Relative Clauses in Mandarin Chinese

Huiying Wen
Queen Mary, University of London

July 2020

Abstract

This thesis is an investigation of the nature and theoretical analyses of the syntax of relative constructions in Mandarin Chinese, with a focus on adjunct relative constructions and "gapless" relative constructions. In contrast to the traditional views, I propose that deriving these relative constructions requires a head raising strategy and show that this can give a better explanation of their properties and their interaction with comparatives deletion.

I argue against the idea that adjunct relative constructions involve null operator movement and defend a novel head raising approach using data from PP-in-situ adjunct relatives. With this in hand, I examine the syntactic analysis of gapless relatives, arguing that gapless relatives are true relatives as opposed to noun complements, and show that gapless relatives can be classified into two types: adjunct gapless relatives and resultative gapless relatives, depending on the semantic status of their head nouns. The former involves a manner-kind head noun which is the complement of a PP adjunct. The latter involves a result-kind head noun which is the complement of a null VP. Further, I extend this alternative approach to analyse comparative deletion in relative constructions.

Acknowledgements

First, I would like to say a big thank you to my supervisor, Prof. David Adger. His immense knowledge and great passion for linguistics have inspired and encouraged me in all the time of syntactic research I spend at QMUL. Without the enormous support and encouragement that I grained from David, I would not have been possible to start and finish my PhD study and this thesis. He has the ability to mentor you to look at what you considered from different angles. I cannot imagine a supervisor better than David.

I would like to thank my second supervisor Dr. Hazel Pearson for her support and feedbacks on my study, and for her exciting semantics courses. Also, I am grateful to Dr. Coppe van Urk for the inspiring discussions that I had with him. Additionally, I would also like to thank Prof. Daniel Harbour, Dr. Alex Drummond, Dr. David Hall, Dr. Sam Steddy and the rest of the staff of our department for the support and training that they have given me.

Many thanks to Yan Zhang, Chen Wang, Margaret Wang, Pietro Baggio and other LingLab members for their valuable comments and help on my study, and many discussions they have with me. Apart from QMUL, I am also thankful to my friends Boya Zhang and Yao Zheng for their help on data collection and language judgements. Additionally, I would like to thank ACTL 2016 autumn school, and ACTL 2017 and 2018 summer school for the great linguistics classes that they have offered. Finally, a big thank goes to my family. Thank you all for being supportive and encouraging when I am away from home.

Contents

Chapter 1

Introduction

In this thesis, I will examine the properties of a kind of clause in Mandarin Chinese which looks like a relative clause, but apparently lacks any kind of dependent variable. This kind of clause is called a gapless relative.

(1)   a. Zhè shì [Lisa táng gāngqín de zīshì   ].
        this is   Lisa play piano   DE posture
        'This is the posture that Lisa had when playing piano.'

       b. Zhè shì [John táng gānqín de xiàchǎng   ].
        this is   John play piano   DE consequence
        'This is the consequence of John's playing the piano.'

The noun phrases above contain clausal modifiers and the particle *de*, both of which make the gapless relatives look like a true relative. However, there appears to be no gap associated with the head noun within the clausal modifier. In Chapter 5, I will show that this construction in fact involves a gap.

My examination of Mandarin relative constructions will lead me to propose a new syntax for adjunct relative clauses in Mandarin, and to extend that syntax to some of the cases of gapless relatives which have been discussed in the literature, particularly gapless relatives of *manner* as in (2).

(2)   a. Zhè shì [Lisa táng gāngqín de zīshì   ].
        this is   Lisa play piano   DE posture
        'This is the posture that Lisa had when playing piano.'

       b. Zhè shì [John gōngzuò de xiàolǜ   ].
        this is   John work   DE efficiency
        'This is the efficiency that John had when working.'

However, I will also show that there is another type of gapless relative that involves a null verb. These are gapless relatives of *result* as in (3).

(3) a. Zhè shì [John táng gāngqín de xiàchǎng   ].
          this is   John play piano   DE consequence
          'This is the consequence of John's playing the piano.'

     b. Zhè shì [Mary jiù   rén   de huíbào].
          this is   Mary save people DE reward
          'This is the reward that Mary obtained from saving people.'

I will show that these can be analysed as *resultative gapless relatives* which have a reduced serial verb structure. I will then explore the consequences of these proposals for how comparative deletion operates in relative clauses, uncovering a new locality pattern, and solving a long standing problem noted by Tsai (2008).

Mandarin is a particularly interesting language to examine. It has the special particle *de* to connect a noun and a relative clause rather than applying any overt relative operator such as a relative pronoun, so issues arise as to the status of *de*, and the pre-nominal order of the relative modifiers. Further, Mandarin uses both a gap strategy and a resumptive strategy in relatives. Consider the examples in the following.

(4) a. [$_{IP}$ Lisa shuō _____$_i$ míngtiān bùnéng lái   ] de [nà-wèi tóngxué$_i$]
          Lisa say   tomorrow can   come DE that-CL classmate
          'the classmate who Lisa said cannot can tomorrow'

     b. [$_{IP}$ Lisa shuō **ta**$_i$ míngtiān bùnéng lái   ] de [nà-wèi tóngxué$_i$]
          Lisa say he tomorrow can   come DE that-CL classmate
          'the classmate who Lisa said he cannot can tomorrow'

Unlike other languages with resumptives, like Arabic, for example, resumptives in Mandarin have an intricate set of constraints on where they can be used. I will show in chapter 4 how resumptives provide a useful inroad into arguments for the analysis of adjunct relatives.

The thesis is organized as follows:

In Chapter 2, I introduce the cross-linguistic properties of relative construction in general and then examine the syntactic analyses of relative constructions, including the head external analysis, the head raising analysis, the matching analysis and the mixed analysis.

In Chapter 3, I examine the properties of the Mandarin relative construction (some of these correspond to the cross-linguistic features discussed in Chapter 2, others are particular to Mandarin Chinese) and previous syntactic analyses of the Mandarin

relative construction, including Ning's (1993) operator movement analysis, Simpson's (2002) head raising analysis, Xu's (2009) matching analysis and Aoun and Li's (2003) mixed analyses. I conclude that we need to apply the head raising analysis to derive the Mandarin relative construction.

In Chapter 4, I examine the syntactic analyses of the adjunct relative construction, namely Ning's (1993) and and Aoun and Li's (2003) operator movement analyses. I conclude that we need to analyse adjunct relatives containing gap and PP-in-situ adjunct relatives separately. On this basis, I propose to employ the HRA and suggest developing Collins's (2007) approach to null prepositions to explain the absence of adpositions in those adjunct relative clauses in Mandarin which have a gap. I suggest that the resumptive variants require a base-generation analysis.

In Chapter 5, I examine the syntactic analyses of the gapless relative construction. The analyses include Ning's (1993) VP adjunct approach, Aoun and Li's (2003) noun complement approach, Sybesma's (2005) event-variable approach and Zhang's (2015) modification approach. I conclude that the standard examples of gapless relatives need to be divided into two subtypes: adjunct gapless relatives and resultative gapless relatives. I then develop a concrete proposal of my own, showing how it improves over the alternatives.

In Chapter 6, I review the syntax and semantics of comparatives in English and Mandarin Chinese. I then examine the interaction of relative clauses with comparatives and discuss a new asymmetry between subject-extraction and object-extraction of relative clauses in comparatives which my analysis provides an account for. With this in hand, I also show how my approach provides an explanation for Tsai's (2008) observation and argue that gapless relatives behave like relatives as opposed to noun complement clauses under comparative deletion.

Overall, the conclusion of the thesis is that gapless relatives in Mandarin are indeed relative clauses and not noun complement clauses, but that there are two distinct structures involved. This proposal will be shown to not only explain an number of peculiarities of the syntax of this construction, improving over extant accounts in the literature, but also how it interacts with ellipsis processes in comparatives.

Chapter 2

Overview of Relative Construction

2.1 Introduction

In this chapter, I will review the theoretical studies on the syntax of relativization in the literature. More specifically, I will describe the approaches of these studies concerning the nature of the relation between the head noun and the variable contained in a relative clause. This will provide a basis for the analysis of the relative construction in Mandarin Chinese.

The chapter will start with an introduction of the relative construction in general, followed by two semantic types of relative clauses and two crucial notions involved in relative constructions. Then, I will turn to the cross-linguistic typology of relative constructions. Roughly speaking, there are six universal properties of the relative construction considered: (i) the order between a head noun and a relative clause; (ii) the position of a head noun appearing externally or internally to a relative clause; (iii) whether a relative clause includes a gap or a pronoun; (iv) the appearance of the relative pronoun and relative complementizer; (v) the way in which multiple relative clauses are arranged; (vi) the position of the relative clause in a DP.

Given the typology of relative constructions, then I turn the analysis of the relative construction. Broadly speaking, the received approaches concern the relation between a noun and a supposed variable along two main lines. The first type of approach proposes that there is no direct relation between them; namely, a head noun is based-generated outside a relative clause (Partee, 1975; Chomsky, 1977; Less, 1960, 1961; Chomsky, 1965; Carlson, 1977; Cinque, 2003, 2015; Sauerland, 1998, 2000, 2003;). The head external analysis, the matching analysis and the mixed analysis belong to this type. The second type of approach assumes that there is a direct relation between them. That is, a head noun originates inside a relative clause and moves

to its surface position, which is the pivot of the head raising analysis (Brame, 1968; Schachter, 1973; Vergnaud, 1974; Kayne, 1994; Sauerland, 1998; Bianchi, 1999, 2000; de Vries, 2002; Cinque, 2015). With this in mind, let me start the chapter with the definition of the term 'relative construction'.

2.2 Relative Constructions in General

Relative clauses are clausal structures which can be used to modify nominals. In the DP-hypothesis, the relative clause is adjoined to the NP within DP (Abney, 1987).

(5) I read [$_{DP}$ the book of poems [$_{CP}$ that you bought]].
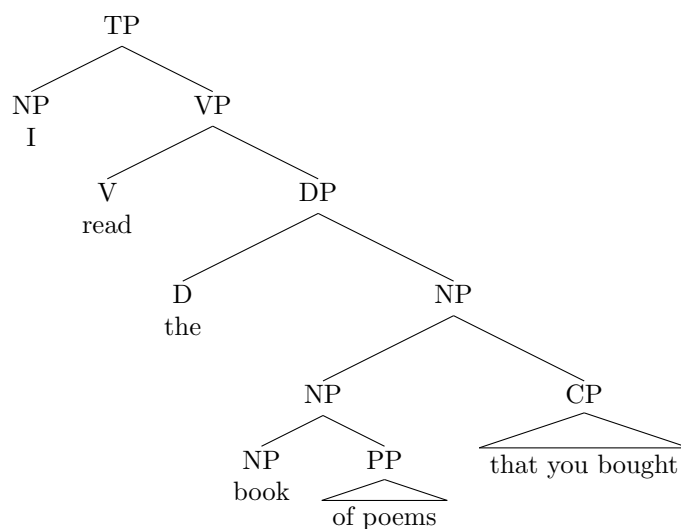
In (5), the relative clause is *that you bought* and the head noun is *book*. The complementizer *that* can be substituted by a relative pronoun, *which*. De Vries (2002) outlines three defining properties of the relative construction with respect to their syntax and semantics: (i) a relative clause is subordinated; (ii) a relative head (the pivot) is semantically shared by the matrix clause and the relative clause; (iii) the roles that a head noun plays inside and outside of the relative clause are independent of each other. In this section, I will present two important issues concerning relative clauses in English, involving pied-piping and reconstruction. Before moving to that, I will introduce two main types of relative clauses in both syntactic and semantic terms first in the next subsection.

2.2.1 Restrictive and Non-restrictive RCs

Generally, relative clauses are divided into two kinds: restrictive relative clauses and non-restrictive (or appositive) relative clauses. In English, restrictive relative clauses are significantly distinct from non-restrictive relative clauses in several respects (Jackendoff, 1977; McCawley, 1988, among others). The examples in (6) illustrate.

(6)   a.   The books which are about linguistics are interesting.   *Restrictive*

b.   The books, which are about linguistics, are interesting.   *Non-restrictive*

Semantically, (6a) implies that the linguistic books are being distinguished from those who are not about linguistics. Both of them are under discussion. (6b) implies that all the books under discussion are about linguistics. Phonologically, there is no intonational break in (6a) between the matrix clause and the relative clause, while in (6b), there should be a slight pause between the head noun and the relative clause. Syntactically, the relative complementizer *that* is prohibited in non-restrictive relatives; only relative pronouns can be used to indicate non-restrictive relative clauses. In addition to this, the relative pronouns in non-restrictive relative clauses cannot be elided as in restrictive relatives.

(7)   a.   The painting which/that/∅ John bought is one of Monet's works.

b.   The painting, which/*that/*∅ John bought, is one of Monet's works.

Furthermore, the order between a restrictive relative clause and a non-restrictive relative clause is also constrainted, when both of them are adjoined to the same noun. Non-restrictive relatives must follow restrictive ones when a sentence contains both of them. Consider the examples in (8).

(8)   a.   The painting that John bought, whose painter is Monet, disappeared.

b.   * The painting, whose painter is Monet, that John bought, disappeared.

However, in some other languages, as in Japanese and Mandarin Chinese, there is no morphological and prosodic evidence distinguishing the form of restrictive and non-restrictive relative clauses. For this kind of language, the linear position of the demonstrative is assumed to signal restrictiveness (Kamio, 1977; Chao 1968; Huang, 1982b, 2009; Tsai, 1999; Lin, 1997, 2003). Consider the Japanese examples in (9).

(9)   a.   **Restrictive relative clause**

sono [aniki-ga   katte-ki-ta]   ringo
that   brother-NOM buy-come-PAST apple

'that apple that brother bought'

b.   **Non-restrictive relative clause**

[minna-ga   sagasi-teiru] **sono** ronbun
everyone-NOM look for-ASP that   paper

12

'that paper, which everyone is looking for'

(Kamio, 1977:153-154)

In (9a), the restrictive relative appears between the demonstrative and the head noun, while in (9b) it appears before both of the demonstrative and the head noun. This distinction is considered to be accounted for by the scope of modification. When the demonstrative scopes over the relative clause, as in (9a), only the restrictive reading is available. On the other hand, in (9b), when the demonstrative is in the scope of the relative clause, a non-restrictive reading arises.

2.2.2   Pied Piping

Pied piping is term coined by Ross (1986), who showed that some elements move along with the relative pronoun in the syntactic derivation. In particular, when the pied-piped element is a preposition, the possibility of another phenomenon, *preposition stranding*, also arises. Consider the examples of relative clauses, the head nouns of which are indirect objects, below.

(10)   a. the man **whom** I gave the flowers **to** t *Preposition stranding*
          b. the man **to whom** I gave the flowers   *Preposition pied-piping*

(de Vries, 2002:64)

In (10a), the preposition *to* remains in the original position, which we describe by saying that a preposition is 'stranded'. There is a trace in the complement position of the preposition *to* (Chomsky, 1977; Vergnaud, 1974; Kayne, 1994, among others). In (10b), the preposition *to* raises along with *whom* to the Spec CP position. This is called pied piping of a preposition.

In languages such as English, it is possible to apply both preposition stranding and preposition pied-piping to relative clauses, as shown in (10). However, in other languages, such as German, French and Dutch, preposition stranding is not possible in relative clauses. In these languages, it is obligatory to pied pipe of a preposition and prohibited to strand a preposition (Horvath, 2017).

(11)   a. der mann **über den**   wir sprachen
              the man   about whom we spoke
              'the man about whom we spoke'
          b. * der man **den**   wir **über** sprachen
                the man whom we about spoke
              lit. 'the man whom we spoke about'   (German)

(12) a. de man **over wie** we spraken
         the man about whom we spoke
         'the man about whom we spoke'

    b. * de man **wie** we **over** spraken
         the man whom we about spoke
         lit. 'the man whom we spoke about'   (Dutch)

With regard to the restrictive and appositive distinctions, it is possible to apply pied piping of a preposition in both types of relative clauses, as illustrated in (13). The relative clauses in German and Dutch also show great similarity to English in this respect.

(13) a. The man **to whom** I just gave a present is celebrating his birthday.

    b. John, **to whom** I just gave a present, is celebrating his birthday.

(de Vries, 2002:188)

Aside from pipe piping of a preposition, it is not always possible to operate *heavy pied piping* in both types of relative clauses in English, according to Fabb (1990) and de Vries (2002, 2006). Heavy pied piping is a kind of pied piping where the relative pronoun is contained in a possessive.

(14) The man(,) **whose mother** I met the other day, is a creep.

(de Vries, 2002:188)

(15) a. * The men **some of whom** I like arrived yesterday.   *Restrictive*
    b. The men, **some of whom** I like, arrived yesterday.   *Non-restrictive*

(Fabb, 1990:64)

In (14), the relative pronoun appears as a possessive pronoun *whose* followed by a pied-piped element *mother*. This shows that both restrictives and non-restrictives can have this kind of heavy pied piping involving a possessive pronoun construction. By contrast, restrictives are limited to cases where involves the heavy pied piping of a prepositional genitive construction, *some of whom*, as shown in (15b).

The issue of pied-piping and restrictiveness/non-restrictiveness will become important when we turn to Mandarin relative clauses, where we will see that certain adpositions are neither stranded nor pied piped and how restrictiveness are defined. Having given a brief introduction to pied piping, I will move on to introduce other important issues in the background of relativization.

2.2.3 Reconstruction

Reconstruction originally was a procedure that operated in the derivation from surface structure to LF in the Extended Standard Theory of Transformational Greammar, according to Chomsky (1977). For instance, it is proposed that the phrase which consists of the possessive pronoun *whose* and the noun *books*, overtly saturating the specifier position of a CP can be moved back to its original position at LF, as represented below. (16a) is the surface structure/form of the sentence and (16b) is the logical form (LF).

(16)   a. Whose books did Mary read?
      b. for which x, x is a person, Mary read [x's book]

(Chomsky, 1977:83)

Reconstruction was rethought from the perspective of the *copy theory of movement* (CTM) in Chomsky (1993), following on from proposals in van Riemsdijk and Williams (1981). With regard to CTM, there are two copies of the relative DP in the underlying structure: one is in the derived position (surface position), and the other one is in the non-derived position (original position).

(17)   [Whose books] did Mary read [whose book]?

The *wh* element in the higher copy is present at both PF and LF, though the restrictor *books* is, at least plausibly, present at PF but absent at LF in this copy. In contrast the operator in the lower copy is absent at LF, while the restrictor, arguably, is present at LF, which is the same as what represents in (16) (Chomsky, 1993, 1995). There is important evidence from the *Binding Theory* involving pied-piping that can confirm the reconstruction phenomenon. Consider the following examples.

(18)   a. [How proud of herself$_i$]$_j$ does Mary$_i$ seem t$_j$?
      b. * [How proud of her$_i$]$_j$ does Mary$_i$ seem t$_j$?
      c. * [How proud of Mary$_i$]$_j$ does she$_i$ seem t$_j$?

(18a) falls under **Binding Condition A**: a reflexive pronoun must have a local antecedent. Thus, the grammaticality of (18a) demonstrates that binding only applies to the low copy of the *wh*-phrase. Since it is only when the *wh*-phrase is in its non-derived position that the reflexive pronoun *herself* can be bound by its local antecedent *Mary*. This is consistent with reconstruction: the *wh*-moved phrase should be reconstructed to its base position first.

(18b) is ruled out by **Binding Condition B**: a pronoun must not be bound within its local domain. The pronoun *her* in the high copy is not bound by the antecedent *Mary*, which seems to obey the condition. However, there is a difference in

grammaticality. At LF, only the low copy of the *wh*-phrase is overt. The pronoun within the low copy is bound by the antecedent, triggering a Binding Condition B violation.

The ungrammaticality of (18c) is captured by **Binding Condition C**: an R-expression must not be bound. The low copy of the *wh*-phrase is in the domain of the antecedent *she*, thus, the R-expression *Mary* within the *wh*-phrase is bound by the antecedent, which incurs a Condition C violation.

Besides the Binding Conditions, more supporting evidence in favour of reconstructing moved phrases in their base position comes from **variable binding**: a pronoun can be bound by a quantified antecedent. Consider the example in (19).

(19) [How proud of her$_i$]$_j$ does [every girl]$_i$ think Mary is t$_j$?

The validity of the co-indexation between the quantified NP (QNP) *every girl* and the pronoun *her* inside the complex pied-piped *wh*-phrase can only be explained if the *wh*-phrase moves back to the low position where the QNP can c-command and bind the pronoun.

However, it is not always the case that Binding Theory applies to the low copy of the *wh*-phrase, which means that reconstruction is not always obligatory (Van Riemsdijk and Williams, 1981). Under some certain circumstances, the *wh*-phrase does not need to move back to the base position, compare (20a) and (20b).

(20) a. * Whose claim [$_{CP}$ that Jess$_i$ is nice] does he$_i$ believe _____?
      b. Which story [$_{CP}$ that Jess$_i$ wrote] does he$_i$ like _____?

(Adger et al., 2017)

For the case that Condition C reconstruction is forced, as in (20a), the whole *wh*-phrase is moved back to its base position, then the pronoun *he* in the matrix clause can bind the R-expression *Jess* incurring a Condition C violation. However, there is no such violation in (20b), the case which does not call for Condition C reconstruction. Lebeaux (2000) proposes that this involves an adjunct/argument asymmetry: adjuncts and complements of the moved phrase behave differently in Condition C reconstruction (Lebeaux, 2000). The CP in (20a) is a complement which has to move along with the noun to reconstruct to the base position. By contrast, in (20b), the CP is an adjunct (a relative clause) which can be inserted in the target position after the application of Binding Theory. This mechanism is called *Late Merge*. In this way, the R-expression contained in the relative clause would not incur a Condition C violation. Consider the corresponding structures of (20) at LF represented in (21).

(21) a. ~~Whose claim~~ [$_{CP}$ ~~that Jess$_i$ is nice~~] does he$_i$ believe <u>whose claim</u>
        [$_{CP}$ that Jess$_i$ is nice]?
     b. ~~Which story~~ [$_{CP}$ that Jess$_i$ wrote] does he$_i$ like <u>which story</u>?

In (21a), the CP which contains the R-expression *Jess* has to present with the *wh*-phrase in the base position, while in (21b), the CP does not present in the base position of the *wh*-phrase. A further complication is that the presence of quantifier NPs force Condition C reconstruction of relative clauses. A QNP in the matrix clause must bind a variable pronoun, although it is inside an adjunct, which means that what happens in (21b) is impossible in such situations. As illustrated below, (22a) has its corresponding structure at LF in (22b) where the *wh*-phrase has a full copy in the base position before the application of Binding Theory.

(22) a. [Which claim [$_{CP}$ he$_i$ had made earlier]]$_j$ did every senator$_i$ deny t$_j$?
     b. ~~Which claim~~ [$_{CP}$ ~~he$_i$ had made earlier~~] did every senator$_i$ deny <u>which claim</u>
        [$_{CP}$ he$_i$ had made earlier]?

Reconstruction is considered as important evidence for generating a direct connection between the relative head and its internal representation within a relative clause, which follows from the Head Raising Analysis. We will see that reconstruction is crucial in allowing us to determine the correct type of analysis of relative clauses, that is whether there is a direct or indirect connection between the head noun and the relative clause gap.

2.3   Cross-linguistic Typology of RCs

Having given a general introduction to the relative clause construction above, I will turn to the typology of relative constructions in this section. Cross-linguistically, there are six parametric factors concerning relative constructions involved in my discussion, namely: (i) the order between a noun and a relative clause; (ii) the appearance of a head noun external or internal to a relative clause; (iii) the appearance of a gap and resumptive pronoun in a relative clause; (iv) the appearance of the relative pronoun and relative complementizer; (v) the way in which multiple relative clauses attach to a noun; (vi) the position of relative clause in a DP. In the following sections, I will go through these parameters in sequence.

2.3.1   Postnominal relatives vs Prenominal relatives

The linear order of the head noun and the relative clause is one significant typological difference. Languages in which head nouns precede the relative clause, have postnominal or *head-initial relatives*, on the other hand, those which have the opposite order

of head nouns and relative clauses have prenominal relatives or *head-final relatives.*
These two opposite types of relative construction are shown in (23a) and (23b).

(23) a. **Postnominal relative clauses:**

    i. The **film** [$_{RC}$ that we're going to tomorrow] will be interesting.

    ii. der **mann** über   den   wir sprachen
          the man   about whom we spoke

        'the man about whom we spoke'   (German)

    b. **Prenominal relative clauses:**

    i. [$_{RC}$ wǒmén míngtiān qù kàn   de] **diànyǐng** hěn yǒumíng.
          we   tomorrow go watch DE   film   very famous

        'The film that we're going to tomorrow is very famous.'   (Mandarin)

    ii. [$_{RC}$ kimura-ga   katter] **inu**-ga   sinda.
          Kimura-NOM keep   dog-NOM died

        'The dog that Kimura kept died.'   (Japanese)

2.3.2   Externally vs Internally headed relatives

Both the postnominal relatives and prenominal relatives illustrated in the last section
are *externally headed relative clauses* (EHRCs) which have the head nouns occurring
outside the relative clauses. In some languages, the head nouns appears within the
relative clauses. This type of relative clauses is called an *internally headed relative
clause* (IHRC). There are two major types of IHRCs: circumnominal and correlative.
One significant difference between them is that only the circumnominal construction
is nominalized. Circumnominal relatives occur in DP positions of matrix clauses while
correlatives do not.

(24) a. **Circumnominal relative:**

    [$_{CP}$ A   mi   [$_{DP}$ [$_{CP}$ o nə ti **saan-so**   ləgri   ] la   ].
        you know   he SR give stranger-SPC/LIV money   DET

    'You know the stranger whom he gave the money.'

                              (Dagbani, cited in de Vires (2002:16))

    b. **Correlative:**

    [$_{CP}$ jo   ləɽki kʰeɽi   hɛ] [$_{matrix}$ ʋo   ləmbi hɛ].
        which girl   standing is   that tall   is

    'Which girl is standing, that/she is tall.'

                                 (Hindi, Dayal (1996))

In (24a), the IHRC appears much like a normal sentence in Dagbani, with an extra particle *la*, which is a determiner, following it, and it has the distribution of a DP (in this case as the object of a transitive verb). As de Vries (2002) points out, the presence of the suffix -*so* indicates which constituent is the head noun of a relative clause. (24b) is a typical example of correlatives from Hindi. The correlative clause *which girl standing is* containing the head *girl* is left-adjoined to the matrix clause. The semantics of relativization is constructed through two separate clauses, connected by an anaphoric device. A correlative requires either a demonstrative or a pronominal in the matrix to refer to the relative head. As in (24b), there is a corresponding demonstrative *vo* 'that' as the correlate in the matrix clause.

2.3.3   Gap vs Resumptive pronoun

In some languages, as in Arabic, a resumptive pronoun is obligatory in the position where there is expected to be a gap. Consider the example from Arabic in (25).

(25)   gaabaltu rajul-an   [ʔarifu-**hu**   ].
       met.1sm man-ACC   knew.1SM-**him**

       'I met a man that I knew.'

(Arabic, Borsley (2013:9))

In (25), the resumptive pronoun is *rajul* 'man' which relates to the head noun *man* within the relative clause. An English counterpart (26a) is illustrated in the following, which shows a gap in the same position.

(26)   a. I met the man that I knew _____.
       b. * I met the man that I knew him.

Both the gap and the resumptive pronouns are obligatorily bound by their antecedents. This property distinguishes resumptive pronouns from normal ones. Compare the examples in (27) and (28). The position which is saturated by a normal pronoun is not possible for a gap (see (27a) and (27b)).

(27)   **Ordinary pronoun**
       a. ḍanna   r-rajul-u   ʔanna-**hu** ġabiyy-un
          thought the-man-NOM that-**him** silly-NOM

          'The man thought that he is silly.'

(Fehri, 2013:24)

       b. * ḍanna   r-rajul-u   ʔanna _____ ġabiyy-un
            thought the-man-NOM that   silly-NOM

          'The man thought that he is silly.'

(28) **Resumptive pronoun**

    a. Daaʕa   l-kitaabu štaraytu-**hu** l-baariħata
        be-lost.3MS the-book bought.1s-**it** yesterday
        'The book that I bought yesterday is lost.'

<div align="right">(Aoun, Benmamoun and Choueiri, 2009:10)</div>

    b. Daaʕa   l-kitaabu štaraytu _____ l-baariħata
        be-lost.3MS the-book bought.1S   yesterday
        'The book that I bought yesterday is lost.'

In (27), the normal pronoun is free to refer to any antecedent if required. Turning to the cases of the resumptive pronoun, and it is possible for the object position within the relative clause to be occupied either by a gap or by a resumptive pronoun *hu*, since this position is obligatorily bound by the antecedent *l-kitaabu*.

Further, in these examples the resumptive pronouns have identical *phi*-features as the head noun. But this is not always the case. Following Adger (2011), resumptive pronouns can be stripped of their *phi*-specification. When the object of a prepositional phrase is extracted, an overt pronoun is obligatory to saturate that position:

(29) Inen faka se   ku n   va mpon ku-e/   *ku-inen
      3PL knife DEM REL 1SG cut bread with-3SG/ with-3PL
      'These knives that I cut the bread with.'

<div align="right">(Hagemeijer cited in Adger, 2011:6)</div>

In (29), the corresponding resumptive should have the same number feature as the extracted arguments. But the grammatical result is with a single form for that resumptive. Adger (2011) calls this phenomenon 'bare resumptive'. In Mandarin, a resumptive pronoun is also necessary in some cases and optional in others.

(30)   a. Zhè jiù   shì [Zhāngsān duì * (**tā**$_i$) xiào-le-xiào de] nà-gè   rén$_i$.
          this exactly be   Zhangsan to   him smile   DE that-CL person
          'This is the man who Zhangsan cast a smile to.'

    b. Zhè jiù   shì [Zhāngsān xǐhuān-le * (**tā**$_i$) hěn jiǔ   de] yí-gè
          this exactly be   Zhangsan like-ASP   **her** very long DE   one-CL
          nǚrén$_i$.
          woman
          'This is a woman who Zhangsan has admired for a long time.'

    c. Zhè jiù   shì [Zhāngsān xǐhuān-le **tā**$_i$ hěn jiǔ de] **nà**   yí-gè
          this exactly be   Zhangsan like-ASP **her** very long DE   **that** one-CL
          nǚrén$_i$.
          woman

'This is the woman who Zhangsan has admired for long time.'

From the examples above, we can see that resumptive pronouns are necessary when they are inside a PP and when the relative construction that contains them are indefinite. In contrast, a resumptive pronoun is optional when being contained in a definite relative construction. I will further discuss this in the next Chapter.

2.3.4   Relative pronoun vs Relative complementizer

Relative pronouns are the elements used to introduce relative clauses in many European languages. They have properties which link to both the head noun and the gap position. In English, for instance, relative pronouns appear as *wh*-words: *which, who, whom, whose, when, where*, etc.

(31)   The artist [**whom** John has appreciated _____ for many years] will arrive soon.

Although relative pronouns play an essential role in relative clauses, they are not the only indicator of a relative clause. *Wh*-words are obligatory and cannot be replaced in non-restrictive relative clauses, whereas *wh*-phrases are not the only choice for restrictive relative clauses. The complementizer *that* can be used instead of a relative pronoun.

(32)   The artist [**that** John has appreciated _____ for many years] will arrive soon.

Provided the relativized elements are not the subject, both relative pronoun and complementizer can be deleted. For example, (32), as a direct object relative clause, can be paraphrased as (33), without any relative indicator.

(33)   The artist [John has appreciated _____ for many years] will arrive soon.

However, the relative constructions in Mandarin Chinese do not have relative pronoun, only a constant particle, *de*.

2.3.5   Recursion vs Iteration

Recursion and iteration are two ways of adding aditional relative clauses (de Vries, 2002). Iteration is also known as stacking or multiple linear embedding. Recursion allows two or more head nouns in a relative clause, and each of them has their own relative clause. Each of these relative clauses is nested deeper into another one, as represented in (34a). Iteration employs only one head noun, which is shared by two or more relative clauses, as represented in (34b). The main difference between them is that recursion builds a nesting structure by increasing the embedding depth, while iteration builds a flat structure (Karlsson, 2010).

(34) a. **Recursive relative clause**

[The woman that saw [the dog that had bitten the man]], ran away.

  b. **Iterative relative clause**

[The dog [that saw the woman] [that had bitten the man]], ran away.

In (34a), there are two head nouns *woman* and *dog*, and the embedding clause just modifies its head noun *dog* which means it cannot generate a relationsip with the higher head noun without the appearance of its head noun. By contrast, in (34b), the embedding clause has a parallel relationship with the original relative clause modifying the same head noun. Consider the tree diagrams for these two examples below.

(35) a. **Recursive structure**

b. **Iterative structure**

```
                        DP
                   ┌─────┴──────┐
                   D            NP
                  the      ┌─────┴──────┐
                          NP            CP
                     ┌────┴────┐   ╱────────────╲
                    NP         CP  that had bitten the man
                    dog  ╱──────────╲
                         that saw the woman
```
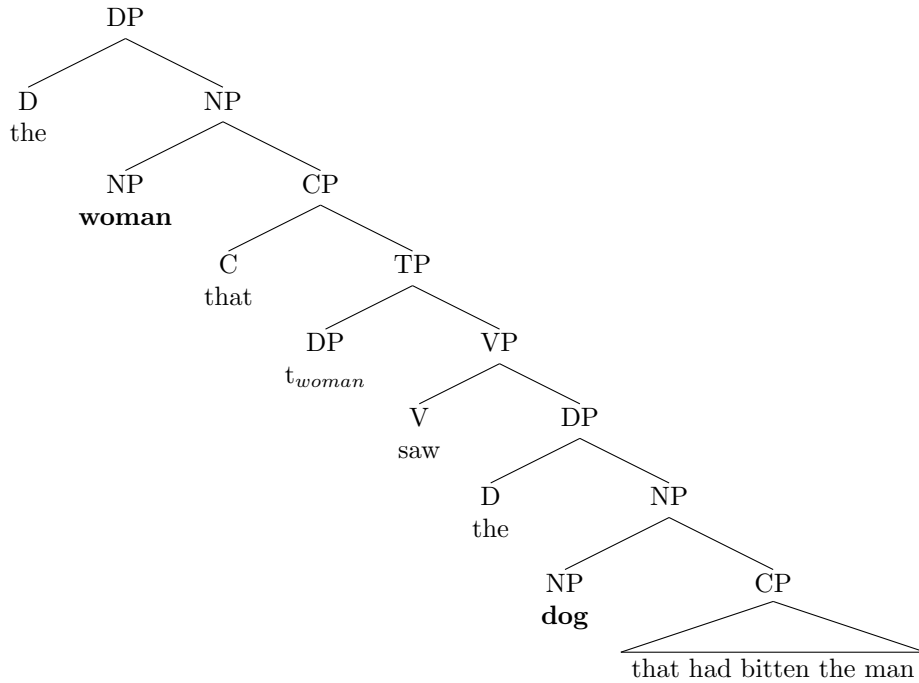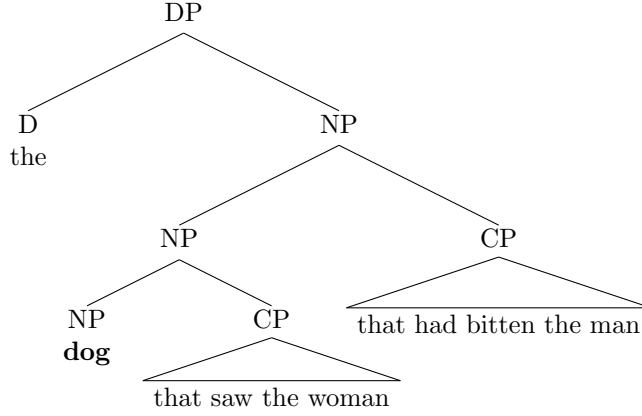
The ways how multiple relative clauses connect to a head noun will be crucial when we considering the relationship between the head noun and the relative clauses. In Mandarin Chinese, there is an assumption that relative clauses can only be recursive. We will further discuss about this in Section 3.3.5.

2.3.6   The position of RC in NP/DP

A noun as an argument in a sentence can be modified by zero or more dependents, such as determiners (Det), adjectives (Adj), numbers (Num), relative clauses (RC) and others. The ordering of these dependents is diverse when they are applied to the noun. In head-initial languages, such as English, a head noun usually follows the determiner and the adjectival modifiers, and precedes the prepositional modifier and the relatively heavier modifiers (such as relative clauses). Therefore, the surface structure of English noun phrases can be typically represented as below:

(36) [**Det** - **Num** - **Adj** - **N**   - **PP**   - **RC**   ]
        Those   two   young   students   with brown hair   whom we talked to
      VP
      run away.

