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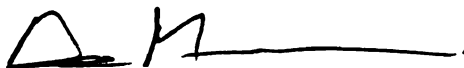
On Chinese Temporal Clauses

presented by

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has been accepted towards fulfillment
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ON CHINESE TEMPORAL CLAUSES

By

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ABSTRACT

ON CHINESE TEMPORAL CLAUSES

By

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This dissertation investigates three issues of temporal clauses in Mandarin Chinese: the syntax of *de shihou* ‘when’ clauses; the syntax of *yi-qian/yi-hou* ‘before/after’ clauses, and the behavior of the preposition *zai* in post-subject positions when it takes a temporal clause.

Temporal elements such as *de-shihou* ‘when’ and *yi-qian/yi-hou* ‘before/after’ have traditionally been analyzed as clause linking units or postpositions. In this thesis, I argue that *shihou* and *qian/hou* are in fact head nouns of noun phrases: *de-shihou* clauses are relative clauses while *yi-qian/yi-hou* ‘before/after’ clauses are noun complement clauses. Adopting Kayne's (1994) analysis of relative clauses, I argue that *de* is an enclitic determiner that takes CP as its complement and the adverbial element *shihou* raises to Spec CP. The remnant IP then raises to Spec DP to license *de*. In *yi-qian/yi-hou* clauses, I argue that *qian* and *hou* are temporal localizers which take a clausal complement. Since *zhi* is the classical form of *de* and *zhi-qian/zhi-hou* have the same function as *yi-qian/yi-hou* in temporal clauses, I argue that *zhi* and *yi* also head DPs with *qian/hou* as NP complements. The complement CP raises to Spec DP to license *yi/zhi*.

The preposition *zai* usually occurs in a temporal clause in an adjunct position, and is optional, especially when the clause is sentence-initial. However omitting *zai* in a sentence like *Wo *(zai) Lisi chusheng yi-qian zao jiu chuguo le* ‘I had gone abroad before Lisi was born’ where the temporal clause follows the main clause subject makes the

sentence to be less acceptable. I argue that the omission of *zai* in sentence of this sort results in two DPs in a sequence, which leads to a garden path effect. When two DPs occur in the sentence initial position without *zai*, the two DPs can easily be interpreted as either a coordination or a topic-subject relationship. Inserting *zai* between the two NPs is preferred in order to avoid the garden path.

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To My Parents

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Chapter 1:

Introduction

Temporal clauses are clauses that contain time expressions. The following sentences are typical temporal clauses in English.

- (1) a. John arrived when Bill left.
- b. John arrived before Bill was fired.
- c. John departed after Bill left.

The research of temporal clauses in English has focused mainly on their interpretations instead of their structures. One important study about English temporal clause structure dates back to Geis (1970). Geis (1970) argues that English temporal clauses are restrictive relative clauses in that sentences like (1a, b, and c) are derived from the following sentences respectively.

- (2) a. John arrived at the time when Bill left.
- b. John arrived before the time at which Bill was fired.
- c. John departed after the time at which Bill left.

That is, each sentence in (1) has a counterpart, which is shown in (2), that contains a noun phrase as the temporal clause's antecedent. After Geis, basically, English temporal clauses have been analyzed similarly to relative clauses or clauses with movement of a

null temporal operator within them. Temporal clauses in Chinese, however, have not been extensively studied. Some examples of Chinese temporal clauses are given in (3)¹.

- (3) a. Wo (zai) chufa de shihou kandao le ta².
 I ZAI depart DE time see LE him
 'I saw him when I departed.'
- b. Wo (zai) huijia yi-qian/yi-hou dei zuo gongke.
 I ZAI return-home before/after must do homework
 'I have to do homework before/ after going home.'

As we can see in (3), Chinese temporal clauses are different from their English counterparts. In what follows, I will introduce Chinese temporal clauses by comparing them with their English counterparts. I will first discuss the differences between *de shihou* 'DE time' clauses and *when*-clauses, then discuss the differences between *yi-qian/yi-hou* 'before/after' clauses and *before/after* clauses.

1.1 Introduction to *de shihou* and *yi-qian/yi-hou* clauses

Consider the following *de shihou* clauses.

- (4) a. Wo (zai) chufa de shihou kandao le ta.
 I ZAI depart DE time saw LE him
 'I saw him when I departed.'

¹ Chinese adverbs such as, manners, locative adverbials and temporal adverbials usually occur after the subject and before the main verb phrase, as in (i) (Li & Thompson 1981, Ernst 1994). Some temporal bare noun phrases can also occur before the subject, as in (ii).

- | | | |
|-----|--|---|
| (i) | a. Wo mingtian dei shangxue.
I tomorrow must go-to-school
'I have to go to school tomorrow,' | (ii). Mingtian wo dei shangxue.
tomorrow I must go-to-school
'I have to go to school tomorrow.' |
|-----|--|---|

² Although *zai* is usually translated as 'at', in this study, I will gloss it as ZAI, since it does not have any meaning. I will discuss *zai* in section 1.2.3.

- b. Wo (zai) chufa de nei-ge shihou kandao le ta.
 I ZAI depart DE that-CL time saw I.E him
 'I saw him at the time/moment when I departed.'
- c. (Zai) chufa de shihou wo kandao le ta.
 ZAI depart DE time I see LE him
 'I saw him when I departed.'

An English *when* clause is usually argued to correspond to the *de shihou* clause in Chinese (Chao 1968, Li and Thompson 1981, Gasde and Paul 1996). *De shihou* occurs at the end of the temporal clause, opposite to the position of *when* in English. Furthermore, *de shihou*, unlike a single element, can be separated by a demonstrative, as shown in (4b) in that *nei-ge* 'that-CL' is between *de* and *shihou*. However, in English it is not possible for a single element *when* to be separated by a demonstrative³.

Now consider Chinese *before/after* clauses, as shown in (5).

- (5) a. Wo (zai) huijia yi-qian/yi-hou dei zuo gongke.
 I ZAI return-home before/after must do homework
 'I have/had to do homework before/ after going home.'
- b. (Zai) huijia yi-qian/yi-hou wo dei zuo gongke.
 ZAI return-home before/after I must do homework
 'Before/after going home, I have/had to do homework.'

³ Another element functioning similar to *zai* is *dang*. *Dang* usually occurs with *de shihou* clauses in temporal clauses; however when a *de shihou* clause occurs with *dang*, it cannot occur in post-subject position as shown in the following:

- (i) a. (Dang) ta lai de shihou wo zheng-zai chifan
 DANG he come DE time I right-ZAI eat-meal
 'When he came I was eating.'
- b. *ta . (Dang) lai de shihou wo bu zai jia
 he DANG come DE time I not ZAI home
 Intended to mean: 'When he came I was not home.'

In (5), we can see that Chinese *yi-qian/yi-hou* clauses differ from their English counterparts in that *before/after* in English precedes their clause *going home*, but the Chinese *yi-qian* ‘before’ and *yi-hou* ‘after’ follow their clauses *huijia* ‘return home’. Also, like *de shihou* clauses, they both optionally allow *zai* to start the temporal clause. Also the optionality of *zai* does not change the meaning of the sentence. However, English temporal clauses do not have this kind of optional element that does not indicate any meaning.

1.2. Examining Chinese temporal clauses

Having discussed differences between the English and Chinese temporal clauses, it is very important to understand if *de shihou* and *yi-qian/yi-hou* are the same element as their English counterparts, *when* and *before/after*. That is, are *de shihou* and *yi-qian/yi-hou* single elements like *when* and *before/after* or are they different from their English counterparts? This question leads to the major goal of this study, namely to determine the syntactic status of *de shihou*, *yi-qian*, and *yi-hou* and investigate the syntactic structure of *de shihou* and *yi-qian/yi-hou* clauses. Moreover, since both *de shihou* and *yi-qian/yi-hou* clauses involve the occurrence of *zai*, it is also important to investigate how *zai* interacts with temporal clauses. In what follows, I will lay out some issues regarding the structure of *de shihou* and *yi-qian/yi-hou* clauses, as well as some issues about how *zai* interacts with temporal clauses.

1.2.1. The status of *de-shihou* clauses

In this section, I will briefly introduce the meaning of *shihou* as in *de shihou*, and then discuss *de shihou*'s status.

Shihou in Chinese, depending on context, can mean 'time', 'moment', 'during', 'while', and 'when', as shown in the following examples:

- (6) a. Ni shenme shihou lai de?
you what time come DE
'What time did you come?'
- b. zai nei-ge shihou
ZAI that-CL time
'at that moment'
- c. wanfan de shihou
dinner DE time
'during dinner'
- d. Ta zai chifan de shihou, wo zai kanshu ne.
he ZAI eat-meal DE time I ZAI read-book NE
'While he was eating, I was reading.'
- e. Ta dao-le de shihou wo zheng zai chi-fan ne.
he arrive-LE DE time I right ZAI eat-meal NE
'When he arrived I was eating.'

In this thesis, I will focus on the combination of *de* and *shihou* since it has been treated as a single element that introduces a temporal clause, (Chao 1968, Li and Thompson 1981, Gasde and Paul 1996), and it is only when *shihou* goes with *de*, that it can introduce a temporal clause.

De shihou traditionally is treated as a single element. Li and Thompson (1981) consider it a conjunction, while Gasde and Paul (1996) treat it as a postposition. Now let us look at *when*-clauses in Chinese again.

- (7) a. Ta lai de shihou wo zai chifan.
 he come DE time I ZAI eat-meal
 ‘When he came I was eating.’
- b. Ta lai de nei-ge shihou wo bu zai jia.
 he come DE that-CL time I not ZAI home
 ‘The moment he came I was not home.’

De shihou clauses especially those like (7b) look very much like relative clauses. A Chinese relative clause (RC) requires *de* to bridge the clause to its left and the head noun to its right. *De* is an element that does not have any semantic content. In (7), the *de shihou* clause, like an RC, also contains a clause, *de*, and *shihou* in which *shihou* is likely the head noun. A typical Chinese RC can be shown as in (8).

- (8) a. chuan hong yi-fu de ren
 wear red clothes DE person
 ‘the person who wears red clothes’
- b. chuan hong yi-fu de na-ge ren
 wear red clothes DE that-CL person
 ‘that person who wears red clothes’

As (8a) shows, the relative clause consists of a clause, *chuan hong yi-fu* ‘wear read clothes’, *de*, and a head noun *ren* ‘person’. (8b) shows that between *de* and the head noun *ren* ‘person’ a demonstrative *nei-ge* ‘that-CL’ can be inserted.

Further evidence that a *de shihou* clause is like a relative clause is that *shihou* can be modified by the demonstrative *na-ge* ‘that-CL’ as (7c) shows. Moreover, a *de shihou* clause behaves similarly to other adjunct RCs in that adjunct RCs do not allow demonstratives to occur in pre-RC positions, as shown below:

- (9) a. *Na-ge ta lai de shihou wo bu zai jia.
 That-CL he come DE time I not ZAI home
 ‘That time when he came I was not home.’
- b. Ni xiu che de (na-ge) wanshang.
 you fix car DE that-CL evening
 ‘the evening when you fixed the car’
- c. *Na-ge ni xiu che de wanshang.
 that-CL you fix car DE evening
 ‘that evening when you fixed the car’

(9a) is a *de shihou* clause that has its demonstrative appearing at the beginning of the clause. (9b) is an adjunct relative clause with a demonstrative, and moving the demonstrative to the beginning of the sentence, we get (9c). As we can see from (9a) and (9c), both *de shihou* clauses and the adjunct relative clauses do not allow pre-RC demonstratives.

1.2.2 The status of *yi-qian/yi-hou* clauses

In this section, I will discuss other elements that can also correspond to *before/after* in Chinese, *zhi-qian/zhi-hou* and *qian/hou*. Furthermore, I discuss the syntactic status of *yi-qian/yi-hou*.

In addition to *yi-qian/yi-hou*, other Chinese elements that correspond to *before/after* are *zhi-qian/zhi-hou* and *qian/hou*, as shown in the following sentences.

- (10) a. Wo (zai) huijia yi-qian/yi-hou dei zuo gongke.
 I ZAI return-home before/after must do homework
 'I have/had to do homework before/after going home.'
- b. Wo (zai) huijia zhi-qian/zhi-hou dei zuo gongke.
 I ZAI return-home before/after must do homework
 'I have/had to do homework before /after going home.'
- c. Wo (zai) huijia qian/hou dei zuo gongke.
 I ZAI return-home before/after must do homework
 'I have/had to do homework before/after going home.'

As we can see from (10), the meaning and function of *yi-qian/yi-hou*, *zhi-qian/zhi-hou*, and *qian/hou* are the same in temporal clauses. Nevertheless, the categorial status of *yi-qian/yi-hou*, *zhi-qian/zhi-hou*, and *qian/hou* is not clear. Let us focus on *yi-qian/yi-hou* for the time being and examine (5), repeated here as (11).

- (11) a. Wo (zai) huijia yi-qian/yi-hou dei zuo gongke.
 I ZAI return-home before/after must do homework
 'I have/had to do homework before/ after going home.'
- b. (Zai) huijia yi-qian /yi-hou wo dei zuo gongke.
 ZAI return-home before/after I must do homework
 'Before/after going home, I have/had to do homework.'

(11) shows that *yi-qian* and *yi-hou* correspond to English *before* and *after* respectively, and introduce embedded clauses as *before* and *after* do in English. However, *yi-qian/yi-hou* follow the clauses that they introduce instead of preceding the clauses as their

English counterparts do. This implies that, instead of being prepositions, they may be postpositions as argued in Gasde & Paul (1996).

However, *yi-qian/yi-hou* ‘before/after’ phrases also behave like noun phrases.

One argument made by McCawley (1992) is that these phrases can occur after *ba* as shown in (12)⁴.

- (12) Zhangsan **ba** wanfan yi-qian/yi-hou kanzuo zuihao de xiuxi shijian.
 Zhangsan BA dinner after/before regard best DE rest time
 ‘He regards after/before dinner as the best rest time.’ (McCawley, 1992, 231)

(12) shows that *wanfan yi-qian/yi-hou* ‘before/after dinner’ can occur after *ba*, and should be noun phrases, thus, *yi-qian* and *yi-hou* are very likely to be nouns.

According to what I have discussed so far, the syntactic category of *yi-qian* and *yi-hou* is not certain; they may be postpositions or they may be nouns. However, if they are postpositions, why is it possible for them to occur after *ba*? Also, it is well known that *zhi* as in *zhi-qian* ‘before’ is *de*’s (*de* as in *de shihou*) classical form (Xu 1996, Simpson 1999, 2000), and *yi-qian/yi-hou*, *zhi-qian/zhi-hou*, and *qian/hou* have

⁴ According to Li (2001), *ba* was a verb in classical Chinese which had the meaning of *take*, *hold*, and *handle*. It has undergone grammaticalization, and is not used with these meanings anymore. A *ba* construction usually has a construction like (i) and (ii), and the NP after *ba* is the object of the verb.

- (i) NP + *ba* + NP + V + X
 (ii) NP + *ba* + NP + X + V

According to Li, the X is anything that is non-null that can be an adverb or a PP. An example of this construction is as follows.

- (iii) Wo ba shuiguo chi-wan le
 I BA fruit eat-finish LE
 ‘I ate up the fruits.’

the same meaning and function as shown in (10); therefore, it is very likely that *yi*, *zhi*, and *de* are the same kind of element, and thus Chinese *before/after* clauses are very likely to be noun phrases.

1.2.3. The function of *zai*

Zai is an element that occurs with both locative phrases as well as temporal phrases. According to Li and Thompson (1974), Li (1990), Ernst (1988), McCawley (1992), and Liu (1998), *zai* is a preposition. *Zai* does not have semantic content as the following sentences show.

- (13) a. Shu zai zhuozi shang
book ZAI table top
'The book is on the table.'
- b. Shu zai xiangzi li
book ZAI box inside
'The book is in the box.'
- c. Shu zai beizi qian-mian
book ZAI cup front-side
'The book is in front of the cup.'

From (13), we can see that *zai* does not contribute any meaning in any of the sentences. The meaning of *on*, *in*, *front*, seems to be from the localizers, i.e., words such as *shang* 'top' *li* 'inside', and *qian-mian* 'front-side' in (13), instead of from *zai*.

Moreover, *zai* does not seem to be an obligatory element in temporal clauses as (4), (5) and (11) show. However, the following sentences show that it is sometimes obligatory.

- (14) a. Zhangsan *(zai) Lisi chusheng yi-qian jiu chuguo qu le
 ZAI was-born before then go-abroad go LE
 Intended to mean: ‘Before Lisi was born, Zhangsan had gone abroad.’
- b. (Zai) Lisi chusheng yi-qian, Zhangsan jiu chuguo qu le.
 was-born before then go-abroad go LE
 ‘Before Lisi was born, Zhangsan had gone abroad.’

What is it that makes *zai* obligatory in (14a)? That is, why is *zai* obligatory when the matrix subject (*Zhangsan*) in (14a) is at the beginning of the sentence, but optional when the matrix subject is not at the beginning of the sentence, as shown in (14b)? Moreover, it is not always the case that when the matrix subject precedes the embedded clause, *zai* becomes obligatory, as we have seen in (4a) and (5a), repeated here as (15).

- (15) a. Wo (zai) chufa de shihou kandao le ta.
 I ZAI depart DE time saw LE him
 ‘I saw him when I departed.’
- b. Wo (zai) huijia yi-qian/yi-hou dei zuo gongke.
 I ZAI return-home before/after must do homework
 ‘I have to do homework before/ after going home.’

Examine (14) and (15). We can see that the difference between them is that (15a) does not have a subject in the embedded clause, but (14a) has a subject in the embedded clause. This suggests that when the embedded subject and the matrix subject are in a sequence, *zai* is obligatory. However the following sentence shows that this is not the case.

- (16) Wo (zai) gongke zuohao yihou jiu huijia.
 I at homework finish after then return-home
 'I will go home after I finish the homework.'

(16) has a subject, *gongke* 'homework', in the embedded clause, and it follows the matrix subject, but *zai* is not obligatory.

Concluding from this section, *zai* does not contribute any crucial meaning to the sentence, and that may be the reason why it is optional. Since it is optional most of the time, its existence cannot be due to syntactic constraints. If this is the case, the presence of *zai* in (14a) should be for a different purpose.

1.3. Problems to be investigated

Having discussed some of the basic data concerning Chinese temporal clauses, there are three main points to be investigated: the structure of *de shihou* clauses, the structure of *yi-qian/yi-hou* clauses, and the inconsistent optionality of *zai*.

I will pursue the hypothesis that Chinese temporal clauses are all noun phrases. This can be illustrated by the following: first, *de shihou* clauses are very similar to adjunct relative clauses in that they both involve the use of *de* and both have the same effect when encountering demonstratives. In Chinese *before/after* clauses, *zhi* in *zhi-qian/zhi-hou* is believed to be the classical form of *de*. Furthermore, phrases with *yi-qian/yi-hou* behave like noun phrases as McCawley argues. Moreover, the clauses introduced by *de shihou* and *yi-qian/yi-hou* precede them, which is similar to relative clauses.

Finally, the inconsistent optionality of *zai* seems to indicate that the optionality of *zai* is not due to syntactic constraints, but to something else.

With this as a background, this study will be based on the framework of Principles and Parameters (Chomsky 1986b, 1995), and will pursue the following issues:

- 1 Is *de shihou* a single element? That is, can it be separated into smaller units? What is the structure of a *de shihou* clause?
2. Are *yi-qian/yi-hou* each a single element? That is, can they be separated into smaller units? What is the structure of a *yi-qian/yi-hou* clause?
3. What is the function of *zai* in Chinese temporal clauses? What are the constraints on its occurrence?

1.4. Organization

In this study, I argue that Chinese temporal clauses, *de shihou* clauses and *yi-qian/yi-hou* clauses, are syntactically similar to clauses involving phrases with *de* (an element that introduces relative clauses and noun complement clauses). In addition, I discuss the optionality of *zai* in temporal clauses. I argue that the optionality of *zai* in temporal clauses in the post-subject position is not due to syntactic constraints. The rest of my dissertation is organized as follows:

In Chapter 2, I review the literature regarding Chinese relative clauses. Since *yi-qian/yi-hou* clauses and *de shihou* clauses are similar to relative clauses, examining the structure of relative clauses is crucial. Two main analyses will be examined. One analysis takes *de* in a relative clause as a complementizer like the English *that* in English

relative clauses. The other analysis takes *de* as a determiner like the English *the*; however, *de* has lost its definiteness and cannot function like the English *the*. The *de* as a determiner analysis will be chosen partially because its classical form *zhi* was a demonstrative in classical Chinese. According to Simpson (2000), demonstratives often develop into determiners and it is very possible that *de* has lost its determiner properties and does not function like a normal determiner. The other reason to take *de* as a determiner is that *de* does not function like a complementizer that connects clauses like *that* does. Finally, evidence from Lin, Murasugi, and Saito (2001) shows that *de* is a determiner since it functions similarly to English 's, that it can license noun phrase deletion, such as *this is John's*.

In Chapter 3, I examine the properties of *de shihou* clauses. Gasde and Paul (1996) argue that *de shihou* is a postposition and *shihou* is not a normal noun. However, I will show that Gasde and Paul's argument cannot be right, and *de shihou* clauses behave like other time relative clauses as Ning (1993) describes.

Chapter 4 deals with *yi-qian/yi-hou* clauses. *Yi-qian/yi-hou* can be substituted for by *zhi-qian/zhi-hou*, and *qian/hou* in temporal clauses. *Qian/hou* are also localizers that indicate locations of objects. Localizers have been studied more than temporal clauses. Therefore, it is necessary to examine localizers, and I will argue that *qian/hou* are temporal localizers that still possess nominal properties. Furthermore, this chapter argues that *zhi* and *yi* in temporal clauses are functional elements similar to *de* in relative clauses/noun complement clauses whose structural positions are the same. As a result, the construction of *yi-qian/yi-hou* clauses shows a similar structure to the relative clauses/noun complement clauses; the *yi-qian/yi-hou* clauses contain a clause, a

functional element *de*, which is *yi* or *zhi*, and a noun which is either *qian* or *hou*.

Nevertheless, I will argue that they are in fact noun complement clauses since *qian/hou* do not undergo movement out of the temporal clause preceding them, assuming Simpson's (2000) analysis of *de* phrases.

In chapter 5, I discuss the syntactic behavior of *zai* in locative phrases and temporal phrases, specifically in *yi-qian/yi-hou* phrases. I argue that *zai* is necessary with locative phrases, but is optional with temporal phrases. Since *zai* is optional in preposed temporal clauses, the obligatory presence of *zai* in post-subject positions is to avoid a temporary parsing ambiguity caused by two noun phrases in a sequence.

Alexie, Sherman
Allen, Paula Gunn
Black Elk
Brant, Beth
Bruchac III, Joseph
Crow Dog, Mary
Deloria, Ella Cara
Deloria, Vine Jr.
Eastman, Charles A.
Erdoes, Richard
Erdrich, Louise
Forbes, Jack D.
Geigamah, Hansey
Glancy, Diane
Hale, Janet C.
Harjo, Joy
Henry, Gordon
Hogan, Linda
King, Thomas
LeBeau, Patrick
McNickle, D'Arcy
Momoday, Scott N.
Mountain Wolf Woman
Ortiz, Alfonso
Ortiz, Simon
Rose, Wendy
Silko, Leslie
Vizenor, Gerald
Welch, James



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Chapter Two:

The Chinese DP

As discussed in the previous chapter, Chinese temporal clauses are similar to noun phrases with *de*¹. In this chapter, I discuss the structure of Chinese noun phrases with *de* (hence forth, *de* phrases), which are found in both relative clauses and complement clauses. In the literature, *de* has mainly been analyzed as either a complementizer or a determiner. In this chapter, I will argue in support of the determiner analysis put forth by Simpson (1999, 2000). The chapter is organized into six sections. In 2.1, I introduce Chinese *de* phrases and their relevant literature. In 2.2, I review the analyses that take *de* as a complementizer (Cheng 1986, Ning 1993, Xu 1997). In 2.3, I discuss Ning's (1996) analysis of *de* as its own syntactic category. In 2.4, I review Simpson's (1999, 2000) and Lin, Murasugi, and Saito's (2001) determiner analyses. Section 2.5 is a discussion of the previous analyses and an overview of my reasons for supporting Simpson's analysis. Finally, in 2.6 I focus on *de* phrases that contain a complement to the left of the head noun.

2.1 Introduction to *de* phrases

The head noun of a Chinese noun phrase always occurs at the end of the phrase, as shown in (1).

¹ Although some linguists view this *de* the same as the adverbial *de* as in *pao de kuai* 'run DE quick (run quickly)', it is argued convincingly among many linguists that these DEs are different. (Huang 1982, Tang 1990).

- (1) a. zhe-ben shu
this-CL book
'this book'
- b. wo de shu
I DE book
'my book(s)'
- c. wo de na-ben shu
I DE that-CL book
'the book which is mine'
- d. piaoliang de hua
pretty DE flower
'pretty flowers.'
'the flowers that are pretty'
- e. wo mai de shu
I buy DE book
'the book(s) that I bought'
- f. ta mei chu-guo de shishi
he not go-abroad DE fact
'the fact that he did not go abroad'

(1a) shows that both the demonstrative and the classifier must precede the head noun.

Examples (1b) to (1e) show that *de* is required for any phrase that relates to the head noun and has the structure of XP + *de* + NP. (1b) shows that *de* is like a genitive marker. Although (1c) has almost the same structure as (1b), from its English gloss, *de* seems to be like a relative clause marker. (1d) shows that *de* is like an adjective modifier marker. (1e) shows that *de* is like a relative clause marker, and (1f) shows that *de* is like a complement marker of the head noun. (1b), (1c), (1d) and (1f) do not show any gap in the XP position. (1e) shows that the XP contains a gap after *mai* 'buy'.

In this chapter, I will focus on noun phrases with *de* instead of noun phrases with demonstratives, numbers, and classifiers as in (1a). Examples (1b) to (1f) seem to show that *de* has different functions. Li and Thompson (1981) suggest that *de* is a genitive marker, an associative marker, and a nominalizer². However, most linguists who

² According to Li and Thompson, when *de* occurs in between two nouns, the meaning of the whole phrase is determined by the association of the two nouns.

study Chinese agree that these *des* are the same *de* (Huang 1982, Ross 1982, Cheng 1986, Tang 1990, Ning 1996, Xu 1997, Simpson 1999, 2000) and the XP that precedes *de* may or may not contain a gap. That is, if the XP contains a gap, it is a relative clause, while if the XP does not contain a gap, the XP is likely a noun complement clause.

There are three kinds of analyses of *de* with respect to its syntactic category. One takes *de* as a complementizer generated in C⁰ (Huang 1982, Cheng 1986, Ning 1993, Xu 1997), one takes *de* itself as a syntactic category that projects a *de* phrase (DeP) (Ning 1996), and the third takes *de* as a determiner (Simpson 1999, 2000, Lin, Murasugi and Saito 2001).

In the following sections, I will review these three analyses, which focus on *de* phrases containing gaps (i.e., relative clauses), and discuss their strengths and weaknesses. I will then give my reasons to support Simpson's analysis. Finally, I will discuss the gapless CP that precedes *de*, i.e., noun complement clauses. In section 2.2, I will review complementizer analyses of Cheng (1986), Ning (1993) and Xu (1997).

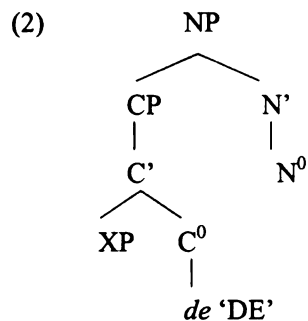
2.2 *De* as a complementizer

De phrases usually can be translated as relative clauses in English, as examples (1c), (1d) and (1e) above show. Even the English version of (1f) contains a complementizer. Many *de* phrases do have the properties of relative clauses since the phrase preceding *de* contains a gap. The three analyses I will discuss in this section view all *de* phrases as having the same syntactic configuration as a relative clause. Because of this, *de* is usually taken to be a complementizer, such as the word *that* in English. Cheng (1986) and Ning (1993), following Huang (1982), argue that *de* is a complementizer, and

further claim that it is a head-final element, while Xu (1997), following Kayne (1994), argues that *de* is a head-initial complementizer and undergoes overt C^0 to D^0 movement. In the following section, I will first review Cheng's and Ning's head-final complementizer approaches, and then discuss Xu's head-initial complementizer approach.

2.2.1 *De* as a head-final complementizer

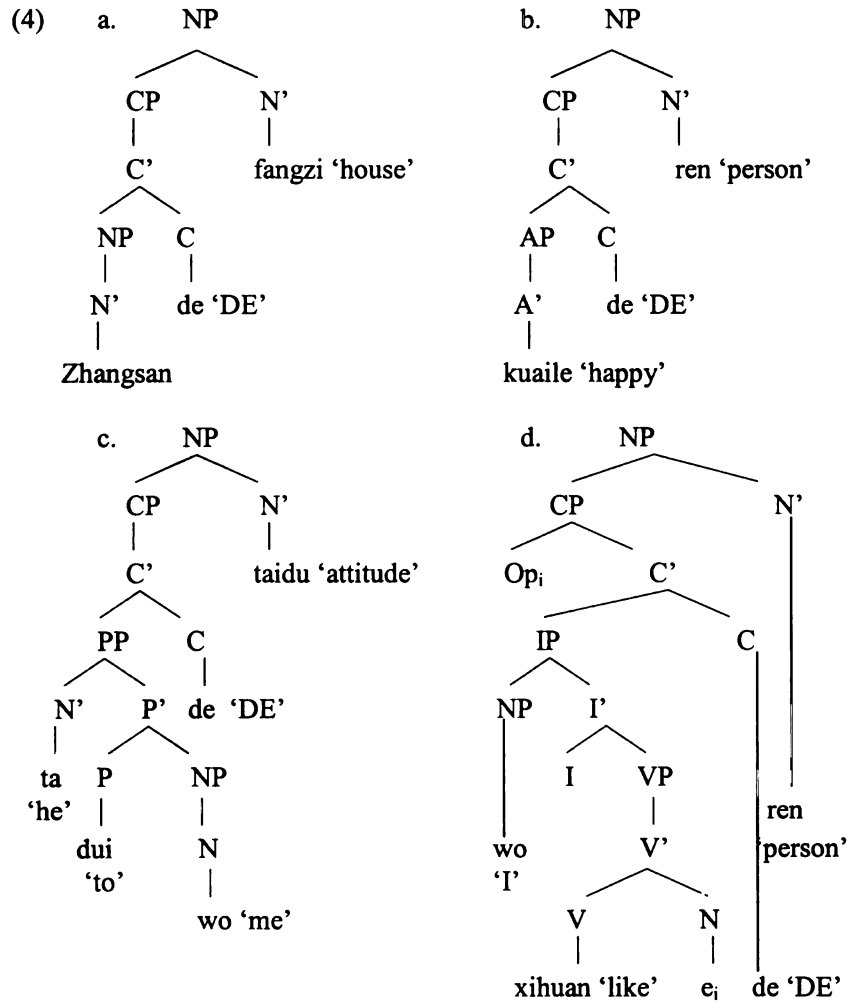
Assuming X-bar theory and following Huang's (1982) claim that Chinese nouns are head-final and *de* is a complementizer, Cheng (1986) argues that Chinese *de* is a head-final complementizer. Her analysis is as follows:



That is, *de* is a head-final complementizer that takes an XP to its left. The CP acts as the modifier of the head noun.

Based on the structure in (2), she suggests that the *de* phrases in (3) have the structures in (4).

- (3) a. Zhangsan de fangzi
DE house
'Zhangsan's house'
- b. kuaile de ren
happy DE person
'a happy person'
- c. Ta dui wo de taidu hen hao.
he to me DE attitude very good
'His attitude towards me is very good.'
- d. Ni xihuan de ren hen chengshi.
you like DE person very honest
'The person that you like is very honest.'



According to Cheng, there is no syntactic restriction on the complement that *de* selects. In (3a), it takes a noun phrase as its complement; in (3b), it takes an AP. In (3c), it takes a PP as its complement, and in (3d), it takes a clause. Among the structures in (4), the whole CP modifies the head noun. Cheng also emphasizes that *de* is a case marker, so *Zhangsan* in (3a) gets case from *de*, while the head of the whole phrase gets case from an external case marker. She concludes that Chinese not only has a head-final head noun, but it also has a head-final complementizer.

Along the line of Huang and Cheng, Ning (1993) also takes *de* as the head of a CP and further elaborates the properties of *de* in a relative clause construction. He argues that there are three kinds of *de* phrases: possessive *de*, complement *de*, and relative clause *de*. All three are illustrated below in (5) respectively.

- (5) a. Zhangsan de shu
 DE book
 ‘Zhangsan’s book’
- b. Ta mei lai de shishi
 he not come DE fact
 ‘the fact that he did not come’
- c. Wo xihuan de shu
 I like DE book
 ‘the book that I like’

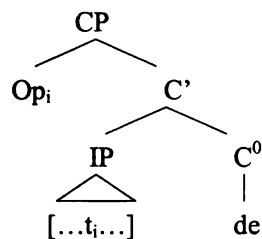
He argues that *de* in (5a) is a case marker. The *de* phrase in (5b) is a complement construction with *de*, which does not involve an operator movement. (5c) is a relative clause and in this case, *de* must select a clause with a gap as its complement.

Ning, following Rizzi (1990), assumes that there are four kinds of C^0 , as shown in (6), and each type attracts different kinds of elements to its Spec position.

- (6) a. [+wh, -pred] b. [+wh, +pred]
 c. [-wh, +pred] d. [-wh, -pred]

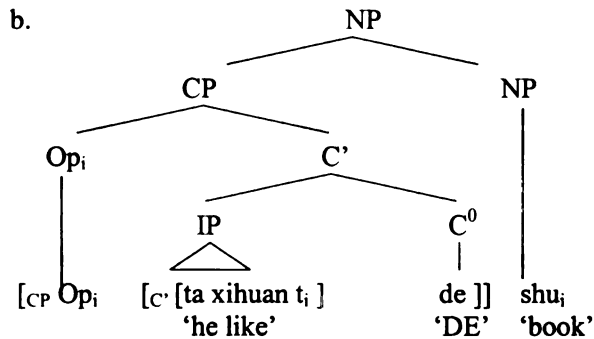
A C^0 with a [+wh] feature attracts a wh-element to its Spec position for Spec-head agreement. A [-wh] feature in C^0 does not allow a wh-element to occur in its Spec position. A C^0 with a [+pred] feature heads a CP which contains a predicate. A [-pred] feature of C^0 heads a CP which contains a proposition. Based on these assumptions about C^0 , Ning analyzes *de* in relative clauses as [-wh, +pred], and in noun complement clauses as [-wh, -pred]. Ning's analysis for *de* in relative clauses is that *de* is a functional head which occupies the C^0 position with the features [-wh, +pred]. Since the C^0 position is [-wh, +pred], *de* does not require a wh-element to occur at its Spec position; however, an operator does occur in its Spec. According to Ning, 'the semantic contribution of *de* as a functional head is to turn a proposition into a one-place predicate (p. 66).' *De* requires the one-place predicate to be its complement which contains a variable gap, and thus an operator must be introduced to have an operator-variable construction, as shown in (7).

(7)



(7) shows that *de* is generated in C^0 and selects an IP as its complement, which involves operator movement. A relative clause as in (8a) has the structure shown in (8b).

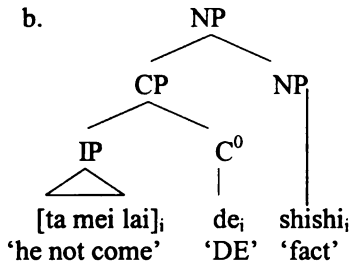
- (8) a. ta xihuan de shu
 he like DE book
 'the book he likes'



(8) shows that *de* heads a CP with a null operator in its specifier, and the operator is coindexed with the gap in the IP and the NP to form a chain at LF.

As for a noun complement clause, (5b), repeated here as (9a), it has the structure shown in (9b).

- (9) a. Ta mei lai de shishi
 he not come DE fact
 'the fact that he did not come'



According to Ning, the C^0 in a noun complement clause has [-wh, -pred] features, and thus C^0 in (9) selects a proposition; however, the C^0 does not project a Spec position. Therefore, there is no operator variable construction involved, and the C^0 is coindexed with the NP.

In summary, Ning claims that *de* is a genitive case marker and also follows Huang (1982) and Cheng (1986) in assuming that *de* in relative clauses and noun complement clauses is in C^0 , which is a head-final element. He argues, supporting Rizzi (1990), that cross-linguistically there are the four kinds of C^0 listed in (6). *De* in a relative clause construction has the features [-wh, +pred], and it selects an IP with a gap as its complement. Thus, it has a full projection and has a Spec position. However, *de* in a noun complement clause has the features [-wh, -pred], selects a proposition as its complement, and does not undergo full projection to have a Spec position.

2.2.2 *De* as a head-initial complementizer

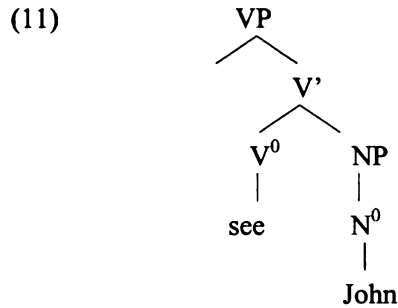
Xu (1997), following Chomsky's (1993) assumption that all languages possess the same set of functional categories, argues that *de* phrases are in fact CPs with *de* as their complementizer.

He suggests that *des* should not be considered as different markers, such as genitive markers, relative clauses markers, or markers for adjectives. He emphasizes that these *des* should all be considered the same. Based on Kayne's (1994) Linear Correspondence Axiom and his relative clauses analysis, Xu proposes that all *de* phrases can be analyzed as relative clauses and that *de* is a head-initial element generated in Comp. Before turning to Xu's analysis, we shall look at Kayne's analysis of a relative clause.

Kayne (1994) proposes the Linear Correspondence Axiom (LCA) which enforces a strict relationship between linear order and hierarchical structure: for any two non-terminal nodes X and Y, if X asymmetrically c-commands Y, then the terminals dominated by X must precede the terminals dominated by Y. Asymmetric c-command is defined as follows.

- (10) X asymmetrically c-commands Y iff X c-commands Y and Y does not c-command X. (p. 4)

Under the LCA, word order is strictly determined by the hierarchy of phrase structure. A head must asymmetrically c-command its complement. Therefore, the head's terminal must precede the complement's terminals as shown in (11).



In (11), the head V^0 asymmetrically c-commands N^0 , and V^0 's terminal *see* precedes N^0 's terminal *John*.

Since the hierarchical structure of a phrase determines the linear order of the terminals, one consequence of the LCA is that right-adjunction is disallowed. The reason is that an XP right-adjoined to a YP will asymmetrically c-command all of YP's terminals, which means that the XP's terminals will precede the YP's terminals, and thus result in an incorrect word order. This can be illustrated in (12)³.



³ According to Kayne, the restriction for c-command is as follows:

'X c-commands Y iff X and Y are categories and X excludes Y and every category that dominates X dominates Y'. (Kayne 1994, 16)

When an XP adjoins to a YP, the two YPs are segments of one category, namely YP. The two YPs are not in a c-command relation since c-command is restricted to categories rather than segments. In (12), XP asymmetrically c-commands all categories that are dominated by the lower YP, and thus, following LCA, XP's terminals should precede YP's terminals.

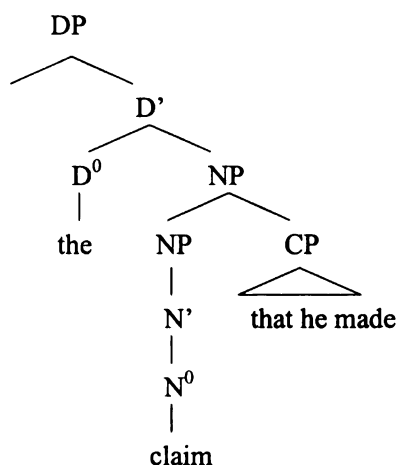
A consequence of the LCA is that the standard analysis of relative clauses cannot be correct. The standard analysis analyzes a relative clause, as shown in (13), as an adjunction to the head noun (Chomsky 1977, Safir 1986, Browning 1991) as in (13b).

(13) a. the claim that he made

b. $[_{DP} \text{ the } [_{NP} [_{NP} \text{ claim}] [_{CP} \text{ Op}_i \text{ that he made } t_i]]]$

If the relative clause is an adjunction to the head noun, as the standard analysis claims, it will c-command the head noun and result in an incorrect word order. (13b) shows this discrepancy, as we can see from its tree structure in (14).

(14)

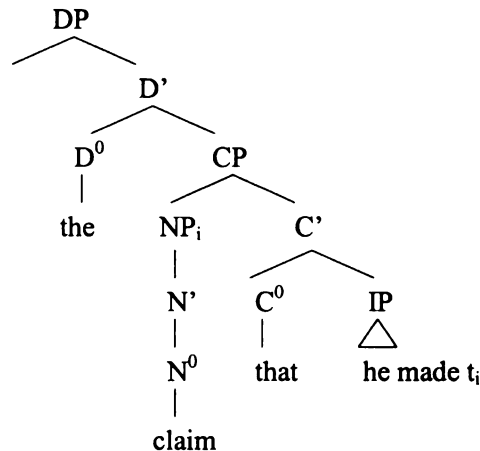


The structure in (14) has the CP adjoined to the head NP. The lower NP and the higher NP are two segments of the same category. Since segments cannot enter into c-command relations, the CP in (14) asymmetrically c-commands the N^0 , and thus the CP's terminals

should precede the head noun, which would derive the word order *the that he made claim*, which is not a grammatical English relative clause. However, Kayne (1994) adopts a head-raising analysis (Vergnaud 1974) which can solve the problem that the standard analysis encounters. The head-raising analysis emphasizes that the head noun is derived through a direct movement from the relative clause. A relative clause, like (13a) *the claim that he made*, has its head noun moved from the relative clause, as shown in (15a) with its tree structure shown in (15b).

(15) a. [_{DP} the [_{CP}[_{NP} claim]_i [_{C'} that he made t_i]

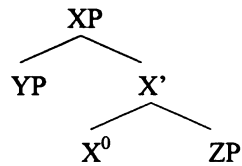
b.



(15) shows that the NP moves to the Spec of CP and it asymmetrically c-commands C⁰ and IP, but not the other way around, since C' is a segment which does not involve a c-command relation. Following the LCA, it has the correct word order, *the claim that he made*.

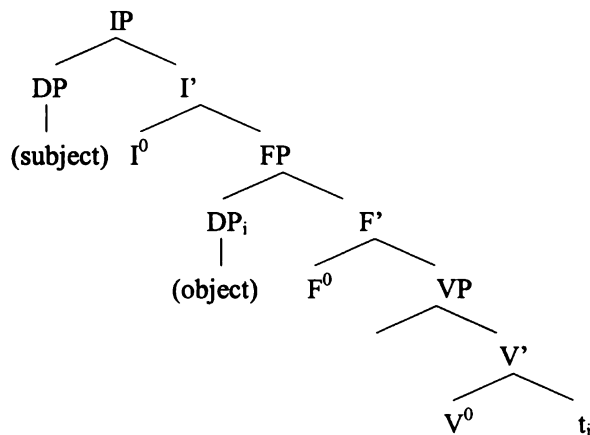
Another consequence of the LCA is that the head direction parameter does not exist. Since right adjunction is not allowed, an XP can only have the following structure:

(16)



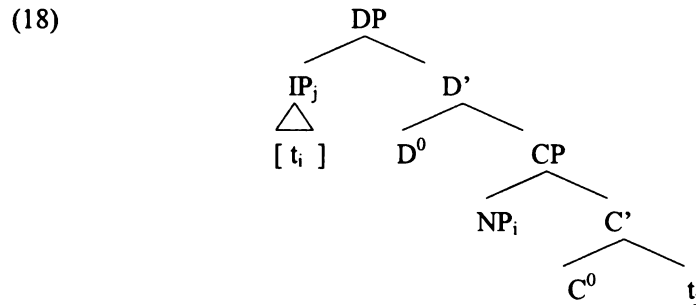
That is, the specifier position is the site for adjunction. The head must asymmetrically c-command and precede its complement, and thus the universal order of the elements of a phrase are specifier, head, and complement. The head directionality parameter does not exist and the word order of each language is derived by movement with respect to the order of the specifier, head and complement sequence. Thus, an SOV order has a derivation as shown in (17).

