Event Coercion of Mandarin Chinese Temporal Connective *hou* 'after'

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Abstract

Unlike its English equivalent *after*, which often takes NP complement, Chinese temporal connective *hou* tends to take VP complement. In terms of type coercion, while *after* seems to generally license event coercion, Chinese *hou* does not (with a few exceptions), as in most cases the presence of a verb is required for the *hou*-construction (and the sentence) to be correct. Rather than attributing this difference to the different lexicalization of nouns in these two languages, this paper argues that it is due to the difference between *hou* and *after*. In particular, *hou* is weaker in its coercion force than *after* because of its polysemy. It is either a temporal connective or a locative connective.

1 Introduction

Natural language often leaves many meaning facets unexpressed in the surface form, which will lead to type-mismatch, underspecification or semantic incongruity. For example, there is some covert event meaning in the sequence in (1), which must be recovered in understanding or interpretation. Type mismatch occurs because *the book* is an entity type and *begin* requires its complement to be an event type.

(1) John began the book.

The theory of Generative Lexicon (Pustejovsky,1995,2001,2006) proposes in particular that the mismatch is solved by the operation of type coercion, which is defined as follows (Pustejovsky, 1995: 111).

(2) Type Coercion
A semantic operation that converts an argument to the type which is expected by a function where it would otherwise result in a type error.

It is redefined as (3) (Pustejovsky, 2006).

(3) Type Coercion: the type a function requires is imposed on the argument type. This is accomplished by either:
①Exploitation: taking a part of the argument's type to satisfy the function;
②Introduction: wrapping the argument with the type required by the function.

In essence, it confers to the predicate the ability to change the argument type. The eventive verb *begin* in (1) coerces its argument to assume an event type (i.e. *read/write the book*) from an entity type (i.e. *the book*). *Read* and *write* are the telic role and agentive role of *book* respectively. The type coercion discussed above will be called event coercion below, which makes an entity type shift to an event type.
Similarly, some temporal connectives can coerce its complement to be an event type. Consider the following examples. Some events like *eating dessert* and *drinking coffee* can be reconstructed respectively (Pustejovsky, 1995:231).

(4) Let's leave after dessert.

(5) Let's leave after the coffee.

(6) is a case of French temporal connective *après* (Godard & Jayez, 1993).

(6) Après ce livre, je me seas fatigué.
    After this book I feel tired.

Lin & Liu (2005) claim that most of the coercion mechanisms postulated by GL do not seem to work in Mandarin Chinese. While event coercion mechanism works in English as shown in (1), it does not in Mandarin Chinese as shown in (7). To obtain a grammatical expression, a verb such as 读'read' or 写'write' must be explicitly provided.

(7) *张三　　　开始　一　本　书。
    zhangsan kaishi yi ben shu
    Zhangsan begin one CL book
    'Zhangsan began a book.'

However, other researches paint a different picture. According to Huang & Ahrens (2003), Liu (2005), Lin et al. (2009), Song(2011a, 2011b) , coercion is a universal linguistics mechanism and pervasive in Mandarin Chinese which is exemplified by (8) . 赶 'rush' is an eventive verb like *begin*.

(8) 我　在　　赶　这　篇　论文。
    wo zai   gan zhe pian lunwen
    I   being rush the CL   paper.
    'I am rushing (to write) the paper'.

To my knowledge, so far no study on Chinese temporal connectives has been done from the perspective of type coercion. Based on data from bilingual corpora, this paper aims to show that event coercion of 后*hou*[1] is not as pervasive as that of its English equivalent *after* and give an explanation for the phenomenon.

The rest of this paper is organized as follows. In Section 2 I first list the argument types of *hou.* Section 3 compares *hou* with *after* and shows the difference between them in the respect of type coercion through analyzing the data from Chinese-English bilingual corpora. Section 4 attempts to account for the difference. Finally, I summarize the paper in Section 5.

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[1] 后 *hou* stands for 后 *hou*, 之后 *zhihou* and 以后 *yihou,* all of which have a sense equivalent to *after*.

2　Argument Type of *hou*

The argument types of *hou* can be classified into intervals, events and entities. As a temporal connective, *hou* normally selects for an interval type argument as its complement as in (9). 十点 'ten o'clock' refers to a point of time and 三天 'three days' refers to a period of time, respectively. Here the mechanism at work is pure selection since the type requirement of *hou* is satisfied directly.

