

# **Chinese Morphology: An Exploratory Study of Second Language Learners' Acquisition of Compounds**

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Research in the field of linguistics has focused on syntax and grammar, while studies related to morphology have been relatively underrepresented. However, recent developments in linguistics have prompted researchers' to pay greater attention to lexicon and morphology. The aim of this paper is two-fold. One objective is to provide, from the perspectives of theoretical linguistics, a descriptive machinery that could serve as guidelines for distinguishing Chinese compounds from other concatenations. The other is to provide an exploratory study investigating the difficulty that adult learners of Chinese as a second language may have when learning compounds of different internal construction. The results indicated that while some types of Chinese compounds were easier than other types for both groups of American and Japanese participants, the compound-recognition and compound-production performance of one group was different from that of the other. Furthermore, it seemed likely that the performances of the two groups were related to features of their mother tongue. The present study extends the scope of morphological studies and, more importantly, the findings contribute to a better understanding of what strategies L2 learners may adopt and what role learners' mother tongue may play in their compound-acquiring process.

Key words: compounds, Chinese compounds, phrase structure grammar, Chinese as a second language, accuracy order, acquisition sequence

## **1. Introduction**

Research in the field of linguistics has focused on syntax and grammar, while studies related to morphology have been relatively underrepresented. However, recent developments in linguistics have prompted researchers' to pay greater attention to lexicon and morphology. Research in the field of psycholinguistics is one example. The study of human information processing has already been extended to the study of mental lexicon (e.g. Matthews 1991; Spencer and Zwicky 1998; Gleason 2001). Thus, a theory of the acquisition of lexical entries has appeared to be indispensable to our study of language in order to have a better understanding of how the human mind produces and processes language. Just as

Pinker (1984) has duly noted that many linguistic phenomena once regarded as governed by phrase structures or transformational rules are later found to be better accounted for by rules which are associated with particular entries or even set of entries, it seems reasonable to hypothesize that any comprehensive theory of language acquisition must at least address in some detail the issue of how the learner is able to acquire lexical entries and rules.

The aim of this paper is two-fold. One objective is to provide, from the perspectives of Chinese and Western theoretical linguistics, a descriptive machinery that could serve as guidelines for distinguishing Chinese compounds from other concatenations. The reason why some specific theories are referred to is not that Chinese compounding is considered another test case that lends support to their theoretical stances. It is just that these theories are regarded here as useful tools that can provide background information to help the reader reach a better understanding of compounding in Chinese. The other objective of the present paper is to provide the results of an exploratory study that examined the ways in which American and Japanese learners of Chinese produced and recognized Chinese compounds. By comparing these second language (L2) learners' compound production and recognition behavior, the present study aimed to detect whether some types of Chinese compounds were easier than other types for both groups of participants, and to see what strategies L2 learners may adopt and what role learners' native language (L1) may play in their compound acquisition process.

Nowadays there has been much work done to investigate the processes and infer the general rules of how the human acquires word structure. However, while the persistent investment of time and energy is evidently noticed in the literature to date and morphological studies are increasingly receiving greater attention from other disciplines such as psychology and education, little has been done in the study

of Chinese-as-a-foreign-language (CFL) learners' acquisition of compounds. As compared with a Slavonic or Romance language, Chinese can be considered simplistic in terms of its internal structure of words because it has only very few inflectional morphemes that could indicate categories such as tense/aspect and number/person for verbs, or categories like case and gender for nouns. In fact, it is a language with very little grammatical inflectional morphology; it, thus, is frequently thought of as an isolated language.

Generally the type of morphological device found in Chinese has to do with compounds and derivational morphemes (Comrie 1987). Since Chinese, compared to Indo-European languages, has very few derivational processes, compounding is thus considered its only real evidence of morphological complexity (e.g. Chao 1948, 1968; Lu 1965; Kratochvil 1968; Li and Thompson 1981; Tang 1989; Spencer 1991; Packard 2000). Indeed, Chinese compounding exhibits a high degree of freedom in its combination of two or more stems, so it is often thought of as the most productive device to form lexical entries. Theoretically speaking, stems of most parts of speech in Chinese could be combined together to generate compounds (Zhu 1999). Therefore, in studying how L2 learners master Chinese morphology, it is important for us to look into how they acquire compounds.

## **2. Compounding in Chinese**

To serve as background information for the focus—Chinese compounds—of the present study, some basic issues about Chinese compounds are introduced. For example, what is the general definition of words and compounds? What usually are the descriptive characteristics of compounds? What could the compounding process be? In this paper, these issues are discussed and analyzed mainly from the perspectives of both Chinese and Western linguistics.

## 2.1 Words in Chinese

In the literature, there is some controversy concerning the definition of “word” in Chinese (cf. Chao 1948, 1968; Kratochvil 1968; Li and Thompson 1981; Tang 1989; Packard 2000). Even so, according to the phonological structure of syllables, Chinese words can generally be divided into two categories: one is the monosyllabic word, and the other, the polysyllabic. In essence, the monosyllabic word consists of one morpheme, such as ‘人 *rén*’ (person) and ‘鳥 *niǎo*’ (bird), whereas the polysyllabic word is composed of two or more morphemes, such as ‘點燈 *diǎndēng*’ (to light) and ‘十字路口 *shízìlùkǒu*’ (intersection). However, there are a few cases in which polysyllabic words contain only one morpheme, such as ‘葡萄 *pútáo*’ (grape) and ‘馬拉松 *mǎlāsōng*’ (marathon race). One-morpheme polysyllabic words such as these are typically borrowed from other languages. Due to the fact that the permissible patterns of the monosyllabic structure are very restricted in Chinese, there are a very large number of monosyllabic homophones in modern Chinese; hence, word formation tends to become more and more polysyllabic. Nowadays roughly two thirds of the basic lexicon of everyday Chinese can be considered consisting of polysyllabic words (Lu 1965; Comrie 1987).

## 2.2 Major types of compounds in Chinese

When it comes to the types of Chinese compounds, according to Tang (1989), there are five major categories of compounds in Chinese—based on the different internal construction of words. They are as follows:

- (a) Subject-predicate (SP) construction, which means that there is a syntactic subject-predicate relationship between the components of a given compound.

