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A SEMANTIC STUDY OF THE CLASSIFIER TIAO (条)*

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1. Introduction

Categorization is one of the most important aspects of human cognition. As pointedly noted by Jackendoff (1983:77 and 1987:134), 'An essential aspect of cognition is the ability to categorize: to judge that a particular thing is or is not an instance of a particular category.' In the words of Lakoff (1987: 5-6), 'There is nothing more basic than categorization to our thought, perception, action, and speech ..... An understanding of how we categorize is central to any understanding of how we think and how we function, and therefore central to an understanding of what makes us human.'

Human language deeply involves the categorization not only of linguistic structures but also of the reality represented by linguistic structures. When we call an object *shu* 书 in Chinese, we put the object in the category of 'book.' By the same token, when we name an activity *kan* 看 in Chinese, we take the activity as an instance of the category 'to see.' Two categories can intersect to form a new category. Thus, the expression *kan shu* 看书 defines a new category 'to read books.' When we name an activity *kan shu*, we assign the activity in the category 'to read books.' What is interesting and intriguing in Chinese as well as in other languages with classifier systems is the fact that nouns are further categorized by classifiers. For example, the classifier *ben* 本 'volume' puts *shu* 书 'book,' *zidian* 字典 'dictionary,' *zazhi* 杂志 'magazine,' etc., in the same category.

While it is obvious that classifiers in Chinese categorize nouns into different classes, it is not immediately clear whether they reflect conceptual structures or are merely arbitrary forms without a conceptual basis. In this paper, we wish to argue that classifiers in Chinese to a great extent reflect human categorization in Chinese culture, and that they are arbitrary only in those cases where the original salient conceptual basis has become conventionalized.

The classical view of categorization holds that categories are formed by certain objective properties inherent to the entities in the world, and that

these properties are discrete, serving as necessary and sufficient criterial conditions for categorization. This view of categorization is fundamentally important in the development of many branches of natural and social sciences. Mathematics, logic, and formal semantics and syntax totally depend on this classical view of categorization. However, the view has been challenged in recent years by a wealth of new data on human categorization. Of special relevance to the study of classifiers in natural languages is the study of color categories in anthropological linguistics (Berlin and Kay 1969, Kay and McDaniels 1978), the study of categorization of concrete objects in cognitive psychology (Rosch 1975, 1978; Tversky and Hemenway 1984), and the study of lexical categories in linguistics (Ross 1972, Hopper and Thompson 1984). From these studies, a new theory of categorization, known as prototype theory, has emerged and influenced the thinking of many linguists. Departing from the classical theory of categorization, the prototype theory views human categorization as resulting primarily from the interaction between the human body and the physical environment in different socio-cultural contexts. In this theory, categorization can be achieved through association with the prototype(s), or the central member(s). Members of a category may be associated with one another in *family resemblance* (*à la* Wittgenstein). It is thus not necessary for all members of a category to possess a common property which criterially defines that category. In prototype theory, categorization contains the notions of 'centrality' and 'gradation.' Thus, some members of a category, being prototypes, may serve as 'typical' or 'better' examples of that category than others. Rosch (1973, 1975) has shown that people regard some birds as more typical and better examples of the category than other birds. For example, robins and sparrows are judged as better examples of birds than pelicans and penguins. Furthermore, in prototype theory, human imagination plays a crucial role in categorization. Thus, metaphor, metonymy, and imagery all enter into the formation of a category, as clearly demonstrated by Lakoff (1986) in his explication of Dyirbal classifiers and the classifier *hon* in Japanese.

Although Chinese classifiers provide linguists and cognitive psychologists with rich data for the study of the intricate relationship between cognitive and linguistic categories, existing linguistic studies of Chinese classifiers have been confined to their occurrence conditions in terms of structural principles, especially their co-occurrence with different classes of nouns. To the best of our knowledge, there is no systematic study of Chinese classifiers as a system of human categorization in Chinese culture. Nor is there any attempt to search for the cognitive basis of the system.

This paper is a pilot study with which we wish to show that a cognition-based study of classifiers in Chinese is not only feasible but also of high explanatory value. It will focus on the classifier *tiao* 条. For two important reasons, we have chosen *tiao* for the present pilot study. In the first place, it is one of the most frequently used classifiers with an extensive domain; the concept of 'extension in length' underlying *tiao* is also very common in other classifier languages (Allan 1977).[1] In the second place, we have more data about historical development and about child language on *tiao* than on other classifiers (Erbaugh 1985). *Tiao* appears to be the first classifier generalized to various kinds of object by shape. In her data collected in Taiwan of Mandarin used in Mandarin-speaking families, Erbaugh has found that *tiao* is the most frequently used and most frequently extended classifier in child and adult Mandarin.