(9) a. 十　　点　　**后**
      shi dian **hou**
      ten o'clock after
      'after ten o'clock'

    b. 三　　天　**后**
       san tian **hou**
       three day after
       'after three days'

Secondly, expressions denoting events can combine with *hou* naturally because time is the basic element of event and an event always extends over time. See the following examples.

(10) 会　　**后**　有　　　茶点
     hui **hou** you chadian
     meeting after there-be refreshments
     供应。
     gongying
     provide
     'Refreshments will be served after the meeting.

(11) 写　　完　论文　**后**，我　就　　睡　了。
     xie wan lunwen **hou** wo jiu   shui le
     write ASP paper   after I   EMP sleep ASP
     'After finishing the paper, I went to sleep. '

The event-denoting expression can be an NP involving an event nominal (会*hui*'meeting') as in (10) or a VP (写完论文*xie wan lunwen* 'finishing the paper') as in (11).Here *hou* coerces an event to shift to an interval.

Finally, some nouns denoting entities such as 酒 *jiu*'wine' can be a complement of *hou* occasionally. For the case in (12), the NP 三杯马提尼 *san bei matini* 'three martinis' does not satisfy the type required by the temporal connective *hou* since it denotes entities, but the sentence is acceptable. It is

because *hou* coerces the NP into obtaining an event denotation, one which is available from the NP's qualia structure. That is, an event reading such as 喝完三杯马提尼后 *he wan san bei matini hou* 'after drinking three martinis' can be reconstructed. 喝 'drink' is the telic qualia of the 酒. Type Coercion as defined in (2) and (3) makes this possible. Here an entity shifts to an event.

(12) 三　杯　马提尼　**后**，约翰　感觉　好　了。
　　 san bei matini **hou** yuehan ganjue hao le
　　 three CL martini after John feel well ASP
　　 'After three martinis John felt well.'

In this paper, I confine my research to an analysis of the type coercion as shown in (12), i.e. event coercion. I will illustrate how *hou* and *after* are different in event coercion and further explain where the difference comes from.

3　A Comparison of *hou* and *after*

In this section I will take advantage of bilingual corpora to compare *hou* and *after*. My analysis is based on Chinese-English bilingual Corpus of Peking University and Jukuu Chinese-English bilingual Corpus. Also, a few data are collected by informants' intuition.

In section 2, I classify the kinds of complement of *hou*. At a first glance it seems that there is no significant difference between *hou* and *after* since both of them can take interval, event and entity type complement. To put it in another way, both basically select for the arguments of type interval and event, and can license event coercion whereby an entity type shifts to an event type. However, the data from bilingual corpora show that event coercion of *hou* is not so pervasive as that of *after*. *hou* tends to take VP rather than NP complement when the complement nouns are entity type. My analysis focuses on this type. In addition, the complex type of *physobj•event* will be touched on.

3.1　Entity Type Nouns

hou can't combine with entity type nouns as freely as *after* can. Data show the frequency of event coercion involving *hou* in the bilingual corpora is very low, suggesting that it is not a pervasive phenomenon. Actually, no relevant instances of [entity type noun+ *hou*] construction were found in both bilingual corpora, whereas 23 instances of

[after+ entity type noun] construction were found. All the missing verbs in English sentences appear overtly in the corresponding Chinese sentences. See the following examples.

(13) *喝*　了　几　杯　马提尼酒　**后**，
　　 he le ji bei matinijiu **hou**
　　 drink ASP some CL martini after
　　 他的　表演　　发挥　到　了　最佳
　　 ta de biaoyan fahui dao le zuijia
　　 he POSS performance develop to ASP best
　　 状态。
　　 zhuangtai
　　 status
　　 'He played best after a couple of martinis.'

(14) *吃*　过　中餐　　**后**，来　一　杯
　　 chi guo zhongcan **hou** lai yi bei
　　 eat ASP Chinese food after come one CL
　　 绿茶　　很　棒。
　　 lvcha hen bang
　　 green tea very good
　　 'after a Chinese food a cup of green tea is perfect.'

(15) *通过*　　海关　**之后**，你　必须
　　 tongguo haiguan **zhihou** ni bixu
　　 go through customs after you must
　　 在移民局　　出示　你　的　护照。
　　 zai yiminju chushi ni de huzhao
　　 at immigration show you POSS passport
　　 'After the Customs, you must show your passport to the office at Immigration.'

