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DISYLLABIC BOUND FORMS IN MODERN MANDARIN CHINESE:
AN ANALYSIS OF *YIQIAN* AND *YIHOU**

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ABSTRACT

This study argues that along with an increasing number of monosyllabic bound morphemes, Modern Mandarin has begun to add disyllabic bound forms to its inventory of linguistic elements. *Yiqian* ‘before’ and *yihou* ‘after’ are two such examples. The behavior of phrase-final *yiqian/yihou* indicates that they are not nouns, postpositions, word affixes or phrasal affixes; rather, they are nominal bound forms at the phrasal-level. Thus they constitute a new category in the domain of morpho-syntax. It is suggested that the emergence of these bound forms is a consequence of the early origin and the frequency with which they occur at the phrase-final position.

SUBJECT KEYWORDS

Morphology Disyllabic bound forms Frequency

1. INTRODUCTION

The division between free and bound morphemes is well-established in morphology. Typically bound morphemes are affixes, such as inflectional and derivational affixes. Affixation as a word formation process is not productive in Modern Mandarin, although there is a small number of affixes in the language, e.g. the diminutive *zi*, *er*, and *tou* ‘head’¹. Modern Mandarin actually has a large number of bound morphemes that are not affixes; they are neither inflectional, nor derivational morphemes. They are similar to free morphemes in that they constitute an open class, rather than a closed class; the only difference is

that they are not used as words by themselves. For example, Lü (1942/1982: 7) notes that *yuan* ‘yard’ does not form a word by itself; rather, it combines with the diminutive *zi* to form *yuanzi* ‘yard’, with *xi* ‘plays’ to form the compound *xiyuan* ‘theater’, and with *fa* ‘law’ to form the compound *fayuan* ‘court’. He refers to such forms as *cigen* ‘word-root’. Packard (2000) calls them ‘bound roots’. We will adopt the latter term as it reflects the boundness of these forms.

One characteristic of bound roots is that they are all monosyllabic. As far as we know, in the literature there have not been discussions of disyllabic bound roots. This seems to suggest that in general, when a form is disyllabic, it has the potential to be an independent word. In this study we will attempt to show that Modern Mandarin has a different type of bound forms that are disyllabic. They are not bound roots (which combine with other morphemes to form words); rather, they are bound at the phrasal-level— they combine with a phrasal expression to form another phrasal expression. Two concrete examples of such forms are *yiqian* ‘before’ and *yihou* ‘after’. These two forms, with a diverse syntactic distribution, are both free and bound, depending on specific context. In one environment (see section 2), they are used as nominal phrasal bound forms, where their syntactic and morphological behavior distinguishes them from monosyllabic bound roots as well as independent words. Thus they constitute another category in the domain of morpho-syntax. In what follows, we will first look at their distribution (section 2); we will then consider how they have been analyzed in the literature (section 3). We present supporting evidence for the boundness of these forms in section 4. In section 5, we consider how *yiqian* and *yihou* became bound over time by looking at data from early periods as well as corpus data, which allow us to hypothesize not only on their origin, but also in what way they will continue to evolve over time. In section 6, we consider other possible disyllabic bound forms in the language.

2. DISTRIBUTION

On the basis of data from Sinica Corpus, we identify four environments for *yiqian* and *yihou*.

Type 1: Phrase-final *yiqian/yihou*

In this usage, *yiqian/yihou* occurs at the end of a phrase, as illustrated in (1-3):

- (1) Henjiu yiqian, you yige hanren xiao guniang
 long-time before there-is one-CL Chinese-person little girl
 ‘Long time ago, there was a little Chinese girl.’
- (2) Mingchao yiqian de ren dou yi chawan he cha
 Ming-dynasty before DE people all use tea-bowl drink tea
 ‘People before the Ming dynasty all drank tea with a tea bowl.’
- (3) 1979 nian yihou, dongya jige guojia cong riben kaishi xiandaihua le
 1979 year after east-Asiaa-few-CL country from Japan start modernizePRT
 ‘After 1979, a few East Asian countries, beginning with Japan, started to modernize.’

(1) and (3) feature *yiqian* and *yihou* in unambiguous time phrases, signaled by the entire construction being set off by commas. In (2) the entire time phrase *Mingchao yiqian* is in a *de* construction, preceding the clitic *de*.

The phrase-final usage also appears after whole sentences or verb phrases, as in (4-5), (4) being marked off initially with the preposition *zai*:

- (4) Taiwan tuzhu minzu zai meiyou he wailai wenhua jiechu
 Taiwan aboriginal ethnic-group at not-PERF and foreign culture in-contact
 yiqian, jie shi wei ceng shiyong wenzi de minzu
 before all are not have used writing DE ethnic-group
 ‘The aboriginal ethnic groups in Taiwan, before they had contact with other cultures, were groups that did not use a writing system.’
- (5) Zhuangzi xia -le shan yihou, dao yige pengyou jia qu.
 Zhuangzi go-down-PERF mountain after go one-CL friend house DIR
 ‘After Zhuangzi went down the mountain, he went to a friend’s house.’

Of the four distributions, this is the only one that is used as a bound form, as we will argue in section 4.

Type 2: *Yiqian/yihou* as a noun

In this usage *yiqian* and *yihou* function as a noun, though this distribution is often limited to the environment of the object of prepositions such as *bi* ‘compare’ and *gen* ‘with’:

- (6) Renmin que yiran shenghuo zai pinkun zhi zhong, shenzhi bi
 people but still live at poverty of middleeven compare
yiqian geng qiong
 before more poor
 ‘But people still lived in poverty, (they were) even poorer than before.’
- (7) Wo huran dong -le henduo shiqing, kanfa gen yiqian
 I suddenly understand-PERF a-lot-of things viewpoint with before
bu yiyang le
 not same PRT
 ‘I suddenly understood a lot of things; my viewpoint is no longer the same as before.’

In both examples, *yiqian* is an NP, serving as the object of the preposition.

Type 3: *yiqian/yihou* in *de* construction

Another free use of *yiqian/yihou* on the word-level occurs in the *de* construction, where the forms occupy the XP position preceding *de*:

- (8) Houlai faxian women de diren jiushi yiqian de pengyou
 later discover we DE enemy EMP-be before DE friend
 ‘Later (we) discovered that our enemy is our former friend.’
- (9) Yaoshi tamen manyi, yihou de dingdan jiu dadeduo le
 if they be-satisfied after DE orders then big-DE-much PRT
 ‘If they are satisfied, the orders afterwards will be much bigger.’

The *de*-construction has the structure XP *de* NP (Huang 1989); the phrase before *de* can be of various phrasal categories, e.g. NP, AP and VP, as shown in (10):

- (10) a. Zhangsan de pengyou NP
 Zhangsan DE friend
 'Zhangsan's friend.'
- b. fenhong de xiaolian AP
 pink DE smiling-face
 'pink smiling face'
- c. mei zuoguo de shiqing VP
 not do-PERF DE things
 'things that (I) have not done before.'

Given this, we will not assign *yiqian* and *yihou* to a particular category, although they are likely to be NPs as well.

Type 4: Phrase-initial Adverbial *yiqian/yihou*

This distribution of *yiqian* and *yihou* is adverbial in nature, and appears in a pre-predicate position or pre-subject position. In this usage, the range of time referred to by *yiqian* and *yihou* is wider. Thus *yiqian* means 'in the past', while *yihou* has the meaning 'in the future'.