It is hoped that the present pilot study will lead to a comprehensive study of the Chinese classifier system as a system of human categorization.[2]

2. Classifiers versus measure words

In the literature of Chinese grammar, classifiers are often treated on a par with measure words. With rare exceptions, the term *shuliangci* 数量词 'number-measure-word' has been adopted by Chinese linguists in mainland China and Taiwan to cover both classifiers and measure words. Chao (1968:584-620) has treated classifiers as 'individual measures.' Li and Thompson (1981:106) have blended classifiers with measures words and stated that 'any measure word can be a classifier.' Thus, they treat *bang* 磅 'pound' in *shi bang rou* 十磅肉 'ten pounds of meat' and *qun* 群 'crowd' in *yi qun yang* 一群羊 'a crowd of sheep' on an equal footing as *tiao* in *yi tiao yu* 一条鱼 'a fish' and *zhang* 张 'piece' in *yi zhang zhi* 一张纸 'a piece of paper.' However, it is desirable and feasible to differentiate classifiers from measure words in order to better understand the cognitive basis of a classifier system. Having examined the kinds of things that are grouped together by classifiers in more than fifty languages, Allan (1977:285) concludes that 'a classifier denotes some salient perceived or imputed characteristic of the entity to which the associated noun refers.' The imputed characteristics of entities picked up by classifiers are relatively 'inherent' in comparison with the 'contingent' characteristics of entities assigned by measure words. Thus, a classifier is set only to a certain number of nouns which are associated with one another in one single category. Measure words can, however, accompany different kinds of nouns which may not be related categorically. To illustrate,

The measure word *bang* 磅 'pound' can be used to weigh iron, sand, apples, cotton, etc., which take different classifiers as shown in the following.

1) yi bang tie 铁 — yi kuai tie 一块铁
一磅 'a pound of iron' — 'an (piece) iron'
shazi 沙子 — li shazi 一粒沙子
'a pound of sand' — 'a (grain-like) sand'
pingguo 苹果 — ge pingguo 一个苹果
'a pound of apples' — 'an (general thing) apple'
mianhua 棉花 — tuan mianhua 一团棉花
'a pound of cotton' — 'a (ball-like) cotton'

In our view, Chao's 'temporary measures' such as *dui* 堆 'pile,' *shen* 身 'body,' and others should be treated as measures rather than classifiers. Thus, we can substitute *bang* 磅 with *dui* 堆 for the examples in (1). In turn, both *bang* and *dui* 堆 can be replaced by other measure words such as *jin* 斤 'catty,' *dun* 吨 'ton' or other Chao's 'temporary measures' such as *chuan* 船 'boat' and *wuzi* 屋子 'house.' All these measure words designate 'contingent' or 'temporary' properties. In contrast, classifiers denote relatively 'inherent' or 'permanent' properties and therefore can not substitute for one another freely. Thus, expressions such as *yi li tie* *一粒铁 and *yi tuan pingtuan* *一团苹果 are unacceptable in normal contexts.

We propose to adopt the distinction between 'permanent' and 'temporary' properties of entities as the fundamental cognitive basis for the distinction between classifiers and measure words. We would like to avoid the term 'inherent properties,' which can easily be misconstrued as 'objective properties' of the entities in the world and independent of the experience of human beings in different cultures. We thus propose the following distinction between classifiers and measure words.

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

In essence, (2) amounts to saying that while a classifier 'categorizes' an object, a measure word simply 'measures' an object.

This functional distinction between classifiers and measure words also has some desirable consequences in describing different languages or different

dialects of the same language. First, every language has measure words, but only some languages have classifiers. Thus, like Chinese, English has measure words such as *pound* and *pile* which are equivalent to *bang* 磅 and *dui* 堆 in Chinese; but, unlike Chinese, English does not have classifiers such as *tiao* 条 for counting fish and *ke* 棵 for counting trees. Secondly, many measure words such as *pile* and *group* presumably have similar, if not identical, meanings across languages. Thus, *dui* 堆 in Chinese has roughly the same meaning as *pile* in English; *qun* 群 in Chinese is semantically equivalent to *group* in English. By extension, we should not be surprised to find that measure words do not vary much from one Chinese dialect to another, whereas classifiers may vary greatly.[3] Thirdly, the conceptual distinction between classifiers and measure words will help us tease apart the complexity of the Chinese classifier system as exhibited in Chao's description, where classifiers are treated as subgroups of measure words. We believe that once we regard a classifier as serving to categorize an entity and a measure word as simply serving to measure, the perplexity in Chao's analysis of Chinese classifiers can be mitigated.[4]

We hasten to add here that the distinction in question, like other prototype-based categorical distinctions, is a graded distinction with fuzzy boundaries. On one hand, we have classifiers like *kuai* 块 'piece' and *pian* 片 'slice' which also function as measures in the sense that they denote a portion of an object, in addition to the shape of the portion. Thus, we have *yi kuai rou* 一块肉 'a piece of meat,' *yi pian rou* 一片肉 'a slice of meat,' *yi kuai tie* 一块铁 'a piece of iron,' *yi pian tie* 一片铁 'a slice of iron,' etc. On the other hand, we have measures like *wan* 碗 'bowl,' *bei* 杯 'glass' which involve containers with a clear visible shape and thus are closer to classifiers than other strictly quantitive measures such as *pang* 磅 and *jin* 斤.

