection issue I have suggested here. For instance, *bǎ* (把) is placed in the "Direct Connection" group (item 2.1.1, Appendix C), and it is supposed to classify objects that have a handle. But when we examine the things *bǎ* actually classifies (see item 1.1.4.1, Appendix B), we find that objects such as violin, chair, key and ruler are also included, but they can hardly be said to have a handle. Moreover, there are many other objects that clearly have a

handle, (e.g., a bucket, a refrigerator door, a door to a room, etc.) are not included in the *ba* category. Another example is *chǎng* (场), which is put in the "Close Connection" group (see item 2.2.1, Appendix C). The original meaning of *chang* is "arena" or "field." We can see that (see item 1.2.2.3.2.2, Appendix B) some of the things listed there, such as all the ball matches, can be said to be associated with "arena" or "field." But we will have tremendous difficulty explaining the connection between "illness, disaster, film, concert, etc." with "arena or field."

Also, there is no clear indication that classifiers in the "No Clear Connection" group classify a more diverse set of entities. In fact, most of them classify a very restricted set of nouns.

In sum, when we try to understand the basis for a classifier category, or why particular objects are grouped together under a given label, one thing we can do is to look at all the nouns that appear in one category, and see if they share anything in common. If there is some feature in common, this feature may be the dimension along which these objects are grouped together. Another thing we can also do is to examine the labels or category names. We can see very well by now that classifier category names say a lot more than taxonomic labels, such as "tools" and "furniture." I tentatively suggest that meanings of classifiers are related

to meanings of other words. The meanings of these "other words" -- related nouns, verbs, and adjectives -- prescribe what nouns the classifiers are used for. This seems to be true for about 80% of the classifiers studied here.

CHAPTER 6 CONCLUSION

It is the aim of this thesis to review relevant literature on noun classifiers, and study, in particular, Chinese numeral classifiers with the hope of gaining some insight and better understanding of classifier systems.

There is an unsettled controversy in the literature about whether classifiers define conceptual categories. One view is that classifiers do not have any real meanings, and the choice of a classifier for a given noun is arbitrary. Therefore, classifiers do not define categories. The opposing view is that the use of classifiers is not arbitrary, but reflects categorization processes. Therefore, classifiers do define categories that have some psychological reality.

The second view is supported by many observations and research findings. For instance, first of all, people find that although languages differ noticeably in syntax, phonology, and morphology, classifier languages share a lot in common, e.g., there are some syntactic universals (e.g., the word order of the classifier construction) (Adams & Conklin, 1973; Greenberg, 1972; Allan, 1977; Carpenter, 1987) and some common semantic bases (e.g., shape, animateness, and function) (Adams & Conklin, 1973; Carpenter, 1987) for classifier categories.

Secondly, it is demonstrated in a large variety of

languages that when some new words and new objects are introduced to a number of native speakers, they are always able to classify new objects consistently and easily on the basis of their observed characteristics (Allan, 1977). Or, at least, they know the proper use of classifiers within fairly narrow margins (T'sou, 1976). This demonstrates that there must be some underlying principles that guide people's use of classifiers.

Thirdly, researchers also find a connection between children's overextensions and classifier categories (Clark, 1977). It is found that the shapes selected by classifiers often coincide with the very shapes that children use in overextensions. It is likely, therefore, the phenomena just mentioned are the results of human cognitive processes. This thesis supports the hypothesis that classifier systems represent some type of human categorization.

Since Mandarin Chinese is one of the languages that has an elaborate numeral classifier system, I have focused my study on the use of classifiers in Mandarin. Specifically, I have focused on individual classifiers.

My analysis of Chinese classifiers consists of two steps. First, I presented a taxonomic picture of all the classifiers studied. A classifier is placed in the taxonomy according to the nature of the nouns that appear in the classifier category, or according to the nature of the dominant members of the category. A detailed list of all

the 126 classifiers and the nouns that each of the classifier is used for is provided (see Appendix B).

Secondly, I examined how each of the 126 classifiers is connected with the nouns it classifies. I conclude that most of the meanings of classifiers are related to the meanings of the noun forms, or verb forms, of the same characters.

There are still a lot of puzzles about the way in which classifiers are used. But I hope the analyses of Chinese numeral classifiers provided in this thesis can help us move towards a better understanding of classifier systems in general, and the nature of human categorization.

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Appendix A

A Questionnaire

INSTRUCTIONS

This is a pretest for a research project on Chinese numeral classifiers (量词). You are now given a list of Chinese numeral classifiers. Your task is to read carefully each classifier and the accompanying example(s) where the classifier may be used, and then answer the question "Is the classifier familiar to native speakers of modern Mandarin Chinese?" You may indicate a yes to the question by giving a check mark, and indicate a no by giving an X.

Thank you very much for your help.