- (11) Zhe dou shi lao pengyou la, yiqian ni bushi han wo lao gao
 this all be old friend PRT in-past you not-be call me old gao
 lao gao de ma?
 old gao DE Q
 'We are all old friends. In the past, didn't you call me Old Gao, Old Gao?'
- (12) Ni ruguo bu haohao nianshu dehua, ni yihou jiu dao gongchang
 you if not well study if you in-future then go factory
 qu zuogong
 DIR work
 'If you don't study hard, you will then go work in a factory in the future.'
- (13) Ta zhu wo yihou you ge xingfu de jia
 he wish me in-future have CL happy DE family
 'He wished that I have a happy family in the future.'

(11) and (12) demonstrate *yiqian* in pre-subject and pre-predicate positions, respectively, while (13) illustrates *yihou* in an embedded clause. This use is similar to the use in the *de* construction in that both occur at a phrase-initial position.

Of the four types, type 1, the phrase-final use, and type 4, the adverbial use, are the most common usages. In sections 3 and 4, where we consider the syntactic properties of *yiqian/yihou*, we will only focus on type 1, the phrase-final use, but in section 5, where we discuss the development of *yiqian / yihou*, we will compare the phrase-final use (type 1), with the phrase-initial use, which includes types 3 and 4. Type 2 won't be discussed much as it is the latest development and is only found in a small percentage of tokens in Modern Mandarin.

3. PREVIOUS ANALYSES OF *YIQIAN* AND *YIHOU*

The status of *yiqian* and *yihou* has not received much attention in the literature. McCawley (1992) and (1997) are two of the few studies that examine the two forms closely. McCawley is concerned with the part of speech assignment of type 1 *yiqian* and *yihou*, i.e. the phrase-final use of the two forms. He puts *yiqian* and *yihou* in the same group as locative particles, such as *shang* 'above', *xia* 'below' and *li* 'inside', and considers two possible assignments for them: noun or postposition. This is because locative particles have been considered as nouns (Li 1985, 1990) or postpositions (Tai 1973, Hagège 1975, Peyraube 1980, and Ernst 1988) in previous studies. McCawley at first considers whether (phrase-final) *yiqian* and *yihou* could be postpositions. He relies on two universals of Ps as tests, which apply to prepositions as well as postpositions, given in (14) (1992, p. 220):

- (14) a. Objects of Ps are less free in allowing extraction or deletion.
 b. Ps allow their objects to have scope over higher constituents more easily than Vs do².

According to (14b), the element whose object can be quantified by the universal quantifier *dou* is more likely to be a P, rather than V (p. 222-223). Applying these two tests, McCawley finds that *yiqian* behaves like a P, in this case, a postposition, as in (15) (p. 228-229, ex. 31):

- (15) a. *Neichang qiusai_i, ta t_i yiqian mai-le pijiu
 that-CL ball-game he before buy-PERF beer
 'That (ball) game, he bought beer before.'
- b. *[Ta t_i yiqian mai-le pijiu] de neichang qiusai_i
 he before buy-PERF beer DE that-CL ball-game
 'that game that he bought beer before'
- c. Ta neisanchang qiusai yiqian dou mai-le pijiu
 he that-three-CL ball-game before all buy-PERF beer
 'He bought beer before all three of those games.'

(15a) and (15b) show that the object of *yiqian* cannot be extracted, following the universal (14a), while (15c) shows that the universal quantifier *dou* can be associated with the object of *yiqian*, *na sanchang qiusai* 'those three ball games'. These facts are consistent with the postposition analysis of *yiqian*. However, McCawley says that we also need to rule out that *yiqian* is a noun, and this turns out to be a difficult task. He shows that the universal (14b) also applies to noun, as in (16), where the genitive adjunct of noun, treated as the object of noun, can also be quantified by *dou*:

(16) (p. 229, (32))

- Ta sange ren de shu dou kanguo
 he three-CL person DE book all read-PERF
 'He has read the books of all three persons.'
 ('all three persons', not 'all the books of three persons')

That is, on the N analysis of *yiqian*, (15c) also follows. McCawley therefore says that on the basis of known universals, *yiqian* could be either a postposition or a noun.

However, in the later part of the study, McCawley (1992) returns to the issue again and offers support for the noun analysis. The evidence comes from *ba* and *bei* sentences where the object of *ba* and object of *bei* contains *yihou*, as in (17) (p. 231, ex. 37):

- (17) a. Zhangsan ba wanfan yihou kanzuo zuihao de xiuxi shijian
 Zhangsan BA dinner after regard best DE rest time
 ‘Zhangsan regards after dinner as the best rest time.’
- b. Wanfan yihou bei Zhangsan kanzuo zuihao de xiuxi shijian
 dinner after BEI Zhangsan regard best DE rest time
 ‘After dinner is regarded by Zhangsan as the best rest time.’

The object of *ba* or *bei* is an environment where NPs are allowed, but not PostPs; therefore, *wanfan yihou* is an NP, which in turn suggests that *yihou* is a noun, rather than a postposition. In (1997) McCawley provides further support for the N analysis by showing that expressions of the form NP *yihou* can also be the object of *cong* ‘from’, as in (18) (p. 99, ex. 17):

- (18) Zhangsan cong wucan yiqian dao xianzai yizhi zai hejiu
 Zhangsan from lunch before to now continuouslyPROG drink
 ‘Zhangsan has been drinking since before lunch.’

In short, according to McCawley, phrase-final *yiqian* and *yihou* are nouns, not postpositions.

4. SYNTACTIC BEHAVIOR

In this section we take a closer look at syntactic properties of phrase-final *yiqian* and *yihou*. We agree with McCawley that phrase-final *yiqian* and *yihou* are nominals, not postpositions. However, we differ from McCawley in one area: while McCawley treats phrase-final *yiqian* and *yihou* as independent nouns, we argue that they are nominal bound forms at the phrasal-level. In 4.1, we offer more support that *yiqian* and *yihou* are nominal and that they head a phrasal category; however, they are also bound phrasally, and this argues against the noun analysis. On the other hand, if *yiqian* and *yihou* are bound, it is possible that they are postpositions, because postpositions, unlike nouns, are bound phrasally. Therefore, in 4.2, where we consider the postposition status, we will rely on evidence other than boundness to argue against the postposition analysis. In 4.3 we compare *yiqian* and *yihou* with their monosyllabic

counterpart *qian* and *hou*, and in 4.4 we consider the possibility whether *yiqian* and *yihou* could be clitics (phrasal affixes).

4.1 Nominal but not Noun

First, we pursue the nominal analysis further. Consider the phrases in (19):

- (19) a. [[Xiaozhang likai]_S yihou]_{NP}
 Xiaoshang leave after
 ‘After Xiaozhang left’
- b. [[jiao juan]_{VP} yiqian]_{NP}
 turn-in exam-paper before
 ‘Before turning in the exam paper’

As a nominal, *yiqian/yihou* serves as the head of the phrases in (19a-b), making the entire phrase an NP. Such an NP can then function as an adverbial time phrase, as in (1, 3, 5), or as object of a preposition, as in (4). In section 3 we saw that McCawley takes the environment after *ba*, *bei* and *cong* as evidence that *yiqian/yihou* is a noun, not a postposition. In fact, the characteristic of serving as object of preposition makes it unlikely that a *yiqian/yihou* phrase is anything but an NP, because it is known that prepositions take NPs, but not other phrases, as objects, as illustrated in (20-21):

- (20) a. zai zhege shihou
 at this-CL time
 ‘at this time’
- b. *zai [Xiaozhang likai]_S
 at Xiaozhang leave
 *‘at Xiaozhang leaving’
- c. *zai [yujian Xiaoli]_{VP}
 at meet Xiaoli
 *‘at meeting Xiaoli’

- (21) a. *zai* Xiaozhang likai yihou
 at Xiaozhang leave after
 ‘after Xiaozhang left’
- b. *zai* yujian Xiaoli yiqian
 at meet Xiaoli before
 ‘before meeting Xiaoli’

(20b-c), where the preposition *zai* is followed by S and VP, are unacceptable, but once *yiqian/yihou* is added, as in (21a-b), the forms are well-formed. This is strong support for the NP analysis of the *yiqian/yihou* phrase. Given that the *yiqian/yihou* phrase is an NP, it then follows that its head, i.e. *yiqian/yihou*, is nominal, since in Chinese an NP is head-final.