(17)



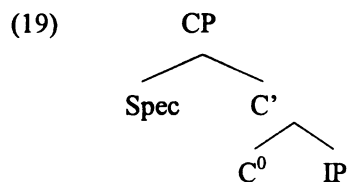
That is, the complement of the head V^0 will make a leftward movement to the Spec of an FP (a functional phrase, such as an Agr Phrase), resulting in SOV word order, which is the correct word order for languages like Japanese.

Since head directionality does not exist, the underlying structure of final head relative clauses must be the same as the structure of head-initial relative clauses. For a language like Amharic, which has a definite article between its relative clause and its head noun, (i.e., relative clause + definite article + noun), Kayne proposes the structure shown in (18).



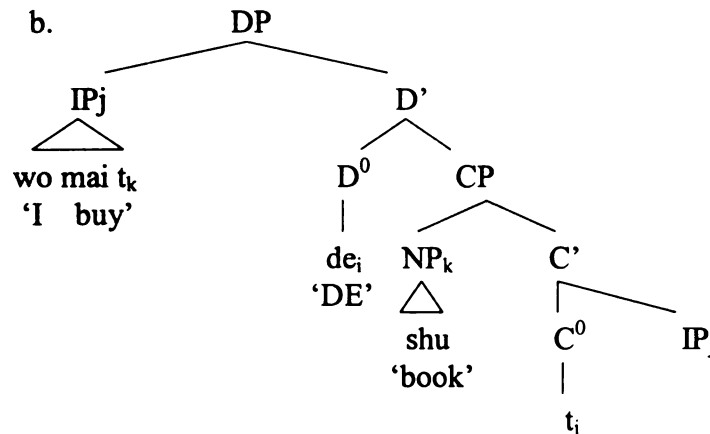
(18) shows that head-final relative clauses have the same structure as head-initial relative clauses. However, in order to get the head-final relative clause, the IP originally containing the head noun moves to Spec of DP, after the head noun raises to Spec of CP, and thus the head noun appears at the end of the relative clause.

Following Kayne's proposal, according to Xu, a Chinese CP will have the same structure as other languages, as shown in (19).



Since Chinese has noun final relative clauses, the Chinese relative clause has a similar structure to (18). According to Xu, a Chinese relative clause such as (20a), will have a structure as in (20b).

- (20) a. wo mai de shu
 I buy DE book
 'the book I bought'



That is, the head noun moves to Spec of CP. *De* starts out in C⁰ and moves to D⁰. This allows IP to make a legal movement to Spec of DP. According to Xu, *de* is not a determiner since *de* + NP does not form a constituent, as shown in (21).

- (21) **de* shu
 DE book

Therefore, the most likely position to generate *de* in is C⁰. After *de* moves to D⁰, the distance from the lower IP to [Spec, CP] equals to the distance to [Spec, DP] under the assumptions of Minimalist Program (Chomsky 1993). Thus, [Spec, DP] is a possible target for IP to move to. Xu argues that C⁰ to D⁰ movement is important for two reasons.

First, by moving to D^0 , it can check the feature of CP. Second, according to him, “assuming that IP features have to be checked in the [Spec, DP] position and that these features (due to selection) have to be checked by C^0 instead of D^0 , substituting the empty D^0 with a lexical C^0 such as *de* will make this checking possible” (1997, 92).

Based on Xu’s analysis, the sentences in (22) will have the structures in (23).

- (22) a. Zhangsan de shu
DE book
‘Zhangsan’s book’
- b. zai zhuo shang de shu
ZAI table top DE book
‘the book which is on the table top.’
- c. haokan de dianying
good-looking DE movie
‘the movies that are good to watch’
- d. Lisi shang guo de daxue
top GUO DE university
‘the university that Lisi attended’

- (23) a. $[DP[IP \text{ Zhangsan } \text{Pred. } t_i]_k [D^0 DE_j [CP [NP \text{ shu }]_i [C^0 e_j [IP e]_k]]]^4$
- b. $[DP[IP t_i \text{ zai zhuo shang }]_k [D^0 DE_j [CP [NP \text{ shu }]_i [C^0 e_j [IP e]_k]]]$
- c. $[DP [IP t_i \text{ haokan }]_k [D^0 DE_j [CP [NP \text{ dianying }]_i [C^0 e_j] [IP e]_k]]]$
- d. $[DP [IP \text{ Lisi shang-guo } t_i]_k [D^0 DE_j [CP [NP \text{ daxue }]_i [C^0 e_j [IP e]_k]]]$

As a result of his analysis for relative clauses, Xu further applies this structure to *yi-qian/yi-hou* and *zhi-qian/zhi-hou* ‘before/after’ clauses. He suggests that *yi/zhi* should

⁴ Xu, following Hashimoto (1971), analyzes (22a) *Zhangsan de shu* ‘Zhangsan’s book’ as deriving from *Zhangsan you shu* ‘Zhangsan has books’. *You* ‘has’ is deleted and therefore, (23a) shows a *Pred* in the structure.

be analyzed as *de*, and *qian/hou* ‘before/after’ should be analyzed as head nouns that are modified by temporal clauses. A temporal clause such as in (24a) would have the structure in (24b).

- (24) a. wo likai zhongguo yi-qian/yi-hou.
 I leave China before/after
 ‘before/after I left China...’
- b. [_{DP} [wo likai zhongguo]_j [_{DP} yi_i [_{CP} [_{NP} qian/hou] [_{CP} t_i IP_j]]]]]...

That is, *qian/hou* are head nouns that are base-generated in Spec of CP, and *yi* is in the same position as *de*. Xu also emphasizes the fact that (24) can occur after the preposition *zai*, suggesting that the temporal clause is a DP. This is shown as (25).

- (25) zai wo likai Zhongguo yi-qian/yi-hou
 ZAI I leave China before/after
 ‘before/after I left China’

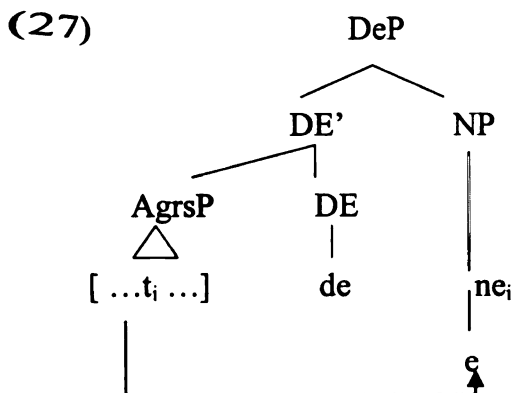
In summary, following the Minimalist framework, and Kayne’s analysis of head-**final** relative clauses, Xu argues that *de* is in C⁰. The head noun moves to Spec of CP and *de* moves from C⁰ to D⁰. The head movement extends the domain of C⁰, and this allows **IP** to move to Spec of DP to derive the correct word order.

2.3 *De* as a syntactic category

Ning (1996) proposes that *de* and Cl(assifier) are functional heads in Chinese that project their own phrases: *de* projects to a DeP (*de* phrase), and CL projects to a ClP (classifier phrase).

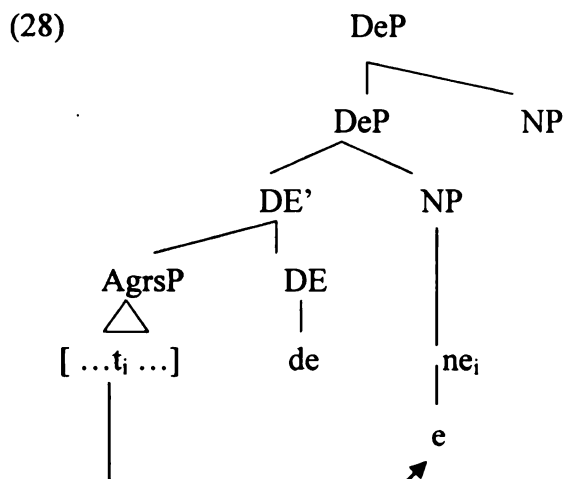
Ning suggests that *de* selects a clause to the left as its complement. This complement must be an AgrsP that contains a gap. The gap for Ning is created by movement to Spec of DeP for feature checking, as (27) shows, just as *wh*-phrases move for checking [+*wh*] features in English⁵. Semantically, a DeP is like a predicate formed by λ abstraction and any bare DeP expresses a set of entities that shares the property that is defined in the pre-*de* clause. Examples of bare DePs are shown in (26), and the proposed structure of a bare DeP is shown in (27).

- (26) a. ta xihuan de
 he like DE
 ‘a set of entities having the property of x such that he likes x’
- b. zhuotian huilai de
 yesterday come DE
 ‘a set of entities that came yesterday.’



⁵ Ning labels the moved element [ne] for Null Entity, but it is unclear what significance is to be attached to this label.

With this bare *de* structure, the head noun adjoins to DeP, and the structure is as follows:



That is, the head does not extract directly from the relative clause, but it adjoins to the DeP.

Like Xu, Ning analyses all *de* phrases as relative clauses. Sentences such as (29), which appear not to have a gap, are analyzed as having a gap, as in (30).

- (29) a. Zhangsan de shu
 DE book
 ‘Zhangsan’s book’
- b. zai MIT de na-ge xuesheng
 ZAI DE that-CL student
 ‘the student at MIT’
- c. hen qimiao de gushi
 very wonderful DE story
 ‘a very wonderful story’
- ❸0 a. [NP[*e* Zhangsan] de [NP shu]]
- b. [[*e* zai MIT] de [nage xuesheng]]

c. [[*e* hen qimaio] de [gushi]]

(29a) is analyzed such that *Zhangsan de* is a predicate, as shown in (31).

- (31) Zhe shu shi [Zhangsan de].
 this book is DE
 ‘This book is Zhangsan’s.’

Since *Zhangsan de* can occur after the copula *shi* ‘be’, it is a predicate and able to be selected by *de* and merges with *de* to form [*Zhangsan de*] *de*], a DeP. After this merge, then one *de* is deleted; later, the NP *shu* adjoins to the DeP, and (29a) is derived. (29b) *zai MIT* is also taken as a predicate and it has a subject gap. Evidence for this comes from the following comparison.

- (32) a. *[e cong MIT] de xuesheng
 from DE student
 ‘the student(s) who is/(are) from MIT/comes from MIT.’
 b. *na-ge xuesheng cong MIT
 that-CL student from
 ‘That student is from MIT/comes from MIT.’

- (33) a. [e zai MIT] de na-ge xuesheng
 ZAI DE that-CL student
 ‘that students who is at MIT’
 b. Na-ge xuesheng zai MIT.
 that-CL student ZAI
 ‘That student is at MIT.’

(33b) shows that the subject *na-ge xuesheng* ‘that student’ takes *zai MIT* ‘at MIT’ as a predicate, but (32b) *na-ge xuesheng* ‘that student’ does not take *cong MIT* ‘from MIT’ as a predicate. Therefore, leaving out a subject in (33a) to make a relative clause with *zai MIT* is fine, but not in (32a) because it is ungrammatical before the subject is relativized⁶. The same analysis applies to (30c) that adding a subject to *hen qimiao* ‘very wonderful’ is a grammatical construction.

To sum up, Ning suggests that *de* is a head-final functional category that selects a clause with a gap created by movement to Spec DeP. If a *de* phrase contains a head noun, the head noun adjoins to DeP to the right.

2.4. *De* as a determiner

In this section, I will discuss two analyses that take *de* as a determiner. One is Simpson (1999, 2000) who follows Kayne’s noun final relative clauses analysis and argues that *de* is an enclitic determiner. The other is Lin, Murasugi, and Saito (2001) (henceforth Lin et al.) who argue that *de* is a determiner that licenses a DP Spec position, and the relative clause is base-generated in the Spec of DP. I will review Simpson’s argument first then go on to review Lin et al.

⁶ The correct sentences for (32a) and (32b) can be expressed in (i) and (ii) respectively.

<p>(i) <i>cong MIT lai de ren</i> from come DE person ‘The person who comes from MIT.’</p>	<p>(ii) <i>Na-ge xuesheng cong MIT lai</i> that-CL student from come ‘He comes from MIT’</p>
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That is, the difference between *zai* and *cong* is that *zai* phrases can be predicates, but *cong* phrases are pure Prepositional phrases. Since (32a) lacks a predicate, it is ungrammatical before the relativization takes place.

2.4.1 Simpson's analysis

Simpson (1999, 2000), following Kayne's analysis for relative clauses, argues that *de* is an enclitic determiner that takes CP as a complement. Since *de* + NP does not form a constituent, as Xu (1997) argues, such an analysis does not seem to be straightforward. However, Simpson examines determiners cross-linguistically and finds that there are similarities between *de* and determiners in other languages. He also looks at the historical derivation of how determiners changed among languages and concludes that *de* is an enclitic determiner.

There are three difficulties in claiming that *de* is a determiner. First, *de* can occur more than once in a DP, as shown in (34), and it is not common for a DP to have more than one determiner as the head, especially in English.

- (34) wo de Chomsky xie de nei-ben shu
 I DE write DE that-CL book
 'my book which is written by Chomsky'

Simpson argues that we cannot use our understanding of West European languages to judge this phenomenon. He gives examples from Giusti (1997) to show that Hebrew, as in (35a), Albanian, as in (35b), and Greek, as in (35c), all have phrases that contain more than one determiner.

- (35) a. ha-yit ha-gadol
 the-house the-big
 'the big house'

b. dial-i i-mire
 boy-the the-good
 'the good boy'

c. afto to oreo to vivlio
 this the good the book
 'this good book'

As shown in (35), the determiners in these languages are able to occur more than once within a DP. Therefore, a determiner that occurs more than once should not be something that is forbidden.

The second problem with *de* not being a suitable determiner is that it does not have any contribution to mark definiteness of a noun phrase. Simpson draws attention to Longobardi's (1994) argument that in some languages, the definite determiners are simply expletives which are place-holders, and do not necessarily mark definiteness. That is, the occurrence of the definite determiner is not contributing to the definiteness of the whole noun phrases. One of examples from Italian is shown in (36).

(36) a. il mio Gianni
 the my Gianni

b. Gianni_i mio t_i

c. *mio Gianni

According to Longobardi, a definite determiner can be a placeholder. The definiteness of the DP in (36b) is established by overt movement from N⁰ to D⁰. Otherwise, a definite article has to fill the determiner's position as (36a) shows. Otherwise, failure to insert an expletive in D⁰ or moving the name to D⁰ will end up ungrammatical as in (36c). Also, in French, definite determiners, when used in instances of inalienable possession, do not have definite interpretation, but an indefinite interpretation as shown in (37).

- (37) Olga a le bras enfle.
 Olga has the arm swollen
 'Olga has a swollen arm.'

Also English definite article may be used without marking definiteness when it is used as a book or story title, as shown in (38).

- (38) The Crow and the Fox

Therefore, the fact that *de* does not have the function of definiteness is not a crucial argument in support of the conclusion that *de* is not a determiner.

A third possible reason to reject *de* as a determiner is that *de* can co-occur with demonstratives. As shown in (39), the determiner and demonstrative should not co-occur in English since the demonstrative is traditionally considered to be in D⁰ position.

- (39) a. *the that book

- b. *that the book

However, examples from Spanish and other languages show that it is not impossible for the definite article to co-occur with a demonstrative, as shown in (40).

- (40) el hombre este
 the man this
 'this man'

Furthermore, evidence from Grosu (1988) shows that demonstratives in Romanian are not generated in D^0 , but are phrases, i.e., XPs. This explains why N-movement over a demonstrative is not barred, as in (41a), but AP movement over a demonstrative is barred as shown in (41)⁷.

- (41) a. $\text{baiat}_i\text{-uo}$ acesta frumos t_i
 boy-the this nice
 ‘this nice boy’
- b. * $\text{frumos}_i\text{-ul}$ acesta t_i baiat
 nice-the this boy

If demonstratives are not in D^0 , it is not surprising to see a determiner and a demonstrative present in the same phrase, as with *de* and other determiners.

The data above demonstrate that, although *de* behaves differently from English ‘the’, this should not be taken as reason to exclude *de* as a determiner. Simpson further argues that *de* is an enclitic determiner in Chinese by applying Grosu’s (1988) argument supporting an enclitic determiner analysis for the Romanian definite determiner.

According to Grosu, the Romanian definite determiner is an enclitic determiner and needs phonological support to exist. Therefore, the determiner triggers some other element to move to precede it, as shown in (42).

- (42) a. $\text{potret}_i\text{-ul}$ t_i unei fete
 portrait-the a.Gen. girl
 ‘the portrait of a girl’

⁷ Rizzi (1990) shows that movements should obey relativized minimality. A category can only be blocked by the same kind of category. Therefore, an XP would be blocked by an XP, but not an X^0 .

- b. un portet al unei fete
 a portrait of-the one girl
 'a portrait of the girl'

(42a) shows that *ul* 'the' triggers *potret* 'portrait' to move to its left for phonological support⁸. (42b) shows that the indefinite determiner, *un* 'a', does not trigger any element to its left. Simpson argues that this situation is just like *de* phrases. *De* always needs some element to precede it for phonological support. Furthermore, he follows Szabolcsi's (1994) analysis of Hungarian determiners and assumes that *de* in Chinese is similar to the Hungarian determiner. According to Szabolcsi, Hungarian D⁰ is only a position for the determiner to fill in, and the determiner does not have definite interpretation. Szabolcsi argues that the Hungarian determiner is just a subordinator; the definiteness is assumed to come from other elements. For example, demonstratives appear lower than the determiner. Along the line of Szabolcsi, Simpson takes *de* as an underspecified determiner that does not contribute a definite interpretation. However, a demonstrative can co-occur with the determiner and assign definiteness to the whole phrase, as shown in (43).

- (43) ta mai de nei-ben shu
 he buy DE that-CL book
 'that book that he bought'

Assuming that *de* is a determiner, Simpson takes the function of *de* "to introduce a predicative restriction on some nominal" (1999, 9). The reason that *de* is required is

⁸ It is unclear what Simpson means by "phonological support"; however, it can be assumed that a D⁰ requires its specifier position to be filled with an XP.

that the presence of a modifier for a head noun depends on the presence of a determiner.

(44) shows this fact in Vietnamese.

- (44) a. Trong nha-hat kia co muoi-bay ghe.
in cinema this are 17 chair
'There are 17 chairs in this cinema.'
- b. Trong nha-hat kia co muoi-bay *(cai) ghe lam bang cay tot.
in cinema this are 17 CL chair make of wood good
'There are 17 chairs make of good wood in this cinema.'

Classifiers in Vietnamese have determiner-like properties, according to Daley (1995). (44) shows that Vietnamese does not need a classifier for counting. However if a modifier phrase occurs, the classifier is obligatory. English also shows a similar situation. Although it is not obligatory for English modifiers to co-occur with the definite determiner *the*, sentences in (45) show that there is a connection between the determiner and the noun modifier.

- (45) a. *the every whim
a'. the every whim of Margaret Thatcher
- b. that sweater of John's (is expensive.)
b'. * the sweater of John's (is expensive.)
b''. the sweater of John's that you showed me last night (is expensive.)

All these examples support the idea that the determiner has a strong bond with the modifier of a head noun.

Therefore, according to Simpson, the reason that (46) is ungrammatical is because *de* in (46a) needs a modifier's phonological support to its left. (46b) shows that movement of the head noun to the left of *de* does not satisfy the structural requirements of *de*.

- | | | |
|------|---|---|
| (46) | a. * <i>de ren</i>
DE person
Intended to mean: 'the person' | b. * <i>ren_i de t_i</i>
person DE
Intended to mean: 'the person' |
|------|---|---|

That is, the connection between the modifier and the determiner is a cross-linguistic phenomena. *De*, in the same sense, is necessary when a modifier is needed to modify the head noun. Therefore, in order for a modifier to precede the head noun, *de* is necessary.

Simpson also looks through the development of determiners cross-linguistically in other languages that have determiners behaving quite parallel to *de*. He argues that *de* is indeed an enclitic determiner. Determiners frequently develop from demonstratives and then gradually lose their definiteness. For example, French *le* and *la* 'the' are derived from Latin demonstratives *il-le* and *il-la*. Greenberg (1978) also claims that quite a few African languages have determiners that developed from demonstratives, and gradually lost their definiteness. Hence, a new set of demonstratives will be used for specifying the definiteness of a noun phrase.

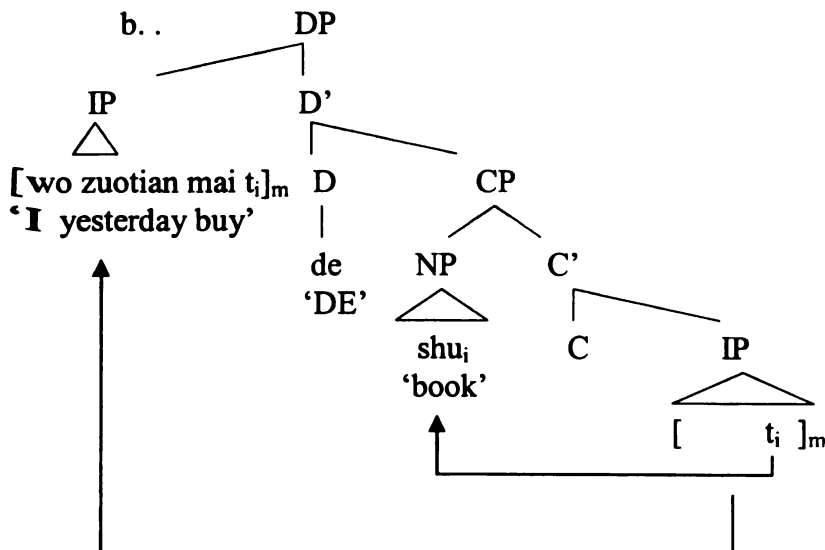
Chinese *de* is thought to develop from the classical form *zhi*, which functions like *de* in introducing modifiers, but also functions as a demonstrative (Pulleyblank 1995). Simpson believes that this is good evidence that *de* is an enclitic D⁰ element. Moreover, there is also evidence from Buginese (47) that its definite determiner shows a similar

phenomenon like *de* that introduces a modifier and noun relationship, as in (47a), and it uses the definite determiner to form relative clauses, as shown in (47b).

- (47) a. iaro buku-e malotonng-e lima-e
 those book-the black-the five-the
 'those five black books' (Nishiyama 1997)
- b. buku lima-e uvlii-e iaro
 book five-the 1SG.buy-the that
 'those five books which I bought'

In summary, *de* is a semantically bleached determiner that introduces a predicate/modifier phrase before the head noun. Since it needs phonological support, the predicate/modifier it introduces has to move to its left. This situation is similar to the Romanian data in (42). Now turning to Simpson's analysis of a Chinese *de* phrase, Simpson proposes the structure in (48b) as an analysis of (48a).

- (48) a. wo zuotian mai de shu
 I yesterday buy DE book
 'the book that I bought yesterday.'



(48) shows that *shu* ‘book’ moves from the IP to the Spec of CP, and the IP moves to the Spec of DP.

In addition to relative clauses like (48), *de* phrases such as genitive phrases and adjective phrases are also interpreted as relative clauses under Simpson’s analysis. The examples in (49) are analyzed as in (50).

- (49) a. *wo de shu*
 I DE book
 ‘my book’
- b. *lü de huaping*
 green DE vase
 ‘green vase’/ ‘the vase that is green’

- (50) a. $[_{DP} [_{IP} \text{wo } I^0 [_{VP} e \ t_i]]_k \text{ de } [_{CP} \text{shu}_i \ t_k]]$
- b. $[_{DP} [_{IP} \ t_i \ lü]_m [_{D} \text{de } [_{CP} \text{huaping}_i \ t_m]]]$

(50b) is not problematic since it is widely known that Chinese adjectives can be predicated without *be* like in English. In (50a), Simpson follows Kayne’s analysis, analyzing *wo shu* ‘I book’ meaning ‘I have (a) book’ as an IP headed by a null verb. The element *e* in (50a) is equivalent to English *have*. Simpson argues that the copula *shi* ‘be’ can be dropped in certain environments, for instance, *wo (shi) zhongguo ren, ta (shi) yingguo ren*. ‘I am a Chinese person, he is an English person’. Therefore, it can be taken as a default verb in sentences which have two nouns without verbs. However, it is uncommon to have the copula followed by a noun in a *de* phrase and link with the head noun, as shown in (51).

- (51) *shi zhongguo de ren
 is China DE person
 ‘*people who are China’

Therefore, Simpson suggests that if this default interpretation of the copula does not apply to *de* phrases, then when *de* connects a noun phrase and a head noun, the null verb possession reading can occur, as (50a) shows.

In summary, Simpson argues that we cannot apply the English use of definite determiners to refute the determiner analysis of *de*. Examples of determiners in other languages that behave differently from English *the* have very similar syntactic properties to *de*. For instance, some of these determiners introduce modifiers, and some need phonological support, and some have both characteristics, like *de*. Also when looking into history, determiners that developed from demonstratives are usually semantically bleached. Since *de* is believed to be developed from *zhi*, and *zhi* is also a demonstrative, it is likely that *de* is a determiner.

2.4.2 Lin, Murasugi and Saito's analysis

Lin, Murasugi and Saito (Lin et al.) (2001), based on Murasugi and Saito's (M & S) (1990) study of Japanese NP deletion, claim that Chinese *de* is a determiner. M & S (1990) argue that only under the DP hypothesis can a noun phrase deletion be explained in a principled way. It is said that the deletion of a noun phrase occurs because it undergoes N' deletion (Jackendoff 1971), as shown in (52), and the same situation applies to Japanese, as shown in (53).

- (52) [_{NP} Linclon's [_{N'} portrait]] didn't please me as much as [_{NP} Wilson's [_{N'} e]].
- (53) [_{NP}Haruki no [_{N'}e]]-wa [_{NP} Masako no [_{N'} e]] yori kirei da.
 NO picture-Top NO than beautiful be
 'Haruki's picture is more beautiful than Masako's.'

Deleted N's must be preceded by a genitive phrase, and like VP deletion, the deleted constituent needs an antecedent. As (52) and (53) show, the deleted noun phrase has an antecedent, which is *portrait* in (52) and *e* 'picture' in (53), and they both have a stranded genitive phrase which is *Wilson's* for English and *Masako no* in Japanese.

M & S argue against an N' deletion approach on the following grounds. First, if as Jackendoff argues, N' deletion and VP deletion share the same basic properties, it misses a structural parallel with the VP deletion that N' is not a maximal projection. Under the assumption that all empty categories need to be licensed, VP deletion is licensed by Infl, while N' deletion does not have a head similar to Infl to license the deleted noun phrase. Moreover, by examining (54), we find that the N' deletion analysis also encounters empirical problems.

- (54) a. This [book] is John's [e].
- a'. Kono [hon]-wa John no [e] da.
 this book-Top John NO be
 'This book is John's.'
- b. *That [bad attitude toward research] is John's [e].
- b'. *Sono [yokunai kenkyuu-ni taisuru taido]-wa John no [e] da.
 that bad research-Dat toward attitude-Top NO be
 'That bad attitude toward research is John's.'
- c. John's attitude toward research is good, but Mary's is bad.

c' . [John no [kenkyuu-ni taido]]-wa ii ga, [Mary no [e]]-wa yokunai.
 NO research-Dat attitude-Top is-good though, NO -Top bad
 'John's attitude toward research is good, but Mary's is bad.'

(54a) shows that the deleted noun phrase refers back to *book*. The same meaning in Japanese as in (54a') shows that the deleted noun phrase after *no* has an antecedent *hon* 'book' and is grammatical. (54c) also shows that the gap refers back to *attitude toward research* and the same meaning in Japanese as in (54c') shows that the deleted noun phrase after the second *no* can refer back to the noun phrase, *kenkyuu-ni taido* 'research attitude'. However, the gap in (54b) cannot refer back to *bad attitude toward research*, and the gap in (54b') cannot refer back to *yokunai kenkyuu-ni taisuru taido* 'bad attitude toward research'. Given N' deletion, it is puzzling why the gaps in (54b) and (54b') cannot refer back to their antecedents.

M & S (1990) suggest that a DP hypothesis not only provides a parallel structure with the VP deletion, but it can also explain the situation in (54). With a DP hypothesis, the deleted noun phrase is an NP, a maximal projection just as in VP deletion. Also, NP deletion will have D^0 to license the deleted NP just as I^0 licenses the deleted VP, as illustrated in (55).

- (55) a. [_{IP} I [_{I'} [_I] [_{VP} left] because [_{IP} John [_{I'} [_I did] [_{VP} e]]]
- b. [_{DP} John [_{D'} [_D 's] [_{NP} t_i [_{N'} reliance on his advisor]]] is more problematic than [_{DP} Mary [_{D'} [_D 's] [_{NP} t_i e]]]

Also, the situation for English in (54) can be well explained, as shown in (56).

- (56) a. [DP This [[NP book] is [DP John's [NP e]].
 b. *[DP That [NP bad attitude toward research]] is [DP John_j [D 's [NP t_j e]]].
 c. [DP John's_i [NP t_i attitude toward research]] is good, but [DP Mary_j [D 's [t_j e]]] is bad.

Given the DP hypothesis, (56a) has 's in D⁰. *John* is the possessor of *book*, and the possessor is base-generated in Spec of DP. In (56b) and (56c), *John* and *Mary* are not the possessors of *attitude*, so they are not base-generated in Spec of DP. However, they start out in the NP to receive the θ -role of experiencer from *attitude toward research* and then move to Spec of DP to get case from D⁰. In (56b), the deleted NP has *John* move to Spec of DP. The deleted NP contains a trace, and therefore cannot refer back to the higher NP *bad attitude toward research* since there is no trace in the higher NP, and thus the result is ungrammatical. In (56c), both the higher NP and the deleted NP contain a trace, and therefore, the deleted NP can refer back to the higher NP. A similar analysis can be applied to the Japanese data in (54), as shown in (57).

- (57) a. [DP Kono [NP hon]-wa [DP John no [NP e]] da.
 this book-Top John NO be
 'This book is John's.'
 b. *[DP Sono [NP yokunai kenkyuu-ni taisuru taido]-wa [DP John_j no [t_j e]] da.
 that bad research-Dat toward attitude-Top NO be
 'That bad attitude toward research is John's.'
 c. [DP John_i no [NP t_i kenkyuu-ni taido]]-wa ii ga,
 NO research-Dat attitude-Top is-good though
 [DP Mary_j no [NP t_j e]]-wa yokunai.
 NO -Top bad
 'John's attitude toward research is good, but Mary's is bad.'

Under the DP hypothesis, (57b) is ruled out for the same reason as (56b) -- a deleted NP with a trace cannot refer back to an NP that does not contain a trace. However, Japanese *no* cannot be equal to English 's. For M & S, *no* is inserted whenever two noun phrases or a PP and a noun phrase are adjacent to each other. Therefore, a phrase like *Kyooto no hikai* 'Kyooto's destruction' can have either structure in (58).

- (58) a. [_{DP} [_{NF} Kyooto-no hakai]]
 destruction
 ‘Kyooto’s destruction’

 b. [_{DP} Kyooto-no_i [_{NF} t_i haikai]]
 destruction
 ‘Kyooto’s destruction’ (M & S 1990, 296)

That is, *Kyooto* can stay as the complement of *hakai* 'destruction' and then insert *no*, as (58a) shows; or it can move to Spec of DP and then insert *no*, as (58b) shows.

Nevertheless, when NP deletion occurs, the movement to Spec of DP is forced.

Following their analysis of the NP deletion and *no* phrases, Murasugi and Saito **further** examine the reason why a sentence parallel to (57c) is ungrammatical, as (59) **shows**.

- (59)
- a. *Saikin-wa hare-no hi-ga ame-no yorimo ooi.
recently-Top clear-NO day-Nom rain-NO than plentiful
'Recently, sunny days are more plentiful than rainy ones.'
- b. *Saikin-wa [_{DP} hare_i -no [_{NP} t_i hi]]-ga [_{DP} ame_j-no [_{NP} t_j e]] yorimo ooi.
recently-Top clear-NO day-Nom rain-NO than plentiful

According to M & S, NP deletion requires the phrase preceding *no* to move to Spec of DP, as (58b) shows. Hence, (59a) has its structure of (59b) that *hare* ‘clear’ and *ame* ‘rain’ move to Spec of their DPs. However, adjunct NP movement is known to be an illegitimate movement⁹. In (59), both *hare* and *ame* are adjuncts moving to Spec of DP, and thus, the illegitimate adjunct movement causes (59) to be ungrammatical. If (59) is analyzed under an N’ deletion analysis, it would be difficult to explain why (59) is ungrammatical, since under N’ deletion, no movement would occur.

Lin et al. (2001) suggest that there are many similarities between Japanese *no* and Chinese *de*. Based on M & S’s (1990) NP deletion analysis that was discussed above, Lin et al. also suggest that the same analysis can apply to Chinese noun phrase deletion, as shown in (60). (60) has a structure parallel to (56) and (57).

- (60) a. [_{DP} Zhe-liang [_{NP} che] shi [_{DP} John de [_{NP} e]].
 this-CL car is DE
 ‘This car is John’s.’
- b. *[Zhe-zhong [_{NP} taidu] shi [John_i de [_{NP} t_i e]].
 this-CL attitude is DE
 ‘*This attitude is John’s.’
- c. [_{DP} John de [_{NP} t_i taidu]] bi [_{DP} Mary_j de [_{NP} t_j hao]].
 DE attitude compare DE good
 ‘John’s attitude is better than Mary’s.’

⁹ According to Murasugi and Saito (1990), the blocking of adjunct movement can be illustrated as in (i) below:

(i) *Two pounds_i are weighted t_i by this book. (p. 297)
 In (i), *two pounds* does not get any θ -role from *weight*, and therefore cannot undergo NP movement to the subject position.

However unlike the Japanese *no* phrases that do not allow NP deletion when an adjunct precedes *no*, as (59) shows, Chinese *de* phrases allow NP deletion when an adjunct precedes *de*, as shown in (61).

- (61) Wo zuotian kandao de nuhao bi ni zuotian kando de piaoliang.
 I yesterday saw DE girl compare you yesterday saw DE beautiful
 'The girl I saw yesterday is more beautiful than the one you saw yesterday.'

(61) shows that although the relative clause is an adjunct, Chinese *de* still allows the NP deletion. Lin et al. conclude that Japanese *no* and *de*, although similar in many aspects, are different in NP deletion. In Japanese, *no* does not play a crucial role in NP deletion. It is inserted when the NP moves to Spec of DP, as in (58b). In Chinese, *de* is crucial in that it licenses an NP deleted position although a relative clause precedes it. Therefore, in Chinese, *de* must be a determiner occurring in D⁰ that can license its Spec position. A relative clause is an adjunct and does not have a θ -role. It cannot undergo NP movement according to M & S (1990), as shown in (59b), thus, the relative clause which is preceding *de* must be base-generated in Spec of DP. In addition to relative clauses, they also claim that all thematic expression phrases that relate to the head noun are also base-generated in the Spec of DP that is projected by *de*, instead of starting below with the head noun and moving to Spec of DP. This is so, as illustrated by the fact that a relative clause can occur between a theta marked noun phrase and the head noun, as shown in (62).

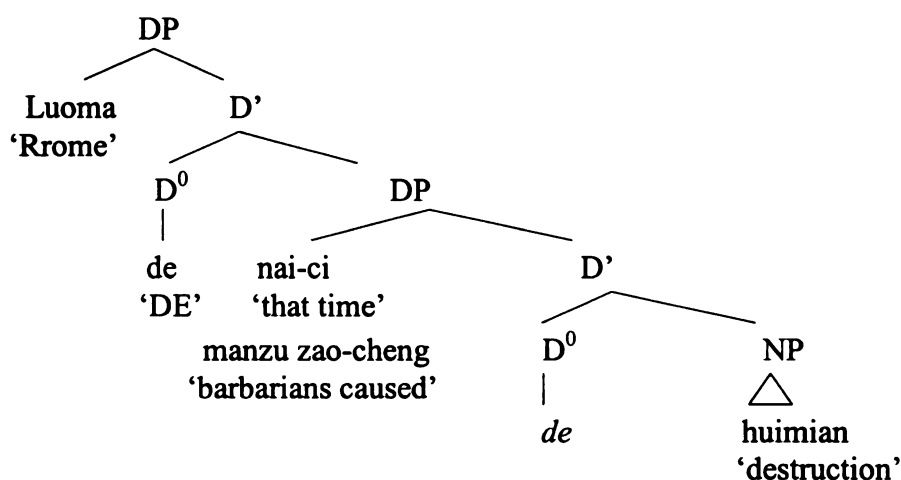
- (62) Luoma de (na-ci) manzu zao-cheng de huimian.
 Rome DE (that-time) barbarian cause DE destruction
 ‘The destruction of Rome that the barbarians caused (that time).’

According to Murasugi and Saito’s (1990) analysis of NP deletion, *Luoma* ‘Rome’ has the patient θ -role from *huimian* ‘destruction’ and is supposed to start out as the complement of *huimian* ‘destruction’ and move to the highest Spec of DP as in (62). However, Lin et al. observe that this movement would cross the relative clause and thus violate Relativized Minimality, as stated in Rizzi (1990). Therefore, the sentence should be ungrammatical. But, (62) is grammatical. Thus, there should not be movement from the head noun to the highest Spec of DP position. The explanation for (62) is that *de* can license a relative clause that is base-generated in Spec of DP, and it does not matter if a thematic expression phrase relates to the head noun. According to Lin et al., (63) shows that this explanation is valid since (62) can also be expressed as (63) in that the relative clause can exchange positions with *Luoma* ‘Rome’ without changing the meaning of the whole phrase.

- (63) (na-ci) manzu zao-cheng de Luoma de huimian.
 (that-time) barbarian cause DE Rome DE destruction
 ‘The destruction of Rome that the barbarians caused (that time).’

Therefore, (62) has the structure shown in (64).

(64)



In summary, Murasugi and Saito (1990) claim that under DP hypothesis, noun phrase deletion can be explained in more principled way. NP deletion has D⁰ to license the gap just as VP deletion has I⁰ to license the gap. They conclude that, in order to have a successful NP deletion, the element preceding the genitive elements (i.e., 's in English and *no* in Japanese) must be a possessor which is base-generated in Spec of DP, or it has to bear a thematic role and undergo movement to Spec of DP. However, this movement does not apply to adjunct genitive phrases in Japanese since adjuncts do not have a thematic role. The movement of the adjunct is barred and thus adjunct genitive phrases do not license NP deletion. Chinese *de* phrases also show NP deletion, and adjunct + *de* can even allow NP deletion, which is not allowed in Japanese. Since Japanese *no* is an inserted item and does not stay in D⁰, this leads Lin et al. to conclude that *de* must be base-generated in D⁰, and therefore *de* is a determiner that can license NP deletion. They also observe that thematic expressions relating to the noun following *de* can be intervened by relative clauses. Exchanging the thematic expressions and the relative clauses does not change the meaning of the whole phrase. This further leads them to conclude that *de* as a determiner can license the Spec of DP position and thus any

thematic expression relating to the head noun does not need to be base-generated close to the head noun but can instead be base-generated in Spec of DP.

2.5 Discussing the three analyses

In this section, I will examine the three analyses with the goal of choosing one on which to base my subsequent analysis of Chinese temporal clauses. I will first examine the head-final complementizer (Cheng 1986 and Ning 1993) and the head-final *de* (Ning 1996) analyses. Then I will examine Xu's head-initial complementizer analysis and show that Xu's analysis is a better choice than Cheng and Ning's analyses. Next, I will examine Lin et al. (2001). I will show that it is difficult to interpret the relationship between the head and the relative clause if relative clauses are base-generated in Spec of DPs. Finally, I will examine Xu's complementizer analysis and Simpson's enclitic **determiner** analysis together since their analyses are very similar. I will ultimately **choose** Simpson's analysis on which to base my analysis of temporal clauses.

Basically, Cheng (1986) and Ning (1993) both argue for *de* as a head-final **complementizer** and take *de* as a case assigner. The difference is that Cheng does not **constrain** the category of phrases occurring before *de*, while Ning insists that only clauses **that** contain gaps can precede *de*. However, Cheng and Ning's analysis of *de* as a case **marker** is problematic. Tang (1990) has argued convincingly that *de* is not a case marker, as **shown** in (65).

- (65) Zhangsan (de) meimei de haizi
 DE sister DE children
 'The children of Zhangsan's sister'

Although *de* occurs between two nouns here, the first *de* is optional. If *de* is a case marker, it is not clear why the first *de* is optional. Also, *de* is usually preceded by a clause, as in a relative clause and a noun complement clause. Clauses do not need case (Stowell 1981), but *de* is obligatory. The obligatory presence of *de* is apparently irrelevant to case marking. Furthermore, Cheng's analysis that *de* unrestrictively selects an XP as its complement is problematic, since it is simply not true that *de* unrestrictively selects an XP to be its complement, as (66) illustrates clearly.

- (66) a. *cong Michigan de ren
 from DE people
 'people who are from Michigan'
- b. *xuesheng dai yanjing de ren
 students wear glasses DE people
 '*people who students wear glasses'

(66a) shows that it is not true, as Cheng claims, that *de* can take any PP as its complement.

(66b) shows that *de* does not take any clause as its complement. Thus, Cheng's claim is too strong.

Actually, none of the analyses that attempt to prove that *de* is a complementizer are satisfactory, including Cheng (1986) and Ning (1993). *De* may mark a subordinate clause, but it is not sufficient to claim that *de* is a complementizer. Szabolcsi (1994) shows that a definite determiner can be a subordinator too. If *de* is a complementizer, it would be odd that cross-linguistically *de* may be the only complementizer that marks the genitive relation between two nouns. And, it would be odd that *de* may be the only

complementizer that cannot mediate a matrix clause and an embedded clause as a complementizer usually does, as shown in (67).

- (67) Ta shuo (*de) ta bu zhidao
 he say DE he not know
 'He said that he doesn't know.'

In addition, the Chinese lexical complementizers, *ruguo/yaosh/jiarui* 'if', precede their complement clauses. Wu (2000), following Hwang's (1998) observation that Chinese languages grammaticalize *say*, also suggests that *de* cannot be a complementizer.

According to Hwang, Mandarin Chinese, Taiwanese and Cantonese *say* is undergoing grammaticalization into a complementizer in certain environments, such as after the main verb *think* and *tell*, and before complements, as shown in (68)¹⁰.