Numeral Classifier	Pinyin (Chinese Phonetic Symbol)	Example	Is the Classifier Familiar to native Speakers of Modern Mandarin Chinese?
封	fēng	一封信，一封电报	
台	tái	一台电视机，一台机器	
张	zhāng	一张纸，一张床	
卷	juàn	一卷书，一卷著作	
顶	dǐng	一顶帽子，一顶蚊帐	
户	hù	一户人家，一户居民	
着	zhāo	一着好棋，一着好办法	
处	chù	一处伤，一处印刷错误	
把	bǎ	一把椅子，一把手枪	
则	zé	一则消息，一则寓言	
点	diǎn	一点血迹，一点墨迹	
件	jiàn	一件衬衫，一件行李	
幕	mù	一幕话剧，一幕往事	
枝	zhī	一枝铅笔，一枝枪	
垄	lǒng	一垄地	
坨	tuó	一坨泥，一坨铅块	
站	zhàn	一站路	
条	tiáo	一条绳子，一条鱼	
幅	fú	一幅画，一幅地图	
驾	jià	一驾马车，一驾雪撬	
牙	yá	一牙月亮，一牙西瓜	
场	chǎng	一场战争，一场球赛	
眼	yǎn	一眼井，一眼泉水	

Numeral Classifier	Pinyin (Chinese Phonetic Symbol)	Example	Is the Classifier Familiar to native Speakers of Modern Mandarin Chinese?
具	jù	一具尸体	
株	zhū	一株麦苗，一株树	
段	duàn	一段路，一段讲话	
部	bù	一部小说，一部电话	
辣	biàn	一辣蒜	
笔	bǐ	一笔现金，一笔买卖	
本	běn	一本书，一本画报	
阵	zhèn	一阵风，一阵枪声	
溜	liù	一溜脚印，一溜黑影	
滴	dī	一滴水，一滴血	
首	shǒu	一首诗，一首歌	
刀	dāo	一刀纸	
沓	dá	一沓纸，一沓钞票	
名	míng	一名教授，一名记者	
道	dào	一道门，一道菜	
宗	zōng	一宗买卖	
出	chū	一出戏，一出话剧	
艘	sōu	一艘轮船，一艘军舰	
丝	sī	一丝头发，一丝笑容	
片	piàn	一片面包，一片沙漠	
杆	gǎn	一杆步枪，一杆旗子	
绺	liǔ	一绺线，一绺头发	
截	jié	一截路，一截竹竿	

Numeral Classifier	Pinyin (Chinese Phonetic Symbol)	Example	Is the Classifier Familiar to native Speakers of Modern Mandarin Chinese?
撇文	piě	一撇胡子	
块	kuài	一块石头，一块布	
丸	wán	一丸药	
屯负	dùn	一屯负饭	
贴	tiē	一贴膏药	
朵	duǒ	一朵花，一朵云彩	
趟	tàng	一趟列车，一趟舟台	
份	fèn	一份报纸，一份工作	
身	shēn	一身西服，一身武艺	
所	suǒ	一所房子，一所城市	
栋	dòng	一栋楼房	
册	cè	一册书，一册杂志	
束	shù	一束鲜花，一束手电光	
梭	suō	一梭子弹	
面	miàn	一面镜子，一面墙	
管	guǎn	一管毛笔	
届	jiè	一届学生，一届总统	
家	jiā	一家商店，一家工厂	
盏	zhǎn	一盏电灯，一盏油灯	
句	jù	一句话，一句诗	
粒	lì	一粒米，一粒沙子	
枚	méi	一枚奖章，一枚硬币	
撮	cuō	一撮泥土，一撮面粉	

Numeral Classifier	Pinyin (Chinese Phonetic Symbol)	Example	Is the Classifier Familiar to native Speakers of Modern Mandarin Chinese?
门	mén	一门学问，一门功课	
发	fā	一发子弹，一发炮弹	
集	jí	一集电视剧，一集电影	
畦	qí	一畦菜，一畦稻田	
腔	qiāng	一腔热血，一腔怒火	
位	wèi	一位同志，一位家长	
串	chuàn	一串钥匙，一串葡萄	
趟	bān	一趟汽车，一趟火车	
撮	zuǒ	一撮头发，一撮胡子	
幢	zhuàng	一幢楼房	
团	tuán	一团乌云，一团火	
泡	pāo	一泡尿，一泡屎	
轮	lún	一轮红日，一轮明月	
味	wèi	一味中药	
堂	táng	一堂课	
间	jiān	一间屋子，一间教室	
圈	quān	一圈花环，一圈小山	
汪	tān	一汪净水，一汪泥	
架	jià	一架飞机，一架照相机	
曲	qǔ	一曲歌曲，一曲音乐	
打	dá	一打鸡蛋，一打铅笔	
瓣	bàn	一瓣蒜，一瓣桔子	