Having established that *yiqian/yihou* is nominal, we will now show that they are not independent nouns, however. There are two characteristics of *yiqian/yihou* that challenge the independent noun analysis. First, the phrases in (19) can be compared with a time expression with *de shihou* ‘the time of, when’, as in (22), which is an instance of the *de*-construction, with the clitic *de* between the non-head phrase and the head *shihou*:

- (22) [[Xiaozhang likai]_S *de* shihou]_{NP}
 Xiaozhang leave DE time
 ‘at the time when Xiaozhang left’

As discussed earlier, a *de*-construction allows for a variety of phrasal categories in the pre-*de*, non-head, position, including VP, PP, S and NP. Indeed, the *yiqian*-phrase is similar to the *de*-construction in that it also allows for a number of phrases in the non-head position, as we saw earlier in (1-5). However, the two differ with regard to one important aspect: while *de* is obligatory in (22), it is excluded in (19), as shown in (23):

- (23) a. *Xiaozhang likai *de* yihou
 Xiaozhang leave DE after
 ‘after Xiaozhang left’

- b. *Jiaojuan de yiqian
 turn-in exam-paper DE before
 ‘before turning in the exam paper’

That is, *yiqian* cannot occur as the head in a *de*-construction. The inability raises doubts concerning *yiqian*’s category membership and undermines its noun status— if *yiqian* is an independent noun, why can’t it occur as the head N in a *de*-construction³? Thus in the noun analysis this restriction on *yiqian/yihou* is unexplained.

The second piece of evidence comes from dependency of *yiqian/yihou* on the immediately preceding phrase. We show that phrase-final *yiqian/yihou* cannot occur without the latter. Since dependency on neighboring segments is a defining characteristic of bound forms, this fact points to its bound-form status, and against the free-form noun status.

First, in a nominal compound, if the head noun is free, it can occur without the non-head component in an anaphoric environment; for example, *gangqin bisai* ‘piano contest’ can be anaphorically referred to as *bisai* ‘contest’, as in (24):

- (24) Zuotian Xiaoli you yichang gangqinbisai, ta hua -le henduo
 yesterday Xiaoli has one-CL piano contest he spend-PERF much
 shijian wei bisai zuo zhunbei
 time for contest make preparation
 ‘Yesterday Xiaoli had a piano contest. He spent a lot of time preparing for
 the contest.’

In contrast, a bound form cannot stand alone, but must occur with a host phrase, even if the host phrase is understood from the context. For example, *zhuozi shang* ‘on the table’ cannot be anaphorically referred to as *shang* ‘on, top’ in (25), because the latter is not a free form:

- (25) a. *Xiaoli shuo yaoshi fang zai dianshiji shang, keshi shang meiyou
 Xiaoli say key put at TV-set top but top not-exist
 ‘Xiaoli said the key was placed on top of the TV, but it was not there.’

- b. *Ta zhi de shi zhuozi shang, bu shi xia.
 he refer-to DE is table top not is under
 ‘What he referred to is the top of the table, not under the table.’

Thus anaphoric reference can be used as a test to distinguish free forms from bound forms. If we apply this test to *yiqian/yihou*, we get (26):

- (26) a. *Zhongwen ke yiqian wo mei kanjian ta, yihou wo
 Chinese class before I not-PERF see him after I
 cai zhaodao ta
 only find him
 ‘Before the Chinese class I didn’t see him; I found him only after the class.’
- b. *Wuhui yiqian wo gen ta shuo-le hua, yihou wo mei
 dance before I with him talk -PERF words after I not-PERF
 deng ta jiu xian huijia le
 wait-for him then first go-home PRT
 ‘Before the dance I talked to him; afterwards I went home without waiting for him.’

The sentences in (26) are unacceptable; that is, although the reference time of *yihou* in the second clause is recoverable from the first clause, i.e. *zhongwen ke* ‘Chinese class’ in (26a) and *wuhui* ‘dance’ in (26b), both must be expressed. Thus *yihou* in (26) behaves like *shang* in (25), but unlike *bisai* in (24), suggesting that it is a bound form.

In addition, if we compare *yihou* with other time expressions, such as *xiawu* ‘afternoon’ and *dongtian* ‘winter’ in (27), we can see that the latter can stand alone, anaphorically referring to ‘tomorrow afternoon’ and ‘winter of this year’ respectively:

- (27) a. Mingtian shangwu wo youshi, xiawu wo keyi qu zhao ni
 tomorrow morning I busy afternoon I can go find you
 ‘Tomorrow I’m busy in the morning, but I can go find you in the afternoon.’

- b. Jinnian xiatian wo yao qu Beijing, dongtian hui dai zai zher
 this-year summer I will go Beijing winter will stay at here
 ‘This summer I will go to Beijing; this winter I will stay here.’

This indicates that *xiawu* and *dongtian* in (27) are free words, while *yihou* in (26) is a bound form, being dependent on the preceding phrase, which must be overt. In the noun analysis, it would be difficult to explain the required presence of the preceding phrase.

To apply the anaphoric reference test, however, two conditions need to be met⁴. First, the test applies to clause combining, rather than combining of sentence fragments. The latter follows a different pattern than clause combining. Thus the test does not apply to (28a), which involves fragments only, as it does not even contain a verb.

- (28) a. Tingchechang shoufeilu, tianhei yiqian 10 kuai, yihou 5 kuai⁵
 parking-lot fare-rate nightfall before 10 dollar after 5 dollar
 ‘The parking lot fare rates: before darkness, \$10; afterwards, \$5.’
- b. *Tingchechang shoufeilu, tianhei yiqian shi/yao 10 kuai, yihou
 parking-lot fare-rate nightfall before is/require 10 dollar after
 shi/yao 5 kuai
 is/require 5 dollar
 ‘The parking lot fare rates: before darkness, it is/requires \$10; afterwards,
 it is/requires \$5.’

If (28a) is supplied with a verb and becomes a case of clause combining, as in (28b), the test applies. Indeed, (28b) is much less acceptable than (28a), suggesting that *yihou* needs to occur with a time phrase. Second, the *yihou* in the second clause must be interpreted as X-*yihou*, where X is specified earlier in a preceding clause. Sometimes *yihou* in the second clause can be interpreted as the free standing phrase-initial one; in such cases, the anaphoric reference test also does not apply, for *yihou* would not be reduced from X-*yihou*. A free standing *yihou* has a different interpretation than a phrase-final *yihou*. While a phrase-final *yihou* has a definite reference time, provided by the immediately preceding phrase, the reference time of a phrase-initial *yihou* is unspecified, and it is often

understood as the speech time or the time established in the context. Because of lack of specification, rather than being interpreted as ‘after X’, it has the interpretation of ‘in the future’, ‘from now on’, or ‘later’, ‘afterwards’, where the reference time can sometimes be vague. An example is given in (29):

- (29) Wo xingqiwu yiqian kongpa wangcheng bu liao, yihou zai shuo ba
 I Friday before probably finish not able after again talk PRT
 ‘I probably won’t be able to finish (it) before Friday; we’ll talk about it later.’