In (13), the verb 喝*he* 'drink' shows up although the Chinese sentence is still allowed without it. In (14) and (15), the verbs 吃*chi* 'eat' and 通过 *tongguo* 'go through' can't be absent. Otherwise the *hou*-construction (and the sentence) would be ungrammatical. In most cases, the construction of [*after* + entity type noun] can't be translated into Chinese word for word and a verb must be explicitly provided to obtain a grammatical expression. More examples are presented in (18).

(18) 大学　*毕业*　**后**
　　 daxue biye **hou**
　　 College graduate after
　　 'after college'

喝　完　茶　**后**
he　wan　cha　**hou**
Drink ASP　tea　after
'after tea'

喝　过　咖啡　**后**
he　guo　kafei　**hou**
drink ASP　coffee　after
'after coffee'

打　完　高尔夫　**后**
da　wan　gaoerfu　**hou**
play ASP　golf　　after
'after golf'

听到　信号　**后**
tingdao xinhao　**hou**
hear　tone　after
'after the tone'

收　过　小麦　**以后**
shou　guo　xiaomai　**yihou**
gather ASP　wheat　after
'after wheat'

在　*写　了*　两　部　练笔　　　的
zai　xie　le　liang bu　lianbi　　de
at　write ASP　two　CL apprentice　MOD
小说　　**之后**
xiaoshuo　**zhihou**
novel　　after
'after two apprentice novels'

In the above cases, the complements of *hou* are VPs and the verbs (and aspectual markers) in italics must be present. The complements of *after*, however, are NPs.

　To confirm further the frequency of [entity type noun+ *hou*] construction, I have consulted Modern Chinese corpus of Peking University which consists of more than 1.5 hundred million words. As a result, only 2 instances are found which is presented below. In these cases, coercion can facilitate type satisfaction and an event reading can be recovered from the complement nouns. The hidden verb is 烧 *shao* 'burn' in (16) and 喝 *he* 'drink' in (17) , which are the telic role of 香 *xiang* 'incense' and 酒 *jiu* 'wine' respectively.

(16) 一　炷　香　**后**，和尚　推　开　了
　　　yi　zhu xiang　**hou**　heshang tui　kai　le
　　　one CL incense after　monk　push open ASP
　　　门。
　　　men
　　　door
　　　'After one stick of incense burnt out, the monk pushed open the door.'

(17) 于是　三　　杯　酒　**后**，　　就　说：
　　　yushi san　　bei　jiu　**hou**　jiu　shuo
　　　then　three　CL　wine　after　EMP　say
　　　"你　的　　太太　真　像 Nancy Caro11。"
　　　ni　de　　taitai zhen xiang Nancy Caro11
　　　you POSS　wife　very like　Nancy Caro11
　　　'Then after three glasses of wine, (he) said "your wife is just like Nancy Caro11 "'

Note that the cardinal-classifier phrase in (16) can't be deleted, otherwise error will occur. Namely, 香后 is impossible as shown in (18c). Although 酒后 is grammatical in Mandarin Chinese, it is a compound and can't combine with other words freely. It is usually used in some fixed expressions like four- character idioms, e.g. 酒后驾车 *jiuhoujiache* 'drive after having drunk'. Moreover, not all the imaginable occurrences of the sequence [bare noun+*hou*] are allowed as shown in (18c-d). According to my data, only 酒后 and 茶后 are possible.

(18) a. 酒**后** *jiuhou* 'after drinking'
　　　b. 茶**后** *chahou* 'after tea'
　　　c. *香**后** *xianghou*
　　　　　literal translation: incense after
　　　d. *咖啡**后** *kafeihou* 'after coffee'

　It appears that the [cardinal ＋ CL ＋ N+*hou*] construction can license event coercion as both 一炷香 and 三杯酒 are sequences of this kind of construction. However, it is not so for all the imaginable occurrences of construction. *Hou* imposes some restrictions on this construction. Firstly, the [cardinal＋classifier＋N] construction has no definite reading and only indefinite reading is available. Secondly, generally speaking, the cardinals involved in this construction are limited to 半 *ban* 'half', 一 *yi* 'one', 二 *er* 'two' and 三 *san*

'*three*', and the nouns are limited to those denoting incenses, liquors and teas. (19) is acceptable but it means 'behind the three books'. Here *hou/zhihou* is not a temporal connective but a locative connective. 三本书exhibits a definite reading.