3. A prototype theory of the classifier *tiao* 条

Based on the historical data of *tiao* documented by Chinese scholars including Wang Li (1980,1965) and Chou Fa-kao (1959), Erbaugh (1985) has constructed an historical development consisting of four stages for *tiao*. In the first stage (the Shang dynasty, ca. 1400 B.C.), the word *tiao* appeared in oracle bone writings as a noun meaning 'small branch.' In the second stage (the Post-Han, ca. 25 A.D.), it was used as a classifier for the lengths of cloth and strings of gold ingots. In the third stage (by the Tang, 600-900 A.D.), *tiao* as a classifier had expanded its reference to snakes, ropes, and cloths. In the fourth stage (by the Song 960-1117 A.D.), it had further extended to long objects in general including roads and articles of law, which were written

vertically on the page. From the developmental history of *tiao*, we can gain an important insight into its categorical extension in modern Mandarin Chinese. In the following, we construct a prototype theory for the classifier *tiao* consisting of four subcategories: (a) nominal origins,[5] (b) central members, (c) naturally extended members, and (d) metaphorically extended members.

3.1. *Tiao* as a noun

We have mentioned that *tiao* began as a word meaning 'branch.' In Modern Mandarin, as a noun it still retains this meaning. It is defined in *Xiandai Hanyu Cidian* (现代汉语词典*Modern Chinese Dictionary*) as *xichang de shuzhi* 细长的树枝 'slender tree branch.' It can occur alone, but more frequently occurs as a bound morpheme in compound words such as *liutiaor* 柳条儿 'willow twig,' *xiantiaor* 绲条儿 'line,' and *miantiaor* 面条儿 'noodle.'[6]

3.2. Central members of *tiao*

The historical development of *tiao* shows that in its inception as a classifier, it was used to refer to long things. We can treat as the central members those nouns in Mandarin Chinese denoting three-dimensional concrete objects with a long shape. The list below exemplifies the central members.

3)	yi tiao yu	一条鱼	'a fish'
	yi tiao kuzi	一条裤子	'a pair of pants'
	yi tiao tui	一条腿	'a leg'
	yi tiao chuan	一条船	'a boat'
4)	yi tiao huanggua	一条黄瓜	'a cucumber'
	yi tiao maojin	一条毛巾	'a long towel'
	yi tiao dengzi	一条凳子	'a long bench'

It is noteworthy that among the *gua* 瓜 'melon' class, only *huanggua* 黄瓜 'cucumber,' *kugua* 苦瓜 'bitter gourd,' *sigua* 丝瓜 'towel gourd,' and other kinds of *gua* which have a long-shaped body take the classifier *tiao*. For those melons such as *xigua* 西瓜 'water melon' and *donggua* 冬瓜 'wax gourd,' the general classifier *ge* 个 is used, since they do not have a long-shaped body. Similarly, only long-shaped *maojin* 毛巾 'towel' and *dengzi* 凳子 'bench' take *tiao*. Otherwise, the classifier *kuai* is used for *maojin* and the classifier *zhang* 张 'flat surface' or *ge* 个 is used for *dengzi*. These facts

clearly indicate that *tiao* is semantically as well as cognitively based and not merely an arbitrary linguistic device for noun classification.

3.3. Natural extension of *tiao*

In Mandarin Chinese, *tiao* is also used as a classifier for noun classes denoting entities which possess a visible long shape but which have only two dimensions. They can be construed as the extended members of the *tiao* category. Below are listed some of the members created through natural extension.

5)	yi tiao jie	一条街	'a street'
	yi tiao he	一条河	'a river'
	yi tiao lu	一条路	'a road'
	yi tiao yingzi	一条影子	'a shadow'
	yi tiao shanmai	一条山脉	'a mountain range'

The reason we refer to this group as consisting of naturally extended members is because the entities involved are still concrete and with a visible long shape. They are different from the central members in two important respects. First, although they have clear spatial boundaries, they have only two dimensions rather than three dimensions as in the case of the central members. Second, they do not interact with the human body as closely as the central members, most of which can be grasped by the hand. When a long-shaped entity has only two dimensions, the salient perceptual feature naturally falls on the 'extension in length' of the entity. This is especially clear in the imagery of *he* 河 'river' and *lu* 路 'road.'

The membership by natural extension should include *xian* 绲 'line' as in *yi tiao xian* 一条绲 'a line,' which has only one dimension but nevertheless visible. The word *xian* 绲 can also denote 'thread,' a three-dimensional object. In referring to *xian* in the latter meaning, the classifier *gen* 根 'root-like' is preferred. In section 4, we will discuss the essential perceptual differences between *tiao* and *gen*.

The proposed distinction between the central members and the naturally extended members in terms of their different manners of interaction with the human body is in line with a view of language held by many anthropologists and psychologists that human language reflects the biological make-up of human beings. (Clark 1973, Miller and Johnson-Laird 1976, Johnson 1987).

3.4. Metaphorical extension of *tiao*

In Mandarin Chinese, *tiao* can be used to classify not only concrete visible objects or entities (as we have seen in 3.2. and 3.3.) but also entities which are invisible and abstract. The following are some of the examples.

6) yi tiao xinwen 一条新闻 'an item of news'
yi tiao falü 一条法律 'a legal article'
yi tiao hetong 一条合同 'an agreement'
yi tiao yijian 一条意见 'an opinion'
yi tiao liyou 一条理由 'a reason'
yi tiao mingling 一条命令 'an order'

The use of *tiao* in the above examples can properly be construed as metaphorical extension. While the natural extension discussed in 3.3. is based on the real and visible long shape of an entity, the metaphorical extension is based on the imagined long shape of an entity through the creative mind of human beings. This metaphorical extension is clearly associated with the fact that in Chinese news items, legal articles, agreements, opinions, and so forth are traditionally written down vertically on the page. The metaphorical extension in question is structured on a domain of experience to which most native speakers still can relate.