In (29), *yihou* is not reduced from *xingqiwu yihou* ‘after Friday’, but is an appearance of the free standing, phrase-initial *yihou*. The test of anaphoric reference does not apply here.

But how can we tell whether an occurrence of *yihou* is reduced from X-*yihou*, where the anaphoric reference test applies, or a phrase-initial *yihou*, where the test does not apply? It depends on whether the context requires *yihou* to be temporally dependent on a preceding time phrase. A dependent interpretation means it is reduced from X-*yihou*, while a flexible one means it could be phrase-initial *yihou*. In (26), the context makes it clear that *yihou* is interpreted relative to *zhongwenke* ‘Chinese class’ in (a) and *wuhui* ‘the dance’ in (b). In (29), however, *yihou* does not need to be interpreted relative to *xingqiwu* ‘Friday’. Thus the anaphoric reference test is context dependent, and as such its application may not seem straightforward. However, we believe a contrast between the dependent reading and the independent reading of *yihou* can be drawn, and when *yihou* has a dependent reading, the anaphoric test applies—*yihou* must occur with a time phrase; otherwise, the sentence is ill-formed, as in (26).

The bound-form analysis provides an explanation for why *yiqian/yihou* does not participate in the *de*-construction, as demonstrated in (23). If it is bound, it cannot be the head noun in the *de*-construction, as the construction has a structure of XP *de* NP. But one might question how a bound nominal could head an NP in other structures, as in (19). There is in fact no conflict between being a head and being bound. This phenomenon is frequently seen in compounds. The compounds in (30) all have a head that is a bound root:

- (30) a. gaoxing
 high-spirit
 ‘happy’
- b. guanzhong
 view-crowd
 ‘viewers’
- c. xiaorong
 smile-expression
 ‘smile’

The morphemes *xing* ‘spirit’, *zhong* ‘crowd’ and *rong* ‘expression’ serve as the head of the compounds in (28) although they cannot stand alone as words. The phrases in (19) display the same pattern at the phrasal-level: both (19) and (30) involve heads that are bound; the only difference is that while *yiqian/yihou* in (19) is bound at the phrasal-level, *xing*, *zhong* and *rong* are bound at the word-level.

To summarize, we have presented two pieces of evidence against the noun analysis of phrase-final *yiqian* and *yihou*. They cannot occur as the head noun in the *de*-construction, and they require the presence of a host phrase.

4.2 The Postposition Analysis

In this section we consider the possibility of whether *yiqian* and *yihou* can be postpositions. If *yiqian/yihou* is a postposition, it would form a PostP with the preceding NP, similar to locative particles, which have also been claimed to be postpositions (e.g. Tai 1973, Ernst 1988).

There are two pieces of evidence against the postposition analysis. First, consider locative particles again. *zai zhuzi shang* ‘on the table’ would have the structure in (31b)⁶:

- (31) a. *zai zhuzi shang*
 at table on/top
 ‘on the table’
- b. [*zai* [[*zhuzi*]_{NP} [*shang*]_{Post}]PostP]_{PP}

That is, *shang* combines with the NP *zhuozi* to form PostP, which then combines with *zai* to form PP. However, locative particles do not combine with VP or S, as demonstrated in (32):

- (32) a. *Zuo feiji shang, wo meiyou yijian
 take plane on I not-have opinion
 ‘About taking a plane, I have no opinion.’
- b. *Ta xue zhongwen shang, wo tebie gaoxing
 he learn Chinese on I particularly happy
 ‘About him learning Chinese, I’m particularly happy.’

In contrast, the phrase-final *yiqian* and *yihou* freely occur with VP, S, as well as NP. This is demonstrated in (33-35):

- (33) Meidun fan yiqian, mama zhaoli yao qu wen yeye nainai NP
 every-CL meal before mother as-usual will go ask grandpa grandma
 ‘Before every meal, mother as usual would go ask grandpa and grandma.’
- (34) Xidu yiqian, ta dui rensheng chongman xiwang VP
 breathe-drugs before he to life full-of hope
 ‘Before taking drugs, he was full of hope toward life.’
- (35) a. Ni shiguo yihou jue de ruhe? S
 you try-PERF after feel how
 ‘How did you feel after you tried it?’
- b. (=5) Zhuangzi xia -le shan yihou, dao yige pengyou jia qu.
 Zhuangzi go-down-PERF mountain after go one-CL friend house DIR
 ‘After Zhuangzi went down the mountain, he went to a friend’s house.’

Thus unless there is evidence that postpositions occur with VP and S, data such as (33-35) poses a problem for the postposition analysis.

The second piece of evidence comes from conjunction. (36) demonstrates that an NP can combine with a phrase that contains a phrase-final *yihou*:

- (36) Jintian shangwu huo mingtian xiawu yihou wo dou keyi
 today morning or tomorrow afternoon after I all can
 'I can (do it) this morning or after tomorrow afternoon.'

On the postposition analysis, this would be a case of conjunction between NP and PostP. But in languages that have postpositions, NP and PostP generally don't coordinate, in the same way that in languages with prepositions, NP and PP don't coordinate. The former is illustrated by Japanese (37), while the latter can be demonstrated in English (38) and Chinese (39):

- (37) *Teeburu ni to sofa Mearii no hon ga arimasu
 table at and sofa Mary GEN book NOM there-is
 'On the table and sofa are Mary's books.'
- (38) *The table and on the sofa are Simba's favorite places to sleep.
- (39) *Xuexiaohe zai gongsi ta dou you henduo pengyou
 school and at company he all have many friends
 *'Both at school and in the company he has many friends.'

Therefore, it is doubtful that (36) is a case of conjunction of NP and PostP. We suggest that (36) is in fact a conjunction of two NPs, with the second NP having the structure $[[\textit{mingtian xiawu}]_{\text{NP}} [\textit{yihou}]_{\text{N}}]_{\text{NP}}$, where *yihou* is a nominal bound form heading the entire NP phrase.

This demonstrates that, *yiqian* and *yihou* are not postpositions. On this point we are in agreement with McCawley (1992, 1997).

4.3 *Yiqian/Yihou* and *Qian/Hou*

At this point it will be useful to compare *yiqian/yihou* and their monosyllabic counterpart *qian/hou*. A comparison of the two sets of forms will highlight why *yiqian/yihou* is a bound form at the phrasal-level but not at the word-level.

Similar to *yiqian/yihou*, *qian/hou* also occurs in environments where they are bound at the phrasal-level. (33-35) can all be expressed with *qian/hou* rather than *yiqian/yihou*, as in (40-42):

- (40) Meidun fan qian, mama zhaoli yao qu wen yeye nainai NP
 every-CL meal before mother as-usual will go ask grandpa grandma
 'Before every meal, mother as usual would go ask grandpa and grandma.'
- (41) Xidu qian, ta dui rensheng chongman xiwang VP
 breathe-drugs before he to life full-of hope
 'Before taking drugs, he was full of hope toward life.'
- (42) a. Ni shiguo hou, juede ruhe? S
 you try-PERF after feel how
 'How did you feel after you tried it?'
- b. Zhuangzi xia -le shan hou, dao yige pengyou jia qu.
 Zhuangzi go-down-PERF mountain after go one-CL friend house DIR
 'After Zhuangzi went down the mountain, he went to a friend's house.'

On the postposition analysis of locative particles, *qian* and *hou* would also be members of postpositions, as illustrated in (40), although (41-42) demonstrates that *qian* and *hou* actually have a wider distribution than postpositions, as they also combine with VP and S, while postpositions do not, as discussed in 4.2.