Numeral Classifier	Pinyin (Chinese Phonetic Symbol)	Example	Is the Classifier Familiar to native Speakers of Modern Mandarin Chinese?
席	xí	一席话，一席酒	
注	wāng	一注水，一注油	
桄	guàng	一桄线，一桄毛线	
车两	liàng	一车两公共汽车，一车两卡车	
批	pī	一批大学生，一批专家	
剂	jì	一剂中药，一剂汤药	
棵	kē	一棵树，一棵白菜	
扇	shàn	一扇门，一扇窗	
堵	dǔ	一堵墙，一堵篱笆	
章	zhāng	一章书	
声	shēng	一声枪响，一声雷鸣	
尾	wěi	一尾鱼苗	
支	zhī	一支手枪，一支队伍	
口	kǒu	一口井，一口人	
颗	kē	一颗珍珠，一颗子弹	
根	gēn	一根棍子，一根头发	
车由	zhóu	一车由线	
胎	tāi	一胎男孩，一胎双胞胎	
任	rèn	一任总统，一任市长	
起	qǐ	一起事故，一起盗窃案	
盘	pán	一盘磁带，一盘棋	
股	gǔ	一股水，一股香味	
窝	wō	一窝鸡，一窝小猪	

Numeral Classifier	Pinyin (Chinese Phonetic Symbol)	Example	Is the Classifier Familiar to native Speakers of Modern Mandarin Chinese?
缕	lǚ	一缕线，一缕烟	
挂	guà	一挂爆竹，一挂竹帘	
桩	zhuāng	一桩心事，一桩事情	
期	qī	一期杂志，一期工程	
节	jié	一节车箱，一节电池	
桌	zhuō	一桌酒席，一桌饭	
尊	zūn	一尊佛像	
床	chuáng	一床被子，一床铺盖	
代	dài	一代人，一代皇帝	
项	xiàng	一项工程，一项决定	
星	xīng	一星灯火，一星油	
洞	dòng	一洞桥	
挺	tǐng	一挺机枪，一挺步枪	
座	zuò	一座山，一座城市	
线	xiàn	一线希望，一线生机	
码	mǎ	一码事	
头	tóu	一头牛，一头蒜	
页	yè	一页纸，一页书	
只	zhī	一只鸟，一只老虎	
个	gè	一个人，一个国家	
篇	piān	一篇文章，一篇小说	
匹	pǐ	一匹马，一匹布	

Appendix B

Chinese Numeral Classifier Domains and Some Associated Nouns

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1 Individual classifiers

1.1 Shape classifiers

1.1.1 Saliently one-dimensional

1.1.1.1 *duàn* (段), indicating a section of something that extends saliently in one dimension, used for rope, stick, road, railway, speech, article, life

1.1.1.2 *gēn* (根), meaning root (of a plant), indicating a stick-shape object, used for stick, chopstick, straw, candle, finger, hair, needle, thread, rope, nerve

1.1.1.3 *gǔ* (股), meaning strand, used for thread, rope, water, flood, airstream, cold current, warm current, fragrant smell, offensive odor

1.1.1.4 *jié* (节), meaning section, length, used for something that consists of natural sections in length, or something that is often cut into sections, such as train car, cell battery, stick, rope, pipe, chalk, period of lesson (in school)

1.1.1.5 *jié* (截), meaning to cut (into halves), indicating an arbitrarily cut section of something that extends in one dimension, used

for wood, stick, wire, bamboo pole, road

1.1.1.6 *liǔ* (绺), meaning tuft, lock, skein, used for thread, knitting wool, hair

1.1.1.7 *lǔ* (缕), meaning wisp, strand, lock, used for thread, hemp, smoke, sunlight, moonbeam

1.1.1.8 *piě* (撇文), used for one particular stroke of a Chinese character, and moustache (which resembles the stroke in shape), eyebrow

1.1.1.9 *shù* (束), meaning to tie, to bundle up, indicating something in a long shape of a bundle, bunch, sheaf, used for fresh flowers, straw, sunlight, flash light

1.1.1.10 *sī* (丝), indicating a thread-like thing, used for hair, vision, breeze, smile, warmth

1.1.1.11 *tiáo* (条), meaning a slender, long-shape thing, often flexible, used for rope, line, plait, snake, fish, stream/brook, river, canal, towel, road, trousers, skirt, blanket, slogan, news, experience, life, brave/true man

1.1.1.12 *zhī* (枝), meaning tree branch, twig, used for tree branch, match, pencil, pen, cigarette, arrow, gun

1.1.1.13 *zhī* (支), indicating a stick-like long thing for candle, pencil, pen, cigarette, flower, thermometer, gun, pistol, spear, arrow, hand, arm, feather, troop

1.1.2 Saliently two-dimensional

1.1.2.1 *méi* (枚), used for coin, badge, medal, stamp, missile

1.1.2.2 *miàn* (面), meaning surface, used for mirror, silk banner, flag, wall, big drum

1.1.2.3 *pán* (盘), meaning a plate, used for magnetic audio tape, video tape, mosquito-repellent incense (coiled in a shape of a plate), grinding stone, chess match