(19) 三　本　书　**后/之后**
　　san ben shu　**hou**/**zhihou**
　　three CL book behind
　　'behind the three books'

3.2　Complex Type Nouns

It seems that some nouns denoting to other entities can be complement of *hou* as shown in (20a). 早餐 *zaocan* 'breakfast' can refer to food, so it can be a entity type. Oddly enough, (20b) is not allowed even though 中餐 *zhongcan* 'Chinese food' also refers to food.

(20) a. 早餐　　**以后**，我们　去　巡视
　　　zaocan　**yihou**　women qu　xunshi
　　　breakfast after　we　go　make-a-tour
　　　柏林墙。
　　　bolinqiang
　　　Berlin Wall
　　　'After breakfast we made a tour of the Wall.'

　　b. *中餐² 　　**后**
　　　zhongcan　**hou**
　　　Chinese food after
　　　'after Chinese food'

It is because these two nouns belong to different types. 中餐 *zhongcan* 'Chinese food' is an artifactual type and only refers to an entity, while 早餐 *zaocan* 'breakfast' is a complex type and refers to more than one aspect, an entity or an event. It identifies both an eventuality of eating and the physical manifestation of food: *event•food.* (20a) is acceptable because coercion by dot exploitation takes place (cf. Pustejovsky, 2011). In this example, it is the event manifestation of the noun meaning that is selected for by *hou*. More examples are presented in (21), all the nouns in

which are typed as a dot object *event•physobj* [3] and the event aspect are selected for by *hou*.

(21) 午餐**后** *wucan hou* 'after lunch'
　　晚餐**后** *wancan hou* 'after supper'
　　雨**后** *yuhou* 'after the rain'
　　雪**后** *xuehou* 'after the snow'

3.3　Summary

In short, when the complement noun is an entity type, *hou* tends to take VP rather than NP complement. It is different from its English equivalent *after*, which often takes NP complement. In terms of type coercion, while *after* seems to generally license event coercion, Chinese *hou* does not (with a few exceptions), as in most cases the presence of a verb is required for the *hou*-construction (and the sentence) to be correct. In rare cases, the [cardinal+CL+N+*hou*] construction licenses coercion. Many restrictions, however, are imposed on it and therefore the examples of event coercion of *hou* are few and far between.

4　Discussion

Data from bilingual corpora prove event coercion of *hou is* much less than that of *after*. My findings are in line with the studies of Liu (2004) and Lin & Liu (2005). By comparing complement coercion in Chinese and English, they come to a conclusion that while in English some event information is left unexpressed in surface syntactic form, in Chinese it tends to be expressed directly. Lin & Liu (2005) claim that coercion involving event information (i.e. event coercion) does not work in Chinese as shown in (7). They further propose a hypothesis, which assume that being an analytical language, Chinese lexicon does not share the same degree of richness in sub-lexical event information as in a language like English. In English the primitives that carry event information are extensively incorporated into individual lexical forms, but in Mandarin Chinese they are sent directly to syntactic computation. In other words, it is because nouns in Mandarin Chinese don't have sub-lexical event information that complement coercion

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² 中餐 *zhongcan* has another sense. In this sense, it is a synonym of 午餐 *wucan* 'lunch', which is a complex type and can combine with *hou* as shown in (21).

³ Not all the nouns of complex type *event•physobj* can be the complement of *hou*. For example, *电影后 *dianying hou* 'after the film' is not allowed.

doesn't work. For example, (1) is acceptable but its (7) is not, because 书 *shu* 'book' doesn't have sub-lexical event information while *book* does. According to this account, it is because 中餐 *zhongcan* 'Chinese food' does not have sub-lexical event information that 中餐后 *zhongcan hou* 'after Chinese food' is impossible (cf.(20b)).

However, there is a problem with this analysis. If it is the poverty of sub-lexical event information that makes coercion inapplicable in Mandarin Chinese. 一炷香后 *yi zhu xian ghou* and 三杯酒后 *san bei jiu hou* (cf.(16) and (17)) should be unacceptable since 香 *xiang* 'incense' and 酒 *jiu* 'wine' have no sub-event information to be retrieved. But that is not the case as shown in (16) and (17).It suggests that they are not short of event information at all and instead they can provide a verb 烧 *shao* 'burn' and 喝 *he* 'drink' respectively for the reconstruction of event reading.