There is a difference between *yiqian/yihou* and *qian/hou* at the phrasal-level and it is a semantic one: while *yiqian/yihou* only has the temporal use, (43), *qian/hou* can be used spatially as well, as illustrated in (44):

- (43) a. *Women de xuexiao yiqian you yitiao he
 we DE school before there-is one-CL river
 'In front of our school there is a river.'
- b. *Xiaoli zai na dong laofangzi yihou da lanqiu
 Xiaoli at that CL old-house after play basketball
 'Xiaoli is playing basketball behind the old house.'
- (44) a. Women de xuexiao qian you yitiao he
 we DE school in-front-of there-is one-CL river
 'In front of our school there is a river.'

- b. Xiaoli zai na dong laofangzi hou da lanqiu
 Xiaoli at that CL old-house behind play basketball
 'Xiaoli is playing basketball behind the old house.'

Qian/hou and *yiqian/yihou* differ more at the word-level. In our comparisons we will only consider the temporal use of *qian/hou* since *yiqian/yihou* only has the temporal meaning. *Qian* and *hou* form compounds of the form X-*qian/hou*, and *qian/hou*-X, as illustrated in (45-46):

- (45) a. xue qian
 school before
 'before schooling'
- b. shou hou
 sale after
 'after sale'
- c. xueling qian
 school-age before
 'before school age'
- d. boshi hou
 doctor after
 'post-doc'
- (46) a. qian ren
 before term-of-appointment
 'predecessor'
- b. hou jin
 after strength
 'strength after (the liquor goes into the mouth)'
- c. qian zongtong
 before president
 'former president'
- d. hou xiandai
 after modern
 'post-modern'

In contrast, *yiqian/yihou* does not participate in compound formation, and this is so regardless of whether the morpheme it combines with is mono-syllabic or disyllabic:

- (47) a. *xue yiqian
school before
'before schooling'
- b. *shou yihou
sale after
'after sale'
- c. xueling yiqian
school-age before
'before school age' (*as compound)
- d. boshi yihou
doctor after
'post-doc' (*as compound)
- (48) a. *yiqian ren
before term-of-appointment
'predecessor'
- b. *yihou jin
after strength
'strength after (the liquor goes into the mouth)'
- c. *yiqian zongtong
before president
'former president'
- d. *yihou xiandai /xiandai yihou
after modern modern after
'post-modern'

The forms in (47c-d) are acceptable; however, they are not compounds, but phrases. This can be seen by comparing (49) and (50):

- (49) a. *xueling yiqian ertong
 school-age before children
 ‘children before school age’
- b. *boshi yihou yanjiu
 doctor after research
 ‘post-doc research’
- (50) a. xueling yiqian de ertong
 school-age before DE children
 ‘children before school age’
- b. boshi yihou de yanjiu
 doctor after DE research
 ‘post-doc research’

(49) shows that (47c-d) do not directly combine with a nominal head to form a larger compound; rather, they combine with the clitic *de* first before combining with a nominal head, as in (50). As mentioned earlier, the *de*-construction has the structure *XP de NP*, which suggests that *xueling yiqian* and *boshi yihou* are NPs, not Ns. This then means that the forms in (49c-d) are non-compounds, as an NP does not directly combine with an N to form a nominal compound, illustrated in (51)

- (51) a. *Wo xiang zhidao zhege diannao dingjia
 I want know this-CL computer price
 ‘I would like to know the price of this computer’
- b. *Ni ji -bu -jide shangci xuanju jieguo
 you remember-not-remember last-time election results
 ‘Do you remember the results of the last election?’

(51) shows that *zhege diannao* ‘this computer’ and *shangci xuanju* ‘the last election’ do not directly combine with *dingjia* ‘price’ and *jieguo* ‘result’.

In summary, while *qian/hou* participates in compound formation, *yiqian/yihou* does not. Thus a comparison between the two sets of forms

further supports our thesis that *yiqian* and *yihou* are bound at the phrasal-level, but not at the word-level.

4.4 Are *Yiqian* and *Yihou* Clitics?

The status of *yiqian* and *yihou* as phrasal bound forms raises the question whether they are clitics. Clitics are phrasal affixes (Klavans 1980, 1985; Anderson 1992); they are similar to affixes at the word-level in that both are dependent, but differ from the latter in that they are attached to a phrase, rather than a word. In Chinese a number of particles have been claimed to be clitics, including sentential particles, e.g. *ma*, *ne*, *ba*, as sentential clitics (Huang 1985), the nominal *de* as an NP clitic (Huang 1989), the verbal *de* as a VP clitic (Liu 1994), and locative particles as NP clitics (Liu 1998). *Yiqian* and *yihou* do show important characteristics of clitics in two aspects: (i) they are bound (dependent), (ii) they are attached to a phrase. However, at this stage we will take *yiqian* and *yihou* not as clitics, but simply as phrasal bound forms, which are distinguished from clitics. The reason for not including *yiqian* and *yihou* in the class of clitics is that they don't yet quite meet the definition of clitics.

There are two types of clitics: simple clitics and special clitics. A simple clitic is an element that is phonologically reduced, e.g. *-s* in *Here's the bus*, and appears in a position by regular rules of syntax. A special clitic is a one whose position is decided by principles other than regular rules of syntax, e.g. second-position clitics in Romance languages (Anderson 1992). If *yiqian* and *yihou* were clitics, they would be simple clitics, since their position in a sentence is determined by rules of syntax. Simple clitics, by definition, are phonologically deficient in that they do not bear stress or accent. However, the phrase-final *yiqian* and *yihou* have full tone; there is also no evidence of reduction at the segmental level. In this aspect, *yiqian* and *yihou* differ from particles such as *de*; the latter has the neutral tone and is clearly phonologically reduced. Therefore, at this stage *yiqian* and *yihou* can't be considered clitics. In fact, the monosyllabic *qian* and *hou* are probably also not affixes at the phrasal-level, despite Liu (1998)'s claim, as they also have full tone.⁷ An important step for *yiqian* and *yihou* to become clitics is for *qian* and *hou* to be phonologically reduced, which has not taken place yet.

If our view is on the right track, we have identified a new type of linguistic elements in Modern Mandarin: non-clitic bound forms at the phrasal-level. Interestingly, something similar can be observed at the word-level in Chinese. Packard (2000:281-283) notes that in Modern Mandarin quite a number of new bound roots have been created, most of which come from old words used in a new context. For example, the word *dian*, meaning ‘electricity’, is used as a bound morpheme, meaning ‘television’, in *caidian* ‘color television’. (52) gives a few more examples (Packard 2000: 281-282):

- (52) a. *gai* ‘change’ → ‘reform’ *can gai* ‘participate in reform’
 b. *tie* ‘iron’ → ‘railroad’ *ditie* ‘earth-railroad’ (subway)
 c. *mi* ‘to be fascinated’ → ‘fan’ *ying mi* ‘movie fan’

Importantly, these new bound morphemes are not affixes. Phonologically, they have full tones and may even bear stress. Packard also points out that as time goes on, there will be a proliferation of such non-affix bound roots in the language, because while there is a trend for a form to go from free to bound, there is no force in the opposite direction. In section 5, where we consider how *yiqian* and *yihou* developed through time, we will see that a similar process of going from free to bound is happening at the phrasal-level.

In this section we have argued that phrase-final *yiqian* and *yihou* are nominal bound forms, attached to the preceding phrase, which could be NP, VP, S, or PP. They are not clitics, however, because at the current stage they are not yet phonologically reduced.