For example, the compound ‘耳鳴 *ěrmíng*’ (tinnitus) consists of the morpheme ‘耳 *ěr*’ (ear, which can be considered the subject) and the morpheme ‘鳴 *míng*’ (to buzz, which can be considered the predicate).

- (b) Modifier-head (MH) construction, which means that there exists a syntactic modifier-head relationship between the components of a given compound. For example, the compound ‘大紅 *dàhóng*’ (crimson) consists of the morpheme ‘大 *dà*’ (big, which can be considered the modifier) and the morpheme ‘紅 *hóng*’ (red, which can be considered the head). Since in a given endocentric compound one of its elements functions as the head (Spencer 1991; Carstairs-McCarthy 1992), this type of construction can also be considered an endocentric one. Overall the endocentric compounds in Chinese are right-headed. Thus, Williams’ (1981) Right-hand Head Rule, which claims that the head is the right-most morpheme of the construction, appears to hold true for Chinese modifier-head type compounds. In fact, it has even been suggested that all nouns are right-headed in Chinese (Packard 1998, 2000).
- (c) Verb-object (VO) construction, which means that there is a syntactic verb-object relationship between the components of a given compound. For example, the compound ‘打仗 *dǎzhàng*’ (to wage war) consists of the morpheme ‘打 *dǎ*’ (to fight, which can be considered the verb) and the morpheme ‘仗 *zhàng*’ (war, which can be considered the object).
- (d) Verb-complement (VC) construction, which means that there exists a syntactic verb-complement relationship between the components of a given compound. For example, the compound ‘吃飽 *chībǎo*’ (to eat till one is full) consists of the morpheme ‘吃 *chī*’ (to eat, which can be considered the verb) and the morpheme ‘飽 *bǎo*’ (full, which can be considered the complement).

- (e) Coordinate (CO) construction, which means that there exists an antonymous or a synonymous relationship between the components of a given compound. For example, the compound ‘男女 *nánnǚ*’ (male and female) consists of the morpheme ‘男 *nán*’ (male) and the morpheme ‘女 *nǚ*’ (female).

### 2.3 Analyzing Chinese compounds from theoretical points of view

As suggested above, we can easily find disagreements over the definition of Chinese compounds in the existing literature (e.g. Chao 1948, 1968; Kratochvil 1968; Li and Thompson 1981; Tang 1989; Packard 2000). The main reason is that there appears to be no apparent demarcation between compounds and non-compounds—no matter what criterion researchers may adopt. According to Li and Thompson (1981), we can basically regard as compounds all polysyllabic units that have certain properties of single words and that could be analyzed into two or more meaningful elements, i.e. morphemes. The morphemes that comprise the compound can be both free and bound morphemes. However, bound morphemes cannot be affixes, which is an important criterion for us to distinguish compounds from derived words (Chao 1968). For example, both ‘尺 *chǐ*’ (rule) and ‘寸 *cùn*’ (inch) are bound morphemes and can be compounded into the word ‘尺寸 *chǐcùn*’ (size); however, the word such as ‘桌子 *zhuōzi*’ (table) is not a compound, but a derived word because –‘子 *zi*’ is an affix, which cannot be regarded as a component part of compounds.

In order to further understand the characteristics of Chinese compounds, the following discussion is based on some linguistic formulations that enable a framework for description. Two extensively discussed frameworks that have had a major influence on morphological studies are chosen: One is Spencer’s (1991) phrase structure grammar (psg), and the other, Lieber’s (1983) feature percolation

theory. The reason why these two specific theories are referred to in this section is not that Chinese compounding is considered another test case that supports their theoretical stances, but that the theories are regarded here as useful tools that can help the reader have a basic understanding of compounding in Chinese through some theoretical formulations on English compounding.

Spencer (1991) argues that there are eight basic claims and assumptions about English compounding. We can refer to them to achieve a greater understanding of compounding in Chinese. These eight claims are as follows (Spencer 1991: 319):

- (i) Compounds are formed from concatenated words.
- (ii) Compounds are formed from concatenated (bound) stems.
- (iii) Endocentric compounds are always right-headed.
- (iv) Compounds do not include phrases.
- (v) Only irregular inflection is found within compounds.
- (vi) Minor categories (function words) are not compounded.
- (vii) All major categories participate in compounding, though prepositions do not head compounds.
- (viii) Compounds may be either primary (root) or synthetic (verbal).

In the following, the arguments of Spencer's that seem to work for Chinese will be examined first. The first two claims proposed are that '[c]ompounds are formed from concatenated words', and that '[c]ompounds are formed from concatenated (bound) stems' (Spencer 1991: 319). As discussed earlier, Chinese compounds can be formed from words or morphemes (free or bound). Thus it appears that these two claims hold for Chinese. With regard to how to distinguish compounds from other syntactic phrases, stress generally can be very helpful when it comes to the English language. We thus know that *blackbird* is a compound, whereas *black bird* is a syntactic phrase. In contrast, as far as the Chinese language is concerned, the tone of the words will not differ by these two types of concatenations, but a particle,

‘的 *de*’, needs to be employed in order to differentiate one from another. For example, the particle ‘的 *de*’ can be added between ‘黑 *hēi*’ (black) and ‘盒子 *hézi*’ (box). Thus, ‘黑的盒子 *hēidehézi*’ (black box) is a syntactic phrase, whereas ‘黑盒子 *hēihézi*’ (a cockpit voice recorder) is a compound. In Chinese, one way to distinguish compounds from syntactic phrases is to examine whether the particle, ‘的 *de*’, exists. If it indeed exists, we thus know that such concatenation is a syntactic phrase because this particle cannot be part of any compounds (Chao 1968).

The third claim proposed by Spencer is that ‘[e]ndocentric compounds are always right-headed’ (Spencer 1991: 319). This claim, which generally appears to be valid in English, is Williams’ (1987) Right-hand Head Rule for compounds. For Chinese endocentric compounds (i.e. modifier-head compounds, which were introduced earlier), this rule also seems to be applicable (e.g. Tang 1989; Zhu 1999). Furthermore, the fourth claim that ‘[c]ompounds do not include phrases’ (Spencer 1991: 319) is also widely accepted as true for Chinese as for English (e.g. Chao 1968; Lu 1965; Tang 1989; Zhu 1999). Thus, the following,

- (1) *kànsì*      *tiāncái*    *de*      *tuīxiāoyuán*  
 看似      天才      的      推銷員  
 look like    genius    particle    salesman  
 ‘a salesman who looks like a genius’

cannot be considered a compound in that ‘看似天才的 *kànsìtiāncáide*’ is a phrase in Chinese.