- (68) a. Ta xiang shuo ta bu lai le.
 he think say he not come LE
 'He thinks that he is no longer coming.'
- b. Ta gaosu wo shuo ta bu lai le.
 he tell me say he not come LE
 'He told me that he is no longer coming.' (Wu 2000, 104)

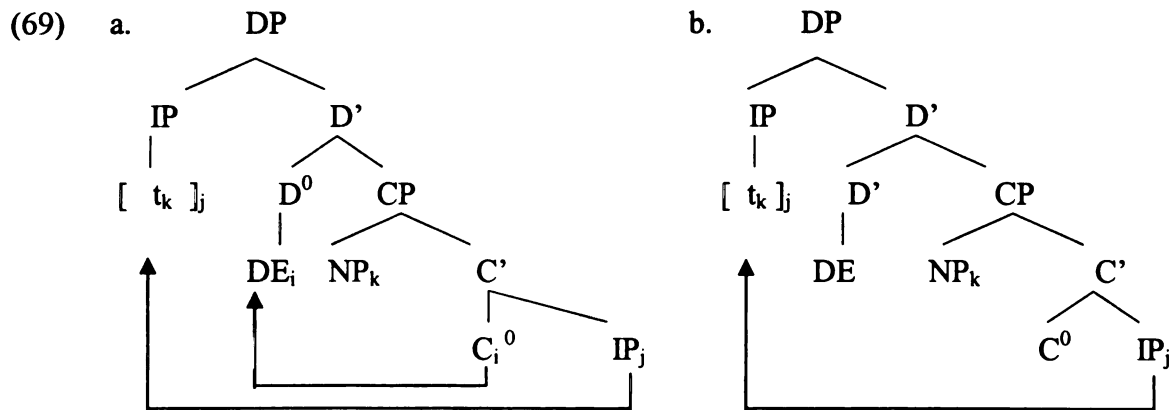
Therefore, for *de* to be a complementizer is very unlikely, since Chinese does possess head-initial complementizers.

Generally speaking, Cheng (1986) and Ning (1993) take *de* as a head-final complementizer that can assign case. Cheng emphasizes *de*'s lack of restriction in

¹⁰ *Say* is expressed as *shuo*, *gong*, and *gong* in Mandarin Chinese, Taiwanese and Cantonese respectively.

selecting a complement to its left, while Ning argues that *de* must select a gapped-clause. However, as (65) shows, *de* does not assign case and (66) shows that *de* cannot take any category to its left. Ning (1996) takes *de* as its own syntactic category. This is too language specific and appears to be too ad hoc. Furthermore, neither analysis has a good story to support why *de* is a complementizer. Finally, their head-final analysis poses a language typology problem since, in a language like Chinese, verbs, prepositions and the lexical complementizers *ruguo/jiaru/yaoshi* ‘if’ are head-initial. Therefore, for Chinese to have a head-final noun phrase and a head-final functional category *de* seems odd.

Now let us examine Xu and Simpson’s analyses since their analyses are very similar in that they both apply Kayne’s proposal for noun final relative clauses. The difference is that Xu takes *de* as a complementizer, while Simpson takes *de* as a determiner. These are illustrated below in (69), respectively:



(69a) is Xu’s analysis. He argues that *de* is not a determiner because it does not allow any noun to follow it to form a phrase. He argues that *de* is generated in C^0 and moves to D^0 to expand *de*’s domain. This allows the lower IP to move to Spec of DP. Among the

complementizer analyses, Xu's analysis seems to be the best choice. His head-initial analysis follows the language typology. He does not have an ad hoc analysis that takes *de* as a specific syntactic category, as Ning (1996) does. His analysis is able to account for all the *de* phrases without claiming that some *de* phrases have *de* as a case marker, and some do not. His analysis seems to be more explanatory than either Cheng's or Ning's.

(69b) is Simpson's analysis. He argues that *de* is a determiner based on cross-linguistic support and *de*'s development from *zhi*, which is a demonstrative in old Chinese. According to him, the IP in (69b) moves for the phonological support of *de*, and this phenomenon can be found in Romanian and Buginese. Simpson's determiner analysis also follows the language typology system by being head-initial. In addition, there is a wide range of cross-linguistic support for *de* as a determiner that introduces adjectives and clauses to modify nouns. For instance, Romanian and Buginese definite determiners show very striking parallels with Chinese *de* in that they can introduce adjectives for modifying nouns. Also, these determiners attract movement of other elements to their left for phonological support, and *de* also requires this kind of movement. Moreover, Buginese's definite determiner is similar to *de* in that they both can reoccur in phrases and form relative clauses.

Now let us examine (69) again. Both structures follows Kayne's (1994) noun final relative clause analysis, regardless of the overt C^0 to D^0 movement in (69a). Before we go further in comparing these two analyses, we should be aware of two problems with Kayne's analysis. One is that the movement of IP to Spec of DP violates the minimality requirement put forth by Chomsky (1993). The other is that this movement is a remnant

movement that contains an empty category that is not governed by its antecedent, the moved NP which is in the Spec of CP. With respect to the first problem, Kayne suggests that the problem can be solved by abstracting the incorporation of C^0 to D^0 . As to the second problem, Kayne does not discuss the issue directly, instead referring to similar remnant movements existing in German, in which the IP movement is a legitimate movement. It is well known that German allows remnant topicalization and that the remnant contains a trace that is not bound by its antecedent. However, it is not the case that any remnant movement is allowed, as (70) shows.

- (70) a. [_{NP} Ein Buch t_i]_j hat [_{PP} über die Liebe]_i niemand t_j gelesen.
a book has about the love no-one read
‘No one read a book about love.’ (Müller 1996, 362)
- b. *daß [_{NP} ein Buch t_i]_j niemand [_{PP} über die Liebe]_i t_j gelesen hat.
that a book no-one about the love read has
‘that no one read a book about love (Müller 1996, 363)

To explain (70), Müller (1996) proposed that remnant movements are legitimate only when the remnant moves to a different category from the category type that the moved item moves to. That is, when an item moves to Spec of XP, its remnant cannot move to another Spec of XP. The only legitimate site for the remnant to move to is a position other than an XP. In (70a), the PP *über die Liebe* adjoins to IP, and its remnant, the NP *Ein Buch t_i*, moves to Spec of TP, which is a different category from the site that the PP moves to and thus is a legitimate movement. In (70b), the PP *über die Liebe* adjoins to IP, while its remnant *ein Buch t_i* adjoins to Spec of the higher IP, and ends up to be ungrammatical. Along the lines of Müller, Kayne's IP movement is legitimate since it

moves to Spec of DP, while the original moved item, the NP, moves to Spec of CP, which is a different site from the Spec of DP that contains the NP.

Now let us go back to Xu and Simpson's analyses in (69). Xu rejects generating *de* in D^0 because *de*+NP is an impossible constituent in Chinese. Simpson argues for *de* being determiner because it developed from *zhi*, which is a demonstrative in old Chinese. If we set aside the impossibility of *de* being a complementizer as I discussed above, then both analyses are very strong. Their analyses are better than Cheng and Ning's analyses in that their analyses both follow the language typology that *de* is a head-initial functional category, and they both treat *de* in a general way that *de* is analyzed as a single item. However, I will choose Simpson's analysis over Xu's for two reasons. First, as Kayne states, the minimality requirement can be solved through covert C^0 to D^0 movement. Therefore, although Xu's analysis of *de* as a complementizer moving to D^0 seems to solve the minimality requirement, if *de* is a determiner generated in D^0 , and a covert C^0 to D^0 movement takes place, then the overt C^0 to D^0 movement seems to be unnecessary. Second, *de* seems to act more like a determiner than a complementizer. In addition to the fact that *de* does not function like a complementizer, as discussed above, evidence from Lin et al. (2001) shows that *de* is a determiner since Chinese *de* phrases show NP deletion even when a relative clause precedes *de*. A higher DP must exist in the *de* phrase as the highest maximal projection in order to allow the NP deletion. *De* must be a determiner that projects the DP; otherwise, it would not allow NP deletion when an adjunct precedes *de*, as Murasugi and Saito (1990) argue. In the following, I examine Lin et al (2001).

We have seen that Simpson argues for *de* to be a determiner since it is developed from the classical demonstrative *zhi*. Lin et al.'s analysis further gives empirical

evidence to support the claim that *de* is a determiner that can license a deleted NP.

However, Lin et al.'s analysis of the phrases preceding *de* being base-generated in Spec of DP needs to be further examined. Lin et al. basically claim that because *de* is able to license the Spec of DP, phrases preceding *de* can be base-generated in the Spec of DP.



Evidence from (62) and (63) that complement phrases (a phrase that receive its thematic role from the head noun of the DP) and adjunct phrases (a relative clause) can be switched without changing meaning further leads them to confirm that whether or not the phrase preceding *de* has any relationship with the head noun they are all base-generated in the Spec of DP that is projected by *de*. Although some phrases preceding *de* show no order preference, this does not hold for adjuncts and complements that are preceding *de* at the same time. Simpson (1999) cites a Tsao (1997), shown here in (71). It shows that adjunct and complement order in *de* phrases is significant.

- (71) a. [wo zuotian tingdao] de [Deng Xiao-ping shishi] de xiaoxi
I yesterday hear DE Deng Xiao-ping die DE news
'the news that Deng Xiao-ping had died which I heard yesterday'
- b. *[Deng Xiao-ping shishi] de [wo zuotian tingdao] de xiaoxi
Deng Xiao-ping die DE I yesterday hear DE news
'the news that Deng Xiao-ping had die which I heard yesterday'

(71) shows that the complement *Deng Xiao ping shishi* 'Deng Xiao-ping had died' must occur right before the head noun *xiaoxi* 'news', while the adjunct *wo zuotian tingdao* 'I heard yesterday', which is a relative clause, is far away from the head noun. If phrases preceding *de* are base-generated in Spec of DP and make no meaning change when the

order is switched, it will be difficult to explain why it is impossible for the two phrases preceding *de* to exchange their position.

Simpson (1999) shows that (71) can be explained by movement along the lines of Kaynes's analysis of noun final relative clauses as the derivation shown in (72).

- (72) a. [DP de [NP xiaoxi [Deng Xiao-ping shishi]]
DE news die
- b. [DP[Deng Xiao-ping shishi]_i [D de [NP xiaoxi t_i]

- c. wo zuotian tingdao [DP DengXiaoping shishi de xiaoxi]
I yesterday hear die DE news
- d. [DP de[CP [DP Deng Xiao-ping shishi de xiaoxi]_j [IP wo zuotian tingdao t_j]]]

- e. [DP [IP wo zuotian tingdao t_i]_k [Dde[CP [DP Deng Xiao-ping shishi de xiaoxi]_j t_k]]

(72a) and (72b) shows that *Deng Xiao-ping shishi de xiaoxi* ‘the news that Deng Xiao-ping had died’ is a complement clause and that *xiaoxi* ‘news’ takes *Deng Xiao-ping shishi* ‘Deng Xiao-ping had died’ as its complement. Then *de* in D^0 requires an IP to fill in its Spec position. Therefore, *Deng Xiao-ping shishi* moves to precede *de* resulting in (72b). (72c) shows that the DP, *Deng Xiao-ping shishi de xiaoxi*, is the object of *tingdao* ‘hear’. Then (72c) undergoes relativization, so in (72d) the head noun *Deng Xiao-ping shishi de xiaoxi* moves out of the IP. Then again the higher *de* requires the IP, *wo zuotian tingdao* ‘I heard yesterday’, to fill its Spec of DP.

However, the reverse order as in (71b) would not be possible. First, the relative clause has to form *wo zuotian tingdao de xiaoxi* ‘the news I heard yesterday’, but then there is no way to connect *xiaoxi* ‘news’ with *Deng Xiao-ping shishi* ‘Deng Xiao-ping

had died' without violating cyclicity. And there is even no way to connect *Deng Xiao-ping shishi* with *wo zuotian tingdao de xiaoxi* since *Deng Xiao-ping shishi* is not an unsaturated clause. Further, following Kayne's analysis, since the IP movement to Spec of DP is a remnant movement to a different target than the first moved item, there is no movement violation as stated in Lin et al.

To sum up, in this section I have reviewed *de* phrases with relative clauses. *De* has been analyzed as a complementizer, a syntactic category, and a determiner. In the complementizer analyses, both Cheng and Ning's analyses do not follow language typology, and their claim that *de* is a case marker is problematic. Ning's analysis of *de* as a syntactic category also does not follow language typology and taking *de* as a syntactic category is too language specific. Among these analyses, only Xu, Simpson and Lin et al.'s analyses follow the language typology and have a general analysis for *de*. They both take the *de* phrases as DPs, and have competitive analyses. In order to choose a proper analysis, I compared Xu and Simpson's analyses, and take Simpson's analysis because a covert movement of C^0 to D^0 is less costly, and *de* does not behave like a normal complementizer. Also, evidence from Lin et al. shows that *de* as a determiner can license the NP deletion. Furthermore, both Xu and Simpson agree that *de* developed from *zai* which was a demonstrative. A determiner analysis therefore seems to be the best. Lin et al. also argue for *de* as a determiner, however they argue that there is no movement involved in generating phrases preceding *de*. These phrases are based-generated in the Spec of DP since the phrases preceding *de* do not show order difference. However, as shown in (71), order does matter for clausal adjuncts and complement. Simpson's analysis, on the other hand based on Kayne (1994), is able to account for the order of the

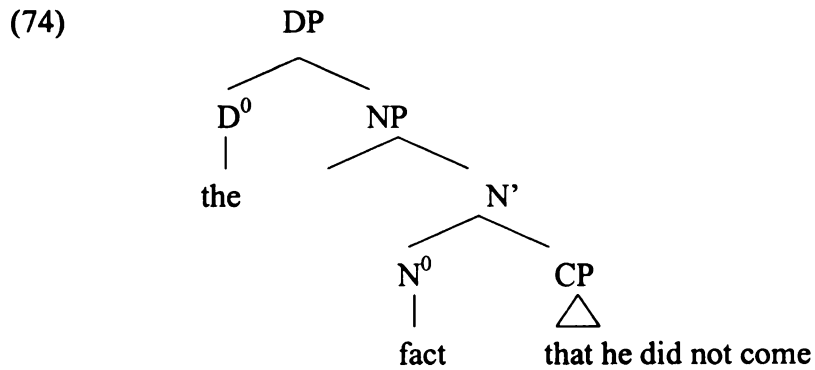
clausal adjuncts and complements. Therefore, I take Simpson's analysis as the basis for my consequent analysis of temporal clauses. As a consequence of adopting this analysis, I also adopt the idea of demonstratives being generated in a lower position of a DP, as shown in (43).

2.6. *De* phrase with a noun complement clause

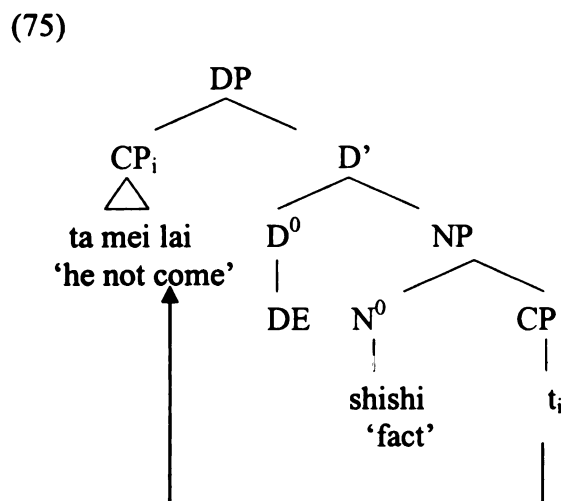
Having discussed *de* phrases that contain a relative clause that is an adjunct to the head noun, now we will examine *de* phrases that contain a complement of the head noun preceding *de*, as shown in (73).

- (73) ta mei lai de shishi
 he not come DE fact
 'the fact that he did not come'

As shown in the English gloss, this kind of noun phrase does not show any movement within the clause. That is, the structure of this kind of noun phrase, although it has a very similar syntactic configuration to a relative clause, has a different relationship between the head noun and the clause. The head noun does not move out from the clause, but instead, the head noun takes the clause as its complement. The structure of *the fact that he did not come* is shown as (74).



Similarly, the structure of (73) in Chinese, under Simpson's (1999) analysis appears in (75).



(75) shows that the CP is the complement of the head noun. Since the determiner requires phonological support, the CP moves to the Spec of DP.

In the following chapters, I will take the syntactic structure that I have discussed here and use as the basis for an investigation of the structure of temporal clauses. I will investigate the *de shihou* clause first and argue that its structure is a relative clause. Then

I will examine *yi-qian/yi-hou* clauses and argue that these clauses have a structure similar to that shown in (75).

Chapter 3

De shihou clauses

In this chapter, I will argue that the Chinese *when*-clauses, *de shihou* ‘DE time’ clauses, are relative clauses. I will demonstrate that *de shihou* ‘DE time’ is not a particle equal to the English *when* (Chao 1968), not a linking element that links two sentences (Li and Thompson 1981) and not a postposition heading a postpositional phrase (Gasde and Paul 1996). Instead, *shihou* ‘time’ is the head noun that follows *de* in a relative clause.

3.1 Introduction

De shihou ‘DE time’ has been treated as a single element that selects for a clause (Chao 1968, Li and Thompson 1981, Gasde and Paul 1996). Chao (1986) treats it as a compound particle which can be equated with *when*. Li and Thompson (1981) consider it a sentential linking element, but they never give a clear explanation of what syntactic role *de shihou* plays. Gasde and Paul (1996) also treat it as a single element and argue that it is a postposition. Despite these analyses, it is clear that *de shihou* clauses have many properties in common with relative clauses. First, as we have seen in Chapter 2 the combination of clause + *de* + NP is a typical Chinese relative clause construction, and *de shihou* clauses have the same order, as shown in (1a). Furthermore, *shihou* can be modified by a demonstrative as in (1b).

- (1) a. Ta lai de shihou wo zai chifan.
he come DE time I ZAI eat-meal
‘When he came I was eating.’

- b. Ta lai de nei-ge shihou wo bu zai jia.
 he come DE that-CL time I not ZAI home
 ‘The moment he came I was not home.’

(1a) shows that *de shihou* clauses are like other *de* phrases in that they take a clause preceding *de*. (1b) shows that the demonstrative is generated to the right of *de*. These two properties of *de shihou* clauses are like some relative clauses that we have discussed in Chapter 2. However, unlike most relative clauses, *de shihou* clauses do not allow the demonstrative to occur in a pre-relative position as shown in (2).

- (2) *Nei-ge ta lai de shihou wo bu zai jia.
 that-CL he come DE time I not ZAI home

Gasde and Paul argue that the impossibility of the demonstrative occurring in the pre-RC position shows that *de shihou* clauses are not relative clauses. However, Ning (1993) shows that time adjuncts in *de* phrases are relative clauses. He does not discuss *de shihou* clauses, but *de shihou* clauses do contain time adjuncts. In this chapter, I will review Ning’s (1993) account of adjunct relative clauses and show that *de shihou* clauses are in fact relative clauses. This chapter is organized as follows. In 3.2, I will review Gasde and Paul (1996) and in 3.3 and 3.4 I raise some problems concerning their analysis. In 3.5, I review Ning (1993) and show the characteristics of adjunct relative clauses. I will also discuss issues regarding the position of demonstratives and quantifiers in Chinese relative clauses and further confirm that *de shihou* clauses are relative clauses. Finally, in 3.6, I will show that *de shihou* clauses show long distance dependencies, following Geis (1970) and Larson (1990).

3.2. Previous studies of *de shihou* clauses

Traditionally, *de shihou* has been treated as a single element, like *when*, to introduce a clause to form an adverbial phrase. Chao (1968) claims that the clause before *de shihou* is an adjectival clause that modifies the noun *shihou* ‘time,’ and *shihou* is frequently pronounced in a neutral tone. So *de* and *shihou* form a compound particle that can be equated with *when*. Li and Thompson (henceforth L & T) (1981) describe *de shihou* as a sentential linking element. Basically, whether *de shihou* is a particle or a sentential linking element, Chao and L & T both treat *de shihou* as a single element without any further syntactic explanation; the only discussion of *de shihou* that provides a syntactic explanation is Gasde and Paul (1996) (henceforth G & P).

G & P argue that *de shihou* is a postposition, and that *shihou* is not a noun, and therefore not the head of a relative clause. Their reasons for treating *de shihou* as a postposition and not as a relative clause head noun rely on the following arguments. First, *shihou* does not take an adjectival modifier like a regular noun. Second, extraction out of a *de shihou* clause is possible. Third, *de shihou* clauses do not allow demonstratives to precede their clauses. In the following, I will summarize these three arguments.

G & P argue that *shihou* ‘time’ is not a noun because it does not take an adjective modifier as in (3a), while a regular noun like *shijian* ‘time’ does take an adjective modifier, as in (3b).

- (3) a. *hen duan *de shihou*
very short DE time

- b. *hen duan de shijian*
 very short DE time
 ‘a very short time.’

According to G & P, *shihou* is part of the *de shihou* postposition that takes an IP or a DP as a complement, but that does not take adjectives as complements. (3b) shows that *shijian* ‘time’ is a noun that can take adjectival phrases as its modifiers, as other nouns do, but *shihou* in (3a), not being a noun, cannot be modified by an adjectival phrase. Therefore, G & P conclude that *shihou* is not a noun.

The second argument relies on the following sentences.

- (4) a. *Zhei-jian zang yifu*_i *ni xi t_i de shihou* *kending yao hua bushao liqi.*
 this-CL dirty clothing you wash DE time certainly must spend much energy
 ‘This dirty garment, when you wash it you will certainly have to make a lot of effort.’
- b. **Xigua_i, nongmin cai-shou t_i de jijie hen kuai jiu hui guoqu le.*
 watermelon peasant pick-harvest DE season very fast then will pass LE
 ‘Watermelons, the season when the peasants can harvest them will soon be over.’

(4a) shows that topicalizing an object out of the temporal clause does not make the sentence ungrammatical. However, (4b) shows that a relative clause does not allow topicalization. That is, if the temporal clause is a relative clause, then the topicalization should cause an ungrammatical result due to the Complex NP constraint.

Furthermore, according to G & P, a normal RC would allow a demonstrative to either follow the relative clause, as in (5a,) or precede the relative clause, as in (5b).

- (5) a. Dai yanjing de nei-ge xuesheng jiao Zhangsan.
wear glasses DE that-CL student call
'That student, who wears glasses, is called Zhangsan.'
- b. Nei-ge dai yanjing de xuesheng jiao Zhangsan.
that-CL wear glasses DE student call
'That student that wears glasses is called Zhangsan.'
- (6) a. Ta lai de nei-ge shihou wo bu zai jia.
he come DE that-CL time I not at home
'When he came, I was not home.'
- b. *Nei-ge ta lai de shihou wo bu zai jia.
that-CL he come DE time I not at home
'When he came, I was not home.'

However, a *de shihou* clause only allows the demonstrative to follow it as in (6a), but not to precede the clause as in (6b). Therefore, the *de shihou* clause is not a relative construction.

3.3 Problems with Gasde and Paul's analysis

Although at first G & P's (1996) arguments seem to work, they need to be further examined. In this section and the following one, I question their arguments.

First, the fact that *shihou* can not be modified by an adjectival phrase does not show that it is not a noun. There are nouns that cannot be modified by an adjectival phrase. (7) is an example of this fact.

- (7) a. Wo bu zhidao ta de quxiang.
I not know he DE direction
Literately means: 'I don't know his direction.'
(I don't know where he is going.)

- b. * *hen yuan/jin/chang/duan/zhengque de quxiang*
 very far /near/long/short/correct DE direction

(7a) shows that *quxiang* ‘direction’ is a noun because it follows *de*. However, (7b) shows that it cannot be modified by an adjectival phrase. If we follow G & P’s analysis of *shihou*, then *quxiang* in (7) should not be a noun either. Furthermore, data from English temporal relative clauses also shows a similar pattern to *de shihou* clauses.

- (8) a. I have studied for a long time.
 b. The time that/when John came I was studying.
 c. * The long/short time that/when John came I was studying.

Note that *the time* is translated as *shijian*, as in (3b), in Chinese only when it is not the head of the *when*-clause, while *the time* is translated as *shihou* only when it is the head of a *when*-clause. When *the time* in (8c) means *shihou*, it has the same property as *shihou* in that it cannot be modified by an adjective as in (3a); however (8b), without an adjective modifier, is a relative clause. Therefore, a relative clause can have an un-modifiable noun as its head.

Now turning to the extraction effect for *de shihou* clauses, we will see that it is not obvious that (4a) is sufficient to show the real extraction from the adverbial clause. Two independent properties of Chinese, gapless topics and null objects, make (4a) less straightforward than it might appear. (4) is repeated here as (9) for convenience.

- (9) a. Zhei-jian zang yifu_i ni xi t_i de shihou kending yao hua bushao liqi.
 this-CL dirty clothing you wash DE time certainly must spend much energy
 ‘This dirty garment, when you wash it you will certainly have to make a lot of effort.’
- b. *Xigua_i, nongmin cai-shou t_i de jijie hen kuai jiu hui guoqu-le.
 watermelon peasant pick-harvest DE season very fast then will pass-LE
 ‘Watermelons, the season when the peasants can harvest them will soon be over.’

It is well known that Chinese verbs sometimes take null objects (Huang 1984a). This property also correlates with having gapless topics, as topic is shown in (10).

- (10) Nei-chang huo, xingkui xiaofang-dui lai de kuai.
 that-CL fire fortunately fire-brigade come DE quickly
 ‘That fire, fortunately the fire brigade came quickly.’ (L & T 1981, 96)

Thus, having a topic in a sentence does not mean that the topic is derived by movement. Furthermore, even if there is a gap in the sentence, the topic may not have moved from the gap site. Instead, the topic is base-generated in the topic position and associates with a resumptive pronoun or a null object derived by operator movement as shown in (11) (Huang 1984a, 1989).

- (11) a. XP_i [...pronoun_i] b. XP_i [Op_i [.....e_i]]

Consider the examples in (12).

(12) Speaker A: Ni kanjian John le ma?
 You see LE MA
 'Did you see John?'

Speaker B:

a. John, wo kanjian ta le.
 I saw him LE
 'John, I saw him.'

b. Wo kanjian le e.
 I saw LE
 'I saw him.'

c. John, wo kanjian e le.
 I saw LE
 'John, I saw him.'

(12) shows that speaker B can answer speaker A's question with a topic without a gap as shown in (12a). Speaker B can even utter (12b) with a null object without an overt antecedent. Speaker B can also utter (12c) with a topic and a null object. That is, to have a topic does not mean to have a gap, and the converse is also true. With these characteristics as a background, (9a) can be rephrased in the following way:

(13) Speaker A: Wo dei qu xi zhe-jian yifu.
 I have to go wash this-CL clothes
 'I want to go and wash this clothing.'

Speaker B: Ni xi e de shihou kending yao hua bushao liqi.
 you wash DE time certainly must spend much energy
 'when you wash it you will certainly have to make a lot of effort.'

As shown in (13), speaker B can utter the sentence with a null object without an overt antecedent, which is like (12b) and has the same meaning as (9a). (9a) has *zhe jian yifu* 'this clothing' as a topic with a null object, which is like (12c), and this shows that (9a)

could be a combination of a topic with a null object instead of an extraction of the topic out of the embedded clause. However, it is necessary to examine why (9b) does not allow topicalization. Let us examine topicalization similar to (9b) as shown in (14).

- (14) a. Nonmin cai-shou (zhexie) xigua de shihou kending hui hen mang.
 peasant pick-harvest (these) watermelons DE time certainly will very busy
 ‘The time when the peasants harvest watermelons will be very busy.’
- b. Zhexie xigua_i, nonmin cai-shou t_i de shihou kending hui hen mang.
 these watermelon peasant pick-harvest DE time certainly will very busy
 ‘These watermelons, the time when the peasants harvest them will be very busy.’
- c. *Xigua_i, nonmin cai-shou t_i de shihou kending hui hen mang.
 watermelon peasant pick-harvest DE time certainly will very busy
 ‘Watermelons, the time when the peasants harvest them will be very busy.’

(14a) is a *de shihou* clause without topicalization, while (14b) and (14c) are *de shihou* clauses with topicalization. However, only a definite NP can be topicalized, as in (14b), but not a bare NP, as in (14c). If G & P are right about extraction in *de shihou* clauses, it would be predicted that (14c) should be acceptable, but it is not. Examining (14b) and (14c), it seems that the difference between the two is that (14b) involves a definite NP topicalization, while (14c) involves a bare NP topicalization. This predicts that a definite NP extraction in a sentence similar to (9b) will be good, and this is the case as shown by the acceptability of (15).

- (15) Na-xie nongzuowu_i, nongmin cai-shou t_i de jijie hen kuai jiu hui guoqu-le.
 That-ME crop peasant pick-harvest DE season very fast then will pass-LE
 ‘Those crops, the season when the peasants can harvest them will soon be over.’

If this is the case, we should further examine other cases of topicalization. Now consider (16).

- (16) a. Renren ai chi (zhexie) xigua.
Everyone love eat (these) watermelon
'Everyone loves to eat watermelons.'
- b. Xigua renren ai chi.
watermelon everyone love eat
'Watermelons, everyone loves to eat (them).'
- c. Zhexie xigua renren ai chi.
these watermelon everyone love eat
'These watermelons, everyone loves to eat (them).'

(16) shows that either a bare NP, as in (16b), or a definite NP, as in (16c), can be topicalized. However, the following topicalizations show an asymmetry between a bare NP and a definite NP.

- (17) a. Wo jian-guo (neixie) huai shangren.
I see-GUO those bad business-men
'I have seen (those) bad business men.'
- b. Nexie hua shangren, wo jian-guo.
Those bad business-men I see-Guo
'Those bad business men_i, I have seen (them_i).'
- c. Nexie hua shangren_i, wo jian-guo tamen_i.
Those bad business-men I see-Guo them
'These bad business men_i, I have seen them_i.'
- d. Huai shangren, wo jian-guo.
bad business-men I see-Guo
'Bad business men_i, I have seen (them_i).'

- (20) a. Xi yifu de ren kengding hen xinku.
 wash clothes DE person certainly very hard-working
 'The person who washes this clothing must have worked very hard.'
- a' *Yifu, xi de ren kengding hen xinku.
 clothes wash DE person certainly very hard-working
- b. Mai fangzi de ren kengding hen you qian.
 buy house DE person certainly very have money
 'The person who bought this house must be very rich.'
- b' *Fangzi, mai de ren kengding hen you qian.
 house buy DE person certainly very have money

(19) shows that a normal relative clause also allows definite NP topics, but (20) shows that a relative clause does not allow bare NP topics. Following the Complex NP constraint, it seems that (20a') and (20b') involve movement, but (19a') and (19b') do not. If we follow this argument for the definite NP topic and the bare NP topic in (17), (19a'), (19b') and (20a'), (20b') should contain a trace in the object position of the RC. However, (19a') and (19b') are not ungrammatical, because they involve null operator movement and the null operator does not move out of the relative clause, according to (18). On the other hand, (20a') and (20b') are ungrammatical because bare NPs do not undergo null operator movement, and must move directly out of the RC to the topic position.

If this analysis is on the right track, the reason why (14b) is fine but (14c) is not can be explained if *de shihou* clauses are relative clauses. (14b) has a definite NP topicalization similar to (19), which undergoes operator movement, while (14c) has a bare NP topicalization similar to (20), and is a real extraction. The topic in (14b) does not involve direct movement out of the *de shihou* clause; therefore, (14b) is allowed, but

(14c) is not allowed. The parallels between the data in (14) and the data in (19) and (20) seem to suggest that *de shihou* clauses obey the Complex NP constraint and are thus relative clauses.

Gasde and Paul's analysis of *de shihou* as a postposition does not seem to be convincing. As I have shown, the inability of *shihou* to take adjectives is a property of *shihou*. Also, some usages of English *time* cannot take adjectives either, as shown in (8c). Furthermore, as shown in data from (13) to (20), the topicalization test is not a good test to claim that *de shihou* clauses are not relative clauses since definite NP topicalization does not involve movement. In the next section, I will discuss G & P's third argument, which relates to the position of demonstratives in a relative clause.

3.4 The position of demonstratives and quantifiers in Chinese relative clauses

G & P argue that *de shihou* clauses are not relative clauses because they do not allow a demonstrative to occur in the pre-RC position, as shown in (6), repeated here as (21).

- (21) a. Ta lai de nei-ge shihou wo bu zai jia.
 he come DE that-CL time I not at home
 'When he came, I was not home.'
- b. *Nei-ge ta lai de shihou wo bu zai jia.
 that-CL he come DE time I not at home

In this section, I show that the position of a demonstrative is also not a good test for defining a structure of relative clause. Consider the following sentences:

- (22) a. Mary jianfei zhongyu jian-diao ta yao de nei-ge zhongliang.
 lose-weight finally lose-away she want DE that-CL weight
 ‘Mary finally lost the weight that she wants.’
- b. ??Mary jianfei zhongyu jian-diao nei-ge ta yao de zhongliang.
 lose-weight finally lose-away that-CL she want DE weight
 ‘Mary finally lost the weight that she wants.’
- c. Mary jian-diao de xuduo zhongliang you zeng huilai le.
 lose De much weight again add back LE
 ‘Much of the weight that Mary lost came back again.’
- d. ?Xuduo Mary jian-diao de zhongliang you zeng huilai le.
 Much lose DE weight again add back LE

(22a) contains a relative clause since it contains an unsaturated clause and follows the typical relative clause patterns (XP + *de* + NP). (22b) shows that a pre-RC demonstrative is not allowed, but we cannot say that (22b) does not contain an RC. Also, (22c) and (22d) show a similar situation. (22c) allows the quantifier to occur after the RC, while (22d) is less acceptable with the quantifier preceding the RC. Now consider the *de shihou* clauses again.

- (23) a. Ta lai de shihou wo bu zai jia.
 he come DE time I not at home
 ‘I was not home when he came.’
- b. Ta lai de neige shihou wo bu zai jia.
 he come DE that-CL time I not at home
 ‘I was not home at that time that he came.’
- c. *Neige ta lai de shihou wo bu zai jia.
 that-CL he come DE time I not at home
- (24) a. Ta lai de xuduo shihou wo dou bu zai jia.
 he come DE many time I all not at home
 ‘Many times, when he came I was not home.’

- b. *Xuduo ta lai de shihou wo dou bu zai jia.
 many he come DE time I all not at home
 ‘Many times when he came I was not home.’

De shihou clauses behave quite similarly to *de zhongliang* ‘weight’ clauses in that they are both sensitive to a demonstrative being in the pre-RC position, as in (22b) and (23c). When they interact with quantifiers, the *de shihou* clauses do not allow quantifiers to precede the RC (24b), and *de zhongliang* clauses, though not as dramatically as *de shihou* clauses, are still sensitive to the quantifier preceding it (22d). Nevertheless, *de zhongliang* clauses do allow quantifiers to follow the RC, as in (22c) and (24a). This interaction with quantifiers is opposite to what happens in a normal RC with its subject relativized. A subject-relativized RC does not allow the quantifier to follow its RC, but it is fine with an object-relativized RC (Tang 1976, Huang 1983, Hou and Kitagawa 1987), shown as follows:

- (25) a. Xuduo dai yanjing de xuesheng hen yonggong.
 many wear glasses DE students very hardworking
 ‘Many students who wear glasses are hard working.’
 (subject-relativized RC)
- b. * Dai yanjing de xuduo xuesheng hen yonggong.
 wear glasses DE many students very hardworking
 ‘Many students who wear glasses are hard working.’
 (subject-relativized RC)
- c. Xuduo wo renshi de xuesheng dou hen yonggong.
 Many I know DE students all very hardworking
 ‘Many students I know are hard working.’ (object-relativized RC)
- d. Wo renshi de xuduo xuesheng dou hen yonggong.
 I know DE many students all very hardworking
 ‘Many students I know are hard working.’
 (object-relativized RC) (Tang 1976, 252-253)

(25) shows that only an object-relativized RC allows a quantifier to either precede or follow the RC, while a subject-relativized RC does not allow a quantifier to follow the RC. However, we cannot say that a subject-relativized RC is not an RC just because a quantifier cannot occur after the RC. If we pay attention to the meanings of *shihou* ‘time’ and *zhongliang* ‘weight’, we can find that they both are semantically non-individual denoting nouns. It is possible that this difference might explain why they behave differently from the individual denoting nouns. If they behave differently from the individual denoting nouns, it does not mean that they are unable to be the head of an RC. Therefore, G & P’s data do not show that *de shihou* clauses are not relative clauses. In the next section, I shall discuss Chinese adjunct relative clauses, and I will show that other adjunct relative clauses also behave similarly to *de shihou* clauses. This further confirms that *de shihou* clauses are in fact adjunct relative clauses.

3.5 Introduction to Chinese adjunct relative clauses

In this section, I will review Ning (1993) and Li (1999), who argue that Chinese adjunct relative clauses do in fact show movement. Furthermore, I will show that those adjunct relative clauses that Ning argues have operator movement behave like *de shihou* clauses in that they do not allow pre-RC demonstratives.

Ning (1993) argues that a relative clause must contain a gap in its clause, i.e., a relative clause is an unsaturated expression. Consider a sentence like (26).

- (26) Ta zuotian zai wu li yong bi xie xin.
 he yesterday ZAI room inside with pen write letter
 ‘Yesterday he wrote a letter with a pen in the house.’

(26) has the following structure and semantic roles:

- (27) [ta [zuotian] [zai wu li] [yong bi] xie xin]
 he yesterday ZAI room inside with a pen write letter
 agent time place instrument patient

With any gap from any semantic role in (27), a relative clause can be formed, as shown in

(28).

- (28) a. [e [zuotian] [zai wu li] [yong bi] xie xin de ren]
 yesterday ZAI room inside with a pen write letter DE person
 ‘the man who wrote the letter with a pen in the room yesterday’
- b. [ta [e] [zai wu li] [yong bi] xie xin de nei tian]
 he ZAI room inside with a pen write letter DE that day
 ‘the day when he wrote the letter with the pen in the room’
- c. . [ta [zuotian] [e] [yong bi] xie xin de difang]
 he yesterday with a pen write letter DE place
 ‘the place where he wrote the letter with the pen yesterday’
- d. . [ta [zuotian] [zai wu li] [e] xie xin de na-zhi bi]
 he yesterday ZAI room inside write letter DE that-CL pen
 ‘the pen with which he wrote the letter in the room yesterday’
- e. . [ta [zuotian] [zai wu li] [yong bi] xie e de xin]
 he yesterday ZAI room inside with a pen write DE letter
 ‘the letter he wrote with the pen in the room yesterday’

However, if no such gap occurs, a *de* phrase is ungrammatical, as shown in (29).

- (29) *ta xihuan juzi de shuiguo
 he like orange DE fruit
 ‘*the fruit that he likes orange’

According to (28), relativization is possible from both argument positions and adjunct positions which denote time, place or manner. Ning further shows that there are four adjunct relative clauses that show null operator movement. These correspond to English single word *wh*-adjunct operators (as opposed to operators like *in which*, *for whom* etc.,) as shown in (30).

- (30) a. Locative adjunct:
 ta xiu che de cheku
 he fix car DE garage
 ‘the garage where he fixed his car’
- b. Time adjunct:
 ta xiu che de na-ge wanshang
 he fix car DE that-CL evening
 ‘the evening when he fixed the car’
- c. Manner adjunct:
 ta xiu che de fangfa
 he fix car DE way
 ‘?the way how he fixed the car’
- d. Reason adjunct:
 ta xiu che de yuanyin
 he fix car DE reason
 ‘the reason why he fixed the car’

As the gloss in (30) shows, the English single word *wh*-operator relative clauses have Chinese counterparts. However, the English pied-piping relative clauses do not have Chinese counterparts, as shown in (31).

- (31) a. *wo tiaowu de guniang
 I dance DE girl
 Intended to mean: ‘the girl with whom I danced’

- b. *wo cha xie de xiansheng
 I polish shoe DE gentleman
 Intended to mean: 'the gentleman for whom I polished his shoes'

The English relative clauses in the gloss of (31) involve a preposition with the *wh*-operator; however, their Chinese counterparts do not have the same mechanism to form pied-piped relative clauses. With this asymmetry between single word *wh*-operator relative clauses and pied-piped relative clauses, Ning concludes that the relative clauses that can correspond to their English counterparts must use the same strategy as English for movement¹. That is, relative clauses like (30) all use operator movement. Li (1999) further illustrates this fact. She shows that Chinese adjunct relative clauses obey island constraints. (32) shows that long distance movement is possible for adjunct relative clauses and (33) shows that the long distance dependency for these adjunct relative clauses must obey island constraints. (33a) shows a Complex NP constraint violation and (33b) shows an adjunct island constraint violation.

- (32) a. zhe jiu shi [[women jue de [ta yinggai qu t_i nian shu] de] difang;
 this exactly is we feel he should go study DE place
 'this is the place where we feel he should go study.'
- b. zhe jiu shi [[ta renwei [nimen t_i yingai likai] de] yuanyin;
 this exactly is he think you should leave DE reason
 'this is the reason why he thinks you should leave.'

¹ According to Ning, although the Chinese does not have pied-piped *wh*-operator movement, Chinese uses a resumptive strategy to form relative clauses in (31). Therefore, (31) is fine with this strategy.

- (i) Wo gen ta tiaowu de guliang.
 I with her dance DE girl
 'The girl with whom I danced.'
- (ii) Wo wei ta cha xie de xiansheng.
 I for him polish shoe DE gentleman
 'the gentleman for whom I polish his shoes.'

- (33) a. *zhe jiu shi [[[ta xihuan [t_i nian guo shu] de] ren] de] difang;
 this exactly is he like read ASP book DE person DE place
 ‘this is the place where he likes the person that has studied (there)’
 b. *zhe jiu shi [[[ruguo ta t_i shengqi] ni hui bu gaoxing] de]yuanyin;
 this exactly is if he angry you will not happy DE reason
 ‘this is the reason(x) that you will not be happy if he gets angry (because of x)’
 (Li 1999, 9)

Having enough evidence to show that Chinese adjunct clauses do show island effects, now we should turn to their interaction with demonstratives. Let us examine the following sentences:

- (34) a. Ta xiu che de nei-ge difang hen zang.
 he fix car DE that-CL place very dirty
 ‘That garage where he fixed his car is very dirty.’
 a’. ??Na-ge ta xiu che de difang hen zang.
 that-CL he fix car DE place very dirty
 ‘That place where he fixed his car is very dirty.’
 b. Ta xiu che de na-ge wanshang, women dou bu zai jia.
 he fix car DE that-CL evening we all not at home
 ‘That evening when he fixed the car, we were not home.’
 b’. ??Na-ge ta xiu che de wanshang, women dou bu zai jia.
 that-CL he fix car DE evening we all not at home
 ‘That evening whenhe fixed the car, we were not home.’
 c. Ta xiu che de na-ge fangfa hen hao.
 he fix car DE that-CL way very good
 ‘?That way how he fixed the car is good.’
 c’. *Na-ge ta xiu che de fangfa hen hao.
 that-CL he fix car DE way very good
 ‘That way howhe fixed the car is good.’
 d. Ta xiu che de na-ge yuanyin hen qiguai.
 he fix car DE that-CL reason very strange
 ‘That reason why he fixed the car is strange.’

d'. *Na-ge ta xiu che de yuanyin hen qiguai.
 that-CL he fix car DE reason very strange
 'That reason why he fixed the car is strange.'

Not surprisingly, these relative clauses all have the same restriction on pre-RC demonstratives. The head nouns in adjunct relative clauses are also not individual denoting nouns. This strongly supports the idea that the restriction on pre-RC demonstratives and quantifiers is related to the semantics of the head noun. Therefore, the fact that a relative clause does not allow pre-RC demonstratives cannot be used to argue that it is not a relative clause.

3.6. Movement effects in *de shihou* clauses

As I have mentioned briefly in Chapter 1, Geis (1970) argues that *when*-clauses and clauses following *before/after* are relative clauses. He believes that the sentences in (35) are derived from (36).

- (35) a. John arrived when Bill left.
 b. John arrived before Bill was fired.
 c. John departed after Bill left.
- (36) a. John arrived at the time when Bill left.
 b. John arrived before the time at which Bill was fired.
 c. John departed after the time at which Bill left.

That is, Geis believes that *when*-clauses and clauses after *before/after* are adjuncts of deleted head nouns, i.e., *when*- clauses and the clauses after *before/after* are relative clauses. To argue that the sentences in (35) are relative clauses, he gives evidence to show that *when*-clauses and clauses after *before/after* observe the Complex NP effect, can be substituted for by pronominal items, and show time adverbial movement.