1.1.2.4 *piàn* (片), meaning a flat, thin piece, slice, or a stretch of land, used for bread, meat, tree leaf, snow flake, farming field, desert, forest, white/dark cloud

1.1.2.5 *shàn* (扇), meaning a leaf-shape thing, used for door, window, sail, partition, grinding-stone

1.1.2.6 *zhāng* (张), meaning to spread open/flat, used for paper-like things, or something that has a flat surface, including paper, photo, ticket, diploma, certificate stamp, postcard, phonograph record, carpet, cattle hide, pancake, desk, table, bed, mouth, bow, fishing net

1.1.3 Saliently three-dimensional

1.1.3.1 *bàn* (瓣), meaning a segment/section (of an orange, etc.), used for orange, mandarin,

tangerine, garlic

1.1.3.2 *dī* (滴), meaning to drip (in drops), used for water, oil, tear, blood, sweat, saliva, soup, vinegar

1.1.3.3 *kē* (颗), used for something small and roundish in shape, such as pearl, soya bean, button, tooth, mine, bullet, bomb, star, (man-made) satellite

1.1.3.4 *kuài* (块), indicating a lump-shape thing, used for soap, candy, cake, meat, stone, wrist watch, cloth, handkerchief, lawn, farming field, white/dark cloud

1.1.3.5 *lì* (粒), meaning a grain-like thing, used for rice, salt, sand, grain, seed, drop of sweat, button, bullet

1.1.3.6 *quān* (圈), meaning a circle, used for water, grease stain, hills, mountains, wreath

1.1.3.7 *tuán* (团), meaning a collection of something in a ball shape, used for cotton, thread, knitting wool, paper, wire, hemp, dough, fire, smoke, dark cloud

1.1.3.8 *tuó* (坨), indicating a big lump, used for iron bar, lead bar, mud

1.1.3.9 *wán* (丸), meaning a ball, pellet, used for Chinese medicine, marble

1.1.3.10 *xīng* (星), meaning a star, used for light

(in a distance), oil

1.1.3.11 *yá* (牙), meaning tooth, or something with a shape of a tooth, indicating a shape of a crescent moon, used for moon, watermelon, pancake

1.1.3.12 *zhóu* (轴), meaning a spool (for thread), used for thread, (a scroll of) Chinese painting

1.1.3.13 *zuǒ* (撮), meaning a tuft, used for hair, beard

1.1.4 Salient feature classifiers

1.1.4.1 *bǎ* (把), meaning a handle, used for things that have a handle, such as umbrella, pistol, teapot, knife, screwdriver, scissors, pliers, hammer, spoon, broom, violin, chair, key, ruler

1.1.4.2 *dǐng* (顶), meaning crown of the head, top, used for something that has a top, such as cap, hat, straw hat, tent, mosquito netting, umbrella

1.1.4.3 *dòng* (洞), meaning a hole, used for (stone) bridge, big (arch) gate

1.1.4.4 *gǎn* (杆), meaning shaft or arm, used for things that have shaft or arm, such as rifle, steelyard, flag, pen, pencil

1.1.4.5 *guǎn* (管), meaning a pipe, used for

something that has a pipe-like shape, such as hunting gun, bamboo flute, hair brush (for writing or painting)

1.1.4.6 *jià* (架), meaning a frame, stand, used for things that have a frame, such as airplane, space shuttle, helicopter, ladder, eye glasses, machine, piano, accordion, electronic keyboard, camera

1.1.4.7 *kǒu* (口), meaning mouth, used for something has a shape of a mouth, such as pot, bell, water well, person, pig, coffin, knife

1.1.4.8 *yǎn* (眼), meaning an eye, used for things that have a big opening, such as water well, water spring, roof window, cave house

1.2 Taxonomic-specific classifiers

1.2.1 Animate classifiers

1.2.1.1 Human classifiers

1.2.1.1.1 *dài* (代), meaning generation, used for emperor, people,

1.2.1.1.2 *hù* (户), meaning household, used for family, residents

1.2.1.1.3 *míng* (名), meaning name, used for people of different professions, such as teacher, professor, nurse, doctor, scientist, lawyer, journalist, worker, student, writer, soldier, actor/actress, politician, policeman, sailor

1.2.1.1.4 *rèn* (任), meaning to hold the post of, used for president (of country or institution), mayor, chairman, company/factory head

1.2.1.1.5 *tāi* (胎), meaning fetus, used for boy, girl, twins, also used for animals, such as piglets, puppies, etc.