Those modifiers preceding the head are called premodifiers, and the others are called postmodifiers. Now turning to languages that have all these dependents precede the head noun on the surface structure, as in Mandarin Chinese and Japanese. Simpson (2005) notes the surface ordering of Mandarin noun phrases as follows:

(37) [**Det** - **Num** - **CL(Classifier)** - **RC**   - **Adj**   - **N**   ]
        nà   liǎng   gè   nǐ kàndào de   niánqīn   xuéshēng
        that   two   individual   you see DE   young   student

VP
shì wǒ-de tóngxué.
are my classmate

'Those two young students whom you saw are my classmates.'

As shown above, in Mandarin Chinese, an adjectival modifier can be inserted between a relative clause and the head noun. In most Southeast Asian languages, especially head-initial languages, the linear ordering relation between the relative clause and the head noun can be interrupted by adjectival modifiers, as illustrated in (38a) and (38b).

(38) a. Thai, Khmer: **N** - Adj - **Relative Clause** - Num - CL - Det
      b. Hmong, Malay, Vietnamese: Num - CL - **N** - Adj - **Relative Clause** - Det
      c. Burmese: Det - **Relative Clause** - **N** - Adj - Num - CL

(Simpson, 2005)

From the various strings above, it seems that in these languages, except Burmese, the Num-CL sequence and the N-Adj-RC sequence are two fixed units. The latter sequence has a mirror counterpart which is RC-Adj-N. Interestingly, Simpson shows that not only the RC-Adj-N sequence but the whole string in (38a) is a complete mirror image of that in (37). This shows that the linear ordering between a relative clause and other elements is a cross-linguistic issue. However, the linear ordering between a relative clause and elements like Det, Num and CL is a measure to diagnose restrictiveness/non-restrictiveness in Mandarin Chinese.

To conclude this section, there are six crosslinguistic properties that allow classification of relative clauses: (i) postnominal vs prenominal; (ii) external-headed vs internal-headed; (iii) gap vs resumptive; (iv) relative pronoun vs complementizer; (v) recursive vs iterative relatives; and (vi) the position of the relative clause in NP. In the next section, I will turn my focus on the relationship between a relative head and the internal gap of a relative clause.

2.4   Analyses of Relative Clauses

In this section, I will introduce four major approaches about how to manage the relationship between a head noun and the abstract gap inside a relative clause, namely the Head External Analysis (Standard Analysis), the Head Raising Analysis (Promotion Analysis), the Matching Analysis and the Mixed Analysis (involving both HRA and MA). I will go through the analyses of these four approaches, respectively, in the following sections.

2.4.1 Chomsky's (1977) Standard Analysis

The Standard Analysis (also called the 'Head External Analysis' (HEA)) is an early generative approach to relative clauses which is advocated by Partee (1975), Chomsky (1977), Jackendoff (1977) among others. This approach proposes that a head noun is base-generated externally to a relative clause, which indicates that there is no direct relation between a head noun and the gap within a relative clause. A relative head is selected by the determiner that precedes it and can only maintain a relationship with the following relative pronoun (or the operator) via co-indexation. The underlying structure of a relative clause in such an approach can be exemplified and sketched as in (39).

(39) $[_{DP} [_{D'}$ the $[_{NP} [_{N'}$ book$_i$ $[_{CP}$ Op_i/which$_i$ John likes t_i]]]]]

```
                    DP
                   /  \
                 D⁰    NP
                 the  /  \
                    N⁰    CP
                  book_i  /  \
                  Op_i/which_i  C'
                             /  \
                           C⁰    IP
                          +rel  /  \
                            John likes t_i
```
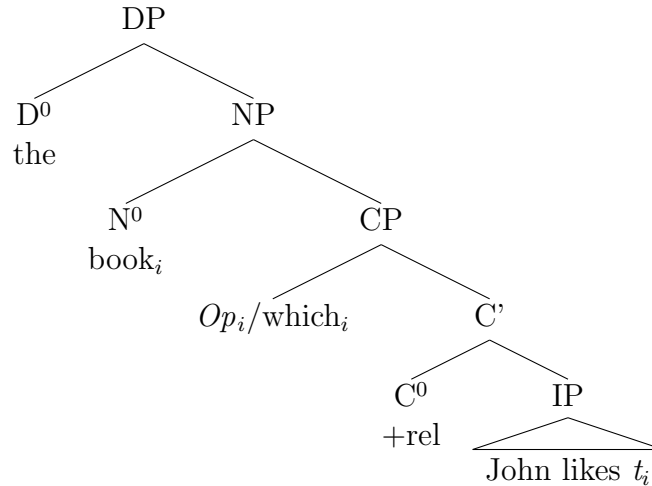
According to the tree structure, we can see that the trace (represented by t) is an element that represents the relative pronoun *which* or the null operator *Op* after it moves to the Spec CP position. Therefore, we can directly mark them with the index *i*. However, there is no such relationship between the noun *book* and the relative pronoun/operator because the head noun is proposed to be base-generated in that position outside the relative clause. Instead, the head noun *book* is indexed via a mechanism called as *co-indexation*. Compared with the relationship between the relative pronoun and the trace, there is no binding relationship between the head noun and the relative pronoun, and the head noun and the trace. Thus, in this approach, reconstruction requires a complex mechanism that replaces the trace by the content of the head noun.

2.4.2 The Head Raising Analysis

The Head Raising Analysis (HRA) (also called as the *promotion analysis*) proposes that a relative NP is originally generated within a relative clause and then moves directly to its surface position (Brame, 1968; Schachter, 1973; Vergnaud, 1974). There are two variants of the head raising analysis. The first variant proposes that all relative clauses are internal-headed, and the relative head stands in the specifier position of a CP (Kayne, 1994; Sauerland, 1998; Bianchi, 1999, 2000). The second variant proposes that the relative head raises out of but is close to the clause, and creates an NP projection (Bhatt, 2002). (40a) and (40b) show these different approaches.

(40)   a. $[_{DP}$ $[_{D'}$ the $[_{CP}$ $[_{NP}$ book $]_i$ that John likes t_i $]]]$
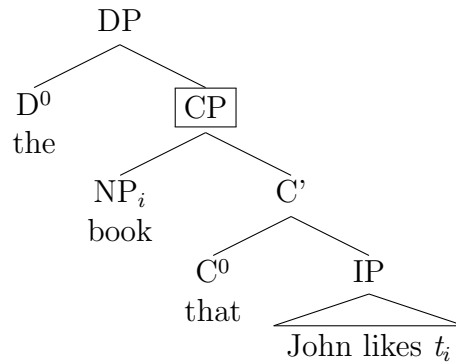
   b. $[_{DP}$ $[_{D'}$ the $[_{NP}$ $[_{N'}$ book $]_i$ $[_{CP}$ that John bought t_i $]]]]$
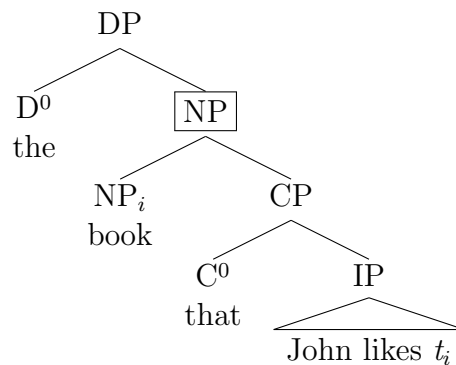
(40a) shows that the underlying structure proposed in the first variant of the HRA involves a D which takes a CP as a complement. The NP *book* which originates in a position within a relative clause saturates the specifier position of a CP on the surface. A trace is proposed to saturate its original position and is marked with the same index. In (40b), although the NP *book* is raised from a relative clause, the landing site of the NP is contained in an NP projection. According to Bhatt (2002), this NP

projection is created by the movement of the head noun. This distinction indicates the different selectional properties of D. More precisely, the determiner takes a CP as a complement in the first proposal. In contrast, the determiner takes an NP as a complement in the second proposal. In addition to this, these two structures show different considerations for the relation between a head noun and a relative clause. The landing site of a head noun is inside the CP that contains the relative clause in the first structure, whereas it is outside of the CP that contains the relative clause in the second structure. This implies that it is not possible to delete a relative clause and retain a head noun in the former, but it is possible to do so in the latter. This is because the relative clause is a bar-level and not a phrasal constituent to get deleted under the first proposed structure.

When a relative pronoun is involved rather than the complementizer *that*, the relative head needs to move twice. First, the head noun combining with a relative pronoun shows up as a relative DP constituent in the base position. Then, the relative DP constituent moves and lands in the intermediate position Spec CP. The relative pronoun *which* will remain in this position. The head noun *book* needs to move out of that DP and raise to a higher position, the Spec DP position in Kayne's analysis (see (41a)) or a position projected by a created NP (see (41b)).

(41)   a. $[_{DP} [_{D'} $ the $[_{CP} [_{DP} [_{NP} $ book $]_i [_{DP} $ which $t_i]_j $ John likes $t_j]]]]$
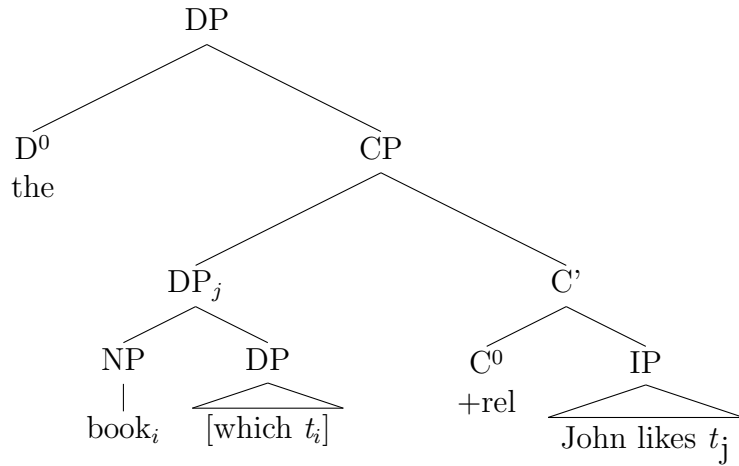
b. the $[_{NP}$ [book $]_i$ $[_{CP}$ $[_{DP}$ which t_i $]_j$ John bought t_j]]

```
                        DP
                       /  \
                     D⁰    NP
                     the  /  \
                        NP    CP
                      book_i /  \
                   [which t_i]_j  C'
                                 /  \
                               C⁰    IP
                              +rel  /  \
                                 John likes t_j
```
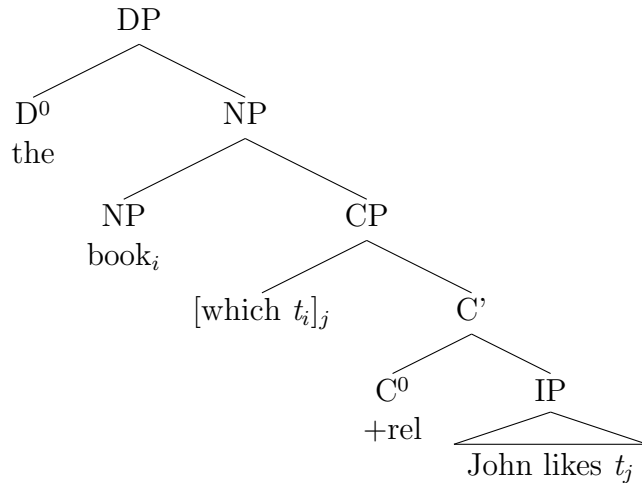
The same problem of constituency reemerges in Kayne's proposed structure. Borsley (1997) and Bhatt (2002) point out that the relative clause *which John likes* forms a constituent, according to evidence from coordination.

(42)   the book [which John likes] and [which Ann writes]

Under Kayne's structure, a *wh*-word is combined with a head noun in Spec CP which shows the *wh*-word is apart from the clause. This indicates (42) to be out, however, this is not the case. In contrast, the proposed structure in (41b) can handle this coordination. Bhatt (2002) notes that this coordination may call for a Matching Analysis for relative clauses. However, there is a piece of evidence showing that an NP must originate within the relative clause. Consider the following example that involves variable binding.

(43)   the [picture of his$_i$ $]_j$ [[[which t$_j$] every freshman$_i$ likes] and [[which t$_j$] every sophomore dislikes]]

<div align="right">(Bhatt, 2002:75)</div>

This suggests that a head noun must originate internally to the relative clauses. However, since Mandarin relative clauses do not apply any visual relative operator, there is not overt evidence from coordination can show that which structure is more possible to derive relative constructions in Mandarin Chinese. In the following analysis, I will adopt Kayne's version and ignore this structural difference.

2.4.2.1 Evidence for the HRA

Important evidence for the HRA comes from reconstruction and idiom chunks. I have introduced reconstruction of *wh*-phrases in the previous section. Here, I extend our discussion of reconstruction to relative clauses. Whether the head noun of a relative clause is able to move back to its base position is essential for the HRA (Vergnaud, 1974; Kayne, 1994). Consider the following examples of relative clauses, the head nouns of which involve prepositional possessive constructions.

(44)   a. the [picture of himself$_i$]$_j$ that Bill$_i$ likes t$_j$ (Munn, 1994)

       b. the [picture of his$_i$ mother]$_j$ that every soldier$_i$ kept t$_j$ (Safir, 1999)

       c. the [picture of Bill$_i$]$_j$ that he$_i$ likes t$_j$ (Munn, 1994)

Condition A reconstruction is obligatory, as shown in (44a): the reflexive *himself* should appear in the base position to meet the binding requirement that it be bound by the local antecedent *Bill*. The derivation can be represented by the tree structure below.

(45)
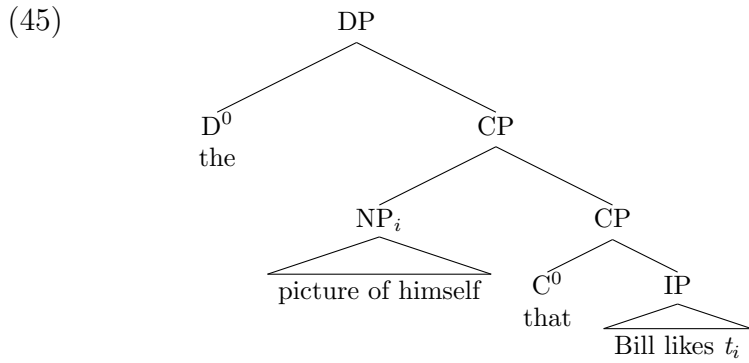
Variable binding reconstruction can also provide support for the idea of a head noun's raising from a relative clause, as represented in (44b): the quantifier NP *every soldier* can only bind the pronoun *his* if the head NP containing the pronoun appears in its base position.

(46)

```
                    DP
              _____|_____
             |             |
            D⁰             CP
            the       _____|_____
                     |           |
                    NP_j         CP
                 ____|____    ____|____
                |         | |         |
        picture of his_i mother C⁰    IP
                               that  __|__
                                    |     |
                          every soldier_i likes t_j
```
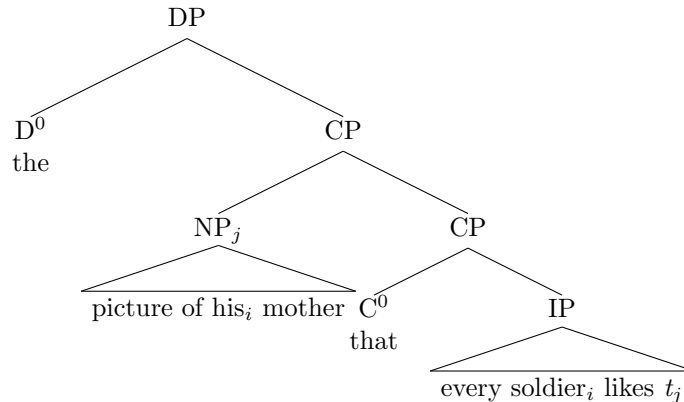
With respect to Condition C, this shows that reconstruction is not always oblig-
atory. As shown in (44c), the R-expression *Bill* inside the relative head does not
incur a Condition C violation. If Condition C reconstruction happens in this case,
the sentence will be out since the R-expression is bound by the pronoun. Munn
(1994) proposes that the binding behaviour of relative clauses is different from other
wh-movement structures in which reconstruction is obligatory for the low copy (as
illustrated in Section 2.3). Munn argues that the LF structures of relative clauses
and *wh*-questions are different, as represented in (47) and (48).

(47) **Relative Clause**

    a. [the picture of Bill$_i$]$_j$ that he$_i$ likes t$_j$

    b. [[the picture of Bill$_i$]$_{Head}$ [$_{CP}$ [which picture of Bill$_i$]$_{Operator}$ that he$_i$ likes ~~[which picture of Bill$_i$]~~]][1]

<div align="right">(Munn, 1994:402)</div>

(48) ***Wh*-Question**

    a. * [Which picture of Bill$_i$]$_j$ does he$_i$ like t$_j$

    b. [$_{CP}$ ~~[which picture of Bill$_i$]~~$_{Operator}$ does he$_i$ like [which picture of Bill$_i$]]

In (48), there are two copies in the chain: one is the operator, and the other one
is in the base position, both of which are identical to each other; then, the copy as
operator undergoes LF deletion; the other one should incur a Condition C violation.
However, in (47), there is an additional copy, the head NP of the relative clause,
which can be adopted to recover the deleted copy as operator following William's
(1978) extension of **Recoverability of Deletion**. Thus, we can delete the copy in

---

[1]Munn (1994) ignores the difference between the determiner of the relative head and its copies,
but he assumes that the operator has to be [+WH].

base position, escaping a Condition C violation in this case.

Munn (1994) further observes that Condition C violation reemerges in cases involving *idiom chunk* interpretation. Before going through the detailed cases, I need to briefly introduce how reconstruction happens in a relative clause that involves an idiom. The observation is that the relative head can be part of an idiom interpretation, and the rest of that idiom is left within a relative clause (Brame, 1968). This is a piece of straightforward evidence for the reconstruction of a relative head. Consider the following.

(49)   a. the pictures$_j$ that Bill took t$_j$ [2]
       b. the headway$_j$ that Bill made t$_j$

In (49), *take pictures* and *make headway* are idioms. This shows that the relative heads *pictures* and *headway* originates as the complements of the verbs, *take* and *make*, which appear within the relative clause. Given this rough picture of relative clauses involving idioms, let's turn back to the issue of Condition C violations. Consider the example with a complex head noun which contains part of an idiom.

(50)   * [The headway on Mary$_i$'s project]$_j$ she$_i$ had made t$_j$ pleased the boss.

To meet the adjacency requirement, the low copy of the head noun cannot be deleted as same as that in (47). Thus, it incurs a Condition C violation. Sauerland (2000, 2002) points out that examples involving variable binding can also show Condition C effects for relative clauses, as demonstrated below.

(51)   a. * [The letters by John$_k$ to her$_i$]$_j$ that he$_k$ told every girl$_i$ to burn t$_j$ were published.
       b. * [A review of John$_k$'s debate with her$_i$]$_j$ that he$_k$ wanted every senator$_i$ to read t$_j$ landed in the garbage instead.

(Sauerland, 2002:18)

In (51a), the R-expression *John* which is contained in a complex relative head should be reconstructed as part of the relative head to appear in a position inside the relative clause. In that position, the R-expression can be bound by the pronoun *he* indexed as k. In cooperation with a variable binding between the quantifier NP *every girl* and the pronoun *her*, Condition C effects are again present. (51b) patterns with (51a).

Furthermore, the narrow scope reading of a relative head can also force a Condition C violation. Consider the examples in (52).

---

[2]The phrase *take pictures* has both idiomatic and common interpretations. Commonly, it means "have pictures in hands". Idiomatically, it means "take photos", which is adopted in the discussion.

(52)   a. * [The many books for Gina$_i$'s vet school]$_j$ that she$_i$ needs t$_j$ will be expensive. (need ≫ many)

       b. * [The few coins from Bill$_i$'s pocket]$_j$ he$_i$ could spare t$_j$ weren't enough for all the needy. (could ≫ few)

(Sauerland, 2002:20)

To get a narrow scope reading from (52a) and(52b), we need to move the relative heads back to their base positions. The coindexation between the R-expression *Gina* and the pronoun *she*, and *Bill* and *he* results in a Condition C violation.

The findings above demonstrate that both Condition C violation and Condition C obviation are possible in relative clauses. While the former gives reconstruction, the latter is sometimes referred to as anti-reconstruction. We will see below that Sauerland uses the possibility of both reconstruction and anti-reconstruction to argue that both raising, as discussed above, and matching, to be further discussed below, are possible analyses for relative clauses. Let's turn our focus to the objections of the HRA in the following subsection.

2.4.2.2 Borsley's (1997) objections to Kayne's (1994) HRA

Borsley (1997) raises several objections to the raising structure proposed in Kayne's (1994) analysis, especially involving evidence from stacking, coordination, and extraposition constructions. One of the notable points in Borsley's objections is that the trace which represents the head noun within a relative clause is expected to be a DP rather than an NP. Considering that the relative pronouns in *wh*-relatives possess a D-feature already, the following arguments mainly focus on non-*wh*-relatives. Under Kayne's proposal, the underlying structure of a non-*wh*-relative is as represented in (53).

(53) $[_{DP}$ $[_D$ the $[_{CP}$ $[_{NP}$ picture $]$ that Bill liked t_{NP} $]]]$

```
              DP
           /      \
        D            CP
        |          /    \
       the      NP         CP
                |         /    \
             picture   that Bill liked t_NP
```
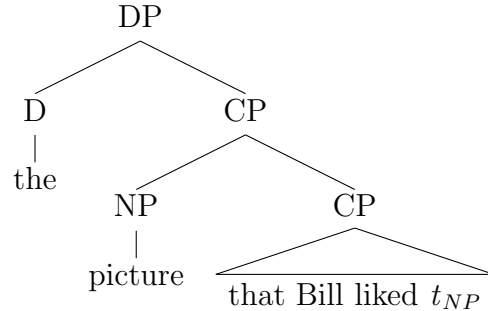
Borsley argues that the status of the moved element, the nominal head of the relative clause, and the status of the trace, is that they are DPs and not NPs. He mentions that NPs are not referential; however, a trace is referential. That a trace is referential can be shown in four respects: (i) a trace can refer to a pronoun which does not c-command it; (ii) a trace can control a PRO subject; (iii) a trace can license a parasitic gap; (iv) a trace must saturate a Case-marked position. So that there is a DP in the Spec CP position, Borsley points out that the NP needs to combine with an empty relative pronoun (represented by e in (54)).

(54) $[_{DP}$ $[_D$ the $[_{CP}$ $[_{DP}$ e picture $]$ that Bill liked t_{DP} $]]]$

```
                DP
             /      \
          D            CP
          |          /     \
         the       DP         CP
                 /    \      /    \
               D     NP   that Bill liked t_DP
               |      |
               e   picture
```
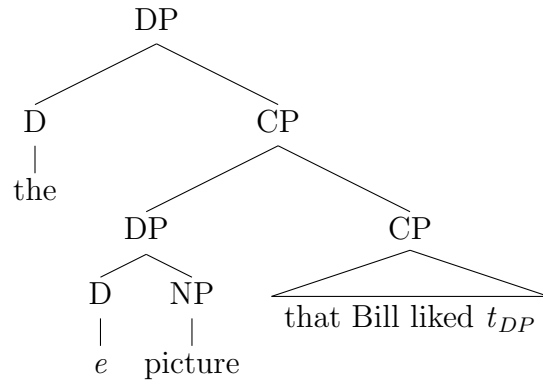
(Borsley, 1997:633)

   Let's turn our attention to a more complicated situation where relative clauses are stacked. The basic assumption proposed in Kayne (1994) is that, in a stacking sentence, the second trace is a CP because it stands for the combination of an NP and a relative clause. Following what Borsley (1997) proposes above, the underlying structures of stacked relative clauses are as sketched in (55) and (57). Consider the case with a *that*-relative first below.

33

(55) Stacked ***that*-relatives**
the book [that John wrote] [that Bill burnt] (Borsley, 1997:635)

```
                          DP
                  ┌────────┴────────┐
                  D                 CP
                  │          ┌───────┴───────┐
                 the      ┌──────────────┐   CP
                          │  CP_j        │ ┌──┴──┐
                          │ ┌──┴──┐      │ C     IP
                          │ DP_i   CP    │ │   ┌──┴──┐
                          │ ┌┴┐  ┌──┴──┐ │that  Bill burnt t_j
                          │ D NP  C    IP│
                          │ │ │   │  ┌──┴──┐
                          │ e book that John wrote t_i
                          └──────────────┘
```
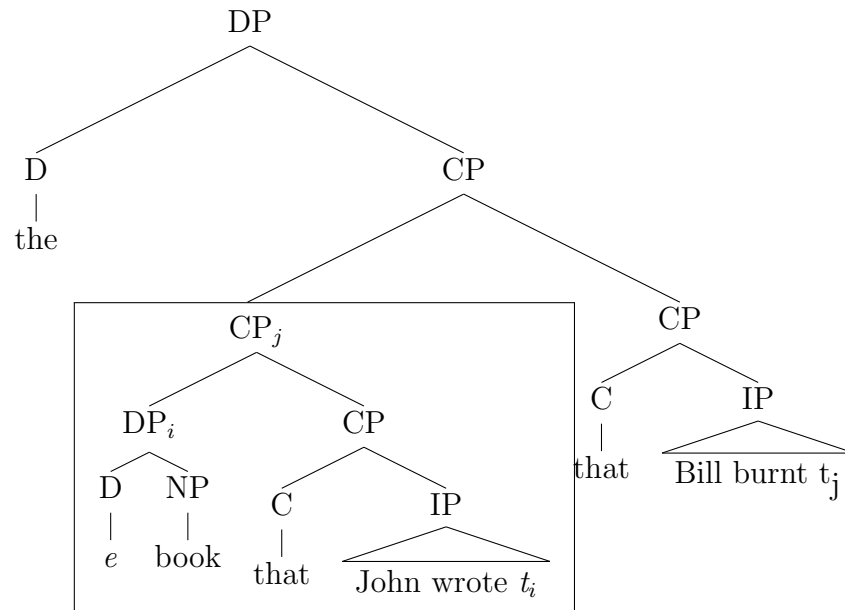
As shown in the recursive structure above, the second trace t_j stands for a moved CP, following Kayne's (1994) proposal. The first trace t_i stands for a moved DP, following Borsley's (1997) assumption. As for the status of the second trace, Borsley (1997) claims that it must be a DP since the verb *burnt* contained in the second clause cannot take a CP as a complement. Again, Borsley uses the same evidence as he used to prove the DP-feature of the trace in the normal case to support his idea here. Thus, the proposed CP, the framed element in (55), has to be reformed as represented in (56).

(56)
```
              ┌────┐
              │ DP │
              └────┘
           ┌────┴────┐
           D         CP
           │     ┌────┴────┐
           e    DP_i       CP
              ┌──┴──┐   ┌───┴───┐
              D    NP   C       IP
              │    │    │     ┌──┴──┐
              e   book that  John wrote t_i
```
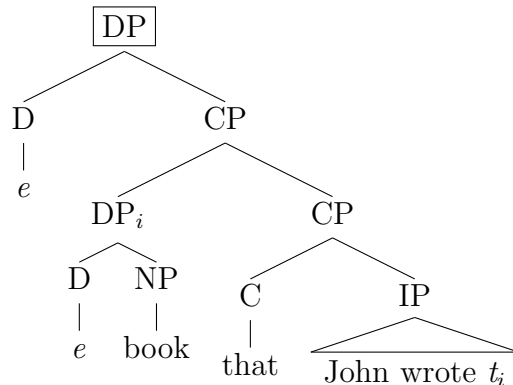
As shown above, an additional DP projection which takes an empty determiner as a

head is attached to the original CP. According to Borsley (1997), it is necessary to ensure that two empty determiners are covert in this structure. Seemingly, such a double *es* structure can serve to shift the status of an embedded relative construction from a CP to a DP when the relative clauses involved are *that*-relatives. However, it is not possible to have such a structure when the relative clauses involved are *wh*-relatives. Consider the tree structure of an example with stacked *wh*-relatives.

(57) Stacked **wh-relatives**
the book [which John wrote] [which Bill burnt]   (Borsley, 1997:639)
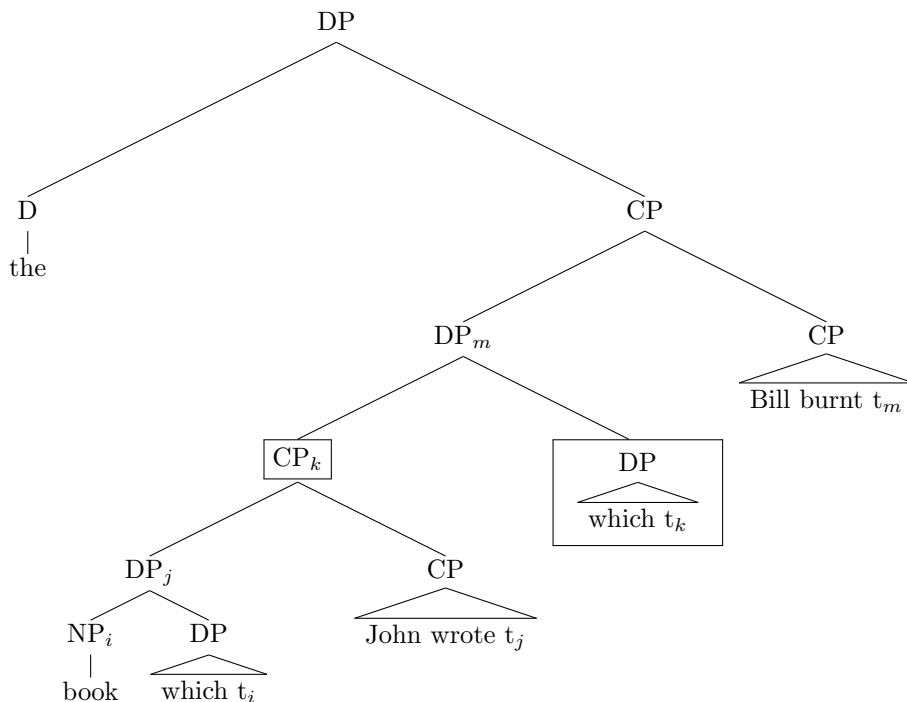
From this tree, we can see that the framed DP consists of a *wh*-relative pronoun and a trace which stands for a relative construction, a CP. This implies that the complement of a *wh*-pronoun is a CP underlyingly. However, a *wh*-word cannot take a CP as a complement, according to Borsley (1997). Furthermore, the mechanism used in *that*-relatives cannot be used to shift the status of an RC here. Regarding these issues, therefore, Borsley concludes that the proposed structure of relative clauses in Kayne's (1994) HRA is problematic.

2.4.2.3 Bianchi's (2000) response to Borsley (1997)

Bianchi (2000) provides an answer to Borsley's (1997) objections by making some modifications to Kayne's (1994) proposal. As an empty determiner which is covert is c-commanded by an external determiner which is overt, a licensing relationship between them can be established. The licensing relation takes place through an abstract incorporation mechanism from the empty relative D to the external D. Therefore, the empty D can incorporate with the external determiner *the*, as represented in (58).

(58) $[_{DP}$ D$_{Rel}$ + the $[_{CP}$ $[_{DP}$ t book $]_i$ that John likes t_i $]]]$

(Bianchi, 2000:125)

Since the external D and the relative D share fully consistent feature structures, the relative D can be deleted after incorporating with the external D (restricted by an economy principle [3]). Accordingly, the empty D cannot appear in other positions, for instance:

(59) * Bill liked $[_{DP}$ e $[_{NP}$ picture $]]$.

(Borsley, 1997:633)

An empty D can only be licensed by a Ds which has fully consistent feature structures with it. In (59), it is impossible for an empty D to be identical with a lexical head; thus, the empty D fails to be licensed. For the cases with double empty Ds, as in (55), Bianchi proposes a double abstract incorporation to operate. In this abstract mechanism, the lowest D gets deleted by incorporating to the intermediate D; then, the intermediate D gets deleted by incorporating to the highest D, *the*.

Consider the questions raised by Borsley (1997) involving stacking of *wh*-relatives, as in (57). In the underlying structure of stacked *wh*-relatives, which assumes a CP complement for the second *which*, Borsley doubts that the interrogative *which* can take a CP complement, which is why (60a) is ungrammatical. Bianchi (2000) points out that the ungrammaticality of (60a) is not triggered by the inability of *which* to take a CP complement, but is because the following CP fails to meet the [+N] requirement of *which*.

(60) a. * Which $[_{CP}$ that John was here $]$ did Bill believe?   (Borsley, 1997)

  b. Which $[_{CP}$ book <u>that</u> John wrote $]$ did Bill burn?   (Bianchi, 2000)

---

[3]Bianchi (2000:126) proposes the following economy principle to implement her idea:

Economy of Representation

Incorporate a functional head to a host whose feature structure is consistent with its own.

In (60b), the CP contains a relative construction with a [+N] feature, whereas, the CP involved in (60a) is a clause which cannot have a [+N] feature.

Let's turn now to the second objection, which is about coordination of relative clauses. Borsley (1997) provides examples, like (61), to argue that the second conjunct in a coordination is not a constituent under Kayne's (1994) proposal, since the *wh* relative operator in (61) has an NP in its specifier position.

(61)   the picture [which Bill liked] and [which Mary hated]

(Borsley, 1997:638)

One might assume that the second conjunct undergoes a deletion process. Under identity with the first part of a preceding constituent in Spec CP, deleting the first part of a constituent in Spec CP. However, Borsley argues against this due to lack of independent evidence. Bianchi points out that the head noun of two relative clauses in (61) can be analysed as undergoing *across-the-board extraction* (ATB for short) rather than deletion. Alternatively, she notes that Munn's (1992) null operator analysis can be adopted to solve problems encountered with coordination of *that*-relatives.

(62) $[_{DP}$ the $[_{\&P} [_{CP1} [_{DP}$ picture $]_i$ [that Bill liked t$_i$]] $[_{\&P}$ and $[_{CP2}$ Op$_j$ [that Mary hated t$_j$]]]]]   (Bianchi, 2000:133)

As shown in (62), the coordination takes two CP conjuncts: the first CP which overtly contains a complete relative construction saturates the Spec &P position and the second CP, which contains an abstract head noun, is in the complement position of the &P. Both RCs involve a raising head. The difference between them is that the former involves a lexical head while the latter involves a null operator. Finally, the whole conjunction is adjoined to the external D as a complement. Regarding this, Bianchi's proposals are sufficient to overcome the objections.

Let's now turn briefly to the Head External Analysis, and its relation to the HRA. The head external analysis proposed in Chomsky (1977) argues that a noun takes a relative clause, a CP, as an adjunct. This structure is ruled out by Kayne's (1994) theory of antisymmetry. Compared with the HEA, Kayne's (1994) HRA in the framework of antisymmetry proposes that the D takes a relative clause as a complement and the N(P) is the specifier of that relative clause. Consider and compare their structures in brief below.

(63) a.

$$\text{NP} \rightarrow \text{D}, \text{N'}; \quad \text{N'} \rightarrow \text{N}, \text{CP}; \quad \text{CP} \rightarrow \text{C}, \text{IP}$$

b.

$$\text{DP} \rightarrow \text{D}, \text{CP}$$
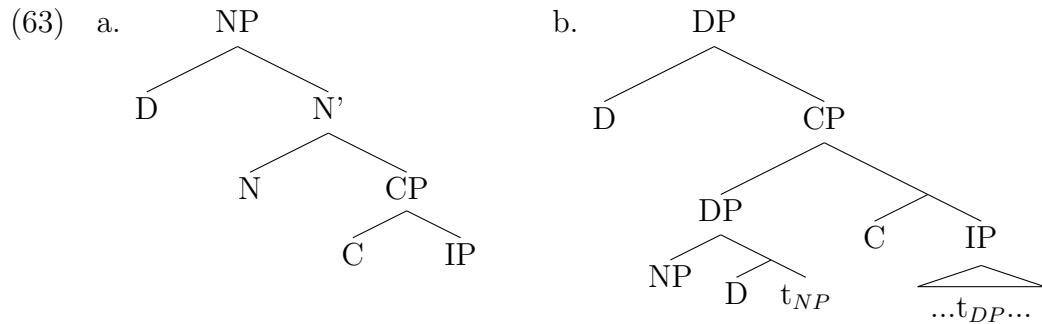
Kayne (1994) proposes a strict phrase structure which rejects adjunction structures and allows only specifier-head-complement (SHC) structures. He abandons the standard view of phrase structure which relates hierarchical relations (asymmetric c-command) with linear precedence. In an asymmetry phrasal structure, the non-terminal node A dominates the terminal node α, and the non-terminal node B dominates terminal node β. If A asymmetrically c-commands B, α precedes β. This is a statement of the *Linear Correspondence Axiom* (LCA for short). With respect to phrase structure in the framework of Kayne's antisymmetry theory, we can use the same syntactic structure to analyse prenominal and postnominal relative clauses. A significant difference between their derivation is that the latter has an additional step of movement to account for the surface order. Specifically, after raising a head noun to Spec CP position, a remaining relative clause, an IP, needs to have leftward movement to a Spec DP position where a relative clause can precede the head noun it modifies, as represented in the following.