Similarly, the use of *tiao* in (7) can be construed as a metaphorical extension.

7) yi tiao renming 一条人命 'a human life'

Although *renming* 人命 'human life' is abstract, it is naturally associated with the human body, which has a long shape.

For the sake of clarity, it is desirable to distinguish the metaphorical extension of a noun from that of a classifier. For example, through metaphorical extension, *sangzi* 嗓子 'throat' also means 'voice' as illustrated in

8) Ta you yi tiao hao sangzi. 他有一条好嗓子。
he-have-one-*tiao*-good-throat
'He has a good voice.'

In 8), the classifier *tiao* for *sangzi* 嗓子 'throat' remains unchanged, even though the meaning of *sangzi* 'throat' has already been extended. For the same reason, we regard (9) as involving a metaphorical use of the noun *zhanxian* 战线 'battle line' rather than the classifier *tiao*.

9) yi tiao sixiang zhanxian 一条思想战线
'a battle line of thought'

3.5. From concrete to abstract

We have analyzed the categorical extension of the classifier *tiao* as from concrete objects to abstract entities. Being three-dimensional objects, the central members are more concrete than the extended members. It should be noted that while the naturally extended members are more concrete than the metaphorically extended members, we do not wish to claim that the latter has come into existence through extension from the former. In our present view, both types of extension can be derived directly from the central members.

4. Tiao 条, gen 根, zhi 枝/支, zhi 只

We have identified the long shape as the cognitive basis of the classifier *tiao*. Yet, there are many nouns referring to long objects which do not take *tiao* as the classifier. Instead, they take *gen* 根 'root' or *zhi* 支 'branch.' Consider,

10) yi gen gunzi 一根棍子 'a stick'
yi gen kuaizi 一根筷子 'a chopstick'
yi gen chaihuo 一根柴火 'a stick of firewood'
yi gen xiang 一根香 'an incense stick'
yi gen ganzhe 一根甘蔗 'a sugarcane'

11) yi gen cao 一根草 'a blade of grass'
yi gen toufa 一根头发 'a hair'

12a) yi zhi ji 一只鸡 'a chicken'
yi zhi niao 一只鸟 'a bird'
yi zhi tuzi 一只兔子 'a rabbit'

12b) yi zhi gou 一只狗 'a dog'
yi zhi yang 一只羊 'a sheep'
yi zhi niu 一只牛 'an ox'

14) yi zhi bi 一支笔 'a pen'
yi zhi dizi 一支笛子 'a bamboo flute'
yi zhi qiang 一支枪 'a gun'
yi zhi lazhu 一支蜡烛 'a candle'

As can be discerned from examples in (10), the classifier *gen* 根 seems to refer to long objects which are stiff and straight. The salient perceptual property of the entities associated with *gen* appears to involve not only the long shape but also the rigid consistency. When asked about the difference between *tiao* and *gen*, many native speakers respond to the effect that, while *gen* refers to long objects with rigidity, *tiao* refers to long objects with relative flexibility. The rigidity property disallows *gen* to be used to refer to animals such as *niu* 牛 'ox,' *yang* 羊 'sheep,' and *gou* 狗 'dog,' which have a long shape but which can move and bend their body. In contrast, with the property of flexibility, *tiao* can be used for these animals, along with *zhi* 只, a classifier for animals with legs.[7] Notice that being long and flexible but without legs, *yu* 鱼 'fish' and *she* 蛇 'snake' can only take *tiao*, but not *zhi*.

Gen and *tiao* are interchangeable for objects such as *huanggua* 黄瓜 'cucumber' and *xiangjiao* 香蕉 'banana.' These objects seem to fall in between rigidity and flexibility. In other words, in terms of consistency, they are not as rigid as *gunzi* 棍子 'stick' and *chaihuo* 柴火 'firewood.' Nor are they as bendable and flexible as *kuzi* 裤子 'pants' and *yu* 鱼 'fish.' The interchangeability between *gen* and *tiao* in referring to these objects can therefore be attributed to the ambiguity in perceptual salience of these objects with respect to the rigidity/flexibility distinction.

The examples in (11) raise the question why *cao* 草 'grass' and *toufa* 'hair' 头发 take *gen* but not *tiao*, even though they are more bendable and thus less rigid than *huanggua* 'cucumber' and *xiangjiao* 'banana.' One reasonable answer would be that the consistency of *cao* 'grass' and *toufa* 'hair' is indeed more rigid than that of *huanggua* and *xiangjiao*, which are after all edible. Perhaps, the rigidity has to do with the internal consistency of an object and not merely with its bendability.[8]

We have so far treated the rigidity in consistency on a par with the length in shape. However, it can be argued that the latter is more fundamental than the former as a salient perceptual feature underlying the Chinese classifier system. First, we have cases like *chang dengzi* 长凳子 'long bench' and *muban* 木板 'board' which are long and firm but which take *tiao* rather than *gen*. Second, *gen*, unlike *tiao*, has neither natural extension nor metaphorical extension. Third, *tiao* is overall much more frequently used than *gen*, even

though they overlap considerably. Our argument, if correct, would further support the implicational scale suggested by Craig (1986) to the effect that linguistic classifications mark shape first and then consistency.