5. HOW THE BOUND FORM DEVELOPED

Once it is established that the phrase-final *yiqian/yihou* in Modern Mandarin is bound at the phrasal-level, our next question, then, is how it acquired this characteristic. Given the lack of clear phonological evidence distinguishing the free use and the bound use of *yiqian* and *yihou*, it is difficult to know when boundness began historically. What we will try to find out is how the phrase-final (bound) use and phrase-initial (free) use developed through time. Did they emerge around the same time? If not, which one is the original use? Was a particular use dominant at a given

period? Answers to these questions will shed light on the grammaticalization process, which eventually led to their boundness. In what follows, we will first present a brief outline of the development of *yiqian* and *yihou* in early times, and we will then focus on two periods, Early Mandarin and Modern Mandarin. We will see that although *yiqian* and *yihou* are on similar developmental paths, they are currently at different stages relative to one another.

5.1 Developmental Paths

Yi qian and *yi hou* occur together as a constituent as early as Old Chinese, as illustrated in (53):

- (53) a. 今三世以前，至於趙之為趙

Jin san shi yi qian, zhiyu Zhao zhi wei Zhao
now three generation use-this before down-to Zhao of become Zhao

‘Three generations before now, down to when Zhao became the king of Zhao.’

Zhanguoce (150-200 BC)⁸

- b. 王曰：自今日以後，內政無出，外政無入

Wang yue: zi jinri yi hou, nei zheng wu chu,
king say from today take after internal affairs no go-out
wai zheng wu ru
external affairs no go-in

‘The king said: from today on, internal affairs do not go out, and external affairs do not come in.’

Guoyu (470 BC)⁹

Yi occurring before a time or place phrase is a preposition (Mathews 1931, Wang 1945, 1958) or a coverb (Pulleyblank 1995). Mathews (1931) notes that *yi* in Classical Chinese often combines with expressions of time and place. Wang (1945, 1958) and Pulleyblank (1995) make a similar point: that one of the uses of *yi* is to introduce a time or place phrase. Thus, *yi qian* and *yi hou*, are interpreted together as time adverbials in the passages in (53). At this stage, *yi qian* and *yi hou* always occur phrase-

finally; there are no examples where they occur phrase-initially. This situation continued through Old Chinese to Middle Chinese.

In the Tang-Song period, however, *yi qian* and *yi hou* began to occur together independently, without the preceding material. In *Dunhuang Bianwen Ji* (850-1015 AD), for example, besides tokens where *yiqian* and *yihou* follow a phrase, we also find tokens where they are phrase-initial, as in (54-55):

- (54) 且世尊初成正觉，阿难方始诞生，后乃年至二十，方与佛为弟子，
已前教法，何得闻之

Qie shizun chu cheng zhengjue, Anan fangshi dansheng,
hounai
and Buddha just achieve Buddha Anan just born later

nian zhi ershi, fang yu fo wei dizi, yiqian
age reach 20 only-then with Buddha become disciple before
jiaofa, hede wen zhi?
teaching how hear it

‘Furthermore, when Buddha achieved the status of Buddha, Anan was just born; when he was 20 years old, only then did he become a disciple of Buddha. (Buddha’s) teaching before then, how did he know about it?’

(*Dunhuang Bianwen Ji*, Wei Mojie jing jiangjing wen)

- (55) 若也已后为君，事须再兴佛法

Ruoye yihou wei jun, shixu zaixing fofa
if later become king, need revive Buddhism

‘If (I) later become king, I need to revive Buddhism.’

(*Dunhuang Bianwen Ji*, Han Qinhu huaben)

As we can see, some tokens *yi* are written as ‘已’. In *Zhuizi Yulei* (1270 AD), there are also cases of phrase-initial *yiqian* and *yihou*, as illustrated in (56-57):

- (56) 以前看得心只是虛蕩蕩地，而今看得來，湛然虛明，萬理便在裏面
 Yiqian kan de xin zhishi xudangdang-de, er jin kan de lai,
 before see RES mind only empty-ADV but now see RES DIR
 zhanran xuming, wangli bian zai limian
 clear bright ten-thousand-ways therefore at inside

‘In the past (we) saw the mind as empty, but now (we) see it as clear and bright; all kinds of logic and ways of things are in it.’

(*Zhuzi Yulei*, Chap. 113)

- (57) 某年某月某日某家于某官番诉，某官又如何断。以后几经番诉，
 并画一写出
 mou nian mou yue mou ri mou jia yu mou
 certain year certain month certain day certain household at certain
 guan fan su, mou guan you ruhe duan, yihou ji jing
 judge turns sue certain judge then how judge later several through
 fan su, bing huayi xiechu
 turns sue and clearly write-out

‘In a certain year, certain month, on a certain day, a certain household filed suits with a certain judge, and how that judge made a decision. Later the case went through several rounds of litigation, which were written down clearly.’

(*Zhuzi Yulei*, Chap. 106)

The change of position also triggers a change in meaning. Rather than anchored to a time specified in the sentence, the phrase-initial *yiqian* and *yihou* have the meaning of ‘in the past’ and ‘later on’, where the reference time is not specified, but understood from the context.

The number of *yiqian/yihou* tokens found in the two texts is given in Table 1. In *Dunhuang Bianwen Ji* 6 out of 7 tokens of *yiqian* occur phrase-initially, whereas most of the *yihou* tokens occur phrase-finally. However, in *Zhuzi Yulei*, both *yiqian* and *yihou* occur mostly phrase-finally. It looks like *yiqian* was ahead of *yihou* in the new (phrase-initial) use, as there is a higher percentage of phrase-initial use of *yiqian* than phrase-initial use of *yihou*: 26.5% (26/98) vs. 5.6% (6/107) between these two texts. The overall distribution of *yiqian* and *yihou* in *Zhuzi Yulei*, however, is comparable: 91 vs. 89.

	Dunhuang Bianwen Ji			Zhuzi Yulei		
	phrase-initial	phrase-final	total	phrase-initial	phrase-final	total
<i>yiqian</i>	6	1	7	20	71	91
<i>yihou</i>	4	22	26	2	87	89

Table 1: Phrase-initial and phrase-final uses of *yiqian* and *yihou* in *Dunhuang Bianwen Ji* and *Zhuzi Yulei*

Since 1300 AD, however, two changes took place. First, *yihou* became more productive than *yiqian*. The data based on the Academia Sinica Tagged Corpus of Early Mandarin Chinese reveals a sharp contrast between the two, as shown in Table 2:

	# of tokens
<i>yiqian</i>	11
<i>yihou</i>	263

Table 2: Number of tokens of *yiqian* and *yihou* in the Early Mandarin Corpus

Further, looking at *yihou*, the phrase-initial use became more common; in the corpus the number of tokens of phrase-initial *yihou* is actually slightly more than the number of tokens of the phrase-final *yihou*. Table 3 gives a comparison:

	# of tokens	percentage
phrase-initial	139	52.9 %
phrase-final	124	47.1 %
total	263	100.0 %

Table 3: Phrase-initial use and phrase-final use of *yihou* in the Early Mandarin Corpus

The dominance of phrase-initial *yihou* peaked around the time of *Honglouneng*, which has almost twice as many phrase-initial tokens as phrase-final tokens, as in Table 4:

	# of tokens	percentage
phrase-initial	91	64.1 %
phrase-final	51	35.9 %
total	142	100.0 %

Table 4: Phrase-initial use and phrase-final use of *yihou* in *Honglouloumeng*

(58-59) gives an example each of the phrase-initial and phrase-final *yihou* in *Honglouloumeng*:

- (58) 咱俩人一样的年纪，况又同窗，以后不必论叔侄，只论弟兄朋友就是了
Zan liangren yiyang de nianji, kuang you tongchuang yihou
we two-people same DE age moreover and classmate later
bubi lun shuzhi, zhi lun dixiong pengyou
no-need talk-about uncle-nephew only talk-about brothers friends
jiushi le
just-be PRT

‘The two of us are of the same age; moreover, we are classmates. In the future, there is no need to consider us uncle and nephew; let’s consider us brothers and friends.’