With regard to both the sixth claim that ‘[m]inor categories (function words) are not compounded’, and the seventh claim that ‘[a]ll major categories participate in compounding though prepositions do not head compounds’ (Spencer 1991: 319), they also appear to hold true in Chinese (Lu 1965; Chao 1968; Tang 1989). In Chinese, it is obvious that only the major lexical categories are productively

involved in word formation. In fact, there exists a very high degree of compounding in Chinese so that words can be formed into different concepts through various major category types. For example, if only the three categories—*Noun* (N), *Verb* (V), and *Adjective* (A)—are taken into account, it can be found in the ‘國語日報辭典 *Guóyǔ Rìbào Cídiǎn*’ (Mandarin Daily News Dictionary), which is designed primarily for and often used by elementary and high school students, that the combinations of these three categories may generate approximately 24,000 disyllabic compounds (Zhu 1999). We can thereby imagine how productively and creatively Chinese compounds could be constructed through the various combinations of the major lexical categories.

Nevertheless, there is one substantial difference in the seventh claim between Chinese and English. Based on Spencer’s (1991) formulations, prepositions are considered one of the major categories in English, but in Chinese there are very few occasions in which prepositions would be involved in compounding. Thus, in our applying to Chinese compounds the psg approach exemplified by Selkirk (1982), a modified psg would be needed. The following is the investigator’s attempt to propose such an *ad hoc* psg. To make the proposed psg clearer, Adverbs (Adv) will be discussed separately from Adjectives(Adj)—although, as in English, the former can also be regarded as lexically equivalent to the latter in Chinese:

(i) N -- {N, A, V} N

NN: ‘文法 *wén-fǎ*’ (article-law, i.e. grammar)

AN: ‘安全火柴 *ānquán-huǒcǎi*’ (safe-match, i.e. safety match)

VN: ‘臥車 *wò-chē*’ (to lie-car, i.e. sleeper)

(ii) A -- {N, A, Adv} A

NA: ‘火熱 *huǒ-rè*’ (fire-hot, i.e. extremely hot)

AA: ‘早熟 *zǎoshóu*’ (early-mature, i.e. precocious)

AdvA: ‘不滿 *bù-mǎn*’ (no-full, i.e. unsatisfied)

(iii) V -- {N, A, V} V

NV: ‘面談 *miàn-tán*’ (face-to talk, i.e. to interview)

AV: ‘輕視 *qīn-shì*’ (light-to look, i.e. to despise)

VV: ‘改組 *gǎi-zǔ*’ (to change-to organize, i.e. to reshuffle)

(iv) Adv -- Adv Adv

AdvAdv: ‘未必 *wèi-bì*’ (never-must = not necessarily)

Basically these rules can form the intended Chinese compounds directly. In addition, Selkirk’s (1982) claim that the emergence of compounds as right-headed is a stipulated property of this rule system seems to be also true in Chinese, but since Chinese has only very few inflectional morphemes, some English puzzles, for example, ‘bracketing paradoxes’ such as *bird-brained*, cannot be found.

While the discussion above can generally account for the English compounding process satisfactorily, one caveat is in order here. According to Spencer (1991), there in fact are some empirical difficulties analyzing English compounds and he provides two specific examples. One is that it is impossible for us to be always sure about the category of a word because words frequently appear in homophonous pairs. For instance, is the word *password* an N N compound, or a V N compound? Basically Chinese does not have this sort of problem in that usually the category of the component parts of a compound could be easily determined from the meaning of that compound. The other difficulty Spencer mentions is that when the structures of a compound and phrase are very similar to each other, such as *postal order* and *beautiful girl*, how can we be sure whether we are now dealing with a compound or a phrase? Chinese also has this kind of problem because as in the example ‘黑的盒子 *hēidehézi*’ (black box) above, a phrase like this in spoken Chinese can often be found to have the particle, ‘的 *de*’ omitted. Therefore, for the phrase *beautiful girl* in Chinese, either [‘美麗的 *meilide*’ (beautiful) ‘女孩 *nǚhai*’ (girl)] or [‘美麗. *meili* (beautiful) ‘女孩 *nǚhai*’ (girl)] is easily heard. We hence oftentimes have

difficulty telling whether [‘美麗 . *meilì* (beautiful) ‘女孩 *nǚhái*’ (girl)] is a syntactical phrase or a compound.

In addition, Chinese has its own unique problem in N N compounds. For example, the phrase [‘家庭 *jīatín*’ (family) ‘教育 *jiàoyù*’ (education)], meaning ‘family education’, is an N N compound in Chinese, but [報紙 *bàozhǐ* (newspaper) ‘雜誌 *zázhì*’ (magazine)], meaning ‘newspaper and magazine’, is a conjoined noun, rather than a compound. According to both Chao (1948) and Li and Thompson (1981), there are two ways to distinguish N N compounds from conjoined nouns: one is that there is no pause between compound constituents, whereas there is a pause between the constituents of conjoined nouns; the other is that the order of the component parts of compounds is fixed, whereas the order of those of conjoined nouns is free. That is to say, normally Chinese can say [報紙 *bàozhǐ* (newspaper), ‘雜誌 *zázhì*’ (magazine)] (comma means that there is a pause) or [‘雜誌 *zázhì*’ (magazine), 報紙 *bàozhǐ* (newspaper)], but cannot say [‘教育 *jiàoyù*’ (education) ‘家庭 *jīatín*’ (family)] or [‘家庭 *jīatín*’ (family), ‘教育 *jiàoyù*’ (education)].

While some of Spencer’s claims appear to work well in Chinese, some do not. Claim 5 that ‘[o]nly irregular inflection is found within compounds’ (Spencer 1991: 319) is a case in point. As mentioned earlier, Chinese is regarded as a language with very little inflection. There is, thus, no such thing as irregular inflection in Chinese (Tang 1989).