The fact that *tiao* but not *gen* is extended from three-dimensional objects to one and two-dimensional objects is significant and deserves a few words of further discussion. In Allan's comprehensive study of classifiers across languages, shape as a perceptual basis for noun classification is broken down into saliently one, two, and three-dimensional for long, flat, and round objects respectively. We can follow Allan by regarding the salient perceptual characteristic for long things as the one-dimensional 'extension in length,' which underscores *tiao* but not *gen*. In other words, while *tiao* picks out the one-dimensional configuration of a long object, *gen* is sensitive to the three-dimensional physical body of a long object. This cognitive distinction between the two classifiers enables us to account for the significant fact that *tiao* cannot be substituted with *gen* for either naturally or metaphorically extended members. The distinction can also explain some semantic differences between the two classifiers. For instance, it explains a fact noted earlier in 3.3. that *gen* can be used as a classifier for *xian* 线 meaning 'thread' but not meaning 'a line on the plane,' the meaning of which requires the use of *tiao*. We have also earlier noted that *chang dengzi* 长凳子 'long bench' takes *tiao* but not *gen*, even though a bench has the physical property of 'rigidity.' It appears that the salient perceptual feature of a long bench is the one-dimensional 'extension in length' of the top board of the bench. Thus, the use of *tiao* for a long bench is parallel to the use of *zhang* 张 'flat surface' for a table in Chinese, which has a two-dimensional flat face as its salient characteristic.

The examples in (12) show that the classifier *zhi* 只 is used in reference to animals. In (12b), however, *zhi* can be substituted with *tiao*. In contrast, in (12a), only *zhi* 只 can be used. It can be observed that animals listed in (12b) present a long shape to human's eyes. It appears that domestic animals tend to pick up other perceptual characteristics than being just animals. For example, *niu* 牛 'ox' uses the classifier *tou* 头 'head' besides *zhi* and *tiao*. The use of the classifier *pi* 匹 for *ma* 'horse' 马 can only be understood in terms of functional characteristics.[9] Once *pi* 匹 is used for *ma*, it is extended to *luozi* 骡子 'mule' but interestingly not to *lü* 驴 'donkey.'[10] This kind of extension provides another piece of evidence for the prototype-based categorization in Chinese classifier system.

The data in (13) suggest that the classifier *zhi* 支 refers to long objects with a cylinder-like body, sometimes hollow as in the case of *dizi* 笛子

bamboo flute' and sometimes filled with contents as in the case of *bi* 笔 'pen' and *qiang* 枪 'gun.' The cylindricity of an object, like the roundness (*à la* Allan), is saliently three-dimensional. Thus, like *gen* 根, *zhi* 支 encompasses all the three dimensions of an object and does not single out the one-dimensional 'extension in length' as is in the case of *tiao*. Also, like *gen*, *zhi* picks up the rigidity property. The salient perceptual feature which distinguishes *zhi* from *gen* is therefore cylindricity.

Unlike *gen*, *zhi* can, however, be used to refer to more abstract entities such as *duiwu* 队伍 'ranks,' *ge* 歌 'song,' and *liliang* 力量 'strength.' This use can be construed as a metaphorical extension of *zhi* 支 based on the 'division' imagery of 'a tree branch,' the basic denotational meaning of *zhi* as a noun.

In written Chinese, two related characters 枝 and 支 are used for *zhi* in referring to long objects. Etymologically, 支 appeared first meaning 'a tree branch.' Later, as 支 was extended to mean 'division,' 枝 was therefore added to stand for 'tree branch.'[11] Based on data from *Xiandai Hanyu Babaici* (现代汉语八百词 *800 Words in Modern Chinese*) and *Xiandai Hanyu Cidian* (现代汉语词典 *Modern Chinese Dictionary*), they are interchangeable as far as the central members are concerned. However, only 支 is used for the members in metaphorical extensions such as *duiwu* 队伍 'ranks' and *ge* 歌 'song,' and only 枝 is used in referring to tree branch as in *yi zhi liutiao* 一枝柳条 'a willow twig' and *yi zhi meihua* 一枝梅花 'a plum.' For many native Chinese in their daily writing, 枝 is more naturally associated with objects composed of wood or parts of plants, whereas 支 is more naturally associated with objects of other kinds of material. Here is a clear case of folk etymology at work.

In sum, with respect to long objects, *tiao*, *gen*, and *zhi* each has a salient perceptual property which serves as the typicality condition for categorization; namely, the one-dimensional extension in length for *tiao*, the three dimensionality of a long, rigid object for *gen*, and the cylindricity of a long, rigid object for *zhi*. The following figure illustrates the basic distributional patterns of the three classifiers in terms of (a) nominal origin, (b) central membership, (c) natural extension, and (d) metaphorical extension.