Rather than attributing this difference to the different lexicalization of nouns in these two languages, this paper argues that it is due to the different coercion force of the temporal connectives. *Hou* is weaker in its coercion force than its English equivalent *after*. Specifically, *after* is a temporal connective referring to time sequence and means "later in time than". *hou*, however, can be either a temporal connective or a locative connective. In particular, it is polysemous and has at least two senses. One is equivalent to *after* and refers to time sequence. The other is equivalent to *behind* and refers to location. The temporal meaning is derived metaphorically from the spatial meaning. As a locative connective, it usually selects for entity type nouns as complement. As a temporal connective, if it also combines with entity type nouns, ambiguity will arise in [entity type noun + *hou*] construction. For example, 海关之后 *haiguan zhihou* might mean either "behind the customs" or "after (going through) the customs"(cf.(17)).To avoid this ambiguity, the verb 通过 *tongguo* 'go through' must be present. This is why the temporal connective *hou* does not take an entity type complement and license event coercion.

Against the analysis above, 一炷香后 *yi zhu xian ghou* and 三杯酒后 *san bei jiu hou* can license coercion. There seem to be two reasons for such counterexamples. First, cardinal-classifier

plays an important role. Despite in Chinese cardinal-classifier-noun phrases have definite explanation in certain context (cf.(19)), they have only indefinite readings in this context. Hence, the physical objects denoted by them occupy no specific position and can not be used as a reference to specify the location of the other objects. *hou* gets only the temporal meaning. But, if the cardinal-classifier-noun phrases are preceded by demonstrative pronouns such as 这 *zhe* 'this', its definite reading will be salient and *hou* will get spatial meaning other than temporal meaning. So (22) denotes some locations other than time.

(22)a. 这　一　炷　香　　**之后**
　　　 zhe yi　zhu xiang　**zhihou**
　　　 this one　CL incense　after
　　　 'behind the incense'

　　b.这　三　杯　酒　　**之后**
　　　 zhe san　bei jiu　**zhihou**
　　　 This three CL　wine　after
　　　 'behind the three glasses of wine'

Second, the sequence of [cardinal+classifier+N] such as 一炷香 *yi zhu xian* is a highly conventionalized construction and functions as [cardinal+ CL+ temporal measure word] construction, which denotes a period of time. It can be observed from the contrast between (23) and (24).

(23) a.一　炷　香　　　的　　时间
　　　 yi zhu xiang　　de　　shijian
　　　 one CL incense　MOD　time
　　　 'the time that it takes for one stick of incense to burn out'

　　 b. 一　炷　香　**后**
　　　 yi zhu xiang　**hou**
　　　 one　CL incense after
　　　 'After one incense burnt out

(24) a. 一　个　小时　　的　　时间
　　　 yi ge xiaoshi　de　　shijian
　　　 one CL hour　　MOD　time
　　　 'one hour'

　　 b.一　个　小时　**后**
　　　 yi　ge　xiaoshi **hou**

one CL hour after
'after one hour'

In the examples above, both 一炷香 *yi zhu xian* and 一个小时 *yi ge xiao shi* can modify temporal nouns such as 时间 *shijian* 'time' and describe duration of time. Since 一个小时之后 *yi ge xiao shi zhihou* is allowed, it becomes logical for 一炷香 *yi zhu xian* to combine with *hou.* Other such NPs includes 一盏茶 *yi zhan cha* 'one cup of tea', 三杯酒 *san bei jiu* 'three glasses of wine' and so on. Without denoting a period of time, 一本书 *yi ben shu* can't modify time nouns as shown in (25a) and therefore 一本书后 *yi ben shu hou* is impossible as shown in (25b).

(25) a. *一　本　书　　的　　　时间
　　　 yi　ben shu　de　　shijian
　　　 one CL　book MOD time
　　　 'the time that it takes for one to finished one book'

　　 b. *一　　本　书　后[4]
　　　 yi　　　ben shu　**hou**
　　　 one　　CL　book after

It is not difficult to conclude that only the NPs which can modify time nouns can combine with *hou*. Because of the lack of timer such as clock and watch, in ancient China, time can be measured in the duration of one stick of incense burning out, or having a cup of tea or a glass of wine. For example, it takes about one hour for one incense to burn out, so 一炷香的时间 *yi zhu xiang de shijian* is equivalent to one hour or so.

5　Conclusion

To conclude, this paper describes the difference between *hou* and its equivalent *after* in event coercion. Furthermore, an alternative account is given for the difference.

　Future study is required to investigate more temporal connectives in different languages and further discuss this issue from a typological perspective.

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[4] It can't mean 'behind the book', because unlike 三本书 *san ben shu* in (19), 一本书 *yi ben shu* does not have definite reading.

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