1.2.1.1.6 *wèi* (位), meaning an individual, used for a person, more polite than the general classifier *gè* (个), such as professor, teacher, mister, miss, parent, policeman, comrade

1.2.1.2 Animal classifiers

1.2.1.2.1 *pǐ* (匹), used for horse, mule, cloth (a bolt of)

1.2.1.2.2 *tóu* (头), meaning a head, used for big animals, such as pig, deer, cattle, donkey, lion, elephant, garlic (a head of)

1.2.1.2.3 *wō* (窝), meaning nest, litter, brood, used for birds, chickens, eggs, pigs, children

1.2.1.2.4 *zhī* (只), meaning single, alone, used for one of a pair, such as bird, fly, mosquito, bee, chicken, goat, sheep, tiger, elephant; also used for hand, foot, leg, eye, ear, shoe, sock, boat, watch, suitcase, music/tune

1.2.2 Inanimate classifiers

1.2.2.1 Natural object classifiers

1.2.2.1.1 *duǒ* (朵), used for flower, white cloud

1.2.2.1.2 *kē* (棵), used for all plants (the whole plant), such as tree, grass, corn, cabbage

1.2.2.1.3 *lún* (轮), meaning a wheel, used for the sun and the moon only (especially, red sun, and bright moon)

1.2.2.1.4 *pāo* (泡), used for urine, shit

1.2.2.1.5 *tān* (摊), to spread (on the ground) indicating a small pool of liquid, mud, used for water, blood, mud, shit

1.2.2.1.6 *zhū* (株), meaning stalk and the part of the root that is above the ground, used for plants only, almost the same as *kē* (棵), used for tree, seedling

1.2.2.2 Sound classifier

1.2.2.2.1 *shēng* (声), meaning sound, used for gun shot, thunder, shout, crying, coughing, knocking

1.2.2.3 Artifact classifiers

1.2.2.3.1 Concrete object classifiers

1.2.2.3.1.1 *bān* (班), meaning a work shift, used for transportation on fixed schedule, such as bus, train, ship, airliner

1.2.2.3.1.2 *běn* (本), meaning a book (a bound copy of printed materials), used for book, magazine, pictorial, novel, dictionary

1.2.2.3.1.3 *biàn* (辫), meaning a braid, used for garlics (a braid of), hair

1.2.2.3.1.4 *bù* (部), meaning part, used for film, literary work (especially one of good quality, and in a form of a book), long novel, telephone

1.2.2.3.1.5 *cè* (册), meaning copy, volume, used for books

1.2.2.3.1.6 *chù* (处), meaning place, location, used for physical wound, typographical error, household

1.2.2.3.1.7 *chuáng* (床), meaning bed, used for quilt, cotton-padded mattress, bedding

1.2.2.3.1.8 *dào* (道), meaning way, course, path, used for wall, fence, door, gate, defense line, dish, procedure, sun rays

1.2.2.3.1.9 *dòng* (栋), used for building

1.2.2.3.1.10 *dǔ* (堵), meaning to block up, used for wall, fence

1.2.2.3.1.11 *dùn* (顿), meaning pause, used for meal

1.2.2.3.1.12 *fā* (发), meaning to fire, used for bullet, artillery shell

1.2.2.3.1.13 *fèn* (份), meaning share, portion/part of a whole, used for newspaper, magazine, exam paper, homework, meal, gift, job

1.2.2.3.1.14 *fēng* (封), meaning to seal, used for letter, telegram

1.2.2.3.1.15 *fú* (幅), meaning the width of cloth (a bolt of), used for picture, painting, ad, poster, map

1.2.2.3.1.16 *guà* (挂), to hang something on a hook, used for a set of something tied/strung together, such as firecrackers (a string of), bead curtain, a horse and cart

1.2.2.3.1.17 *jì* (剂), meaning a dose, for Chinese herbal medicine, decoction of medicinal ingredients

1.2.2.3.1.18 *jiā* (家), meaning family, home, used for household, store, restaurant, hotel, supermarkets, bank, cinema, hospital, factory, company, news agency, travel agency, publishing house

1.2.2.3.1.19 *jià* (驾), meaning to harness, used for horse-drawn cart, cattle-drawn cart, horse-drawn sleigh

1.2.2.3.1.20 *jiān* (间), meaning room, used for any rooms, including bedroom, living-room, kitchen, bathroom, study, office, classroom, workshop

1.2.2.3.1.21 *jiàn* (件), meaning a piece, used for clothes, shirt, coat, overcoat, jacket, sweater, luggage, matter/thing, work/job, case

1.2.2.3.1.22 *jù* (句) meaning sentence, used for speech, talk, poem

1.2.2.3.1.23 *jù* (具), meaning utensil, apparatus, used

for corpse, coffin

1.2.2.3.1.24 *juàn* (卷), meaning book, volume, used for book, writings/works (in a form a book)

1.2.2.3.1.25 *liàng* (辆), used for all ground vehicles including bus, car, truck, bicycle, truck, jeep, tractor, train, tank

1.2.2.3.1.26 *lǒng* (垄), meaning ridge (in a farming field), used for farming land, roof tiles

1.2.2.3.1.27 *piān* (篇), meaning a complete article, used for article, report, editorial, commentary, review, novel, prose