It can be seen from figure 1 that *tiao* have both natural extension and metaphorical extension, *gen* has neither, and *zhi* has only metaphorical extension. We have proposed that the salient perceptual feature that *tiao* picks out from a long object is the one-dimensional configuration of 'extension in length.' In contrast, *gen* and *zhi* are sensitive to the three-

	Nominal Origin	Central Members	Natural Extension	Metaphorical Extension
條 *Tiao*	條子 *tiaozi* 柳條兒 *liutiaor* 麵條兒 *miantiaor* 木條兒 *mutiaor*	魚 *yu* 黃瓜 *huanggua* 褲子 *kuzi* 被單 *beidan* 櫈子 *dengzi*	路 *lu* 街 *jie* 河 *he* 走廊 *zoulang*	新聞 *xinwen* 意見 *yijian* 消息 *xiaoxi* 理由 *liyou*
根 *Gen*	根兒 *genr* 樹根兒 *shugenr*	火柴 *huochai* 針 zhen 甘蔗 *ganzhe* 草 *cao*		
支/枝 *Zhi*	樹枝兒 shuzhir (剪)枝兒 *(jian)zhir*	筆 *bi* 牙膏 *yagao* 香 *xiang*		歌 *ge* 部隊 *budui* 力量 *liliang*

dimensional physical body of a long object. This accounts for the fact that *tiao* can be naturally extended to two-dimensional entities such as *jie* 街 'street' and one-dimensional entities such as *xian* 线 'a line,' whereas neither *gen* nor *zhi* can. The imagery of 'extension in length' also enables *tiao* to be *metaphorically* extended easily. The metaphorical extension in *zhi* is based on the imagery of 'division' of a tree branch in addition to that of 'extension in length.'

Although the three classifiers each picks out a salient perceptual feature from a long object, they all refer to long objects. We would therefore expect they overlap with one another. They overlap in an interesting manner. First, they only overlap in the subcategory of central members, but not in natural extension, nor in metaphorical extension. Second, *tiao* and *gen* overlap, and *gen* and *zhi* overlap, but *tiao* and *zhi* do not overlap except in *qiang* 枪 'gun' and *xian* 线 'line; thread.' In the case of *xian* 'thread,' *zhi* is a measure denoting the density of a sweater in terms of the number of threads. In the case of *qiang*, the *zhi* is more prevalent than *tiao*. The overlapping among the three classifiers can therefore be captured by figure 2.

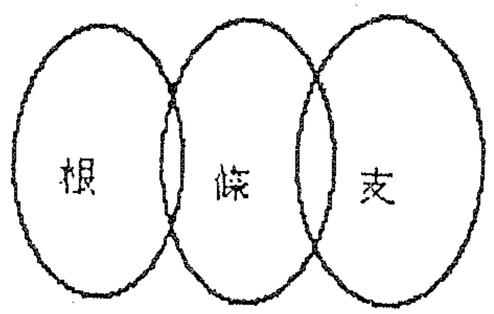

Figure 2

5. Variation

While *tiao* 条, *gen* 根, and *zhi* 支/ 枝 pick up different salient perceptual characteristics of a long object, they all refer to the long shape as the central categorical property. However, a long object needs not be categorized on the basis of its shape. For example, we have seen that animals in Chinese are categorized by *zhi* 只(隻) and only some animals can also be categorized by *tiao*. Similarly, the classifier *zhi* 只 in Chinese refers to one member of a pair. Thus, in addition to *yi gen kuaizi* 一根筷子 'a chopstick,' *yi zhi kuaizi* 一只筷子 'a chopstick (in a pair)' is also used to refer to one chopstick as versus *yi shuang kuaizi* 一双筷子 'a pair of chopsticks.' By the same token, *yi zhi tui* 一只腿 'a leg (in a pair)' can be used in addition to *yi tiao tui* 一条腿 'a leg.'

In the case of *jiao* 脚 'foot,' only *zhi* 只 but not *tiao* can be used, because the foot does not present a long shape as the leg does. The same contrast exists between *gebo* 胳膊 'arm' and *shou* 手 'hand.' Thus, we can say *yizhi gebo* 一只胳膊 in addition to *yitiao gebo* 一条胳膊, *but not yitiao shou** 一条手, which again does not present a long shape as the arm does. These contrasts show that functionally-derived salient properties can take precedence over physically-based properties. Therefore, variation in the use of different classifiers in reference to the same kind of objects is attributable to its different salient perceptual properties, either physically-based or functionally derived.

Classifier systems vary considerably across Chinese dialects. On one hand, the set of classifiers varies from one dialect to another. For example, many southern dialects do not use *gen*根. On the other hand, different dialects may use different classifiers for the same object. For example, for *yu* 鱼 'fish,' while most dialects use *tiao* 条, some Southwestern Mandarin dialects and Southern Min dialects use *wei* 尾 'tail.' Still in other dialects in Northern Min and Southern Wu, *tou* 头 'head' is used. Thus, in addition to the long shape, either the tail or the head can be chosen as the salient perceptual property of *yu*. In Nanchang dialect, the classifier *zhi* 只 'animal' is used for *yu* 鱼 'fish,' as well as for other animals. Therefore, it appears that the same object can be imputed with different salient characteristics in different dialects.

We have based our analysis of *tiao*, *gen*, and *zhi* on the Putonghua as spoken by educated Chinese. However, in Beijing dialect, *gen* is more prevalent than *tiao*; *gen* is preferred to *tiao* for *huanggua* 黄瓜 'cucumber' and others which constitute the central members of *tiao* in Putonghua. Beijing dialect does not differ much from Putonghua in the use of *tiao* in both natural and metaphorical extensions. As most of the southern dialects do not use *gen*, the class of *gen* in Putonghua is divided between *tiao* and *zhi*, depending on the dialect. For example, both *toufa* 头发 'hair' and *cao* 草 'grass' take *zhi* 支 in Amoy, but both take *tiao* in Cantonese. In view of the difference between northern and southern Chinese dialects with respect to *gen*, we are inclined to the opinion that the use of all the three classifiers as well as the overlapping pattern as schematized in figure 2 is a result of dialectal mixture.