(64) **The derivation of prenominal relative clauses**
Step 1 : $[_{DP} [\text{D}^0 [_{CP} [_{NP} \text{book}] [\text{C}^0 [_{IP} ...t_{NP}...]]]]]$
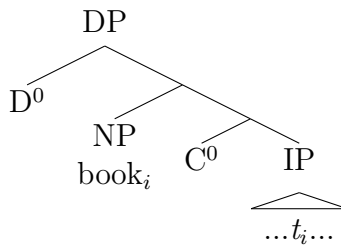
Step 2 : $[_{DP}\ [_{IP}\ ...t_{NP}...\ ]_j\ [D^0\ [_{CP}\ [_{NP}\ \text{book}\ ]\ [C^0\ t_j\ ]]]^4$

DP

IP   D^0 CP

...t_j...

NP   C'
book$_i$

C^0 t_j
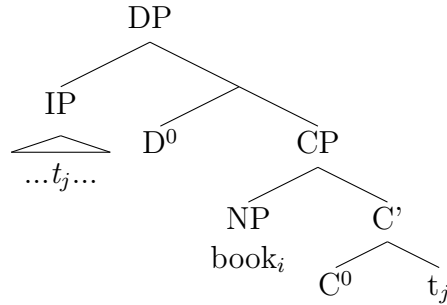
<div align="right">(Kayne, 1994)</div>

As depicted in the tree diagrams above, the determiner (D^0) and complementizer (C^0) are both phonetically covert (Kayne, 1994). Kayne notes that there are no *the*-like determiners in the languages with prenominal relative clauses; thus, a covert D^0 is proposed to stand at that position. A [D^0 [CP]] (head-complement) structure is prohibited from having a mirror structure, [[CP] D^0] (complement-head) structure, under the strict phrase structure proposed in Kayne (1994). Therefore, to derive a prenominal relative clause in a [D^0 [CP]] basic structure, we need to move the clause the elements of which have been relativized to the specifier position of the DP that stands for the whole construction. Further, the moved element is an IP which excludes the complementizer C^0 because the combination of them is not a phrase level but a bar level. Kayne's proposed structure unifies the analyses of different types of relative clauses. In the next chapter, I will illustrate the application of the HRA to relative clauses in Mandarin Chinese in more detail and provide my view of the HRA with an antisymmetric structure.

2.4.3   The Matching Analysis

The matching analysis (MA) is a mixed approach of the HEA and HRA. In the proposed structure of the MA, there are two relative heads appearing externally and internally to a relative clause (Less, 1960, 1961; Chomsky, 1965; Carlson, 1977; Cinque, 2003; Sauerland, 1998, 2000, 2002). The head noun appearing externally is the head noun that we can see on the surface. This head noun is base-generated outside of a relative clause, which is the same as what the external head does in the HEA. The head noun appearing internally is covert and phonologically null. It is originated together with a relative operator in a position within a relative clause and

---

[4]Kayne (1994) leaves an open question about how to exclude the cases where there is a overt complementizer stranding.

moved along with the relative operator to the specifier position of a CP, which is the same as the head noun does in the HRA. These two head nouns are not related by movement, instead, by matching. First, an external head must be the antecedent of an internal head. Second, the content of an external head must be identical to the content of an internal head. Finally, we can apply *relative deletion* to the internal head. This derivation can be depicted as in the following.

(65) a. **The derivation of a *that*-relative clause**
$[_{DP}$ the $[_{NP}$ [book$_i$] $[_{CP}$ ~~book$_i$~~ that I brought t]]]
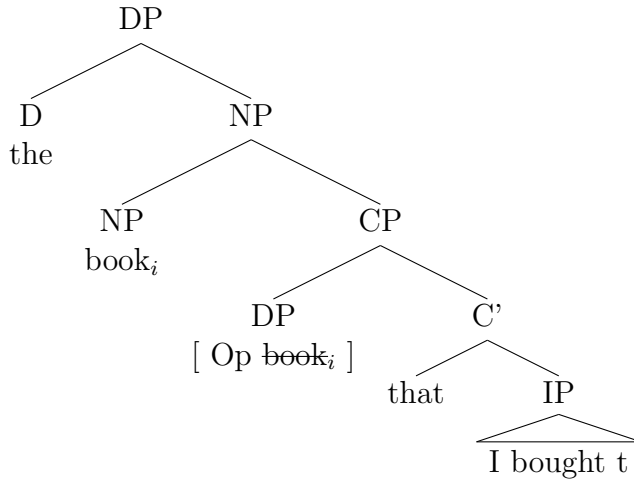
b. **The derivation of a *wh*-relative clause**
$[_{DP}$ the $[_{NP}$ [book$_i$] $[_{CP}$ $[_{DP}$ which ~~book$_i$~~] I brought t]]]
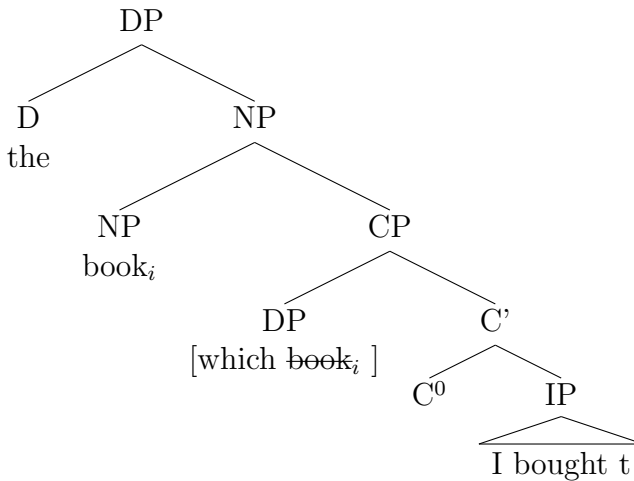
According to the tree structures of the *that*-relative and *wh*-relative showed above, the internal copy of a head noun is raised from a base position to the Spec CP. In the *wh*-relative, the internal copy of a head noun appears as the complement of the *wh*-operator *which* originating in the base position and moving to the surface position along with *which*, as in (65b). On the other hands, a null D^0 standing for a null operator is proposed to saturate that position in two situations: when the complementizer *that* appears, as in (65a); when a complementizer and a relative pronoun both do not appear.

There are several pieces of convincing evidence for the matching analysis, which argue against the head raising analysis, involving the absence of Condition C effects, extraposition, stacking and weak island sensitivity. As mentioned in the last section, a relative clause, as shown below, is expected to trigger Condition C obviation, repeated from (44c).

(66) [the picture of Bill$_i$] that he$_i$ likes   (Munn, 1994)

In (66), a Condition C violation must occur if the complex relative head is proposed to originate from a position within the relative clause under the HRA. The R-expression *Bill* appearing in the base position can be c-commanded by the pronoun *he*, therefore, this incurs the violation. However, it is contrary to fact because (66) is grammatical under the indexing shown. Regarding this, Sauerland argue that the HRA cannot account for Condition C binding effects inside relative clauses, while, the matching analysis can. Since only an internal head noun can appear in the base position, only the internal head noun can show a binding relationship with arguments inside the relative clause. Therefore, an external head noun cannot have such a relationship with the pronoun inside the relative clause and therefore cannot trigger a Condition C violation.

Aside from the Condition C effects, Cinque (2015) provides three pieces of evidence for distinguishing the matching analysis and the head raising analysis. Since there are various situations where the HRA cannot apply but the MA can, adopting the HRA solely to derive relative clauses will result in some wrong predictions. However, we cannot eliminate the application of the HRA to relative clauses in some situations.

The first piece of evidence involves relative clause extraposition, which has been mentioned in Borsley's (1997) objections to the HRA. Based on Borsley (1997), Cinque points out further issues connected to extraposition. Cinque also notes that Harris (2008) argued that the HRA is not compatible with extraposition. The argument starts with a famous ambiguous sentence raised by Heim (1979). Harris observes that each different reading represents a different derivation.

(67) John guessed the price that Mary guessed

a. John and Mary do not know each other. They have an identical guess of the price of a product.

b. What John guessed is about Mary's guess, which is not really about the price of something.

<div align="right">(Harris, 2008:194)</div>

In (67), following Harris' description, the first reading stands for the Matching Analysis, and the second reading stands for the Head Raising Analysis. In the first case, the identities of the head noun *price* in the matrix clause and the relative clause do not have a direct relationship, which is compatible with the MA. In the second case, the head noun *price* has to contain the information it receives from the relative clause when it is expressed in the matrix clause, which is compatible with the HRA. Harris (2008) points out that the second reading disappears if the relative clause is extraposed.

(68) John guessed the price *yesterday* that Mary guessed

    a. John and Mary both knew the same price yesterday

    b. * John knew which price Mary knew yesterday

<div align="right">(Harris, 2008:198)</div>

When adding an adjective, *yesterday* in (68), the relative clause needs to be extraposed from the head noun. Harris shows only the first reading is possible, which results in the MA.

The other issue involving extraposition is connected to *Inverse Case Attraction.* Inverse Case Attraction states that a head noun prefers to conserve the Case acquired from its base position rather than from its surface position, coming together with the HRA. In (69), the subject 'the girl' has accusative case, consistent with its base position in the relative clause.

(69) doxtar ey **ra** [ke jon mišnose] inja æs
      girl ART ACC COMP John know.PRS.3SG here be.PRS.3SG
      'The girl that John knows is here.'

Following this, the base Case of a head noun would be expected even though the relative clause is extraposed because the head noun has the same case as the empty element contained in the relative clause has. However, it is not possible for a further left-moved head noun to have the Case it once had. Consider the examples from Dari.

(70) * doxtar ey **ra** inja æs [ke jon mišnose]
      girl ART ACC here be.PRS.3SG COMP John know.PRS.3SG

<div align="right">(Dari, Cinque, 2015:11)</div>

As illustrated by (70), after extraposition of the relative clause *John knows*, the head noun *girl* can no longer be case-marked as ACC. Therefore, Cinque concludes that we require the MA and HRA both to derive relative constructions.

The second piece of evidence mentioned in Cinque's (2015) discussion is about stacking of relative clauses. The examples of relative clauses here contain idiom interpretations. Recall that idiom chunks have been regarded as an important factor to support the HRA. A head noun can originally be part of an idiom interpretation, showing a strong relationship between a trace and the head noun. However, this kind of head nouns cannot be modified by multiple relative clauses.

(71)   * The headway [that he made] [that we will also make]

Grosu and Landman (1998) also mention that stacking is restricted to those relatives, such as *degree relatives*, *free relatives*, *internally headed relatives*, and *correlatives*, other than *restrictive* and *appositive relative clauses*. Degree relatives are relative clauses whose head nouns involve a degree expression. Consider the following examples that involve degree relatives, whose head nouns are modified by a number, *one*.

(72)   a.   * The one sailor [that there was ＿＿＿ on the boat] [that there ＿＿＿ had been on the island] died in the explosion.
       b.   The one sailor [who was on the boat] [who had been on the island] died in the explosion.

(Grosu and Landman, 1998:148)

Under the HRA, the NP *one sailor* must be interpreted inside both relative clauses. However, the arguments here for *degree relatives* is compatible with that of idiom interpretations showed above: the relative head of a degree relative cannot be reconstructed to the base position of more than one relative clause, as illustrated in (72). The expected base positions of the head noun *sailor* are underlined. The grammaticality of (72b) shows that this kind of NP does not originate inside the relative clause, which against the HRA.

The last piece of evidence mentioned in Cinque (2015) is that a raising head is sensitive to weak islands, illustrated by data concerning *free relatives*.

(73)   a.   * Whatever pilots we asked them [$_{wh-island}$ whether you had contacted].

(Postal cited in Cinque, 2015)

       b.   * What [$_{neg-island}$ these players don't weigh] is at least 300 pounds.

(Rullmann cited in Cinque, 2015)

c. * Whatever friends [$_{factive\ island}$ I am glad I once had] are gone.

d. * Whatever friends [$_{extraposition\ island}$ it was time that you had] are gone.

<div align="right">(Cinque, 2015:14)</div>

As shown in (73), extraction of the *wh*-phrases, *whatever pilots*, *what* and *whatever friends*, from the clauses which are suggested to be weak islands is blocked. The weak islands involved include *wh*-islands, negatives, factives, and extraposition. All the examples displayed suggest that a raising head noun is sensitive to weak islands. This is because a relative clause derived by the HRA involves either a degree or a kind variable, whereas, a relative clause derived by the MA involves an individual variable. Cinque does not give further explanation about this. He just notes that the former is sensitive to islands, while the latter is not.

Regarding this evidence, we can see that there are various cases that we cannot apply the HRA to derive. Therefore, Cinque (2015) proposes that the HRA and the MA are both necessary for deriving relative clauses. In the following section, I will introduce an approach that mixes the analyses.

2.4.4   The Mixed Analysis

The Mixed Analysis is a combination of the head raising analysis and the matching analysis. It proposes that the MA and HRA are both obligatory for deriving relative clauses, with respect to the presence and absence of reconstruction (Bhatt, 2002; Aoun & Li, 2003; Sauerland, 2000, 2003; Cinque, 2015). Cinque (2015) points out that the traditional "matching" analysis is not compatible with Antisymmetry (Kayne, 1994). In the traditional MA, the relative clause is right-adjoined to the external head (as shown in (65)). Cinque proposes a "Prenominal Origin" of relative clauses which is in contrast to the hypothesis proposing a *postnominal*-base underlying structure for relative clauses, such as, Kayne's version of the HRA. He proposes that a relative clause does not originally appear to the right of a head noun, and the surface order results from the leftward movement of a head noun. To reconcile the traditional "matching" analysis with Kaynian phrase structure, Cinque (2015) creates a double-chain structure for deriving relative clauses. Each chain contains a head noun; therefore, as with the traditional "matching" analysis, there are two head nouns within the proposed structure, as represented in (74).

(74)   [$_{DP}$ the [book] [$_{CP}$ [~~book~~]$_i$ that John likes t_i]

DP
├─ D
│ the
└─ FP
   ├─ NP
   │ books
   └─ ...
      ├─ F
      └─ FP
         ├─ CP₂
         │ ├─ DP
         │ │ Op books
         │ └─ ...
         │   ├─ C₂
         │   └─ CP₁
         │   that
         │   ├─ C₁
         │   └─ IP
         │   ├─ DP
         │   │ John
         │   └─ ...
         │   ├─ I
         │   └─ ...
         │   ├─ V
         │   │ likes
         │   └─ dP₂=Internal Head
         │   Op books
         └─ ...
            ├─ F
            └─ dP₁=External Head
               │
               NP
               books
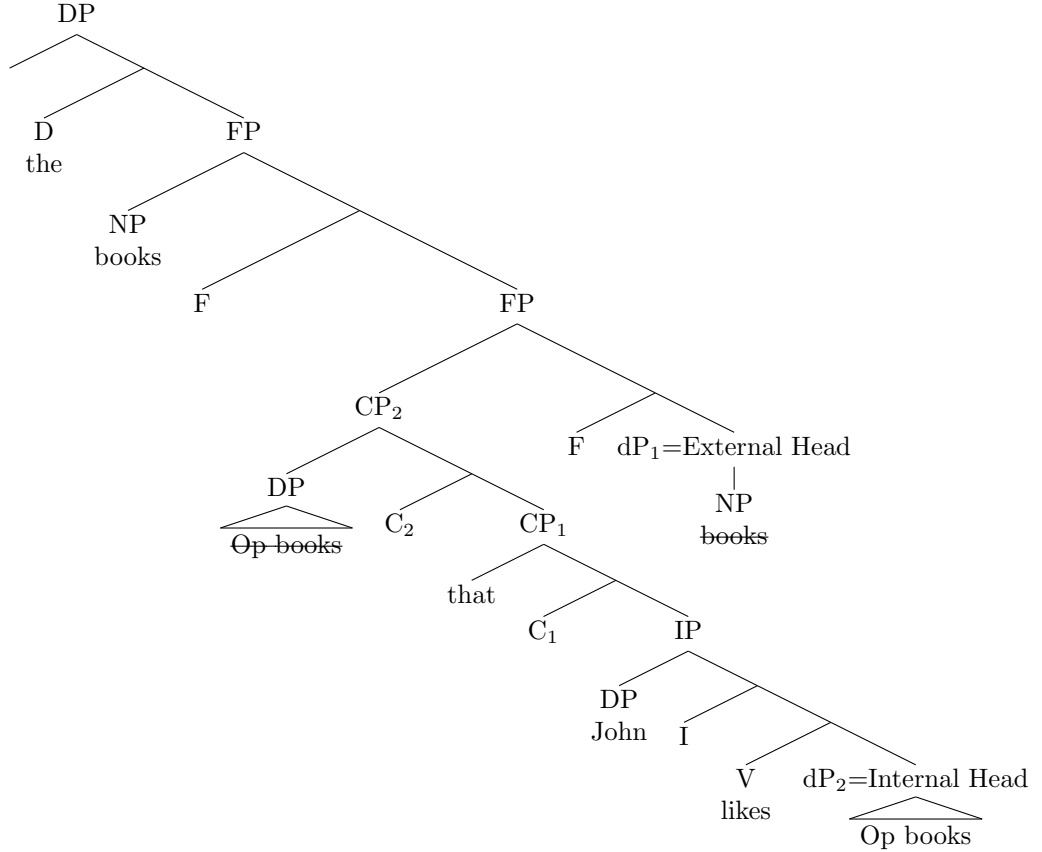
According to the tree structure shown above, the two chains are stacked together; more precisely, the lower chain stands for a relative clause that is nested in the other one. The upper chain accounts for fixing the ordering between a head noun and a relative clause to meet the antisymmetry framework. In Cinque's (2015) hypothesis, there are two leftward movements involved in the derivation of postnominal relative clauses, as shown in (74). We call the head noun contained in the upper chain the external head noun and call the other one contained in the lower chain the internal head. An external head originates in a position which is lower than its surface position, and left-moved past the CP that stands for a relative clause to get to its surface position, as represented by the dashed line in (74). An internal head is moved to the specifier position of its local CP_2, as represented by the solid line in (74), which is the same as the HRA. The internal copy will get deleted after movement. The deletion of an internal head noun is incurred by *relative deletion* which requires that an internal head must be covert by checking the contents between the internal head noun with its external copy. Compared with the derivation of prenominal relatives, their external head does not need to raise to the Spec FP position. Consider below.

(75) he [_{RC} taa-w   kuttuwᵃ ehida   ] iccashᵘ adussa laagge-t-I
     those   me-DAT chicken having-brought five   tall   friend-PL-SUBJ.
     'those five tall friends who brought me a chicken'

(Wolaytta, Lamberti and Sottile cited in Cinque, 2015:4)
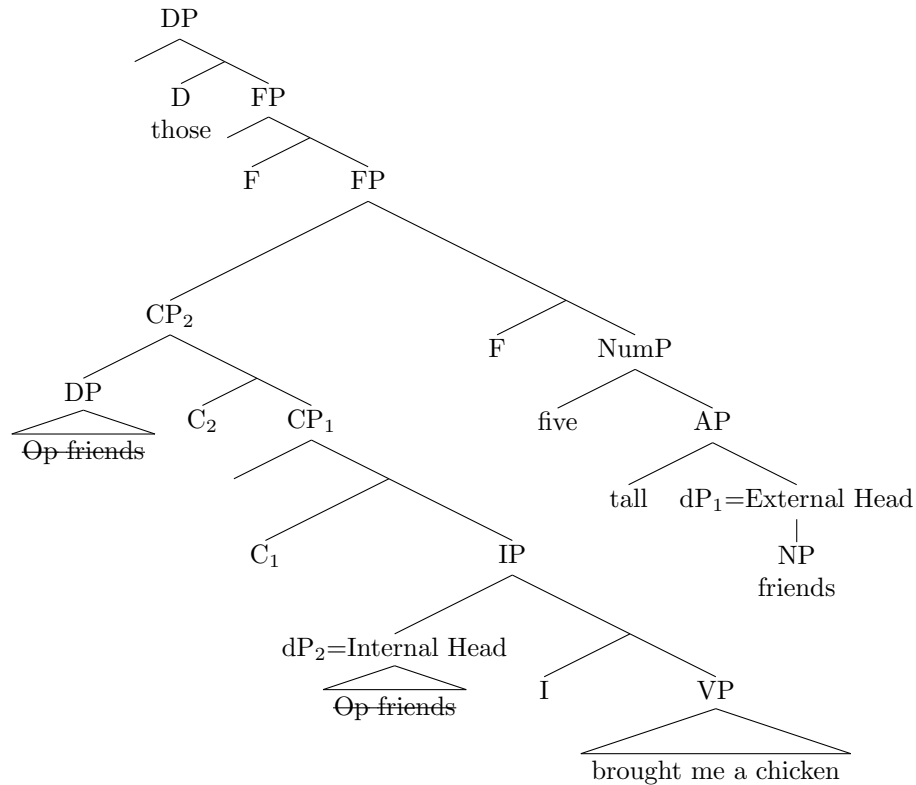
As in (75), the external head *friends* stays in the low position, which allows a relative clause to precede the head noun. The two examples shown above both belong to the category of externally-headed relative clauses. According to Cinque (2015), this proposed double-headed structure can also account for internally-headed relative clauses. I repeat the circumnominal relative clauses from Dagbani in Section 2.4.2 below.

(76) [A   mi   [_{DP} [_{CP} o nə ti   saan-so   ləgri   ] la].
     you know   he SR give stranger-SPC/LIV money   DET
     'You know the stranger whom he gave the money.'

(Dagbani, cited in de Vires (2002:16))

```
                              DP
                        _____
                      Spec        D    FP
                                      _____
                                     F              FP
                                              _____
                                           CP₂            F    dP₂=Internal Head
                                        _____              _____
                                      C₂        CP₁              stranger
                                            _____
                                          C₁        IP
                                               _____
                                             DP    I    VP
                                             he        _____
                                                      V         NP
                                                    gave      _____
                                                   dP₂=Internal Head   NP
                                                      _____       money
                                                      stranger
```
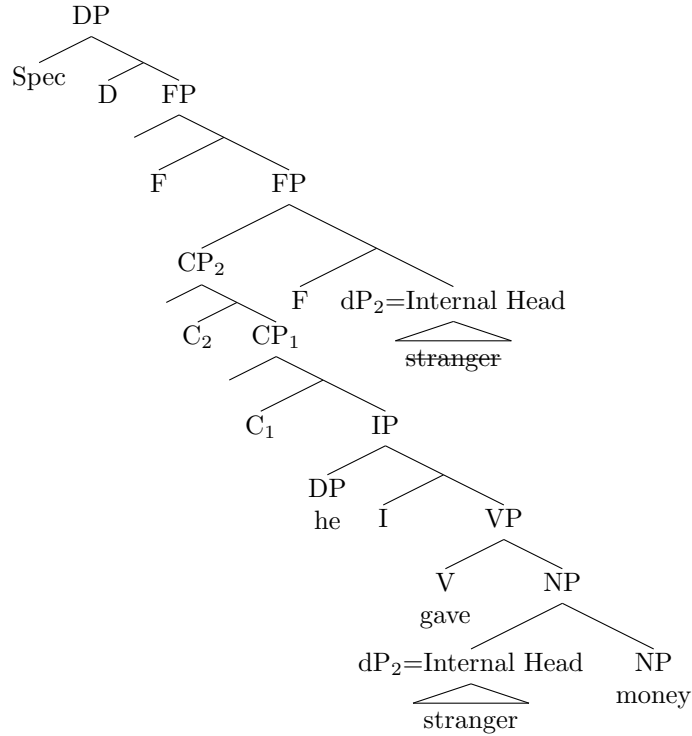
As shown in the derivation of internal-headed relative clauses above, there is a significant difference from the derivation of the external-headed relative clause. The relative head that is expected to undergo deletion is the external one, and the internal head stays in its base position within the relative clause. Since a determiner in Dagbani follows the relative clause, the FP which contains the relative clause has to move to the Spec DP position; then, the relative clause precedes the determiner.

2.5   Chapter Summary

In this chapter, a general picture of relative clauses has been sketched out. First, I have introduced the basic elements of a relative construction. Second, I have illustrated three crucial properties of relative clauses, namely restrictiveness, pied-piping and reconstruction. Third, I have reviewed seven cross-linguistic properties of relative clauses and the syntactic analyses of the derivation of the relative construction. The criteria to classify the properties can be summarized as follows: (a) the order between a relative head and a relative clause; (b) the position of a relative head within a relative construction; (c) the adoption of a gap or a resumptive pronoun; (d) the adoption of a relative pronoun or a complementiser; (e) the way in which restrictives and non-restrictives are differentiated; (f) recursive and iterative structures; (g) the position of a relative clause within an NP. Having given these properties, I turned to

the four primary analyses of relative clauses.

After providing the crucial facts about relative clauses, I proceeded to illustrate four different analyses of relative clauses, namely the Head External Analysis (HEA), the Head Raising Analysis (HRA), the Matching Analysis (MA) and the Mixed Analysis. These analyses propose a different relationship between the head noun and the trace which stands for the head noun in a relative construction. The HEA regards a head noun as originating outside of the relative clause, which fails to explain reconstruction. In the HRA, the head noun is assumed to raises from a position within a relative clause to its surface position. Reconstruction and idiom interpretations are important evidence to support the HRA. However, there arises a situation showing that it is not always obligatory to reconstruct a relative head to its base position, with respect to Condition C obviation. Aside from this, Borsley (1997) makes several strong objections to Kayne's (1994) HRA, involving the requirement of an empty D in *that*-relatives, coordination, stranding and extraposition constructions. The MA adopts the base-generated external head from the HEA and the raising internal head from the HRA into one analysis, which can account for the case where there is Condition C obviation. But, the indirect relationship between the two heads fails to capture, at least elegantly, reconstruction effects. The incompatibility of the MA and Antisymmetry is resolved in the Mixed Analysis. The Mixed Analysis adopts analyses from the MA and the HRA, and it makes a change to the MA, the external head of which is not base-generated but raised from a lower position. The proposed double-headed structure can account for different types of relative clauses.

In the next chapter, I will go through the relative constructions in Mandarin Chinese and introduce how the received analyses of relative clause can be extended to relative clauses in Mandarin Chinese.

Chapter 3

The Relative Construction in Mandarin Chinese

3.1 Introduction

The cross-linguistic typology and analyses of relative clauses presented in the last chapter give us a clear picture of the relative construction and the development of the syntactic analyses of the relative construction. In this chapter, I will present an overview of the relative construction in Mandarin Chinese. I will begin with the canonical pattern of the Mandarin relative construction. In Section 3.3, I will move on to the properties of the Mandarin relative construction. There are five properties I will go through, some of which correspond to the cross-linguistic parameters discussed in the last chapter, the Mandarin relative construction (i) involves no overt relative pronoun; (ii) can take a resumptive pronoun optionally under certain conditions; (iii) a relative clause can appear in two possible positions in a DP; (iv) both recursive and iterative relative clauses are possible; (v) the linear ordering between different relative clauses to an NP sometimes cannot be changed.

Given this basis, in Section 3.4, I will proceed to the syntactic analyses of Mandarin relative construction. The approaches to derive Mandarin relative construction are along two lines. One claims for a unified analysis for the Mandarin relative construction, regardless of the differences among NP relativization, adjunct relativization and others (Ning, 1992; Simpson, 2000, 2002; Xu, 2009). However, the other argues to analyse the Mandarin relative construction type by type (Aoun and Li, 2003; Huang, Li and Li, 2009). The former approach includes analyses that adopt operator movement (the head external analysis), head raising and matching. The latter approach involves a mixed analysis, more specifically, these researchers propose to derive NP relativization via a head raising strategy and adjunct relativization via a

base-generation strategy.

3.2 The Structure of the Relative Construction in MC

Mandarin Chinese is a subject(S)-verb(V)-object(O) word order language. In Mandarin Chinese, a relative construction consists of a head noun, a relative clause (shown below with an underscore standing for a relativized element) and a fixed particle, *de*, as represented in (77).

(77)   a. **Object relative clause**

   Det - **Relative Clause**   - DE - **Head Noun**
   nà   [[Lisa xǐhuān _____] de   shū   ]
   that   Lisa like   DE   book

   'the books that Lisa likes'

   b. **Subject relative clause**

   Det - **Relative Clause**   - DE - **Head Noun**
   nà   [[_____   mǎi shū] de   nánshēng   ]
   that   buy book   DE   boy

   'the boy that bought books'

(77) illustrates the canonical structure of relative clauses in Mandarin Chinese. First, Mandarin relative clauses are external-headed and postnominal basically. Second, there is no overt relative operator, relative pronoun or complementizer, appearing in the relative clause. Third, a fixed particle, *de*, appears intermediately between the head noun and the relative clause.

Having given a brief introduction to the basic structure of Mandarin relative clauses, I will proceed to the properties of Mandarin relative clauses in the following sections. The properties that I will include in the following subsections are mostly compatible with the cross-linguistic properties laid out in Chapter 2.

3.3 The Properties of Mandarin Relative Construction

3.3.1 No relative pronoun

Relative clauses in Mandarin Chinese do not contain a relative pronoun (Ning, 1993; Huang, Li and Li, 1984, 2009; Aoun and Li, 2003; Del Gobbo, 2007, among others). According to de Vries (2002), this is a typical property of prenominal relative clauses. In European languages, such as English, Dutch and German, relative pronouns are the *wh*-words that we use in interrogatives. Although we use *wh*-words to introduce interrogatives in Mandarin[1], we cannot use these *wh*-words in relativization in the same way as those European languages do. Consider below.

(78) Zhè jiù   shì [nà-gè   [[[Lisa kànjiàn] de] gūniáng]].
      this exactly be   that-CL   Lisa see   DE   girl
      'This is the girl who Lisa saw.'

    a. ***Wh-question***

      Lisa kànjiàn **shuí** ?
      Lisa saw   who

      'Who did Lisa see?'

    b. **Applying *wh*-word into the relative clause**

      * [$_{CP}$ **shuí** Lisa kànjiàn de] gūniáng
        who Lisa see   DE   girl

Instead, a covert relative operator (Op) is proposed in the derivation of Mandarin relative clauses (Ning, 1993; Huang, Li and Li, 1984, 2009; Aoun, Li and Li, 2003; Del Gobbo, 2007). Thus, the relative construction contained in (78) has the underlying structure as sketched in (79).

(79) [na   [**Op**$_i$ Lisa kànjiàn t$_i$ de] gūniáng]
      that   Lisa see   DE   girl
      'the girl who Lisa saw'   (Del Gobbo, 2007:182)

Apart from Mandarin Chinese, languages like Japanese and Korean also do not contain an overt relative pronoun in relative clauses. Furthermore, unlike Mandarin Chinese, Japanese and Korean do not have an analogue of the Mandarin *de* particle in relative clauses.

---

[1] Interrogatives in Mandarin are *wh*-in-situ. Therefore, the *wh*-words appear in the base position rather than move to the specifier position of a CP.

(80)   a. **Korean relative clause**

[[John-i   cohaha-nun] chosanghwa-ka] pyek-ey kellye iss-ta.
   John-NOM like-ADN   portait-NOM   wall-at hang be-DECL

'The portrait that John likes is on the wall.'

(revised from Han, 2013:322)

   b. **Japanese relative clause**

[[Watashi-ga kinoo   atta] hito   ] -wa   yasashii.
   1SG-NOM   yesterday met   person -TOP kind

'The person that I saw yesterday is kind.'

(Saito, Lin and Murasugi: 2008:300)

In Japanese, there is a *de*-like particle, *no*, used to connect other elements to a noun. However, this particle cannot appear in the relative construction (Saito, Lin and Murasugi, 2006).

(81)   [watashi-ga knoo   mita] (* no) hito
       1SG-NOM   yesterday met   *no* person
   'the person I saw yesterday'

(Saito, Lin and Murasugi: 2008:313)

Compared with (80b), the case becomes ungrammatical when we change the particle -*wa* to *no*. The status and category of *de* are under intense scrutiny because it plays an essential role in the derivation of Mandarin relative clauses. It has been analysed as a determiner in Simpson (2001), a complementizer (Ning, 1993; Aoun and Li, 2003; Huang, Li and Li, 2009), an independent functional head (Ning, 1996) and a modifier head (Zhang, 2015). I will show how the different identities of *de* affect the analyses of Mandarin relative clauses in Section 3.4.

3.3.2   Presence of resumptive pronoun

McCloskey (2006) points out that resumptive pronouns have an identical appearance to regular pronouns. As mentioned in the last chapter, resumptive pronouns can appear in Mandarin relative clauses. They can occupy the base position of a head noun within the relative clauses. A trace can also occupy this position. According to Zhou (2012), resumptive pronouns do not occur freely. There are three conditions that affect how resumptive pronouns appear in Mandarin relative clauses.

The first condition is that resumptive pronouns cannot appear in the simple **subject** or simple **direct object** positions. However, it is possible to have a resumptive pronoun when adding an adverbial modifier, as shown in (82c). In this case, the presence of the resumptive pronoun is optional. The presence and absence of the pronoun do not affect the meaning and grammaticality of a sentence.

(82) a. * Zhè jiù shì [**tā**$_i$ xǐhuān-le Lǐsì de] nà-gè nǚrén$_i$.
    this exactly be **her** like-ASP Lisi DE that-CL woman

    'This is the woman who admired Lisi.'

  b. * Zhè jiù shì [Zhāngsān xǐhuān-le **tā**$_i$ de] nà-gè nǚrén$_i$.
    this exactly be Zhangsan like-ASP **her** DE that-CL woman

    'This is the woman who Zhangsan admired.'

  c. Zhè jiù shì [Zhāngsān xǐhuān-le **tā**$_i$ <u>hěn jiǔ</u> de] nà-gè nǚrén$_i$.
    this exactly be Zhangsan like-ASP **her** <u>very long</u> DE that-CL woman

    'This is the woman who Zhangsan has admired for a long time.'

In (82a) and (82b), the positions occupied by the resumptive pronouns are a subject position and a direct object position, therefore, ungrammatical according to the condition. As for (82c), although the resumptive pronoun also occupies a direct object position, an expected ungrammatical result can be rescued by adding an adverb modifier *hěn jiǔ* 'very long'. However, there is no similar effect for subject. I assume that it is possible for the pronoun in (82b) to contract with the following *de* and the noun and become a possessive leading the sentence to be false. Therefore, when we add an additional elements which isolate the pronoun from the following elements can help to improve the expression of the sentence. I consider this phenomenon to be a colloquial behaviour and argue that resumptive pronoun cannot appear in the subject and direct object positions.

The second condition involves the positions of **indirect object** and the **object of a preposition**. In contrast to the first condition, resumptive pronouns are obligatory in these positions. Consider the examples below.

(83) a. Zhè jiù shì [Zhāngsān sòng * (**tā**$_i$) shū de] nà-gè rén$_i$.
    this exactly be Zhangsan give him book DE that-CL person

    'This is the man who Zhangsan gives the book to.'

  b. Zhè jiù shì [Zhāngsān duì * (**tā**$_i$) xiào-le-xiào de] nà-gè rén$_i$.
    this exactly be Zhangsan to him smile DE that-CL person

    'This is the man who Zhangsan cast a smile to.'

The third condition is that a resumptive pronoun can only appear in a relative construction which is definite. In Mandarin, definiteness is usually expressed by the demonstratives *zhè* 'this' or *nà* 'that'.

(84) a. Zhè jiù   shì [Zhāngsān xǐhuān-le **tā**$_i$ hěn jiǔ de] **nà**   yī-gè
          this exactly be   Zhangsan like-ASP   **her** hen jiu DE   **that** one-CL
          nǚrén$_i$.
          woman

          'This is the woman who Zhangsan has admired for long time.'

      b. * Zhè jiù   shì [Zhāngsān xǐhuān-le **tā**$_i$ hěn jiǔ de] yī-gè   nǚrén$_i$.
          this exactly be   Zhangsan like-ASP   **her** hen jiu DE   one-CL woman

          'This is a woman who Zhangsan has admired for a long time.'

(84a) is repeated from (82c). As mentioned above, adding an adverbial modifier can allow the occurrence of a resumptive pronoun. In fact, without the accompaniment of a demonstrative, the sentence is illicit, as shown in (84b) where the head noun is only modified by a number-classifier chain. Therefore, in a relative construction, it is possible to have a resumptive pronoun in a direct object position only when a verb is followed by a postverbal adverb, and a head noun occurs with a definite determiner.

3.3.3   The position of RC inside a DP

As noted in Section 2.3.6, Simpson (2005) has sketched the noun phrase structure for Mandarin Chinese, as represented in (85).

(85) [**Det** - **Num** - **CL(Classifier)** - **RC**   - **Adj**   -
          Nà   liǎng   gè   wǒ jīngguò de   niánqīn
          that   two   individual   whom I passed-by DE young
      N   ]
          xuéshēng   shì wǒ-de tóngxué.
          student   are my classmate

      'That two young students whom I passed by are my classmates.'