The last claim of Spencer’s that ‘[c]ompounds may be either primary (root) or synthetic (verbal)’ (Spencer 1991: 319) also seems problematic when applied to Chinese. Primary compounds are comprised of concatenated words, such as *dreamteam*, whereas synthetic compounds consist of deverbal heads and the non-head constituent that ‘fulfills the function of the argument of the verb from which the head is derived’ (Spencer 1991: 319), such as *party crusher* ‘one who

crashes a party’ and *moth-eaten* ‘eaten by moths’. Generally speaking, the meanings of English synthetic compounds that involve inflection need to be expressed through phrase structures in Chinese because it in fact has very few inflectional morphemes (e.g. Lu 1965; Tang 1989). For example, the word *moth-eaten* in Chinese would be:

- (2) *chī é de*  
 蟲 蛀 的  
*chóng zhù* particle  
 ‘moth-eaten’

Due to the fact that the word ‘的 *de*’ which always marks a subordinate phrase can never be part of any compounds in Chinese (Chao 1968), here ‘蟲蛀的 *chóngzhùde*’ (moth-eaten) has to be deemed as a syntactic phrase.

As regards synthetic compounds involving derivation such as the phrase ‘*party crasher*’, the structure of this type of compound in Chinese is very similar to that in English. For example, the structure of *party crasher* in Chinese is:

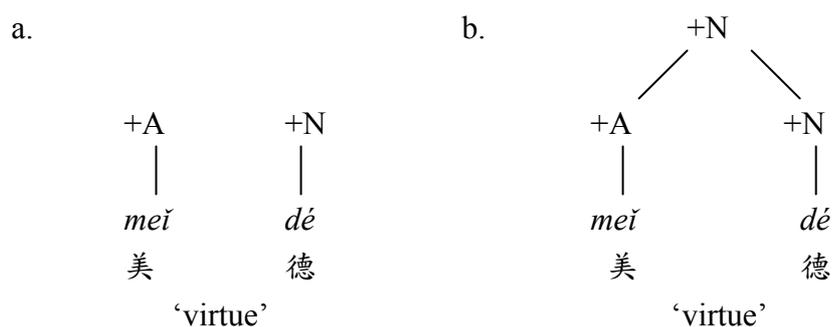
- (3) *wǔhuì chūàngìn zhě*  
 舞會 闖進 者  
 party crash derivational affix  
 ‘party crasher’

Here, the constituent ‘闖進者 *chūàngìnzhě*’ (crasher) is not a compound, but a derived word because as discussed earlier, the morphemes that constitute compounds cannot be affixes. As in English, it is a deverbal head and the constituent ‘舞會 *wǔhuì*’ (party) that fulfills the function of the argument of the verb (‘闖進 *chūàngìn*’, i.e. to crash) from which the head (闖進者 *chūàngìnzhě*’, i.e. crasher) is derived. Therefore, we can see ‘舞會闖進者 *wǔhuì chūàngìnzhě*’ (party crasher) as a synthetic compound. For this type of Chinese compound,



only type of synthetic compound found in Modern Chinese (Tang 1989). However, these compounds are relatively few because basically they are employed in Classical Chinese. Thus, even though they can be considered creative and productive in Classical Chinese, they are rarely used today (Chao 1968; Lu 1965; Tang 1989). Therefore, the above discussion of Spencer's all other claims and assumptions is confined to root or primary compounds.

Furthermore, we can try to examine how Lieber's (1980) feature percolation theory can be applied to account for the Chinese compounding process. There are four Feature Percolation Conventions (FPC) in her theory. Here the first and fourth conventions can be used to adequately exemplify Chinese compounds. As in Figure 2a, FPC I, which states that '[t]he features of a stem are passed to the first dominating non-branching node', labels the non-branching nodes for the word, '美德 *meǐdé*', and then as in Figure 2b, FPC IV, which says that '[i]n compound words in English features from the right-hand stem are percolated up to the branching node dominating the stems' (Spencer 1991: 203), labels the whole compound and thus guarantees its right-headedness:



**Figure 2.** Exemplification of the first and fourth conventions of Lieber's Feature Percolation Conventions Theory

The reason why Lieber's theory seems to work in Chinese is that Chinese is a language with right-headed compounds (e.g. Chao 1948, 1968; Lu 1965; Tang 1989;

Packard 2000). For Lieber, FPC IV is especially important here because this rule is particularly devised for languages which have right-headed compounds such as English. In other words, unlike the first three conventions, which are meant to be universal, the fourth is intended to be language-specific. It thus seems to be no surprise that FPC can work well in Chinese.

Simply put, the previous discussion has attempted to provide from a theoretical stance a descriptive machinery for the Chinese language that could serve as guidelines for distinguishing Chinese compounds from other concatenations. Certainly the discussion here is not meant to be conclusive and comprehensive (as mentioned earlier, there exist some controversies on the definition of “word” in Chinese). It is in fact only very preliminary, and we surely can find other theoretical frameworks that can be used to illustrate how compounding works in Chinese. Nevertheless, it is hoped that the discussion presented in this section can at least help the reader reach a basic understanding of what the Chinese compounding process is like.

### **3. Exploratory study**

#### **3.1 Background**

In addition to the objective that aims to provide, from the perspectives of Chinese and Western theoretical linguistics, a descriptive machinery that could serve as guidelines for distinguishing Chinese compounds from other concatenations, the other objective of the present paper is to provide an exploratory study that looked into the difficulty that CFL learners might experience when learning compounds of different internal construction. The present study, in some respects, can be considered similar to a number of studies, commonly known as the *morpheme studies*, which were carried out to examine the order of acquisition of a specific

range of grammatical functors in the speech performance of L2 learners. These studies were often motivated by researchers' assumption that the result of universal language processing strategies would conduce to an invariant order in both L1 and L2 acquisition. Generally, this line of research has been conducted by following a somehow fixed procedure. Oral and/or written data were elicited through some kind of elicitation device consisting of a series of pictures that the learners were asked to describe. The researchers then tried to identify the grammatical items that were the target of investigation. Each item was scored based on whether it was correctly produced in each carefully designed context, and an *accuracy order* of its total use by all the participants in the study was accordingly calculated and obtained. It was thus possible to rank all the tested items in order of their accuracy scores (Ellis 1985: 55).