In what follows, I show how Geis argues to support that *when*-clauses are relative clauses; in Chapter 4 I will discuss his arguments regarding clauses following *before/after*. In addition to Geis (1970), I will also show Larson's (1990) analysis for *when*-clauses. Finally, I will show that *de shihou* clauses, like *when*-clauses, also observe the Complex NP constraint, can be substituted for by items that are similar to pronominals, and involve time adverbial movement.

The first piece of evidence that Geis gives to support the idea that *when*-clauses are noun phrases is the fact that *when*-clauses seem to observe the Complex NP constraint. If *when*-clauses are noun phrases, they would not allow any element to move out of the *when*-clauses. The following sentences illustrate this assumption:

- (37) a. Mary began to cry when Harry kissed Lelita.
b. *Which woman did Mary begin to cry when Harry kissed?
c. *The woman who Mary began to cry when Harry kissed is named Lelita.
- (38) a. Mary began to cry at the moment when Harry kissed Lelita.
b. *Which woman did Mary begin to cry at the moment when Harry kissed?
c. *The woman who Mary began to cry at the moment when Harry kissed is named Lelita. (p. 76)

(37a) does not have any element that moves out of the *when*-clause. (37b) is ungrammatical because it involves a *wh*-movement out of the *when*-clause, while (37c) relativizes an object out of the *when*-clause, and it is ungrammatical because the relativization crosses the *when*-clause. Furthermore, (37) behaves like (38), which contains *at the time* as the *when*-clause's antecedent. Therefore, Geis argues, *when*-clauses must be analyzed like the relative clause in (38)².

Further evidence to support the idea that *when*-clauses are relative clauses is the fact that *when*-clauses can be pronominalized like a regular noun phrase, as shown in (39).

(39) John left when Harry left and George left then too. (p. 74)

(39) shows that *then* can substitute for *when Harry left*. Therefore, *when Harry left* is very likely a noun phrase.

Finally, Geis shows that “*when* is derived from some time adverbial that moves to clause-initial position” (p. 77), which is like adverbial movement in the relative clause counterparts. This can be illustrated in (40) and (41).

(40) a. John arrived when Harry told Mary that she should leave.

b. John arrived when Harry told Mary about his desire that she should leave.

² It should be noted that this argument is not very strong, since movement out of adjuncts would be blocked by the CED (Condition on Extraction Domain) (Huang 1982).

- (41) a. John arrived at the moment when Harry told Mary that she should leave.
- b. John arrived at the moment when Harry told Mary about his desire that she should leave. (p. 77-78)

(40a) is ambiguous in that *when* can be interpreted as modifying either the verb *told* or the verb *leave*. That is, it can mean that John arrived at the time that Harry told Mary the time that she had to leave, and it can also mean that John arrived at the time that Mary was told to leave. (40b) is not ambiguous like (40a) because there is only one reading. (40b) means that John arrived at the time when Harry showed his desire to Mary regarding her leaving time, but it does not mean that John arrived at the time that Mary was told to leave. The sentence in (40b) does not show two readings because the time adverbial in the most embedded clause is blocked by the complex NP *his desire that she should leave*. This suggests that there must be an adverbial movement from the most embedded clause, and the complex NP blocks the reading from the most embedded clause. The same phenomenon occurs in relative clause counterparts of (40) shown in (41). (41a) has two readings like (40a), while (41b), which contains a complex NP, only has one reading. This is further evidence to support the idea that *when*-clauses are relative clauses.

In summary, Geis' arguments to support the idea that *when*-clauses are relative clauses are the following: *when*-clauses can be the antecedent of the temporal pronoun *then*. *When*-clauses are subject to the Complex NP constraint, which is similar to *when* clauses that contain antecedents in (38); thus *when*-clauses very possibly have *then* or *at some time* as their antecedent. Furthermore, he suggests that *when*-clauses are derived by

moving a time adverbial to the initial position of *when*-clauses, just as in other relative clauses.

Following Geis, Larson (1990) discusses the two-reading effect, as shown in (40), and proposes an operator movement to account for it, as shown in (42).

- (42) a. I saw Mary in New York [_{CP1} *when*_i [_{CP2} she would arrive] *t*_i]].
 b. I saw Mary in New York [_{CP1} *when*_i [_{CP2} she would arrive *t*_i]]].

In (42a), the trace is the adjunct of the verb *claim* and has the reading of seeing Mary at the time when she made the claim. In (42b), the trace is the adjunct of the verb *arrive* and has the reading of seeing Mary at the time of arrival she had earlier specified.

According to Larson(1985), in order for the traces to be interpreted, the traces must have case; since *when* bears Oblique case, the two traces in (42) are case-marked, and therefore, it is possible for the two readings to be accessible³.

Whether the movement is a time adverbial or an null operator, both Geis and Larson show that *when*-clauses involve movement⁴. Now, following Geis, I will show that *de shihou* clauses also show similar effects to those of *when*-clauses. Let us consider the following data in Chinese.

- (43) a. Mary zai John qin Sue de shihou ku-le.
 ZAI kiss DE time cry-LE
 ‘Mary cried when John kissed Sue.’

³ Larson (1985) discusses how bare NPs and adjunct relative clauses can occur in adverbial position without any apparent casemarking, since in the Government and Binding framework, NPs must be case marked. He proposes that bare NPs and *wh*-operators of adjunct relative clauses bear Oblique case; hence they are able to occur in adverbial position without apparent case.

⁴ Larson’s analysis does not treat temporal clauses as relative clauses.

- b. *Mary zai John qin t_i de shihou ku-le de ren_i shi Sue_i.
 ZAI John kiss DE time cry-LE DE person is Sue
 ‘*The person who Mary cried when John kissed is Sue.

(43a) contains a *de shihou* clause. (43b), which contains (43a), relativizes the object *Sue* out of the *de shihou* clause and has an ungrammatical result. It is accepted that Chinese relative clauses observe island effects, although its question clauses do not. If *de shihou* clauses are relative clauses, it follows that *de shihou* clauses give rise to the Complex NP effect, as (43b) shows.

Turning to pronominalization, Chinese does not seem to have a pronominal form corresponding to *then*; however, we can still test the substitutability of temporal phrases by using the DP *na-ge shihou* ‘that time’; consider (44).

- (44) a. Zhangsan zai [san dian]_i likai, Lisi ye zai [na-ge shihou]_i likai.
 ZAI three o'clock leave also ZAI that-CL time leave
 ‘Zhangsan left at three, and Lisi left then, too.’
 b. Zhangsan zai [Lisi zou le de shihou]_i daoda,
 ZAI walk LE DE time arrive
 Wangwu ye zai [na-ge shihou]_i daoda.
 also ZAI that-CL time arrive
 ‘Zhangsan arrived when Lisi left, and Wangwu arrived then, too.’

In (44a), *na-ge shihou* ‘that time’ refers back to the temporal noun phrase *san dian* ‘three o’clock’. *Na-ge shihou* ‘that time’ in (44b) refers back to *Lisi zou le de shihou* ‘when Lisi left’. Thus, Chinese *de shihou* clauses can be complex NPs.

Now let us examine if *de shihou* clauses also show two readings like their English counterparts.

- (45) a. John zai Harry gaosu Mary ta yinggai likai de na-ge shihou daoda.
 ZAI told she should leave DE that-CL time arrive
 ‘John arrived at that time when Harry told Mary that she should leave.’
- b. John zai Harry_i gaosu Mary_j youguan ta_j yao ta_j likai de qingqiu
 ZAI told about he want her leave DE desire
 de na-ge shihou daoda.
 DE that-CL time arrive
 ‘John arrived at that time when Harry told Mary about his desire for her to leave.’

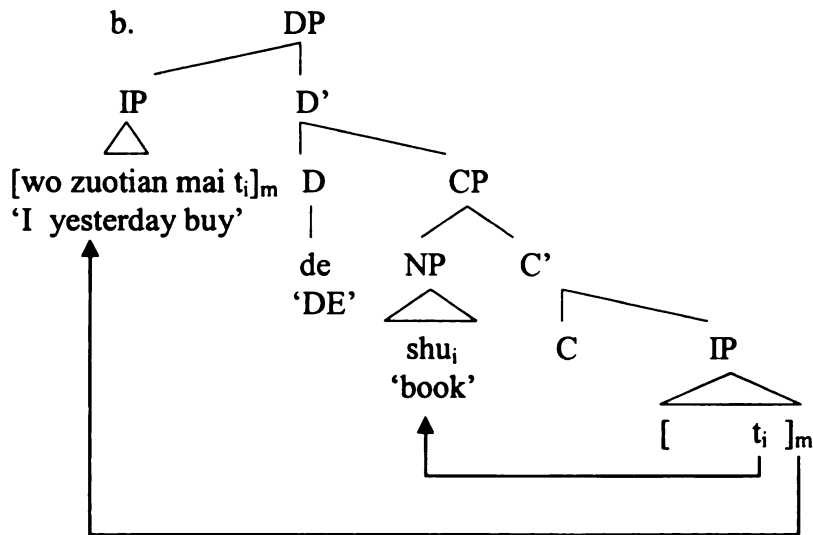
(45a) has the reading that the time that John arrived can be either the time that Harry told Mary something or the time that Mary should leave; however, (45b), which contains a complex NP, shows that the lower clause reading is not available. That is, the complex NP inside the *de shihou* clause blocks the operator from moving out of the lower clause, and thus the lower clause reading is disallowed.

This chapter has argued that *de shihou* clauses behave much like relative clauses. In what follows, I will show the structure of *de shihou* clauses.

3.7. The structure of *de shihou* clauses

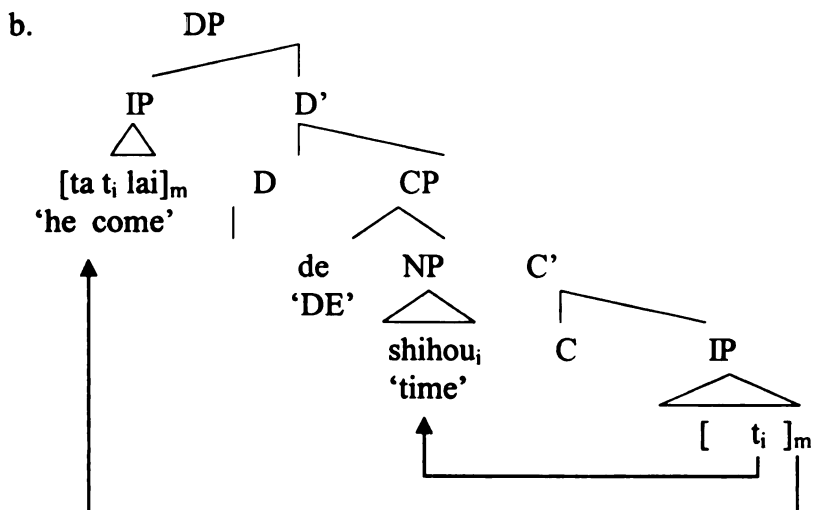
In Chapter 2, I stated that Simpson’s (1999, 2000) analysis for the structure of Chinese relative clauses will be used in my analyses of temporal clauses. According to Simpson, a Chinese relative clause as in (46a) has the structure shown in (46b).

- (46) a. wo zuotian mai de shu
 I yesterday buy DE book
 ‘the book I bought yesterday’



I have argued that *de shihou* clauses are relative clauses. Following the structure for relative clauses given in (46b), the *de shihou* clause in (1), repeated here as (47a), has the structure shown in (47b).

- (47) a. Ta lai de shihou wo zai chifan.
 he come DE time I ZAI eat-meal
 'When he came I was eating.'



That is, *shihou* moves out of the IP to the Spec of CP, and then the remnant IP moves to the Spec of DP to fulfill Spec head agreement with D⁰.

3.8. Conclusion

In this chapter, I have analyzed *de shihou* clauses. I argue against G & P's postpositional analysis to show that *shihou* is a noun and that *de shihou* clauses are relative clauses. G & P's arguments supporting a postposition analysis are based on the following beliefs: first, *shihou* cannot be modified by adjectives; second, *de shihou* does not show the Complex NP effect; third, *de shihou* clauses do not allow demonstratives to precede the clauses before *de shihou*. However, I argue that it is not sufficient to claim that an element that cannot be modified is not a noun. I gave evidence to show that a noun like *quxiang* 'direction' cannot be modified but is a noun, as in (7). Moreover, English *time* cannot be modified when it is used as a head of a *when*-clause, as in (8c). I also show that topicalization cannot be used as a method to test movement effects in Chinese, since Chinese definite NP topics are base-generated in topic positions, and only bare NP topics involve real extraction. The NP topics that G & P use to support their claim are definite NP topics, and thus they do not show the Complex NP effect.

In addition, G & P argue that regular Chinese relative clauses allow both pre-relative and post-relative demonstratives; however, demonstratives cannot occur before *de shihou* clauses, and thus *de shihou* clauses are not relative clauses. Nevertheless, I show that the distribution of demonstratives cannot be used as a way to judge whether or not a phrase is a relative clause. Since quantifiers occur in pre-RC or post-RC positions depending on the linguistic context, the position of quantifiers in relative clauses cannot

be used to judge whether a clause is a relative clause. Moreover, I reviewed Ning's (1993) analysis of Chinese adjunct relative clauses and found that adjunct relative clauses behave the same way as *de shihou* clauses in that they do not allow demonstratives to occur before them. Finally, following Geis' analysis for *when*-clauses, I examine whether *de shihou* clauses can be substituted for by the DP *na-ge shihou* 'that time', as well as if *de shihou* clauses observe island effects. Example (44) shows that *de shihou* clauses can be substituted for by *na-ge shihou* 'that time', and (43) and (45) show that *de shihou* clauses do involve movement just as regular relative clauses do; this further gives evidence to support the idea that *de shihou* clauses are relative clauses.

Chapter Four:

Yi-qian/Yi-hou clauses

4.1 Introduction

In the previous chapter, we have seen that, in Chinese, modifiers and complements in noun phrases appear to the left of the head noun. I also showed that *de shihou* ‘time’ clauses are relative clauses where the modifier of the head noun is to the left of *shihou* ‘time’. Chinese *before/after* clauses are very much like the *de shihou* clauses in that their clauses are obligatorily at the beginning of the whole temporal clause. Geis (1970) treats clauses that are introduced by *before/after* as relative clauses. If Chinese *before/after* clauses are similar to *de -shihou* clauses and the English clauses introduced by *before/after*, they are very likely to be noun phrases. However, the syntactic category of *yi-qian* ‘before’ and *yi-hou* ‘after’ in Chinese temporal clauses has been an issue because they have been treated as both postpositions (Gasde and Paul 1996) and nouns (McCawley 1992). If they are treated as postpositions, the *yi-qian/yi-hou* clauses will be analyzed as postpositional phrases. If they are treated as nouns, the *yi-qian/yi-hou* clauses will be analyzed as noun phrases. In this chapter I will further investigate this issue, and will show that a noun phrase analysis for *yi-qian/yi-hou* clauses is a better choice.

As discussed in chapter 1, the function of *yi-qian/yi-hou* in a temporal clause can also be performed by *zhi-qian/zhi-hou* and *qian/hou* ‘before/after’. When *qian/hou* denote time, they indicate ‘before/after’; however, they are also location-denoting words that mean ‘front/back’. Chao (1968) categorizes words such as *qian/hou* ‘front/back’,

shang ‘on, top’, and *li* ‘in’ as localizers. Li and Thompson (henceforth L & T, 1981) also coined the term locative particles, and these particles denote the location of nouns that they attach to (in this thesis I will refer to them as localizers). These localizers usually co-occur with *zai*, according to L & T, as shown in (1).

- (1) a. Shu zai zhuozi shang.
 book ZAI table top
 ‘The book is on top of the table.’
- b. Ta zai tushuguan li kanshu.
 he ZAI library inside study
 ‘He is studying in the library.’
- c. Ta zai shixiang qian wanshua.
 he ZAI statue front play
 ‘He is playing in front of the statue.’
- d. Ta zai wuzi hou changge.
 he ZAI house back sing
 ‘He is singing at the back of the house.’

The localizers above are called short form localizers; there are also localizers called long form localizers (Ernst 1988, Liu 1998)¹. Long form localizers are the combination of the short forms plus words like *bian* ‘top/side’, *mian* ‘side’, and *tou* ‘end/side’². *Bian mian*, and *tou* can be used interchangeably if they are used to mean ‘side’, as shown in (2).

¹ In Li and Thompson (1981), the short forms are called monosyllabic locative particles, and the long forms are called disyllabic locative particles.

² Ernst (1988) considers these words to be suffixes; however since they can follow demonstrative as in *zhe mian* ‘this side’ and can also follow classifiers and/or as numbers as shown in the following phrases, I consider them words.

(i)	liang-ge bian/mian	ii. liang bian/mian/tou
	two-CL side	two side

- (2) Shu zai zhuozi shang-bian/ shang-mian/ shang-tou.
book ZAI table top-side / top-side/ top-side
'The book is on the table.'

Now turn to compare (1) and (3).

- (3) a. Shu zai zhuozi shang-bian.
book ZAI table top side
'The book is on top of the table.'
- b. Ta zai tushuguan li-tou kanshu.
he ZAI library inside study
'He is studying in the library.'
- c. Ta zai shixiang qian-bian wanshua.
he ZAI statue front-side play
'He is playing in front of the statue.'
- d. Ta zai wu-zi hou-mian changge.
he ZAI house back-side sing
'He is singing at the back of the house.'

The meanings of (1) and (3) are the same and they do not show any difference between the short forms and the long forms. While long forms are analyzed as nouns, the syntactic category of short forms is controversial. They have been treated as postpositions (Ernst 1988), nouns (Li 1990), and clitics (Liu 1998). These analyses of short forms all have drawbacks. Since *qian/hou* are also short form localizers, I will investigate the structure of these locative phrases and argue for a parallel structure between locative phrases and temporal phrases with *qian/hou*, *yi-qian/yi-hou* and *zhi-qian/zhi-hou*. Since locative phrases and temporal phrases seem to have a very close relation, and they have been investigated in more depth than temporal phrases have, in

this chapter, I will discuss the locative phrases first. I will propose that short forms are nouns which have become clitics, and with their noun properties, short form localizers take DPs as their complements. I will then show the structural parallels between locative phrases and temporal phrases and apply the structure of locative phrases to the *yi-qian/yi-hou* clauses.

This chapter is organized as follows. In 4.2, I review two analyses of *yi-qian/yi-hou* and discuss their problems. In 4.3, I discuss the behavior of localizers, the literature regarding their categorization, and the problems of their analyses. In 4.4, I propose that these localizers are in fact nouns that have clitic properties and take DPs as complements. In 4.5, I show the parallel between locative and temporal clauses and show that temporal clauses are noun phrases. Based on the parallel, I provide a structure for *yi-qian/yi-hou* phrases will be provided. Furthermore, I compare *yi-qian/yi-hou* phrases with *before/after* phrases in 4.6, and then in 4.7, I distinguish the differences between *yi-qian/yi-qian* clauses from *de shihou* clauses.

4.2 Previous analyses for the category of *yi-qian/yi-hou*

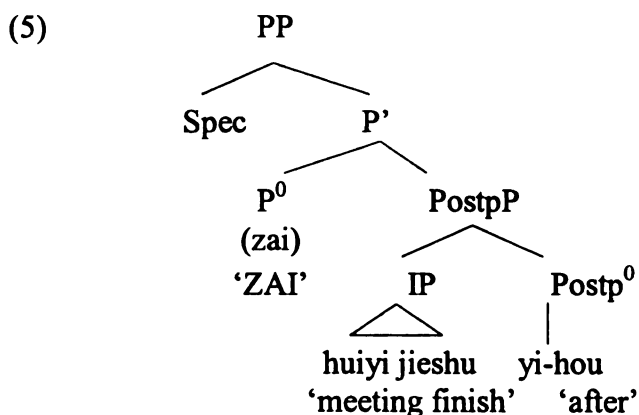
There are two ways of treating *yi-qian* ‘before’ and *yi-hou* ‘after’: either as postpositions or as nouns. Gasde & Paul (1996) put *yi-qian/yi-hou* in the category of postpositions, but McCawley (1992) categorizes *yi-qian/yi-hou* as nouns. In this section, I will show how these linguists define the categorial status of these words, and some problems with their analyses. Finally, I will show that the noun analysis is a better choice to pursue.

4.2.1 *Yi-qian/yi-hou* as postpositions

Gasde and Paul (1996) (henceforth G & P) argue that *zai*, *yi-qian* ‘before’, and *yi-hou* ‘after’ are adpositions: *zai* is a preposition and *yi-qian/yi-hou* are postpositions. There is no dispute regarding *zai* as an adposition, but *yi-qian/yi-hou*’s status as adpositions is debatable because G & P also consider *yi-qian/yi-hou* to have a nominal background. Nevertheless, they argue that *yi-qian/yi-hou* are not nouns since *yi-qian/yi-hou* clauses do not observe the Complex NP effect. They also show that *yi-qian/yi-hou* are adpositional lexical heads that are potential governors which can bar traces from being properly governed by their antecedents. In this section, I will review their analyses of *yi-qian/yi-hou* as postpositions.

According to G & P, the structure of the temporal adjuncts in (4) is (5).

- (4) a. Wo huiyi jieshu yi-hou jin cheng.
 I meeting finish after go downtown
 ‘After the meeting is over, I will go downtown.’
- b. (Zai) huiyi jieshu yi-hou wo jiu jin cheng.
 ZAI meeting finish after I then go downtown
 ‘After the meeting is over, I will go downtown.’



They argue that the *yi-qian/yi-hou* phrases are not noun phrases, but postpositional phrases (PostpP), of which *yi-qian/yi-hou* are the heads. The Postp^0 only projects one bar level, i.e., there is no Spec of PostpP. (5) shows that *yi-hou* ‘after’ is a final head which projects the postpositional phrase.

According to G & P, the possibility of extracting things out of temporal clauses supports the PostpP analysis rather than the noun analysis. The evidence for their claim comes from the following sentence.

- (6) *Zhei-zuo fangzi ni mai yi-qian yinggai qu zhao yi-ge gongzhengren.*
 this-CL house you buy before should go seek one-CL notary public
 ‘This house, before you buy it, you should consult a notary public.’

According to G & P, (6) has the structure in (7).

- (7) $[\text{Zhei-zuo fangzi}]_i$ $[\text{PostpP} [\text{ni mai } t_i] \text{ yi-qian}]$ *yinggai qu zhao yi-ge*
 this-CL house you buy before should go seek one-CL
 gongzhengren.
 notary public
 ‘This house, before you buy it, you should consult a notary public.’

In (6), *zhei-zuo fangzi* ‘this-CL house’ is topicalized. Following the structure in (7), if the temporal clause, *ni mai t yi-qian* ‘before you buy’, is an NP, topicalizing *zhei-zuo fangzi* ‘this-CL house’ out of the temporal clause should not be possible due to the Complex NP constraint. However, since (6) is grammatical, the temporal clause must not be a noun phrase.

They further argue that the Postp⁰ only projects one bar level. According to them, the following sentences demonstrate this fact. When *zai* is present, the topicalization of an object can only be to the position which is to the left of but not lower than *zai*.

- (8) a. *Zai zhei-zuo fangzi ni mai yi-qian yinggai qu zhao yi-ge gongzhengren.
 ZAI this-CL house you buy before should go seek one-CL notary public
- b. Zhei-zuo fangzi zai ni mai yi-qian yinggai qu zhao yi-ge gongzhengren.
 this-CL house ZAI you buy before should go seek one-CL notary public
 ‘This house, before you buy it, you should consult a notary public.’

The phenomenon in (8) is analyzed as follows:

- (9) a. *_{pp} zai [_{PostpP} [_{DP} zhei-zuo fangzi]_i [_{Postp'} [_{IP} ni mai t_i] yi-qian]]]yinggai
 ZAI this-CL house you buy before should
 qu zhao yi-ge gongzhengren.
 go seek 1-CL notary public
- b. [_{pp} [_{DP} Zhei-zuo fangzi]_i [_{P'} zai [_{PostpP} [_{IP} ni mai t_i] yi-qian]]] yinggai qu zhao
 this-CL house ZAI you buy before should go seek
 yi-ge gongzhengren.
 one-CL notary public
 ‘This house, before you buy it, you should consult a notary public.’

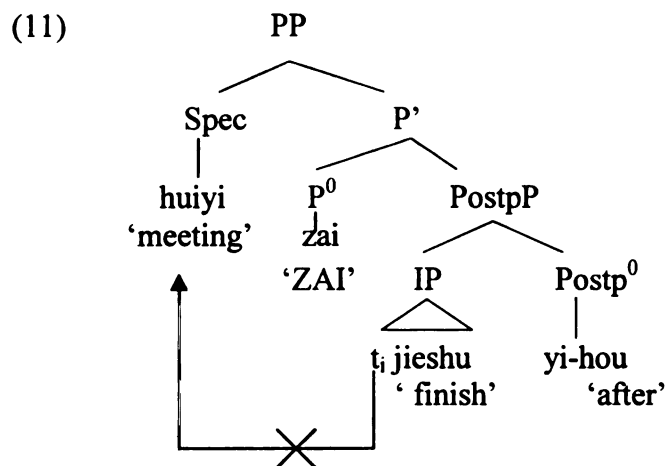
According to G & P, extracting the object *zhei-zuo fangzi* ‘this house’ in (9a) to the right of *zai* is blocked because there is no Spec of PostpP. Extracting *zhei-zuo fangzi* ‘this house’ in (9b) to the left of *zai* is acceptable because Spec of PP, which is headed by *zai*,

offers a place to which *zhei-zuo fangzi* ‘this house’ can move. Therefore, the Postp^0 only projects one bar level.

Another argument that G & P give for postpositional analysis is that *yi-qian/yi-hou* can block an antecedent from governing its trace. The following sentence is used to support their postposition analysis.

- (10) **Huiyi zai jieshu yi-qian/yi-hou wo jin cheng.*
 meeting ZAI finish before/after I enter town
 ‘Before/after the meeting was finished I entered the town.’

The structure of (10) is as (11) according to G & P.



(11) shows that extracting the subject *huiyi* ‘meeting’ is barred. In order to fit their postposition analysis, G & P follow Chomsky’s (1986a) ECP (empty category principle) and assume that a functional head does not intervene between an antecedent governor and

its trace, but a lexical head does³. G & P analyze (11) as similar to a *that*-trace effect in that the head of PostpP, which is *yi-hou*, is a possible governor that bars the antecedent from governing the trace in the subject position. An example of a *that*-trace effect is shown in (12).

- (12) a. *Who_i do you think that t_i left?
 b. Who_i do you think that John saw t_i?

In (12), *that* is a potential governor for its extracted subject, which bars *who* from antecedent governing its trace, while the object extraction in (12b) is legal because the trace is lexically governed by *saw*. G & P claim that (11) is ungrammatical because *yi-hou* is a potential governor of the trace in *t jieshu* ‘t finish’. According to Chomsky (1986a), only a lexical category can θ -govern a phrase⁴. Since *yi-hou* blocks the trace from being governed by its antecedent *huiyi* ‘meeting’, it must be that *yi-hou* is a postposition that L-marks the IP *t jieshu* ‘t finish’ and therefore, it is a lexical head. However this situation will not apply to object extraction as in (6), where the trace is properly governed by the verb *mai* ‘buy’.

In summary, G & P argue that *yi-qian/yi-hou* are postpositions because clauses that contain them do not show Complex NP effects. The postpositional phrase has only one bar level because extraction to the Spec of postpositional phrase is impossible as in

³ The ECP in Chomsky (1986a) is defined as follows: a nonpronominal empty category must be properly governed. α properly governs β iff α θ -governs or antecedent-governs β (p. 17).

⁴ α L-marks (Lexically-marks) β iff α is a lexical category.

(11); instead it is only possible to extract out of the postpositional phrase to the Spec of the prepositional phrase headed by *zai*. G & P also assume that only lexical categories block an antecedent from governing its trace. With their data in (11) showing that *yi-hou* blocks an antecedent from governing its trace, they conclude that *yi-qian/yi-hou* are lexical heads and therefore must be postpositions.

4.2.2. McCawley's analysis

McCawley (1992) argues that *yi-qian/yi-hou* are nouns since Chinese *yi-qian/yi-hou* 'before/after' are similar to localizers, and localizers behave like nouns⁵. Chinese localizers are a group of words that indicate locations, and they usually occur after nouns. For example, in the Chinese phrase *chuang xia* 'under the bed,' *chuang* means *bed*, and *xia* means *under*, functioning as a localizer.

McCawley first argues against the idea that *yi-qian/yi-hou* are adpositions. According to McCawley, an adposition in Chinese has the following characteristics:

- (13) i. Objects of an adposition cannot undergo extraction.
- ii. Objects of an adposition can serve as the antecedent of *dou* 'all'.

Based on the criteria in (13), (14) *yi-qian* 'before' appears to be an adposition.

- (14) a. *Nei-chang qiusai_i, ta *e*_i yi-qian mai le pijiu.
 that-CL ball-game he before buy LE beer
 'that ball-game, he bought beer before'

⁵ McCawley analyzes *yi-qian/yi-hou* phrases with NP arguments rather than clausal arguments, i.e., he only discusses NP +*yi-qian/yi-hou* phrases instead of Clause +*yi-qian/yi-hou* phrases.

- b. *ta e_i yi-qian mai le pijiu de nei-chang qiusai
 he before buy LE beer DE that-CL ball-game
 ‘that game that he bought beer before’
- c. Ta nei-san-chang qiusai yi-qian dou mai le pijiu.
 he that-three-CL ball-game before all buy LE beer
 ‘He bought beer before all three of those games.’

If *yi-qian* is an adposition, (14a) shows that the object of *yi-qian*, *nei-chang qiusai* ‘that ball game’, cannot undergo extraction, and (14b) shows that the object of *yi-qian* can’t form a relative clause while (14c) shows that the object of *yi-qian* can serve as the antecedent of *dou* ‘all’.

However, with regard to the use of *dou*, McCawley shows that nouns do not in fact differ from adpositions. For example, a nominal adjunct can also be the antecedent of *dou* as in (15). Here the adjunct *sange ren* ‘three people’ is the antecedent of *dou*, which is similar to (14c) in that *nei-san-chang qiusai* ‘the three ball games’, the object of *yi-qian*, is the antecedent of *dou*.

- (15) Ta san-ge ren de shu dou kan-guo.
 he three-CL people DE book all see-GUO
 ‘He has read the books of all three persons.’
 (‘all three persons’ not ‘all the books of the three persons’)

The following sentences further illustrate the fact that nouns and adpositions behave alike when they occur with *dou*.

- (16) a. Zai Jiulong-chezhan bi zai qita chezhan dou shufu.
 ZAI Kowloon-station than ZAI other station all comfortable
 'It is more comfortable in Kowloon Station than in all other railway stations.'
- b. Ta de shu bi qita zuozhe de shu dou you yisi.
 he DE book than other author DE book all have interesting
 'His books are more interesting than all other authors' books.'

In (16a), *bi* 'than' is a preposition which takes the prepositional phrase *zai qita chezhan* 'at other stations' as its complement. In (16b), *bi* takes the noun phrase *qita zuozhe de shu* 'other authors' books' as its complement. *Dou* 'all' in (16a) has the adpositional phrase *zai qita chezhan* 'at other stations' as its antecedent, while *dou* in (16b) has the noun phrase *qita zuozhe de shu* 'other authors' books' as its antecedent. That is, *dou* takes either an adpositional phrase or a noun phrase as its antecedent.

McCawley further shows that an NP combined with a localizer as the object of an adposition can be the antecedent of *dou* as in (17), but the fact is that no matter whether the NP + localizer is an NP or PP, it always can be the antecedent of *dou*. That is, if localizers are adpositions, (17) is analogous to (16a) because *nei sanjia puzi-li* 'inside the three stores' is the adpositional complement of the preposition *zai*. If localizers are nouns, (17) is analogous to (16b) because *nei sanjia puzi-li* 'inside the three stores' is a noun phrase complement of the preposition *zai*.

- (17) Zhangsan zai nei san-jia puzi-li dou mai guo dongxi. (*li* is the localizer)
 ZAI that three-CL store-inside all buy GUO things
 'Zhangsan has bought things in all three of those stores.'

(18) a. Haizi-men ba (*zai) jia-li nong-de hen hao-kan.
 Child-plural BA ZAI home-inside make-DE very good-looking
 'The children made inside the house pretty.'

b. Jia-li bei haizi-men nong-de luanqibazao.
 home-inside BEI child-plural make-DE messy
 'The inside of the house was made a mess by the children.'

(19) a. Ta ba wanfan yi-hou kanzuo zuihao de xiuxi shijian.
he BA dinner after regard best DE rest time
'He regards after dinner as the best rest time.'

(ii) Ta bei (Zhangsan) da-le
he BEI beat-LE
'He was beaten by (Zhangsan)/someone.'

(iii) ta ba pingguo chi-le
he BA apple eat-LE
'He ate the apple'


- b. Wanfan yi-hou bei ta kanzuo zuihao de xiuxi shijian
 Dinner after BEI he regard best DE rest time
 ‘After dinner is regarded by him as the best rest time.’

Since the phrases in (19) containing *yi-hou* ‘after’ are noun phrases, McCawley concludes that *yi-qian* and *yi-hou* are nouns.

4.2.3 Problems with G & P’s and McCawley’s analyses

G & P (1996) argues that *yi-qian/yi-hou* ‘before/after’ are postpositions, while McCawley (1992) argues that they are nouns. In this section, I will examine their analyses and I will support McCawley’s analysis as a better choice than G & P’s.

G & P’s argument for the temporal clause not being a noun phrase is that there is no complex NP effect when topicalization occurs, as shown in (7), repeated here as (20).

- (20)  [[Zhei-zuo fangzi]_i [PostpP [ni mai t_i] yi-qian]] yinggai qu zhao yi-ge
 this-CL house you buy before should go seek one-CL
 gongzhengren.
 notary public
 ‘This house, before you buy it, you should consult a notary public.’
 (G & P 1996, 283)

As we have discussed in Chapter 3, however, topicalization is not a good test to show whether or not a phrase is a complex NP. Furthermore (20) shows that a definite NP topicalization is a non-movement topicalization, which was shown in Chapter 3.

However, a bare noun phrase can not undergo topicalization out of an adjunct clause, as (21) shows.

- (21) a. Ni mai fangzi yi-qian yinggai qu zhao yi-ge gongzhengren.
you buy house before should go seek one-CL notary public
'Before you buy a house, you should consult a notary public.'
- b. *Fangzi_i ni mai t_i yi-qian yinggai qu zhao yi-ge gongzhengren.
house you buy before should go seek one-CL notary public
'The house_i, before you buy it_i, you should consult a notary public.'

Now consider (22).

- (22) Speaker A: Wo xiang mai zhe-zuo fangzi.
I want buy this-CL house
'I want to buy this house.'

Speaker B: Ni yao mai *e* yi-qian, yinggai qu zhao yi-ge gongzhengren.
You want buy before should go seek one-CL notary public
'Before you buy the house, you should consult a notary public.'

(22) shows that (20) is a non-movement topicalization. In (22), after speaker A mentions *zhe-zuo fangzi* 'this house', which is the topic in (20), speaker B can utter the sentence with a null object without an overt antecedent (the antecedent can be realized in the discourse), and the sentence has the same meaning as (20). (20) has *zhe-zuo fangzi* 'this house' as the topic with a null object, and this shows that (20) could be the combination of a topic with a null object instead of an extraction of the topic out of the embedded clause.

Furthermore, G & P, following Chomsky's (1986a) ECP, claim that the Postp^0 is a lexical head blocking movement of the subject as in (10), repeated here as (23).

- (23) *Huiyi zai t_i jieshu yi-qian/yi-hou wo jin cheng
 meeting ZAI finish before/after I enter town
 ‘Before/after the meeting was over, I went downtown.’ (G & P 1996, 284)

This argument does not seem very convincing. First, as a similar situation to the *that*-trace effect, *that* is not a lexical head, but a functional head. That is, assuming Chomsky (1986a), a functional head blocks government; whether or not a lexical head blocks government seems to need further examination. Second, what is considered to be ungrammatical due to government blocking as in (23) becomes grammatical if *huiyi* ‘meeting’ is the main subject as shown in (24).

- (24) Huiyi zai e kaishi bujiu yi-hou jiu liuhui le
 meeting ZAI start not-long after then miscarry LE
 ‘The meeting broke up soon after it started.’

The acceptability of (24) shows that the unacceptability of (23) may be due to subject competition since *huiyi* ‘meeting’ is right before *zai*, which is a typical subject position; however, the position after *yi-hou* has another subject, *wo* ‘I’, and the result is ungrammatical. Therefore, the unacceptability of (23) may not be due to any island effect, but to a problem of having two subjects at once⁷.

⁷ Assuming that Chinese word order is subject + adverb + verb phrase, and phrases containing *zai* are adverbials, then NPs preceding *zai* are usually subjects. Evidence from the following contrast shows the preference that NPs (including DP and bare NP) preceding *zai* are subjects. (The comma indicates that the NP preceding it is a topic.)

- (i) a. ?Nei-ben shu wo kanwan le yi-hou yanjing hen bu-shufu
 that-CL book I read-finish LE after eye very uncomfortable
 ‘That book_i, after I finished reading it_i, my eyes became very uncomfortable.’
 b. *Nei-ben shu zai wo kanwan le yi-hou yanjing hen bu-shufu
 that-CL book ZAI I read-finish LE after eye very uncomfortable
 Intended to mean: ‘That book_i, after I finished reading it_i, my eyes became very uncomfortable.’

Now let us examine McCawley's analysis. McCawley showed that *yi-qian/yi-hou* behave like localizers in that they act as adpositions as well as nouns, and the positions in which they can occur, after *ba* and the subject position of *bei* constructions, seem to show that they are nouns. However, the position after *ba* and the subject position of *bei* constructions are very similar to the positions held by *after dinner* as shown in the English gloss in (19), repeated here as (25).

- (25) a. He regards after dinner as the best rest time.
b. After dinner is regarded by him as the best rest time.

It is assumed that the subject position in English is a position only for noun phrases; however this may not always be the case, as shown in (25). In (25a), *after dinner* occurs after the verb *regard* and is the subject of the small clause *after dinner as the best rest time*. In (25b) *after dinner* is in the subject position of the passive construction. However, *after dinner* in both sentences is a prepositional phrase, but not a noun phrase.

Now let us look at (19), repeated here as (26).

-
- c. ??*Nei-ben shu*, *zai* *wo kanwan le yi-hou yanjing hen bu-shufu*
that-CL book ZAI I read-finish LE after eye very uncomfortable
Intended to mean: 'That book_i, after I finished reading it_i, my eyes became very uncomfortable.'
- (ii) *Na-liang chezi*, (*zai*) *women chu le chehuo yi-hou jiu bei mai le*.
that-CL car ZAI we have LE car-accident after then BEI sell LE
'The car_i, after we had a car accident, it_i was sold.'

In (ia), *Nei-ben shu* 'that book' is a topic, and the main subject is *yanjing*. If an NP before *zai* is not forced to be interpreted as subject, (ib) should not be unacceptable since it is possible to have topic before *zai* as shown in (ii). Having a comma after *nei-ben shu* as in (ic), it makes the sentence better; however, it is still not very good. The contrast between (ic) and (ii) shows that when *zai* occurs, a topic is preferred to be a subject. See Chapter 5 for more discussion.

- (26) a. Ta ba wanfan yi-hou kanzuo zuihao de xiuxi shijian.
 he BA dinner after regard best DE rest time
 'He regards after dinner as the best rest time.'
- b. Wanfan yi-hou bei ta kanzuo zuihao de xiuxi shijian.
 Dinner after BEI he regard best DE rest time
 'After dinner is regarded by him as the best rest time.'

According to Sybesma (1999), noun phrases after *ba* should be analyzed as subjects of small clauses. For example, in (26a), the small clause is *wanfan yi-hou zuihao de xiuxi shijian* 'after dinner as the best rest time'. Since *kanzuo* 'regard' is an unaccusative verb and cannot assign case to *wanfan yi-hou*, *wanfan yi-hou* has to move to the position after *ba* to get case⁸. (26b) is a passive sentence which is like its English translation, and *wanfan yi-hou* occurs in the subject position. *Wanfan yi-hou* in both (26a) and (26b) is the subject, which behaves like its English counterpart shown in the translation. If only NPs can occur after *ba* and be the subject of *bei* constructions, it seems reasonable to treat *wanfan yi-hou* as an NP. However, the similarity between the English and Chinese in (26) may reveal a possibility that *wanfan yi-hou* may not be a noun phrase.

If it is true cross-linguistically that adpositional phrases can be subjects, it is not clear why the following sentences are ungrammatical.

- (27) a. *Ta ba zai wanfan yi-hou kanzuo zuihao de xiuxi shijian.
 he BA at dinner after regard best DE rest time
 'He regards after dinner as the best rest time.'
- b. *Zai wanfan yi-hou bei ta kanzuo zuihao de xiuxi shijian.
 ZAI dinner after BEI he regard best DE rest time
 'After dinner is regarded by him as the best rest time.'

⁸ *Kanzuo* 'regard' is a combination of *kan* 'look' and *zuo* 'as', which is a resultative verb, i.e., an unaccusative verb according to Sybesma (1999).

(27) shows that the prepositional *zai* phrase is not able to occur in case position such as after *ba* (27a) or in the subject position of the passive sentence (27b). Li (1990) argues that Chinese prepositional phrases behave differently from English prepositional phrases since English, but not Chinese, allows prepositional phrases to occur in case positions. The following sentence further supports this fact.

- (28) a. (*Zai) jia haoxiang shi ta wancheng duoshu gongzuo de difang.
 ZAI home seem is he finish most work DE place
 'At home seems to be where he gets most of his work done.'
- b. At home seems to be where he gets most of his work done.

From (28), we can see that in a raising structure, English PPs can undergo raising to a subject position. Since Chinese PPs cannot, they do not behave like English PPs.

Although *yi-qian/yi-hou* 'before/after' seem to behave like their English counterparts and are able to occur in the *regard* construction, we should also be aware of other syntactic differences between English and Chinese. Given this evidence, it seems more likely that *yi-qian/yi-hou* phrases are NPs.

In summary, G & P's argument only depends on *yi-qian/yi-hou*'s clauses not showing the Complex NP effect, but topicalization in Chinese is not sufficient to prove that there is extraction going on, and therefore is not an argument to say that *yi-qian/yi-hou* clauses are not noun phrases. On the other hand, McCawley has shown that *yi-qian/yi-hou* phrases do behave like noun phrases, and I also have shown that Chinese PPs behave differently from their English counterparts. Thus, we cannot claim that because

before/after are adpositions, therefore *yi-qian/yi-hou* ‘before/after’ in Chinese are also adpositions. It seems more reasonable to treat *yi-qian/yi-hou* ‘before/after’ as nouns.

4.3 Localizers

Recall that Chinese *before/after* clauses can not only be expressed by *yi-qian/yi-hou*, they can also be expressed by *zhi-qian/zhi-hou*, and *qian/hou* ‘before/after’, and *qian/hou* are also localizers. This makes the behavior of *yi-qian/yi-hou* very much like localizers. In this section, I will discuss the syntactic category of localizers. I will first discuss the behavior of localizers, and then review previous studies regarding localizers and argue that localizers in fact are nouns that take the noun phrases that they attach to as complements.

4.3.1 Introduction

Localizers are divided into short form localizers and long form localizers. Some short form localizers are given in (29).

- (29)
- a. shang ‘top’
 - b. li ‘inside’
 - c. qian ‘before/front’
 - d. hou ‘after, back’

A long form localizer consists of a short form localizer and a noun which means *side*, as in (30).

- (30) a. shang-mian ‘top side/surface’
 b. li-mian ‘inside’
 c. qian-mian ‘front side’
 d. hou-mian ‘back side’.