In addition to dialectal mixture and influence, the classifier system used by educated Chinese may also fluctuate between spoken Putonghua and formal written Chinese. For example, in formal written Chinese, instead of *tiao*, *ze* 则 'item' is used for *xiaoxi* 消息 'news,' and instead of *zhi* 支, *shou* 首 is used

for *gequ* 歌曲 'song.' It can be observed that the more formal the style is, the richer the variety of classifiers becomes.[12]

We have thus identified three factors which have contributed to the variation in the use of classifiers in Putonghua. They are cognitive ambiguity, dialectal influence, and the level of formality in style. The interaction among the three factors varies from one speaker to another of Putonghua, depending on their educational, social, and dialectal backgrounds. The intertwining of the various factors has sometimes made murky the salient perceptual properties underlying the classifier system in Chinese. Nevertheless, the cognitive basis of these properties can be identified through careful examination, as we have demonstrated in this paper.

6. Conclusion

We have demonstrated that the classifier *tiao* 条 in Chinese is not an arbitrary linguistic device of categorization but represents some type of human categorization based on an imputed salient perceptual property of 'extension in length.' We have argued that *tiao* and its related classifiers *gen* 根 and *zhi* 支/ 枝 are semantically motivated as well as cognitively based in that each of the three classifiers picks up a unique salient perceptual property of a long object. The three classifiers constitute the most frequently used subset of classifiers in Chinese. This fact correlates with the fact that the nominal origins of the three classifiers all denote parts of a tree. This correlation can hardly be fortuitous; it reflects the central role played by the parts of a plant in human categorization, especially at the 'basic' level (Tversky & Hemenway 1984). In this light, our findings of the cognitive basis of the three classifiers may lead to a meaningful answer to the question why Chinese and other languages have classifiers.

We have seen that the classifiers *tiao*, *gen*, and *zhi* are related with one another in referring to long objects. As shown in the figure 2, they overlap with one another, exhibiting *family resemblance* rather than the three-way intersection as would be expected. Furthermore, their overlapping involves mostly central members and rarely extended members. We have thus shown the explanatory value of the prototype theory in teasing apart the complex relationship among the noun classes organized by the three related classifiers. We believe that many other perplexing phenomena of linguistic categorization in Chinese can better be understood by means of the prototype theory. For example, as observed by King (1989), in the Chinese writing system, the character 鱼 'fish' is used as a semantic component in the

characters for *jing* 鲸 'whale' and e 鳄 'crocodile'; and the character *chong* 虫 'insect' is used to classify *she* 蛇 'snake' and *xia* 虾 'shrimp.' For another example, the animal 'seal' is referred to as *haigou* 海 狗 'sea dog,' and 'sea cucumber' as *haishen* 海参 'sea ginseng.'

We have observed that in addition to *tiao*, *gen*, and *zhi*, long objects can also be categorized by salient perceptual characteristics based not on shape but on animacy, as in the case of animals, or on functional properties, such as 'one member of a pair.' Thus, the family of *tiao, gen*, and *zhi* in turn interact crisscrossingly with other types of classification which are based on attributes other than shape. It is significant to note that functionally-based groupings can override perceptually-based groupings. We have seen that 只 (隻) 'one member of a pair' can group objects of different shape under one category. Moreover, the grouping of *daozi* 刀 子 'knife' under the classifier *ba* 把 'handle,' in spite of its long shape, should be construed as partly functionally-based, inasmuch as the characteristic 'handle' of a knife is an imputed salient perceptual property due to the interaction between a knife and the hand. On this view, the grouping of *zhuozi* 桌 子 'table' under the classifier *zhang* 张 'flat surface' is also partly functionally based, since the flat surface of a table represents the main interaction point between the object and the hand. The Chinese classifier system thus offers a wealth of data for the study of the interaction between perceptual properties of objects and their functions in human activities.

We have pointed out that Chinese dialects differ considerably from one another with respect to classifiers, and that often the same object is classified by different classifiers in different dialects. Chinese dialects therefore provide abundant sources for the study of human categorization in different sub-cultures of China.

We have come to the view that the use of all three classifiers *tiao, gen*, and *zhi* in the Putonghua used by educated Chinese is a result of dialectal mixture between northern and southern dialects. Further investigation of other classifiers in Putonghua vis-à-via those in other dialects will certainly reveal the extent and nature of dialectal mixture in the classifier system of Modern Standard Chinese.

As a final point, even though the family of *tiao, gen*, and *zhi* in Putonghua is a system developed from dialectal mixture between northern and southern dialects, it is not an arbitrary classification system as one would expect from a mixed system. Notwithstanding the mixed nature of the system, all of three classifiers are semantically as well as cognitively based.[14] This fact points to

the important role of reinterpretation in human categorization. Thus, the study of the classifiers in Putonghua will lead us to a better understanding of the mechanism of reinterpretation in the face of language contact and language change.[13]

It is our hope that the findings of the present pilot study will germinate interests in uncovering principles of human categorization underlying the Chinese classifier system. It is also our hope that the findings will be of use to the teaching of Chinese classifiers to speakers of other languages.