Some criticisms have been raised as to the evidence from the morpheme studies. For example, the order produced from the above procedure was initially claimed to be *acquisition order*. It was later proved by a number of longitudinal studies that 'acquisition order' was not supposed to be equated with 'accuracy order' (See Ellis 1985: 42-74, 1994: 73-117 for a detailed review of the morpheme studies). Even so, this line of research indeed shed good light on our understanding of L2 learners' acquisition process and inspired some later work on developmental studies. Since very little research has been done in the study of L2 learners' acquisition of Chinese compounds, the design of the present study is based on the original idea of the two most frequently cited early morpheme studies by Dulay and Burt (1973, 1974). In addition, efforts have been made by the investigator to avoid some criticisms raised in the existing literature concerning these two scholars' studies.

### 3.2 Research questions

The specific research questions that guided this exploratory study are:

- (i) Are some types of Chinese compounds easier than others for L2 learners to acquire?
- (ii) If compounds of different internal construction do impose different degrees of difficulty for L2 learners, does this difference vary according to the learner's native language? In other words, does a *learner's L1 affect performance to a great extent?*

Simply put, the aim of the present study is to find out whether some types of compounds are easier than other types for L2 learners to acquire. In addition, since research has suggested that the accuracy order can be attributed to factors such as a learner's mother tongue (Ellis 1985), the present study also tries to explore what role learners' L1 may play in their acquisition of Chinese compounds.

### 3.3 Research design

#### 3.3.1 Participants

Forty American and forty Japanese adults learning Chinese as a foreign language in Taiwan were tested to examine their ability to recognize and produce Chinese compounds. They were all selected from intermediate Chinese classes being offered in a college setting. All participants had studied Chinese for at least four years. The reason why the participants with this proficiency level of Chinese were chosen had to do with the linguistic tasks imposed in the present study. After carefully evaluating different levels of CFL textbooks currently employed in college, the investigator found that the learners in the intermediate level class were more ideal participants than those in advanced-level or beginning-level courses. Students at the advanced level would know too much about the language, and beginners too little; therefore it would be difficult to assess their ability to make

judgments about Chinese morphological relationships.

### 3.3.2 Test Materials

The test materials used in the present study are the five major types of compounds in Chinese discussed previously, namely subject-predicate (SP) construction, modifier-head (MH) construction, verb-object (VO) construction, verb-complement (VC) construction, and coordinate (CO) construction.

### 3.3.3 Procedures

All the participants had to perform two tasks: compound recognition and compound production. During the entire data-collecting period, each participant was asked to recognize 300 compounds (i.e. 60 words for each type) and to also produce 300 compounds (i.e. 60 words for each type). The compounds chosen for the experiment were either disyllabic or polysyllabic. Each of the test items was selected from the high frequency words in the intermediate-level reading material for the L2 learners of Chinese (Chen, Wang, and Lu 2001). Each data-collecting session aimed to collect both compound-recognition and compound-production data. In each session there were 50 compounds tested (10 words--5 for compound recognition and 5 for compound production--for each type), and there were 12 sessions in total. The investigator met with the participants in small groups of 10 persons. Each session was conducted in a language laboratory.

Most importantly, to make certain the participants' performance was really reflective of their ability to recognize and produce the five types of Chinese compounds, all the words consisted of the characters that they had studied before in earlier textbooks. The reason was that if the participants could not recognize or produce some compounds simply because they had not studied some or all of the

components of those compounds, it did not necessarily mean that they had not acquired the types of compounds to which those words belonged. After all, the focus of the present study was on the acquisition of the type of compounds, rather than on the acquisition of each individual character.

When recognizing and producing the test compounds, the participants were asked to have their answers recorded on a tape recorder first, and then to write down their answers. The written responses were meant to serve as a supplement to their oral responses. In two of the data-collecting sessions, in addition to the regular test, the participants had to fill out a questionnaire, asking what strategies they frequently adopted in dealing with unfamiliar or novel compounds. It is hoped that this could provide the investigator with some further insights into how these participants learned Chinese compounds. The actual procedures of the compound-recognition and compound-production tasks are detailed as follows:

**(a) Compound recognition**

The participants were instructed to give both oral and written interpretations to the test compounds. They had to first record their oral responses into a tape recorder and then give a written version of their answers. The test items were all presented on a sheet of paper in isolation without any contextual support. The reason why no such support was provided was to prevent the participants from guessing the meaning of the test words from the context.

**(b) Compound production**

With a view to encouraging the participants to produce the desired test compounds, the investigator designed a specific instrument that combined the methods of a discourse completion test, which was originally developed by Blum-Kulka (1982) (following Levenston 1975) for studying speech act realization,

and of the concrete picture description task, which was employed by the Nijmegen researchers (Poullisse 1989) to study L2 learners' use of compensatory strategies. The following (a) and (b), which were constructed to elicit '洗澡 *xǐzǎo*' (to take a bath), is an illustration of this specially designed method:

- (a) '運動後 *Yùndònghò*' (After exercise)  
 '安全身溼透了 *Ān quánshēn shītoùle*'. (Ann is very sweaty).  
 '安 *Ān*': '我現在要去 *Wǒxiànzài yàoqù*' \_\_\_\_\_.  
 (Ann: I am going to \_\_\_\_\_.)  
 Jim: '快去吧! 沖掉汗水會使你覺得舒服。'  
*Kuàiqùba! Chōngdiào hànshuǐ huì shǐ nǐ juéde shūfú*.  
 (Go ahead. After you take a shower, you'll feel more comfortable.)
- (b) A picture showing a man taking a bath will be provided along with the dialogue above.

Simply put, in the compound-production part of the test, a dialogue and a picture invented especially for the purposes of this test were provided for every compound studied.

### 3.3.4 Data Analysis

Adapted from Dulay and Burt's (1973, 1974) studies on the acquisition sequence of grammatical morphemes for L2 learners, the method of data analysis employed in the present study was that each test item for a given type of compound was scored on a three point scale: a wrong response counted as 0, a likely response counted as 0.5, and a correct response counted as 1.0. These scores were then averaged to get a proportion out of 1.0 for each type of compound. Next the scores were put in order to generate a sequence that ranged from the types of compounds given correct answers most often to those given least often. To see whether there was a matter of transfer from learners' L1 that might affect their acquisition order, the investigator scored the Japanese participants' and the American participants'

answers separately. In addition, a second rater independently coded twenty percent of the data from each group, which were randomly selected, to ensure the reliability (Cohen 1960) of the investigator's scoring. A corrected-for-chance level of kappa of at least .85 was considered acceptable. The interrater agreement coefficients for the Japanese participants' and the American participants' responses were 93% and 95% respectively.