This is not the only possible ordering for DPs in Mandarin Chinese. Huang, Li and Li (2009) point out that, based on the prenominal-modifier chain shown in (86), there are two positions that allow relative clauses to appear. The positions are I and III. Relative clauses cannot appear in position II.

(86) **Det(or Demonstrative)** - **Num** - **CL** - **Adj** - **Noun**
      I   II   III

(Huang, Li and Li, 2009:233)

These two possible orderings have been treated as a criterion to distinguish restrictive and non-restrictive relatives in Mandarin (Chao, 1968; Tsai, 1999; Lin, 2003; Huang, Li and Li, 2009; Zhou and Han, 2012). Chao (1965) and Tsai (1999) propose opposite

views. Chao (1965) argues that a relative clause that occurs in position I is restrictive, and in position III is "descriptive" (which is parallel to non-restrictive). Tsai (1999) proposes that a relative clause is non-restrictive when it precedes all the modifiers, and a relative clause is restrictive when it appears between DNC (short for Det-Num-CL) and an adjective. Unlike Chao (1965) and Tsai (1999), Lin (1997) argues that there is no difference between the relative clause appearing in position I or position III. Consider the following.

(87) a. [[_{CP} Zhāngsān mǎi de] **nà   yī-běn** yǒuqù-de   *shū*]
          Zhangsan buy DE   that one-CL interesting-De book
      bújiàn-le.
      disappear-ASP
      'The/A book that Zhangsan brought is missing.'

   b. [**na   yī-běn** [_{CP} Zhāngsān mǎi de] yǒuqù-de   *shū*]
         that one-CL   Zhangsan buy DE   interesting-De book
      bújiàn-le.
      disappear-ASP
      'The/A book that Zhangsan brought is missing.'

However, Del Gobbo (2001) claims that Mandarin relative clauses can only be restrictive. To motivate her claim, Del Gobbo (2001) lays out ten traditional properties of relative clauses and tests Mandarin relative constructions with respect to these properties. These ten properties indicate the differences between restrictive and appositive relative clauses. The properties are summarized in the chart below.

	Features	restrictives	appositives
I	antecedent = any category	no	yes
II	sentential adverbs	no	yes
III	pronouns	no	yes
IV	quantified NP	yes	no
V	quantifier scope	yes	no
VI	negation	yes	no
VII	DP-final position	no	yes
VIII	stacking	yes	no
IX	proper names	no	yes
X	pied-piping	no	yes

(Del Gobbo, 2001)

As shown in the chart, restrictive relative clauses are significantly different from appositive relative clauses in numerous respects. Del Gobbo, then, examines Mandarin

relative clauses in term of these factors to see if there is a distinction between restrictives and non-restrictives. In the following paragraphs, I will illustrate some of the results of these investigations in detail.

The first factor is about the categories of relative head. Del Gobbo (2001) adopts this property from Sells (1985). This diagnostic states that the candidates of the relative head of an appositive relative are categorically richer than those of a restrictive relative. The relative head of an appositive relative can be an NP, an AP, a VP, a PP, an IP, and a CP, while the relative head of a restrictive relative can only be an NP.

(88) a. * Mary was intelligent$_{Head}$ that John never was.

b. * Zhāngsān hěn [Lǐsì cónglái jiù bù de] cōngmíng.
   Zhangsan very   Lisi ever   just not DE   smart

A corresponding example of (88a) is impossible in Mandarin. Del Gobbo points out that we can only use two separate sentences to express the same meaning as (88a) expresses in Mandarin. This is because Mandarin relative clauses can only modify NPs or DPs, suggesting they are only ever restrictive.

Skipping to the fourth factor involves quantifier NPs (QNPs), stating that it is possible for a restrictive relative clause to take a QNP as a head noun, but it is not possible for an appositive relative clause to do so. Del Gobbo (2001) observes that there is no such distinction in Mandarin relative clauses. Consider the examples from English and Mandarin Chinese below.

(89) a. Every student that wears socks is a swinger.

b. * Every student, who wears socks, is a swinger.

<div align="right">(Ross cited in Del Gobbo, 2001)</div>

(90) a. [**měi-yī-gè**   [$_{CP}$ chuān wàzi de] *xuéshēng*] dōu shì tiàowǔ-de.
         every-one-CL   wear sock DE student   all be dance-De

b. [[$_{CP}$ chuān wàzi de] **měi-yī-gè** *xuéshēng*] dōu shì tiàowǔ-de.
        wear sock DE ever-one-CL student   all   be dance-De

'Every student who wears socks is a dancer.'

<div align="right">(Lin cited in Del Gobbo, 2001)</div>

As shown in(89), the appositive relative cannot modify the QNP *every student* while its restrictive version can. Turning to Mandarin relative clauses, if the position of DNC brought about a restrictive/appositive difference, as illustrated in (90), the two different sequences would result in different interpretations. However, the fact is

that there is no such distinction because a quantifier NP can appear in either position.

The eighth property is that stacking is possible for restrictives but not for appositives. Again, there is no such distinction in Mandarin Chinese. The evidence shows that stacked relative clauses can appear in both pre-DNC or post-DNC positions.

(91) a. The tiger [that I saw] [that I wanted to buy] was expensive.
      b. * The tiger, which was 5 weeks old, *(and) which was fed twice a day, ate only fish.

(Alexiadou et al. cited in Del Gobbo, 2001)

(92) a. [Zhāngsān bù xǐhuān de] [wǒ zuótiān   mǎi de] **nà-yī-běn** *shū*
         Zhangsan not like   DE   I yesterday buy DE that-one-CL book
         'the book that I bought yesterday that Zhangsan doesn't like'
      b. **nà-yī-běn** *shū* [Zhāngsān bù xǐhuān de] [wǒ zuótiān   mǎi
         that-one-CL   Zhangsan not   like DE   I yesterday buy
         de] *shu*
         DE book
         lit. 'that book, which I bought yesterday, which Zhangsan doesn't like'

(Lin cited in Del Gobbo, 2001)

As for the English examples, it is not possible to have stacked appositive relative clauses. Following the generalization, if the position of DNC indicates a restrictive/non-restrictive distinction, one of the Mandarin examples should be ungrammatical. However, the examples on display illustrate that stacked relative clauses either preceding or following the DNC sequence are grammatical.

I have sketched out three of Del Gobbo's arguments to give a sense of how the properties of Mandarin relative clauses align with restrictive relatives only. Del Gobbo gives another seven arguments and concluded that there is no restrictive/non-restrictive distinction in Mandarin relative clauses, and that the different positions of the relative clause with respect to the DNC cannot diagnose a restrictive/appositive distinction. She further suggests that all Mandarin relative clauses are restrictives.

Del Gobbo (2010) provides a further discussion about the possibility of appositives in Mandarin. With respect to cases involving proper names and pronouns, she admits that those relative clauses can be appositives. However, the Mandarin appositive relatives appear differently from English appositives, the former belongs to the type of "integrated" appositives and the latter belongs to "non-integrated" appositives which is the canonical type. I will not discuss restrictives and non-restrictives

further in this thesis, but will adopt Del Gobbo's conclusion that Mandarin relative clauses are generally restrictive in both meaning and syntax.

3.3.4 Recursive and iterative structures in Mandarin RCs

As mentioned in Section 2.3.5, a recursive structure allows two or more head nouns to be contained in a relative clause, and each head noun can have its modifying relative clause which is nested inside another relative clause. In an iterative structure, a head noun is modified by two or more relative clauses which are stacked to each other, simultaneously. Mandarin Chinese has both recursive and iterative relative clauses, as illustrated in (93a) and (93b).

(93)   a. **Recursive relative clauses**

[[$_{RC}$ Kànjiàn [$_{DP}$ [$_{RC}$ yǎoshàng-le rén de] nà-zhī *gǒu*] de] nà-gè
     see   bite-ASP   man DE that-CL dog DE that-CL
nǚrén] páozǒu-le.
woman   run-ASP

'The woman who saw the dog that had bitten a man, ran away.'

   b. **Iterative relative clauses**

[[$_{RC}$ Kànji`n-le nà-gè   nǚrén de] [$_{RC}$ yǎoshāng-le nà-gè   nánrén de
     see-ASP   that-CL woman DE   bite-ASP   that-CL man   DE
] nà-zhī *gǒu*] páozǒu-le.
  that-CL dog   run-ASP

'The dog that saw the woman that had bitten the man, ran away.'

In (93a), there are two head nouns, namely *nǚrén* 'woman' and *gǒu* 'the dog'. The latter head noun 'dog' is modified by a relative clause preceding it, then the combination of them appears as an object in the relative clause embedding them. Therefore, the external relative construction expresses *kànjiàn nà-zhī gǒu de nà-gè nǚrén* 'the woman who saw the dog', ignoring the relative modifier of the object *gǒu* 'dog'. In (93b), there is only one head noun *nà-zhī gǒu* 'the dog' which is simultaneously modified by two relative clauses *kànjiàn nà-gè nǚrén de* 'that saw the woman' and *yǎoshāng-le nà-gè nánrén de* 'that had bitten the man'. According to the cross-linguistic properties of stacking relative clauses, the order between relative clauses is free. However, Del Gobbo (2005), Lin (2008) and Huang (2016) point out that the order between stacked relative clauses are not free in Mandarin Chinese, which results in a conclusion that Mandarin relative clauses cannot be iterative. I will discuss this issue further in the next section.

3.3.5 The order of relative clause in MC

The ordering effects discussed in this section pertain to the order between different relative clauses inside a DP. As mentioned in Section 2.3.5, Mandarin Chinese has both restrictive and "appositive" relative clauses. Del Gobbo (2005) proposes that the distinction between restrictives and appositives in Mandarin Chinese can be represented as the distinction between deictic (or **stage-level** (s-level)) and generic (or **individual-level** (i-level)). When the relative clauses in question are equally generic or deictic, they can be ordered freely. I repeat (93b) to illustrate.

(94) a. [[$_{RC1}$ kànjiàn-le nà-gè   nǚrén   de] [$_{RC2}$ yǎoshāng-le nà-gè   nánrén
            see-ASP   that-CL woman DE   bite-ASP   that-CL man
        de] nà-zhī gǒu] pǎozǒu-le.
        DE   that-CL dog run-ASP
        'The dog that saw the woman that had bitten the man, ran away.'

      b. [[$_{RC2}$ yǎoshāng-le nà-gè   nánrén de] [$_{RC1}$ kànjiàn-le nà-gè   nǚrén
            bite-ASP   that-CL man   DE   see-ASP   that-CL woman
        de] nà-zhī gǒu] pǎozǒu-le.
        DE   that-CL dog run-ASP
        'The dog that had bitten the man that saw the woman, ran away.'

Since the relative clauses above are both deictic (s-level) relatives, the order between them is free. By contrast, when a generic (i-level) relative clause occurs with a deictic (s-level) relative clause, the order between them cannot be switched, as illustrated in (95b).

(95) a. [[$_{s-level}$ wǒ zuótiān   kànjiàn de] [$_{i-level}$ xǐhuān qù yīnyuèhuì de] rén
            I   yesterday meet   DE   like   go concerts DE   ren
        shì Lǐsì.
        be Lisi
        'The person I met yesterday who likes to go to concerts is Lisi.'

      b. *[[$_{i-level}$ xǐhuān qù yīnyuèhuì de] [$_{s-level}$ wǒ zuótiān   kànjiàn de] rén
            like   go concerts DE   I   yesterday meet   DE   ren
        shì Lǐsì.
        be Lisi
        Intended: 'The person I met yesterday who likes to go to concerts is Lisi.'

When different levels of relative clauses co-occur in a DP, an s-level (deictic) relative clause must precede an i-level (generic) relative clause, suggesting that it is structurally more distant. With respect to the presence of DNC (demonstrative-number-classifier), Del Gobbo (2005) further points out that there are two possible orderings between an s-level (deictic) relative clause and a DNC sequence, namely an

s-level (deictic) relative clause can either precede or follow the DNC sequence. As for i-level (generic) relative clauses, they can only follow a DNC sequence. Based on Del Gobbo's descriptions, the order among i-level (generic) relatives, s-level (deictic) relatives and a DNC sequence can be represented as follows:

(96) $[_{DP}$ RC$_{S-Level}$ $[_{D}$ **DNC** $[_{NP}$ $[_{IP}$ RC$_{S-Level}$ $[_{IP}$ RC$_{I-Level}$ **Head Noun** $]]]]]$

To summarize this section, I have illustrated the important properties of relative construction in Mandarin Chinese. First, I introduced the canonical structure of Mandarin relative clauses. Significant differences between Mandarin relative clauses and English relative clauses are observed, including (i) the order between a relative clause and a head noun; (ii) a fixed particle rather than a relative pronoun appears between a relative clause and a head noun; (iii) the position of determiner is not fixed. Second, I have demonstrated and discussed the important properties of Mandarin relative clauses. There are five properties taken into account, namely (i) no relative pronouns; (ii) the appearance of resumptive pronouns; (iii) two possible landing positions of relative clauses inside a DNC-AP-NP sequence; (iv) the possibility of both recursion and iteration; (v) the order between multiple relative clauses is free, though s-level vs i-level clauses appear in distinct hierarchical positions. Given this background knowledge of Mandarin relative clauses, I will move on to the particular analyses of Mandarin RCs in the following sections.

3.4 Analyses of Mandarin Relative Clauses

3.4.1 Ning's (1993) Operator Movement Analysis

Ning's (1993) analysis of relative clauses, which is a counterpart of Chomsky's (1977) HEA, adopts a null relative operator movement. There are two major points involved in Ning's proposed analysis for normal argument relative clauses: (i) a relative clause combines with the functional particle *de* to create an operator-variable construction, with a head noun being generated externally to the relative clause; (ii) this construction is sensitive to islands. Ning treats the particle *de* as a functional head appearing in the C^0 position of his proposed underlying structure for Mandarin relative clauses. He notes that the particle *de* is the head of a CP which contains a relative clause. If the clausal complement of *de* contains a gap or resumptive, the clausal complement is a relative clause, whereas, if the complement of *de* is gapless, then the clausal complement is a complement clause or an appositive clause. When the functional head *de* is merged to a relative clause containing a gap, an operator-variable construction is built. Then, an NP which contains the head noun of the relative clause is projected. The proposed structure of Mandarin relative clauses is sketched below.

(97) $[_{CP}$ Op$_i$ $[_{C'}$ [Lisa xǐhuān t$_i$] $[_C$ de]] shū$_i$]
              Lisa like   DE   book

'the book that Lisa likes'

                              NP
                          ╱   ╲
                      CP   NP
                   ╱   ╲   │
               Op$_i$ C'   shū$_i$
                         ╱   ╲   book
                      IP   C
                   ╱   ╲   │
            tā xǐhuān t$_i$ DE
            Lisa likes t$_i$
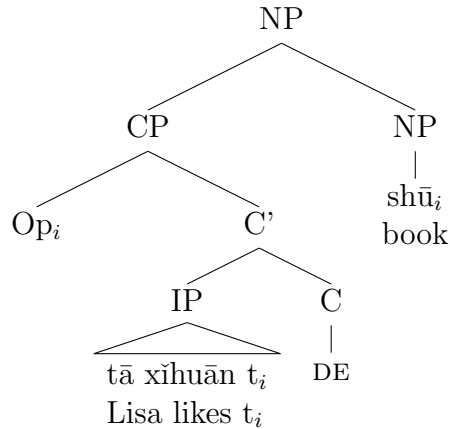
(Ning, 1993:67)

As shown above, this structure involves an IP that is a rightwards complement to a C head. A null operator is moved from a direct object position to the specifier position of a CP. The movement of the null operator leaves a trace in the base position of the operator. Therefore, a binding relationship between a null operator and a trace is established. The relation between a trace and an external head noun is not a binding relationship of the sort established by movement. The referential indices shown above are created by a distinct operation of co-indexation. Since the trace is linked to the null operator, the null operator appear relates the head noun to the trace. In addition to this, Ning (1993) proposes a null preposition mechanism for deriving adjunct relative clauses. I will discuss this in the next chapter.

Given the introduction of the proposed operator-variable construction, I will proceed to the supporting evidence for operator movement. According to Ning (1993), Mandarin relative clauses are sensitive to island constraints, such as the Adjunct Condition(AC), the Sentential Subject Condition (SSC) and the Complex NP Constraint (CNPC). Consider the examples below which show sensitivity to adjunct islands.

(98)   a. **Extraction from a clausal adjunct**

       * $[_{CP}$ $[_{Clausal\ Adjunct}$ rúguǒ **t** lái   ] $[_{IP}$ wǒ jiù   lái   ] de] [nà-gè
                           if   come   I   then come   DE   that-CL

       rén   ]
       person

       '* the man I will come if comes...'

61

b. **Extraction from a PP adjunct**

* [$_{CP}$ tā [$_{PP\ Adjunct}$ [$_P$ gēn] [t]] tiàowǔ de] [gūniáng]
       he   with   dance DE   girl

'the girl he dance with'

(Ning, 1993:69-70)

(98a) involves the extraction of a subject from a conditional clause which is an adjunct, therefore, incurring a violation of the AC. (98b) involves the extraction of a complement from a preverbal prepositional phrase, which is also an adjunct. The ungrammaticality of these examples shows that it is not possible to relativize elements from an adjunct inside the relative clause. Ning takes this as evidence for movement in Mandarin relative clauses. In addition to the evidence from the AC, Ning (1993) provides examples to demonstrate that Mandarin relative clauses can also show sensitivity to the sentential subject condition (SSC). Consider below.

(99)   [$_{IP}$ tā dé-le   jiǎng] shì jiàn hǎo   shì.
           he get-ASP prize   be CL   good matter

'It is great for him to get the prize.'

   a. **Extraction of a subject from a sentential subject**

[$_{CP}$ [$_{IP}$ **t** dé-le   jiǎng] shì jiàn hǎo   shì   de] nà-gè   *rén*
              get-ASP prize   be CL   good matter DE   that-CL man

'*the man it is great for to get the prize'

   b. **Extraction of an object from a sentential subject**

* [$_{CP}$ [$_{IP}$ tā dé-le   **t**] shì jiàn hǎo   shì   de] *jiǎng*
               he get-ASP   be CL   good matter DE   prize

'* the prize it is great for him to win'

(99a) illustrates that it is possible to extract the subject of a sentential subject, which suggests that the relative clause is not sensitive to the SSC. However, turning to (99b), it is ungrammatical to extract the object of a sentential subject, which shows that the relative clause is sensitive to the SSC. Ning (1993) provides the following explanation of why extraction appears differently between the subject and object in these examples. Ning suggests that the underlying structure of (99a) is as given below.

(100)   [$_{CP}$ Op$_i$ [[$_{IP}$ pro$_i$ dé-le   jiǎng] shì jiàn hǎo   shì   ] de] nà-gè   *rén*
                     get-ASP prize   be CL   good matter   DE   that-CL man

The trace contained in (99a) may be a *pro*, which is controlled by a null operator under Huang, Li and Li's (1984, 2009) Generalized Control Rule (GCR). Therefore,

there is not a real SSC obviation. As for (99b), such an operation is not accessible for the object of a sentential subject; therefore, it cannot be rescued by the GCR. Therefore, Ning (1993) concludes that Mandarin relative clauses are sensitive to the SSC.

In this section, I have introduced Ning's (1993) analysis of Mandarin relative clauses showing how Ning uses the operator-variable construction to derive relative clauses. In the proposed derivation, a null operator is moved to the specifier position of a CP which is headed by the particle *de*. A head noun is generated outside of a relative clause. The relation between a head noun and a relative clause is carried out by co-indexation between the head noun and the null relative operator. As a head noun is base-generated outside of a relative clause, there is no binding relationship between the head noun and a variable inside the relative clause. However, there is evidence showing a binding relationship between them, which requires reconstruction of a head noun into a relative. I will discuss the evidence for this in the next section.

3.4.2   Simpson's (2002) Head Raising Analysis

Simpson (2002) proposes a head raising analysis for Mandarin RCs. In his proposal, the functional particle *de* appears as a determiner, and it is base-generated in the D^0 position, which is different from Ning's (1993) analysis which treats *de* as a complementizer originating with a relative clause. Simpson (2002) claims that the *de*-as-determiner hypothesis can help to fix the word order of head-final RCs and fits Mandarin RCs into the antisymmetric structure of relative clauses proposed by Kayne (1994). Before getting into the analysis, it is worth going through Simpson's discussion of determiners first.

Simpson (2002) argues that the particle *de* is an enclitic, which requires leftward phonological support. In other words, it requires its specifier position to be occupied. Elements, such as a noun, an adjective and a demonstrative, can appear in that position. Simpson's hypothesis is inspired by findings regarding determiners in Romanian. According to Grosu's (1988) study (cited in Simpson, 2002) of definite and indefinite determiners in Romanian, a definite determiner is an enclitic, while an indefinite determiner is not. A definite determiner, an enclitic, is always preceded by some overt material, as shown in (101), whereas, an indefinite determiner does not display the same behaviour, as shown in (102).

(101)   **Definite determiner**

   a. potret$_i$-**ul** t_i unei   fete
       portrait-**the**   a.GEN girl
       'the portrait of a girl'

b. frumos$_i$-**ul** t_i baiat
   nice-**the**   boy

   'the nice boy'

c. * -ul potret   unei   fete
      the portrait a.GEN girl

(102) **Indefinite determiner**

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

'a portrait of the girl'   (Simpson, 2002:10-11)

As shown above, the definite determiner *ul* in Romanian needs its preceding position to be overtly filled, if not, it will result in ungrammaticality. In contrast to the definite cases, the indefinite determiner *un* does not have such a requirement. Simpson (2002) proposes that the functional particle *de* belongs to this type of determiner, requiring an element to fill its preceding position. This element can appear as an adjective, a noun or a clause. Combining the first two choices with *de* respectively can produce a [AP DE NP] or a [NP DE NP] sequence, e.g. *hanleng$_{AP}$ de jijie* 'cold season', *chengshi de huimie* 'the destruction of the city'. The preceding position of *de* can be occupied by a clause, for instance, a relative clause.

Having given Simpson's hypothesis about the status of *de*, let's move on to Simpson's (2002) analysis of Mandarin relative clauses. Based on the hypothesis regarding *de* above, Simpson proposes that Mandarin relative clauses have an underlying structure as sketched in (103).

(103) $[_{DP}$ $[_{D'}$ de $[$ nà-běn $[_{CP}$ C^0 $[_{IP}$ Lisa xǐhuān shū $]]]]]]$
       DE   that-CL   Lisa like   book

'The books that Lisa likes.'

```
                    DP
                    |
                    D'
              ┌─────┴─────┐
             D⁰           XP
              |      ┌─────┴─────┐
             DE     Spec        X'
                    /\     ┌─────┴─────┐
                 nà-běn   X⁰          CP
                 that-CL          ┌────┴────┐
                                Spec       C'
                                     ┌──────┴──────┐
                                    C⁰            IP
                                              ┌────┴────┐
                                            Lisa xǐhuān shū
                                            Lisa likes book
```
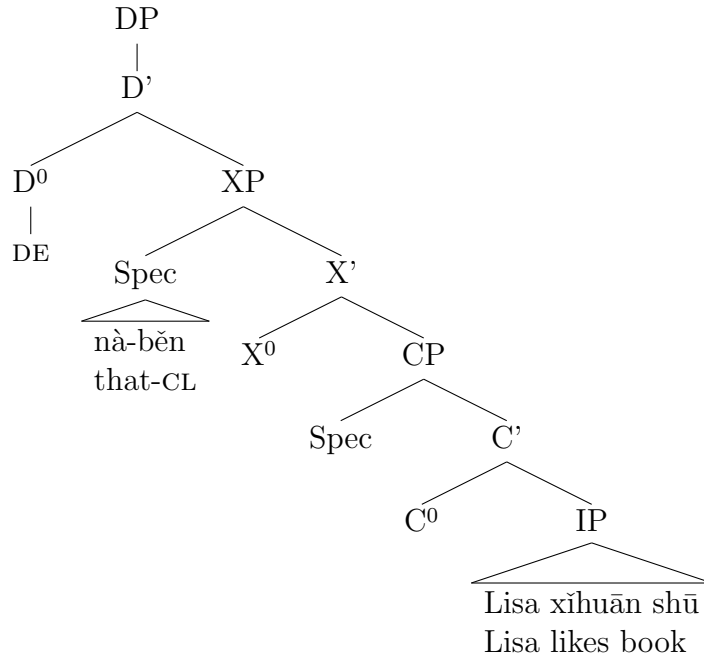
As shown by the tree structure, a relative clause appears to the right of the particle *de*. According to Simpson's (2002) description, there is a demonstrative-(numeral)-classifier sequence base-generated in the specifier position of an XP projection which is lower than *de* but higher than CP. This is not the only possible position for the DNC sequence. Based on this structure, the relative noun *shū* 'book' is extracted out of an IP and moved to the specifier position of CP, as represented below.

(104) $[_{DP}$ $[_{D}$ de $[$ nà-běn $[_{CP}$ shū$_i$ $[_{C'}$ C^0 $[_{IP}$ Lisa xǐhuān t$_i$ $]]]]]]$
        DE   that-CL   book   Lisa like

```
                        DP
                        |
                        D'
                      /    \
                   D⁰        XP
                   |        /   \
                  DE     Spec      X'
                        /‾‾‾\     /   \
                      nà-běn   X⁰     CP
                      that-CL        /   \
                                  Spec      C'
                                   |       /   \
                                  shū_i   C⁰     IP
                                  book          /‾‾‾‾\
                                             tā xǐhuān t_i
                                             Lisa likes t_i
```
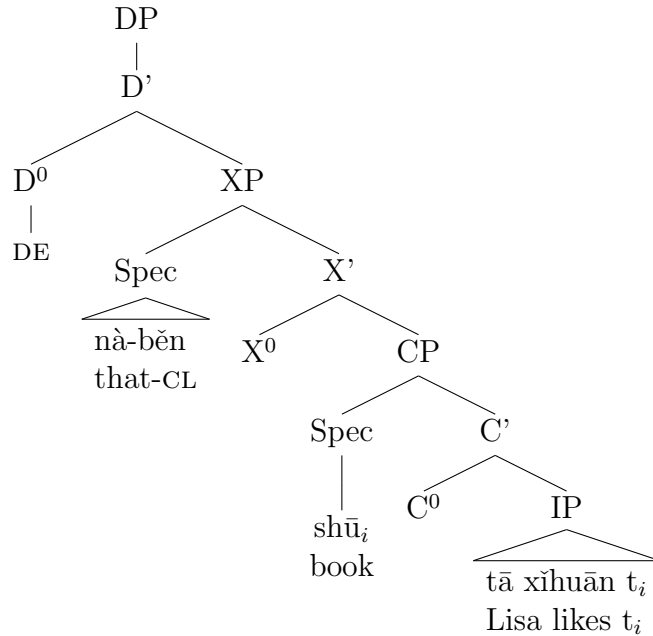
(104) depicts the first step in the derivation of Mandarin RCs, which is consistent
with postnominal relatives. For the postnominal relatives, this is also the only step
of their derivation in the framework of the HRA. By contrast, for the prenominal
relatives, an additional step is necessary to derive the word order between a relative
clause and a head noun. Simpson (2002) has attributed this operation to the partic-
ular phonological requirement of the particle *de*. Therefore, following the derivation
shown in (104), an element, a relative clause, is forced to move to occupy the specifier
position of *de*, as illustrated in (105).

(105) $[_{DP}$ $[_{IP}$ tā xǐhuān t_i $]_m$ $[_D$ de [nà-běn $[_{CP}$ shū$_i$ t_m]]]]
       he like   DE   that-CL   book

```
                              DP
                          ╱       ╲
                        IP          D'
                      ╱╲          ╱    ╲
              tā xǐhuān t_i     D⁰       XP
              he likes t_i      │      ╱    ╲
                               DE   Spec       X'
                                   ╱╲        ╱    ╲
                              nà-běn       X⁰       CP
                              that-CL             ╱    ╲
                                              Spec       C'
                                               │        ╱ ╲
                                              shū      C⁰  IP
                                              book_i        │
                                                            t
```
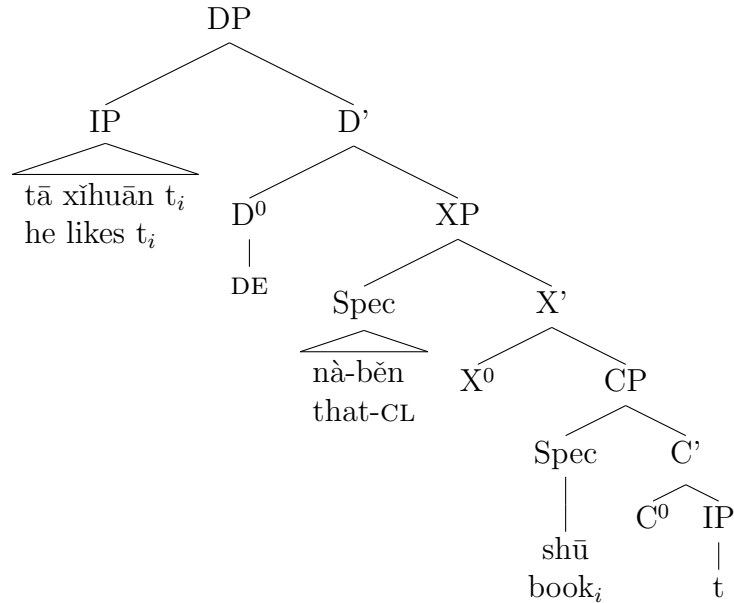
Reconstruction and idiom chunk interpretations provide supporting evidence for the proposed HRA of Mandarin relative clauses. Regarding anaphora, Mandarin Chinese pronouns and R-expressions behave similarly to English pronouns and R-expressions. Reflexives in Mandarin Chinese are, however, slightly different from those in English. We can use the single-form reflexive *zìjǐ* 'self' instead of its composition with pronouns, such as, *nǐ zìjǐ* 'yourself', *tā zìjǐ* 'himself/herself/itself', *nǐmén zìjǐ* 'yourselves', and *tāmén zìjǐ* 'themselves'. (106) shows this bare anaphor behaves as though it is interpreted in a low position:

(106) [[Wǒ jiào Zhāngsān quàn   měi-gè-rén$_i$ kāi **t** guòlái de] *zìjǐ$_i$ de*
        I   ask Zhangsan persuade every-CL-person drive   come DE   self De
       chēzi]
       car

       'self's car that I asked Zhangsan to persuade everyone to drive over'

(106) provides evidence for reconstruction effects. It contains a head noun which is a possessive. The reflexive *zìjǐ* 'self' inside the head noun can be bound by the QNP *měi gè rén* 'everyone'. This requires the head noun to be interpreted in its base position as a whole noun phrase. So that the QNP can c-command the reflexive.

67

(107) [[Tā chī $\mathbf{t}_i$ de] $c\grave{u}_i$] bǐ   shuí dōu dà.
       he eat   DE   vinegar   compare who all   big
       'His jealousy is greater than anyone else's.'

(Huang, Li and Li, 2009:220)

(107) illustrates reconstruction of a split idiom interpretation. The idiom involved in this example is $ch\bar{\imath}_V$ $c\grave{u}_N$ 'to be jealous'. The head noun of the relative clause is an element that belongs to this idiom, an object. The close relationship between elements contained in an idiom forces the head noun 'vinegar' to reconstruct to its base position.

Applying Kayne's head raising analysis to derive Mandarin relative constructions results in a hypothesis that Mandarin relative construction involves a complementation structure rather than an adjunction structure between a relative clause and a noun. However, Aoun and Li (2003) and Huang, Li and Li (2009) point out that the idea of adopting a complementation structure for Mandarin relative clauses is problematic according to the given evidence from conjunction. Therefore, Aoun and Li (2003) and Huang, Li and Li (2009) argue that the Mandarin relative construction involves an NP adjunction structure under the framework of the HRA. The detail of Aoun and Li's (2003) and Huang, Li and Li (2009)'s analyses will be given in Section 3.4.4.

To summarize, Simpson (2002) adopts the HRA, a version consistent with Kayne's antisymmetry theory, to derive Mandarin relative constructions. In his analysis, Simpson proposes that the particle *de* is an enclitic appearing as a determiner within the relative construction. The determiner *de* is base-generated in the D position, which requires its specifier position to be occupied by some elements. The IP complement of the relative C then moves to this position deriving the surface order. Supporting evidence for applying the HRA to Mandarin relative clauses is also observed from reconstruction and idiom interpretation.

3.4.3   Xu's (2009) Analysis to Derive Mandarin RCs

Xu (2009) proposes a matching analysis for Mandarin RCs, following Sauerland's (2002) approach. In Xu's hypothesis, there are two head nouns. One is based-generated externally to the relative clause, the other originates in its base position together with a null relative operator. It is the internal head noun that undergoes *wh*-movement to the Spec CP. This internal head noun will be deleted after matching with the external head noun, so only the external head noun is phonologically overt.

The CP, the specifier position of which is occupied by a moved head noun, takes the functional particle *de* as its head. The derivation of Mandarin relative clauses Xu (2009) proposes is as sketched in (108).

(108)   [$_{NP}$ [$_{CP}$ [$_{DP}$ *Op* zuòjiā$_i$] [[$_{IP}$ Lisa xīnshǎng t] de]] [$_{NP}$ zuòjiā]$_i$]
          author   Lisa admire   DE   author

   'the author that Lisa admires'
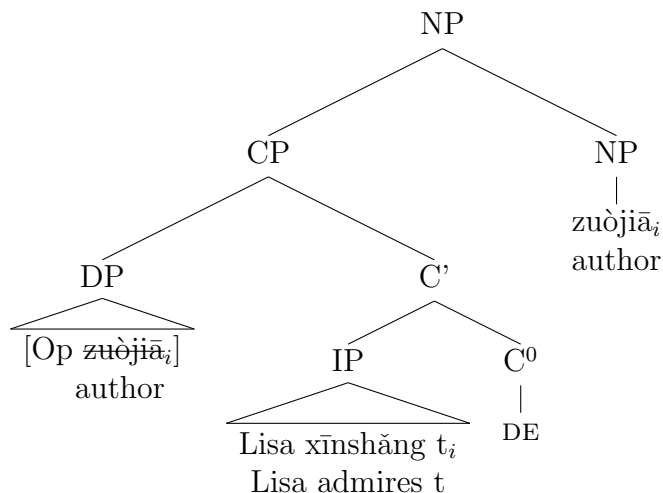
As shown above, the proposed structure involves a left-adjoined CP, the complementizer of which is *de* and the external head noun *zuòjiā* 'author'. An internal head noun is moved along with a null operator to the Spec CP position. The dashed line linking the two head nouns indicates a matching relationship between them.

Xu (2009) points out that reconstruction is not always necessary in Mandarin relative clauses. Thus, he argues that reconstruction is not convincing evidence for applying the HRA to derive Mandarin relative clauses. Consider the pair of examples which incur reconstruction below.

(109)   a. Tā$_i$ xiǎng zhǎo [$_{DP}$ yī-gè   néng zhàogù   **zìjǐ**$_{i/j}$ de *zhàngfu$_j$*].
            she want find   one-CL can take.care.of self   DE husband
            'She wants to find a husband who can take care of her/himself.'
        b. [$_{CP}$ tā$_i$ xiǎng zhǎo de] [$_{DP}$ néng zhàogù   **zìjǐ**$_{i/j}$ de *zhàngfu$_j$*]]
            she want find DE   can take.care.of self   DE husband
            'the husband that can take care of himself/her that she wants to find'

                                                                    (Xu, 2009:70)

69

In (109a), the reflexive *zìjǐ* can stand for either the pronoun *tā* 'she' in the matrix clause or the relative head noun *zhàngfu* 'husband'. The referential relationship between the reflexive and the relative head stands for reconstruction, which requires the inner copy of the head noun *zhàngfu* 'husband' to appear in its base position. The syntactic structure of (109a) is sketched below.