According to Li and Thompson (1981), a locative phrase has the following structure:

- (31) *zai* noun phrase- (localizer) (L & T 1981, 390)

That is, a typical locative phrase consists of *zai*, a noun phrase, and a localizer, such as *shang* in (29a) and *shang mian* in (30a). The following are examples of locative phrases.

- (32) a. Shu zai zhuozi shang (mian).
 book ZAI table top-side
 ‘The book is on top of the table.’
 b. Ta zai tushuguan li (mian) kanshu.
 he ZAI library in side study
 ‘He is studying in the library.’
 c. Ta zai yuanzi qian (mian) wanr.
 he ZAI yard front side play
 ‘He is playing in front of the yard.’

Although the locative phrases consist of *zai*, a noun phrase, and a localizer, as shown in (32), locative phrases that have definite reference do not require localizers to occur (Liu 1998), as in (33).

- (33) Wo zai jia/xuexiao/tushuguan (li) kan shu. (li is the localizer)
 I ZAI home/school/library in see book
 'I read at home/at school/ in the library.'

However when a locative phrase is in subject position, the localizer must occur, as shown in (34).

- (34) a. Jia li you liang ge ren.
 home inside has two CL people
 'There are two people at home.'
- b. *Zai jia you liang ge ren.
 ZAI home has two CL people
- c. ?Zai jia li you liang ge ren⁹.
 ZAI home inside has two CL people
- d. *Jia you liang ge ren.
 home has two CL people

As to the constituency of the *zai* + NP + localizer, Liu (1998) shows that *zai* and the NP do not form a constituent, but the NP and the localizer form a constituent, as shown in (35).

- (35) a. Wo zai zhuozi shang he yiz shang dou fang le yi-ben shu.
 I ZAI table top and chair top all put LE one-CL book
 'I put a book both on the table and on the chair.'

⁹ Although (34c) is not good with *zai* in the subject position, the following sentence is fine:

- (i) Zai jia li you liang ge ren, zai tushuguan li you si ge ren
 ZAI home in has two CL people at library in has four CL people
 a. 'At home, there are two people, at the library, there are four people.'
 b. 'There are two people at home and there are four people in the library.'

(i) can be translated as (ia) and (ib), but (ia) seems to be a better translation since (i) is contrasting the number of people in two different places; therefore the two places are emphasized and are in topic positions, but not subject positions.

- b. Wo zai zhuozi he yizi shang dou fang-le yi-ben shu.
 I ZAI table and chair top all put-LE one-CL book
 'I put a book both on the table and on the chair.'
- c. *Wo zai zhuozi he zai yizi shang dou fang le yi-ben shu.
 I ZAI table and ZAI chair top all put LE one-CL book
 'I put a book both on the table and on the chair.'

(35a) shows that the two NP + localizer combinations can be coordinated. (35b) shows that two NPs can also be coordinated, while (35c) shows that two *zai* + NP combinations cannot be coordinated. Therefore, (35) shows that in a locative construction of *zai* + NP + localizer, *zai* + NP is not a constituent, but NP + localizer is a constituent. The following data also support this result.

- (36) a. Ta zai nar wanr?
 He ZAI where play
 'Where is he playing?'
- b. *Ta nar qian-(mian) wanr?
 He where front-(side) play
 'Where is he playing?'
- c. Ta zai yuanzi qian (mian) wanr.
 He ZAI yard front (side) play
 'He is playing in front of the yard.'

(36a) and (36b) both are the possible questions for the answer in (36c). *Nar* in (36a), which means *where*, corresponds to *yuanzi qian (mian)* 'front yard' in (36c), but the *nar* 'where' in (36b) does not corresponds to *zai yuanzi* 'in the yard' in (36c). That is, in questions, involving the combination of *zai* + NP + localizer, only NP + localizer is a

constituent and is a noun phrase that can be substituted for by a question, but *zai* + NP is not.

Turning to the NP + localizer combination, as we see in (32), nouns can take either long form or short form localizers. However, Li and Thompson (1981) observed that the long forms often go with disyllabic nouns, and the short forms often go with monosyllabic nouns, as in (37).

- (37) a. Ta zai men qian wanr.
 he ZAI door front play
 ‘He is playing in front of the door.’
- b. *Ta zai men qian-mian wanr.
 he ZAI door front-side play
 ‘He is playing in front of the door.’
- c. Ta zai fangzi pang-bian wanr.
 he ZAI house beside-side play
 ‘He is playing beside the house.’
- d. *Ta zai fangzi pang wanr.
 he ZAI house beside play
 ‘He is playing beside the house.’

In addition to this difference, the short form and long form localizers behave differently syntactically. The long forms can follow *de*, but the short form can only follow *zhi*¹⁰. This is shown in (38).

- (38) a. zhuozi shang
 table top
 ‘on the table’

¹⁰ *Zhi* is considered to be *de* in Classical Chinese (Gao 1957; Xu 1997; Simpson, 1999, 2000). Although *zhi* is not commonly used in modern spoken Chinese, NP+ *zhi* + short form is a legal combination in classical form.

b. zhuozi zhi shang
table ZHI top
'on the table' / 'above the table'

c. zhuozi shang-mian
table top-side
'on the table'

d. Zhuozi de shang-mian
table DE top-side
'on the table'

e. *zhuozi de shang
table DE surface
'on the table'

f. *zhuozi zhi shang-main
table ZHI top-surface
'on the table'

g *zhuozi de zhi shang-(mian)
table DE ZHI top side
'on the table'

(38) shows that when insertion takes place in between the NP + localizer combination, *de* can only precede the long form and *zhi* can only precede the short form. (38g) shows that *de* and *zhi* can not co-occur. Furthermore, *yi* as in *yi-qian/yi-hou* 'before/after', although not a classical form of *de*, can also occur between the NP and localizer combination and have a different meaning from phrases with *zhi* and *de*. In (39), for example, the location that the localizer refers to is *above the table*, but not *on the table*.

(39) a. zhuozi yi shang
table YI top
'above the table'

- b. *zhuozi yi zhi/zhi yi shang
 table YIZHI/ZHI YI top
 Intended to mean: 'on/above the table'
- c. *zhuozi yi de /de yi shang
 table YI DE/DE YI top
 Intended to mean: 'on/above table'

Another difference between the short form and long form is that the long form is a full-fledged noun in modern spoken Chinese, but the short form is not, because it cannot occur in all argument positions, as shown in (40).

- (40) a. Zhuozi shang/shang mian you beizi.
 table top / top side has cup
 'There are cups on the table.'
- b. *Shang you beizi.
 top has cup
- c. Shang-mian you beizi.
 top side has cup
 'There are cups on the top.'

Because of these differences, in the literature, the long forms are categorized as nouns.

Because the short forms do not behave like full-fledged nouns, their category is controversial. The syntactic category of the short forms has been argued to be as a postposition (Ernst 1988), a noun (Li 1990), and a clitic (Liu 1998)¹¹.

¹¹ There is also a P' analysis (Troike & Pan 1994) which takes *zai* and the noun as a constituent and localizers as adpositions. As shown in (27), *zai* and the noun cannot form a constituent; I will not further review this approach.

Ernst (1988) argues that short form localizers should be postpositions because they cannot stand alone in an argument position, and they cannot follow *de*, which usually is used to test noun-hood. Li (1990) argues that short form localizers are nouns because the NP + localizer combination is able to occur in argument positions. Liu (1998) argues that both the postposition and the noun analyses have their drawbacks; therefore, she proposes that short form localizers are clitics that do not take syntactic positions. In the following section, I will review these three analyses.

4.3.2 Localizers as postpositions

Ernst (1988) argues that although both the postposition analysis and the noun analysis have their drawbacks, the postposition analysis is a better choice. That is, if we choose the noun analysis, according to him, we have to adopt the idea that an isolating language like Chinese has obligatorily bound nouns that cannot refer to actual places. They have to depend on other objects to determine places for them to refer to. However, if we choose the postposition analysis, we will have to say that Chinese has head-final adpositions although its verbs and prepositions precede their objects. Under this analysis we must also accept the unusual subcategorization that a preposition *zai* has to subcategorize a postposition phrase as in *zai zhuozi shang* ‘on the table top’. Nevertheless, Ernst argues that the postposition analysis is a better choice. The following is a summary of his arguments.

Ernst says that we cannot categorize the short forms as nouns just because the long forms are nouns. He emphasizes that the short forms do not behave like nouns as

their long form counterparts do. In fact, there are a number of ways in which the short forms do not behave like nouns. First, they can not follow *de*:

- (41) a. chezi de shang-mian
car DE top-side
b. *chezi de shang
car DE top
'on top of the car'

De is an element in Chinese that can be followed by nominal elements only. (41) shows that the short form cannot follow *de*.

Second, short forms cannot stand alone in argument positions by themselves, as shown in (42b).

- (42) a. xia-mian you henduo shu
under side has many book
'There are many books underneath.'
b. *xia you henduo shu
under has many book
'There are many books underneath.'

Third, the element preceding a short form must be a noun phrase, and not an adjectival verb phrase, such as *zangzangde* 'dirty', as in (43).

- (43) a. Wo pengdao le chezi de zhangzangde shang-mian.
I touch-to LE car DE dirty top side
'I touched the dirty top of the car.'

- b. *Wo pengdao le chezi de zhangzangde shang.
I touch-to LE car DE dirty top

Finally, Ernst argues that NP+ short form is a relational phrase and it occurs in subject or object positions only when a relational reading is required. According to him, the relational phrases refer to ‘a place defined by position relative to some other object’ (1988, 229). That is, relational phrases refer to places according to the context, but not a constant place. This is shown as in (44).

- (44) a. *Chezi shang shi mutou zuode.
Car top is wood make
‘The top of the car is made of wood.’
- b. Chezi de shang-mian shi mutou zuode.
Car DE top-side is wood make
‘The top of the car is made of wood.’
- c. Ta tai ai, kan-bu-dao zhuozi shang.
He too short see-not-to table top
‘He is too short; he cannot see on top of the table.’
- d. Under the bed is a lousy place to sleep.’

The subject in (44a) requires a reading that refers to an actual place of the car, but not a relational place of car. Since the NP+ short form is relational, it cannot be in a subject position which does not allow a relational reading. (44b) shows that the long form, however, can refer to a part of the car that is made of wood because the long form has the function to refer to places that do not rely on other objects. In (44c) the NP + short form can be in an object position because this sentence is not about the actual place of the table, but the person’s height. That is, object in (44c) requires a relational reading, therefore

(44c) is grammatically correct with a NP + short form in the object position. Ernst also draws attention to a parallel phenomenon between English and Chinese relational readings of adpositions. He shows that the gloss in (44c) and the sentence in (44d) both contain a relational locative phrase, like the Chinese NP+ short form, which occurs in object and subject position respectively. This relational function of short forms leads Ernst to argue against the noun analysis because, according to him, it is not acceptable for a noun to have a relational function.

In summary, for Ernst, the noun analysis and the postposition analysis both have problems. In the noun analysis, it would be more difficult to explain why short form localizers fail most of the tests for being a noun and why these nouns are bound forms and are relational, but not referential. He claims that the postposition analysis is better because adpositions cannot stand alone and cannot follow *de*, which are also properties of short form localizers. Ernst concludes that although it is marked to allow a postpositional phrase to be the object of a preposition and allow a head-initial language to have postpositions, these phenomena are also found in other languages and therefore, their markedness is tolerable¹².

4.3.3 The noun analysis

Li (1990) argues that Chinese is an SVO language and is prepositional in nature. Short form localizers are therefore nominal expressions, and not postpositions. She shows that NP + localizer has the same distribution as other noun phrases in that they

¹² Ernst suggests that English also allows P+PP, for example, *from out of the darkness* (Jackendoff 1973). Also, English *notwithstanding* or *aside* might be analyzed as postpositions, for example:

- (i) His parents' disapproval notwithstanding, he married the girl.
- (ii) Table aside, there is a vase.

(45) a. Yizi xia hen ganjing. subject
chair under very clean
'Under the chair is clean.'

b. Ni xian jiancha yizi xia. object
you first examine chair under
'You examine the area under the chair.'

c. yizi xia de mao ____ de N
chair under DE cat
'the cat under the chair'

¹³ Ernst (1988) points out that some PPs can occur in pre-*de* position, as shown in (i) and (ii):

- (i) dui guojia de re-ai
 towards country DE love
 'Love of (one's) country' (p. 239)
- (ii) guanyu zheijian shi de wenti
 about this-CL matter DE problem
 'the problem with this matter' (p. 240)

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- (46) a. pengyou de fangzi (noun phrase)
 friend DE house
 'friend's house'
- b. haokan de fangzi (adjective)
 good-looking DE house
 'good-looking house'
- c. ta zhu de fangzi (clause)
 he live DE house
 'the house where he lives'
- d. *dui ta de hua (prepositional phrase)
 to him DE word
 'words to him'
- e. dui ta shuo de hua (clause)
 to him say DE word
 'words said to him'

Li also shows that NP + localizer does not occur in positions where prepositional phrases occur and prepositional phrases do not occur in places where noun phrases occur as shown in (47).

- (47) a. *Ta bu neng jia li gongzuo.
 he not can home in work
 'He cannot work at home.'
- b. Ta bu neng zai jia li gongzuo.
 he not can at home in work
 'He cannot work at home.'
- (48) a. (*Zai) xing kong xia shi shuijiao de hao difang.
 at star sky under is sleep DE good place
 'Under the stars is a good place to sleep.'

non-predicate PPs cannot occur in pre-*de* phrases alone to form relative clauses, instead of saying that PPs cannot occur in pre-*de* positions.

- b. Ta cong (**zai*) men de hou bian lai.
he from at door DE back side come
'He came from behind the door.'

(47) shows that NP + localizer cannot occur in adverbial positions where prepositional phrases can occur. (48) shows that *zai* cannot occur in argument positions where NP + localizer can occur. In short, Li argues that NP + localizers are in complementary distribution with PPs and have the same distribution as noun phrases. Chinese is an SVO language and has only prepositions, but not postpositions. Therefore, she supports the noun analysis for short form localizers.

4.3.4 Analysis of the short form localizers as clitics

By comparing the arguments of the noun analysis and the postposition analysis for short form localizers, Liu (1998) concludes that they both have disadvantages and need other solutions. In order to capture short form localizers' properties and the way that they interact with other syntactic categories, she proposes that the short forms do not belong to any category; they are simply clitics that have no syntactic positions.

She agrees with Ernst that short forms cannot be categorized nouns because they cannot stand alone and they cannot follow *de*. Moreover, some of the NP + localizers cannot be in argument positions. However, she also claims that the localizers cannot be postpositions because, as Ernst points out, the postposition analysis does not follow the SVO parameter, and since Chinese is basically an SVO language, it should have prepositions instead of postpositions. Furthermore, the postposition analysis fails the coordination test, as shown in (49).

- (49) a. Xiaoming zai jia li he xuexiao dou bu tinghua.
 ZAI home inside and school all not behave
 ‘Xiaoming does not behave either at home or at school.’
- b. *Houyuan he zai qianyuan dou you yi-ke juzi shu.
 back yard and at front yard all exist one-CL orange tree
 ‘There is an orange tree both in the back yard and in the front yard.’

The postpositional analysis takes *zai* to have either an NP or a postpositional phrase as its complement. If *zai*+ NP and NP + postposition (localizers) are both adpositional phrases, then they should behave the same syntactically. (49a) shows that NP+ localizer can coordinate with the noun phrase *xuexiao* ‘school’, but (49b) shows that the prepositional phrase *zai qianyuan* ‘in the front yard’ cannot coordinate with the noun phrase *houyuan* ‘back yard’. This test shows that the prepositional phrase and the postpositional phrase seem to behave differently.

Due to the drawbacks of both analyses (noun and adposition analyses), Liu proposes that short form localizers are clitics and do not have a syntactic category. Semantically, they carry a locative feature. According to her, with the locative feature that the short form localizers carry, the NP + short form only occurs in places where a locative phrase is required, such as an adverbial position, an argument position, and a topic position, shown as in (50), (51), and (52).

- (50) a. Ta fang le yi-ben shu zai nei-zhang zhuozi shang. (Adverbial position)
 he put LE one-CL book at that-CL table top
 ‘He put a book on that table.’
- b. Wo zai jie shang yujian le yi-ge pengyou.
 I at street top meet LE one-CL friend
 ‘I met a friend on the street.’

- (51) Wu -li you yi-zhi mao. (Argument position)
house inside exist one-CL cat
‘There is a cat in the house.’
- (52) Laowang nar wo bu qu le. (Topic position)
there I not go LE
‘As for Laowang’s place, I will not go anymore.’

Since these short form localizers do not have a syntactic category, they do not interfere with the syntactic category of the NP that they attach to; therefore, the NP + short form remains a noun phrase.

Liu claims that this analysis covers all the characteristics of localizers. Since they are clitics, they do not stand alone and do not follow *de*. Since they are clitics and do not have a syntactic position, their combination with NP is able to conjoin with nouns as shown in (49a), and they can occur in argument positions where a locative phrase is required. Unlike the postposition analysis, there is no typological problem about their differences from verbs and other prepositions. There is also no problem with their failing the noun tests.

4.3.5 Problems of Ernst’s analysis

As Ernst (1988) and Liu (1998) observe, both the postposition analysis and the noun analysis have their disadvantages. Ernst’s observation is true in that short forms do in fact fail most of the tests for noun-hood. Although he agrees that the postposition analysis does not follow Chinese word order typology, the postposition analysis seems to him to be a better choice. Li (1990) also makes important points in her noun analysis in that NP + short form is able to occur in subject, object, and pre-*de* positions, as shown in

(45), and in places where prepositional phrases cannot occur, as shown in (46) and (47). However, Ernst argues against Li by claiming that a full-fledged noun should not be relational. Those NP + localizer combinations that can occur in subject or object positions are places that require a relational locative phrase. Also, it is not sufficient to claim that NP + short form is a noun just because it does not occur in some adverbial positions. Ernst's NP tests provide a strong argument against the noun analysis for short forms. However, if we further examine his analysis, we will see that his account, categorizing short forms as adpositions, is also not a good analysis since they also fail adpositional tests.

Ernst claims that relational locative phrases can occur in argument position only when the position requires a location reading. He gives evidence from English, as shown in (44d), to show that it is adpositional phrases that can have this function and concludes that since Chinese NP + short form can occur in subject position, it must behave like its English counterpart and therefore also like adpositional phrases. However, Ernst does not notice that English relational locative phrases can occur in subject positions as well as in normal PP positions, but Chinese NP+localizer combinations do not occur in adpositional positions, as shown in (53) and (54).

- (53) a. (*Zai) Chuang xia bei renwei shi cang shen de hao difang.
 ZAI bed under BEI consider is hide body DE good place
 ‘Under the bed is considered to be a good place to hide.’
- b. Wo xihuan cang *(zai) chuang xia.
 I like hide ZAI bed under
 ‘I like to hide under the bed.’

- (54) a. Wo kan-bu-dao (**zai*) zhuozi shang.
 I see-not-to ZAI table top
 'I cannot see on top of the table.'
- b. **(Zai)* zhuozi shang, wo kan-bu-dao¹⁴.
 ZAI table top I see-not-to
 Intended to mean: "On top of the table, I cannot see (the thing)."

The English glosses in (53a) and (54a) show that both *under the bed* and *on top of the table*, which Ernst calls relational phrases, can be in the subject position and the object position. In addition, the glosses in (53b) and (54b) also show that *under the bed* and *on top of the table* can occur in regular PP positions. However, (53a) and (54a) show that the NP+ localizer in Chinese, although it is able to occur in the subject and object position, cannot occur in a regular PP position without *zai*, the preposition. What (53) and (54) show is that NP + localizer is different from Ernst's relational phrase examples in English. The NP + localizers in (53) and (54) do not behave the same both in argument position and in regular PP position. However, the glosses in English show that the PPs *under the bed/on top of the table* can occur in argument position as in (53a) and (54a), and also in the regular PP position as in (53b) and (54b).

The ungrammatical Chinese PP with *zai* in (53a) and (54a) show that PPs in subject and object position are not allowed, while (53b) and (54b) show that NP + localizer cannot be in regular PP positions. The complementary distribution between PP and NP + localizer shows that NP + localizers are consistently behaving like noun

¹⁴ The null object in (54b) is understood in discourse. Although (54a) is acceptable without *zai*, it has a different meaning and structure from (54a) in that it means "I cannot see the place which is on top of table", as in (i). That is *zhuozi shang* 'on the table' is the object of *kan-bu-dao* 'cannot see'

(i) Zhuozi shang wo kanbudao
 table top I see-not-to
 'I cannot see on top of the table.'

phrases. Li (1990) also points out that NP + localizers do not occur in PP position, and PPs do not occur in positions where NP + localizers occur, as shown in (47) and (48), repeated here as (55) and (56) for convenience.

- (55) a. *Ta bu neng jia li gongzuo.
 he not can home inside work
 ‘He cannot work at home.’
- b. Ta bu neng zai jia li gongzuo.
 he not can at home inside work
 ‘He cannot work at home.’
- (56) a. (*Zai) xing kong xia shi shuijiao de hao difang.
 star sky under is sleep DE good place
 ‘Under the stars is a good place to sleep.’
- b. Ta cong (*zai) men de hou bian lai.
 he from at door DE back side come
 ‘He came from behind the door.’

Ernst draws attention to cases like (55), and argues that although some post-subject positions only allow prepositional phrases, it is not sufficient to claim that NP + localizer cannot occur in post-subject position and therefore is a noun. He gives the following sentences to illustrate this point:

- (57) a. (Zai) qiuchang shang you ren ti qiu.
 At ball-field on there-be people kick ball
 ‘On the field some people were playing soccer.’
- b. *Tamen qian-main fang le ji ben shu¹⁵.
 they front side put LE a-few CL book
 ‘They put a few books in front.’

¹⁵ If *tamen* ‘they’ is used as a modifier of *qian-mian* ‘front side’ the sentence is fine. But in (57b) *tamen* is not a modifier of *qian-mian*, and the sentence is not good without *zai* preceding *qian-mian*.

- c. *Tamen fang le yi da dui dongxi qian-mian.
they put LE a big pile thing front side
'They put a big pile of things in front.' (Ernst 1998, 227)

(57a) shows that both PP and NP + localizer can occur in sentence initial position. But (57b & c) show that, without *zai* preceding the locative *qian-mian* 'front side', the sentences are ungrammatical, and this might imply that the positions (after subjects and verbs) only allows adpositional phrases, but not noun phrases. Ernst is against this conclusion because there are cases where noun phrases, such as *mingtian* 'tomorrow', can occur in adverbial positions, i.e., in the post-subject position. Therefore, it is not sufficient to claim that all localizers are nouns just because NP + short form does not occur in the adverbial position.

I agree with Ernst's idea that the fact that NP + localizers are not able to occur in adverbial position does not mean that they are nouns. However, it is well known that both nouns and adpositions can occur in post-subject positions in Chinese. Following this premise, the implication is that whatever cannot occur in post-subject position is neither an adposition nor a noun. However, to claim that the short forms are neither category does not seem correct. Now, let us examine Ernst's examples in (57) again. The post subject position in (57b) is the position where Ernst argues that both an adposition and a noun are able to occur. With this in mind, the ungrammatical (57 b) is not a good example to argue that NP + short form is a noun, since both adpositions and nouns can occur here. However, in (57c), the predicate *fang* 'put' requires an adposition complement to follow the noun *yi da dui dongxi* 'a big pile of things', but not a noun complement. Therefore, the position following *yi da dui dongxi* 'a big pile of things' is a

good place to test for adposition. Since *qian-mian* ‘front side’ is a long form localizer, it is a noun and therefore cannot occur in (57c). If NP + short form is an adpositional phrase, we would predict that an NP + short form is able to occur after *yi da dui dongxi* ‘a big pile of things’ in (57c). However, (58) shows that without *zai*, the NP + short form, *men qian* ‘door front’ cannot occur in the adposition position.

- (58) * Tamen fang le yi da dui dongxi *(zai) men qian.
 they put LE a big pile thing at door front
 ‘They put a big pile of things in front of the door.’

Furthermore, (57a) may be acceptable with *zai* at the sentence initial position, but (53a) and (56a) show that *zai* is not allowed in subject position, and actually in some situations, the presence or absence of *zai* affects interpretation¹⁶. Therefore, we must consider whether *zai* is really optional in cases where it seems to be optional¹⁷. As discussed above, preposition + NP + short form is consistently unable to occur in subject position. Additionally, (53), (54), (56a), and (58) show that in an argument position, NP + localizer and Preposition + NP + short form are in complementary distribution. This is more important than the data from post subject adverbial positions, since these positions allow both adpositional phrases and noun phrases as in (56b) and (57b).

¹⁶ The following sentences illustrate this fact.

- (i) Qiang shang wa-le yi-ge dong.
 wall top dig-LE one-CL hole
 ‘There is a hole dug in the wall.’
 (ii) Zai qiang shang wa-le yi-ge dong.
 ZAI wall top dig-Le one-CL hole
 ‘Someone dug a hole in the wall.’ (Wen 1957, 25)

¹⁷ We will have further discussion of the optionality of *zai* in Chapter 5.

Ernst's arguments that categorize short forms as postpositions are not sufficient. Ernst knows that both the noun analysis and the adposition analysis have their problems, but since the short forms fail most of the noun tests and they cannot stand alone and have to follow NPs, he concludes that they are adpositions. However, as shown above, short forms also fail most of the adpositional tests, and therefore they clearly are not adpositions.

A final problem with Ernst's analysis comes from his argument that a noun cannot be relational. (59) shows that this is not true.

- (59) a. The top of the table is made of wood.
 b. On top of the table is a vase.

It is well known that English does not allow singular bare nouns. *On top of the table* is a relational phrase in (59b). Since singular bare nouns are not allowed, if we follow Ernst's analysis for the short form localizers, we would have categorized *top* as an adposition. Finally, let us reexamine Ernst's example of the relational sentence in (45c), repeated here as (60).

- (60) Ta tai ai, kanbudao zhuozi shang.
 He too short see-not-to table top
 'He is too short; he cannot see on top of the table.'

(60) is equivalent to the following sentence with the long form following *zhuozi* 'table'.

- (61) Ta tai ai, kanbudao zhuozi shang-mian.
He too short see-not-to table top-side
'He is too short; he cannot see on top of the table.'

If the NP + short form in (60) is relational and (61) has the same meaning as (60), does this mean that the NP + long form is also relational? In (60) and (61), both *zhuozi shang* and *zhuozi shang-mian* mean 'on top of the table' and the positions they occur in are relational in that it is the top of the table that the short person cannot see. The sentence is about the height that the person cannot see and not about the actual top of the table. If Ernst is correct that a noun can not be relational, then the function of long forms as able to refer to relational places and also as real nouns would be difficult to account for.

In summary, if NP + localizers are adpositional phrases, they should behave like normal adpositional phrases. However, as shown in (53) and (54), the NP + localizer does not behave like its English counterpart PP. Furthermore, although the inability of the NP + short form to occur in adverbial position does not mean that the NP + short form is a noun, the complementary distribution between the prepositional phrase and the NP + localizer should not be a coincidence. Moreover, whether or not a noun is relational should not be taken as a test for noun-hood. The English *top* is relational; however, it is a noun, and the same fact holds for long form localizers in Chinese: they are nouns and have a relational function. Being relational is not a sufficient reason to exclude short forms from the noun category. Finally, it is not valid to consider only the adposition and noun analyses and then categorize short forms as adpositions by showing them not to be nouns without testing whether they are adpositions. In the next section, I

will show that the short forms in fact have many noun properties, and are therefore not adpositions.

4.4 The analysis

Having discussed the problems of Ernst's analysis, we can see that the adposition analysis actually does not present a convincing argument supporting short forms as postpositions. However, the argument that short form localizers are nouns is still controversial. Li's evidence that short forms are nouns is that they combine with NPs and show up in argument positions, and most of the time, NP + short form is in complementary distribution with PPs. However, whether or not the short forms are nouns is still an issue. It needs to be further explained why the short forms carry noun properties, but they fail most noun tests. In this section, I further investigate the behavior of the short form localizers, and argue that short forms are nominal clitics. The reason to pursue the idea of short forms as nominal clitics is that the grammar should allow words that are developing from their classic forms to modern forms to have a transition stage. There are many monosyllabic nouns in Chinese which are in this stage in that they cannot stand alone and have to attach to other elements to exist in noun phrase positions. Li and Thompson (1981) have shown that many disyllabic words have in fact developed from monosyllabic forms¹⁸. The co-occurrence of short form and long form localizers could signify a transition stage. Assuming that short forms are in this transition stage, short forms then are losing their noun properties. Claiming that short forms do not have any

¹⁸ Words like this are like *mutou* 'wood' and *xiezi* 'shoe' in modern form; they both have their classical form *mu* 'wood/tree' and *xie* 'shoe' respectively. *Xie* may still be used in spoken language, but *mu* is only used in classical Chinese.

syntactic category seems to ignore the noun properties they still have. In order to characterize short forms, it is necessary to accept their being clitics and still possessing noun properties. In the next section, I explain why it is preferable to analyze short forms as nominal clitics. I first show the difference between the short forms and the long forms, and look for the short form's noun properties independent from their attachment to NPs. Counter to Liu (1998), I argue that it is not the case that they are clitics that do not have syntactic positions.

4.4.1 Short form localizers are nouns that carry clitic properties

In this section, I examine the properties of short form localizers and argue that short form localizers are not adpositions, but nouns that carry clitic properties.

First, let us review Chao's (1968) description of short form localizers. According to Chao, short form localizers are *shang* 'up', *xia* 'down', *qian* 'front', *hou* 'back', *nei* 'inside', *li* 'inside', *wai* 'outside', *zuo* 'left', *you* 'right', *dong* 'east', *nan* 'south', *xi* 'west', and *bei* 'north'. These localizers, except *li*, occur mostly in certain phrases based on classical Chinese and are free words in this situation. Consider the examples in (62)

- (62) a. *Shang you tiantang, xia you Su-Hang.*
 Top has Heaven below has Su-Hang
 'Above, there is heaven, below there are Su-zhou and Hang-zhou.'
- b. *Zuo ye bu shi, you ye bu shi.*
 left also not is, right also not is
 Literally: 'Neither the left nor the right is right.'
 'There is no way to please a person.'

Chao further claims that these localizers, when preceding *bian* ‘side’, *mian* ‘side’, or *tou* ‘side’, become long form localizers, which are the modern spoken style. Also, short forms can not follow or precede *de*, while long form localizers can. Moreover, *yi* (as in *yi-qian* ‘before’) and *zhi* (as in *zhi-qian* ‘before’) combine easily with short forms, since *yi* and *zhi* come from the classical Chinese.

Next we should reexamine the properties of localizers, and we will see that Ernst and Liu’s argument against the noun analysis is actually just a matter of different lexical selection. Consider (38) and (39), repeated here together as (63).

- | | |
|--|---|
| <p>(63) a. zhuozi shang
table top
‘on the table’</p> | <p>b. zhuozi <u>zhi</u> shang
table ZHI top
‘on/above the table’</p> |
| <p>c. zhuozi shang-mian
table top surface
‘on the table’</p> | <p>d. zhuozi <u>de</u> shang-mian
table DE top-surface
‘on/above the table’</p> |
| <p>e. *zhuozi de shang
table DE top
‘on the table’</p> | <p>f. *zhuozi zhi shang-main
table ZHI top-surface
‘on/above the table’</p> |
| <p>g. *zhuozi de zhi shang(mian)
table DE ZHI top side
‘on the table’</p> | <p>h. zhuozi <u>yi</u> shang
table YI top
‘above the table’</p> |
| <p>i. *zhuozi yi zhi/zhi yi shang
table YI ZHI/ZHI YI top
‘on/above the table’</p> | <p>j. *zhuozi yi de/de yi shang
table YI DE/DE YI top
‘on/above the table’</p> |

(63) shows that long forms and short forms behave very similarly in that they both are relational and that they can refer to an area depending on the object to which they relate. However, why are long forms full-fledged nouns in modern spoken Chinese, and short

forms not? Long forms are the combination of short form localizers and the following words: *bian* ‘side’, *mian* ‘side/surface’, and *tou* ‘side/end’. Without short forms, when *bian*, *mian*, and *tou* attach to noun phrases, they only refer to part of the object. With the combination of short forms and *bian*, *mian*, and *tou*, long form localizers have both a relational function and a referential function. That is, the function that long forms have is a result of short forms plus *bian*, *mian*, and *tou*. Long forms are nouns, can follow *de* and can occur in argument positions because of *bian*, *mian*, and *tou*, so they are full-fledged nouns in modern spoken Chinese.

Another difference between short forms and long forms is that short forms and long forms do not allow the same elements to be inserted inside the NP+ localizer combination. Long forms allow *de* to be inserted between NP and localizer, as shown in (63d), and short forms allow only *zhi* and *yi*, as shown in (63b& h). This is as Chao (1968) described. Since *zhi* and *yi* are from classical Chinese, they go well with short forms. As mentioned before, *zhi* was the classical form of *de*, and can only be followed by a noun. *De* is a good element to test for noun-hood, but not being able to follow *de* is not sufficient to claim that an item is not a noun. For example, *zhǐ* means the body parts that are at the end of our hands and feet, namely fingers and toes respectively. It is definitely a noun because it can be modified by numbers and occur in argument positions, as shown in (64) ¹⁹.

¹⁹ The same characteristic also applies to *nian* ‘year’. *Nian* is a noun; it has to be modified by numbers without classifiers, and it follows *de* only when a demonstrative is preceding it, as shown below:

(i) *wo qu ni jia de nian.
I go you home DE year
‘the year I went to your home’

(ii) wo qu ni jia de nei nian.
I go you home DE that year
‘that year I went to your home’

- (64) Yi-zhī shou you wu zhǐ.
 one-CL hand has five fingers
 ‘A hand has five fingers.’

Zhǐ ‘finger/toes’ is a noun. It cannot stand alone, but must attach to some element to be in an argument position or follow *de*. For instance, it has to attach to *shou* ‘hand’ to mean *fingers* or *jiao* ‘feet’ to mean *toes* and be followed by *tou* to be able to follow *de* or appear in an argument position, as shown in (65)²⁰.

- (65) a. *Zhe shi wo de zhǐ.
 This is I DE fingers
 ‘This is my finger.’
- b. Zhe shi wo de shou-zhǐ.
 this is I DE hand-finger
 ‘This is my finger.’
- c. Zhe shi wo de zhǐ-tou²¹.
 this is I DE finger-TOU
 ‘This is my finger.’
- d. * Zhǐ shi ren shenti de yi bufen.
 finger/toe is human being body DE one part
 ‘Fingers/toes are part of our body.’
- e. Shou-zhǐ shi ren shenti de yi bufen.
 fingers is human-being body DE one-part
 ‘Fingers/toes are part of our body.’

Zhǐ ‘fingers/toes’ is just one of the examples of bound nouns that cannot follow *de*.

Nouns that have developed to be bound forms are common in Chinese²².

²⁰ According to Li & Thompson, *tou*, although it does not have any meaning, like *zi* as in *zhuo-zi* ‘table’, is a suffix that is used to attach to a group of bound nouns. More examples are: *man-tou* ‘Chinese steamed bun’, and *mu-tou* ‘wood’

²¹ Although *zhǐ* can mean both fingers and toes, (65c) has the core meaning of referring to fingers.

The behavior of *zhǐ* ‘fingers/toes’ and the short forms is very similar in that they cannot follow *de*, cannot stand alone and have to attach to some element to exist in modern spoken Chinese²³. It is necessary for words to be nouns in order to occur after *de* or in argument positions, but a word’s inability to occur after *de* is not a sufficient reason to claim that the word is not a noun as the sentences in (65) show. That is, *de* can be used to confirm whether or not an element is a noun, but using the test to show that an element is not a noun would incorrectly rule out words like *zhǐ* ‘fingers/toes’.

I argue that short forms are like *zhǐ* ‘fingers/toes’ in that they are nouns that are becoming clitics and still carry their noun property from their classical forms. Short forms cannot follow *de*, but they can follow *zhi*, which is the classical form of *de* as shown in (63), and words after *zhi* have to be nouns. The following sentence further confirms that the short forms can be used in an argument position in a coordinate structure.

- (66) Zhe-dong wuzi, shang you diao-long, xia you shi-shi, zhen
 this-CL house top has carved-dragon below has stoned-lions really
 qipai.
 magnificent
 ‘On top of the house, there are carved-dragons and under the house, there are stone lions. It is really magnificent.’

²² More examples are like *er* ‘ear’ and *chi* ‘teeth’: they cannot stand alone and cannot follow *de*.

(i) ??Zhe shi wo de er. (ii) Zhe shi wo de er-duo. (iii) *Zhe shi wo de chi. (iv) Zhe shi wo de ya-chi.
 This is I DE ear this is I DE ear This is I DE tooth this is I DE tooth
 ‘This is my ear.’ ‘This is my ear.’ ‘This is my tooth.’ ‘This is my tooth.’

²³ The difference between the short forms and *zhǐ* ‘fingers/toes’ is that short forms cannot be modified by numbers. This is not surprising, for relational words are not physical; therefore they cannot be counted. Further *zhǐ* is not pronounced as a neutral tone, but the short forms are in most dialects. However whether or not the short forms are pronounced as neutral tone varies from dialect to dialect.

According to Chao, when the short forms are used as free forms, they mostly occur in certain fixed phrases that are based on classical Chinese. (66) shows that the structure of these certain phrases is somewhat fixed but the structure can be used with different short forms within different contexts²⁴, as shown in (66); this kind of structure is a coordination. Actually, those phrases that Chao describes that allow short forms to occur in subject positions are all coordinate structures. (67) further shows that the short forms do still carry their noun properties and that their coordination can occur after *de*, but coordination of two prepositions cannot occur after *de*, as shown in (68).

- (67) Zhe zhang zhuozi de shang (he) xia dou shi mutou zuo de.
 this CL table DE top and under all is wood make DE
 ‘This table’s top and bottom are made of wood.’
- (68) a. Ta wang xuexiao zou qu.
 he toward school walk go
 ‘He is going to school.’
- b. Ta cong xuexiao zou lai.
 he from school walk come
 ‘He is coming from school.’
- c. *Ta de wang he cong xuexiao zou lai zou qu rang rentou hun.
 he DE toward and from school walk come walk to let people head faint
 ‘His walking to and from school makes me feel like fainting.’

²⁴ Liu (1998) considers (i) an idiom, and therefore, it does not show that the short forms are able to stand alone, however, this kind of construction with other localizers is also possible and quite productive in formal or classical Chinese. If I change (66) with other localizers as shown in (ii), the sentence is still fine.

- (i) Shang you tiantang, xia you Su-Hang.
 Top has heaven beneath has Su-Hang
 ‘Above there is Heaven, below there are Suzhou and Hangzhou.’
- (ii) Zhe-dong wuzi, shang you diao-long, zuo you shi shi, zhen qipai.
 this-CL house top has carved-dragon left has stone lions really magnificent
 ‘On top of the house, there are carved-dragons and to the left of the house, there are stone lions. It is really magnificent.’

From (66) and (67) we can see that, when short forms occur in subject position and follow *de*, the environment is of a coordinate structure. This implies that short forms have noun properties; however, they are losing these properties. This limits the environments they can occur in as an argument. Liu (1998) argues that short forms are clitics that do not occupy any syntactic position in the phrase structure. However, the fact that short forms can be conjoined and follow *de* is not compatible with a pure clitic analysis. As (68) shows, the coordination of two prepositions cannot follow *de*. It must be that short forms still possess their noun properties and that their coordination is able to follow *de*. They do not have any noun properties, do not have syntactic positions, and are pure clitics. It is not possible for two pure clitics to conjoin and become a noun.

As we have seen in section 4.3, NP + localizer combinations do not behave like regular adpositions. They are not able to occur in regular adpositional phrase positions, but only in post subject positions where both a noun phrase and an adpositional phrase can occur. Based on what we have observed about short form localizers, in order to capture the properties of short forms, I would like to propose that short forms are nouns that have clitic properties. The reason to pursue this analysis is that short forms do in fact possess noun properties as we have discussed above; however, their transition to clitics makes their noun properties limited to a certain structure, occurring only in coordination structures. Pure clitics do not coordinate, so short forms are unlikely to be pure clitics. Instead, they are becoming clitics; therefore, they cannot stand alone, fail most of the noun tests in modern spoken Chinese, and have to attach to some element to be in an NP position. Nevertheless, they are nouns from classical Chinese, so they can follow *zhi*, as in (63b), and their coordination can follow *de*, as in (67). Short forms occur when *zhi* and

yi show up, and long forms occur when *de* shows up. In order to characterize these properties, acknowledging their nominal position in the syntactic structure of locative phrases is preferable.

4.4.2 The structure of NP + localizer

We have come up with the analysis that short forms are nouns that carry clitic properties. Now we should consider what the structure of a locative phrase is. Before investigating the structure of NP + localizer in general, we should examine the status of NP + short form and NP + long form to see if they are compounds or phrases. Furthermore, assuming that Chinese is head-initial, I will investigate the structure of locative phrases and base this analysis on the structure of *de* phrases provided by Simpson (1999, 2000). I will argue that both long forms and short forms take the noun phrases that they attach to as complements and that the noun phrases move to a higher position to precede the localizers. Now we should examine if NP + localizers and long forms are compounds.

To test if an element is a compound, Duanmu (1997) suggests one of the tests suggested in Huang (1984b), Conjunction Reduction. Although single words can be coordinated, parts of compound words cannot be coordinated, as shown in (69)-(71)²⁵.

- (69) a. jiu de shu gen xin de shu
 old DE book and new DE book
 ‘old books and new books’
- b. jiu de gen xin de shu
 old DE and new de book
 ‘old and new books’

²⁵ (69) is from Duanmu (1997, 137). (70) is from Huang (1984 b, 61)

(70) a. huo-che gen qi-che
fire-car and gas-car
'train and automobile'

b. *huo gen qi che
fire and gas car

(71) a. blackbirds and bluebirds

b. *black and blue birds

Now consider (72) which contains a NP + localizer combination.

(72) a. Zhuozi shang he yizi shang dou ge fang-zhe yi ben shu.
table on and chair top all each put-ZHE one CL book
'There is a book on the table and the chair.'

b. Zhuozi he yizi shang dou ge fang-zhe yi ben shu.
table and chair top all each put ZHE one CL book
'There is a book on the table and on the chair.'

(72b) shows that separating NP, *zhuozi* 'table', and the short form, *shang* 'top/on', does not alter the meaning in (72a). This means that NP + localizer is not a compound. Now consider (73), which focuses on testing the long forms.

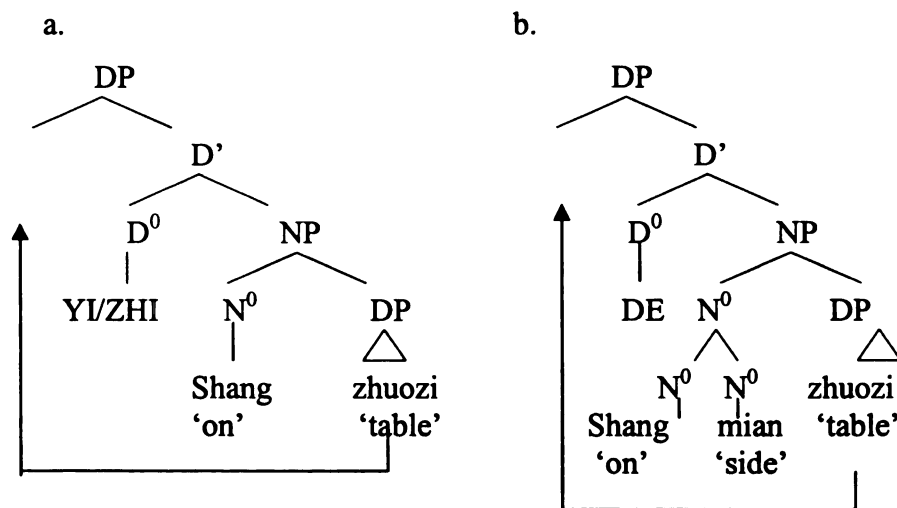
(73) a. zhuozi shang mian gen xia mian
table top side and down side
'on the table and under the table'

b. *zhuozi shang gen xia mian
table top and down side
'on the table and under the table'

(73) shows that long forms are words, and separating the short forms from *mian* in (73b) creates an ungrammatical sentence. Therefore, the NP + localizer combination is a phrase, and long forms are compounds. In the following, I will therefore treat short forms and long forms the same, as the head of NP + localizer.