1.2.2.3.1.28 *qī* (期), meaning scheduled time/date, used for magazine (one issue of), pictorial, training class , students/trainees (in a training class), project

1.2.2.3.1.29 *qí* (畦), meaning a rectangular piece of land in a field, separated by ridges (usually for growing vegetables), used for vegetables, plants,

1.2.2.3.1.30 *shēn* (身), meaning body, used for suit, clothes, dress, strength, skills in martial arts, foreign flavor/Western style

1.2.2.3.1.31 *sōu* (艘), used for all ships (especially big in size) including speedboat, ocean liner, warship, oil tanker

1.2.2.3.1.32 *suō* (梭), meaning cartridge clip, used for

bullets

1.2.2.3.1.33 *suǒ* (所), meaning location, used for house, villa, residence, school, kindergarten, university, hospital, club, church

1.2.2.3.1.34 *tái* (台), meaning platform, stage, stand, support, used for machine, TV set, recorder, radio, computer, locomotive, tractor, performances

1.2.2.3.1.35 *tàng* (趟), used for (frequency of) scheduled transportation including regular bus, train, ship, ocean liner, air liner

1.2.2.3.1.36 *tiē* (贴), meaning to paste, to stick, used for medicated plaster

1.2.2.3.1.37 *tǐng* (挺), used for rifle, machine gun, submachine gun

1.2.2.3.1.38 *wèi* (味), meaning taste, flavor, used for ingredient (of a Chinese medicine prescription)

1.2.2.3.1.39 *yè* (页), meaning page, leaf, used for paper, book, text, article, novel, document

1.2.2.3.1.40 *zhǎn* (盏), meaning a small cup, used for oil lamp, bulb lamp, fluorescent lamp

1.2.2.3.1.41 *zhāng* (章), meaning chapter, used for book, novel, thesis, dissertation

1.2.2.3.1.42 *zhuàng* (幢), used for building

1.2.2.3.1.43 *zhuō* (桌), meaning table, used for food,

feast, people, guests

1.2.2.3.1.44 *zūn* (尊), meaning respect, used for statue of a Buddha, artillery piece

1.2.2.3.1.45 *zuò* (座), meaning seat, stand, pedestal, base, used for bell, stone tablet, pagoda, bridge, house, temple, building, factory, church, grave, reservoir, forest, mountain, village, city

1.2.2.3.2 Other Classifiers

1.2.2.3.2.1 *bǐ* (笔), meaning pen/pencil, used for (business) deal, sum of money, cash, fund, expense

1.2.2.3.2.2 *chǎng* (场), meaning arena, field, used for battle, fight, war, illness, storm, rain, disaster, nightmare, film, concert, dancing ball, opera, play, ball (basketball, football, volleyball, tennis ball, etc.) match

1.2.2.3.2.3 *chū* (出), meaning a big section/episode of a legend, used for a dramatic piece, including opera, play

1.2.2.3.2.4 *diǎn* (点), meaning spot, dot, indicating a point (as in a point of view), and a tiny amount, used for view, suggestion, criticism, request, ink spot/stain, blood spot/stain

1.2.2.3.2.5 *jí* (集), meaning a collection of literary works, volume, part, used for film, TV play

1.2.2.3.2.6 *jiè* (届), meaning due time, used for something that occurs in a fixed sequence, such as congress, president, students (enrolled in the same year), Olympics, the Asian Games

1.2.2.3.2.7 *mǎ* (码), meaning number symbols, used for matter

1.2.2.3.2.8 *mén* (门), meaning branch, class, category, used for branch of learning, knowledge, art, subject, course, craftsmanship, artillery piece

1.2.2.3.2.9 *mù* (幕), meaning curtain, used for (an act of) play, reminiscence of an earlier event

1.2.2.3.2.10 *qǐ* (起), used for (an occurrence of an) accident, theft, robbery, burglary, murder

1.2.2.3.2.11 *qiāng* (腔), meaning (thoracic) cavity, used for love, regret, warmth, enthusiasm, anger, hatred

1.2.2.3.2.12 *qǔ* (曲), meaning tune melody, used for song, music, melody, solo, duet, trio, quartet, etc.

1.2.2.3.2.13 *shǒu* (首), used for song, poem, nursery rhyme

1.2.2.3.2.14 *táng* (堂), meaning hall, used for lesson (as in school), furniture

1.2.2.3.2.15 *xí* (席), meaning feast, used for banquet, talk, conversation (with someone)

1.2.2.3.2.16 *xiàn* (线), meaning thread, used for hope, light, life/energy

1.2.2.3.2.17 *xiàng* (项), meaning item, used for plan, suggestion, decision, order, decree, measure, task, work, activity, invention, discovery, result (of an experiment), cause, (business) deal record

1.2.2.3.2.18 *zé* (则), meaning norm, rule, used for a piece of writing, such as news, ad, commentary, fable