(110)
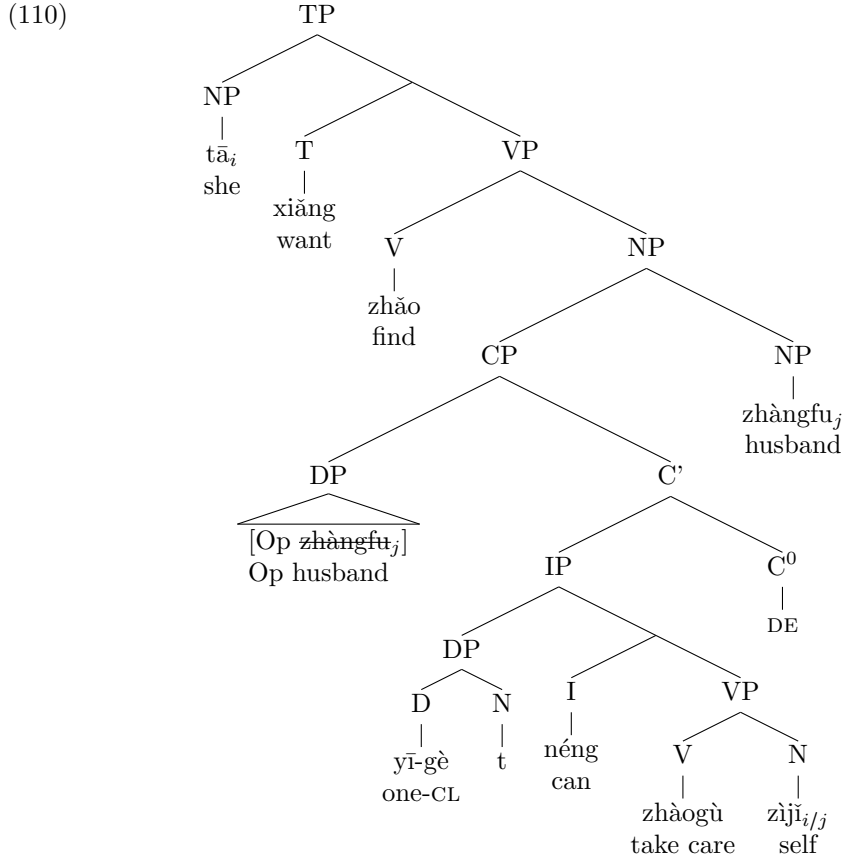
In (110), the reflexive *zìjǐ* 'self' is c-commanded by both the pronoun *tā* 'she' and the internal head noun *zhàngfu* 'husband', resulting in two readings.

(109b) involves a iterative structure. The head noun *zhàngfu* 'husband' is modified by the relative clause, which is close to it first. Then, the other relative clause modifies the composition of them. Here, the referential relationships between the reflexive and the relative head, and between the pronoun and the relative head, both provide evidence for reconstruction. Consider the derivation of (109b) which is made based on (110):

(111)

NP

CP — NP

néng zhàogù zìjǐ$_{i/j}$ DE zhàngfu$_j$
can take-care-of self de husband

C'

NP

CP — NP

zhàngfu$_j$
husband

NP — C'

~~zhàngfu$_j$~~
husband

IP — C^0

DE

NP — I — VP

t$_j$

néng
can

V — N

zhàogù
take care

zìjǐ$_{i/j}$
self

IP — C^0

DE

NP — VP

tā$_i$
she

V — NP

xiǎng zhǎo
want to find
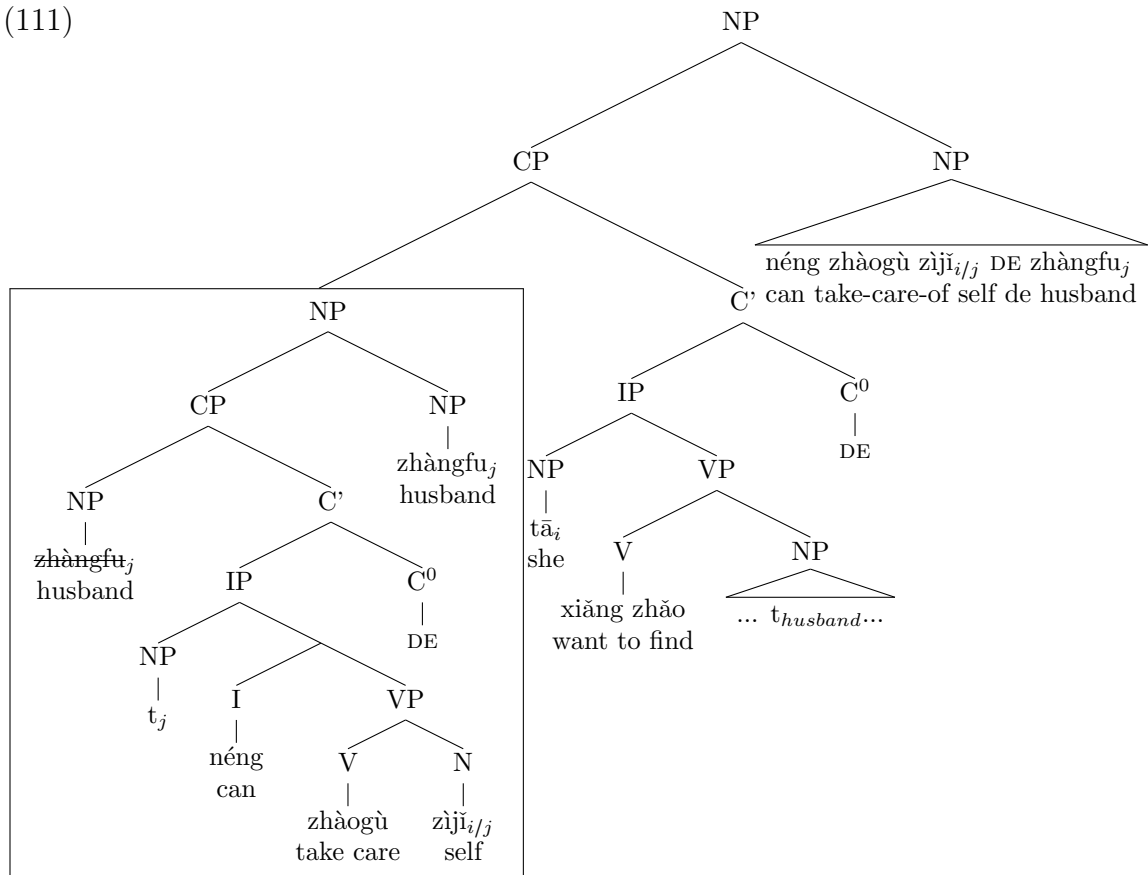
... t$_{husband}$ ...

The NP *néng zhàogù zìjǐ de zhàngfu* 'a husband that can take care of himself' originally appears as the object of the verb *xiǎng zhǎo* 'want to find'. In this position, we can see that the reflexive *zìjǐ* 'self' can also be c-commanded by the pronoun *tā* 'she'.

The other pair of examples against reconstruction is provided in (112).

(112)   a. Wǒ xiǎng tā$_i$ zhǎo [néng zhàogù   zìjǐ$_{i/j}$ de *zhàngfu$_j$*].
                I   want she find   can   take.care.of self   DE husband
            'I want her to find a husband that can take care of her/himself.'

         b. [$_{CP}$ wǒ xiǎng tā$_i$ zhǎo de] [$_{DP}$ néng zhàogù   zìjǐ$_{*i/j}$ de *zhàngfu$_j$*]
                I   want her find DE   can take.care.of self   DE husband
            'the husband that can take care of himself that I want her to find'

Compared with (109a), the expression is deeper embedded as the complement of a verb in (112a). Still, the reflexive *zìjǐ* can stand for the pronoun and the relative head noun *zhàngfu* 'husband' because it can be c-commanded by both of them. Again, the referential relationship between the reflexive and the relative head requires the

71

relative head to move back to its base position, as represented in (113).

(113)   Wǒ xiǎng tā$_i$ zhǎo [< zhàngfu$_j$ > néng zhàogu zìjǐ$_{i/j}$ de *zhàngfu$_j$*].
       I   want she find   < husband > can take   care-of-self DE husband.

Comparing with (112a), however, the reflexive can no longer stand for the pronoun in (112b). Xu (2009) seems to prove that if a target anaphor is deeper embedded, it is less possible for it to be bound. Therefore, it cannot confirm that the reconstruction of the relative head noun takes place there. Xu (2009) points out that the problem involved in (112b) can be explained in the framework of the matching analysis. It shows that it is the intermediate position that stops a reflexive having a referential relationship with a higher anaphor.

(114)
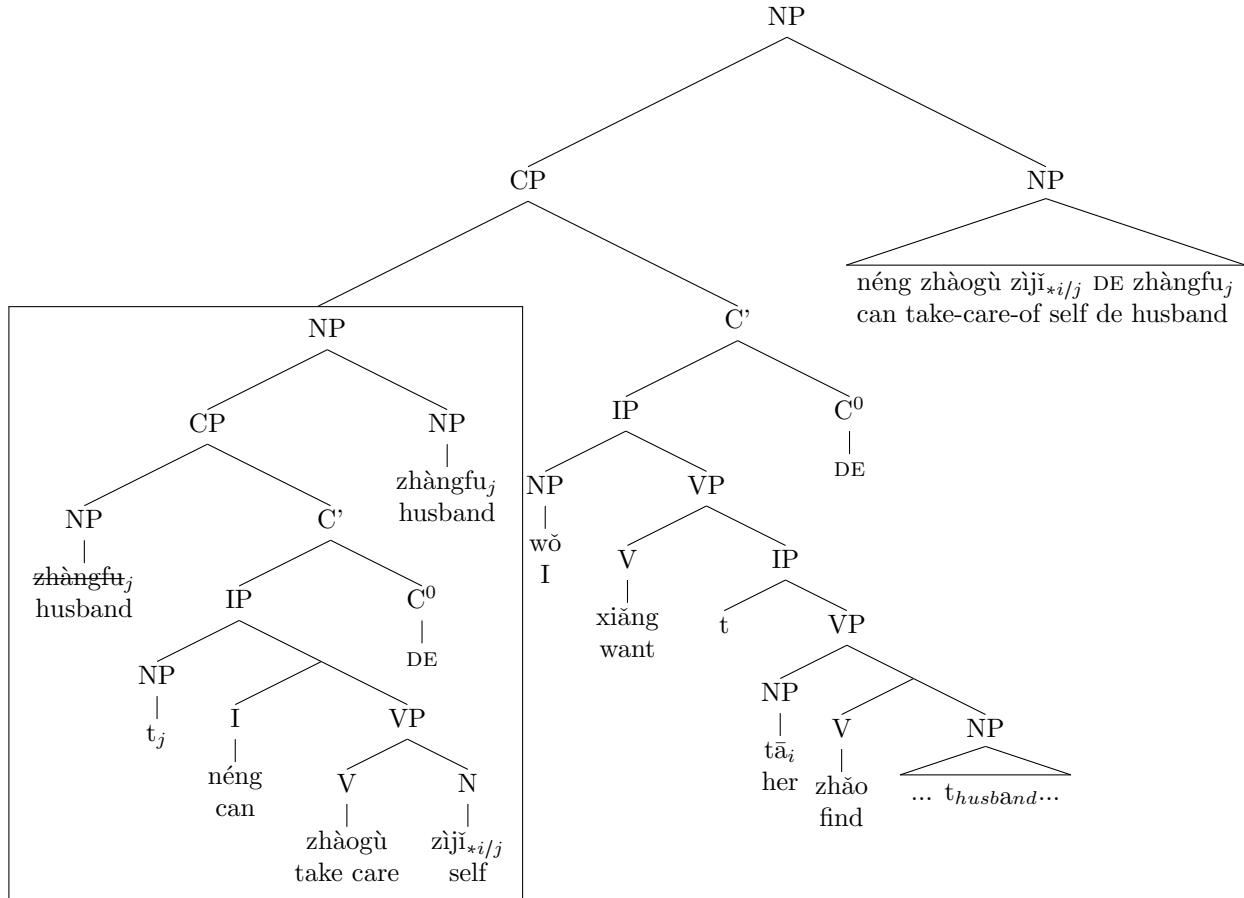
Xu (2009) points out that the complex NP *néng zhàogù zìjǐ de zhàngfu* 'the husband

that can take care of self' is deeper embedded in another IP, so it needs to undergo successive movement to get to Spec CP. Due to this halfway step, the pronoun ta 'her' cannot bind the reflexive *zìjǐ* 'self' again. Xu explains that the intermediate copy will be substituted by "one" anaphora when the derivation involves more than one step of movement and when there is a more local binder to bind the anaphor. Therefore, the relative head *zhàngfu* 'husband' cannot refer to the pronoun. Following this, Xu (2009) concludes that the MA is a better approach than the HRA to derive Mandarin relative clauses.

To sum up, Xu (2009) argues to derive the Mandarin relative construction in the framework of the matching analysis. The proposed underlying structure for the Mandarin relative construction contains a structure which has a left-adjoined CP to an NP. The functional particle *de* appearing as a complementizer which is the head of a CP is projected to a relative clause. There are two relative head nouns, and the internal one will be deleted after matching with the external one. Xu also provides evidence against the HRA involving reconstruction. Further, he points out that the observed unavailability of binding can be explained through the derivational structure proposed in the MA. In the next section, I will move on to Aoun and Li's (2003) analysis. In the discussion, I will show more evidence from binding.

3.4.4   Aoun and Li's (2003) Analysis

Cinque (2015) and Sauerland (2000, 2002) have pointed out that not only "raising" but also "matching" is necessary to the analysis of English RCs. Aoun and Li (2003) propose to take more than one approach to analyse Mandarin relative constructions. Huang, Li and Li (2009) also argue to use different approaches to derive various types of relative clauses in Mandarin Chinese. They classify Mandarin relative constructions into three types, depending on two criteria: (i) whether a relative clause contains a gap or not; (ii) the position that a gap appears in. The first type is argument NP relativization, including subject, direct object, and indirect object relativizations. Aoun and Li (2003) propose that relativization of these positions involves a raising analysis. It is worth noting that this has to exclude the case that involves resumptive pronoun. For the relativization that involves a resumptive pronoun, Aoun and Li (2003) propose that this relative construction is derived by base-generation. The second type is adjunct relativization, where a PP adjunct marking *place*, *reason*, *time*, etc, is relativized. They propose to apply null operator movement to derive this type of relative construction. The third type involves a gapless structure. In fact, Aoun and Li (2003) do not regard the third type as a true relative construction. In this section, I will focus on the analysis of argument NP relativization because I will discuss adjunct relativization and gapless structure in the next two chapters in detail.

An essential difference from Simpson's (2002) HRA is that Aoun and Li (2003) and Huang, Li and Li (2009) propose that the Mandarin relative construction involves an NP adjunction structure rather than a complementation structure, as represented in (115)

(115)

```
              NP
            /    \
          D       N'
                 /  \
               CP    N'
```
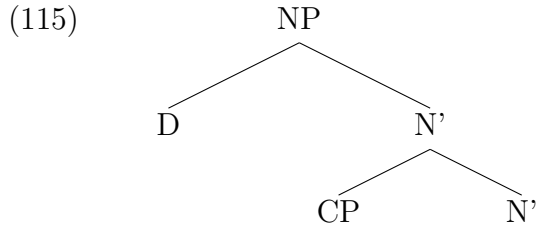
According to this structure, a relative clause should be left-adjoined to a head noun. Importantly, the structure shows that they propose an NP rather than a DP for Mandarin relative clauses. The evidence they propose for NP projection comes from the behaviour of the relative construction in conjunction structures. Consider below.

(116) a. He is [[**an** actor that wants to do everything] and [*(**a**) producer wants to please everyone turned up at my front door]].

   b. wǒ xiǎng zhǎo **yī-gè**   [[fùzé   yīngwén de *mìshū*   ] jiān [jiāo
      I   want find one-CL   charge English DE secretary   and   teach
      xiǎohái de *jiājiào*]].
      kid   DE tutor

      'I want to find a secretary that takes care of English (matters) and tutor that teaches kids.'

                                                    (revised from Aoun and Li, 2003:144-145)

In English, it is not allowed to conjoin two relative constructions as arranged in (116a), the second relative construction of which lacks a determiner, *a*. This is because the conjunction of English relative construction has to be made between DPs. In Mandarin Chinese, it is possible to elide the determiner of the second relative construction in conjunction, as represented in (116b). This implies that conjunction of Mandarin relative construction can be made between NPs. Based on this structure, the derivation of an NP relativization can be depicted as below.

(117) [Lisa mǎi t$_i$ de] nà-běn *shū*
        Lisa buy   DE   that-CL book
     'the book that Lisa bought'

```
                          NP
                     ╱         ╲
                   D              N'
                that-CL       ╱       ╲
                           CP          N'
                         ╱    ╲         │
                       CP      C'      book_i
                     ╱   ╲     DE
                  Lisa buy t_i
```
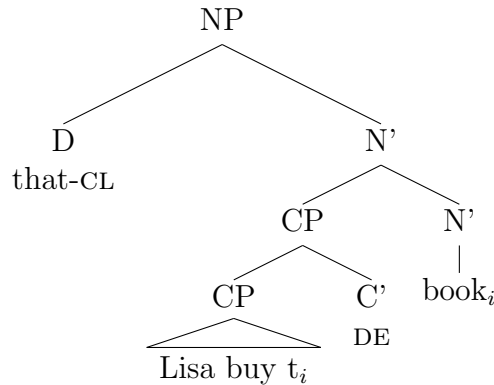
Huang, Li and Li (2009) point out that the movement involved above is sensitive to island conditions. Consider the example showing sensitivity to the complex noun phrase constraint (CNPC) below.

(118) * Wǒ rènshí hěn duō [_island [[t_i xǐhuān] de] *rén*   ] de nà-gè   *nǚhái_i*.
       I   know very many   like   DE person DE that-CL girl

      'the girl that I know many people who likes'

(Huang, Li and Li, 2009:219)

As shown above, it is not possible to make extraction of the subject *nǚhái* 'girl' from a CNP island, otherwise, incurring a CNPC violation.

In the following paragraphs, I will examine the evidence supporting the HRA in English to Mandarin Chinese, including reconstruction and idiom interpretations. Aoun and Li (2003) point out that these two types of evidence are not always effective in Mandarin relativization. The first piece of evidence comes from reconstruction. Consider the examples involving variable binding below.

(119)   a. [[wǒ jiào Zhāngsān quàn   **měi-gè rén_i** kāi lái   de] **zìjǐ_i** de
         I   ask Zhangsan persuade every-CL person drive come DE   **self** DE
        chēzi]
        car

        'self's car that I asked Zhangsan to persuade everyone to drive over'

   b. Nǐ   huì kàndào [[wǒ xīwàng **měi-gè xuéshēng_i** dōu néng dài   lái
       you will see   I   hope   every-CL student   all   can bring come
       de] wǒ gěi **tā_i** de   shū].
       DE I give **him** DE book

       'You will see the book that I gave to him_i that I hope every student_i will bring.'

75

In (119a), the reflexive *zìjǐ* 'self' which is contained in a relative head has a referential relationship with the quantifier NP *měi-gè rén* 'everyone', which requires the relative head to move back to its base position.

(120) [[wǒ jiào Zhāngsān quàn **měi-gè rén**$_i$ kāi < **zìjǐ**$_i$ de chēzi > lái
  I ask Zhangsan persuade every-CL person drive self DE car come
  de] **zìjǐ**$_i$ de chēzi]
  DE **self** DE car

(119b) patterns with (119a). The pronoun *tā* 'him' is an object of an embedded relative clause. The referential connection between the pronoun and the quantifier NP contained in an embedding relative clause requires the embedded relative clause to appear in the embedding clause.

(121) Nǐ huì kàndào [[wǒ xīwàng **měi-gè xuéshēng**$_i$ dōu néng dài < wǒ
  you will see I hope every-CL student all can bring I
  gěi **tā**$_i$ de shū > lái de] wǒ gěi **tā**$_i$ de shū].
  give **him** DE book come DE I give **him** DE book

However, Aoun and Li (2003) point out that reconstruction is not necessary in certain situations, which call for a base-generation strategy. One situation is when a relative clause contains a resumptive pronoun. As mentioned at the beginning of this section, they propose to derive this type of argument NP relative via base generation of the pronoun.

(122) * wǒ xiǎng kàn [[nǐ shōu **měi-gè rén**$_j$ huì dài **tā**$_i$ huílái de] [**zìjǐ**$_j$
  I want see you say every-CL person will bring him back DE **self**
  de péngyǒu]$_i$].
  DE friend
  Intended. 'I want to see self's friend that you said that everyone would bring back.'

The reconstructed interpretation is impossible in this example since a pronoun occupies the base position of a head noun. Therefore, the QNP cannot bind the reflexive.

The other situation incurring anti-reconstruction involves scope interaction and the presence of *dōu*. Consider the examples below.

(123)　　a.　Wǒ huì zhěnglǐ [[**měi-gè rén**　　*dōu* huì kàn **t** de] **sān-běn shū**].
　　　　　　I　　will arrange　　every-CL person *all*　will read　　DE　three-CL book

　　　　'I will put the three books that everyone will read in order.'
　　　　(three≫every: everyone reads the same three books)

　　　b.　Wǒ zhěnglǐ [[**měi-gè rén**　　huì kàn **t** de] **sān-běn shū**].
　　　　　　I　　arrange　　every-CL person will read　　DE　three-CL book

　　　　'I put the three books that everyone will read in order.'
　　　　(every≫three: different three books)

<div align="right">(Aoun and Li, 2003:133-134)</div>

Reconstruction cannot account for the reading of (123a). Aoun and Li (2003) point out that this should be ascribed to the ocē of *dōu* 'all'. In (123a), *dōu* appears in the relative clause; it prevents the reconstruction of the head noun to its base position where the QNP can take scope over it. Thus, the quantity NP *sān-běn shū* 'three books' must scope over the quantifier NP *měi-gè rén* 'everyone'. In (123b), when *dōu* is not present, the quantifier NP can scope over the quantity NP, which requires that the quantity NP reconstructs to its base position. This suggests that the possibility of reconstruction depends on other aspects of the syntax, which suggests that there are two analyses for relativization.

The other piece of evidence is from idiom interpretations. However, Aoun and Li (2003) point out that idiom interpretations in Mandarin Chinese do not always argue for the HRA because the presence and absence of reconstruction are both possible for idioms. This is different from the behaviour of idioms in English relative clauses. Recall the English examples which contain an idiom in a relative construction, as repeated below.

(124)　　a.　The **headway**$_i$ that we **made** t_i was insufficient.
　　　　b.　* We **made** the **headway**$_i$ that t_i was insufficient.

<div align="right">(Alexiadou et al., 2000:11)</div>

(124a) shows the requirement of reconstruction in English relative clauses. However, if the rest of the idiom chunk appears in the matrix clause rather than the relative clause, as shown in (124b), the sentence will be ungrammatical. This is because reconstruction of the head noun *headway* will interrupt the idiom interpretation. Therefore, both examples provide evidence that there is reconstruction.

However, Aoun and Li (2003) observe that there is no such distinction in Mandarin relative constructions. Examples involve the idiom *chī cù* 'to be jealous' are used to illustrate the phenomenon in (125).

(125)   a. **Inside relative clause: reconstruction available**

[[tā **chī** t$_i$ de] **cù**$_i$] bǐ   shéi dōu dà.
he eat   DE vinegar compare who all   big

'His jealousy is greater than anyone else's.'

   b. **Outside relative clause: reconstruction unavailable**

tā lǎoshì ài **chī** [[t$_i$ ràng rén   shòu-bù-liǎo   de] **cù**$_i$].
he always like eat   let   people receive-not-complete DE vinegar

Lit: 'He always likes to eat vinegar that cannot be put up with.'

'He always likes to be jealous of such a degree that is beyond what can be put up with.'

(Aoun, Li & Li, 2003:138-139)

In (125), a part of the idiom, *chī* 'eat', remains in the relative clause; thus, reconstruction is necessary here to meet the Adjacency Requirement for idiomatic interpretations, which is similar to (124a). In (125b), when the rest of the idiom appears in the matrix, the sentence is still grammatical, unlike in (124b). The grammaticality of this sentence implies that reconstruction of the head noun *cù* 'vinegar' does not take place. Therefore, Aoun and Li (2003) conclude that idiom interpretation does not show that reconstruction is obligatory in Mandarin.

To summarize, Aoun and Li (2003) have proposed to derive Mandarin relative clauses type by type. For argument NP relativization, they propose to apply the HRA. For adjunct relativization and NP relativization that involved resumptive pronouns, they propose to apply base-generation. Apart from this, Aoun and Li (2003) argue for an adjunction structure and an NP projection for the Mandarin relative construction. They also observe that reconstruction and idiom interpretation are not always positive evidence in Mandarin relativization, which shows Mandarin relative clauses behave differently from English relative clauses.

3.5   Chapter Summary

In this chapter, I have given a general picture of Mandarin relative clauses. First, I have demonstrated the canonical structure and the relevant properties of Mandarin relative clauses. Structurally, Mandarin relative constructions are head-final, taking a functional particle *de* in the intermediate position between a relative clause and a head noun. There are four properties discussed in this chapter, namely that Mandarin relative clauses (i) do not take any relative pronoun; (ii) can host resumptive pronouns conditionally; (iii) appear either before or after a DNC sequence; (iv) allow

recursion and iteration; (v) can be ordered in free. Second, I have provided the analyses in the derivation of Mandarin RCs. Ning's (1993) analysis, as a counterpart of Chomsky's (1977) standard analysis, proposes to derive Mandarin relative clauses in an operator-variable construction. Simpson (2002) proposes a head raising analysis for Mandarin RCs, and treats the functional particle *de* as a determiner saturating the D position in the underlying structure of the relative clause. Xu (2009) argues for a matching analysis to Mandarin RCs, regarding a piece of evidence against reconstruction. Aoun and Li (2003) and Huang, Li and Li (2009) both propose to analyse Mandarin relative construction in different approaches, namely the head raising analysis and base-generation. They also point out that the supporting evidence for the HRA in English is not always useful in Mandarin Chinese. In the next chapter, I will focus on adjunct relativization. Having given the discuss on the analysis of Mandarin relative construction, I tend to adopt the HRA to derive Mandarin RCs, regarding the evidence from binding relationships and idiom chunks. More specifically, I suggest to apply Kayne's (2004) and Simpson's (2000, 2002) approaches to analyse Mandarin RCs, considering the identity of the particle *de*. However, Aoun and Li (2003) argue that adjunct relativization is derived by operator movement rather than head raising. In the next chapter, I will discuss the literature of adjunct relativization in Mandarin and show that not only argument NP relativization but also adjunct relativization are derived by the HRA.

Chapter 4

Adjunct Relative Construction

4.1 Introduction

This chapter develops, in a new way, the head raising analysis of relative clauses in Mandarin Chinese. The discussion focuses on adjunct relativizations in Mandarin. Adjunct relative clauses have long been analysed via an operator movement analysis (e.g., by Ning (1993), Aoun and Li (2004) and Huang, Li and Li (2009)). There are, however, problems with the operator movement analysis of adjunct relatives in regard to some important issues. These include (a) the absence of prepositions in adjunct relative clauses; (b) binding dependencies in adjunct relative clauses; (c) interactions of adjunct relative clauses and *wh*-questions. In this chapter, I will argue that the operator movement analyses of adjunct relatives gloss over important differences and suggest that adjunct relatives with a gap and adjunct relatives with an in-situ preposition and a resumptive pronoun should be analysed in different ways. For the former adjunct relatives, I will follow the head raising analysis proposed by Simpson (2001, 2002) and provide an updated analysis of the absence of prepositions which is inspired by Collins (2007).

To conclude this chapter, I will argue to distinguish adjunct relatives containing gaps from PP-in-situ adjunct relatives; further, I will derive the former under a HRA and the PP-in-situ adjunct relatives under a base-generation analysis. This is motivated by data showing that adjunct relatives containing gaps can show reconstruction and have sensitivity to islands, while PP-in-situ adjunct relatives cannot.

4.2 The Syntax of PPs in Mandarin Chinese

In this section, I outline some important properties of PP adjuncts in Mandarin Chinese. I will adopt Djamouri, Paul and Whitman's (2013) system for the classi-

fication of PPs in Mandarin Chinese. Djamouri, Paul and Whitman (2013) assert
that the system of PPs in Mandarin is mixed and disharmonic. Generally, there are
three types of PPs: prepositional PPs (PrepPs), postpositional PPs (PostpPs), and
circumpositional PPs (CircumpPs), as in (126), (127) and (128) respectively.

(126) Mary gāng [$_{PrepP}$ **cóng** jiàoshì   ] huí   bàngōngshì.
       Mary just   from classroom   come-back office
       'Mary just came back to the office from the classroom.'

(127) Mary bù néng [$_{PostpP}$ xíngdòng **shàng**] zhīchí   yóuxíng.
       Mary not can   action   on   support parade
       'Mary cannot support the parade in action.'

(128) Mary [$_{CircumpP}$ [$_{PreP}$ **zài** [$_{PostP}$ bàngōngshì **lǐ**]]] pīgǎi shìjuàn.
       Mary   at   office   in   mark exam-paper
       'Mary marked exam-paper at the office.'

In addition to this, PPs can appear in positions which precede or follow a VP inside the
clause. Huang, Li and Li (2009) and Djamouri et al (2013) treat only preverbal PPs
as real adjuncts that modify the verb phrases. For postverbal PPs, they regard them
as complements within the verb phrase because the prepositions of the postverbal
PPs can contract with the preceding verb, as shown below.

(129) a. Tā [$_{PP}$ **zài cāochǎng shàng**] pǎo-le   jǐ-quān.
           he   in playground on   run-PERF several-circle
           'He ran several circles on the playground.'
       b. Tā mànmàn-de   [$_{VP}$ zǒu [$_{PP}$ **zài** [**cāodì shàng**   ]]].
           he slowly-DE$_{verbal}$ walk   on   grass surface-of
           'He walked slowly on the grass.'

As for (129b), Djamouri et al argue that the bracket structure can also be analysed
as [$_{VP}$ zǒu$_V$-zài$_P$ [cǎodì shàng]], where the verb and the preposition make up as a
verbal compound. I will discuss evidence for this in Section 4.2.1.3.

Let us now turn to the issue of P-stranding in Mandarin Chinese. As we dis-
cussed in Chapter 2, P-stranding is a common phenomenon in relativization. How-
ever, Huang (1982b) has pointed out that preposition stranding is disallowed in both
Mandarin relativization and topicalization, which means prepositions have to be pied-
piped in derivation, as follow:

(130) **Preposition stranding in Relativization**

    * Zhè jiù   shì [$_{RC}$ Mary gāng [$_{PP}$ **cóng** t$_i$] huí   bàngōngshì de
    this exactly be   Mary just   from   come-back office   DE
    jiàoshì$_i$].
    classroom

    Intended. 'Mary just came back to the office from the classroom.'

(131) **Preposition stranding in Topicalization**

    * Jiàoshì$_i$,   Mary gāng [$_{PrepP}$ **cóng** t$_i$] huí   bàngōngshì.
    classroom Mary just   from   come-back office

    Intended. 'Mary just came back to the office from the classroom.'

Djamouri et al (2013) observe that postpositions also cannot be stranded. Consider the following.

(132) **Postposition stranding in Toplicaliziation**

    * Bā   diǎn$_i$,   wǒ zuótiān   [$_{PostpP}$ t$_i$ **qián**] dǎ-guò   diànhuà gěi Lisa.
    eight o'clork I   yesterday   before   strike-PAST phone   to Lisa

    Intended. 'Eight o'clork, I make a call to Lisa before that yesterday.'

Paul (2013), however, notes that the examples Huang gives to show the unacceptability of P-stranding in Huang et al are all preverbal. This makes it difficult to determine whether they are illicit because of a ban on P-stranding or because of the Adjunct Island Constraint, given that preverbal PPs are adjuncts. However, Paul shows that postverbal PrepPs, as in (133), also disallow stranding, and thus concludes that it is illicit because of a ban on P-stranding. Paul also shows that the same holds for postverbal PostpPs, as in (134).

(133)   * Mary, wǒ xiě-le   yī-fēng yóujiàn [$_{PrepP}$ gěi t].
        Mary I   write-PERF one-CL email   to
        Intended. 'Mary, who I sent an email to.'

However, Paul shows that postverbal PostpPs also disallow stranding, and thus concludes that the ungrammaticality of stranding the P cannot therefore be a result of the AIC or CED, but is due instead to an independent ban on extraction from PPs. This is because the PostpP included in (134) is a complement also banning P-stranding.

(134) * Liáng mǐ$_i$, Lisa kéyǐ tiào-dào [$_{PostpP}$ t$_i$ **yǐwài**].
dual meter Lisa can jump-reach beyond

Intended. 'Two meters, Lisa can jumped further than that.'

I will adopt this conclusion in what follows: there is a general ban on stranding Ps in Mandarin. Furthermore, in the latter part of this thesis, I will show that there are cases where the P may remain in situ in relativizations in Mandarin. However, these Ps have to appear with an overt argument (a resumptive pronoun). They are not the remnant of a movement operation.

4.2.1 Prepositions, Postpositions and Circumpositional constructions

According to Djamouri, Paul and Whitman (2013), there are semantically salient differences between prepositions and postpositions in Mandarin. For instance, prepositions are usually used to denote the paths of actions, e.g. *dào* 'to', *duì* 'toward', *wǎng* 'in the direction of' etc., while postpositions are usually used to denote specific locations, e.g. *lǐ* 'in(side)', *qián* 'in front of; before', *shàng* 'on' etc. (135) below is repeated from (126).

(135) Mary gāng [$_{PrepP}$ **cóng** jiàoshì] huí bàngōngshì.
Mary just from classroom come-back office

'Mary just came back to the office from the classroom.'

(136) Lisa quàn měigèrén [$_{PostpP}$ jiǔ **hòu**] búyào kāichē.
Lisa persuade everyone alcohol after not-want drive

'Lisa persuaded everyone not to drive after drinking.'

In (135), the preposition *cong* 'from' denotes the starting point of the path of the action 'come to the office'. In (136), the postposition *hou* 'after' denotes a specific point in time. Some postpositional phrases have to be contained in prepositional phrase when they appear preverbally. Giving a circumpositional structure.

(137) Mary [$_{CircumpP}$ [$_{PrepP}$ **zài** [$_{PostpP}$ lǐhé **shàng**]]] xiě-le zhùfú.
Mary at gift-box on write-PERF greeting

'Mary wrote a greeting on the gift box.'

In (137), the postpositional phrase (PostpP) is embedded in the prepositional phrase (PrepP) and it cannot appear without the preposition. All PPs included in the examples above are preverbal since we regard only preverbal PPs as adjuncts, following Huang et al (2009). Before turning to the question of how PPs function as adjuncts or complements, I will briefly discuss the categorial status of PostpPs.

4.2.1.1 Are PostpPs true PPs or NPs?

Huang, Li and Li (2009) have proposed to treat the postpositional phrases as localizer phrases (LPs), which is a different view from Djamouri, Paul and Whitman (2013) on the categorial status of postpositional phrases. The proposed LPs have similar properties to normal NPs: for instance, both the LP and the NP cannot appear without a preposition in the relevant cases. As shown in (138), the absence of the preposition *zai* 'in' leads to the ungrammaticality of the example.

(138) a. Tā *(zài) [$_{NP}$ nàgè chéngshì] jŭbàn-guò yì-gè zhánlǎnhuì.
he in   that city   hold-EXP a-CL exhibition
'He held an exhibition *(in) that city.'

   b. Tā *(zài) [$_{LP}$ chéng **wài/lǐ**   ] jŭbàn-guò yí-gè zhánlǎnhuì.
he in   city outside/inside hold-EXP a-CL exhibition
'He held an exhibition outside/inside the city.'

(Huang, Li and Li, 2009:13)

Paul (2013) and Djamouri et al (2013) provide a piece of evidence from Ernst (1988) to argue that postpositional phrases are not NPs because the elements inside NPs can be interrupted by *de*. However, this is completely impossible in postpositional phrases.

(139) Tā jīnwǎn [$_{PreP}$ zài [$_{NP}$ chéngshì **(de) lǐmiàn**]] yùjiàn-le Mary.
he tonight   in   city   DE inside   meet-PERF Mary
'He met Mary inside the city tonight.'

(140) * Tā jīnwǎn [[$_{PreP}$ zài [$_{PostP}$ chéngshì **de lǐ**]]] yùjiàn-le Mary.
he tonight   in   city   DE in   meet-PERF Mary
'He met Mary in the city tonight'

The particle *de* is only licit in (139) because the elements that on either side of *de* are nominal. In contrast, in (140), the presence of *de* is illicit. This is because *lǐ* 'in' is a postposition and *de* is limited to appearing between a noun and a P. This suggests the relevant structures are:

(141) a.

```
           PP
           |
           P
          / \
       zài   NP
       in    |
            PossP
           /     \
         NP      Poss
          |      /  \
      chéngshì  DE  NP
       city         |
                 lǐmiàn
                 inside
```

b.

```
          PP
          |
          P
         / \
      zài   PP
      in    |
            P
           / \
         NP   P
     chéngshìᵢ |
       city    lǐ
               in
```
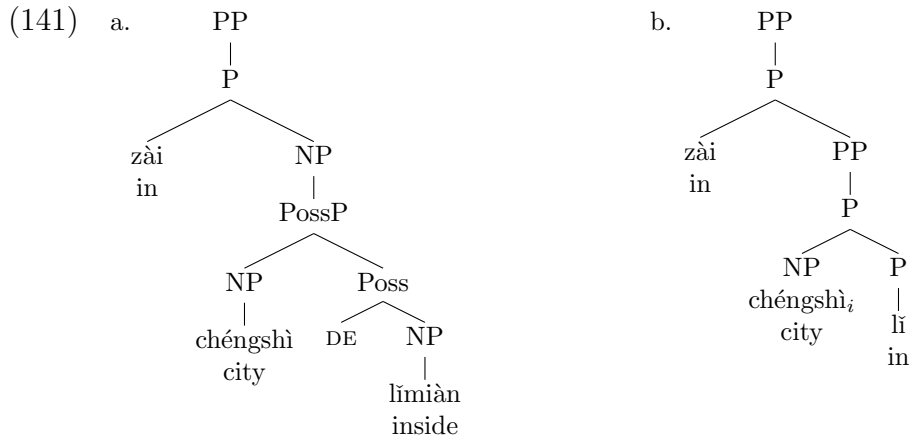
4.2.1.2 Preverbal PPs vs Postverbal PPs

In contrast to PPs in Mandarin Chinese, English PPs normally occur postverbally in a sequence. Postverbal PPs are, accordingly, often ambiguous in English. For instance, sentences like (142) can have two different meanings.