As discussed above, the NP + localizer combination can contain *zhi/yi* and *de* (short form with *yi/zhi*, long form with *de*). Although *yi* is a bit different, the distinction between the presence or absence of *zhi/de* inserted between the NP + localizer combination is subtle, as shown in (63). According to Chao (1968), the presence or absence of *de* in a locative phrase will result in a different meaning, perhaps implying that the locative phrase without *de* is a compound²⁶. However, as shown in (72), NP + localizer is not a compound, and Duanmu (1997) has argued that *de* insertion is not a reliable test for compound words; therefore, I will treat locative phrases with and without *yi/zhi/de* both as phrases. Next, I will follow Simpson (1999, 2000) and take *yi*, *zhi* and *de* to be the same functional item and assume that the structure of a locative phrase is similar to the *de* structure, as shown below.

(74)



²⁶ For example, inserting *de* in *qiang shang* 'on the wall' changes the meaning to 'above the wall'.

Since localizers are relational, they require something for them to relate to. That is, localizers are head nouns that select a DP²⁷, such as *zhuozi* ‘table’ in (74), as their complement. The NP + localizer phrase is a DP whose head takes the NP (projected by the localizers) as a complement. The D⁰ in the higher DP requires that its specifier must be filled, following Simpson (1999, 2000); as a result, the complement of the localizer moves to fill the Spec of DP, in process similar to that undergone by complement clauses, as discussed in Chapter 2. When *yi/zhi* occurs in D⁰, the short form occurs. However, when *de* occurs in D⁰, the long form shows up. Furthermore, if D⁰ is not filled with *yi/zhi/de*, the D⁰ position is empty and, therefore, there is no difference between NP + short form and NP + long form. The occurrence of these functional items (*yi/zhi/de*) will interact with the occurrence of localizers and determine the meaning of the whole locative phrase. This structure is consistent with other Chinese noun phrases in that the head noun goes to the right of its complement²⁸.

Now we should examine how *yi* can be equated with *zhi* and *de* and occur in D⁰, especially since *yi* and *zhi/de* do not have a close historical relation and *yi* does not have the same meaning as *zhi* and *de*. However, in the following, I will show that *yi* and *zhi* are in fact similar in many ways.

²⁷ For convenience, and also following L & T, I have been using NP + localizer to refer to locative phrases; however, this NP can be as big as a DP, for example,

(i) *nei-ge zhuozi shang*
 that-CL table on
 ‘on that table’

²⁸ An audience member at NACCL 14 pointed out that the structures in (74) have the DP recursive problem in that (74) cannot prevent a localizer head noun from selecting a DP that contains another localizer as complement, which is ungrammatical, e.g. **zhuozi shang zuo* ‘*table top left’. Actually, this can be avoided naturally for semantic reasons. That is, a relational head does not select a relational phrase as a complement, since it needs a referential element for it to relate to a position. Since both the localizer and the DP containing a localizer are relational, the DP recursive problem is avoided.

Simpson (1999, 2000) argues that *de* is an enclitic definite determiner, and that *de* developed from the demonstrative *zhi*. Actually, *zhi* does possess the property of being a determiner since it is not only a demonstrative, but also a pronoun. Nevertheless, there is no evidence in the literature to show that *zhi* is a demonstrative but not a definite determiner. The following sentences list common usages of *zhi* in classical Chinese.

- (75) a. Yi-ri pu zhi, (from Mengzi, Gaozi Shang)
 one day put-it-under-the sun ZHI,
 shi-ri han zhi
 ten-day make-cold ZHI
 ‘Expose it (a plant) to the sun for one day, and let it be in cold weather for ten days.’
- b. Du zhi yu you yan. (from Hanshu, Caoshen chuan)
 Figure ZHI want has words
 ‘The emperor, figures that he, would like to say something.’
- c. Zhi er chong you he ru (from Zhuangzi, Xiaoyaoyou)
 ZHI two animals what know
 ‘These (The) two small animals know what?’
 (What do the two small animals know?)
- d. xiao da zhi yu
 small big ZHI law-case
 ‘large and small law cases’
- e. Zhi ma zhi mu da er bu wei zhi ma da (from Mozi Xiaoqu)
 ZHI horse ZHI eye big then not say ZHI horse big
 ‘If the horse’s eyes are big, one does not say that the horse is big.’

(75a) and (75b) show that *zhi* can be used as a pronoun. (75c) shows that *zhi* is used as what is usually called ‘demonstrative’. (75d) shows that *zhi* is used like *de*, and (75e) shows that what is called the demonstrative *zhi* (the *zhi* preceding *ma* ‘horse’) and the *zhi* (the *zhi* preceding *mu* ‘eye’), which is used like *de*, can co-occur in a phrase. Apparently,

zhi is a determiner since it is used as a pronoun. (75e) even shows that *zhi* is more like a definite determiner, than a demonstrative. First, demonstratives often come in sets. That is, there is one for referring to near distance and another for a long distance, for example, *zhe* ‘this’ and *na* ‘that’, respectively, both in Modern spoken Chinese and English. However, there are no words that pair with *zhi* to show distance. Second, (75e) is a general statement that states a generic truth, that one does not call a horse that has big eyes a big horse. A demonstrative would not be appropriate to function as a generic indicator, and therefore a definite determiner seems more likely to be used in this context²⁹.

Now let us turn to the relationship between *zhi* and *yi*. As I have shown, *zhi* and *yi*, when combined with short form localizers, have very similar functions; for example, *Jiang zhi dong* ‘Yangtze river *zhi* east’ and *Jiang yi dong* ‘Yangtze river *yi* east’ both refer to an area in relation to the east part of the Yangtze River. The difference is that the phrase with *zhi* contains the meaning of the small area next to the river, while the phrase with *yi* denotes that the place starts from the river and the whole area which is east of it. *Zhi* and *yi* have similar functions when used with short form localizers. In addition, historically, *yi* behaves similarly to *zhi* syntactically. In classical Chinese, according to

²⁹ *Zhi* also has the following functions.

(i) a. Huang-fu zhi er zi si yan.
Huang-fu ZHI two son die YAN(exclamation)
‘Huang-fu and his two sons died!’

b. Shang-jun yu zhi ta-guo.
Shang-jun want ZHI other-country
‘Shang-jun wants to go to other countries.’

(ia) shows that *zhi* can be used as a conjunction connecting *Huang-fu* and *er zi* ‘two sons’, and (ib) shows that *zhi* can be used as a verb.

He, et. al. (1985), *yi* was used as a verb, a preposition, a conjunction and a question pronoun, as shown in (76).

- (76) a. HuanGong jiu he zhuhou, bu yi bing che³⁰.
 HuanGong nine unite dukes not use soldiers battle-vehicle
 ‘Huangong united the Dukes nine times without using force.’
 (*yi* is used as a verb)
- b. Jun-zi bu yi yan ju ren, bu *yi ren* fei
 educated-man not with-words recommend person not with-person disregard
 yan³¹.
 words
 ‘An educated man should not recommend a person because of what the person said, and should not disregard a person’s words because of his (low) social status.’ (*yi* is used as a preposition.)
- c. Zhu yu zuo wen yi ji zhi³².
 Bid me make essay YI record it
 ‘Ask me to write an essay to record it.’
 (*yi* is used as a conjunction.)
- d. Yu *yi* cheng zhi?
 At YI contain ZHI(it)
 ‘Where is it contained?’
 (*yi* is used as a question pronoun)

(76a) shows that *yi* can be a verb, since it can be preceded by *bu* ‘not’ and is followed by the objects *bing che* ‘soldiers and battle-vehicle’. (76b) shows that *yi* can be a preposition, since it is followed by a noun such as *yan* ‘words’/*ren* ‘person’ and occurs in the adverbial position that is after the subject and followed by a verb. (76c) shows that *yi* can be a conjunction that connects two verb phrases, *zuo wen* ‘write essays’ and *ji zhi* ‘record it’. (76d) shows that *yi* can be a question pronoun, and it not only can mean *what*,

³⁰ From “Lun Yu, Xianwen” (Lun Yu is Confucius’ words that were collected by his students.)

³¹ From “Lun Yu, Weilinggong”

it can also mean *where* and *how*. He et. al. (1985) take *yi* in *yi-qian/yi-hou* as a conjunction. They claim: '*yi* precedes *lai* 'come', *wang* 'toward', *shang* 'up', *xia* 'down', *dong* 'east', *xi* 'west', *nan* 'south', *bei* 'north', etc. to give a further explanation in time, place and range.' (p. 693). The following are examples of this claim.

- (77) a. Cong ci yi wang yong-feng huanhao.
 from now YI toward forever love-each other
 'From now on, love each other forever.'
- b. You shan yi shang wu liu li you xue yaoran
 from mountain YI up five six miles has cave deeply
 'Five or six miles up the mountain, there is a deep cave.'
- c. Yuji yi nan shu yu Yue, Qiantang yi bei shu yu Wu guo
 Yuji YI south belongs to Yue, Qiantang YI north belongs to Wu Country
 'The area from Yuji's southern border toward its south belongs to Yue, the area
 from Qiantang's northern border toward its north belongs to Wu Country.'

From (76) and (77), it is obvious that *yi* is not a verb when it is used with localizers, since NP + *yi* + localizer does not form a sentence. So *yi* + localizer is very likely a preposition, conjunction or pronoun; however, *yi-qian/yi-hou* can occur after a preposition, as shown in (78).

- (78) Wo zai yi-qian jiu shuo-guo le, zhe-jian shi shi xing bu tong de.
 I at before then say-GUO LE this-CL matter is work not through *de*
 'I have said before that this is not going to work.'

Therefore, He et. al. (1985) could be right that *yi* in *yi* + localizer is a conjunction.

However, we should examine whether *yi* in *yi* + localizer is really a conjunction, since, as

³² From "Gu Wen Guan Zhi, Yu Yang Lou Ji"

I will show in (81), *yi+ qian/hou* can occur at the beginning of the sentence and at the end of a clause to form a temporal phrase. In addition to its role in temporal phrases, after a speech, a speaker can utter (79a), or to state one's opinion, a speaker can utter (79b), seems to show that *yi* is not a conjunction.

- (79) a. *Yi-shang shi wo geren de yi-xie yijian.*
 YI-top is I each-person De one-CL opinion
 'The preceding is my own opinion.'
- b. *Yi-xia shi wo geren de yi-xie yijian.*
 YI-below is I each-person De one-CL opinion
 'The following is my own opinion.'

In (79), *yi-shang* refers to what the speaker just said and *yi-xia* refers to what the speaker is going to say. (79) shows that *yi-shang/xia* are in subject position, which is an argument position that requires a DP. The following *yi* + localizer also has this property.

- (80) A: *Changjiang yi-bei* you shenme difang?
 Yangtze-river YI-north has what place
 'What places are located to the north of the Yangtze river?'
- B: *Yi-bei* you Xiang, Chuan deng sheng.
 YI-North has Xiang, Chuan etc. province.
 'To the north is Xiang, Chuan province etc.'

In (80), after A asks the question, B can answer without Yangtze-river. If *yi* is a conjunction connecting Yangtze-river and north, it would be surprising that *yi* + *bei* 'north' can substitute for the whole phrase *Changjiang yi-bei* and occur in the subject

position. Therefore, the data suggest that *yi* cannot be a conjunction or preposition when followed by localizers. Instead, it is very likely to be a pronoun.

Now coming back to *zhi* and *yi*, *zhi* and *yi* do not behave similarly in many aspects in classical Chinese; however, syntactically, they both could be verbs, conjunctions, and pronouns. Also, when *zhi/yi* occur with other localizers they also behave quite similarly to each other. Furthermore, when *zhi/yi* occur with *qian/hou*, they have the same meaning and the same function, as discussed before and as shown in (81).

- (81) a. Wo yi-qian/zhi-qian bu zhidao ta shi Zhongguo-ren.
 I before/ before not know he is Chinese-person
 ‘Before, I did not know that he is Chinese.’
- a’. Yi-qian/Zhi-qian wo bu zhidao ta shi Zhongguo-ren.
 before/before I not know he is Chinese-person
 ‘Before, I did not know that he is Chinese.’
- b. Wo dao jia yi-qian/zhi-qian ta zai chi fan ne.
 I arrive home before/before he ZAI eat meal NE
 ‘Before I came home, he was eating.’

Therefore, when combined with short form localizers, *zhi* and *yi* are very likely to have the same syntactic category. *De* is an enclitic determiner, and *de*’s historical counterpart *zhi* behaves like a definite determiner. NP + *de* + long form is interchangeable with NP + *zhi* + short form. Now let us examine the following sentences.

- (82) a. Dajai chifan de qian-tou, ni bie chi dianxin.
 everyone eat-meal DE front-side you don’t eat desert
 ‘Don’t snack before we all have dinner.’
 (Chao 1968, 119)

- b. Dajia chifan (zhi)-qian, ni bie chi dianxin.
 everyone eat-meal ZHI before you don't eat desert
 'Don't you eat any snack before we all have dinner.'
- c. Dajia chifan (yi)-qian, ni bie chi dianxin.
 everyone eat-meal YI before you don't eat desert
 'Don't you eat any snack before we all have dinner.'

The three sentences in (82) have the same meaning. The long form localizer *qian-tou* corresponds to the short form *qian*. Since *de* corresponds to *zhi*, *yi* must also correspond to *de* and *zhi*; otherwise the parallel meaning and structure of the three sentences will be lost. Also, it would not make sense to analyze *yi* in (82c) differently from *zhi* and *de* in (82a) and (82b). Additionally, if *yi* were a definite determiner, it would be easier to explain why *yi* + short form can occur in subject position since Determiner + Noun is a DP.

In summary, long forms are compounds and their function is like short forms in that they are heads that subcategorize a DP complement to form an NP. Also, the locative phrase is headed by a D^0 and takes the NP formed by a localizer and its complement as a complement to form a higher DP. Since the Spec of the higher DP requires its Spec to be filled by an XP, the complement of the localizer has to move to Spec of the higher DP. Furthermore, *de*, *zhi*, and *yi* should be analyzed in the same fashion since they function the same in temporal phrases, as shown in (82).

4.5 Temporal clauses and their structure

Recall that the rationale of discussing localizers is the fact that *qian/hou* 'before/after' are localizers. They are not just localizers that pick out relational spaces

and mean in front/back of some objects or places, but also pick out relational time and mean before/after a certain time. Since *qian/hou* have this property of being both a spatial and a temporal indicator, in this section I will apply the structure of localizers as the structure of the Chinese *before/after* clauses. I will further show that Chinese *before/after* clauses are noun phrases that fit the structure proposed.

As we discussed before, in a temporal clause, *qian*, *hou*, *yi-qian/yi-hou*, and *zhi-qian/zhi-hou* all occupy the same position, i.e., the position after the temporal clause and before the main clause. All the forms have the same meaning when they occur with temporal clauses. *Qian/hou* are also localizers, and we have discussed the category of localizers and the structure of NP + localizer. Based on the usage of *qian/hou* both for space and time, it should be that both the spatial and temporal usages of *qian/hou* have the same structure. In the following, I will give further evidence to support this claim.

First, they both have the structure of *zai* + XP + *qian/hou*, as shown in (83).

- (83) a. *zai zhuozi qian*
 ZAI table front
 ‘in front of the table’
- b. ?*zai mingtian qian*
 ZAI tomorrow before
 ‘before tomorrow’
- c. ?*zai ni lai qian*
 ZAI you come before
 ‘before you come’

Second, the XP in *zai*+XP+ *qian/hou* can be as big as a DP that contains a clause.

- (84) a. Wo zai Lisi chang xuexi de tushuguan qian da lanqiu.
 I often study DE library front play basketball
 'I play basketball in front of the library that Lisi usually studies in.'
- b. Wo zai wo he Lisi yuehui de na-duan shijian qian da lanqiu.
 I I and date DE that-CL time before play basketball
 'I play basketball before the time when Lisi and I date.'

Third, *zai* + XP is not a constituent, but XP + localizer is a constituent, as shown in (85).

- (85) a. Zhangsan zai zhuozi qian, zai yizi qian dou ge fang-le yi-ben shu.
 ZAI table front ZAI chair front both each put-LE one-CL book
 'Zhangsan put a book in front of the table and a book in front of the chair.'
- b. *Zhangsan zai zhuozi zai yizi qian dou ge fang-le yi-ben shu.
 ZAI table ZAI chair front both each put-LE one-CL book
 'Zhangsan put a book in front of the table and a book in front of the chair.'
- c. Zai wo zuowan gongke hou, ni zuowan fan qian
 ZAI I do-finish homework after, you do-finish meal before
 zheli shi yi-tuan zao.
 here is a-CL mess
 'After I finished doing homework and before you finished making dinner, it was already a mess.'
- d. *Zai wo zuowan gongke, Zai ni zuowan fan qian
 ZAI I do-finish homework, ZAI you do-finish meal before
 zheli shi yi-tuan-zao.
 here is a-mess
 'Before I finished doing homework and you finished making dinner, it was already a mess.'

Finally, in light of Chao (1968), the following two sentences are parallel.

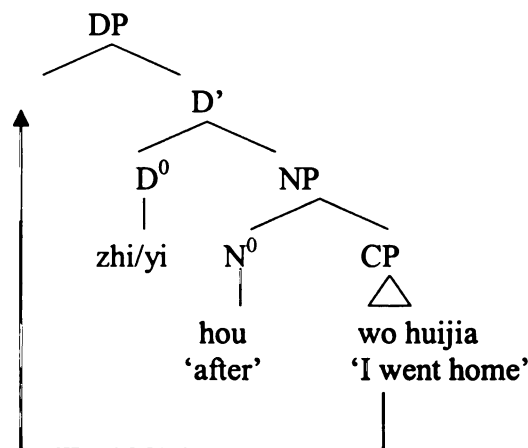
- (86) a. Dajai chifan de qian-tou, ni bei chi dianxin.
 everyone eat-meal DE before you don't eat desert
 'Don't snack before we all have dinner.'

- b. Dajia chifan (zhi) qian, ni bei chi dianxin
 everyone eat-meal ZHI before you don't eat desert
 'Don't snack before we all have dinner.'

That is, it is not only *yi-qian/zhi-qian/qian* that can form the temporal phrase; *de* + long form can do so as well.

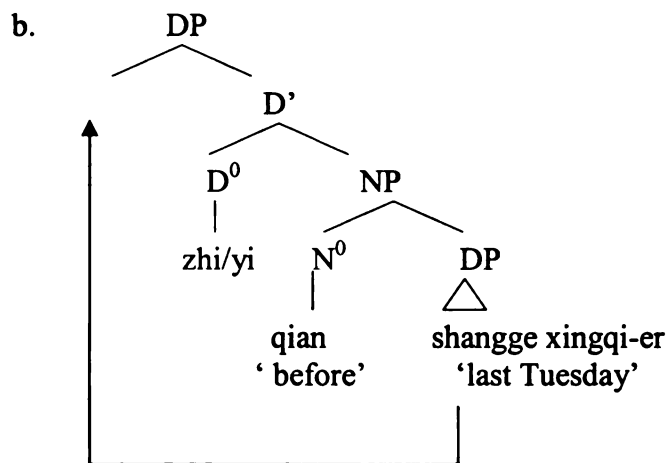
If the noun analysis for localizers is correct, then the structure of the Chinese *before/after* for *wo huijia yi-hou/zhi-hou* 'after I went home' is likely to be as shown in (87).

(87)



That is, *hou* in (87) takes the clause '*wo huijia* 'I went home'' as a complement and the clause moves to Spec of DP to fulfill the Spec head requirement. As for a phrase like (88) the structure is as shown in (88b).

- (88) a. shangge xingqi-er yi-qian
 last Tuesday before
 'before last Tuesday'



That is, the temporal localizers *qian/hou* take either a CP or a DP as their complement. If (87) and (88) are correct, they support McCawely's conclusion that *yi-qian/yi-hou* phrases are noun phrases and they can occur after *ba* and be in the argument position of *bei* constructions. Although McCawely shows this only for NP + *yi-qian/yi-hou*, the following sentences show that the same facts hold for clause + *yi-qian/yi-hou*. This supports the idea that they are noun phrases.

- (89) a. Ta ba taiyang xia-shan yi-hou kanzuo shi zuihao de xiuxi shijian³³.
 he BA sun descent-mountain after regard be best DE rest time
 'He regards after the sun sets as his best resting time.'
- b. Taiyang xia-shan yi-hou bei kanzuo shi zuihao de xiuxi shijian.
 the sun descent-mountain after BEI regard be best DE rest time
 'After the sun sets is regarded as the best resting time.'
- c. Taiyang xia-shan yi-hou shi zuihao de xiuxi shijian.
 the sun descent-mountain after is best DE rest time
 'After the sun sets is the best resting time.'

³³ Native speakers' judgment for this sentence is varied, and I found that not all before/after clauses are able to occur after *ba*. I have no explanation for this situation. However, it is certain that before/after clauses

It has been argued that arguments need to be DPs (Longobardi 1994). Chinese *ba* requires a nominal argument after it. (89a) shows that the *yi-hou* clause can occur after *ba*. (89b& c) show that the *yi-hou* clause can be in an argument position, further confirming that *yi-qian/yi-hou* clauses are noun phrases

In summary, *qian/hou* function as localizers as well as time-denoting elements. Since they function the same in both spatial and temporal phrases, their structures should be the same. *NP +yi-qian/yi-hou* are noun phrases, and so is clause + *yi-qian/yi-hou* as shown in this section. The structure of Chinese *yi-qian/yi-hou* clauses is similar to the structure of NP+ localizer. The difference is that the former take either a clause or a noun phrase as their complements, while the latter take a noun phrase as their complement. Since *yi/zhi* are determiners, *yi/zhi + qian/hou* ‘before/after’ can be used as noun phrases and occur in subject position.

4.6 Comparing *yi-qian/yi-hou* with *before/after*

In Chapter 3, I showed how Geis (1970) argued that *when*-clauses are relative clauses. Similar to what I was discussed in Chapter 3, in what follows, I will present Geis’s argument that the clauses that follow *before/after* are in fact relative clauses. Furthermore, I will examine whether *yi-qian/yi-hou* clauses behave the same as *before/after*. Finally, I will compare the differences between *before/after* and *yi-qian/yi-hou* clauses, and I conclude that *yi-qian/yi-hou* and *before/after* are different syntactically, although *yi-qian/yi-hou* behave similar to *before/after* in light of Geis (1970).

are definitely able to occur in subject position when *shi* ‘be’ is the verb. Please note that *shi* does not behave like English *be* in that it does not co-occur with adjectives except when an emphasized tone occurs.

First of all, according to Geis, one piece of evidence to support the fact that clauses that follow *before/after* behave like relative clauses is that extraction out of these clauses observes the Complex NP constraint, as (90) and (91) show.

- (90) a. John departed before Mary kissed the other boy.
 a'. *Which other boy_i did John depart before Mary kissed t_i ?
 b. John dashed for the closet after his father screamed at his brother.
 b' *Whose brother did John dash for the closet after his father screamed at t_i ?
- (91) a. John departed before the moment at which Mary kissed the other boy.
 a'. *Which other boy_i did John depart before the moment at which Mary kissed t_i ?
 b. John dashed for the closet after the time at which his father screamed at his brother.
 b'. *Whose brother_i did John dash for the closet after the time at which his father screamed t_i ?

(90a & b) and (91a & b) do not involve extraction, while (90a' & b') and (91 a' & b') involve *wh*-movement out of the clauses after *before/after* and violate an island constraint. Since (90) and (91) have the same meaning and relative clauses in (91) observe the Complex NP constraint, Geis believes that *before/after* clauses in (90) must be relative clauses that also observe the Complex NP constraint³⁴.

Second, *before/after* clauses can be pronominalized by *then/that*, as (92) shows.

³⁴ It should be noted that this argument is not very strong, since movement out of adjuncts would be blocked by the CED (Condition on Extraction Domain) (Huang 1982).

- (92) a. John arrived before Bill was fired_i and George arrived before then_i, too.
 b. John departed after Bill left_i and George departed after that_i, too.
- (93) a. John arrived before the moment at which Bill was fired_i and George arrived before then_i, too.
 b. John departed after the moment at which Bill left_i and George departed after that_i, too.

(92) shows that both *Bill was fired* and *Bill left* can be substituted by *then* and *that* respectively. (93) contains relative clause after *before/after*, has the same meaning as (92), and shows the same effect as (92). Therefore, *Bill was fired* and *Bill left* in (92) are likely to be noun phrases.

Third, according to Geis, assuming that these clauses are adjuncts of a deleted noun at some abstract level consistent with the idea that *before/after* are prepositions that are subcategorized only for noun phrases.

Furthermore, as with *when*-clauses, Geis shows that there is time adverbial movement from *before/after* clauses that is like adverbial movement in the relative clause counterparts, as shown in (94) and (95).

- (94) a. Joan left before Harry told her to (leave).
 b. Joan left after Harry requested her to (leave).
- (95) a. Joan left before the moment at which Harry told her to (leave).
 b. Joan left after the moment at which Harry requested her to (leave).

According to Geis, (94a) can mean that Joan left before Harry told Joan the time she should leave, and it can mean that Joan left before the time that she was told to leave. The situation also applies to (94b): it may be the case that Joan left after Harry made the request, or it may be the case that Joan left after the time that she was told to leave. (94)'s relative clause counterparts in (95) show the same readings as in (94). Thus, Geis suggests that the sentences in (94) must have adverbial movement that is like the adverbial movement underlying *at which* in (95), and this adverbial moves from either the first embedded clause or the most embedded clause. Furthermore, this adverbial movement can be blocked by the Complex NP constraint.

- (96) a. Joan left before Harry told her of his desire for her to leave.
 b. Joan left after Harry made his request for her to leave. (p. 129)

The sentences in (96) are not ambiguous like (94) and (95) in that there is only one reading for each sentence in (96). (96a) means that Joan left when Harry told her about his desire, while (96b) means that Joan left after Harry made his request. The sentences in (96) do not show two readings because the time adverbials in the most embedded clauses are blocked by the two Complex NPs, i.e., *of his desire for her to leave* and *of his request for her to leave*. This suggests that there must be an adverbial movement from the most embedded clause; thus, the complex NPs in the two sentences block the reading from the most embedded clauses.

Now we should turn to *yi-qian/yi-hou* clauses to examine whether or not *yi-qian/yi-hou* clauses behave the same as Geis's analysis of their English counterparts. First, let us examine if *yi-qian/yi-hou* clauses have relative clause counterparts.

- (97) a. Lisi zai Zhangsan chifan yi-qian/yi-hou kanshu.
 ZAI eat-meal before/after reading
 'Lisi read before/after Zhangsan eats/ate.'
- b. Lisi zai Zhangsan chifan de shijian yi-qian/yi-hou kanshu.
 ZAI eat-meal DE time before/after reading
 'Lisi read before/after the time at which Zhangsan eats/ate.'

(97) shows that the *yi-qian/yi-hou* clause in (97a), without *de shijian* 'DE time' as its head noun, has the same meaning as the *yi-qian/yi-hou* clause in (97b), which has *de-shijian* as its head noun. If we follow Geis, (97a) is likely to have a deleted head noun like *de-shijian* in (97b) at some abstract level³⁵.

Now let us examine if clauses before *yi-qian/yi-hou* can be pronominalized.

- (98) a. Zhangsan zai Lisi likai_i yi-qian/yi-hou likai,
 ZAI leave before/after leave
 Wangwu ye zai na-ge shihou_i yi-qian/yi-hou likai.
 also ZAI that-CL time before/after leave
 'Zhangsan left before/after Lisi left, and Wangwu left before/after that time too.'
- b. Zhangsan zai Lisi likai_i **de shike** yi-qian/yi-hou likai,
 ZAI leave DE moment before/after leave
 Wangwu ye zai na-ge shihou_i yi-qian/yi-hou likai.
 also ZAI that-CL time before/after leave
 'Zhangsan left before/after the moment at which Lisi left, and Wangwu left before/after that time too.'

As I mentioned in Chapter 3, Chinese does not seem to have a pronominal form corresponding to *then*; however, we can still test the substitutability of temporal phrases by using the DP *na-ge shihou* ‘that time’. In (98), the *yi-qian/yi-hou* clauses behave similar to their English counterparts in that the clauses before *yi-qian/yi-hou* can be substituted for by the DP *na-ge shi-hou* ‘that time’. Also, (98a) has the same meaning as (98b), which has an overt head noun *de-shijian*. In light of Geis, this seems to suggest that the clause before *yi-qian/yi-hou* in (98a) is a relative clause that has a deleted head noun. Now let us consider if *yi-qian/yi-hou* clauses also have two readings that involve time adverbial movement, as discussed above with *before/after* clauses.

- (99) a. Zhangsan zai [ta shuo [ta yao likai]] yi-qian likai³⁶.
 ZAI he say he want leave before leave
 ‘Zhangsan left before he said he would leave.’
 b. Zhangsan zai [ta shuo [ta yao daoda]] yi-hou daoda.
 ZAI he say he want arrive after arrive
 ‘Zhangsan arrived after he said he would arrive.’

Both (99a) and (99b) have two readings. (99a) can mean Zhangsan left before he made the claim that he would leave (the first embedded clause reading) and it also can mean he left before the time that he planned to leave (the most embedded clause reading). (99b)

³⁵ Chinese *wh*-elements do not perform overt movement; thus I cannot present the movement effect like (90) and (91) in English. Also, movement out of adjuncts is always illegitimate; therefore, the movement effect in (90) and (91) cannot show that *before/after* clauses violate the Complex NP constraint.

³⁶ I have asked many native speakers regarding sentences that have the two-reading effect involving *yi-qian/yi-hou* like (99). Some speakers agree that there are two readings, but some do not and think there is no most embedded clause’s reading. However, when I translate Geis’s sentences into (99), there are two readings. Zhangsan’s leaving before the time he planned is more reasonable (the most embedded clause reading) than the time before he made the claim, which is the first embedded clause reading. Pragmatics may influence speaker’s judgement. If this is the reason for the two readings, the Complex NP constraint should not prevent the most embedded clause’s reading. Evidence in (101) shows that the most embedded reading is subject to the Complex NP constraint.

can mean he arrived after he made the claim that he would arrive. It can also mean he arrived after the time he planned to arrive. Now let us insert *de shihou* before *yi-qian/yi-hou* in (99) and get (100), which now contains relative clauses and has the same meaning as (99).

- (100) a. Zhangsan zai [[ta shuo [ta yao likai]] de shihou] yi-qian likai.
 ZAI he say he want leave DE moment before leave
 ‘Zhangsan left before the moment at which he said he would leave.’
 b. Zhangsan zai [[ta shuo [ta yao daoda]] de shihou] yi-hou daoda.
 ZAI he say he want arrive DE moment after arrive
 ‘Zhangsan arrived after the moment at which he said he would arrive.’

(100a) has the same meaning as (99a); it can mean Zhangsan left before he made the claim about his leaving or it can mean that he left before the time he planned to leave.

(100b) means the same as (99b); Zhangsan arrived after he made the claim that he would arrive or Zhangsan arrived after the time he planned to arrive. Now I examine if the most embedded clause’s reading disappears if a complex NP is between the first embedded clause and *yi-qian/yi-hou*. If so, this phenomenon further implies that there is time adverbial movement going on in *yi-qian/yi-hou* clauses, and pragmatics is not the reason for the long distance readings.

- (101) a. Zhangsan zai [ta tichu [[ta yao likai de] qingqiu]] yi-qian likai.
 ZAI he raise he want leave DE request before leave
 ‘Zhangsan left before he made the request that he would leave.’
 b. Zhangsan zai [ta tichu [[ta yao likai de] qingqiu]] yi-hou likai.
 ZAI he raise he want leave DE request after leave
 ‘Zhangsan left after he made the request that he would leave.’

Please note that the structure of (101) is different from that of (100), although the *de* + NP in both clauses occurs before *yi-qian*. The main verb, *likai* ‘leave’ in (101a) and (101b), can only associate with the verb in the first embedded clause and not with the verb in the most embedded clauses. Thus, syntax does play a main role in getting the two readings in that there is time adverbial movement involved. This also shows that *yi-qian/yi-hou* clauses behave the same as *before/after* in the aspect of time adverbial movement.

From what we have discussed, it seems that *yi-qian/yi-hou* clauses behave the same as their English counterparts with respect to Geis’s analysis. This seems to imply that *qian/hou* take DPs, but not CPs. However, this cannot be valid, although *yi-qian/yi-hou* and *before/after* seem to behave similarly in light of Geis. Geis’s analysis of *before/after* clauses seems to make sense, but the construction of *before/after* clauses with and without an overt head noun may not have the same structure. That is, (90a) and (91a), repeated here as (102), although they mean the same, do not have the same structure.

- (102) a. John departed before Mary kissed the other boy.
 b. John departed before the moment at which Mary kissed the other boy.

If all of the clausal phrases that *before/after* take are considered relative clauses simply just because they have the same meaning as their relative clause counterparts (e.g. (102a) has the same meaning as (102b)), then it is difficult to explain why some prepositions do not take clausal phrases, such as *during*, as shown in (103).

- (103) a. *John left during Bill was eating.
 b. John left during the time that Bill was eating.

In (103a), *during* takes a clause. In (103b) *during* takes a relative clause (a DP). Both (103a) and (103b) mean the same thing; however, (103a) is ungrammatical. This indicates that the clause after *during* in (103a) cannot be a relative clause, and this is simply evidence that *during* cannot take a clause. Along the same lines, *before/after* can take either a clause or a relative clause, and it should not be the case that clauses that *before/after* take are relative clauses because they have the same meaning as relative clauses that *before/after* take. Therefore, the analysis for *qian/hou* seems correct in assuming that they take either a clause or a noun phrase.

Nevertheless, *yi-qian/yi-hou* do not behave exactly the same as *before/after*. Now consider the following sentences:

- (104) a. John left before Bill.
 b. John left before last Monday.
- (105) a. Zhangsan zai Lisi yi-qian likai.
 ZAI before leave
 ‘Zhangsan left before Lisi.’
- b. Zhangsan zai shang-ge xingqi-yi yi-qian likai.
 ZAI last-CL Monday before leave
 ‘John left before last Monday.’
- (106) a. John left before anyone. (Geis 1970, 140)
 b. *John left after anyone.
 c. John left before/after everyone.

- (107) a. *Zhangsan zai renheren yi-qian likai.
 ZAI anyone before leave
 ‘Zhangsan left before anyone.’
- b. *Zhangsan zai renheren yi-hou likai.
 ZAI anyone after leave
 ‘*Zhangsan left after anyone.’
- c. *Zhangsan zai meigeren yi-qian/yi-hou likai.
 ZAI everyone before/after leave
 ‘Zhangsan left before/after everyone.’

In (104) and (105), *yi-qian/yi-hou* seem to behave similarly to *before/after* in that both *before/after* and *yi-qian/yi-hou* can take general noun phrases. However, the contrast in (106) and (107) shows that *yi-qian/yi-hou* are different from *before/after* in that *yi-qian/yi-hou* cannot take some quantifiers that *before/after* can take. Now compare (108a) and (108b).

- (108) a. John died before/after 3 o'clock.
- b. Zhangsan si *(zai) san-dian yi-qian/yi-hou.
 die ZAI three-o'clock before/after
 ‘Zhangsan died before/after three o'clock.’

(108b) is a sentence with a verb that requires a complement to indicate the result of the event, i.e., a resultative complement, the time that John died. A resultative complement can be a verb, adjective or adposition, but cannot be a noun phrase. If *yi-qian/yi-hou* are adpositions like *before/after*, it is not clear why *zai* is required in (108b).

The data from (106) to (108) show that *yi-qian/yi-hou* and *before/after* are not exactly the same. (108b) further shows that *yi-qian-yi-hou* phrases are not PPs like their English counterparts, and thus cannot follow the verb as resultative complements.

To conclude this section, *yi-qian/yi-hou* clauses and *before/after* clauses both behave similarly in that the clauses they take can be pronominalized and they have the same meaning counterparts in relative clause forms that *yi-qian/yi-hou* and *before/after* take. Furthermore, they both have two readings to associate with the main verbs when the clauses include an embedded clause. Also, when the most embedded clause is embedded in a noun phrase, the two readings disappear. The variable occurrence and absence of the two readings suggests that there is a time adverbial movement involved, following Geis. However, although *yi-qian/yi-hou* behave similarly to *before/after* clauses along the line of Geis, they do not behave exactly the same as *before/after*.

4.7 Revising the structure of *yi-qian/yi-hou* clauses

Having discussed the differences between *yi-qian/yi-hou* and *before/after*, I have concluded that *yi-qian/yi-hou* clauses also involve adverbial movement in the sense of Geis (1970). In this section, I will review Larson (1990) and Munn (1991) to show how this time adverbial movement works in more recent literature. Then I will revise my structure of *yi-qian/yi-hou* clauses and show how an operator movement works in the structure I provided in section 4.5. Since both *de shihou* clauses and *yi-qian/yi-hou* clauses involve operator movements, I explain the difference between a *de shihou* clause structure and a *yi-qian/yi-hou* clause structure regarding movement. I further give evidence to show that *de shihou* clauses are relative clauses, while *yi-qian/yi-hou* clauses are noun complement clauses, although both involve movement.

Larson (1990), following Geis' time adverbial movement analysis, proposes that the two-reading effect occurs because *before/after* are prepositions that assign case to the

time adverbial from the first and most embedded clause. (109) contains the data that Larson is concerned with.

- (109) a. I saw Mary in New York before [she claimed that [she would arrive]].
 b. I encountered Alice after she swore that she had left. (p. 170)

The main verb in (109a) can be associated with the first embedded clause and mean *I saw Mary in New York before Mary made the claim of her arrival*; also the main verb can be associated with the most embedded clause and mean *I saw Mary before the time that she specified she would arrive*. (109b) also has two readings: i.e., I encountered Alice after she made the statement and I encountered Alice after the time she specified she had left. Larson analyzes (109) as (110).

- (110) a. I saw Mary in New York [_{PP} before [_{CP1} O_i she claimed
 [_{CP2} that she would arrive]t_i]].
 a'. I saw Mary in New York [_{PP} before [_{CP1} O_i she claimed
 [_{CP2} t_i that she would arrive t_i]]].
 b. I encountered Alice [_{PP} after [_{CP1} O_i she swore [_{CP2} that she had left] t_i]].
 b'. I encountered Alice [_{PP} after [_{CP1} O_i she swore [_{CP2} t_i that she had left t_i]]].

According to Larson, a trace must have case in order to be interpreted as a variable bound by an operator; otherwise the null operator, O, will bind nothing and cause vacuous quantification (Chomsky 1982, Koopman and Sportiche 1982). Since *before/after* can assign case to the null operator, the traces will also get case through the chain between

the operator and trace. The operator that is associated with the first embedded clause, as in (110a & b), and the operator that is associated with the lower embedded clause, as in (110 a' & b'), are casemarked by *before/after*, and two readings are available. Evidence for this, according to Larson, comes from the fact that *before/after* can take NP complements, but *while* cannot take NPs, and therefore there is no two-reading effect, as shown in (111) and (112).

- (111) a. John left after the party.
 b. *John left while the party.

- (112) a. I saw Mary in New York before she claimed that she would arrive.
 b. I didn't see Mary in New York while she said she was there. (p. 174)

According to Larson, (112a) shows two readings, as I have discussed above, while (112b) only shows one reading: *I didn't see Mary during the time when she was uttering something about her presence in New York*. This is the case because, according to Larson, *while* does not casemark NPs, as (111b) shows, and thus it cannot casemark null operators as *before/after* do; therefore (112b) cannot show the reading in which the main verb is associated with the verb phrase in the most embedded clause.

Munn (1991) argues that the two-reading effect cannot be derived from casemarking. Munn points out that, according to Larson (1987), in *before/after* constructions, Antecedent Contained Deletion (ACD) is possible as (114a) shows because *before/after* assign case to the subject left after the deletion. However, Munn (1991) questions why *until/since* can take NPs, can license the two-reading effect as

shown in (113), and yet cannot casemark ACD in (114b) and (114c). Therefore, ACD is not a good argument.

- (113) a. I couldn't leave until John said I could leave.
b. I haven't been there since I told you I was there.
- (114) a. John left before/after [IP Bill [I' e]].
b. *John sang a song until Bill.
b'. John sang a song until Bill did.
c. *John has been singing since Bill.
c'. John has been singing since Bill has been.

Munn suggests that the difference between *before/after* and *since/until* is a matter of a semantic difference in the temporal operator, which is similar to the difference between *when* and *while*. The difference between *when* and *while*, according to Munn, is that *when* picks out points in time, and *while* picks out durational events, and this is the reason why *when* clauses have two readings. Thus, he proposes the following structure for *before/after* clauses.

- (115) [PP O_i [P' before/after [IP ...t_i...]]]

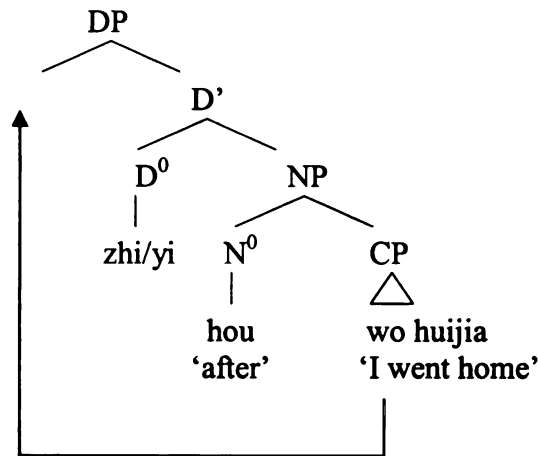
That is, for Munn the operator moves to Spec of PP and *before/after* take IP as their complement, instead of CP as Larson claims.

In summary, Larson (1990) argues that *before/after* take CP as a complement and the temporal operator moves to Spec of CP to get case from *before/after*. On the other

hand, Munn thinks that the temporal operator in *before/after* clauses does not need case and he proposes that the operator moves to Spec of PP and *before/after* take only an IP. Nevertheless, the purpose of this section is to show how time adverbial movement is analyzed in more recent literature; it is not this thesis's intention to argue support for either analysis. Now I shall turn to *yi-qian/yi-hou* clauses.