1.2.2.3.2.19 *zhàn* (站), meaning to stop, used for way, distance

1.2.2.3.2.20 *zhāo* (着), meaning a move (in chess), used for move (in chess), good idea

1.2.2.3.2.21 *zhèn* (阵), meaning (a short) duration of time, used for wind, rain, cold spell, laughters, applause, footsteps, knockings (on the door), gun shots

1.2.2.3.2.22 *zhuāng* (桩), meaning stake, pile, used for (big/small) matter, case, (business) deal, something on one's mind

1.2.2.3.2.23 *zōng* (宗), meaning ancestor, faction/sect, used for business deal, (a large sum of) money

1.3 General classifier

1.3.1 *gè* (个), generally used for nouns that do not have a special classifier, but also often

used as a substitution for some specific classifiers (especially in casual speech); the nouns may include person, boy, girl, man, woman, student, teacher, sun, moon, week, month, fruit, apple, pear, orange, watermelon, country, nation, state, province, city, county, district, school, place, forest, desert, grassland, park, game, festival, story, idea, question, problem, experiment, investigation, solution, mehtod, opportunity, ceremony, dish, plate, sofa, table, chair, news, film, play, and dream

2 Group Classifiers (not studied here)

3 Container Classifiers (not studied here)

4 Standard Measures (not studied here)

5 Temporary Classifiers (not studied here)

6 Verb Classifiers (not studied here)

Appendix C

An Analysis of the Sources of Classifier Meanings

1	Classifier Only
1.1	*duàn* (段) (1.1.1.1)[1]
1.2	*duǒ* (朵) (1.2.2.1.1)
1.3	*gè* (个) (1.3.1)
1.4	*jiàn* (件) (1.2.2.3.1.21)
1.5	*kē* (棵) (1.2.2.1.2)
1.6	*kē* (颗) (1.1.3.3)
1.7	*liàng* (辆) (1.2.2.3.1.25)
1.8	*liǔ* (绺) (1.1.1.6)
1.9	*méi* (枚) (1.1.2.1)
1.10	*pāo* (泡) (1.2.2.1.4)
1.11	*pǐ* (匹) (1.2.1.2.1)
1.12	*qǐ* (起) (1.2.2.3.2.10)
1.13	*shǒu* (着) (1.2.2.3.2.13)
1.14	*sōu* (艘) (1.2.2.3.1.31)
1.15	*tàng* (趟) (1.2.2.3.1.35)
1.16	*tǐng* (挺) (1.2.2.3.1.37)
1.17	*xiàng* (项) (1.2.2.3.2.17)
1.18	*zhuāng* (桩) (1.2.2.3.1.42)
1.19	*zuò* (撮) (1.1.3.13)

[1]. The number refers to the item number in Appendix B, where examples of nouns are listed. The same applies to all the other items in this appendix.

2 Noun-based classifiers

2.1 Direct Connection

2.1.1 *bǎ* (把) (1.1.4.1)

2.1.2 *bàn* (瓣) (1.1.3.1)

2.1.3 *běn* (本) (1.2.2.3.1.2)

2.1.4 *biàn* (辫) (1.2.2.3.1.3)

2.1.5 *cè* (册) (1.2.2.3.1.5)

2.1.6 *chū* (出) (1.2.2.3.2.3)

2.1.7 *dǐng* (顶) (1.1.4.2)

2.1.8 *dòng* (洞) (1.1.4.3)

2.1.9 *gǎn* (杆) (1.1.4.4)

2.1.10 *gēn* (根) (1.1.1.2)

2.1.11 *gǔ* (股) (1.1.1.3)

2.1.12 *guǎn* (管) (1.1.4.5)

2.1.13 *hù* (户) (1.2.1.1.2)

2.1.14 *jí* (集) (1.2.2.3.2.5)

2.1.15 *jì* (剂) (1.2.2.3.1.17)

2.1.16 *jià* (架) (1.1.4.6)

2.1.17 *jiān* (间) (1.2.2.3.1.20)

2.1.18 *jié* (节) (1.1.1.4)

2.1.19 *jù* (句) (1.2.2.3.1.22)

2.1.20 *juàn* (卷) (1.2.2.3.1.24)

2.1.21 *kǒu* (口) (1.1.4.7)

2.1.22 *kuài* (块) (1.1.3.4)

2.1.23 *lì* (粒) (1.1.3.5)

2.1.24 *lǚ* (缕) (1.1.1.7)

2.1.25 *miàn* (面) (1.1.2.2)

2.1.26 *pán* (盘) (1.1.2.3)

2.1.27 *piān* (篇) (1.2.2.3.1.27)

2.1.28 *piàn* (片) (1.1.2.4)

2.1.29 *piě* (撇) (1.1.1.8)

2.1.30 *qǔ* (曲) (1.2.2.3.2.12)

2.1.31 *quān* (圈) (1.1.3.6)

2.1.32 *shàn* (扇) (1.1.2.5)