(142) The boy saw the girl **in the bookshop**.

    a. The boy who was in the bookshop saw the girl. (The girl may not be in the bookshop)

    b. The boy saw the girl who was in the bookshop. (The boy may not be in the bookshop)

PP adjuncts which appear postverbally are free to be analysed as a nominal modifier or a verbal modifier in English. However, PP adjuncts in Mandarin have more limitations than in English.

PPs can precede or follow a verb phrase in Mandarin Chinese. Different from English PPs, preverbal PPs can only modifiy VPs in Mandarin, and postverbal PPs can modify VPs or NPs if the VPs have an overt complement. Since PPs appearing in different positions can have different functions and express different meanings, it is illicit to switch the positions of PPs. Consider the examples with the same PP but in different positions below.

(143) a. Tā [_PP **zài cāochǎng shàng**] pǎo-le   jǐ-quān.
           he   in   playground on   run-PERF several-circle
           'He ran several circles on the playground.'

    b. ??? Tā pǎo-le   jǐ-quān   [_PP **zài cāochǎng shàng**].
             he run-PERF several-circle   in   playground on
            Lit.'There are several circles on the ground that were caused by his running.'

The PP *zài cāochǎng shàng* 'on the playground' functions as an adjunct of the VP, denoting the location where the running event happens in (143a). When the PP appears postverbally, it has the interpretation that the location it denotes is the result of the action. This is the reason that (143b) is odd, as it is not usual for running to cause a change to the location. However, it is not always problematic for a preverbal PP to appear in a postverbal position, as shown in (144b).

(144)   a. Tā [_{PP} **zài Spotify**] xiàzǎi-le   jí-shǒu   gē.
            he   in Spotify   download-PERF several-CL song
            'He downloaded several songs **on Spotify**.'

      b. Tā xiàzǎi-le   jí-shǒu   gē   [_{PP} **zài Spotify**].
            he download-PERF several-CL song   in Spotify
            'He downloaded several songs **to Spotify**.'

In these examples, the preverbal PP describes the way/method that a person downloads music, while the postverbal PP describes the result of the action. It cannot denote that the songs are downloaded from Spotify as in (144a). The songs are downloaded from other applications and moved to Spotify. Although a PP can appear in either position, it has different meanings in the different positions.

In addition to this, a VP can have multiple preverbal PPs, while it is impossible to have more than one postverbal PP. Consider below.

(145) **Multiple preverbal PPs**

    Tā [_{PP1} **yòng máobǐ**] [_{PP2} **zài qiáng shàng**] [_{PP3} **cóng zuó wǎng yòu**
    he   use brush   in wall on   from left to   right
    ] xiě-le   jǐ-gè   zì.
      write-PERF several-CL letter

    'He wrote several letters with a brush on the wall from left to right.'

(146) **Multiple postverbal PPs**

    * Tā xiě-le   jǐ-gè   zì   [_{PP1} **zài qiáng shàng**] [_{PP2} **cóng zuó**
      he write-PERF several-CL letter   in wall on   from left
    wǎng yòu].
    to   right

    Intended.'He wrote several letters which are on the wall and from left to right.'

It is reasonable and understandable for a person to write letters in multiple ways/methods at the same time. As shown in (145), different preverbal PPs are describing the instrument 'brush', the location 'wall' and the way 'left-to-right' of writing letters. (146) shows, in contrast, that multiple PPs are impossible postverbally. In the next section, I will discuss the adjunct vs complement status of preverbal PPs and postverbal PPs.

4.2.1.3 Adjuncts vs Complements

Huang, Li and Li (2009) and Djamouri, Paul and Whitman (2013) have argued that only the PPs in a preceding position of VPs are true adjuncts. In other words, those PPs which follow VPs are complements. That their arguments are consistent with the properties of preverbal PPs and postverbal PPs has been shown in the last section. Consider the following examples from Paul (2013) which provides initial motivation to treat postverbal PPs as complements to VPs.

(147)   a. Tā dǎ-le   jǐ-cì   diànhuà [$_{PrepP}$ gěi tā péngyǒu].
           he strike-PERF several-time phone   to he friend
           'He gave his friends a call several times.'

       b. * Tā chàng gē   [$_{PrepP}$ géi tā péngyǒu].
           he sing   song   to he friend
           Intended. 'He sang songs for his friends.'

<div align="right">(Paul, 2013:16)</div>

The verb *dǎ* 'strike' in (147a) is a 3-argument verb which selects a normal noun, e.g. *diǎnhuà* 'call', as a direct object and a PP as a further argument, and all complements are postverbal. (147b) is ungrammatical because the verb *chàng* 'sing' does not take two internal arguments, so the second PP is illicit, as it would have to be interpreted as a complement and it is semantically an adjunct. The syntactic structure of (147a) is given in (148). The DP *jǐ-cì diànhuà* 'several times call' and the PP *gěi tā péngyǒu* 'for his friends' are, in Paul's analysis, arranged as the arguments of the verb *dǎ* 'strike' under a VP-shell structure.

(148)
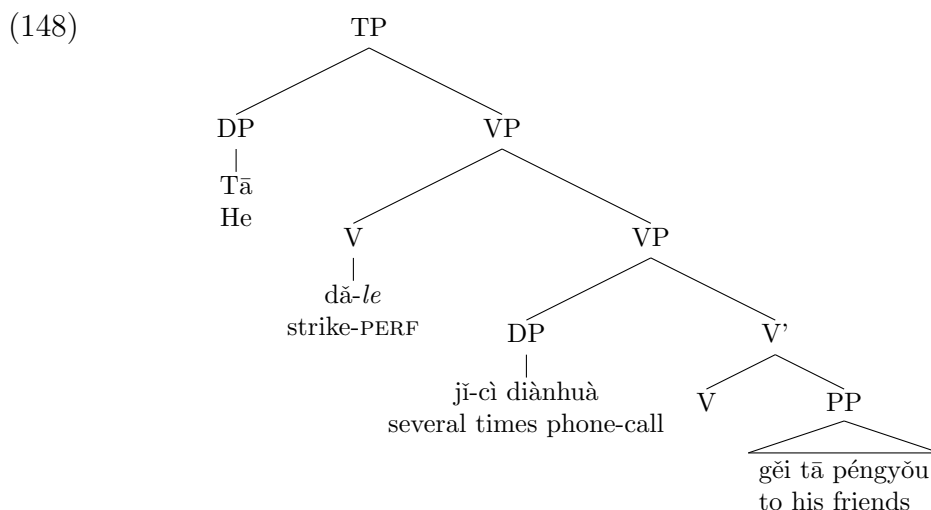
If, however, the PP *gěi tā péngyǒu* 'to his friend' is preverbal, acting as a verbal modifier, it can occur with the verb *chàng* 'sing':

(149) Tā [$_{PrepP}$ gěi tā péngyǒu] chàng gē.
     he   to he friend   sing song
     'He sang songs for his friends.'

```
                         TP
                    ┌─────┴─────┐
                   DP           VP
                    |            |
                   Tā           V'
                   He      ┌─────┴─────┐
                          PP           V'
                      ┌───┴───┐    ┌───┴───┐
                   gěi tā péngyǒu  V      DP
                   to his friends  |       |
                                 chàng    gē
                                 sing    songs
```
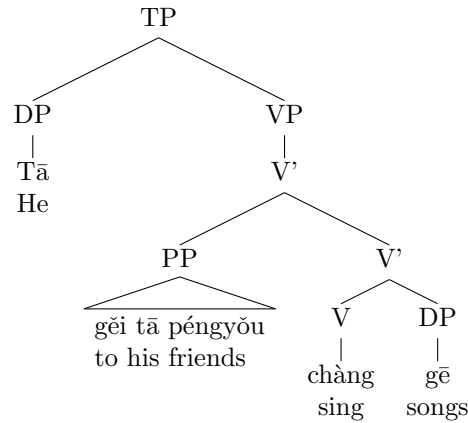
     In addition, it is also worth noting that apparent postverbal PrepPs and PostpPs may actually be NPs because, when a preposition follows a verb, the preposition may actually be in constituency with the verb (Li and Thompson, 1973; Huang, 1982; Paul, 2008). The combination of these two elements is a verbal compound:

(150) Tā mànmàn-de   [$_V$ **zǒu zài**] - (**le**) [$_{PostpP}$ cǎodì shàng].
     he slowly-DE$_{verbal}$ walk on   PERF   grass above
     'He walked slowly on the grass.'

Djamouri, Paul and Whitman (2013) point out that a preposition, like *zài* in (150), can be separated from the following PostpP by the perfective marker *le*, which illustrates that the preposition is a part of a verbal compound. The incorporation of a preposition into the verb is only possible when the preposition is in a complement position because it would violate the ban against extraction from adjuncts. Consider the following.

(151) a. **Incorporation possible**

```
                        TP
                  ┌──────┴──────┐
                 DP            VP
                  │             │
                 Tā            V'
                 He      ┌──────┴──────┐
                        AP            V'
                         │      ┌──────┴──────┐
                    mànmàn-de   V            VP
                     slowly     │             │
                             zǒu-zài         PP
                             walk-on      ╱─────╲
                                        zài cǎodì shàng
                                        on grass above
```
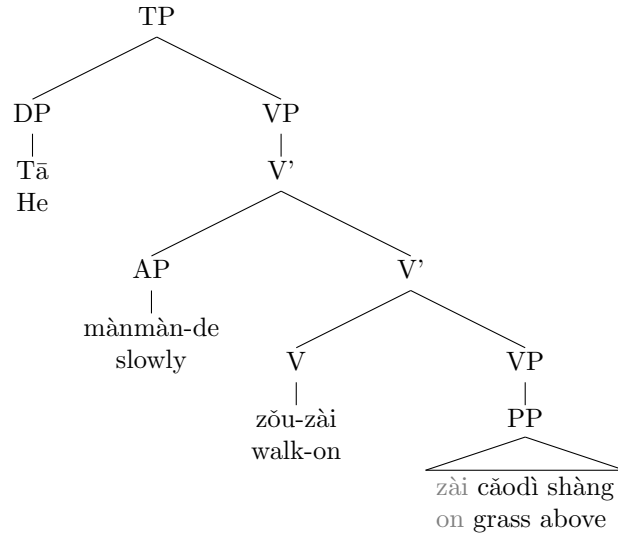
b. **Incorporation impossible**

```
                        TP
                  ┌──────┴──────┐
                 DP            VP
                  │             │
                 Tā            V'
                 He      ┌──────┴──────┐
                        AP            V'
                         │      ┌──────┴──────┐
                    mànmàn-de   V'           PP
                     slowly     │         ╱─────╲
                               V        zài cǎodì shàng
                               │        on grass above
                            zǒu-zài
                            walk-on
```
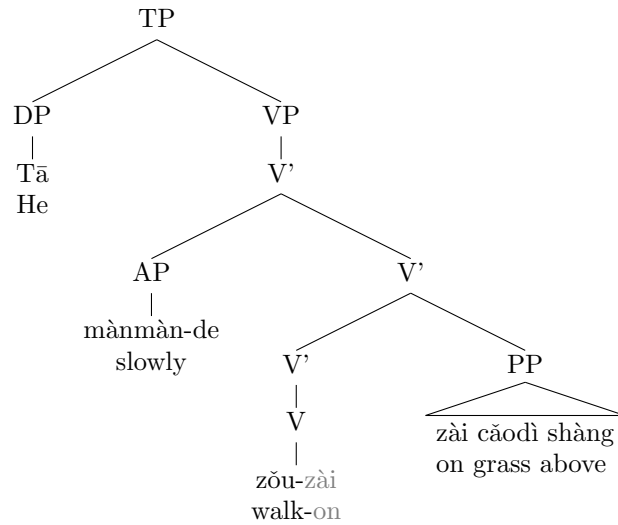
In addition to this, there is one more piece of evidence that supports the view that postverbal PPs are not adjuncts but are complements. This involves A-*not*-A questions in Mandarin. A preposition can be duplicated in an A-*not*-A pattern if the PP including the preposition is an adjunct, as shown in (152).

(152) Mary [$_{PrepP}$ **zài méi zài** jiā   ] shàng gāngqínkè?
       Mary   at not at home   have piano-lesson
       'Does Mary have piano lessons at home?'

89

It is impossible to duplicate a preposition if the PP that contains the preposition is a complement:

(153)   * Mary dāi [$_{CircumpP}$ **zài méi zài** bàngōngshì] ?
        Mary stay   in   not in   office
        Intended. 'Does Mary stay in the office?'

According to Paul (2008), in such cases, the preposition contracts with the preceding verb creating a verbal compound. As shown below, it is more acceptable to reduplicate over the combination of the verb and the preposition rather than the preposition only.

(154)   ? Mary **dāi zài** (bàngōngshì) **méi dāi zài** bàngōngshì?
        Mary stay in   office   not stay in   office
        'Does Mary stay in the office?'

In (154), the apparent preposition *zài* 'in' is optionally stranded. The pattern of the A-*not*-A reduplication can be either *dāi méi dāi zài bàngōngshì* or *dāi zài bàngōngshì méi dāi zài bàngōngshì*, which can be explained if *zài* is a P in the former case and a part of a verb compound in the latter. From (150) and (154), we can see that a preposition can be separated from its NP, either by incorporation or by A-*not*-A formation, if the PP is in a postverbal position. I take this as good evidence that preverbal PPs are adjuncts and postverbal PPs complements. Additionally, I will not consider (150) and (154) as counterexamples to against the ban on P-stranding in Mandarin Chinese.

4.2.2   Adposition Omission

On Collins's (2007) analysis of null prepositions in English, nominals, such as *here*, *there* and *home* are essentially prepositional phrases. More precisely, these nominals are parts of prepositional phrases. Unlike the case of Mandarin Chinese discussed above, the prepositions in English are not optionally omissible. This is because a preposition in Mandarin Chinese can be either part of a verbal compound which disallow omission of the preposition, or an independent element which allow omission. In English, since these prepositions cannot appear preceding *there* and *home*, Collins suggests that *there* and *home* are in fact PPs. Consider the following.

(155)   Mary went (*to) there.

(156)   Mary went (*to) home.

Based on this proposal, Collins provides an analysis which adopts the Doubly Filled Comp Filter (Chomsky and Lasnik, 1977; Koopman and Szabolcsi, 2000; Kayne, 2005) to explain the absence of the P on the surface. According to the Doubly Filled Comp Filter, an element on the edge of a phrase must be spelled-out, which can be

either the specifier or the head but not both. Collins provides an important piece of evidence that *there* has a null preposition. Consider the following examples.

(157) a. I went there and to the place next door.
   b. I went *(to) the place next door.

<div align="right">(Collins, 2007:4)</div>

Collins argues that since *went* cannot take a bare DP as complement, it is only possible that (157b) involves a coordination of two PPs.

Following this, (155) and (156) have an underlying structure shown in (158b). In this skeletal sentence, the preposition *to* appears in a position following the nominal rather than preceding the nominal as above. The ordering is in contrast to normal PPs. In those, the specifier position is empty, therefore, we can spell the head out. However, for cases as in (155) and (156), the complement of the PP is moved to the Spec position and spelled out, which Collins suggests causes the head P to be null. The tree diagram is depicted below to show how the mechanism works: first, the complement is moved to Spec PP position; second, the element in the Spec position is spelled out and the element in the head position is deleted on the surface.

(158) a. Mary went (*to) there/home.
       b. Mary went [$_{PP}$ there/home [$_P$ TO [t]]

(159) **The null P structure of PrepP**

PP
there   P'
         P   t$_{there}$
         |
         ~~TO~~
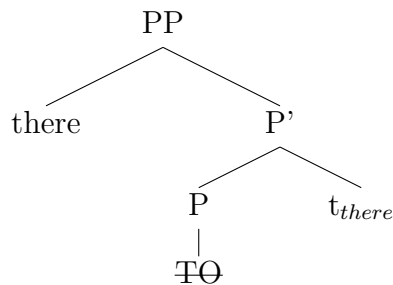
<div align="right">(Collins, 2007:4)</div>

In Mandarin Chinese, we also observe P omission. However, there is slightly different from English examples because P omission is not obligatory in Mandarin Chinese. Consider the examples below, which illustrate the presence and absence of prepositions.

(160) Mary zhù (zài) xuéxiào-de sùshè.
       Mary live   in   school-POSS dormitory
       'Mary lives in school dormitory.'

(161) Nà-běn shū, Lisa là   (zài) túshūguǎn le.
　　　that-CL book Lisa leave   in   library   PERF
　　　'That book, Lisa left in the library.'

Following the discussion of postverbal PPs in the previous section, *la zai* "left on" and *zhu zai* "live in" can be regarded as verbal compounds and *zai* is not a true P. This is because it is possible to put an aspectual marker following *zai*. I assume that there is a covert P when the P is omitted on the surface. This is because the single verbs *la* and *zhu* cannot express the same meaning as the compound verb *la-zai*. Therefore, we need a P appearing there to introduce the relationship between the verb and the following noun. Following this, I propose that there is a covert P appearing between the verb and the following noun. To explain this phenomenon above, I will adopt Collins's null P analysis. Following this, (161) can be analysed as:

(162) Nà-běn shū, Lisa là $[_{PP}$ túshūguǎn $[_P$ ZAI [t]]] le.
　　　that-CL book Lisa left   library   on   PERF

The P is combined with the following noun as a PP and deleted when its specifier position is occupied, as shown in (162). We cannot delete a P by treating it as the complement of a verb because the P can only appear as a part of the verb but cannot appear as the complement of the verb. Following this derivation, I extend the analysis to other PP structures. For instance, in a postpositional phrase (PostpP) whose underlying structure has a left-moved complement under a Kaynian analysis, the complement is internal to the whole PP, but not at the edge, as in (163). Since the specifier of a PostpP is already filled, we need to generate an extended projection pP to operate the deletion. The postposition needs to raise to a higher head position p, and the complement raises to the Spec pP then gets deletion. Consider the derivation of a PostpP adjunct sketched below.

(163) Mary $[_{PP}$ bā   diǎn   [ZUOYOU [t] $[_P$ t$_{zuǒyòu}$ [t]]]] cái   huì líkāi
　　　Mary   eight o'clock around   only can leave
　　　bàngōngshì.
　　　office
　　　Lit.'Mary didn't leave the office until eight o'clock.'

(164) a. **The derivation of a PostpP**
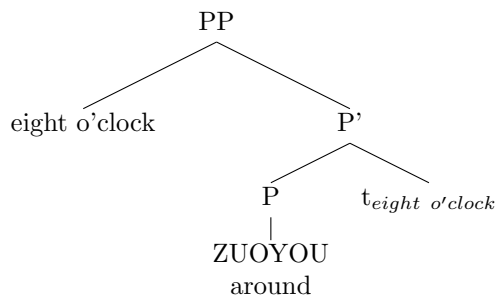
b. **Applying deletion to a PostpP**
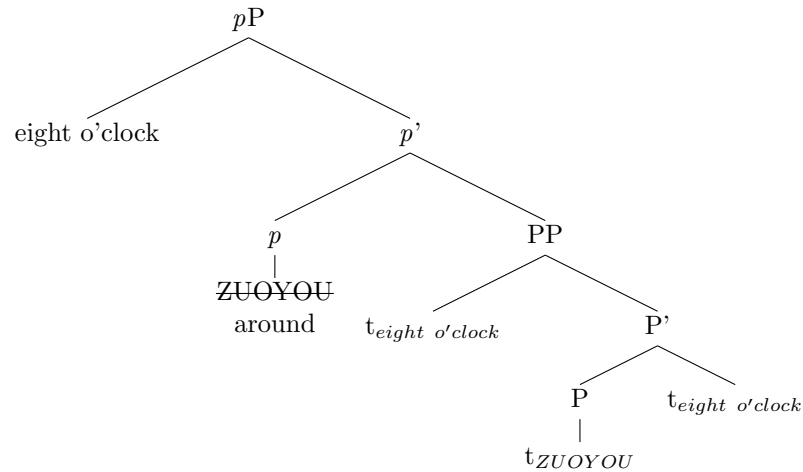
As for circumpositional phrases (CircumpPs), recall that a CircumpP is a combination of a PrepP and a PostpP, following Djamouri, Paul and Whitman (2013). Therefore, there are two Ps that needs to be deleted in the null P structure of a CircumpP. Here, I simply depict the diagram of how to derive a null P structure for a CircumpP. The deletion happens to a preposition when its specifier position is occupied, as shown by the tree diagram in (166b).

(165)   Mary jīn   [$_{PP}$ diàntī   [$_P$ DAO [$_{PP}$ [t] [[t] [$_P$ LI   ]]]]] le.
        Mary enter   elevator   to   inside   PERF

        'Mary had entered the elevator.'

(166)   a. **The derivation of a CircumpP**
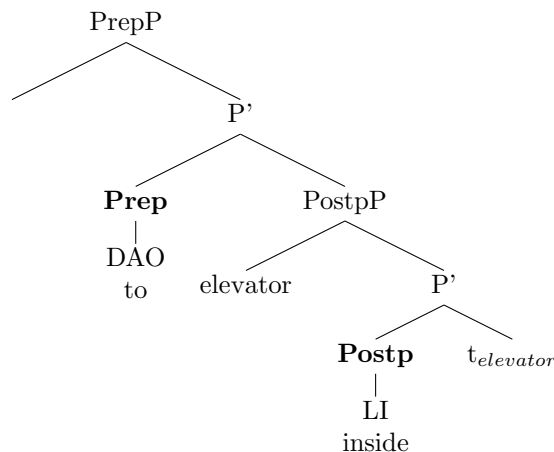
b. **Applying deletion to a CircumpP**

```
                              PrepP
                    ┌───────────┴──────────────┐
                   pP                          P'
              ┌─────┴──────┐              ┌─────┴─────┐
          elevator        p'           Prep         t_pP
                     ┌─────┴─────┐       │
                     p        PostpP    DAO
                     │      ┌───┴────┐    to
                     L̶I̶   t_elevator  Postp'
                   inside          ┌────┴──────┐
                                 PostP      t_elevator
                                  t_LI
```
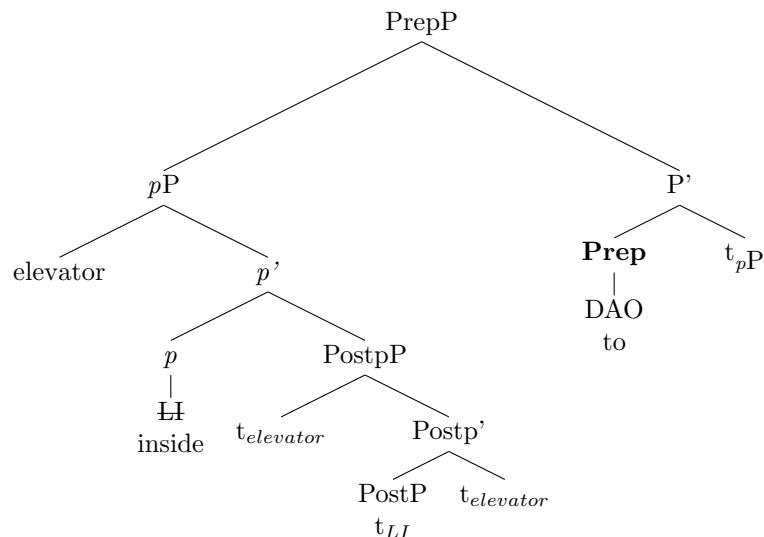
In my following analysis, I will apply Collins null Ps analysis to adjunct relativizations. Following the conclusion from Section 2 that P-stranding is disallowed in Mandarin Chinese, it is no longer possible to posit a covert P stranded in its original position in adjunct relativization. The covert P has to be pied-piped to the Spec C position by the head noun of the adjunct relative clause. Given this, we have the problem of how to deal with the disappearance of the pied-piped P in the Spec C position. I will adopt Collins's analysis to explain the disappearance of Ps in adjunct relativization. In the next section, I first outline some previous accounts of adjunct relativizations in Mandarin Chinese.

4.3 Analyses of Adjunct RCs in Mandarin Chinese

From this section, we turn to the analyses of Adjunct RCs. At the beginning of two subsections, I will go through the analyses in the literature following with my evaluation. Roughly speaking, the two selected proposals all argue that adjunct relatives are derived by null operator movement with a base-generated relative head. Following this two subsections, I provide an alternative analysis which argues that Chinese adjunct relatives need a head raising strategy. First, I will provide observation of adjunct relatives when they interact with *wh*-questions. There is an asymmetry between adjunct relatives that contain a gap and adjunct relatives that contain a resumptive pronoun showing by the distribution of the *wh*-interrogative. Further, the available position of the *wh*-interrogative shows that the relative head must originate

with a *wh*-operator, which is compatible with the HRA. I regard this observation as an essential piece of evidence to argue for a head raising strategy for adjunct relatives. Given this, I proceed to the detail of the analysis. The analysis is based on Simpson's (2002) version of HRA, accompanying with the P deletion operation shown in Section 4.2.2. I disclose the analysis in two ways, regarding for two different types of adjunct relativizations that involve different PPs. Finally, I evidence that adjunct relatives that contain a gap are sensitive to island constraints but adjunct relatives that contain a resumptive pronoun are not. Given the alternative analysis of adjunct relatives, I propose that adjunct relatives that contain a gap demand for a head raising strategy and adjunct relatives that contain a resumptive pronoun demand for a base generation strategy.

4.3.1 Previous Analyses of Adjunct RCs in Mandarin Chinese

In this section, I will focus on two types of adjunct PP relatives. Those where there is no overt PP structure in the relative, and those where there is an overt P and a resumptive. I will call the former type of adjunct relative *gapped adjunct relatives* and the latter *PP-in-situ adjunct relatives.* In addition to this, there are five subtypes of these two types of adjunct relatives, following Ning's (1993) classification.

(167) **Gapped adjunct relatives**

a. LOCATIVE Adjunct Relative

Zhè jiù   shì nà-suǒ [$_{NP}$ [$_{IP}$ Lisa *t* xué-le   Yǔyánxué sì   nián]
this exactly be that-CL   Lisa   study-PRF Linguistics four years
de dàxué   ].
DE university

'This is the university where Lisa studied Linguistics for four years.'

b. TIME Adjunct Relative

Zhè jiù   shì nà-gè   [$_{NP}$ [$_{IP}$ Lisa *t* líkāi jiā   qùshàngxué] de
this exactly be that-CL   Lisa   leave home go-to-school   DE
yèwǎn].
night

'This is the night that Lisa left home for school.'

c. INSTRUMENTAL Adjunct Relative

Zhè jiù   shì nà-gen [$_{NP}$ [$_{IP}$ Lisa *t* dǎ   láoshǔ] de gùnzi].
this exactly be that-CL   Lisa   beat mouse   DE stick

'This is the stick which Lise beat mouse with.'

d. MANNER Adjunct Relative

Zhè jiù   shì [$_{NP}$ [$_{IP}$ Lisa t káochá yuángōng] de fāngshì].
this exactly be   Lisa   inspect staff   DE way

'This is the way that Lisa inspected staff.'

e. REASON Adjunct Relative

Zhè jiù   shì [$_{NP}$ [$_{IP}$ Lisa t líkā   xuéxiào] de yuányīn].
this exactly be   Lisa   leave school   DE reason

'This is the reason why Lisa left school.'

(168) **PP-in-situ adjunct relatives**

    a. COMITATIVE Adjunct Relative

Zhè jiù   shì [$_{NP}$ [$_{CP}$ wo *(**gēn tā**) tiàowǔ de] gūniang].
this exactly be   I   with her   dance DE   girl

'This is the girl whom I danced with.'

    b. GOAL Adjunct Relative

Zhè jiù   shì [$_{NP}$ [$_{CP}$ wǒ *(**duì tā**) xiào-le-xiào   de] nà-gè
this exactly be   I   to   him   smile-ASP-smile DE   that-CL
rén   ].
man

'This is the man whom I cast a smile to.'

    c. ABLATIVE Adjunct Relative

Zhè jiù   shì [$_{NP}$ [$_{CP}$ tā *(**cóng nàr**) lái   de] nà-gè   xiǎozhèn
this exactly be   he   from there   come DE   that-CL town
].

'This is the town where he came from.'

<div align="right">(Ning, 1993:96, 134)</div>

4.3.1.1   Ning's (1993) Operator Movement Analysis

In order to understand Ning's analysis of adjunct relative clauses better, I first need to recap his proposal for Mandarin relative clauses. In Chapter 3, I discussed Ning's analysis of Mandarin Chinese relative clauses, showing that Ning's (1993) analysis is in line with the standard head external analysis (HEA) in English. More specifically, Ning proposes an operator-variable construction for Mandarin relative clauses. In

this construction, a variable which represents the gap contained in the relative clause is bound by an operator that appears in the Spec CP position. This operator relates to an external head noun via co-indexation. Ning depicts the syntactic structure of an argument relative clause as shown in (169).

(169)   [$_{NP}$ [$_{CP}$ Op$_i$ [$_{C'}$ [$_{IP}$ tā xǐhuān t$_i$] [$_C$ de]]] shū$_i$]
                    he like   DE   book

   'the book that he likes'
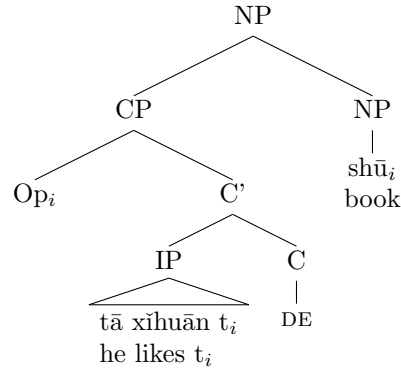
                                                                (Ning, 1993:67)

   Ning argues that Chinese adjunct relative clauses can also be derived from a similar operator-variable construction. (170) is a place adjunct relative clause. Compared with (169), however, the operator in an adjunct relative clause represents more than the operator that we see in (169), as it is a PP categorially, rather than an DP.

(170)   [$_{NP}$ [$_{CP}$ Op [$_{C'}$ [$_{IP}$ māo t zhuō lǎoshǔ] [$_C$ de]]] chuáng]
                    cat   catch mouse   DE   bed

   'the bed where the cat caught the mouse'   (Ning, 1993:111)

Ning suggests that the single form operator in (170) should be decomposed as shown in the following[1]:

(171)   [$_{NP}$ [$_{CP}$ [$_{PP}$ [$_P$ **E**] [**Op** [$_{LOC}$ **E**]]]$_j$ [$_{C'}$ [$_{IP}$ māo t$_j$ zhuō lǎoshǔ] [$_C$ de]]]
                                                        cat   catch mouse   DE

      chuáng]
      bed

Inside a locative PP adjunct which consists of a preposition, a noun and a locative morpheme[2], Ning argues that it is the locative morpheme that denotes the location.

---

[1]The capital Es in (171) designate unspecified prepositions in Ning (1993).

[2]Ning (1993) presents a different view of the structure of PPs shown in (171). Recall that I have regarded this structure as a circumpositional structure which consists of a preposition, an argument and a postposition. Ning regards the postposition as a locative morpheme in his analysis.

The combination of the preposition and the postnominal locative morpheme/noun gives a meaning equivalent to the interpretation of a preposition in English. Further, Ning points out that the covert adjunct PP as a whole in Mandarin is identical to the single-word form *wh*-operator *where* in English. In English, the *wh*-word *where* contains an unspecified preposition. Because of the vagueness of *where*, we can interpret it in a number of ways, for instance, (172) that the mouse is caught by the cat *in/under/near* the bed.

(172)   the bed **where** the cat caught the mouse

Ning notices that in Mandarin, the preposition of a covert pied-piped PP adjunct is also unspecified. However, this unspecified preposition is different from that in English because, Ning claims, the preposition, e.g. *zài*, does not provide information about the location. In contrast, Ning (1993) shows that it is the complement of the preposition *zài*, which can either be a locative morpheme which I treat as postposition following Djamouri, Paul and Whitman (2013) or a locative NP, that indicates the locative information. Consider below.

(173)   Lisa [$_{PP}$ *(zài) shān   (shàng/lǐ/xià/...)   ] jiàn fángzi.
        Lisa   on   mountain above/inside/under   build house

        'Lisa built a house above/inside/under the mountain.'

(174)   Lisa [$_{PP}$ (zài) shān   (shàngmiàn/lǐmiàn/xiàmiàn/...)] jiàn fángzi.
        Lisa   on   mountain top-side/inner-side/bottom-side   build house

        'Lisa built a house on/in the top-side/inner-side/bottom-side of a mountain.'

As shown in (173), the absence of the preposition *zài* leads to an ungrammatical result. In contrast to this, the preposition *zài* is optional in (174) when involving locative NPs rather than locative morphemes/postpositions. In other words, it is the combination of [$_P$ E] and [$_{LOC}$ E] inside the locative adjunct PP that is equivalent to English [$_P$ E] and the preposition in Mandarin is signalled by the postnominal locative element contained in that sequence.

(175)   a. **Mandarin covert operator**   b. **English covert operator**
        [$_{PP}$ [$_P$ E] <u>[Op [$_{LOC}$ E]]</u>]   [[$_P$ E] Op]

In addition, these postnominal elements are omissible when their preceding noun is a localized NP, e.g. a place name such as *train station*, *univeristy*, *restaurant* etc. Given this, Ning argues that it is the combination of the operator plus the locative morpheme that is equivalent to English *where*. Therefore, Ning creates a morphological mechanism to effect the incorporation of the underlined part shown in (175).

(176) $[_{PP}$ $[_P$ E $]$ Op-R<Location> $]$

        PP (Single-form Op)

        P   Op-Restriction<Location>
        |
        E
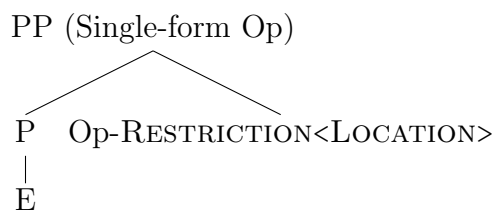
Therefore, the decomposed structure of (170) in (171) should be updated as in the following.

(177) $[_{NP}$ $[_{CP}$ $[_{PP}$ $[_P$ **E** $]$ **Op$_i$-R<Location>** $]_j$ $[_{C'}$ $[_{IP}$ māo t$_j$ zhuō lǎoshǔ $]$ $[_C$
                                                                    cat   catch mouse

        de $]]]$ chuáng$_i$ $]$
        DE   bed

The decomposed operator shown in (171) can be simplified as above, consisting of an unspecified preposition and a restricted operator. The contents of the restrictions to the original operator range over various domains, including Location, Time, Instrument, Manner, and Reason, which constitute the first group of adjunct relative clauses shown in the beginning of this section. Therefore, this morphological mechanism is also key to distinguishing gapped adjunct relatives from PP-in-situ adjunct relatives. According to Ning (1993), because of the availability of the single-word form adjunct relative operator, the proposed operator-variable construction is only applicable for this type of adjunct relative clauses. English counterparts of these single-word form relative operators are *where, when, how* and *why* correspondingly.

As for the second group of adjunct relatives, the resumptive pronouns that appear with an overt preposition are different from true variables that appear with an unspecified covert preposition. The true variables can be locally bound by the relative operator, according to the structure in (177). However, the resumptive pronouns shown in (168) cannot be locally bound by the relative operator because of the overt prepositions. Therefore, Ning adopts a "spell-out-as-pronouns" mechanism to explain the resumptive pronoun that appears in the PP-in-situ adjunct relatives. The reason why the second group of adjunct relative has to appear with an in-situ PP is that the verb involved in those examples are intransitive, e.g. *tiàowǔ* 'dance', *xiào* 'smile', *lái* 'come'. These verbs need to appear with a preposition, and the presence of the preposition requires its complement position to be occupied by an overt element. In contrast to the examples that appear in (168), there are different reasons cause the presence of the resumptive in the following types of adjunct relative which Ning also includes in his classification.