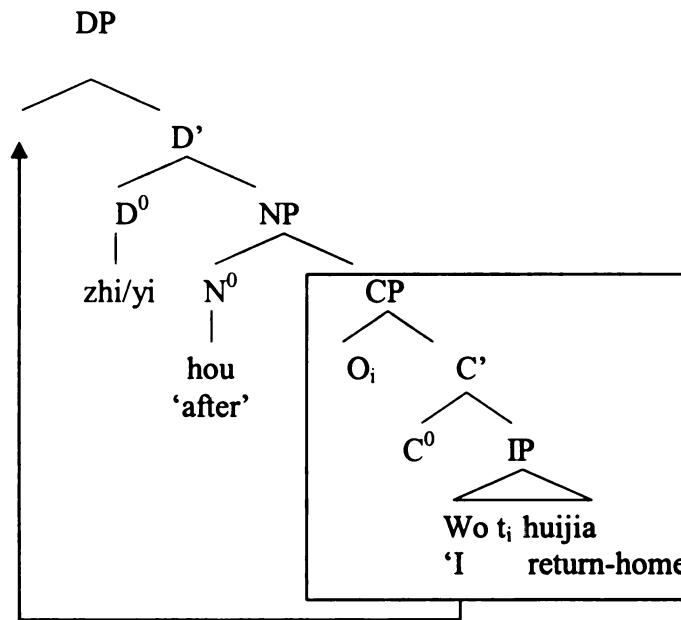
Recall that a structure of *yi-qian/yi-hou* clauses is provided as follows:

(116)



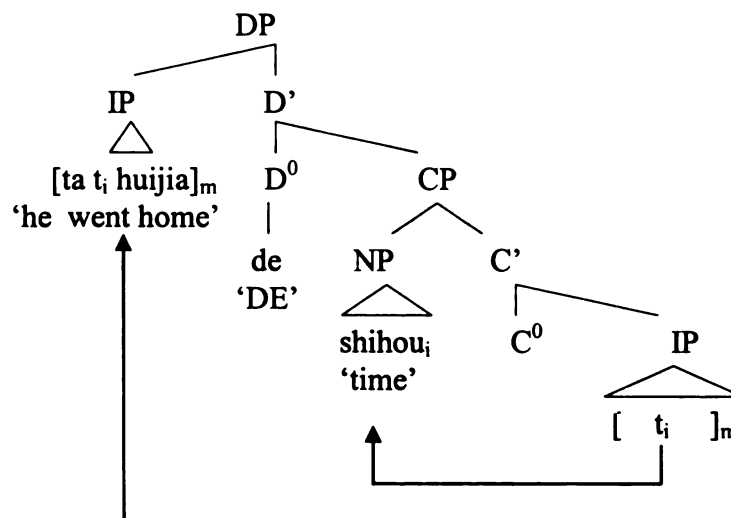
Since a null operator is a *wh*-movement, the only place for the operator in (116) to move to is the Spec of CP as shown in (117).

(117)



As (117) shows, the whole CP still moves to the Spec of DP; however, inside the CP, an operator movement occurs. This is different from the movement in *de shihou* clauses, for *de shihou* clauses involve head raising, while the movement in *yi-qian/yi-hou* is a null operator movement. The *de shihou* structure that I proposed in Chapter 3 is repeated here as (118) for convenience.

(118)



As (118) shows, *shihou* undergoes direct movement out of the IP, and then the rest of the IP moves to Spec of DP leaving the *wh*-operator behind. The *de shihou* clause is a relative clause involving direct *wh*-movement, and *yi-qian/yi-hou* clauses are complement clauses that also have a null operator movement involved. In addition, a difference between *de shihou* clauses and *yi-qian/yi-hou* clauses can be illustrated as follows:

- (119) a. Ta lai de shihou wo bu zai jia.
 he come DE time I not ZAI home
 ‘I was not home when he came.’
 b. Ta lai de nei-ge shihou wo bu zai jia.
 he come DE that-CL time I not ZAI home
 ‘I was not home at the time when he came.’
- (120) a. Ta lai yi-qian wo bu zai jia.
 he come before I not ZAI home
 ‘I was not home before he came.’
 b. *Ta lai yi nei-ge qian wo bu zai jia
 he come YI before I not ZAI home
 c. *Nei-ge ta lai yi-qian wo bu zai jia.
 that-CL he come before I not ZAI home
- (121) a. Ta lai yi-hou wo cai chu-men.
 he come after I then out-door
 ‘I left after he came.’
 b. *Ta lai yi nei-ge hou wo cai chu-men.
 he come YI that-CL after I then out-door
 c. *Nei-ge ta lai yi-hou wo cai chu-men.
 that-CL he come after I then out-door
- (122) a. Dajia chifan de qian-tou ni bie chi dianxin.
 Everybody eat-meal DE before you don’t eat snack
 ‘Don’t snack before we all have dinner.’ (Chao 1968, 119)
 b. *Dajia chifan de nei-ge qian-tou ni bie chi dianxin.
 Everyone eat-meal DE that-CL before you don’t eat snack

- c. *Nei-ge dajia chifan de qian-tou ni bie chi dianxin.
 That-CL everyone eat-meal DE before you don't eat snack

In Chapter 3, we have discussed that a relative clause allows pre-relative clause demonstrative and/or post-relative clause (post-RC) demonstratives. As shown in (119), *de shihou* clauses allow at least post-RC demonstratives, while *yi-qian/yi-hou* clauses in (120) and (121) do not allow any demonstratives to occur within them. Even (122), which contains a long form localizer that means *before*, also shows that a demonstrative is not allowed. This further confirms that the operator movement does not make *yi-qian/yi-hou* clauses into relative clauses as Geis (1970) suggests.

4.8 Conclusion

In this Chapter, I have analyzed the structure of *yi-qian/yi-hou* clauses. Since *qian/hou* as localizers function the same as *yi-qian/yi-hou* in temporal clauses, I also examined localizers. In the literature, there are three main analyses for short form localizers: the noun analysis, the adposition analysis, and the clitic analysis. Here, I have argued that the short forms are nouns that have become clitics. Therefore, they do not behave like standard nouns in Modern spoken Chinese, and their noun properties are limited to certain environments. Interestingly, comparing the positions that nouns and adpositions occur in, NP + localizer can occur mostly in noun position and not in adposition position. Although short forms fail most noun tests in modern Chinese, in classical Chinese, they are free words and behave like nouns instead of adpositions. Short forms do not behave like standard nouns in modern Chinese because they have become clitics. In order to characterize their properties as nouns and clitics, it is

preferable to analyze them as nominal clitics. Since *qian/hou* are both location and time indicators, I have further shown that XP + localizers in locative phrases and XP + *qian/hou* in temporal phrases have parallel structures. Therefore, I conclude that they have the same syntactic structure, that *qian/hou* take an XP as a complement to form an NP, and that D⁰ selects this NP as complement and requires its specifier to be filled. Thus, the XP has to undergo movement to fill the Spec of DP position. This D⁰ position can be empty or have *zhi/de/yi* occur in the position, following Simpson (1999, 2000). Since *yi* and *zhi/de* are not related in classical and modern Chinese, I have further examined the classical usage of *zhi* and *yi*. I have shown that *zhi* is very likely a definite determiner. Also, *zhi* and *yi* both can be verbs, conjunctions, or pronouns. Therefore, they possibly have the same syntactic category when combining with short form localizers. The sentences in (82) further confirm this claim that *de*, *zhi*, and *yi* should be analyzed in the same fashion, allowing a general account for these three items. Finally, I have also given further evidence that clause + *yi-qian/yi-hou* is a DP and that it can occur after *ba* and be the subject of *bei* constructions.

In addition, I compare the differences between *yi-qian/yi-hou* clauses and *before/after* clauses in view of Geis (1970), and they seem to behave similarly. This also provides evidence that *yi-qian/yi-hou* clauses also involve operator movement. Nevertheless, when *yi-qian/yi-hou* and *before/after* take phrases involving quantifiers, they do not behave the same. Also, as shown in (108b), when *yi-qian/yi-hou* phrases follow verbs, *zai* is required, and this situation seems to imply that *yi-qian/yi-hou* do not behave like adpositions such as *before/after*.

Finally, since both *de shihou* clauses and *yi-qian/yi-hou* clauses involve movement, I further compare their differences and show that *de shihou* clauses are relative clauses involving head raising, while *yi-qian/yi-hou* clauses are noun complement clauses involving null operator movement.

Chapter 5:

The optionality of *zai* in temporal clauses

As I have discussed in Chapter 1, Chinese temporal clauses often contain *zai*. *Zai* is optional most of the time, however sometimes it is required. This inconsistent behavior of *zai* is puzzling. In order to understand what role *zai* plays in temporal clauses, in this chapter, I examine the optionality of *zai* regarding its behavior in temporal clauses.

5.1 The problems

In Chapter 4, I have argued that both locative phrases and temporal phrases behave similarly in that they both occur in *zai*+ XP + localizer phrases¹. Accordingly, this predicts that *zai* should behave the same in both locative and *yi-qian/yi-hou* phrases; however, *zai* seems to be optional with temporal phrases, while obligatory with locative phrases, as shown in (1).

- (1) a. Ta *(zai) wu qian da lanqiu.
he ZAI house front play basketball
'He plays basketball in front of the house.'
- b. Ta *(zai) shang diannao ke de na-ge tushuguan qian da lanqiu.
he ZAI have computer class DE that-CL library front play basketball
'He plays basketball in front of the library that holds the computer class.'

¹ In this chapter, I mainly discuss *yi-qian/yi-hou* phrases, i.e., (ZAI)+ CP/NP+ *yi-qian/yi-hou*; therefore terms such as, 'zai phrases' and 'temporal phrases' refer to *yi-qian/yi-hou* phrases; however the optionality of *zai* in *yi-qian/yi-hou* clauses also applies to other temporal phrases as I will discuss in section 5.6. For convenience sake, I use 'temporal clauses' refer to CP + *yi-qian/yi-hou* as well as CP + *de shihou*.

- c. Ta (zai) san dian (yi)-qian da lanqiu.
 he ZAI three o'clock before play basketball
 'He plays basketball before three o'clock.'
- d. Ta (zai) shang diannao ke de na-duan shijian (yi)-qian da lanqiu.
 he ZAI have computer class DE that -CL time before play basketball
 'He plays basketball before the time that the computer class starts.'

(1a) and (1b) contain locative phrases and *zai* is obligatory. (1c) and (1d) contain temporal phrases, and *zai* is optional. However, the use of *zai* in the following sentences shows that it is not the case that *zai* is always optional in temporal clauses.

- (2) a. Zhangsan ??(zai) Lisi chusheng yi-qian jiu chuguo qu le.
 ZAI was-born before then go-abroad go LE
 Intended to mean: 'Before Lisi was born, Zhangsan had gone abroad.'
- b. (Zai) Lisi chusheng yi-qian, Zhangsan jiu chuguo qu le.
 was-born before then go-abroad go LE
 'Before Lisi was born, Zhangsan had gone abroad.'
- (3) a. Meiguihua *(zai) yeshou si le yi-hou jiu diaoxie le.
 rose ZAI beast die LE after then wither LE
 Intended to mean: 'The rose withered after the beast died.'
- b. (Zai) yeshou si le yi-hou Meiguihua jiu diaoxie le.
 at beast die LE after rose then wither LE
 'The rose withered after the beast died.'

In (2) and (3), the meaning in the (a) sentences is the same as those in (b). In the (a) sentences, the temporal clause occurs after the main subject and *zai* is not optional, while in the (b) sentences, the temporal clause is preposed, and the absence of *zai* does not influence the interpretation of the sentences. However, the following sentences show that *zai* is not only optional in the beginning of the sentences, as in (4b) and (5b). *Zai* can also

be optional when the temporal clause occurs after the main subject, as shown in (4a) and (5a).

- (4) a. Wo (zai) wanfan zuohao le yi-hou jiu chumen le.
 I ZAI dinner make-ready LE after then out-door LE
 'I went out after dinner was done.'
- b. (Zai) wanfan zuohao le yi-hou wo jiu chumen le.
 ZAI dinner make-ready LE after I then out-door LE
 'I went out after dinner was done.'
- (5) a. Zhangsan ?(zai) tianqi re le yi-hou cai mai lengqiji.
 ZAI weather hot LE after then buy air-conditioner
 'Zhangsan bought an air-conditioner after the weather became hot.'
- b. (Zai) tianqi re le yi-hou Zhangsan cai mai lengqiji.
 ZAI weather hot LE after then buy air-conditioner
 'Zhangsan bought an air-conditioner after the weather became hot.'

Given that locative phrases and temporal phrases behave the same syntactically, as I have discussed in Chapter 4, it seems puzzling that *zai* is obligatory in locative phrases, but optional in temporal phrases. Therefore, exploring the asymmetry between locative phrases and temporal phrases can help us to understand the asymmetry more specifically. Supposing that an important function of prepositions is to assign case, the asymmetry between locative phrases and temporal phrases seems to be that locative phrases need case, while temporal phrases do not. This suggestion follows, if we ignore post-subject temporal phrases, which inconsistently omit *zai*. That is, if the assumption of the case requirement between locative phrases and temporal phrases holds, the problem which needs to be addressed is why *zai* is not consistently optional when the temporal phrase follows the subject. This inconsistency of the presence of *zai* seems to imply that this

situation is not determined wholly by the syntax. That is, there is some other reason that causes this inconsistency to arise.

The rest of this chapter is organized as follows: in 5.2 I review Larson (1985) and Stroik (1992) to seek an explanation for the different behavior of locative phrases and temporal phrases regarding the use of prepositions. In 5.3, I investigate the behavior of *zai* in locative phrases and that *zai* is required in locative phrases. In 5.4, I examine the optionality of *zai* in *yi-qian/yi-hou* phrases. The inconsistency of the optionality of *zai* among similar sentences suggests that a processing account would explain the data more properly. In 5.5, I will explain why the occurrence of *zai* is inconsistent in the post-subject position in sentences containing temporal phrases. Finally, in 5.6, I examine post-subject positions containing *de shihou* clauses and show that *de shihou* clauses also show the same patterns regarding the optionality of *zai*.

5.2 Larson and Stroik

Larson (1985) examines English bare-NPs, and points out that there is a group of bare-NPs that function as adverbial modifiers without accompanying prepositions or any other means that indicate that they are adjuncts. These NPs are called bare-NP adverbs. Examples of bare-NPs behaving as adverbial modifiers are as follows:

- (6) a. John arrived the Tuesday that I saw Max.
- b. John arrived yesterday.
- c. You have lived someplace warm and sunny.

According to the Case Filter (Chomsky 1981), an NP needs case to be visible and to be theta-marked. However, the sentences in (6) do not have any indicators to show that the temporal NPs bear case. Larson proposes *adverbial theta role assignment* that “assign[s] an adverbial θ -role to α , where α is any phrase” (1985, 606). Therefore, a temporal phrase can bear a θ_{Temp} while a locative phrase can bear a θ_{Loc} . As to the case of these bare-NP adverbs, Larson proposes that these bare-NPs contain head nouns that have a [+F] feature which assigns Oblique case to the bare-NPs. Since these bare-NP adverbs contain inherent Oblique case, they can be visible in adjunct positions.

Stroik (1992) examines Larson’s proposal for the behavior of bare-NP adverbs, and points out that Larson’s Oblique case approach does not explain the fact that the temporal phrases in fact behave differently from locative phrases as shown in (7) and (8).

- (7) a. Mary will see John [one day].
 b. Mary will see John [someday].
 c. Mary saw John [the day that Bill died].
 d. Mary saw John [the day of his birthday].
 e. Mary will see John [Monday]. (Stroik 1992, 269)
- (8) a. *Mary will see John [one place].
 b. *Mary will see John [someplace]².
 c. *Mary saw John [the place that Bill died].
 d. *Mary saw John [the place of his birthday].
 e. *Mary will see John [Madison]. (Stroik 1992, 269)

Stroik argues that temporal NPs behave differently from locative NPs in that temporal NPs are secondary predicates that do not need case, while locative NPs are not predicates and need to be case marked. According to Stroik, following Enç (1985), “an adequate theory of the temporal interpretation of verbs requires that verbs take empty temporal NP arguments as their most proximate arguments” (p. 271). Thus, temporal bare-NP adverbs can be bound by this empty temporal NP-argument, which makes temporal bare-NP adverbs into predicates following Safir’s (1987) predicate principle which Stroik has revised with a condition of binding put forth by Rizzi (1990). The revised predicate principle is as follows:

- (9) **Predicate Principle:**
 A potential referring expression must be either (i) predicate, bound within its m-command domain or (ii) free. (p. 270)

That is, when a sentence contains a temporal NP, it is bound by an empty temporal NP argument that is theta-marked by the verb, and thus a secondary predicate, following Rothstein (1985)³. However, locative phrases do not have an empty locative bare-NP to bind them, and thus are not predicates.

Whether temporal phrases contain a [+F] feature that assigns obligatory case or they are predicates is not directly relevant. However, Larson’s examination of bare-NP adverbs and Stroik’s distinguishing locative phrases from temporal phrases support the idea that there is a group of adverbs that do not need case. In the following, I will

² Some of the native speakers consider (8b) acceptable.

³ According to Rothstein (1985), there are two types of predicates: primary and secondary predicates. A secondary predicate takes a subject that is theta-marked by another lexical head. In the case of bare NP

examine both locative phrases and temporal phrases in Chinese and will argue that only locative phrases need *zai* for syntactic case, while temporal phrases do not need *zai*. Since the syntactic constraint does not apply to temporal phrases, I will try to explain why *zai* shows inconsistency in the post-subject position in sentences containing temporal clauses.

5.3 The optionality of *zai* in locative phrases

In this section, I discuss the function of *zai* in locative phrases, and examine whether or not *zai* can be optional. There are cases where *zai* seems to be optional; however, these cases may not be cases of true optionality since other syntactic constraints may be involved.

As I have discussed in Chapter 4, a typical locative phrase, according to Li and Thompson (1981) (henceforth, L & T), is *zai* + NP + (localizer) as shown in (10)^{4, 5}.

- (10) *zai* *jia* (li)
 ZAI home inside
 ‘at home’

A locative phrase can occur as a predicate as shown in (11).

temporal phrases, the empty temporal NP argument is theta-marked by the verb and also binds the bare NP adverb, and thus the bare NP adverb is a secondary predicate.

⁴ Localizers are optional when the preceding NP is a specific place, as discussed in Chapter 4.

⁵ The locative phrase can also occur after a verb indicating a result of the action caused by the verb preceding it. Since this post-verbal position is an argument position, it is not considered in this thesis. Example of a locative phrase occurring after a verb is as in (i).

- (i) *Ta ba shu fang zai shuzhuo shang.*
 he BA book put ZAI desk top
 ‘He put the book on the desktop.’

- (11) Zhangsan zai jia li.
 ZAI home inside
 ‘Zhangsan is at home.’

A locative phrase can occur as an adverbial phrase that it shows up in the post-subject and pre-verbal position as in (12)⁶.

- (12) Ta zai jia li chi guo fan le.
 he ZAI home inside eat GUO meal LE
 ‘He has eaten at home.’

Also *zai* in (11) and (12) can not be omitted, as (13) shows.

- (13) a. Zhangsan *(zai) jia li.
 ZA home inside
- b. Ta *(zai) jia li chi guo fan le.
 he ZAI home inside eat GUO meal LE

⁶ According to Chen (1978) and Yang (1995), when there are no other aspect markers occurring in the sentences containing *zai*+ localizer phrase, *zai* can mark progressive aspect, as (i) shows.

- (i) Ta zai jia li yundong.
 he ZAI home inside exercise
 ‘He is exercising at home.’

However, there is no evidence that *zai* plays the role of progressive aspect when it occurs with a localizer phrase, since (i) can also mean *he exercises at home*.

- | | |
|---|---|
| (ii) Ta yundong.
He exercises.
‘He is exercising.’ Or ‘He exercises.’ | (iii) Ta zai yundong.
he ZAI exercise
‘He is exercising.’ |
|---|---|

As we can see from (ii) and (iii), when the bare verb phrase *yundong* does not follow *zai*, (ii) has both a progressive reading and a habitual reading. Only when *zai* occurs does it have the progressive reading. The situation in (i) is like (ii) in that the occurrence of *zai* in (i) does not exclude the habitual reading.

L & T (1981) show that a sentence with and without *zai* has different readings.

(14) shows that the presence or absence of *zai* in a locative phrase results in a different reading, although it conveys basically the same information.

- (14) a. Shuzhuo shang dui le yi-xie shu.
desk top pile LE a-few book
'A few books were piled on the desktop.'
- b. Zai shuzhuo shang dui le yi-xie shu.
ZAI desk top pile LE a-few book
'Someone piled a few books on the desktop.'

According to L & T, (14a) indicates a stative sense and is a presentative sentence, which is like an existential sentence. However, (14b) shows an activity, and the agent of the activity is understood from the context. Now let us add a pronoun in the beginning of (14) and get (15).

- (15) a. Tamen shuzhuo shang dui le yi-xie shu.
they desk top pile LE a-few book
'A few books were piled on their desktop.'
- b. Tamen zai shuzhuo shang dui le yi-xie shu.
they ZAI desk top pile LE a-few book
'They piled a few books on the desktop.'

(15) shows the same results as L & T predicted: *tamen* 'they' in (15a) is not the agent of the piling; however, it is part of the whole noun phrase *tamen shuzhuo-shang* 'their desk top' and (15a) expresses a stative existential reading or a passive reading that the table top has some books placed on it. In (15b), *tamen* 'they' is the subject as well as the agent

in that *tamen* ‘they’ refers to the people who perform the act of piling the books.

However, (16a) and (17a), although structurally similar to (14a) and (14b), are ungrammatical.

- (16) a. *Shuzhuo shang xiu le wu-bu diannao.
desk top fix LE five-CL computers
Intended to mean: ‘Five computers were fixed on the desktop.’
- b. Zai shuzhuo shang xiu le wu-bu diannao.
ZAI desk top fix LE five-CL computers
‘Someone fixed five computers on the desktop.’
- (17) a. *Tamen shuzhuo shang xiu le wu-bu diannao.
They desk top fix LE five-CL computers
Intended to mean: ‘Five computers were fixed on their desktop.’
- b. Tamen zai shuzhuo shang xiu-le wu-bu diannao.
They ZAI desk top fix-LE five-CL computers
‘They fixed five computers on the desktop.’

(16) and (17) are parallel to (14) and (15) respectively; however, (16a) and (17a) are not allowed, while (14a) and (15a) are fine. The difference is due to the different verb classes. The verb in (14) optionally takes an agent subject, while the verb in (16) required an agent subject. (14a) and (15a) have the meaning that the desktop was influenced by someone by putting some books on the table, while in (16a) and (17a), the desktop is not influenced. Since the verb *xiu* ‘to fix’ requires an agent in its external structure, the lack of agent in the sentence causes the ungrammaticality of (16a) and (17a). In order for (16a) and (17a) to be grammatical, *zai* has to be inserted to make the locative phrase an adverbial phrase, as shown in (16b) and (17b), instead of inserting a subject noun phrase as in (15a) and (15b). The existence of *zai* in (14b), (15b), (16b) and

(17b) seems to indicate that locative phrases with *zai* are not subjects but adverbial phrases. The recoverability of the subject in (15b) from (14b) and (17b) from (16b) shows that locative phrases with *zai* cannot be subjects. That is, *zai* is not optional in the post-subject position, i.e. the adverbial position. Wen (1957) also mentions a similar situation and holds that *zai* can be used to test if a locative phrase is a subject or an adverbial phrase, as shown in (18).

- (18) a. Qiang shang wa le yi-ge dong.
 wall top dig LE one-CL hole
 ‘There is a hole dug in the wall.’
 b. Zai qiang shang wa le yi-ge dong.
 ZAI wall top dig LE one-CL hole
 ‘Someone dug a hole in the wall.’

According to Wen (1957), the difference between (a) and (b) in (18) is that *qiang shang* ‘wall top’ in (a) is a subject and *zai qiang shang* ‘on the wall (top)’ in (b) is an adverbial phrase. If L & T and Wen are correct in their observations, the existential constructions in (19) should have different structures depending on whether *zai* occurs in the initial position.

- (19) a. (Zai) shuzhuo shang you liang-ben shu.
 ZAI desk top has two-CL book
 ‘There are two books on the desktop.’
 b. (Zai) lou xia lai le liang-ge ren.
 ZAI stairs down come LE two-CL person
 ‘Two people arrived downstairs.’

Note that sentences (14a), (18a) and (19) are all existential sentences in that they all start out including a location, a non-transitive verb, and an indefinite noun phrase. A definite noun phrase is not allowed to occur after the verb as shown in (20).

- (20) a. *Shuzhuo shang dui le na-xie shu.
 desk top pile LE those book
 ‘Those books were piled on the desktop.’
- b. *Qiang shang wa le na-xie dong.
 wall top dig LE those hole
 ‘There are those holes dug on the wall.’
- c. *Shuzhuo shang you na-xie shu.
 desk top have those book
 ‘On the desktop, there are those books.’
- d. *Lou xia lai le na-xie ren.
 stairs down come LE those people
 ‘There arrives those people.’

However, the difference of (19) from (14a) and (18a) is that the verbs in (14a) and (18a) are derived from transitive verbs, while the verbs in (19) are unaccusative. Therefore, we cannot insert an agent noun to test whether there is an agent subject; nor can we find a different meaning with and without *zai*. However, the subject position in (21) indicates that a real (rather than existential) subject position does not allow *zai* to occur.

- (21) (*Zai) shuzhuo shang shi xie zi de hao difang.
 ZAI desk top is write words DE good place
 ‘On the desktop is a good place to write.’

(21) is not an existential sentence; the presence of *zai* in the subject position causes the ungrammaticality. This is further evidence to support Wen's (1957) argument that when *zai* occurs in initial position, the phrase it occurs in is not a subject, but when *zai* does not occur, the NP + localizer is the subject. The contrast between (19) and (21) shows that in existential sentences with *zai*, the locative phrase is not a subject, while without *zai*, the locative phrase is a subject. Now examine (22).

- (22) a. Ta zai shuzhuo shang xie le wu-ge zi.
 he ZAI desk top write LE five-CL words
 'He wrote five words on the desktop.'
- b. *(Zai) shuzhuo shang, ta xie-le wu-ge zi.
 ZAI desk top he write-LE five-CL words
 'On the desktop, he wrote five words.'

(22) shows that a NP+ localizer combination cannot occur in topic position. The NP + localizer combination seems to need *zai* to license it when it is not in a subject position as (21) and (22) show. That is, since NP + localizer is a DP it needs case; it cannot stand alone in non-argument positions such as adverbial positions and topic positions. This suggests that in locative phrases, *zai* cannot be optional even if it seems to look so.

In summary, *zai* in locative phrases cannot be optional. There seem to be cases where optionality exists; however, it is necessary to distinguish cases in which locative phrases with *zai* are in topic positions from cases in which locative phrases without *zai* are in subject positions.

5.4 Zai in yi-qian/yi-hou phrases

Recall the discussion in Chapter 4 that localizers like *qian/hou* are also temporal localizers and the position of *yi-qian/yi-hou* and *zhi-qian/zhi-hou* can be filled by *qian/hou*. That is, the structures of the locative phrases and the temporal phrases with *yi-qian/yi-hou* are similar. Therefore, I assume that temporal phrases with *yi-qian/yi-hou* have similar constructions to locative phrases as in (23).

(23) *zai* + NP/CP + (yi)-*qian/hou*

Like a locative phrase, a *yi-qian/yi-hou* phrase can be a predicate, as shown in (24).

(24) Yinyuehui *zai zhongqiu-jie yi-qian/yi-hou*.
concert ZAI moon-festival before/after
‘The concert will be/is/was before/after the moon festival.’

Also, *yi-qian/yi-hou* phrases can occur after the subject and before the verb, i.e., they can be an adverbial phrase as in (25).

(25) Yinyuehui *zai zhongqiu-jie (yi)-qian/hou* juxing.
Concert ZAI moon-festival before/after hold
‘The concert will be/is/was held before/after the moon festival.’

Moreover, unlike in the locative phrases, *zai* in an adverbial phrase as in (25) can be optional, as shown in (26). The only exception to this is when *zai* is part of a predicate as in (24).

- (26) Yinyuehui (zai) zhongqiu-jie (yi)-qian/hou juxing.
 Concert ZAI moon-festival before/after hold
 ‘The concert will be/is/was held before/after the moon festival.’

Nevertheless, as I have discussed in the beginning of this chapter, it is not the case that *zai* is consistently optional in each *yi-qian/yi-hou* phrase. Now we should discuss the circumstances of the optionality of *zai* in *yi-qian/yi-hou* phrases. The rest of the chapter is organized as follows: in 5.4.1, I argue that *zai* is not syntactically required. Since the optionality of *zai* is not due to syntactic constraints, I suggest that a processing account is an appropriate way to explain the situation. That is, the omission of *zai* can lead to a temporary ambiguity before the temporal clause is realized. In 5.4.2, I will show that there are a number of possible constructions for sentences starting with two noun phrases, and these possibilities effectively force *zai* to be present between the two NPs to avoid them.

5.4.1 *Zai* is not syntactically required in temporal phrases

Consider a bare nominal temporal phrase such as *mingtian* ‘tomorrow’ occupying both the post-subject and pre-verbal positions, as shown in (27).

- (27) a. Ta mingtian qingzhu shengri.
he tomorrow celebrate birthday
'He celebrates his birthday tomorrow.'
- b. Ta zai mingtian qingzhu shengri.
he ZAI tomorrow celebrate birthday
'Tomorrow is the day that he celebrates his birthday.'
- c. Mingtian ta qingzhu shengri.
tomorrow he celebrate birthday
'Tomorrow he celebrates his birthday.'
- d. *Zai mingtian ta qingzhu shengri.
ZAI tomorrow he celebrates birthday
'On tomorrow, he celebrates his birthday.'

In (27a) and (27b), we can see that there is a subtle difference between the sentence without *zai* and the sentence with *zai*; (27a) indicates that there is an event that will happen tomorrow, while in (27b) *zai* picks out *tomorrow* and emphasizes *tomorrow* to be the date that a certain event will take place. (27c) shows the adverbial bare noun *mingtian* 'tomorrow' does not need *zai*, and with *zai* in (27d) the sentence is not acceptable. This pattern consistently differs from locative phrases, which require *zai* even in preposed positions⁷. Now consider (28).

- (28) a. Zhe-jian shi (zai) yi-qian chengjing fasheng guo.
This-CL matter ZAI before have-ever happen GUO
'This matter has happened before.'
- b. Zhe-jian shi (?zai) yi-hou hai hui fasheng.
This-CL matter ZAI afterwards still will happen
'This matter will happen again.'

⁷ Although (27d) is not good, in the context of contrastive focus as in (i) this structure is fine.

(i) Zai mingtian ta qingzhu shengri, zai houtian ta qingzhu jiehunjinianri
ZAI tomorrow he celebrates birthday, ZAI the-day-after he celebrates marriage-anniversary
'Tomorrow he celebrates his birthday; the day after tomorrow he celebrates his anniversary.'

- c. (Zai) yi-qian zhe-jian shi chengjing fasheng guo.
 ZAI before this-CL matter have-ever happen GUO
 'This matter has happened before.'
- d. (Zai) yi-hou zhe-jian shi hai hui fasheng.
 ZAI afterwards this-CL matter still will happen
 'This matter will happen again.'

From (28), we can see that when *yi-qian/yi-hou* are by themselves, they do not need *zai*, either in post-subject positions or pre-subject positions. The data in (28) seem to confirm that bare time adverbials do not need case as I discussed in 5.1, which is unlike locative phrases. Also, recall that in the beginning of this chapter, I have shown that *yi-qian/yi-hou* clauses consistently do not need *zai* when the clauses are in the preposed positions, as (2) and (3) show, repeated here as (29) and (30) with additional examples.

- (29) a. Zhangsan *(zai) Lisi chusheng yi-qian jiu chuguo qu le.
 ZAI was-born before then go-abroad go LE
 Intended to mean: 'Before Lisi was born, Zhangsan had gone abroad.'
- b. (Zai) Lisi chusheng yi-qian, Zhangsan jiu chuguo qu le.
 ZAI was-born before then go-abroad go LE
 'Before Lisi was born, Zhangsan had gone abroad.'
- (30) a. Meiguihua *(zai) yeshou si-le yi-hou jiu diao-xie le.
 rose ZAI beast die-LE after then wither LE
 Intended to mean: 'The rose withered after the beast died.'
- b. (Zai) yeshou si-le yi-hou meiguihua jiu diao-xie le.
 ZAI beast die-LE after rose then wither LE
 'The rose withered after the beast died.'
- (31) a. Wo *(zai) Lisi kan-dao Wangwu yi-qian jiu jin le cheng.
 I ZAI saw before then enter LE town
 'I went downtown before Lisi saw Wangwu.'

- b. (Zai) Lisi kan-dao Wangwu yi-qian wo jiu jin le cheng.
 ZAI saw before I then enter LE town
 'I went downtown before Lisi saw Wangwu.'
- (32) a. Xiaowei ??(zai) pengyou lai-le yi-hou jiu zhi gu wan.
 Xiaowei ZAI friend come-LE after just only attend-to fun
 'After her_i friends came, Xiaowei_i only cared about having fun.'
- b. (Zai) pengyou lai-le yi-hou Xiaowei jiu zhi gu wan.
 ZAI friend come-LE after Xiaowei just only attend-to fun
 'After her_i friends came, Xiaowei_i only cared about having fun.'
- (33) a. Zhangsan (zai) zuowan gongke yi-hou jiu huijia le.
 zai do-finish homework after then went-home LE
 'After finishing his_i homework, Zhangsan_i went home.'
- b. (zai) zuowan gongke yi-hou Zhangsan jiu huijia le.
 ZAI do-finish homework after then went-home LE
 'After finishing his_i homework, Zhangsan_i went home.'
- (34) a. Lisi (zai) gongke zuowan yi-hou jiu hui-jia qu le.
 ZAI homework do-finish after then return-home go LE
 'After finishing his_i homework, Lisi_i went home.'
- b. (Zai) gongke zuowan yi-hou Lisi jiu hui-jia qu le.
 ZAI homework do-finish after then return-home go LE
 'After finishing his_i homework, Lisi_i went home.'

The additional sentences in (31), (32), (33), and (34) also support the idea that the presence of *zai* is not crucial syntactically. It is only when the temporal phrases occur after the matrix subject that the optionality of *zai* becomes a problem. This problem is possibly due to the fact that when temporal phrases occur after the matrix subject, the matrix subject and the first noun phrase of the temporal phrase are in a sequence that, without the presence of *zai* between the two noun phrases, causes a processing ambiguity. This assumption can be supported by the following sentences:

- (35) a. Lisi (zai) erzi si le yi-hou jiu yijuebuzhen.
 ZAI son die LE after then collapsed
 ‘Lisi_i collapsed after his_i son died.’
- b. Lisi zai erzi si le yi-hou jiu cheng-ming le.
 ZAI son die LE after then become-famous LE
 ‘Lisi_i became famous after his_i son died.’
- b’. ??Lisi erzi si le yi-hou jiu cheng-ming le.
 son die LE after then become-famous LE
 ‘Lisi_i became famous after his_i son died.’ Or
 ‘Lisi’s son_i became famous after he_i died.’
- c. Lisi (zai) yi-ge erzi si le yi-hou you si le yi-ge erzi.
 ZAI one-CL son die LE after again die LE one-CL son
 ‘After one son died, Lisi’s other son also died.’

The sentences in (35) are supposed to have the same structure, since the verbs in the temporal clauses are all transitive; however, some require *zai*, but some do not.

Apparently, the requirement of *zai* in some sentences is not because of case or any other syntactic constraints, since *zai* is not consistently required. (35a), (35b), and (35b’) have the same verbs in the temporal clause; however, (35a) is good without *zai*, but (35b’) is not acceptable. The inconsistent behavior of *zai* in (35) cannot be attributed to syntactic constraints. Additionally, in (35a), since Lisi’s son died, the only person who can collapse is Lisi, and therefore there is no question of which entity performs the action of the main verb. Moreover the presence of *zai* forces the interpretation that it is *Lisi* who is involved with the event in the main clause. In (35b’), both *Lisi* and *erzi* ‘son’ can be interpreted to be involved with the main verb, and this causes ambiguity, making it difficult to process the sentence. However, the occurrence of *zai* clearly assigns *Lisi* as the subject that performs the action with the main verb and there is no ambiguity as in the

sentence without *zai*. (35c), with and without *zai*, has the same meaning, and this provides evidence that the optionality of *zai* is not a syntactic constraint⁸.

Based on what I have observed above, apparently the optionality of *zai* in post-subject positions is not because of syntactic constraints, but possibly due to the comprehender's assumptions about the structure of sentences starting with two noun phrases as conflicting or compatible with the structure of sentences containing temporal phrases. That is, the comprehender imposes structure in the string of words. When comprehenders encounter two noun phrases at the beginning of the sentence, they impose a structure that has two noun phrases in the beginning of the sentence and if what they predict is compatible with a temporal construction, the sentence is fine; otherwise a garden path occurs, and it ends up requiring reanalysis.

One of the famous garden path sentences is following:

(36) The horse *(that was) raced past the barn fell. (Bever 1970)

(36) shows that omission of *that was* causes the sentence to be unacceptable, although it is a grammatical sentence without *that was*. The reason that (36) is unacceptable is because the comprehender initially interprets the sentence as follows:

(37) The horse raced past the barn.

⁸ If the *zai* phrases are preposed, the first NP in the non-preposed sentence is consistently interpreted as the subject of the main verb for all the sentences in (35).

When comprehenders read (36), they impose the structure in (37) onto it, and are garden pathed when they encounter *fell*. (36) can be rescued by inserting *then* before *fell*, although it is a different structure. It has a very similar meaning to (36), as shown in (38).

(38) The horse raced past the barn then fell.

Another way to improve (36) is to bias the main verb as (39) shows.

(39) The horse ?(that was) raced past the barn eats a lot.

Similarly, the omission of *zai* has the same effect as *that was* in (36). Consider (40).

(40) Zhangsan *(zai) Lisi chu le che huo yi-hou jiu qu kan ta.
 ZAI have LE car accident after then go see him
 Intended to mean: 'Zhangsan went to visit him_i after Lisi_i had a car accident.'

(40) is not good after omitting *zai* because the initial part of the sentence is interpreted as (41) and the comprehender processes it as (41). (41) is a sentence starting with two noun phrases and the two proper names are interpreted as a coordination.

(41) Zhangsan Lisi chu le che-huo.
 have LE car-accident
 'Zhangsan and Lisi had a car accident.'

(42) a. Zhangsan Lisi chu le che-huo yi-hou jiu shoushang le.
have LE car-accident after then injure LE
'After [Zhangsan and Lisi]_i had a car accident, they_i both were injured.'

b. Zhangsan Lisi zai chu le che-huo yi-hou jiu shoushang le.
ZAI have LE car-accident after then injure LE
'After [Zhangsan and Lisi]_i had a car accident, they_i both were injured.'

c. Zhangsan Lisi (zai) chu le che-huo yi-hou jiu shoushang le.
ZAI have LE car-accident after then injure LE
'After [Zhangsan and Lisi]_i had a car accident, they_i both were injured.'

d. Zhangsan *(zai) Lisi chu le che-huo yi-hou jiu shoushang le.
ZAI have LE car-accident after then injure LE
'After Lisi had a car accident, Zhangsan was injured.'

⁹ There may be an interpretation of *after Zhangsan and Lisi had a car accident, they went to see him*, in which *they* refers to *Zhangsan and Lisi*; however this reading is difficult to get without a context for it.

adverbial in which *zai* is optional. (42c) is like sentences such as (27) and (28), in that *zai* is optional; however, the structure of *Zhangsan* and *Lisi* is different from the one in (40). (42c) is fine and still contains a temporal clause. However, if we intend to make it mean the same as (42d), the absence of *zai* will lead a comprehender to get the wrong interpretation.

Following what I have discussed, the assumption is that *zai* is optional. However, when *zai* is omitted in the post-subject position, it leaves two NPs in a sequence, and this situation resembles other structures, for example, structures starting with a coordination or a topic-subject pair, which leads the comprehender to assume a structure of sentences that starts with a sequence of two noun phrases. If this assumption fits the sentence, it is fine as (42a) to (42c) show. If not, the comprehender encounters disambiguating information after the main verb, as (40) shows. Therefore, when *yi-qian/yi-hou* clauses occur after the main subject, including *zai* is preferred since omitting *zai* would cause ambiguity as shown in (40). This situation is similar to the English example in (36), in which *that was* provides disambiguating information and makes the sentence acceptable¹⁰. If this analysis is on the right track, it is important to know what constructions starting with two noun phrases are allowed to occur before *yi-qian/yi-hou*, as these structures may be hypothesized by comprehenders.

¹⁰Omission of *that* in (i) also shows a temporary garden path with the verb *spilled* being the main verb; however the garden path is quickly recovered from after the main verb is encountered. This seems to be parallel to (ii) in that the omission of *zai*, although causing a temporary garden path with the first NP being the topic of the embedded clause, is recovered from after the main verb is encountered. (See section 5.4.2.2 for the discussion of topic readings.)

- (i) The coffee (that) spilled on the rug caused the stains.
- (ii) Na liang chezi (zai) wo xi le yi-hou jiu huai le
That CL car ZAI I wash LE after then out-of-order LE
'The car become out of order after I washed it.'

5.4.2. Constructions starting with two noun phrases

The possible structures in which two NPs can start a sentence in Chinese are either in coordination or a topic-subject relationship¹¹. Coordination usually needs a conjunction, and not all noun phrases can be in topic-subject relations. In 5.4.2.1, I will examine what conditions allow two NPs to be coordinated without a conjunction, and in 5.4.2.2, I will discuss what constrains topic-subject relations, i.e. what can be and what cannot be in topic-subject relations.

5.4.2.1 Coordination

In this section, I will introduce Chinese coordination and show the conditions that make a two NP sequence have a coordination interpretation without a conjunction.

Chinese coordination with noun phrases usually requires *he* ‘and’ between the two noun phrases and sometimes requires *dou* ‘all’ after the coordinated elements, as (43) shows¹².

- (43) a. Shugui he zhuozi (dou) bu-jian le.
bookshelf and table all not-see LE
'The bookshelf and the table are both gone.'

¹¹ Sentences starting with a subject and a temporal adverbial (such as dates, days of the week, and holidays) are easy to process since adverbials like these are easily defined as adverbs. Therefore they don't cause processing problems and will not be considered issues to be discussed here as a type of sentence starting with two NPs.

¹² Gen 'and' also can be used to coordinate two noun phrases; however, it also means *with*, and without a context, it is difficult to tell if it means *and* or *with*, as shown in (i). Therefore, I don't discuss it here.

- (i) Zhangsan gen Lisi chuqu banshi
 and/with go-out do-business
 ‘Zhangsan and Lisi went out to do some business.’ Or
 ‘Zhangsan went out to do some business with Lisi.’

- b. Na-zhang zhuozi he naxie yizi (dou) bu-jian le.
 that-CL table and those chair all not-see LE
 Intended to mean: 'The table and those chairs have disappeared.'
- c. Zhangsan he yizi ?(dou) bu-jian le.
 and chair all not-see LE
 'Zhangsan and the chair are both gone.'
- d. Yi-zi he Zhangsan ?(dou) bu-jian le.
 Chair all not-see LE
 Intended to mean 'Zhangsan and the chairs both have disappeared.'

When the two noun phrases are two names or two related objects that are frequently combined, this situation can override the requirement of *he* 'and' and *dou* 'all; both' as in (44).

- (44) a. Zhangsan (he) Lisi (dou) bei ma le.
 Zhangsan and Lisi both BEI scold LE
 'Zhangsan and Lisi were scolded.'
- b. Zhuozi (he) yizi (dou) bu-jian le.
 table and chair all not-see LE
 'The table(s) and the chair(s) have disappeared.'

(44a) shows that when two proper names occur in the beginning of the sentence with a predicate, the interpretation is that the two proper names are in a coordinated relationship and undergo the same event. In (44b), the two objects are interpreted as two coordinated objects that have disappeared. *Table* and *chair* are closely related and usually come as a set, and *zhuozi yi-zi* 'table chair' is a commonly combined usage; therefore, without *he* 'and' and *dou* 'all', the sentence can still be processed readily.

However, if the NPs are not names and commonly combined related objects, sentences lacking *he* ‘and’ and *dou* ‘all’ are not good depending on several variables, as shown below.