Results were then analyzed quantitatively by conducting chi-square tests of differences in proportions. An alpha level of .05 was chosen as the cut-off point for significance. These tests helped to determine not only whether there were statistically significant differences between groups in their use of the five major types of Chinese compounds, but also whether there were significant differences within each group of participants in terms of their sequential order when learning these compounds.

### 3.4 Results and discussion

Tables 1 and 2 indicate the frequency and percentage of the correct, likely, and wrong responses to each of the five major types of Chinese compounds for the American and the Japanese learners respectively.

**Table 1.** Frequency and percentage of the correct, likely, and wrong responses to each of the five major types of Chinese compounds for the forty American participants

Type	Compound Recognition N = 300						Compound Production N = 300						Subtotal N= 600					
	Correct		Likely		Wrong		Correct		Likely		Wrong		Correct		Likely		Wrong	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
CO	36	.12	15	.05	9	.03	34	.11	11	.04	15	.05	70	.12	26	.04	24	.04
MH	27	.09	18	.06	15	.05	26	.09	13	.04	21	.07	53	.09	31	.05	36	.06
VO	25	.08	16	.05	19	.06	20	.07	9	.03	31	.10	45	.08	25	.04	50	.08
SP	17	.06	18	.06	25	.09	8	.03	11	.04	41	.14	25	.04	29	.05	66	.11
VC	15	.05	11	.04	34	.11	8	.03	4	.01	48	.16	23	.04	15	.03	82	.14
Total	120	.40	78	.26	102	.34	96	.32	48	.16	156	.52	216	.36	126	.21	258	.43

Notes: 1. The numbers of the correct, likely, and wrong answers here were the average of the forty participants. For example, based on the performance of the forty American participants, on average, each participant recognized 36 and produced 34 coordinate compounds (CO) correctly.

2. For frequency (F), all numbers were rounded to have no decimal, whereas for percentage (%), all numbers were rounded to two decimals.

**Table 2.** Frequency and percentage of the correct, likely, and wrong responses to each of the five major types of Chinese compounds for the forty Japanese participants

Type	Compound Recognition N = 300						Compound Production N = 300						Subtotal N= 600					
	Correct		Likely		Wrong		Correct		Likely		Wrong		Correct		Likely		Wrong	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
CO	42	.14	15	.05	3	.01	37	.12	13	.04	10	.03	79	.13	28	.05	13	.02
MH	37	.12	17	.06	6	.02	35	.12	8	.03	17	.06	72	.12	25	.04	36	.04
VO	32	.11	21	.07	7	.02	27	.09	10	.03	23	.08	59	.10	31	.05	30	.05
SP	21	.07	19	.06	20	.07	15	.05	12	.04	33	.11	36	.06	31	.05	53	.09
VC	18	.06	12	.04	30	.10	12	.04	11	.04	37	.12	30	.05	23	.04	67	.11
Total	150	.50	84	.28	66	.22	126	.42	54	.18	120	.40	276	.46	138	.23	186	.31

Notes: 1. The numbers of the correct, likely, and wrong answers here were the average of the forty participants. For example, based on the performance of the forty Japanese participants, on average, each participant recognized 42 and produced 37 coordinate compounds (CO) correctly.

2. For frequency (F), all numbers were rounded to have no decimal, whereas for percentage (%), all numbers were rounded to two decimals.

Table 3 further contrasts the percentages of these five types of compounds in the correct answers of these two groups of learners.

**Table 3.** The percentages of the five major types of Chinese compounds in the two participant groups' correct answers

	CO	MH	SP	VO	VC	Total
American	32	25	12	21	11	100
Japanese	29	26	21	13	11	100

Note: For each participant group, these percentages were derived from dividing total correct frequency by subtotal correct frequency for each type of compounds respectively. For example, the percentage of the CO type for the Japanese participants was derived from dividing 276 by 79. All numbers were rounded to have no decimal.

Table 4 summarizes the 'accuracy' order of the five major types of compounds from (1) most frequent to (5) least frequent for both groups respectively.

**Table 4.** The 'accuracy' orders of the five major types of Chinese compounds for the forty American and the forty Japanese learners of Chinese

American learners:				
1	2	3	4	5
coordinate	modifier-head	verb-object	subject-predicate	verb-complement
Japanese learners:				
1	2	3	4	5
coordinate	modifier-head	subject-predicate	verb-object	verb-complement

Based on these tables, it appears that the Japanese participants generally performed better than the Americans. We can see that of the 600 test compounds given by each participant in both learner groups, the percentages of the correct answers for the Japanese and American participants were 46% of the time and 36% respectively, whereas the percentages of incorrect answers were 31% of the time and 43% respectively. In other words, the differences between these two groups in their correct and incorrect answers were 10% and 12% respectively. A chi-square test of the significance of these two differences in proportions yielded  $X^2 = 12.40$ ,  $p < .001$  and  $X^2 = 18.86$ ,  $p < .001$  respectively. We thus know that the Japanese participants made significantly more correct responses than did the Americans, and that the former made significantly less incorrect responses than the latter.

In addition, some types of Chinese compounds did seem to be easier than other

types for both groups of learners. For the Japanese participants, the percentages of the coordinate, modifier-head, subject-predicate, verb-object, verb-complement compounds in their correct answers were 29%, 26%, 21%, 13%, and 11% respectively, whereas for the American participants, these percentages were 32%, 25%, 11%, 22%, and 11% respectively. For these percentages, chi-square tests of the differences among these proportions yielded  $X^2 = 33.13$ ,  $p < .001$  for the Japanese, and  $X^2 = 40.66$ ,  $p < .001$  for the Americans. It follows that there were statistically significant differences within each participant group in terms of their ability to respond correctly depending on the different types of Chinese compound construction.