(178)   a. DATIVE Adjunct Relative

      Zhè jiù   shì [$_{NP}$ [$_{CP}$ wǒ sòng le   yī   běn shū *(gěi **tā**) de]
      this exactly be   I   send ASP one CL book   to him   DE
      nà-gè   rén].
      that-CL man

      'This is the man whom I sent a book to.'

    b. COMPARATIVE Adjunct Relative

      Zhè jiù   shì [$_{NP}$ [$_{CP}$ wǒ *(**bǐtā**)   gāo de] nà-gè   rén].
      this exactly be   I   than him tall DE that-CL man

      'This is the man whom I am taller than.'

It is possible to elide the bracketed element in (178a), but it will result in a different underlying structure for this sentence. (178a) involves a ditransitive verb *sòng* 'send' which can arrange its complements in two ways, either [V + NP$_{direct}$ + NP$_{indirect}$] or [V + NP$_{direct}$ + P + NP$_{indirect}$]. The absence of the preposition will cover the intended [V + NP + P + NP] structure of (178a) and lead to a [V + NP + NP] structure. As for (178b), the bracketed element is not an adjunct because *bǐ* is not a preposition and the complement of *bǐ* is not a kind of modifier but a subject to the following predicate. Therefore, in my analysis, I exclude this type of relative construction from the second group of adjunct relatives.

However, I observe that using the morphological mechanism to restrict the operator makes there is no difference between the two types of postnominal elements: the locative morphemes/postpositions and the locative NP. As I mentioned in Section 4.2.1.1, combining a locative NP with its preceding noun results in an NP, while combining a locative morpheme/postposition with its preceding noun results in a PP. The ability of them to take an additional preposition is different. To be more specific, a preposition is obligatory for a PostpP. In contrast, a preposition is optional for an NP that contains a locative NP.

(179)   Lisa [$_P$ *(zài) [chuáng [$_P$ shàng]]] fàng-le   sān-běn shū.
       Lisa   in   bed   above   put-PRF three-CL book
       'Lisa put three books on the bed.'

(180)   a. Lisa [$_P$ zài [chuáng [$_{NP}$ shàngmiàn]]] fàng-le   sān-běn shū.
          Lisa   in   bed   top-side   put-PRF three-CL book
         'Lisa put three books on the surface of the bed.'

     b. Lisa [chuáng [$_{NP}$ shàngmiàn]] fàng-le   sān-běn shū.
          Lisa bed   top-side   put-PRF three-CL book
         'There are three books put on the surface of Lisa's bed.'

Ning extends his mechanism to other types of gapped adjunct relative, which supposes that there also is a postnominal element appearing as a restriction in the other types of gapped adjunct relative. The PPs that appears in instrument and manner adjunct relatives and reason adjunct relatives do not have such informative postnominal elements. Furthermore, Ning argues that the preposition that appears in locative adjunct relatives does not provide information about the location; therefore, he regards the preposition to be covert in relativization. However, it is problematic to extend this generalization to other types of gapped adjunct relative, since the prepositions that the other types of gapped adjunct relative contain can appear independently without an additional morpheme. Therefore, I conclude that applying the morphological mechanism to restrict a relative operator cannot be extended to all types of adjunct relatives and the expression that a preposition is useless in a PP is also problematic.

However, Ning's approach, as we will see, ends up violating the ban on P stranding in Mandarin, and so we will reject it. The ban on P stranding force us to move the P together with its complement when we need to move its complement. Following Ning's argument, the pronoun that appears in the base position is equal to a trace left by operator movement. The preposition is also left by this movement. However, following the ban, we cannot strand a preposition and move the operator only although there is a spelled-out pronouns. Therefore, it is problematic to argue that adjunct relatives that contain a in-situ PP are derived by operator movement. When movement involves, the in-situ P would incur a violation of the ban on P stranding. In Aoun and Li's (2003) and Huang, Li and Li's (2009) proposals for Mandarin relative constructions, relative clauses that contain resumptive pronouns can only be analysed in a base-generated structure, the head noun and the relative operator of which are both base-generated. Let's have a look at the examples that appear in Huang and Aoun's discussion, which are all in the subject or direct object position, as shown in (181).

(181)   Wǒ xiǎng kàn [[nǐ   shuō Zhāngsān huì dài   **tā**$_i$ huílái de] [xiǎohái]$_i$].
        I   want see   you say Zhangsan will bring him back DE   child
        'I want to see the child that you said that Zhangsan would bring back.'

$$\text{(Aoun and Li, 2003:170)}$$

In (181), the resumptive pronoun *tā* 'him' occupies a direct object position of a subordinate clause the subject of which is *Zhāngsān*. There is however an alternative way of expressing this sentence. In addition to being represented by a resumptive pronoun, the argument can also be represented by a trace.

(182)   Wǒ xiǎng kàn [[nǐ   shuō Zhāngsān huì dài   **t**$_i$ huìlài de] [xiǎohái]$_i$].
        I   want see   you say Zhangsan will bring   back DE   child
        'I want to see the child that you said that Zhangsan would bring back.'

Following Aoun and Li, the relative construction that contains a gap is either derived by operator movement (adjunct relativization) or head raising movement (NP relativization). In contrast, the relative construction that contains a resumptive pronoun is derived by based-generation. However, according to Ning's analysis, not only adjunct relatives which contain a gap but also adjunct relatives which contain a resumptive pronoun that has to appear with a stranded preposition are derived by operator movement. Therefore, Ning's (1993) analysis of the PP-in-situ type of adjunct relative involves the violation of the ban on P-stranding in Mandarin Chinese. I agree with Huang et al's (1984, 2009) and Aoun and Li's (2003) proposals that relative constructions that contain/do not contain a resumptive pronoun are derived in different ways, although Huang et al and Aoun and Li also propose an united analysis for both types of adjunct relatives. In the next section, I will illustrate Aoun and Li's united analysis of adjunct relatives and show that both argument NP relative constructions and adjunct relative constructions need to be derived differently in term of containing a gap or a resumptive pronoun.

4.3.1.2 Aoun and Li (2003)

Aoun and Li's (2003) account of relative clauses involves a mixed analysis of Mandarin Chinese relativizations. There are two ways to structure a relative construction depending on whether the variable in the relative clause appears as a gap or as a resumptive. For normal relative clauses which contain a trace/gap, they are derived by the head raising analysis. For the relative clauses which contain a resumptive pronoun, the head nouns and the relative operators are both base-generated (excluding manner and reason adjunct relatives — see below).

(183)   a. **Relative clause that contains a gap**
         $[[_{CP} [_{IP} ... [t_i] ...]] [_{Head} NP_i]$
         b. **Relative clause that contains a resumptive pronoun**
         $[[_{CP} Op_i [_{IP} ... [pronoun_i] ...]] [_{Head} NP_i]$

         (Aoun and Li, 2003:175, 179, 189-190)

However, for adjunct relatives, Aoun and Li argue that they are derived by operator movement even though they contain a resumptive pronoun.

(184)   a. Zhè jiù   shì [[tā rènwéi [nǐ   yīnggāi *rúhé/zěnme$_i$* xiū chē de]]
         this exactly is   he think   you should how   fix car DE
         fāngfǎ$_i$].
         method
         'This is the way that he thinks you should fix the car.'

b. Zhè jiù   shì [[tā rènwéi [nǐmén *wèishěnme*$_i$ méi lái   de]]
   this exactly is   he think   you   why   not come DE
   yuányīn$_i$].
   reason

'This is the reason why he thinks you did not come.'

(Aoun and Li, 2003:183)

According to Aoun and Li's approach, the *wh*-words *rúhé/zěnme* 'how' and *wèishěnme* 'why' are resumptive pronouns for manner and reason adjunct relatives. There are however reasons to be skeptical that the interrogative pronouns *zěnme* and *wèishěnme* as resumptive pronouns in (184a) and (184b). For other types of PP-in-situ adjunct relative clause, as shown in (168), the form of the in-situ elements consists of a relevant preposition and a resumptive which is adopted from regular pronouns. It is unclear why the resumptives used in manner and reason adjunct relatives are interrogative pronouns and the resumptives used in other types of adjunct relatives are regular pronouns. In order to be consistent with the other PP-in-situ adjunct relatives, I will argue for using the same form of in-situ elements as other adjunct relatives in manner and reason adjunct relatives in my analysis of adjunct relativizations.

As for gapped adjunct relatives, Aoun and Li (2003) have proposed that the structure of gapped adjunct relatives is derived by operator movement and the head noun is base-generated. They provides two pieces of evidence to argue for these conclusions. The first piece of evidence is that gapped adjunct relatives disallow reconstruction. Let's consider their argument for this. Consider the examples of manner and reason adjunct relatives below.

(185)   a. * [[wǒ xīwàng **měigèrén**$_i$ dōu néng xiū-hǎo chē de] wǒ jiāo **tā**$_i$ de
            I   hope everyone   all can fix-well car DE I   teach him DE
        fāngfǎ]
        method

        'the way that I taught him that I hope everyone can fix the cars'

      b. * [[wǒ yǐwéi **měigèrén**$_i$ dōu bù néng lái   de] ní   gàosù **tā**$_i$ māmā
            I   think everyone   all not can   come DE you tell him mother
        de yuányīn]
        DE reason

        'the reason that you told his mother that I thought everyone cannot come'

(Aoun and Li, 2003:176)

Their explanation for the ungrammaticality of this pair of examples is that the quantifier pronoun *měigèrén* 'everyone' that is contained in the first adjunct relative clause cannot bind the variable pronoun *tā* 'him' that is contained in the second relative

clause. Therefore, Aoun and Li conclude that adjunct relative constructions are distinct from argument relative constructions because adjunct relative constructions cannot allow such a binding dependency. However, I assume that it is not adjunct relative clauses that disallow the quantifier to bind the pronoun. The problem is caused by the second relative clauses which is a normal argument relative clause. The head nouns of adjunct relative clauses are also the head nouns of normal relative clauses. The structure of (185a) is sketched below.

(186)

```
                              DP
                   ┌──────────┴──────────┐
                   D                     NP
                            ┌────────────┴────────────┐
                           CP                         NP
                    ┌──────┴──────┐            ┌───────┴───────┐
              that I hope everyone can t      CP              NP
                    fix the cars         ┌────┴────┐        method
                                    that I teach him t
```
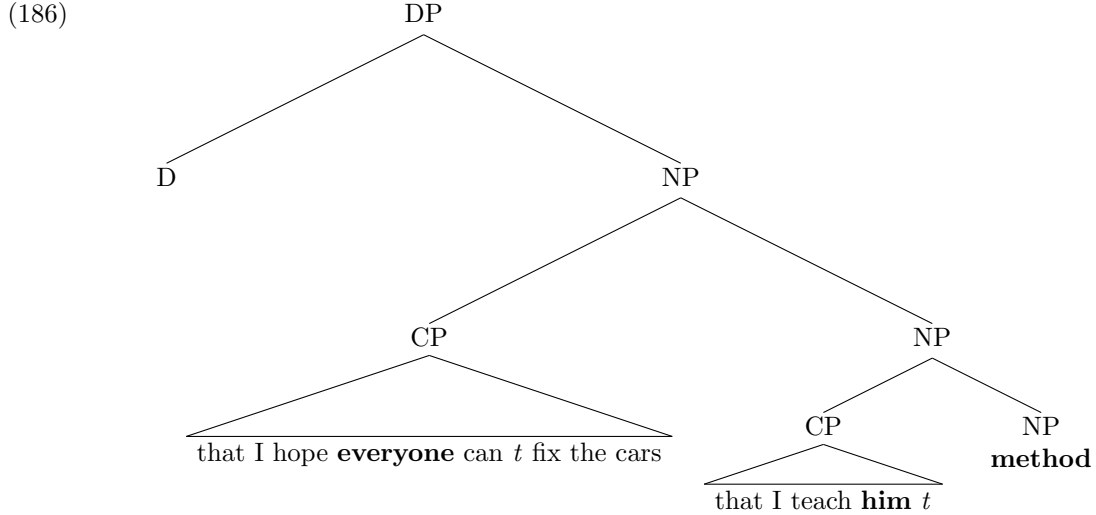
The NP are intended to be direct objects in the second relative clause. However, since Mandarin only applies the particle *de* which cannot help to distinguish different types of relative construction, the second relative clause has two different interpretations: *the way that/which I taught him* and *the way how I taught him*. The former is expected for argument relativization, while the latter is for adjunct relativization. However, we observe that the expected interpretation *the way that/which I taught him* is less available than the interpretation *the way how I taught him*. Following this, (185a) becomes stacking two adjunct relatives rather than stacking an adjunct relative and an argument relative, which ruins the examples. In the Chapter 5, I will show that manner and reason adjunct relatives are not stackable. Let's consider the example of locative adjunct relative in the following.

(187) [[wǒ yǐwéi **měigè xuéshēng**$_i$ dōu néng qǔdé hǎo   chéngjì de] **tā**$_i$
        I   think every student   all can get   good result DE   he
       jiāzhǎng xìnlài de xuéxiào   ]
       parent   trust DE university
       'the university where his parents trust that I think every student can get a good result'

As shown above, it is possible to relate the quantifier NP which is contained in a locative adjunct relative with the pronoun which is contained in an object relative.

This requires the embedded object relative appears inside the locative adjunct relative. In addition to the semantic issue of the head noun of manner and reason adjunct relative, I assume that the inability to stack manner and reason adjunct relative may be another factor accounting for the ungrammaticality of (185a) and (185b). About this, I will have a further discussion in the next chapter where I will consider this factor to be a uniform feature between manner adjunct relatives and gapless relatives. Instead, we can show reconstruction in manner and reason adjunct relatives in the following way.

(188)   a.   Wǒ jìlù-le   [yīxiē tóngxué   [$_{PP}$ t_{NP}] zuò   **tāzìjǐ-de**   bǐjì   de
           I   record-PERF   some classmate   make himself-DE note DE
           [$_{NP}$ **měi-yī-zhǒng** fāngshì]].
               every-NUM-CL   way

           'I recorded every way that some classmates make his own notes.'

   b.   Wǒ jìlù-le   [mǒuxiē jiāzhǎng [$_{PP}$ t_{NP}] ràng **tāménzìjǐ-de**
           I   record-PERF   some   parent   let   themselves-DE
           háizi   shàng bǔxíbān   de [$_{NP}$ **měi-yī-gè**   lǐyóu   ]].
           children go   extra-class DE   every-NUM-CL reason

           'I recorded every reason that some parents let their own children to have extra classes.'

As shown above, the lower scope reading of the QNP requires the head noun to move back to its base position. Therefore, I conclude that adjunct relatives can show reconstruction. In addition to this, Aoun and Li (2003) provide another piece of evidence involving *wh*-islands to illustrate that there is a relative operator inside the relative clauses, and adjunct relatives are derived by an operator variable construction. Consider the following examples of a relative clause embedded in a *wh*-question.

(189)   **Shuí** kàndào [[**shuí** shuō ∅ míngtiān   yào biáoyǎn de] yǎnyuán$_i$]?
       who   saw   who say   tomorrow will perform DE   actor
       Who saw the actor that who said would perform tomorrow?'

                                            (Aoun and Li, 2003:171)

(190)   ?? **Shuí** tīngdào-le [[nǐ   ∅ jiào **shuí**   xiū chē de] yuányīn]?
         who   hear-PERF   you   ask whom fix car DE   reason
       'Who heard the reason you asked whom to fix the car?'

                        (Aoun and Li, 2003:180; Huang, Li and Li, 2009:223)

In (189), there is a *wh*-interrogative contained in a relative construction and this relative construction is further embedded in another *wh*-question. Aoun and Li (2003)

have argued that it is possible for a relative clause to include a *wh*-interrogative when the relative clause is derived by Head movement because such a derivation does not create an island configuration. However, when the embedded relative clause is an adjunct relative which is derived by an operator movement, the sentence will be out because adjunct relativizations give rise to island effects. However, it turns out that it is in fact possible for a *wh*-word to appear inside a locative adjunct relative.

(191) **Shuí** xiǎng zhīdào [[wǒ tuījiàn **shuí** ∅ mǎi fángzi de] dìfāng]?
       who want know   I advise who   buy house DE place
       'Who want to know the place I advised whom to buy a house?'

Further, (189) and (190) are quite different structures. In (189), the *wh*-interrogative is in the matrix clause inside the bracket and embeds the relative operator. However, in (190), the positions of the *wh*-interrogative and the relative operator are switched. More specifically, it is the structural difference that leads to the different grammaticality profile between these examples.

In regard to the problems of Aoun and Li (2003) pointed out above, I have doubts about the validity of their evidence involving reconstruction and *wh*-questions and their proposed analyses for adjunct relativizations shown in (183). As a result, I will argue for an alternative analysis for adjunct relativizations. Before proceeding to the detail of the analysis, I will first provide another piece of evidence for illustrating that gapped adjunct relatives are structurally different from PP-in-situ adjunct relatives.

4.3.2 An Alternative Proposal for Adjunct Relativizations

First, I will discuss how adjunct relatives interact with *wh*-questions to support my idea of analysing gapped adjunct relatives via the Head Raising Analysis and PP-in-situ adjunct relatives via the Base-generated Analysis. Second, I will give my analysis for adjunct relatives containing a gap, which is the focus of this chapter, and PP-in-situ adjunct relatives in brief. The crucial difference between this two types of adjunct relative is that the former are derived under the head raising analysis and the latter are derived under base-genereation.

4.3.2.1 The phenomenon

My observations involve relative clauses in *wh*-questions. I will illustrate the phenomenon with normal relatives first. The phenomenon concerns the distributions of the *wh*-word *nǎ (gè/xiē)* [3] 'which CL(SG/PL)'. Consider below.

---

[3]The *wh*-word *nǎ (gè/xiē)* 'which textsccl(SG/PL)' has a same *Pinyin* with the demonstrative *nà* 'that' while they have difference in tone.

(192) **Argument RC containing a gap**

    a. [_{RC} Mary yāoqǐng de **nǎ-gè**   rén   ] huì xiān dào?

        Mary invite   DE **which**-SG person will earlier arrive

        'Which person that Mary invited will arrive first?'

    b. **Nǎ-gè**   [_{RC} Mary yāoqǐng de rén   ] huì xiàn dào?

        which-SG   Mary invite DE person will earlier arrive

        'Which person that Mary invited will arrive first?'

The relative clauses contained in (192) are argument relative clauses. It is possible to situate the *wh*-word *nǎ-gè* 'which CL(SG)' in a position inside a RC, as shown in (192a), or in a position that precedes the whole relative construction, as shown in (192b), when a normal relative involves. Furthermore, we observe that adjunct relatives that contains a gap pattern with argument relative clauses when taking a *wh*-interrogative.

(193) **Adjunct RC containing a gap**

    a. Nǐ qù-guò [_{RC} Mary shàng-guò xué de **nǎ-xiě**   chéngshì]?

        you go-PAST   Mary go-PAST   study DE **which**-PL city

        'Which cities that Mary went to study before have you been to.'

    b. Nǐ qù-guò **nǎ-xiē**   [_{RC} Mary shàng-guò xué de chéngshì]?

        you go-PAST **which**-PL   Mary go-PAST   study DE city

        'Which cities that Mary went to study before have you been to.'

However, when turning to adjunct relatives that contains a resumptive pronoun, only the second situation is possible, as shown in the following.

(194) **Adjunct RC containing a resumptive pronoun**

    a. * Nǐ yùdào-le   [_{RC} Mary [_{PP} hé tā] yuēhuì de **nǎ-gè**

        you encounter-PERF   Mary   with him meet DE **which**-SG

        rén   ]?

        person

    b. Nǐ yùdào-le   **nǎ-gè**   [_{RC} Mary [_{PP} hé tā] yuēhuì de

        you encounter-PERF **which**-SG   Mary   with him meet DE

        rén   ]?

        person

        'Which person with whom Mary met did you encounter?'

I assume that it is the structural distinctions between the relative constructions that contain a gap and the relative constructions that contain a resumptive pronoun lead to the different grammaticality among the examples ahove. Following my discussion in the last section, adjunct relatives that contain a resumptive pronoun are derived by

a base generation strategy. Relative clauses that contain a gap can take an internal *wh*-interrogative because the head noun of the relative clause is originated with a *wh*-element. The presence of the *wh*-word is a kind of reemergence of the *wh*-element.

(195) **Adjunct relative containing a gap**

a. [$\overbrace{\text{which}}^{Base-generated}$] Mary [t$_{PP}$] went to study DE [$\overbrace{\textbf{which } \textit{cities}}^{Derived}$]

b. [$\overbrace{\textbf{which}}^{Base-generated}$] Mary [t$_{PP}$] went to study DE [$\overbrace{\text{which } \textit{cities}}^{Derived}$]

(196) **Adjunct relative containing an in-situ PP**

[$\overbrace{\textbf{which}}^{Base-generated}$] Mary [$_{PP}$ with $\overbrace{\textit{him}}^{Base-generated}$] met DE $\overbrace{\textit{person}}^{Base-generated}$

Since a base-generated head noun is not originated with a *wh*-element, a base-generated relative construction cannot take an internal *wh*-interrogative. It is worth noting that the position that the *wh*-element occupies is different from the position for other determiners, e.g. demonstrative, number and classifier, which encode the restrictiveness function of relative clauses. The *wh*-element which is inside the relative DP appears closer than the other determiners to the head noun. The reason why we have different D positions can be showed by the facts that the head noun of a base-generated adjunct relative can have an internal determiner but it cannot have a internal *wh*-interrogative. Compare (197) with (194).

(197) Nǐ   kàndào-le [$_{RC}$ Mary [$_{PP}$ hé   tā   ] yuēhuì de **nà**   rén   ].
     you see-PERF   Mary   with him   meet   DE **that** person
   'You saw the person that Mary met with him.'

This shows there is a position for the D but this position cannot be occupied by a *wh*-word. Therefore, the *wh*-word *nǎ-gè* 'which' and the determiner *nà* 'that' are in two different positions.

Recall that the *wh*-word is the reemergence of the *wh*-operator. This observation illustrates that the relative head which can take a *wh*-interrogative is derived with a *wh*-element and the relative head which cannot take a *wh*-interrogative is base-generated. The head nouns of both argument relative clauses and adjunct relative clauses that contain a gap are derived. On this basis, I propose that the Head Raising Analysis can provide a better explanation for this phenomenon. In the HRA, a head noun is originated with a *wh*-word, and the head noun raises along with the *wh*-word to its surface position. Therefore, the derived structures of the relative clause that contains a gap in (192a) is as shown below. Repeated (192a) here.

(198) [$_{RC}$ Mary yāoqǐng de **nǎ-gè**   rén   ] huì xiān   dào?
       Mary invite   DE **which**-SG person   will earlier arrive
'Which person that Mary invited will arrive first?'

(199) **Derivation of the relative clause contained in (198)**

a. [$_{DP}$ [$_{IP}$ Mary invited t$_j$] [$_D$ DE [$_{CP}$ [$_{DP}$which person$_i$]$_j$ t$_{IP}$]]]
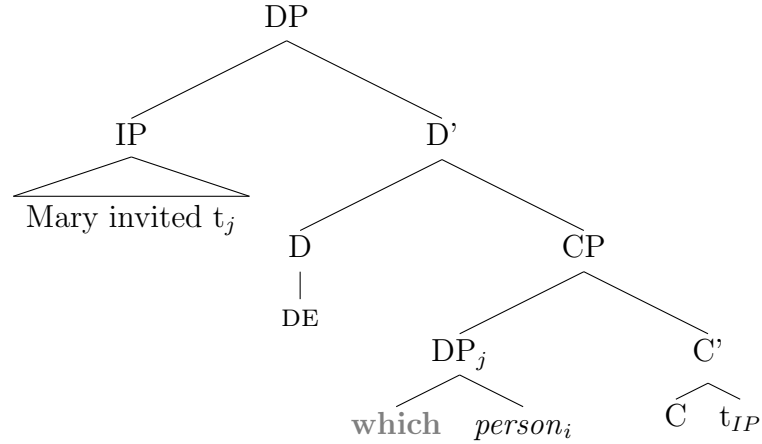
b. [$_{DP}$ [$_{IP}$ Mary invited t$_j$] [$_D$ DE [$_{CP}$ [$_{DP}$ [**which** person]]$_j$ t$_{IP}$]]]
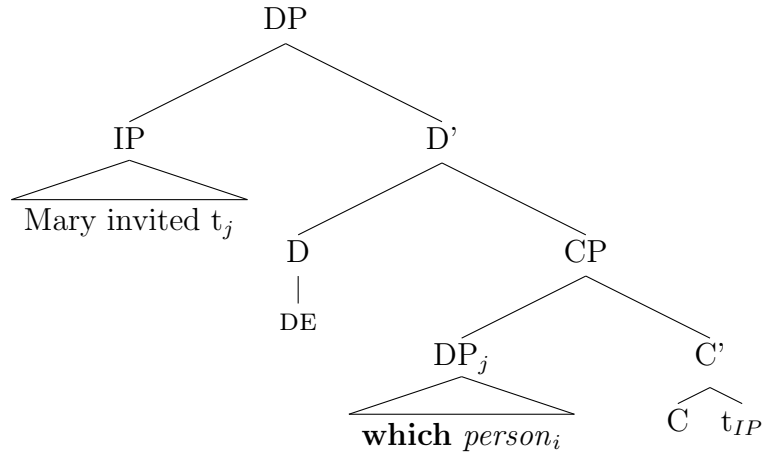
(199a) shows that the *wh*-operator is covert in the underlying structure of the relative clause. The *wh*-operator becomes overt and appears as a *wh*-word when standing for a *wh*-question, as shown in (199b). The external *wh*-word is in an extended DP projection which has no interaction with the structure of the relative construction. Therefore, external *wh*-word is acceptable for all kinds of relative clauses.

109

To conclude, the phenomenon discussed above illustrates that gapped adjunct relatives are distinct from adjunct relatives that contain a resumptive pronoun. I propose the head noun of this type of adjunct relative is base-generated because it is impossible for this kind of head noun to appear with a *wh*-element. The head noun of the relative clause that contains a gap, in contrast, is originated from the relative clause, which appear inside a DP headed by a *wh*-element. Given this supporting evidence, I argue that not only gapped relative clauses can be analysed in the HRA but also gapped adjunct relatives can be. In the next section, I give the analysis of gapped adjunct relatives in particular.

4.3.2.2 The Analyses

In this section, I will focus on the derivation of gapped adjunct relative clauses. Regarding the number of Ps that an adjunct relative can have, I will divide the analyses into two types of adjunct relativizations. The first type is the single P adjunct relativization, including prepositional phrases and postposition phrases. The second type is the dual P adjunct relativization, circumpositional phrases. Regarding the evaluations of the operator movement analysis and following the arguments that I gave in Section 4.4.1, I will use the head raising analysis (HRA) in my analysis of adjunct relatives. In addition to this, since Ps are not allowed to strand inside relative clauses, I will adopt Collins's (2007) null Ps analysis to motivate the disappearance of the pied-piped P on the surface.

4.3.2.2.1 Single P Adjunct Relativization

The first type of adjunct relative clause is those that only contain a preposition or a postposition. Following Ning's classification of adjunct relative clauses, LOCATION, TIME and INSTRUMENT adjunct relatives usually belong to this type. (193) is amended and repeated below to show the derivation of a single P adjunct relative.

(200) Nǐ qù-guò [$_{RC}$ Mary shàng-guò xué de nà-gè *chéngshì*].
       you go-PAST   Mary go-PAST   study DE that-CL city
       'You have been to the city where Mary went to study.'

The base form of the adjunct relative contained in (200) is as shown in (201).

(201) Mary [$_{PP}$ **zài** nà-gè *chéngshì*] shàng-guò xué.
       Mary   in that-CL city   go-PAST study
       'Mary went to study in that city.'

To derive the adjunct relative in (200) from (201), we need to have the following process:

- Step 1: $[_{CP}$ $[_{IP}$ Mary $[_{PP}$ IN **Op** *city*] went to study]]
- Step 2: $[_{CP}$ $[_{PP}$ IN **Op** *city* $]_g$ $[_{IP}$ Mary t$_g$ went to study]]
- Step 3: $[_{CP}$ $[_{PP}$ [**Op** *city* $]_j$ [I̶N̶ t$_j$]$]_g$ $[_{IP}$ Mary t$_g$ went to study]]
- Step 4: $[_{DP}$ $[_{IP}$ Mary t$_g$ went to study] $[_D$ DE $[_{CP}$ $[_{PP}$ [**Op** *city* $]_j$ [I̶N̶ t$_j$]$]_g$ t$_{IP}$]]]

First, the PP adjunct in the original position is moved to the Spec CP position and leaves a trace in its original position. After that, an external DP projection is merged to the CP.

(202) **From Step 1 to Step 2**

CP
PP — C'
in **Op** *city*
C — IP
Mary t$_{PP}$ went to study
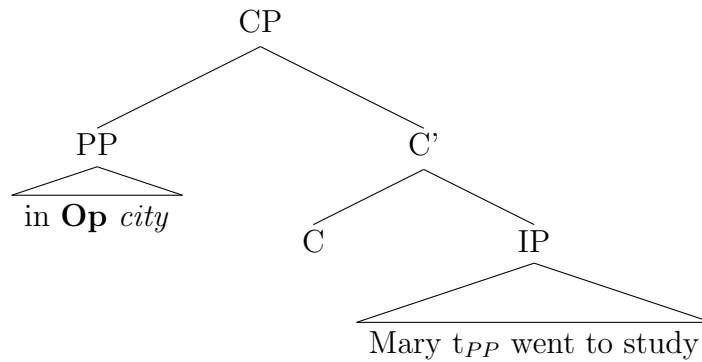
The first movement that happens in Step 3 is that the complement of the PP is moved to the Spec PP position, which causes deletion of the preposition *zài* 'in'. This is because a pied-piped P cannot be pronounced.

(203) **From Step 2 to Step 3**

CP
PP — C'
DP — P'
Op *city*
P — t$_{DP}$
i̶n̶
C — IP
Mary t$_{PP}$ went to study
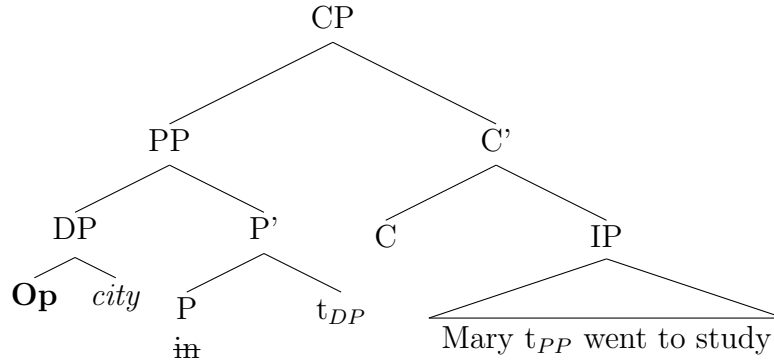
Relative clauses in Mandarin Chinese are prenominal on the surface. Therefore, the relative clause moves to the highest Spec DP, following Kayne (1994) and Simpson (2001, 2002).

111

(204) **From Step 3 to Step 4**

```
                        DP
              _____/    _____
            IP                      D'
    ____/    \____            ___/    \___
  Mary t_PP went to study    D            CP
                             |         __/  \__
                             DE      PP        C'
                                    /  \      /  \
                                 Op city    C    t_IP
```
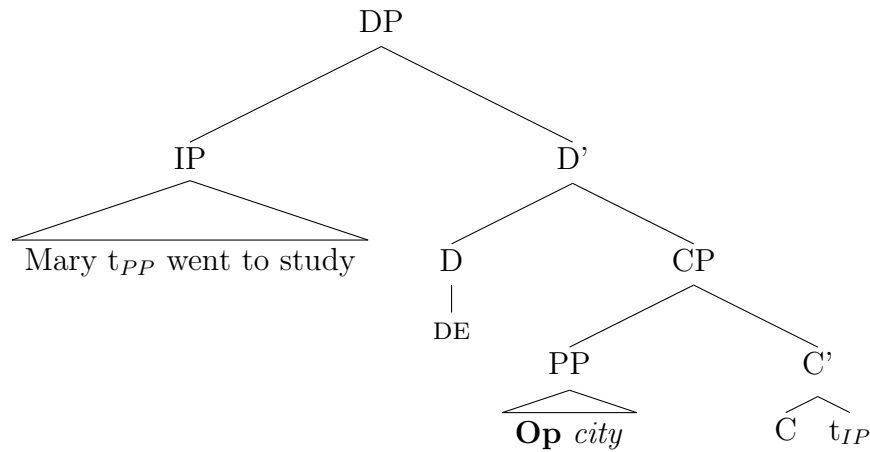
4.3.2.2.2 Dual Ps Adjunct Relativization

The second type of adjunct relative contains a more complex PP structure. This consists of two Ps, a preposition and a postposition. Most MANNER and REASON adjunct relatives use this the circumpositional structure. Before turning to the derivation, let me introduce two examples of CircumpPs that I will use to illustrate the analysis of MANNER and REASON adjunct relatives. I will use the circumpositional structure, $[_{PP}$ *yīn/wéi/yóu* REASON (*ér*) $]$, adopted from Chen (2002), W Li (2007) and Y Li (2008), to analyse reason adjunct relatives. Using the proposed CircumpPs structure, the relative clauses can have base forms roughly as shown in the following.

(205) REASON **Adjunct Relative**

Jǐngchá shìtú jiěxī $[_{RC}$ Mary táopǎo   de nà-gè   *yuányīn* $]$.
Police   try-to profile   Mary run-away DE that-CL reason

'The police tried to profile the reason why Mary ran away.'
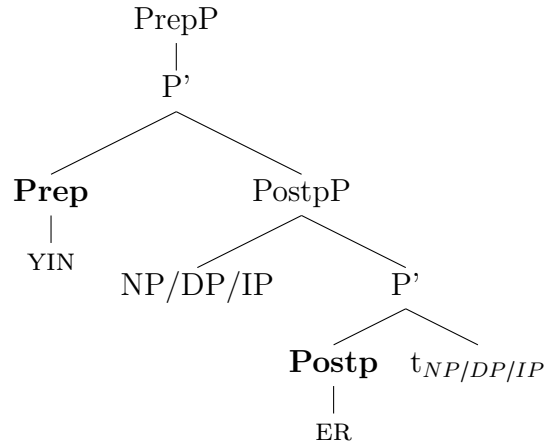
(206) Mary $[_{PP}$ **yīnwéi**   zhè-gè *yuányīn* **ér** $]$ táopǎo.
Mary   because-of this-CL reason   to   run-away
'Mary ran away because of this reason.'

The structure of the proposed CircumpP is depicted below.

(207) REASON **Adjunct CircumP Structure**

PrepP
|
P'
/   \
Prep   PostpP
| /   \
YIN   NP/DP/IP   P'
/   \
Postp $t_{NP/DP/IP}$
|
ER

As for manner adjunct relatives, I will use the circumpositional structure: $[_{PP}$ *yí* MANNER *lái* $]$.

(208) MANNER **Adjunct Relative**

Ann xuéxí $[_{RC}$ Mary táng gāngqín de nà-gè   *fāngfǎ* $]$.
Ann learn   Mary play piano   DE that-CL way

'Ann learn the way that Mary plays the piano.'

(209) Mary $[_{PP}$ **yǐ**   zhè-gè *fāngfǎ* **lái** $]$ tán gāngqín.
Mary   accord-to this-CL way   for   play piano
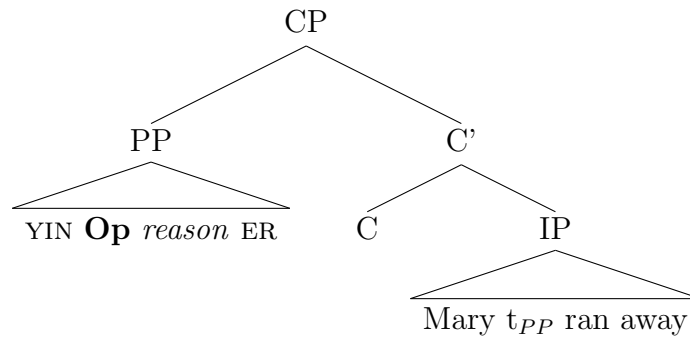
'Mary plays the piano in this way.'

Given this, we can continue to the derivation of the CircumpP adjunct relatives. I will use the reason adjunct relative contained in (205) to show the process of the derivation. To derive the relative clause, we need to have the following process:

- Step 1: $[_{CP}$ $[_{IP}$ Mary $[_{PP}$ YINWEI $[_{PP}$ $[_{DP}$ **Op** *reason* $]$ ER $]]$ ran away $]]$

- Step 2: $[_{CP}$ $[_{PP}$ YINWEI $[_{PP}$ $[_{DP}$ **Op** *reason* $]$ ER $]]_g$ $[_{IP}$ Mary t_g ran away $]]$

- Step 3: $[_{CP}$ $[_{PP}$ $[_{pP}$ $[_{DP}$ **Op** *reason* $]_j$ ~~ER~~$_{\overline{m}}$ $[$ t_j' $[$ t_m $[$ t_j $]]]]]_n$ ~~YINWEI~~ t_n $]_g$ $[_{IP}$ Mary t_g ran away $]]$

- Step 4: $[_{DP}$ $[_{IP}$ Mary t_g ran away $]$ $[_D$ DE $[_{CP}$ $[_{PP}$ $[_{pP}$ $[_{DP}$ **Op** *reason* $]_j$ ~~ER~~$_{\overline{m}}$ $[$ t_j' $[$ t_m $[$ t_j $]]]]]_n$ ~~YINWEI~~ t_n $]_g$ $[_{IP}$ Mary t_g ran away $]]]]$

The process of deriving a dual Ps adjunct relative is similar to the process I provided for the single P adjunct relative in the last section. The difference is that the dual Ps adjunct relative needs to undergo a more complex null Ps operation. Let's look through the process step by step. First, the CircumpP adjunct is moved to the Spec

CP position and leaves a trace in the lower position just as in the single P adjunct relative.