(*Honglouloumeng*, Chap. 9)

- (59) 他说了几次不听。那一夜看见他们三更以后灯还点着呢，他便叫他们吹灯，
个个都睡着了。
Ta shuo-le jici bu ting na yi ye kanjian tamen
he say-PERF a-few-times not listen that one night see they
sangeng yihou deng hai dian-zhe ne ta bian jiao
three-watch after light still light-DUR PRT he therefore ask
tamen chui deng gege dou zhui Zhao le
them blow light everyone all fall-asleep PRT

‘He said several times and they didn’t listen. That night he saw that after midnight they still had the light on, he then asked them to blow out the light. Everyone fell asleep.’

(*Honglouloumeng*, Chap. 88)

As for *yiqian*, its number in the Early Mandarin Corpus, 11, is too small to establish a clear pattern. Of the 11 tokens, 5 are phrase-initial and 6 are phrase-final, as shown in Table 5:

	# of tokens	percentage
phrase-initial	5	45.4 %
phrase-final	6	54.6 %
total	11	100.0 %

Table 5: Phrase-initial use and phrase-final use of *yiqian* in the Early Mandarin Corpus

In Modern Mandarin, *yihou* continues to be more productive than *yiqian*, although the discrepancy is not as large. A search in the Sinica Corpus produced a contrast of 1887 tokens of *yihou* vs. 1356 tokens of *yiqian*. However, the dominant use of *yihou* is no longer phrase-initial, but phrase-final, which, as argued in section 4, is a bound form. In contrast, the dominant use of *yiqian* is phrase-initial. Recall in section 2 *yiqian* and *yihou* in Modern Mandarin are of four types, three of which are free, while one is bound and phrase-final. The breakdown is given in Table 6, for *yiqian* and Table 7, for *yihou*:

<i>yiqian</i> - Modern Mandarin				
Type	# of tokens		Percentage	
1 phrase-final: Bound	455		33.55%	
2 nominal: Free	106	901	7.82%	66.45%
3 pre-de: Free	155		11.43%	
4 adverbial: Free	640		47.20%	
Total	1356			

Table 6: Breakdown of *yiqian* tokens in Sinica Corpus

<i>yihou</i> - Modern Mandarin				
Type	# of tokens		Percentage	
1 phrase-final: Bound	1324		70.16%	
2 nominal: Free	18	563	0.95%	29.84%
3 pre-de: Free	52		2.76%	
4 adverbial: Free	493		26.13%	
Total	1887			

Table 7: Breakdown of *yihou* tokens in Sinica Corpus

5.2 Discussion

Based on the description above, we can make a number of observations about the development of *yiqian* and *yihou*. First, the phrase-final position is in fact the position in which *yiqian* and *yihou* first appeared in Old Chinese. The phrase-initial position appeared later, during Tang-Song, and the noun use is the latest development, occurring as late as Modern Mandarin. The phrase-final position is also the position in which the two forms frequently occurred through all stages, even though it has not always been the most common position. We hypothesize that the early origin and the frequency with which they occur in a phrase-final position together laid the foundation and provided impetus for their eventual boundness. Frequency provides empirical evidence of grammaticalization (Hopper and Traugott 2003). As the two forms frequently occurred with a preceding phrase, these previously free forms developed a binding relationship with the phrases to which they attach. In this case, grammaticalization is manifested in semantic fading (loss of specified reference time) and loss of word boundaries, shown in their inability to be used as anaphors (section 4). Both are characteristics of grammaticalization of lexical forms (Hopper and Traugott 2003). It is possible that over time another characteristic, phonological reduction, could also emerge.

Second, we also find something that is unexpected. That is, *yiqian* and *yihou* are not parallel in productivity in Early Mandarin and Modern Mandarin. Although the two forms were comparable in productivity at the time of *Zhuizi Yulei*, in each stage of development afterwards, *yihou* is considerably more common than *yiqian*. The severity in contrast is perhaps most evident in the data from early Mandarin, in which *yihou* appears more than twenty times as often as *yiqian*. How can this be explained? We suggest that this may be explained by iconicity. Since Jacobson (1965) and Greenberg (1966), scholars have observed that linguistic structure to a great extent corresponds to the conceptual structure of the external world. Greenberg (1966:103) observes: “the order of elements in language parallels that in physical experience or the order of knowledge”. Haiman (1980, 1983, 1985a, b), through extensive studies, demonstrates that cross-linguistically language structures are iconically motivated. Tai (1985, 1993) shows that iconic motivations are

pervasive in Chinese; one of them is the order motivation, and the most important order is temporal sequence. Tai (1985:50) postulates the temporal sequence principle in (60):

- (60) The relative word order between syntactic units is determined by the temporal order of the states which they represent in the conceptual world.

We can see that a sentence with *yihou* follows the temporal sequence principle in that the event that happens earlier is placed before an event that happens later. In contrast, a sentence with *yiqian* does not follow (60), as it has the opposite sequencing; an earlier event is actually placed after a later event. These cases are not discussed by Tai, but they also offer support for (60). The discrepancy between *yiqian* and *yihou* is what we would expect if (60) operates in Chinese. A structure that obeys (60) is preferred and is predicted to be more productive; our data shows that this is indeed the case.

Another pattern demonstrated by the data is seen in the change of dominant use between stages. On the basis of the data, we hypothesize *yiqian* and *yihou* went through a process given in (61) and (62):

- | | | |
|------|-------------------|--|
| (61) | stages | form |
| | 150 BC - 850 AD | <i>yi</i> + <i>qian</i> (phrase-final) |
| | 850 AD - 1900 AD | <i>yiqian</i> (phrase-initial, phrase-final) |
| | after 1900 AD | <i>yiqian</i> (phrase-initial , nominal, phrase-final (bound)) |
| | | |
| (62) | stages | form |
| | 470 BC - 850 AD | <i>yi</i> + <i>hou</i> (phrase-final) |
| | 850 AD - 1300 AD | <i>yihou</i> (phrase-initial, phrase-final) |
| | 1300 AD - 1900 AD | <i>yihou</i> (phrase-initial , phrase-final) |
| | after 1900 AD | <i>yihou</i> (phrase-initial, nominal, phrase-final (bound)) |

The phrases in bold indicate the dominant use at a stage. (61) shows that the dominant use of *yiqian* was phrase-final for a long period of time and it became phrase-initial only recently, in Modern Mandarin. In contrast, (62) shows that the dominant use of *yihou* went from phrase-final to

phrase-initial in Early Mandarin and back to phrase-final again in Modern Mandarin.

Thus *yihou* shows a cyclical progression, while *yiqian* does not. A comparison between (61) and (62) suggests *yiqian* and *yihou* are on the same path, but at different stages, with *yihou* at a more advanced stage than *yiqian*. During the Early Mandarin period, while *yiqian* was still in the stage defined by phrase-final dominance, *yihou* had already reached the next stage of phrase-initial dominance. In modern times, *yiqian* has reached that same stage, and *yihou* has already begun to move back toward phrase-final majority. One might speculate that the cycle will continue so that *yihou* will continue to exhibit signs of phrase-final dominance, and then move back toward a phrase-initial dominance, and *yiqian* will follow the same route, although at a slower pace. However, at the modern time, there is also a competing force at work, that is, the force that moves Chinese toward more bound forms, as Packard (2000) observes. If the latter force prevails, phrase-final dominance will continue for both *yihou* and *yiqian* as this is the position where they are used as bound forms. At this time we are not able to speculate how the interaction between the two forces, cyclical progression and freeness to boundness, will play out.