Moreover, as shown in Table 4, we can find that compounds of different internal construction did impose different degrees of difficulty for the learners with different L1 backgrounds. In other words, the participants with different L1s appeared to have a somewhat different compound ‘accuracy’ order. It can be noticed that although basically both the American and the Japanese participants seemed to have a similar order, the verb-object construction appeared to be easier to learn than the subject-predicate construction for the Americans; in contrast, the former seemed to be more difficult than the latter for the Japanese. Again, we could resort to the chi-square test to see whether there was a significant difference in the use of these two types of Chinese compounds between the two participant groups. A chi-square test of the significance of the difference in proportions between the correct SP and VO responses for the Japanese and the American participants yielded  $X^2 = 23.19$ ,  $p < .001$  and  $X^2 = 13.81$ ,  $p < .001$  respectively. Thus, we know that the American learners produced correct VO compounds more often than did the Japanese, whereas the latter employed correct SP compounds more frequently than the former. Except for this difference, the degree of difficulty

imposed by the other three types for both participant groups appeared to be the same. We, thus, see that the coordinate type has the highest correct rate, the modifier-head, the second, and the verb-complement, the last.

To summarize, the results above suggested that some types of Chinese compounds were easier to acquire than other types for L2 learners. Based on the fact that the nature of the present study is cross-sectional, rather than longitudinal, we hence can only say that there might exist an 'accuracy' order, rather than an 'acquisition' sequence, in their learning of compounds (e.g. Rosansky 1975). In addition, the learners with distinct mother tongues seemed to have different orders. The research questions of the present study, thus, appeared to be answered.

To obtain a better understanding of how the participants acquired Chinese compounds of different internal construction and what strategies they might adopt in dealing with novel or unfamiliar compounds they had not yet learned, the participants' responses to the compound-recognition task were distinguished into four major categories, which roughly accounted for almost 87% of their responses. In fact, these categories can be considered their strategies in recognizing compounds. Their compound-production responses are not applicable in the categories here because those responses were supposed to be the exact words, rather than the interpretations of the test compounds. Each of these four categories is exemplified as follows:

**(a) Paradigm**

If the participants gave the circumstances or conditions under which the meaning or object referred to by the test item worked in the real world, such an interpretation would be thought of as a paradigm strategy. That is to say, what they intended to do was to interpret the test compound by presenting the associated

conditions or situations for the use of that specific item. For example, one participant interpreted ‘醫院 *yīyuàn*’ (hospital) by saying ‘人生病的時候要去的地方 *rén shēngbìng de shíhò yàoqù de dìfōng*’ (the place where people need to go when they are sick).

### **(b) Paraphrase**

If the participants presented an interpretation that was considered synonymous to the test item, this interpretation could be regarded as a paraphrase strategy. For instance, one participant interpreted ‘乾淨 *gānjìng*’ (clean) as ‘清潔 *qīngjié*’ (clean).

### **(c) Head**

An interpretation could be considered a head strategy when the participants seemed to take as the head a certain component part of the test compound. For example, ‘豬肉 *zhūròu*’ (pig-meat, i.e. pork) was interpreted by one participant as ‘豬身上的肉 *zhū shēnshàng de ròu*’ (meat on pig).

### **(d) Compositional**

If the participants gave an interpretation that was derived compositionally from the component parts of the test compound, then this interpretation could be seen as compositional. For instance, one participant interpreted ‘姊妹 *jiěmei*’ [(elder sister)-(younger sister), i.e. sisters] as ‘姊姊和妹妹 *jiějie hé meimei*’ [elder sister (姊姊 *jiějie*) and (和 *hé*) younger sister (妹妹 *meimei*)].

One interesting phenomenon found in these categories was that it appeared that only those test items that had been acquired by the participants received the paradigm interpretations. It could be noticed that the paradigm interpretations produced all appeared to be correct. Maybe this was because the participants had

learned the test items before so that they generally knew the appropriate context in which these compounds could be employed. With regard to the other three category types of interpretations, participants gave all correct, likely, and wrong answers.

As mentioned earlier, the participants were asked to fill out questionnaires in two of the experiment sessions for the strategies they might adopt in dealing with Chinese compounds. Coincidentally, in their responses, most of them indicated that the strategies they might enact for the novel or unfamiliar compounds were the last three category types of interpretations mentioned, that is, paraphrase, head, and compositional. Specifically, the compositional interpretation was the most frequently adopted strategy, with 100 % of the participants reporting that they had used this strategy, whereas roughly 55% of the participants enacted the paraphrase strategy and about 43% adopted the head strategy. Furthermore, among these three strategies, all the participants reported that in coping with novel or unfamiliar compounds, they would try to adopt the compositional strategy first, and if adopting this strategy could not give them a likely or satisfactory answer, they would then try the other two strategies.

There is another interesting difference in the compound recognition strategies adopted by the two groups of learners. For the Japanese participants, they all reported that they would refer to their native language to deal with novel or unfamiliar compounds, whereas for the American participants, none of them reported doing so. This difference may be caused by the fact that in Japanese, there are many characters and words that are borrowed from Chinese [called ‘漢字 *kanji*’ (Chinese character) in Japanese]. Although the meaning of *kanji* is often different from that of the Chinese words or characters that look exactly the same, sometimes the meaning is the same in both languages. For instance, the Japanese word *sensei*

looks exactly like Chinese ‘先生 *xiānshēng*’; however, the former means ‘teacher’ in Japanese, whereas the latter refers to ‘Mr.’ in everyday Chinese even though it can also mean ‘teacher’ in Classic Chinese and is a highly respectable term for ‘teacher’ in modern written Chinese. On the other hand, Japanese *kyoiku* also looks exactly the same as Chinese ‘教育 *jiàoyù*’, and both mean ‘education’. Therefore, whenever the Japanese learners run into a novel or an unfamiliar Chinese compound and some or all component parts of that word also exist in Japanese, they, while knowing that associating Chinese with Japanese may not always render them a correct answer, still cannot help but make that association.

Thus, most of the Japanese participants reported that in situations where they could associate Chinese compounds with those in their L1, they would do so. In other words, under the circumstance of the possible L1-L2 relatedness, they would not adopt the strategy with the highest percentage of usage—the compositional interpretation, for they believe that in referring to their mother tongue, they may have a better chance to give a correct or likely answer. In contrast, the American participants do not have this kind of ‘association advantage’ due to the fact that their mother tongue is an alphabetic language, not a logographic language like Japanese ‘漢字 *kanji*’ and Chinese.