2.1.33 *shēng* (声) (1.2.2.2.1)

2.1.34 *sī* (丝) (1.1.1.10)

2.1.35 *tāi* (胎) (1.2.1.1.5)

2.1.36 *tiáo* (条) (1.1.1.11)

2.1.37 *tuán* (团) (1.1.3.7)

2.1.38 *tuó* (坨) (1.1.3.8)

2.1.39 *wán* (丸) (1.1.3.9)

2.1.40 *wō* (窝) (1.2.1.2.3)

2.1.41 *xīng* (星) (1.1.3.10)

2.1.42 *yá* (牙) (1.1.3.11)

2.1.43 *yǎn* (眼) (1.1.4.8)

2.1.44 *yè* (页) (1.2.2.3.1.39)

2.1.45 *zhāo* (着) (1.2.2.3.2.20)

2.1.46 *zhāng* (章) (1.2.2.3.1.41)

2.1.47 *zhī* (枝) (1.1.1.12)

2.1.48 *zhī* (支) (1.1.1.13)

2.1.49 *zhóu* (轴) (1.1.3.12)

2.2 Close connection

2.2.1 chǎng (场) (1.2.2.3.2.2)

2.2.2 chuáng (床) (1.2.2.3.1.7)

2.2.3 dài (代) (1.2.1.1.1)

2.2.4 diǎn (点) (1.2.2.3.2.4)

2.2.5 dòng (栋) (1.2.2.3.1.9)

2.2.6 fèn (份) (1.2.2.3.1.13)

2.2.7 fú (幅) (1.2.2.3.1.15)

2.2.8 jiā (家) (1.2.2.3.1.18)

2.2.9 jiè (届) (1.2.2.3.2.6)

2.2.10 lǒng (垄) (1.2.2.3.1.26)

2.2.11 lún (轮) (1.2.2.1.3)

2.2.12 mén (门) (1.2.2.3.2.8)

2.2.13 mù (幕) (1.2.2.3.2.9)

2.2.14 qī (期) (1.2.2.3.1.28)

2.2.15 qí (畦) (1.2.2.3.1.29)

2.2.16 qiāng (腔) (1.2.2.3.2.11)

2.2.17 shēn (身) (1.2.2.3.1.30)

2.2.18 suō (梭) (1.2.2.3.1.32)

2.2.19 táng (堂) (1.2.2.3.2.14)

2.2.20 zhǎn (盏) (1.2.2.3.1.40)

2.2.21 zhèn (阵) (1.2.2.3.2.21)

2.2.22 zhū (株) (1.2.2.1.6)

2.2.23 zhuō (桌) (1.2.2.3.1.43)

2.3 Less-direct connection

2.3.1 bān (班) (1.2.2.3.1.1)

2.3.2 chù (处) (1.2.2.3.1.6)

2.3.3 míng (名) (1.2.1.1.3)

2.3.4 suǒ (所) (1.2.2.3.1.33)

2.3.5 tái (台) (1.2.2.3.1.34)

2.3.6 tóu (头) (1.2.1.2.2)

2.3.7 wèi (味) (1.2.2.3.1.38)

2.3.8 xí (席) (1.2.2.3.2.15)

2.3.9 xiàn (线) (1.2.2.3.2.16)

2.3.10 zé (则) (1.2.2.3.2.18)

2.3.11 zūn (尊) (1.2.2.3.1.44)

2.3.12 zuò (座) (1.2.2.3.1.45)

2.4 No clear connection

2.4.1 bǐ (笔) (1.2.2.3.2.1)

2.4.2 bù (部) (1.2.2.3.1.4)

2.4.3 dào (道) (1.2.2.3.1.8)

2.4.4 dùn (顿) (1.2.2.3.1.11)

2.4.5 jù (具) (1.2.2.3.1.23)

2.4.6 mǎ (码) (1.2.2.3.2.7)

2.4.7 wèi (位) (1.2.1.1.6)

2.4.8 zhuāng (桩) (1.2.2.3.2.22)

2.4.9 zōng (宗) (1.2.2.3.2.23)

3 Verb-based classifiers

3.1 dī (滴) (1.1.3.2)

3.2 dǔ (堵) (1.2.2.3.1.10)

3.3 fā (发) (1.2.2.3.1.12)

3.4 fēng (封) (1.2.2.3.1.14)

3.5 guà (挂) (1.2.2.3.1.16)

3.6	jià（驾）(1.2.2.3.1.19)
3.7	jié（截）(1.1.1.5)
3.8	rèn（任）(1.2.1.1.4)
3.9	shù（束）(1.1.1.9)
3.10	tān（摊）(1.2.2.1.5)
3.11	tiē（贝占）(1.2.2.3.1.36)
3.12	zhàn（站）(1.2.2.3.2.19)
3.13	zhāng（张）(1.1.2.6)
4	Adjective-based classifier
4.1	zhī（只）(1.2.1.2.4)

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