6. OTHER POSSIBLE BOUND FORMS

If *yiqian* and *yihou* are nominal bound forms, bound at the phrasal-level, one wonders whether there are other disyllabic forms in Chinese that are in the same category. The candidates that immediately come to mind are other *yi*-expressions, such as *yishang* ‘above’, *yixia* ‘below’, *yiwai* ‘beyond’, *yinei* ‘within’. Results from the anaphoric reference test, employed in section 4, support their bound-form status, as illustrated in (63-64):

- (63) *Qizhongkao bashi fen yishang you ershi ren, yixia you
 midterm 80 score above there-is 20 people below there-is
 shiqi ren¹⁰
 17 people

‘On the midterm 20 students scored 80 or above; 17 people scored below 80.’

- (64) *Chuzuche shoufei wuli yinei dou shi yige jiaqian, yiwai
 taxi collect-fee five-mile within all is one-CL price beyond
 mei yili jia yikuai qian
 every one-mile add one-CL money
 ‘As for the taxi fare, it is the same price within five miles, and a dollar for
 each mile beyond it.’

These examples show that *yixia* ‘below’ and *yiwai* ‘beyond’ can’t be used alone, referring to *bashi fen yixia* ‘below 80’ or *wuli yiwai* ‘beyond five miles’. This suggests that they are bound forms, being dependent on a host phrase, which must be expressed.

Another group of possible candidates are *zhi*-expressions which have the same meaning as *yi*-expressions, such as *zhiqian* ‘before’, *zhihou* ‘after’. However, these expressions behave differently than *yi*-expressions in coordination, as illustrated in (65):

- (65) a. Zhongwen ke zhiqian wo mei kanjian ta, zhihou cai
 Chinese class before I not-PERF see him afterwards only
 zhaodao ta
 find him
 ‘I didn’t see him before the Chinese class; I found him only afterwards.’
- b. Wuhui zhiqian wo gen Xiaoli shuo-le hua, zhihou wo
 dance before I with him talk -PERF words after I
 mei deng ta jiu xian huijia le
 not-PERF wait-for him then first go-home PRT
 ‘Before the dance I talked to him; afterwards I went home without
 waiting for him.’

These sentences are similar to the sentences in (26), where we saw that *yihou* cannot stand alone. In contrast, *zhihou* in (65) can indeed stand alone without the preceding time phrase. This suggests that *zhihou* is not a bound form. (66) shows that *zhiqian* ‘before’ and *zhiwai* ‘beyond’ can also stand alone:

- (66) a. Zuotian kaihui xiaozhang xuanbu Xiaoli yao tuixiu le,
 yesterday meeting principal announce Xiaoli will retire PRT
 zhiqian wo wanquan bu zhidao zhejian shi
 before I completely not know this-CL matter
 ‘At yesterday’s meeting the principal announced that Xiaoli is about to
 retire; before this I didn’t know about it at all.’
- b. chuzuche shoufei wuli zhinei dou shi yige jiaqian,
 taxi collect-fee five-mile within all is one-CL price
 zhiwai mei yili jia yikuai qian
 beyond every one-mile add one-CL money
 ‘As for the taxi fare, it is the same price within five miles, and a dollar
 for each mile beyond it.’

Thus *zhi*-expressions are free forms. It is interesting that the two otherwise similar expressions behave differently in syntax. While *yi*-expressions are bound, *zhi*-expressions are free.

7. CONCLUSION

This study has argued that, along with an increasing number of monosyllabic bound morphemes, Modern Mandarin has begun to add disyllabic bound forms to its inventory of linguistic elements. Phrase-final *yiqian* and *yihou* have been presented as two examples of such a phenomenon. Results of various tests show that they are neither independent nouns, postpositions, phrasal affixes, nor word-level bound forms. It is suggested that the emergence of these forms is a consequence of the early origin and the frequency with which they occur at the phrase-final position. A look at two corpora of Early Mandarin and Modern Mandarin suggests that *yiqian* and *yihou* are on similar developmental paths, but are at different stages of the development.

On the basis of a dependency test, we suggest that other disyllabic *yi*-expressions are also bound forms, whereas *zhi*-expressions, which are synonymous with *yi*-expressions, are free forms. It will be interesting to see if there are disyllabic expressions other than *yi*-expressions that are also in the category of bound forms. What we hope to have shown in this study is that disyllabic bound forms are different from both independent

words and monosyllabic bound roots, and they represent another type of category in the inventory of linguistic elements used in Modern Mandarin.

NOTES

* We wish to thank the anonymous reviewers for valuable comments. Thanks also go to students in the Chinese linguistics class Spring 2011 for providing us with data and feedback.

1. There is much disagreement in the literature on the number of affixes in Mandarin. Pan et al (2004) conduct a comparison of 14 studies of Chinese morphology. 16 morphemes are considered affixes by most of the studies, and 340 morphemes are considered affixes by at least one of the studies.

2. These universals are initially evoked to find out whether co-verbs, such as *gen* ‘with’ and *genzhe* ‘with’ are prepositions or verbs, which is why Ps are compared with Vs in the universals. For our purpose, we will only consider the universals that apply to Ps.

3. One class of nouns that are consistently excluded from this position are *zhi*-expressions, such as *zhiqian* ‘before’, which are considered independent nouns (cf. section 6). We assume there is a simple reason why these expressions are barred after *de*: *zhi* and *de* have the same modifier-forming function, with the former from Classical Chinese, and the latter from Modern Chinese. They are incompatible with each other.

4. Thanks to a reviewer for raising this issue.

5. This sentence is adapted from an example provided by a reviewer.

6. On the postposition analysis of locative particles, there are two views. According to Tai (1973) and Ernst (1988), postpositions combine with NP to form PostP, which then combines with a preposition to form a PP. According to Hagège (1975) and Peyraube (1980), however, the postposition and the preposition form a discontinuous unit.

7. We will leave it open whether *qian* and *hou* are affixes at the word level.

8. *Zhanguoce*’s period is difficult to ascertain, because of a lack of agreement among scholars. Liu Xiang (77- 7 BC) compiled it. Sima Qian used much of the material in *Shi Ji*. It describes events from 453 BC to 209 BC. It is speculated that it was written around 150-200 BC.

9. *Guoyu* is believed to have been written at the beginning of the Warring period, which is 475 BC.

10. As in the case of *yiqian/yihou*, the test only applies when clauses are combined. The following example, provided by a reviewer, involves combination of sentence fragments, and therefore does not pose a problem for our analysis.

Qizhong kaoshi chengji, bashi yishang shi ren, yixia ershi ren
 midterm exam score 80 above 10 people below 20 people
 ‘On the midterm scores, 80 and above: 10 people, below 80: 20 people.’

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现代汉语的双音节粘着形式：以前 和 以后

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提要

本文主要探讨以前 和 以后 在现代汉语里的定位。通过各种试测，我们认为词组尾端的以前 和 以后 既非名词，也非后置词，词缀，或词组后缀；二者为词组里具名词性的一种粘着形式，为构词语法领域的新单位。这显示现代汉语不但单音节的粘着性词根在不断增加，双音节的粘着形式也开始出现。此形式的出现与以前，以后 在词组尾端的起源位置 和在此位置出现的频率有关。

主题关键词

构词法 双音节粘着形式 频率

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