In addition, how can we explain the VO-SP order difference between the two participant groups? It is likely that the participants’ L1 also played an important role here. For the Japanese participants, they have a native language with an S-O-V structure, whereas for the Americans, they have a mother tongue with an S-V-O structure. As for the target language—Chinese, like English, it is also a language with an S-V-O structure. It can be found that although overall the Japanese participants performed better than the Americans, the latter group’s overall performance on VO type was better than the former group’s (the percentages of the

correct, likely, and wrong answers to the VO compounds for the American participants were .08%, .04%, and .08% respectively, whereas for the Japanese, the percentages were .06%, .05%, and .09% respectively). Does the same syntactic structure in English and Chinese make the American participants acquire verb-object compounds earlier and easier than the Japanese? No definitive answers can be offered under the scope of the present study, but here we can refer to some of the Japanese participants' responses given in the two questionnaires in which they were asked what strategies they would adopt in dealing with unfamiliar or novel compounds. According to their responses, they thought that Chinese VO compounds did somehow confuse them from time to time both because in their native language the 'object' is put in front of 'verb,' and because some of the Japanese *kanji* (Chinese character) have an OV structure.

However, generally speaking, although all the Japanese participants admitted that they, in learning Chinese compounds, were sometimes confused or misled by the *kanji*, they still reported that the *kanji* was a good aid in their acquisition process. In other words, they all believed that the *kanji* could do more good than harm for them in learning Chinese compounds. With a view to having a clearer picture of whether or not L2 learners' 'accuracy' order of Chinese compounds would differ by their native language, we need to include learners with more diverse linguistic backgrounds in a possible follow-up study. Since morpheme studies conducted on a longitudinal basis have suggested that there are differences in the L2 developmental sequence that can be attributed to factors such as L1 (Ellis 1985, 1994), it seems obvious that the above discussion of the possible mother tongue influence is indeed worth further exploration.

#### **4. Suggestions for future research**

The present study focuses not only on providing a descriptive machinery that could serve as guidelines for distinguishing Chinese compounds from other concatenations, but on providing an exploratory study that examined the ways in which American and Japanese learners of Chinese produced and recognized Chinese compounds. It should be noted here that the present study is but an initial investigation of how second language learners acquire Chinese compounds. To completely understand this aspect of L2 research, the following suggestions may serve as recommendations for future research.

When it comes to strategies L2 learners may adopt in dealing with novel or unfamiliar compounds, the results of the present study showed that all the participants would first resort to the compositional interpretation. It would be interesting to find out whether or not some types of compounds could be more easily comprehended compositionally than other types so that L2 learners who enact this strategy may have a better chance to interpret those compounds correctly. Put another way, when all five types of Chinese compounds are comprehended compositionally, will it be easier for learners to correctly interpret some types? Further research may ask participants to compositionally interpret some compounds that they have not yet acquired. We may, thus, be able to see whether it will be easier for participants to correctly recognize some types of compounds. In this way, we can reach a better understanding of whether there indeed exists a transparency or complexity hierarchy in Chinese compounds. If so, some types of compounds can be considered more transparent than others and could, thus, be acquired earlier.

- (a) The result of the present study showed that the Japanese participants could associate Chinese compounds with those in their L1. It would be interesting to

find out whether this would be a key factor to account for the result that they generally appeared to perform better than the Americans. A good way to test this hypothesis in future research would be to have the participants interpret compounds in which none of their component parts can be found in Japanese.

- (b) The results of the present study showed that the American participants' performance on VO type of Chinese compounds was better than the Japanese even though overall, the latter performed better than the former. Further research may be conducted to see whether the same syntactic structure between English and Chinese makes the American participants acquire verb-object compounds earlier and easier than Japanese students. Moreover, the research may be extended to explore whether it is easier for L2 learners to acquire L2 compounds if their L1 has a syntactic structure similar to that in the L2.
- (c) Since the present study was based only on eighty L2 participants, with only two different native languages, the results are, thus, not intended to be generalized to all L2 learners of Chinese. Although there are no definitive answers provided about the generalization of the findings and about the possible causes of the performance differences, it is suggested that the participants' native language might play an important role in the observed differences. To ascertain whether the findings of the present study can be generalized to all CFL learners, and whether learners' L1 has to do with their performance differences, we need to conduct further research by including many more participants with diverse linguistic backgrounds.

## 5. Conclusion

The aim of the exploratory study reported in this paper is to find out whether

Chinese compounds of different internal construction would impose different degrees of difficulty for adult CFL learners. The results indicate that although it does seem that some types of compounds were easier than other types for both the American and the Japanese participants, the ‘accuracy’ order shown by the former is different from that of the latter. Subject-predicate construction appeared to be more difficult to learn than verb-object construction for the Americans; in contrast, it was verb-object construction that seemed to be more difficult to learn for the Japanese. In addition, it was found that generally the Japanese participants performed better than the Americans on both compound-recognition and compound-production tasks. Nevertheless, it seems likely that both of their performances relate to features of their L1 to a certain extent.

In brief, it is hoped that the present study can contribute to a better understanding of compound acquisition in the field of morphological studies. Above all, since most research in morphological development to date has mainly focused on languages with inflectional morphemes, its findings cannot be generalized to languages such as Chinese that have very few morphological components in the grammar (Cook 1993). Thus, further studies centering on logographic languages such as Chinese will not only shed light on the universal language development of the human, but also have potential pedagogical implications. The knowledge gained from this line of study can help teachers better adjust L2 teaching to assist learners with different backgrounds in their acquisition process; moreover, a better understanding of the compounding processes involved in acquiring an L2 may lead to a great improvement in L2 learning.

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# 構詞學探索性研究：第二外語學習者習得 中文複合字時所可能遭遇之困難

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過去在語言學領域中，構詞學之研究較不受人重視，令人欣慰的是近來已有愈來愈多學者投入此部分之研究。本論文的目的有二：一是從中、西理論語言學的觀點來介紹如何區分中文與其他語言之複合字；另一是報告一實證性研究結果。此研究探索四十位美國人與四十位日本人在學習中文不同型式之複合字時所可能遭遇之困難，結果顯示儘管不同型式之複合字會影響這兩組受試者之受測表現，但兩組之表現不盡相同，此差異或許是受到其母語之影響。

關鍵詞：複合字、中文複合字、短語結構語法、中文為第二語言、正確順序、習得順序