NOTES

*We have benefited from discussion with Marjorie Chan, Wenze Hu, Rongrong Liao and Yumin Shen. Naturally we are solely responsible for any mistake herein.

1. A statistics based on 440 common nouns and classifiers listed in *Xiandai Hanyu Babaici* (现代汉语八百词 *The 800 Words in Modern Chinese*) shows that the percentages of usage frequency of classifiers which refer to long objects are 14.5, 7, 4.8, 0.2, 0.4, 0.6, 1.4, 0.9, and 0.9 respectively for *tiao*条, *gen*根, *zhi*支, *guan*管, *gan*杆, *chuan*串, *ke*棵, *lü*缕 *and zhu*株. With 14.5 %, *tiao* is the most frequently used classifier only next to the general classifier *ge*个.
2. See Lianqing Wang (in preparation).
3. See section 5 for a brief discussion.
4. Among Chao's nine subgroups of measures (Chao 1968:584-585), only his individual measures and those specially associated with V-O construction are referred to as classifiers. Many classifiers are grouped under other subgroups of measures. For example, under subcategory of Mp (Partitive Measure: *dui* 堆 'pile,' *tiao* 挑 'a carrying-pole load,' *ba* 把 'handful'), classifiers such as *kuai* 块 'piece,' *pian* 片 'slice,' *pian* 篇 'sheet,' and others are included. We also find some classifiers under other subcategories of measures, such as *ming* 名 'name' under Mq (Quasi-measure: *guo* 国 'nation,' *xian* 县 'county,'...), *chuan* 串 'string' under Mg (Group Measures: *da*打 'dozen,' *wan*万 'ten thousand,' ...).
5. We do not intend to claim that all the classifiers in Chinese have developed from nouns. See note 9 for an example which has originated from verbal expression.
6. In Beijing Mandarin, *tiaor* alone can be used as a noun, which means 'slender body (for female)' as in the sentence '*Zhe guniang yao ger you ger, yao tiaor you tiaor.*' 这姑娘要个儿有个儿，要条儿有条儿 'If you want height, she's got height; if you want slenderness, she's got slenderness.'
7. It is interesting to note that *tuzi* 兔子 can only take *zhi* but not *tiao*. Perhaps *tuzi* does not have a body large enough to present a long shape.
8. Many native speakers feel that the reason *cao* and *toufa* take the classifier *gen* is because they are rooted. For the simplicity of our analysis, we have not opted for this alternative explanation.
9. Based on some historical documents, Liu (1965) argues that classifier *pi* 匹 evolved from匹偶 and 匹配 in ancient Chinese, meaning 'to couple.' For example, 马一匹，与人相匹。(See 风俗通 quoted in 侯鲭录, Vol. 6) In the beginning, *pi* was not a classifier often used to refer to the 'to couple' relationship, such as husband and wife, male and female horse. For example, «论语.子罕»皇疏:'谓为匹夫者，言其贱，但夫妇相配匹而已也。' Later on, *pi* evolved into a classifier for horse, while classifiers *ge*个 and *kou*口 came to be used for the people.

   Pi can also be used as a measure word for *bu* 'cloth' meaning 'bolt.' This can be seen from the following documents. 说文段注 writes, '二丈为一端;二端为两;每两为一匹。' 'One *zhang* 丈'3 1/3 meter'(equal to 40 Chinese *Chi* 尺) is called *duan* 端'end,' two *duans* are called *liang* 两'double'; each *liang* is a *pi* 匹.' As we know, *liang* also means 'couple' in ancient time. In annotating «诗.召南.甘棠», 孔安国 writes, 每卷二丈，合为二十尺，今谓之匹，犹匹偶之云與? 'Every bolt has two *zhang* 丈. Now people call it as *pi* 匹. Isn't it reasonable to assume that it relates to *pi'ou* 匹偶'to couple?' If Liu is correct, both classifier *pi* and measure word *pi* are related to the semantic meaning of the word *pi'ou* 匹偶, *pi'pei* 匹配'to couple.' For detailed discussion, see Liu, 1965, pp. 184-187; 227-228. This example also shows that not all classifiers have come from nouns.
10. In the 6th century B. C., *pi* 匹 was a classifier mainly for *ma* 马'horse.' It sometimes classified some other animals such as *niu* 牛'ox' and *lu* 鹿 'deer.' It was even used for people (Liu 1965:186). In modern Chinese, however, *pi* is used almost exclusively for horse. Some Mandarin speakers also use it for *luo* 骡'mule,' which is very similar to horse both in shape and in size. However, it is rarely used for *lü* 驴 'donkey,' which is much smaller than horse in size. This fact provides another evidence for the prototype theory; while horse is the central member of *pi*, *luo* is less central, and the *lü* is bordline member of the *pi* category.
11. As reported in古汉语常用词典(北京商务印书馆, 1979:324) that '支:«汉书»"支叶茂接"。这个意义后来写作"枝"。'
12. In Taiwan Mandarin, *tiao*条 rather than *zhi*支 is more commonly used for *ge*歌.

13. See Haiman (1977) for detailed discussion of the important role of reinterpretation in linguistic systems.

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