- (45) a. ?Shugui zhuozi bu-jian le.
 bookshelf table not-see LE
 ‘The bookshelf and the table have disappeared.’
- a’. Shugui zhuozi **dou** bu-jian le.
 bookshelf table all not-see LE
 ‘The bookshelf and the table have disappeared.’
- b. *Na-zhang zhuozi naxie yizi bu-jian le
 that-CL table those chair not-see LE
 Intended to mean: ‘The table and those chairs have disappeared.’
- b’. ?Na-zhang zhuozi naxie yizi **dou** bu-jian le
 that-CL table those chair all not-see LE
 Intended to mean: ‘The table and those chairs have disappeared.’
- c. *Zhangsan yizi bu-jian le.
 chair not-see LE
 Intended to mean ‘Zhangsan and the chairs both have disappeared.’
- c’. ??Zhangsan yizi **dou** bu-jian le.
 chair all not-see LE
 Intended to mean ‘Zhangsan and the chairs both have disappeared.’
- d. *Yi-zi Zhangsan bu-jian le.
 Chair not-see LE
 Intended to mean ‘Zhangsan and the chairs both have disappeared.’
- d’. ??Yi-zi Zhangsan **dou** bu-jian le.
 Chair all not-see LE
 Intended to mean ‘Zhangsan and the chairs both have disappeared.’

In (45a), although the sentence is acceptable, especially with the addition of *dou* in (45a’), *the bookshelf* and *the chair* do not have a close relationship, and thus (45a) is not

as good as (44b) without *dou*. (45b) also contains *table* and *chair*, but the two NPs containing demonstratives are not commonly used. They are therefore unacceptable without *he* ‘and’ and *dou* ‘all’, and are not very acceptable even with the help of *dou* ‘all’ as in (45b’). (45c) and (45d) both contain two unrelated objects. In addition, the *Zhangsan* and *yizi* ‘chair’ sequence is usually interpreted as *Zhangsan* and *his chair* instead of a list of possible coordinated elements if *he* ‘and’ and *dou* ‘all’ do not occur, and is still not very good with the help of *dou* ‘all’, as shown in (45c’) and (45d’).

In addition, for a pair of noun phrases to have a coordination reading without a conjunction, one NP must not be the antecedent of an overt or covert pronoun in the verb phrase. This can be shown by (46).

- (46) Zhangsan Lisi da le ta yi-dun.
 beat LE him one-CL
 ‘Zhangsan_i, Lisi has beaten him_i up.’ Or
 ‘Zhangsan_i and Lisi_j have beaten him_k up.’

(46) contains a pronoun in the verb phrase which can refer back to *Zhangsan*, but not to *Lisi*. Although there are two interpretations, the topic-subject interpretation is easier to get than the coordination interpretation. Therefore, in order to have a coordination reading straightforwardly without a conjunction, there should not be a pronoun occurring in the verb phrase. Thus, in order to ensure a coordination reading the two noun phrases have to be either two names or two related objects that are commonly used, and there must be no pronoun co-referent to one of the noun phrases occurring in the verb phrase.

5.4.2.2 Topic-subject relationship

The second way in which two NPs can be interpreted is when the first NP is interpreted as a topic. In a sentence containing a topic, there must be some sort of relationship between the topic and the rest of the sentence that contains the topic; otherwise, the topic appears very odd.

Chinese is a topic prominent language (Li and Thompson 1981). According to L & T, a topic has the following characteristics:

- (47) A topic is typically a noun phrase (or a verb phrase) that names what the sentence is about, is definite or generic, occurs in sentence-initial position, and may be followed by a pause or a pause particle (p. 87).

Those characteristics are exemplified in (48) and (49).

- (48) Wo xihuan chi pingguo.
I like eat apple
'I like to eat apples.' (L & T 1981, 88)

- (49) a. Gou wo kan guo le.
dog I see GUO LE
'Dogs_i, I have seen them_i.' Or
'The dog_i, I have seen it_i.'
- b. Nei-zhong douzi yi-jin sanshi kuai qian.
that-CL bean one-catty thirty dollar money
'That kind of bean, one catty is thirty dollars.' (L & T 1981, 96)

In (48), according to L & T, *wo* 'I' is definite, the sentence is about *wo*, and it can be followed by a pause, and is therefore a topic.

In (49a), there should be a resumptive pronoun or trace after *guo* that is coindexed with *gou* ‘dog’. In (49b), the subject *yi-jin* ‘one catty’ is a subset of the *topic nei-zhong douzi* ‘that-CL bean’; i.e., the topic and the subject are in a part-whole relationship. In this thesis, what is relevant are sentences with a topic and a subject because a temporal phrase in its post-subject position results in a two-NP sequence without *zai*. Also *before/after* clauses usually indicate a sequence of two events. Therefore, I will focus on sentences with topics that describe events but not states. Thus sentences like (49b), which does not express any event, will not be considered.

In a topic-subject sequence sentence, the topic and the subject can have a number of different relations. The most common relations are those that indicate the same reference, possessor-possessee relationship, and agent-theme/theme-agent relations. In the possessor-possessee relation, clauses after the topic describe events relating to the possessee, but not to the possessor. In the agent-theme relation, the topic is the doer of clauses after the topic, while in the theme-agent relation, the topic undergoes some event in clauses following it. In what follows, I will provide examples of these relations.

First, a topic may be a co-referent with the subject of a sentence as in (50).

- (50) Zhangsan_i ta_i lai le.
 he come LE
 ‘Zhangsan_i, he_i himself_i came.’

(50) is a sentence containing a topic, *Zhangsan*. *Ta* ‘he’ refers to *Zhangsan*, but not to other people. However, the reverse order is impossible, as shown in (51).

- (51) *Ta_i Zhangsan_i lai le.
he come LE

In (51), not only can the two NPs not be coindexed, the sentence does not make sense at all.

A second kind of topic-subject relation arises when the topic-subject is in a possessor-possessee relation as (52) shows¹³.

- (52) a. Xiaowei chezi huai le.
Xiaowei car break LE
'Xiaowei_i, her_i car is broken.'

- b. Zhangsan erzi si le.
son die LE
'Zhangsan_i, his_i son died.'

¹³ Chinese possessor and possessee relationship is usually marked by using *de*, and *de* sometimes can be omitted as *wo de meimei* can be represented as *wo meimei* 'my sister'. Although (52) may be translated as in (i),

- | | | |
|-----|--|--|
| (i) | a. Xiaowei chezi huai le
Xiaowei car break LE
'Xiaowei's car is broken.' | b. Zhangsan erzi si le
son die LE
'Zhangsan's son died.' |
|-----|--|--|

and the translation in (52) and (i) may refer to the same event, unlike *wo meimei*, *Xiaowei chezi* 'Xiaowei car' and *Zhangsan erzi* 'Zhangsan son' are not legitimate constituents by themselves. This can be illustrated by the following contrast.

- | | | |
|------|---|---|
| (ii) | a. Wo xihuan <u>wo meimei</u>
I like I sister
'I like my sister' | b. *Wo xihuan <u>Zhangsan erzi</u>
I like son
Intended to mean 'I like Zhangsan's son.' |
| | c. *Wo kan guo <u>Xiaowei chezi</u>
I see GUO Xiaowei car
Intended to mean 'I have seen Xiaowei's car.' | |

Since *Zhangsan erzi* in (iib) and *Xiaowei chezi* in (iic) are not constituents, it follows when they are in topic-subject positions, they do not have the meaning in (i) and they do not have an optional *de* as in *wo de meimei* 'my sister'.

Again, the reverse order does not allow the possessee-possessor relationship as in (53).

- (53) a. *Chezi Xiaowei huai le.
car Xiaowei broken LE
Intended to mean: 'That car, Xiaowei's, is broken.'
- b. *Erzi Zhangsan si le.
son die LE
Intended to mean: 'The son, Zhangsan's, is dead.'

However, this kind of combination depends on how frequent the possessor-possessee relationship is in our world. It is difficult for (54a) to have the meaning that the maple trees belong to Zhangsan, although it is easy to get the car belongs to Xiaowei in (52). The reverse order is even worse as (54b) shows.

- (54) a. ??Zhangsan fengshu zhang gao le.
maple-tree grow tall LE
Intended to mean: 'Zhangsan, his maple trees have grown tall.'
- b. *Fengshu Zhangsan zhang gao le.
maple-tree grow tall LE
Intended to mean: 'The maple trees, Zhangsan's, have grown tall.'

A final topic-subject relationship is interpreted as agent-theme/theme-agent as in (49a). (55) contains some similar examples.

- (55) a. Zhangsan shu kanwan le.
book read-finish LE
'Zhangsan has finished reading the book.'

- b. ?Shu Zhangsan kanwan le.
 book read-finish LE
 ‘The book was finished by Zhangsan.’

As I have mentioned before, and as L & T argue, the sentence after the topic has to be about the topic. One way to create this relationship is to have part-whole relations, including possessor–possessee relations; another way is that the topic can be either the agent of the sentence after it, as in (55a), or the topic can be the theme of the sentence after it, as in (55b). However, a definite NP seems to be more readily accepted as a topic than a generic NP, as (56) shows. (53), (54), and (55b) also show a similar situation.

- (56) a. Na-ben shu Zhangsan hen xihuan.
 that-CL book very like
 ‘That book_i, Zhangsan likes it_i very much.’
 b. (Na-ben) shu renren dou hen xihuan.
 that-CL book everyone all very like
 ‘(That book) Books, everyone really likes.’
 c. ??Shu Zhangsan hen xihuan.
 book very like
 ‘The books_i, Zhangsan really likes them_i.’

(56c) has a very similar structure to (56a), (49a), and (55b). The difference is that the verbs in (49a) and (55b) contain a resultative complement, *guo* (a perfective marker) for *kan* ‘see’ in *kanguo* ‘have seen’ in (49a), and *wan* ‘finish’ for *kan* ‘read’ in *kanwan* ‘finished reading’ in (55b). Moreover, since *xihuan* ‘like’ is not a verb with a resultative complement and *shu* ‘book’ is a generic bare NP, changing the subject to a universal quantifier rescues (56b) without a demonstrative. It seems that definite NPs including

proper names can be topics without much limitation, as I have shown in this section, while bare NPs have to have a resultative verb phrase predicate or have a universal quantifier as their subject in order to be a topic.

In summary, sentences starting with two NPs are possibly a coordination subject or a topic followed by a subject. In order to be coordinated without conjunctions, the two NPs have to be names and commonly combined NPs, and there can be no co-referent pronouns involved in the verb phrase. In a topic-subject relation, the topic and the subject have to co-refer, or there must be a part-whole relation between the topic and some NP in the rest of the sentence, or the topic-subject must be in a possessor-possessee relation. Otherwise, the topic has to be either a theme or an agent associated with the rest of the sentence. Finally, it seems that bare NPs have more limitations on being a topic than definite NPs.

5.5 Explaining the problems

As we have discussed before, *zai* is not optional with locative phrases, but is optional with temporal phrases. However, when *zai* phrases occur after the main subject, problems may occur because the omission of *zai* results in two NPs in a sequence, and this situation makes comprehenders impose an incorrect structure. If the structure imposed by a comprehender fits the sentence, the sentence is fine; if not, it is unacceptable. In this section, I will discuss how sentences starting with two NPs fit or do not fit the temporal structure. I will start from sentences starting with two coordinated NPs, then discuss topic-subject relation sentences.

Recall that Chinese coordination can leave out the conjunction and *dou* ‘all’ when the two NPs are names or two commonly combined NPs without a pronoun as the object of the verb phrase, as shown in (44), repeated here as (57), leaving out *he* ‘and’, and *dou* ‘both, all’.

- (57) a. Zhangsan Lisi bei ma le.
 Zhangsan Lisi BEI scold LE
 ‘Zhangsan and Lisi were scolded.’
 b. Zhuozi yizi bu-jian le.
 table chair not-see LE
 ‘The table(s) and the chair(s) have disappeared.’

Zhangsan Lisi in (57a) and *zhuozi yizi* (57b) are understood as in coordination, and when they occur in a temporal sentence with *yi-qian/yi-hou*, ‘Zhangsan and Lisi’ and ‘table and chair’ are the subjects of the sentences as shown in (58). The structure is exactly as if *zai* is omitted after the second NP.

- (58) a. Zhangsan Lisi (zai) bei ma le yi-hou jiu ku le.
 ZAI BEI scold LE after then cry LE
 ‘After [Zhangsan and Lisi]_i were scolded, they_i cried.’
 b. Zhuozi yizi (zai) bu-jian le yi-qian shi bai zai keting li.
 table chair ZAI not-see LE before is put ZAI living inside
 ‘Before they_i had disappeared, [the table and the chair]_i were put
 in the living room.’

Now consider (59).

- (59) Zhangsan *(zai) Lisi bei ma le yi-hou jiu ku le.
 ZAI BEI scold LE after then cry LE
 Intended to mean: ‘After Lisi was scolded, Zhangsan cried.’

In (59), *zai* occurs after *Zhangsan*, and *Zhangsan* is the main subject, while *Lisi* is the subject of the *yi-hou* clause. After omitting *zai*, the sentence only has the reading of (58a), but not the intended meaning from (59). That is, the omission of *zai* in (59) results in a different reading, which is still a temporal sentence; therefore, *zai* is required in (59), not for syntactic reasons, but to prevent a different interpretation.

A similar situation applies to (60).

- (60) Zhuozi *(zai) yizi mai hui-lai le yi-hou jiu fang zai keting li
 table ZAI chair buy back LE after then put ZAI living inside
 Intended to mean: ‘After the chair was purchased, the table was put
 in the living room.’

In (60), the occurrence of *zai* makes *zhuozi* ‘table’ be perceived as the main subject, while the absence of *zai* makes (60) have the meaning as in (58b), and thus a garden path occurs.

However, when a sentence begins with NPs that can not be perceived as in coordination without *he* ‘and’ and *dou* ‘all’, the sentence is unacceptable even if the sentence starts a larger sentence containing a temporal construction, as (61) shows.

- (61) a. ??Na-zhang zhuozi na-ba yizi mai-huilai le yi-hou jiu fang zai keting li.
 that CL table that-CL chair buy-back LE after then put ZAI living inside
 ‘After [that table and that chair]_i were purchased, they_i were put in the living room.’

- b. Na-zhang zhuzi **zai** na-ba yizi mai hui lai yi-hou jiu fang zai keting li.
 that-CL table ZAI that-CL chair not-see LE before is put ZAI living inside
 ‘Before that chair was purchased, that table was put in the living room.’

As I have discussed in 5.4.2.1, uncommonly combined NPs are not generally taken as in coordination. (61a) contains two NPs that are not commonly combined. The two-NP combination is not common and it is unclear how the two NPs are analyzed; when the comprehender encounters *yi-qian*, it is still difficult to determine whether the two-NP sequence caused by leaving out a conjunction or having omitted *zai*. The illegitimately coordinated NPs cannot help the reanalysis that (61a) has an optional *zai* after the first NP when the comprehender encounters *yi-hou*. Thus, (61b) shows that *zai* is required to avoid the unacceptable NP combination.

Recall (2a) and (3a), repeated here as (62a) and (63a).

- (62) a. Zhangsan ??(zai) Lisi chusheng yi-qian jiu chuguo qu le.
 ZAI was-born before then go-abroad go LE
 Intended to mean: ‘Before Lisi was born, Zhangsan had gone abroad.’
 b. ??Zhangsan Lisi chusheng yi-qian jiu chuguo qu le.
 was-born before then go-abroad go LE
 Intended to mean: ‘Before Lisi was born, Zhangsan had gone abroad.’
- (63) Meiguihua *(zai) yeshou si le yi-hou jiu diao-xie le.
 rose ZAI beast die LE after then wither LE
 Intended to mean: ‘The rose withered after the beast died.’

In (62a) with *zai*, the first proper name is the main subject, while the second proper name is the subject of the temporal clause. Without *zai*, as shown in (62b), the two proper names are interpreted as in coordination, and the sentence means *before [Lisi and*

*Zhangsan*_i were born, *they*_i had gone abroad, which is semantically illegitimate.

However, when a comprehender reaches the main verb phrase, disambiguation should occur, but it seems to be difficult to reanalyze the sentence to get the intended meaning.

In (63), with *zai*, *meiguihua* ‘rose’ is the main subject, and *yeshou* ‘beast’ is the subject of the embedded clause. Without *zai*, as shown in (63), the two NPs do not have a close relationship like *table* and *chair*, (recall (44b)), and are not names. It is difficult to understand what the relation is between *meiguihua* and *yeshou*; therefore, it is unclear what the meaning is by saying *meiguihua yeshou si le* ‘roses beasts died’. The two NPs might be perceived as an NP that is about a kind of *yeshou* ‘beast’ which has the property of *meiguihua* ‘rose’; however, it is unlikely. Even in the case of a coordination interpretation, [*the rose and the beast*]_i *withered after they_i died* in (63) is difficult to obtain since it is not common for the two NPs to share the predicates of both the embedded clause and the main clause. More importantly, the bias of the predicate, i.e. *die* for *the beast* and *wither* for *the rose*, is supposed to help in perceiving that the second NP is the subject of the embedded clause. However, it seems that the garden path of the unacceptable NP combination is too strong to be reanalyzed.

Now let us add demonstratives to the two NPs in (63) and have (64).

- (64) Na-duo meiguihua *(zai) na-zhi yeshou si le yi-hou jiu diaoxie le.
that-CL rose ZAI that-CL beast die LE after then wither LE
Intended to mean: ‘That rose withered after that beast die.’

Similar to (63), the two NPs are not in legitimate in coordination without *he* 'and' and *dou* 'all' since they are not closely related or commonly combined. Starting with an ungrammatical NP combination, (64) cannot be reanalyzed as an acceptable sentence.

In summary, when a temporal clause occurs after the main subject, the absence of *zai* may lead NPs that are names or two objects that are commonly combined to be interpreted as in coordination. The coordination can still be the subject of the temporal sentence, but it has to semantically fit the main verb phrase; otherwise, it is difficult to process and results in an unacceptable sentence as shown in (62b). Nevertheless, once a comprehender reaches the coordination interpretation, the interpretation with *zai* after the first NP cannot be obtained. Finally, NPs that are not names or common combinations cannot be coordinated without *he* 'and' and *dou* 'all'. When *zai* is omitted in the post-subject position, leaving a two-NP sequence that reads as an illegitimate NP combination, as in (61a), (62), (63), and (64), the relationship of the NP combination cannot be determined and thus the sentence is unacceptable.

Now we should turn to topic-subject relationships. Before discussing the possible sentences with topic that can appear in *yi-qian/yi-hou* clauses, I shall discuss how topic sentences can be compatible with temporal sentences. Consider (48), repeated here as (65).

- (65) Wo xihuan chi pingguo.
 I like eat apple
 'I like to eat apples.' (L & T 1981, 88)

According to L & T, a subject can sometimes also be a topic. (65) has *wo* 'I' as the topic as well as the subject. Since subjects in Chinese sentences often have this property, main subjects in temporal sentences can be topics as well as subjects as shown in (66) (The commas are used to emphasize the existence of the topics; they are not used else where. Specifically, the comma in (66b) illustrates that the main subject is also a topic.)

- (66) a. Na-liang chezi zai women chu le chehuo yi-hou jiu bei mai le.
 that-CL car ZAI we have LE car-accident after then BEI sell LE
 'After we had a car accident, the car was sold.'
- b. Na-liang chezi, (zai) women chu le chehuo yi-hou jiu bei mai le.
 that-CL car ZAI we have LE car-accident after then BEI sell LE
 'The car_i, after we had a car accident, it_i was sold.'
- c. Na-liang chezi women (zai) chu le chehuo yi-hou jiu ba ta mai le.
 that-CL car we ZAI have LE car-accident after then BA it sell LE
 'The car_i, after having a car accident, we sold it_i.'

(66a) is a regular temporal sentence which is composed of a subject, an adverbial phrase, and a verb phrase. However, the main subject can be separated from the rest of the sentence to be a topic as shown in (66b). The sentence is still grammatical and has the same meaning as (66a), and *zai* can also be omitted. With this in mind, we should predict that a grammatical topic sentence that involves events can occur before *yi-qian/yi-hou*, and the topic can also be the subject of the main predicate. In addition, as long as the whole sentence is about the first NP, the subject after the topic can be the main subject; in this case *zai* should be after the subject, as shown in (66c), instead of before the subject as in (66b). Nevertheless, a topic can be the main subject, for example in (66b), *na-liang*

chezi ‘that car’ can be a topic as well as a subject; however, if *zai* occurs, the NP before *zai* is generally perceived as a subject. This can be shown from the following sentences.

- (67) a. ?*Nei-ben shu wo kanwan le yi-hou yanjing hen bu-shufu*
 that-CL book I read-finish LE after eye very uncomfortable
 ‘That book_i, after I finished reading it_i, my eyes became very uncomfortable.’
- b. **Nei-ben shu zai wo kanwan le yi-hou yanjing hen bu-shufu*
 that-CL book ZAI I read-finish LE after eye very uncomfortable
 Intended to mean: ‘That book_i, after I finished reading it_i, my eyes became very uncomfortable.’

In (67a), *nei-ben shu* ‘that book’ is the topic, but not the main subject; however, after adding *zai* in (67b), the sentence becomes unacceptable because *nei-ben shu* ‘that book’ is interpreted as the main subject, and it competes for the subject position with *yanjing* ‘eye’. This shows that after adding *zai*, the first NP is generally interpreted as a subject, although the first NP can also be a topic¹⁴. Now we shall consider the possible topic-subject sentences that I discussed in 5.4.2.2, which are allowed to occur before *yi-qian/yi-hou* in a sentence that contains *yi-qian/yi-hou* clauses.

First, consider a topic-subject that has the same reference.

- (68) *Zhangsan_i ta_i lai le.*
 he come LE
 ‘Zhangsan_i, he_i himself_i came.’
- (69) a. *Zhangsan zai ta lai le yi-hou jiu yizhi hen bu gaoxing.*
 ZAI he come LE after then all-the-time very not happy
 ‘Zhangsan_i was very unhappy, after he_i came.’

¹⁴ It is unclear why NPs before *zai* phrases, such as in (67b), are perceived as subjects, but not as topics.

- b. Zhangsan ta lai le yi-hou jiu yizhi hen bu gaoxing.
 he come LE after then all-the-time very not happy
 ‘Zhangsan_i was very unhappy, after he_i came.’

(68) is a possible topic-subject sentence, and the two NPs can only be interpreted as having the same reference. As shown in (69a), with *zai*, *Zhangsan* is analyzed as the main subject, and *ta* ‘he’ is the subject of the embedded clause. Although *ta* can refer back to *Zhangsan*, this reading is not as easy to get as the disjoint reading. In (69b), without *zai*, there is only one reading; *ta* ‘he’ can only refer to *Zhangsan*. Therefore, the omission of *zai* makes *Zhangsan* and *ta* interpreted as in topic-subject relation as in (68). When the clause *ta lai le* ‘he came’ encounters *yi-hou*, it is possible to reanalyze *ta lai le yi-hou* ‘after he came’ as an adverbial clause. When the main predicate is encountered, it is still a property of *Zhangsan* and it is a legitimate sentence. Therefore, in order to get a disjoint reading, *zai* is necessary in (69a). Now let us examine the reverse order of *Zhangsan* and *ta*.

- (70) a. Ta zai Zhangsan lai le yi-hou jiu yizhi hen bu gaoxing.
 he ZAI come LE after then all-the-time very not happy
 ‘After Zhangsan_i came, he_j was very unhappy.’
 b. ??Ta Zhangsan lai le yi-hou jiu yizhi hen bu gaoxing.
 he come LE after then all-the-time very not happy
 Intended to mean: ‘After Zhangsan_i came, he_i was very unhappy.’

In (70a), with *zai*, *ta* is the main subject, and *Zhangsan* is the subject of the embedded clause. However, when *zai* is omitted, as shown in (70b), it is unclear how the sentence can be interpreted, since *Ta Zhagnsan lai le* ‘he, Zhangsan came’ is not a grammatical

sentence with a topic. Thus, when *zai* is omitted after the first NP, the ungrammatical NP sequence cannot have the co-referent reading, nor can it help in reanalyzing the second NP as the subject of the embedded clause.

Now let us examine the possessor-possessee sequence.

- (71) a. Zhangsan (zai) chezi huai le yi-hou jiu diu le gongzuo.
 ZAI car break LE after then lose LE job
 ‘Zhangsan_i lost his_i job after his_i car broke down.’
- b. Zhangsan chezi (zai) huai le yi-hou jiu bu-neng kai le.
 car ZAI break LE after then cannot drive LE
 ‘Zhangsan_i, his_i car_j cannot be driven, after it_j broke down.’
- c. Chezi *(zai) Zhangsan diu le gongzuo yi-hou jiu huai le.
 car ZAI lose LE job after then break LE
 Intended to mean ‘After Zhangsan_i lost his job, his_i car broke down.’
- d. ?Zhangsan chezi huai le yi-hou jiu bei mai le.
 car break LE after then BEI sell LE
 ‘Zhangsan, his car_i was sold, after it_i broke down.’
 ‘Zhangsan_i was sold after his_i car broke down.’

In (71a), the presence or absence of *zai* does not influence whether *chezi* ‘car’ is interpreted as Zhangsan’s car. When *zai* is present, *Zhangsan* is the subject of the main clause, while *chezi* ‘car’ is the subject of the embedded clause. When *zai* is absent, *Zhangsan* is the topic as well as the subject of the main clause. Therefore, the topic-subject reading is compatible with the structure at the point that *zai* occurs after *Zhangsan*. (71a) again supports the idea that *zai* is optional. In (71b), *chezi* ‘car’ is interpreted as the main subject. The optionality of *zai* is not a problem here since the main predicate semantically biases the choice of subject to *chezi* ‘car’. However, without *zai*, the reverse order of *Zhangsan* and *chezi* in (71c) is not an acceptable NP sequence

for a possessor-possessee pair, and the sentence is very difficult to process. Now examine (71d). Although in many cases the name-car pair seems to have no ambiguity, the main predicate in (71d) still shows an ambiguity. Many of my informants readily have the reading of the car being sold; they also think there is another reading that *Zhangsan* is sold¹⁵. A similar kind of ambiguity to (71d) is even more obvious when the possessor and possessee are two animate NPs, as we have seen in (35). The sentences in (72), which I repeat from (35) all have same NP pair.

- (72) a. *Lisi (zai) erzi si le yi-hou yijuebuzhen.*
 ZAI son die LE after collapse
 ‘*Lisi_i* collapsed after *his_i* son died.’
- b. *Lisi zai erzi si le yi-hou jiu cheng-ming le.*
 ZAI son die LE after then become-famous LE
 ‘*Lisi_i* became famous after *his_i* son died.’
- c. ??*Lisi erzi si le yi-hou jiu cheng-ming le.*
 son die LE after then become-famous LE
 ‘*Lisi_i* became famous after *his_i* son died.’ Or
 ‘*Lisi’s son_i* became famous after *he_i* died.’

In (72a), due to the death of *Lisi*’s son, only *Lisi* can be the subject of the main predicate, *yijuebuzhen* ‘collapse’. Therefore, the presence of *zai* does not make any difference (with *zai*, *Lisi* is the main subject; without *zai*, *Lisi* is both the topic and the main subject). In (72b), there is only one reading, that *Lisi* is the person who became famous. If *zai* does not occur as in (72b) and we get (72c), although the initial part of the sentence is the same as in (72a), ambiguity still occurs. The ambiguity occurs because *Lisi* is perceived

¹⁵ There is a third reading of *after Zhangsan’s car broke down, someone sold it*; however this reading is not as easy to get as the other two readings.

as a topic, and it can be associated with the main predicate. Meanwhile, since *Lisi* is a topic and the predicate has no semantic bias for choosing the appropriate subject, *Lisi erzi* ‘Lisi, his son’ can be associated with the main predicate, too. Now consider a proper name and bare NP pair in (73).

- (73) a. ??Zhangsan fengshu zhang gao le yi-hou jiu ba fengye
maple-tree grow tall LE after then BA maple-leave
cai xia lai.
pick down come
Intended to mean: 'Zhangsan, after his maple trees_i had grown tall, he picked
their_i leaves off.'
- b. Zhangsan **zai** fengshu zhang gao le yi-hou jiu ba fengye
maple-tree grow tall LE after then BA maple-leave
cai xia lai.
pick down
'Zhangsan picked those maple trees'_i; leaves off, after they_i had grown tall.'

Recall that the proper name-inanimate bare NP pair can be interpreted as a possessor-possessee pair only when possesseees are closely related to the possessor or are common things that the possessors can have. That is, the possesseees have to be things such as cars, computers, etc. that are common in our lives. However the pair in (73a), i.e., *Zhangsan fengshu*, is not a common possessor-possessee pair, and thus (73a) cannot be generally understood as an acceptable possessor-possessee relationship in which *Zhangsan* can own the trees and pick the leaves off¹⁶. However, when *zai* occurs after *Zhangsan* as shown in

¹⁶ Note that *de* is usually required to denote the possessor-possessee relationship unless the possessor and the possessee are closely related. However, when the possessee contains a demonstrative, it does not seem necessary for the possessee to be a common object in our lives as (i) shows. In (i), without *zai*, *those maple trees* are interpreted as *Zhangsan's* trees. This situation cannot be due to syntactic constraints; however, a pragmatic reason of presupposition due to accommodation can explain why (i) is fine. That is, the demonstrative introduces new information that forces a hearer to accommodate it. Therefore, the following sentence is acceptable whether or not *zai* occurs.

(73b), it is not necessary to interpret *Zhangsan* as having any relationship with *fengshu* ‘maple trees’, it simply denotes one event happens to the other. The situation in (73) is similar to what I have discussed for the coordination interpretation and the co-referent interpretation. When *zai* is omitted after the first NP, it leaves a two-NP sequence, which makes a comprehender seek an interpretation for the two-NP sequence, both from their combination relationship and their relationship with the predicate after them, and when the sequence cannot be interpreted, the sentence cannot be reanalyzed after encountering a temporal element.

Finally, let us examine topic-subject pairs that have agent-theme/theme-agent relationships.

- (74) a. Zhangsan (zai) shu kan-wan le yi-hou cai likai.
 ZAI book see-finish LE after then leave
 ‘Zhangsan left after he finished the book.’
- b. Shu ?(zai) Zhangsan kan-wan le yi-hou jiu bujian le.
 book ZAI see-finish LE after then not-see LE
 ‘The book disappeared after Zhangsan finished reading it’¹⁷.

-
- (i) Zhangsan (zai) na-xie fengshu zhang gao le yi-hou jiu ba fengye cai-xia lai
 ZAI those maple-tree grow tall LE after then BA maple-leaves pick-down come
 ‘Zhangsan_i, after his_i maple trees_j, had grown tall, he_i picked their_j leaves off.’ (without *zai*)
 ‘Zhansan picked those maple trees’_j; leaves off, after they_i had grown tall.’ (with *zai*)

¹⁷ In Chapter 3, I have argued that bare NPs cannot undergo movement out of adjunct clauses. (74b) is fine without *zai* because the topic *shu* is also the subject of the main clause. If it is not the main subject, the sentence will not be good, as shown in (ia); however with a definite NP in (ib), the sentence is acceptable although the topic is not the main subject.

- (i) a. *Shu wo kanwan le yi-hou yanjing jiu hen bu-shufu
 book I read-finish LE after eye then very uncomfortable
 Intended to mean: ‘The book_i, after I finished reading it_i, my eyes became very uncomfortable.’
- b. ? Neiben shu wo kanwan le yi-hou yanjing jiu hen bu-shufu
 that-CL book I read-finish LE after eye then very uncomfortable
 ‘That book_i, after I finished reading it_i, my eyes became very uncomfortable.’
- c. ? (zai) Zhangsan kan-wan le yi-hou shu jiu bujian le.
 ZAI see-finish LE after book then not-see LE
 ‘The book_i disappeared after Zhangsan finished reading it_i.’

- c. *Shu* ??(zai) *Zhangsan* *dao le* *yi-hou jiu bu-jian le*.
 book ZAI *Zhangsan* arrive LE after then not-see LE
 Intended to mean: 'The book, after *Zhangsan* arrived, disappeared.'

(74a) is an agent-theme combination, while (74b) is a theme-agent relationship. Whether *zai* occurs or not, both sentences have the same meaning, since with or without *zai* the topic can be the main subject, and there is no semantic bias for the main verb to choose *shu* 'book' as its subject. However, although (74c) has the same meaning when *zai* is present, it is not good since *shu Zhangsan dao le* 'books, *Zhangsan* arrived' is not a legitimate sentence that starts with two NPs. Since (74c) starts out with an illegitimate topic-subject sentence, a comprehender cannot recover after he/she encounters *yi-hou*. That is, the illegitimate topic-subject interpretation hinders the comprehender from reanalyzing the sentence into a temporal clause.

Now consider the following sentences.

- (75) a. *Zhangsan* ?(zai) *tianqi bian re le yi-hou cai mai le lengqiji*.
 weather become hot LE after then buy LE air-conditioner
 'Zhangsan bought an air-conditioner after the weather became hot.'
- b. *Tianqi* *(zai) *Zhangsan mai le lengqiji yi-hou cai bian re*.
 weather ZAI buy LE air-conditioner after then become hot
 'The weather became hot after *Zhangsan* bought the air-conditioner.'

Assuming what I have discussed in Chapter 3, definite NP topics can be topicalized through being coindexed with a moved null operator or a resumptive pronoun, while bare NP topics cannot do so. However, the bare NP in (74b) without *zai* can be in subject position and therefore it is in an A(argument)-position, and the gap after the verb should not be a variable, but a resumptive pronoun. However, if *shu* is a topic, it is coindexed with the subject which forms a chain with the object position of *kanwan* 'finish reading' parallel to a parasitic gap construction. Since bare NP topicalization involves movement, *shu* must move to the topic position from the subject position as in (ic), and the gap in adjunct position is parasitic to the gap in subject position; therefore, no movement occurs in the adjunct position, thus (74b) is grammatical without *zai*.

- (76) a. Zhangsan ?(zai) feng-ye bian hong le yi-hou yao qu ouzhou wan.
 ZAI maple-leave become red LE after will go Europe play
 ‘Zhangsan will travel to Europe after the maple-leaves turned red.’
- b. Feng-ye *(zai) Zhangsan qu ouzhou wan yi-hou jiu bian hong le.
 Maple-leave ZAI go Europe play after then become red LE
 Intended to mean: ‘The maple leaves became red after Zhangsan went to
 Europe.’

Recall that I have discussed that definite NPs are more common topics than bare NPs.

(75a) and (76a) are acceptable without *zai*; however, the reverse order of the NP pair in (75b) and (76b) is not acceptable without *zai*. This can be explained by the fact that a proper name-bare NP order is a plausible sentence with a topic, but a bare NP-proper name order is not, if they are not in a theme-agent relation. In (75a), when a comprehender reads *Zhangsan tianqi* 'weather', he/she takes *Zhangsan* as a topic and waits for a logical interpretation; therefore, the sentence is only acceptable, but not especially good according to many of my informants. However, when a comprehender hears *tianqi* 'weather' *Zhangsan*, he/she cannot take *tianqi* as a topic and therefore, the sentence is unacceptable at the very beginning.

5.6 *Zai* in *de-shihou* clauses

This chapter starts with the problem about the asymmetry between locative phrases and *yi-qian/yi-hou* phrases. In fact, the issue of the absence of *zai* in the post-subject position also exists in *de-shihou* clauses¹⁸. In the following, I examine the

¹⁸ This post-subject two-NP sequence ambiguity also applies to other temporal phrases, as shown in (i). Since the situation of ambiguity is similar to *yi-qian/yi-hou* clauses, I will not discuss it further.

(i) Lisi *(zai) Zhagnsan lai de na-yi-tian chuguo qu le.
 ZAI come DE that-one-day out-abroad go LE
 Intended to mean: 'Lisi went abroad the day that Zhagnsan came.'

optionality of *zai* in *de-shihou* clauses by looking at sentences whose initial part can be interpreted as a coordination or a topic-subject relationship when *zai* is omitted.

First let us examine the initial phrases that can be interpreted as in coordination as shown in (77).

- (77) a. Zhangsan *(zai) Lisi lai de shihou cai kanshu.
 ZAI come DE time then study
 Intended to mean: 'Zhangsan studies only when Lisi comes.'
- b. Zhangsan Lisi lai de shihou xia le women yi-tiao.
 come DE time scare LE us study one-jump
 'When [Zhangsan and Lisi]_i came, they_i scared us'

In (77a), with *zai*, *Zhangsan* is the main subject; however, when *zai* is omitted, *Zhangsan* and *Lisi* are readily interpreted as in coordination, and when comprehenders encounter the verb phrase, they find that the coordination interpretation cannot be right and have to reanalyze the sentence. In (77b), when we semantically bias the verb phrase, the sentence becomes fine.

Now examine the following sentences in which the two NPs can have the same reference in topic-subject relationship before comprehenders encounter *de-shihou*.

- (78) a. Zhangsan zai ta lai de shihou ba women xia le yi-tiao.
 ZAI he/she come DE time BA us scare LE one-jump
 'Zhangsan_i scared us when he_j came.'
- b. . Zhangsan ta lai de shihou ba women xia le yi-tiao.
 he/she come DE time BA us scare LE one-jump
 'Zhangsan_i, when he_j himself_i came, he_j scared us.'

In (78a), the presence of *zai* indicates that *Zhangsan* is the main subject, and *Zhangsan* and *ta* ‘he’ have a disjoint reading¹⁹. Without *zai* in (78b), *Zhangsan* is perceived as a topic and has the same reference with *ta* ‘he’. Now we shall examine the possessor-possessee relations.

- (79) a. Zhangsan (zai) erzi si de shihou ku de hen shangxin.
 ZAI son die DE time cry DE very hurt-heart
 ‘Zhangsan_i cried very sadly when his_i son died.’
- b. Zhangsan zai erzi chu chehuo de shihou shoushang le.
 ZAI son have car-accident DE time get-injure LE
 ‘Zhangsan_i was injured when his_i son had a car accident.’
- c. ??Zhangsan erzi chu chehuo de shihou shoushang le.
 son have car-accident DE time get-injure LE
 ‘Zhangsan_i was injured when his_i son had a car accident.’ Or
 ‘Zhangsan_i, when his_i son_j had a car accident, he_j was injured.’

In (79a), without *zai*, *Zhangsan* is still interpreted as the main subject, since *Zhangsan erzi* ‘Zhangsan, his son’ died, and the only person who cries is *Zhangsan*. In (79b), the occurrence of *zai* makes *Zhangsan* the main subject; however, without *zai*, in (79c), the sentence is ambiguous in that either *Zhangsan* or *Zhangsan erzi* can be the main subject and is difficult to process. Now let us examine (80) in which a proper name and a bare NP have an agent-theme relationship.

- (80) a. Zhangsan (zai) yifu xiwan de shihou jiu hundao le.
 ZAI clothes wash-finish DE time then faint LE
 ‘Zhangsan_i fainted when he_i finished washing clothes.’

¹⁹ As I have discussed before, with *zai*, the co-referent reading between the two NPs is possible when the name precedes the pronoun, however it is not reached as readily as the disjoint reading.

- b. Yifu ?(zai) Zhangsan xi de shihou jiu po le.
 Clothes ZAI wash DE time then worn-out LE
 'The piece of clothing was worn out when Zhangsan washed it.'
- c. Yifu ??(zai) Zhangsan chuqu de shihou jiu po le.
 Clothes ZAI go-out DE time then worn-out LE
 Intended mean: 'The piece of clothing was worn out when Zhangsan went out.'

(80a) and (80b) start with agent-theme and theme-agent relation respectively, and the omission of *zai* does not influence the sentence meaning. In (80c), the beginning of the sentence is not a legitimate topic-subject relation, and the first NP does not contain a demonstrative; therefore, the sentence is difficult to process.

5.7 Conclusion

In this chapter, I first examined the asymmetry between locative phrases and temporal phrases with respect to the presence of *zai*. I assume that locative phrases need case, while temporal phrases do not need case. Stroik's (1992) analysis that English temporal phrases are predicates and do not need case further supports my assumption that Chinese temporal phrases do not need case either.

In order to confirm that in Chinese, locative phrases need case, I examine cases where locative phrases seem to be allowed without case. As a result of my investigation, when locative phrases appear not to have case, the locative phrases are actually in case positions (e.g. subject position). After confirming that locative phrases do need case, I focused my investigation on temporal constructions, mainly on *yi-qian/yi-hou* clauses. I found that *zai* can be optional in most cases except for in post-subject position, in which the occurrence of *zai* is not consistent. Therefore, I propose that the optionality of *zai* in

post-subject position is independent of syntactic constraints. It seems to behave similarly to *that was in the horse (that was) raced past the barn fell* in which the omission of *that was* causes a garden path. The occurrence of *that was* helps the parser to construct the correct structure. That is, when *zai* is absent, the comprehender tries to structure the two sentence-initial NPs into the sentence. If the imposed structure is a legitimate coordination or a legitimate sentence with a topic, and the comprehender does not encounter disambiguating information such as a verb phrase (that is, a verb phrase that does not semantically suit the imposed structure), the sentence is fine. However, these grammatical sentences without *zai* may have different meanings from sentences with *zai*. This is the case because the NP that immediately precedes *zai* is generally perceived as the main subject. Without *zai*, the main subject can be the two NPs in a coordination, or the subject can be either the first or the second NP in a topic-subject sentence, depending on the main verb. Nevertheless, when *zai* is absent and the two NPs are not a legitimate combination, the sentence cannot be reanalyzed as an acceptable sentence even after a comprehender reaches the temporal element *yi-qian/yi-hou*. Therefore, in order to avoid an incorrect analysis, including *zai* is preferred in post-subject position. Finally, I examined the post-subject *de shihou* clauses, and found similar patterns as in *yi-qian/yi-hou* clauses in post-subject position. Therefore, these phenomena generally occur in temporal phrases after the main subject, and the optionality of *zai* should not be attributed to syntactic constraints. Instead, it can be attributed to processing cues which help the comprehender avoid an unrecoverable garden path sentence.

Chapter 6:

Conclusion

In this thesis, I have discussed the structure of *de shihou* clauses, *yi-qian/yi-hou* clauses, and the use of *zai* in Chinese temporal clauses. I will now answer the questions that I stated in Chapter 1. These questions are repeated here as follows:

1. Is *de shihou* a single element? That is, can it be separated into smaller units? What is the structure of *de shihou* clauses?
2. Are *yi-qian/yi-hou* each a single elements? That is, can they be separated into small units? What is the structure of *yi-qian/yi-hou* clauses?
3. What is the function of *zai* in Chinese temporal clauses? What are the constraints on its occurrence?

For the first question, *de shihou* cannot be a single element. One major reason to treat *de shihou* as a single element is that *shihou* cannot be modified, and therefore, is not a noun phrase. However, the fact that *shihou* cannot be modified cannot be taken as evidence to argue against its being a noun phrase because there are many noun phrases which cannot be modified. Other evidence that shows that *de shihou* is not a single element is that *de* and *shihou* can be separated by a demonstrative, similarly to other adjunct relative clauses' head nouns. Finally, based on the structure of relative clauses that I have argued for in Chapter 2, I have shown that *de shihou* clauses are adjunct relative clauses.

Yi-qian/yi-hou are also not single elements. *Yi*, *zhi*, and *de* are all determiners. *Yi* and *zhi* both are determiners that still keep their classical use, unlike *de*, which has become semantically bleached as Simpson argues,. Furthermore, *qian/hou* are nominal clitics that take a noun phrase or a clause as their complement, and *qian/hou* can be used as *yi-qian/yi-hou* with either an NP or a CP preceding it; thus *yi-qian/yi-hou* are DPs, but not compound words. As for the structure of *yi-qian/yi-hou* clauses, *qian/hou* take a CP as their complement instead of moving from within the CP, and this CP moves to Spec of DP that has *yi* or *zhi* as its head, and thus is like a noun complement clause.

With regards to the last question, *zai* in Chinese temporal clauses is optional both when temporal clauses are in pre-subject positions or post-subject positions. Nevertheless, *zai* is sometimes required in post-subject position to avoid a temporary parsing ambiguity caused by two noun phrases in a sequence.

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