(210) **From Step 1 to Step 2**

```
                          CP
                  _____/ _____
                PP                C'
           ____/|\____          _/ \_
      YIN Op reason ER         C     IP
                                   __/|\__
                                Mary t_PP ran away
```

Since Chinese relative clauses cannot appear with any overt Ps, in Step 3, multiple movements are made to delete the pied-pied Ps. First, the DP within the pP is moved from its derived position to the specifier position of pP. The dash line shows the derivation of a PostpP that the noun moves from the complement position to the specifier position of PostpP. To enable P deletion, an extended projection pP is attached to the PostpP and the Postp is moved to its head position. The DP is moved to its specifier position and spelled out. The PostP *yin* gets deletion.

(211) **From Step 2 to Step 3**

```
                                    CP
                         _____/    _____
                       PP                         C'
             _____/    _____             _/ \_
           pP                       P'          C    IP
        __/  \__                  _/ \_            __/|\__
      DP        p'            Prep    t_pP      Mary t_PP ran away
     / \      _/ \_            |
  Op reason  p    PostP        YIN
             |   _/ \_        because
            ER      t_reason  PostP
            to       _/ \_
                  Postp   t_reason
                  t_ER
```

114
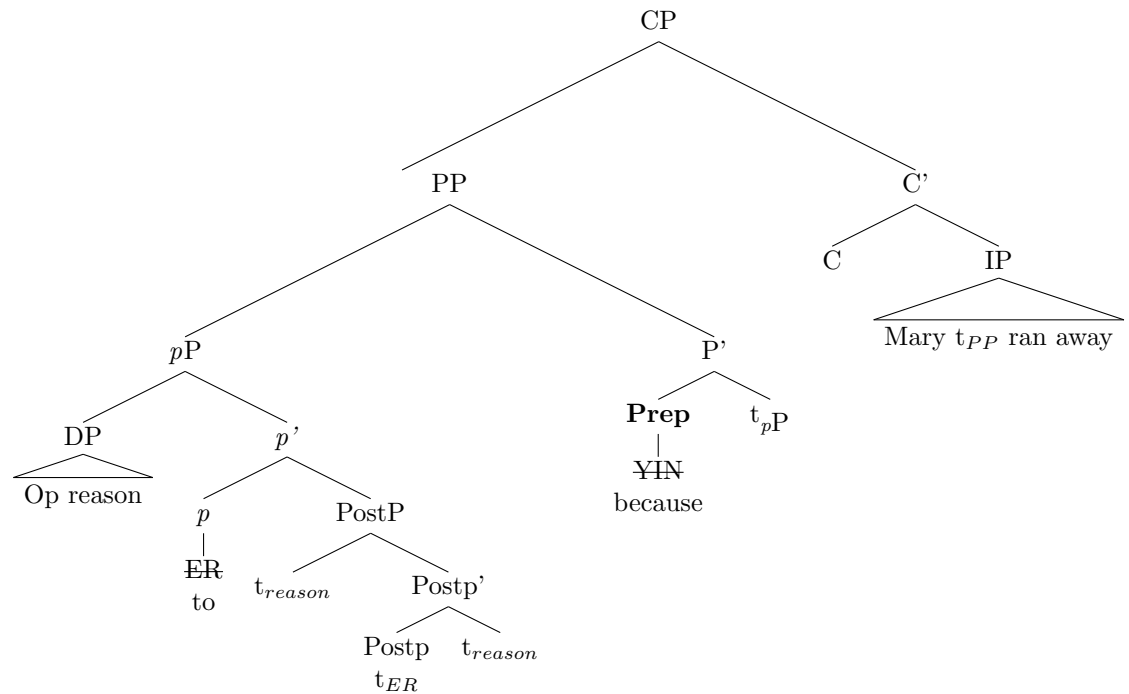
Finally, we need to move the whole IP to the highest Spec DP position to fix the word order of a head-final relative construction.

(212) **From Step 3 to Step 4**

```
                        DP
              ┌──────────┴──────────┐
             IP                     D'
        ┌─────┴─────┐          ┌─────┴─────┐
    Mary t_PP ran away        D           CP
                              │       ┌────┴────┐
                             DE       PP        C'
                                   ┌───┴───┐   ┌─┴─┐
                                  Op reason   C  t_IP
```
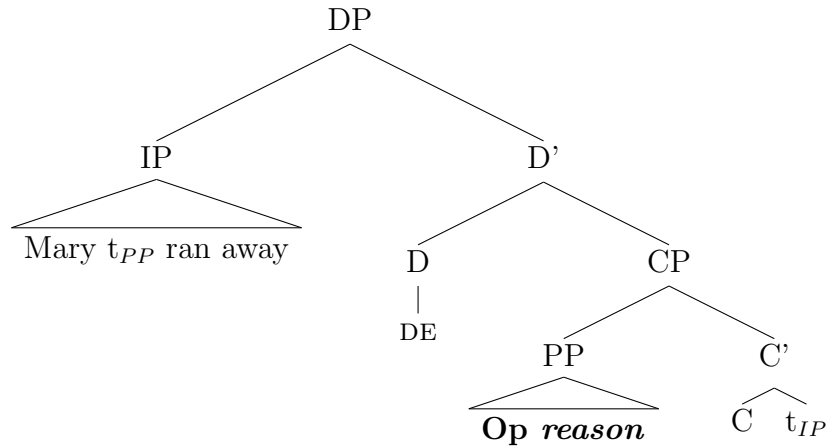
4.3.2.3 Conclusion and Consequence

Following my arguments and analyses above, I conclude that adjunct relatives that appear with a gap and adjunct relatives that appear with an in-situ PP are two different structures. The gapped type of adjunct relatives is derived by the Head Raising Analysis, while the PP-in-situ type of adjunct relative are derived by non-movement analysis: both the relative operator and the head noun are base-generated. In addition, movement of a relative operator would violate the prohibition on P-stranding in Mandarin, therefore, the relative operator is analysed as base-generated in Spec CP. As a result, I predict that two different types of adjunct relatives have different island sensitivity because the binding relationship which is created by movement cannot cross islands while the relationship which is created by co-indexation can.

(213) **PP-in-situ adjunct relative**

a. [[t$_j$ [$_{PP}$ zài nàr$_i$] chīfàn de rén$_j$] dōu hěn yǒu lǐmào   de nà-gè
           in there dine   DE people   all   very have manner DE that-CL
   cāntīng$_i$] jīntiān méi kāimén.
   restaurant   today not open

   'The restaurant where [[the people that all have a good manner] dined]
   did not open today.'

b. [[t$_j$ [$_{PP}$ yǐ   cǐ$_i$ lái] xué   gāngqín de rén$_j$] dōu hěn
           accord-to this for   learn piano   DE people   all   very
   chénggōng de nà-gè   fāngfǎ$_i$] xīyǐn-le   Lisa de zhùyì.
   successful DE that-CL method   attract-PERF Lisa DE attention

   'The method which [[the people that are all very successful] learned to
   play piano with] attracts Lisa's attention.'

(214) **Adjunct relative containing a gap**

a. $^{???}$ [t$_j$ [$_{PP}$ P t$_i$] chīfàn de rén$_j$] dōu hěn yǒu lǐmào   de nà-gè
                         dine   DE people   all   very have manner DE that-CL
   cāntīng$_i$] jīntiān méi kāimén.
   restaurant   today not open

   Intended. 'The restaurant where [[the people that all have a good manner
   ] dined] did not open today.'

b. $^{???}$ [[t$_j$ [$_{PP}$ P t$_i$] xué   gāngqín de rén$_j$] dōu hěn chénggōng de
                          learn piano   DE people   all   very successful DE
   nà-gè   fāngfǎ$_i$] xīyǐn-le   Lisa de zhùyì.
   that-CL method   attract-PERF Lisa DE attention

   Intended. 'The method which [[the people that are all very successful]
   learned to play piano with] attracts Lisa's attention.'

From the examples above, we can see that the PP-in-situ adjunct relative is not
sensitive to island constraints while the gapped adjunct relative is. If the resumptive
pronoun is the remnant of movement (that is, it is a spelled out trace, or an element
stranded by movement), relativizing the complement of the PP would violate the
Adjunct Island Constraint and the Subject Island Constraint. In (214), after deleting
the PP adjunct, it is impossible to relativise the NP *canting* 'restaurant' with the
embedded relative clause. This is because the NP *canting* 'restaurant' which is the
complement of a P is derived by movement rather than by based-generation.

4.4   Chapter Summary

At the beginning of this chapter, I examined the syntactic features of PPs in Mandarin Chinese. Starting with the classification of PPs including PrepPs, PostpPs and CircumpPs, I argued that preverbal PPs are adjuncts while postverbal PPs are complements of the VPs. This is because (a) a PP attached to a VP as an adjunct can only be placed in a preverbal position; (b) the P of a postverbal PP can sometimes incorporate into the verb, suggesting the PP is a complement of that verb; (c) the P of a preverbal PP can be reduplicated in the A-*not*-A pattern while the P of a postverbal PP cannot. Furthermore, I reviewed the ban on P-stranding in relativization and topicalization in Mandarin Chinese and argued that not only the preverbal PPs disallow P-stranding but it is also disallowed by postverbal PPs. It follows that there is a general ban on P-stranding in Mandarin. In addition to this, I illustrated a phenomenon in Mandarin Chinese where certain Ps may be omitted and adopted Collins's (2007) approach to explain this phenomenon.

Apart from the syntax of PPs, I also reviewed the previous analyses of adjunct relatives in Mandarin Chinese by Ning (1993) and Aoun and Li (2003). Both argue that adjunct relatives are derived by operator movement and that the head nouns of the relative clauses are base-generated. I argued that these accounts face problems in the following respects: (a) the treatment of the disappearance of prepositions; (b) binding relationships; (c) the interactions of *wh*-questions with adjunct relatives.

Given this, I argued that gapped adjunct relatives are structurally different from PP-in-situ adjunct relatives, and that the head noun of a gapped relative is generated together with a *wh* operator motivating this by a difference in how gapped and non-gapped relatives behave in *wh*-questions. Following this, I gave an alternative analysis to gapped adjunct relativization which is in line with the HRA of Kayne (1994), Simpson (2001, 2002) and the null P analysis of Collins (2007). I concluded that PP-in-situ adjunct relatives are derived by a non-movement operation accounting for their insensitivity to islands. In contrast, gapped adjunct relatives, derived by the head raising operation, are, as expected, sensitive to islands.

Chapter 5

Gapless Relative Constructions

5.1 Introduction

Gapless relative clauses have been argued to be a special type of relative clause and have been used as a strong evidence for a non-movement analysis of relativization in several Asian languages, such as Japanese (Fukui and Takano, 2000), Korean, as well as Mandarin Chinese (Yang, 2015). However, the question of whether the gapless relative is a true relative clause has been raised by many scholars, such as Huang, Li and Li (2009), Ning (1993), Aoun and Li (2003), and Cheng and Sybesma (2005) and Zhang (2015). Some have treated gapless relatives in the same way as other relative clauses, assigning them a uniform structure (Ning, 1993). Others have argued that gapless relative clauses are to be understood as involving quite distinct, non-relative, constructions. For instance, Aoun and Li (2003) and Huang, Li and Li (2009) treat gapless relatives as noun complement clauses. This chapter evaluates different approaches to gapless relatives. These discussions will provide a basis for my alternative proposal.

The alternative proposal regards there are two types of gapless relatives, namely, *adjunct*-like gapless relatives and resultative gapless relatives. Both of them are true relative constructions. We treat the former type of gapless relatives the same as manner/instrument adjunct relatives by showing three similar behaviour between them. We propose that only the latter type of gapless relatives are "gapless" relatives, which involve a serial verb structure and contain a light verb. The previous analyses may ignore there are more than one type of gapless relatives. Apart from this, the reason why gapless relatives have been treated as other type of construction rather than relatives is that there is no "gap" inside the prenominal clause. In my analysis, I show that the gap inside the gapless relatives is covered by a kind of light element, namely, a light verb, and the relative head is the object of this light verb.

This chapter contains three main sections. In the first, I introduce some surface differences between gapless relatives and normal relative clauses. In the second, I review a range of current analyses of gapless relatives, and the final part of the chapter provides my own analysis and argues that it is empirically superior to these.

5.2 What Makes Gapless Relatives Similar to/Different from Normal Relatives

Gapless relative clauses in Mandarin Chinese were first observed and analysed as a special kind of relative construction by Tang (1979), and this discussion was developed by a number of linguists including Ning (1993), Huang, Li and Li (1984, 2009, 2016), Aoun and Li (2003), Cheng and Sybesma (2005), Zhang (2008), Tsai (2008), Zhang (2015) among others. Mandarin Chinese gapless relatives look very similar to normal relative clauses, which is one of the reasons people regard them as relative clauses.

(215) **Normal Relative Clauses**

    a. Zhè jiù   shì [$_{RC}$ [Mary tīngdào] de nà-zhǒng [$_{Head}$ shēngyīn]].
       this exactly be   Mary hear   DE that-CL   sound
       'This is the sound that Mary heard.'

    b. Zhè jiù   shì [$_{RC}$ [Mary wéndào] de nà-zhǒng [$_{Head}$ qìwèi]].
       this exactly be   Mary smell   DE that-CL   smell
       'This is the smell that Mary smelled.'

(216) **Gapless Relative Clauses**

    a. Zhè jiù   shì [$_{RC}$ [mǎ   cǎi zài dìmiànshàng   ] de nà-zhǒng [$_{Head}$
       this exactly be   horse step on ground-side-over   DE that-CL
       shēngyīn]].
       sound
       'This is the sound of horses' stepping on the ground.'

    b. Zhè jiù   shì [$_{RC}$ [sùliào ránshāo] de nà-zhǒng [$_{Head}$ qìwèi]].
       this exactly be   plastic burn   DE that-CL   smell
       'This is the smell of plastics' burning. '

There are some obvious similarities between these two constructions. The first is that the order between an adnominal and the head noun that the adnominal is going to modify is the same. The second is the particle *de*, which appears in the position between the adnominal and the head noun.

However, nominal gapless relatives have also been treated as other kinds of nominal constructions, rather than relative clauses. This approach is partially motivated by similarities between translations of gapless relatives in languages like English, where the relative is best translated via a nominal, with possessive type morphology, as in *the sound of John's singing*. For instance, Zhang (2008) has analysed gapless relative constructions as a relational construction. This idea is inspired by their similarity to possessives, which also involve a prenominal modifier headed by *de*. Consider the examples of possessives in the following.

(217)   a. [$_{Possessive}$ Hú jiàoshòu **de** jiārén] jīntiān méi lái.
           Hu professor DE family   today not come

       '**Professor Hu's family** did not come today.'

     b. [$_{Possessive}$ Shǒujī **de** língshēng] huànxǐng-le nà-gè   háizi.
           mobile DE ring   rouse-PERF that-CL boy

       '**The ring of his mobile phone** roused that boy.'

The boldface possessive in (217) denotes a kind of relational connection between the possessor and the possessee respectively. There are four kinds of relational connection including kinship, part-whole/body-part, ownership and the subject-property relationship, according to Niu (2015). Two of these relationships can be found in the examples. In (217a), *jiārén* 'family' is a kinship noun denoting a kinship relationships in the proper noun *Professor Hú*. In (217b), *língshēng* 'ring' is a part-whole noun denoting a part-whole relation with the noun *shǒujī* 'mobile'. Zhang (2008) has argued that there is a similar relational connection between the head noun and the body of a gapless relative.

According to Zhang, the head noun of a gapless relative has to be a relational noun. Consider a further example of the subject-property relationship below.

(218)   Tā de xìnggé   hěn wēnshùn.
      he DE character very tame

      'His character is very tame.'   (Niu, 2015:74)

The noun *xìnggé* 'character' is regarded as a property-denoting noun in Niu (2015). Zhang's proposal for gapless relatives is in line with this type of possessive. Consider the gapless relative below to illustrate.

(219)   Tā chùlǐ   shìqín de xiàolǜ   hěn gāo.
      he deal-with things DE efficiency very high

      'The efficiency of his dealing with things is very high.'

                                 (revised from Tsai, 2008:118)

The head noun *xiàolǜ* 'efficiency' can be regarded as a property-denoting noun. Because of the tight relationship between a head noun and its relative clause, Zhang further argues that a gapless relative clause is obligatory to the head noun that it modifies. Additionally, Zhang assumes that it may be impossible for a relational head noun to be modified by multiple gapless relative clauses. In my discussion of the properties of Mandarin Chinese gapless relatives below, I will propose an alternative approach to the optionality of gapless relatives and why the head noun of a gapless relative is unable to be modified by multiple gapless relatives simultaneously.

Noting the gerund structure of English translations of Mandarin gapless relatives and the inability of long-distance dependency with gapless relative constructions, Huang, Li and Li (1984, 2009) and Aoun and Li (2003) have argued that Mandarin gapless relatives are not typical relative clauses but are noun complement clauses. Compare (216a), repeated as (220), with (221).

(220) **Gapless Relative Clause**

Zhè jiù   shì [[má căi zài dìmiànshàng   ] de nà-zhŏng [$_N$ shēngyīn
this exactly be   horse step on ground-side-over   DE that-CL   sound
]].

'This is the sound of horses' stepping on the ground.'

(221) **Noun Complement Clause**

Zhè jiù   shìi [[mă bù chī píngguŏ] de nà-gè [$_N$ yáoyán]].
this exactly be   horse not eat apple   DE that-CL rumor

'This is the rumor that horses do not eat apples.'

The adnominals in (220) and (221) are prenominal and clausal. In addition, neither clausal adnominal contains a gap, at least on the surface. In other words, the left-attached clauses in (220) and (221) are complete, that is, the clauses can appear without the head noun. An important reason why gapless relative clauses are treated as noun complement clauses rather than as true relative clauses is that a relative clause cannot appear without the head noun that it modifies. However, the ability of a clause to appear independently of a head noun is not always a valid diagnostic to check if a clause is true relative clause in Mandarin Chinese. For example, an adjunct relative clause which has a gap standing for a pied-piped PP is absolutely fine to be interpreted independently of the head noun that it modifies. Consider the examples of English and Mandarin Chinese.

(222) LOCATIVE Adjunct Relative
This is the [university [where/in which [$_{IP}$ **Lisa studied Linguistics** t **for four years**]]].

(223) a. LOCATIVE Adjunct Relative

Zhè jiù   shìi nà-suǒ [[$_{IP}$ **Lisa** t **xué-le   Yǔyánxué sì   nián**]
this exactly be that-CL   Lisa   study-PRF Linguistics four years
de dàxué   ].
DE university

'This is the university where Lisa studied Linguistics for four years.'

b. INSTRUMENTAL Adjunct Relative

Zhè jiù   shìi nà-gēn [[$_{IP}$ **Lisa** t **dǎ   lǎoshǔ**] de gùnzi].
this exactly be that-CL   Lisa   beat mouse   DE stick

'This is the stick which Lisa beat a mouse with.'

c. REASON Adjunct Relative

Zhè jiù   shìi [[$_{IP}$ **Lisa** t **líkāi xuéxiào**] de yuányīn].
this exactly be   Lisa   leave school   DE reason

'This is the reason why Lisa left school.'

In the examples of adjunct relative clauses demonstrated above, the boldface IP of every sentence is the body of the relative construction which excludes a relative pronoun (as shown in the example of an English adjunct relative in (222)). All of these IPs can appear independently of their head nouns. This shows that the inability to appear independently of a head noun cannot be treated as a common feature of all relative clauses. Therefore, it is improper to regard the gapless relative clauses as noun complement clauses rather than true relative clauses based on the observation that it is grammatical for the gapless relative clauses to appear independently of their head nouns. This is because a gapless relative construction can contain a gap in a way that makes itself "gapless" on the surface while "gapped" underlyingly, which is not the case for a noun complement construction.

In the discussion of gapless relative clauses below, I will argue that Mandarin gapless relative clauses are true relative clauses, more specifically, they are adjunct relative clauses. This proposal is inspired by Ning's (1993) VP adjunct analysis of gapless relative clauses. To support my idea, I will further point out some relevant behaviour of gapless relative clauses. Most behaviours have been pointed out to be distinct from the behaviour of normal relative clauses. However, these behaviours of gapless relatives are shared by adjunct relatives. Unlike Ning (1993), I will propose

that the gapless relatives in the literature can be classified into two types. More specifically, there are two ways to analyse Mandarin gapless relatives: (i) as adjunct relative clauses; (ii) as resultative argument relative clauses which have a clausal adjunct and a covert(deleted) main verb. Most gapless relatives can only be analysed just one way, depending on the semantics of the head nouns. A few gapless relatives, the head nouns of which are semantically ambiguous, can be analysed either way.

5.3 Analyses of Gapless Relative Clauses

5.3.1 Ning's (1993) VP Adjunct Analysis

Ning (1993) has provided a uniform analysis for Mandarin Chinese adjunct relative clauses and gapless relative clauses, which proposes that the former (normal adjunct relatives) contain a PP adjunct gap and the latter (gapless relatives) contain a VP adjunct gap. Both gapped elements are adjuncts originally modifying the main verb in the relative clause. Consider the examples below to see how these two types of adjuncts appear in sentences after and before being relativized.

(224) **Normal PP Adjunct Relative**

    a. Zhè jiù   shìi [māo zhuō lǎoshǔ de chuáng].
       this exactly be   cat catch mouse DE bed

       'This is the bed where the cat caught the mouse.'

    b. Māo [$_{PP\ Adjunct}$ zài chuáng shàng] zhuō lǎoshǔ.
       cat   on bed   above catch mouse

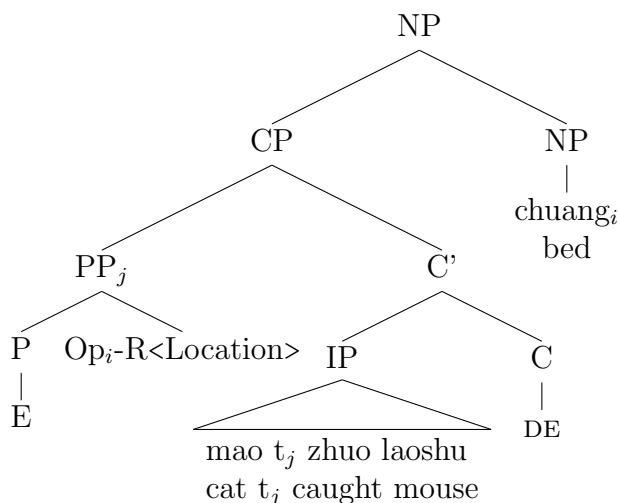   'The cat caught the mouse on the bed.'

(225) **Gapless VP Adjunct Relative**

    a. Zhè jiù   shìi [Lisa xiě   shū de qián   ].
       this exactly be   Lisa write book DE money

       'This is the money that Lisa got from writing books.'

    b. Lisa xiě   shū [$_{VP\ Adjunct}$ zhèng qián   ].
       Lisa write book   earn money

       'Lisa made money by writing books.'

Recall what I have reviewed in Chapter 3 and 4, that Ning adopts the operator movement analysis for Mandarin relative clauses. Before getting into further discussion of particular examples of gapless relatives, we will briefly recap some important features of how HEA has been applied to analyse adjunct relatives by Ning (1993). One crucial feature is that Ning applies a morphological mechanism of converting a single form covert adjunct relative operator which has the effect that a single-word relative

operator is contained by an unspecified preposition and a restricted operator. This single-word relative operator is similar to English adjunct relative operators, for example, *where* which is an assemblage of the pied-piped structure [P + *wh*-word], e.g. *in which, with which, under which*. In addition, this restricted operator is able to bind a variable in the basic position. The canonical structure of adjunct relatives is repeated below:

(226) [$_{NP}$ [$_{CP}$ [$_{PP}$ [$_P$ **E**] **Op$_i$-R<Location>**]$_j$ [$_{C'}$ [$_{IP}$ Māo t$_j$ zhuō lǎoshǔ] [$_C$
                                                                                        cat   catch mouse

de]]] chuáng$_i$]
DE   bed

'the bed where the cat caught the mouse'

```
                              NP
                         /          \
                       CP            NP
                    /      \          |
                PP_j        C'     chuang_i
               /    \      /   \     bed
              P  Op_i-R<Location>  C
              |        IP          |
              E      /    \        DE
                mao t_j zhuo laoshu
                cat t_j caught mouse
```

In order to show the relationship between an adjunct PP and a relative clause and between an adjunct relative operator and its preceding preposition, we use this version of the derivation of adjunct relativization in our future discussion. Since there are no apparently missing thematic arguments inside gapless relative clauses and adjunct relative clauses, Ning extends his proposed derivation of adjunct relatives to gapless relatives. This implies that the head noun of the gapless relative can be reanalysed as the argument of an adjunct inside the relative clause. However, gapless relativizations cannot employ exactly the same converting mechanism that is used in adjunct relativizations because the single form operator is only available in limited numbers of domains: only LOCATIVE, TIME, INSTRUMENT, MANNER and REASON adjunct PP fall under this conversion mechanism. According to Ning, gapless relatives cannot be categorized under these domains. Although we cannot adopt the restricted adjunct relative operator for gapless relativizations, Ning points out that the converting mechanism can be applied to gapless relativizations by redefining
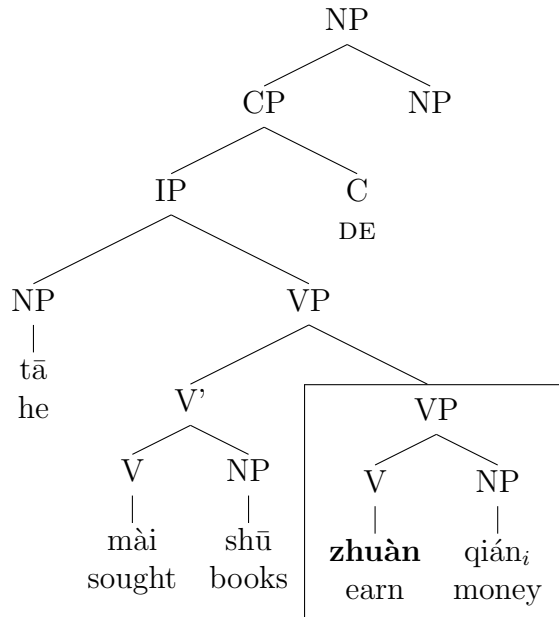
the restriction of the converting mechanism once a shared property can be found to restrict the relative operator. The difference between applying this mechanism in adjunct relativizations and gapless relativizations is that the operators appearing in adjunct relativizations are subject to particular semantic domains while the operator in gapless relativizations is restricted by a designated head (a nominated verb). Accordingly, Ning's proposed structure for gapless relative clauses is as in (227).

(227) $[_{NP}$ $[_{CP}$ $[_{VP}$ $[_V$ **e** $]$ **Op**$_i$ $]_j$ $[_{C'}$ $[_{IP}$ Tā mài shū $[_{VP}$ e $]_j$ $]$ $[_C$ de $]]]$ qián$_i$ $]$
he sell book   DE   money

‘the money that he got from selling books’   (Ning, 1993:138)
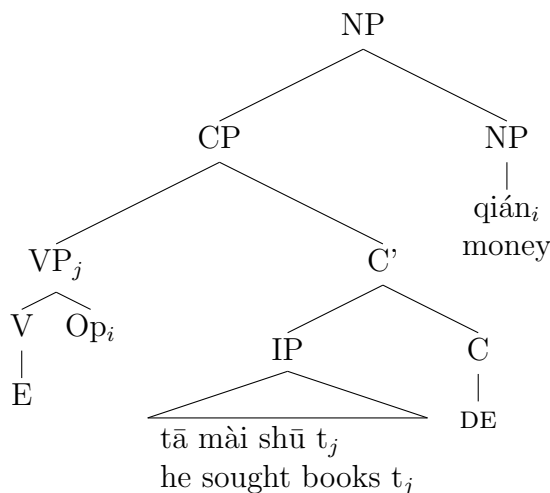
As shown in (227), the head noun *qian* ‘money’ is co-indexed with a covert operator that appears inside a VP. Ning proposes that this VP acts as an adjunct to modify the main VP inside the gapless relative just like PPs in adjunct relativizations. Additionally, this VP adjunct is interpreted as involving an abstract verb which has the meaning of *dédào* ‘obtain’ in general. This proposed VP is effectively a resultative VP adjunct which modifies the main verb. Thus, (227) can be reanalysed as in (228) with a single-form relative operator which is a combination of a verb and an operator. More examples from Ning (1993) to show how this nominated verb is used to reanalyse gapless relativizations are illustrated in (229).

(228) $[_{IP}$ Tā $[_{VP}$ $[_{V'}$ mài shū $[_{VP}$ $[_V$ **zhuàn** $]$ qián $]]]]$.
he   sell book   earn   money

‘he earned money by selling books’   (revised from Ning, 1993:137)

125

```
                                    NP
                          ┌──────────┴──────────┐
                         CP                     NP
                   ┌──────┴──────┐
                  IP             C
                                 DE
           ┌───────┴────────┐
          NP                VP
           │         ┌───────┴────────┐
          tā        V'              ┌──VP──┐
          he    ┌───┴───┐          V      NP
                V      NP          │       │
                │       │        zhuàn   qiáni
              mài      shū        earn   money
            sought    books
```

(229)   a.   i.   Tā chàng gē   de shēngyīn
                   he sing   song DE sound

                   'the voice/sound he (produced) from singing the song'

             ii.   [$_{IP}$ Tā [$_{VP}$ [$_{V'}$ chàng gē   [$_{VP}$ [$_V$ **fāchū**   ] shēngyīn]]]].
                   he   sing song   produce sound

                   'He produced the sound while sing songs.'

        b.   i.   Tā jiù   rén   de huíbào
                  he save people DE reward

                  'the reward he (obtained) from saving people'

             ii.   [$_{IP}$ Tā [$_{VP}$ [$_{V'}$ jiù   rén   [$_{VP}$ [$_V$ **dédào**] huíbào]]]].
                   he   save people   get   reward

                   'He saved the people to get the reward.'

The tree diagram in (228) shows that the inserted VP *zhuàn qián* 'earn money' appears as an adjunct next to the matrix VP *mài shū* 'sell books'. Further, not only the verb *zhuàn* 'earn' in (228) but also verbs *fāchū* 'produce' and *dédào* 'get' in (229a-ii) and (229b-ii) respectively can express the designated meaning of *dédào* 'obtain' according to Ning's argument. Ning, therefore, uses an empty verb as *e* to substitute all these verbs, as shown in (227).

Now we have sketched out Ning's (1993) uniform proposal for gapless and adjunct relative clauses, let's consider some problems with it. The first problem is the resultative relationship between the existing VP inside a gapless relative clause and

the proposed VP adjunct. According to the proposed underlying structure that Ning provides for the gapless relative, the head noun of a gapless relative clause is the result of the event described by the relative clause in some way. Therefore, the variable, the representation of the head noun, can be reconstructed into the gapless relative by an '*obtain*-kind' verb whose role is to introduces the resultative relationship. However, not all gapless relativizations have a resultative connection between their head nouns and the VPs inside the relative clauses. That means it is inappropriate to assign this specific relationship for the gapless relativizations. Consider examples from Tang (1979) and Tsai (2008) that fail to have a resultative expression in the following.

(230) **Resultative Expression Impossible:**

　　a. Zhè jiù　　shì [$_{NP/DP}$ [Lisa chùlǐ　　shìqín] de **xiàolǜ**　].
　　　this exactly be　　　　　Lisa deal-with things　DE efficiency

　　　'This is the efficiency of Lisa's dealing with things.'

　　b. Zhè jiù　　shì [$_{NP/DP}$ [Lisa mǎi shū　] de **yùsuàn**].
　　　this exactly be　　　　　Lisa buy book　DE budget

　　　'This is the budget of Lisa's buying books.'　　　　　(Tsai, 2008:118)

　　c. Zhè jiù　　shì [$_{NP/DP}$ [fēijī　yùnshū　huòwù] de **sùdù**].
　　　this exactly be　　　　　plane transport goods　DE speed

　　　'This is the speed of planes' transporting goods.'

(revised from Tang, 1979:243)

The head nouns in the examples above do not have a resultative connection with their corresponding gapless relative clause. In (230a), it is inappropriate to regard the *xiàolǜ* 'efficiency' to be a result or outcome of *Lisa's dealing things*. In (230b), we also cannot regard the head noun *yùsuàn* 'budget' to be an outcome of *buying books*. Lastly, the head noun *sudu* 'speed' cannot be an outcome of *a plane's transporting goods*. Therefore, we cannot reanalyse the head noun of this sort of gapless relative as the argument of a resultative VP adjunct. Instead, these nouns can relate to their preceding relative clauses in another way depending on their meanings. For instance, the head nouns *xiàolǜ* 'efficiency' and *sùdù* 'speed', in fact, can be the conditions/properties/manners of a person's doing something, and the head noun *yùsuàn* 'budget', or *qián* 'money' can be considered as instruments for a person to do something. There are more gapless relatives that can be analysed in the same way, as illustrated below:

(231)　a. Zhè jiù　　shì [$_{DP}$ [Ann zhùshì Mary] de nà-zhǒng mùguāng].
　　　　this exactly be　　　Ann stare　Mary　DE that-CL　sight

　　　　'This is the the sight of Ann's staring at Mary.'

　　b. Zhè jiù　　shì [$_{DP}$ [Ann miànduì shībài] de nà-zhǒng tàidù　].
　　　　this exactly be　　　Ann face　　failure　DE that-CL　attitude

'This is the the attitude of Ann's facing failure.'

    c. Zhè jiù   shì [$_{DP}$ [Ann pīpíng Mary] de nà-zhǒng yǔqì].
       this exactly be   Ann criticize Mary DE that-CL   mood

      'This is the the mood of Ann's criticizing Mary.'

    d. Zhè jiù   shì [$_{DP}$ [Ann píngshěn ànjiàn   ] de nà-gè   biāozhǔn].
       this exactly be   Ann judge   law-case DE that-CL criteria

      'This is the criteria of Ann's judging law cases.'

The gapless relatives in the examples do not have a resultative reading. Recall that we have mentioned that the head nouns of these gapless relativizations can be regarded as conditions, properties, manners or instruments of the events expressed by the relative clauses. Therefore, I propose to treat this kind of GRC as involving a normal PP adjunct rather than a resultative VP adjunct. Following this, there is no need to analyse these gapless relatives via a serial verb structure which Ning uses in his analysis. For this sort of gapless relative, we can just adopt the analysis used for normal adjunct relativizations. Consider below an example with an explicit circumpP-structure [*yǐ* + Head + (*lái*)] that we proposed for the *adjunct*-like kind of gapless relatives.

(232)   Lisa [$_{PP}$ **yǐ**   **zhè-bǐ yùsuàn (lái)**] mǎi shū.
       Lisa   with this-CL budget for   buy book

      'Lisa bought books with this budget.'

In Section 5.4, we will provide more evidence to show how this kind of gapless relative behaves in a way that is consistent with the behaviour of manner/instrument adjunct relatives. I therefore suggest that GRCs are actually not a uniform phenomenon: they involve two distinct structures, depending on whether they are resultative or not.

The second problem of Ning's proposal, even if we accept that it is along the right lines for the resultative gapless relatives, concerns the identity of the inserted VP. According to Ning, this inserted VP appears as a postverbal resultative adjunct to the matrix VP inside the gapless relative clause. Ning derives this postverbal resultative adjunct following the standard syntax of adjunct relatives. However, there is some evidence showing that this inserted VP in Ning's proposed underlying structure for gapless relatives should be analysed as the main VP of the clause rather than an adjunct.

The first piece of evidence is that the verb inside a resultative gapless relative clause cannot have aspectual particles, e.g. the perfect tense marker *le* and the past tense marker *guò*, while the inserted verb can, as shown in (233).

(233) * Zhè jiù   shì [[Mary **tán-*le*/*guò*** gāngqín] de nà-zhǒng shēngyīn].
         this exactly be   Mary play-PRF/PST piano   DE that-CL   sound

         Intended. 'This is the sound that Mary played the piano had.'

Recall that the relative clause contained in (233) is derived from (234), according to Ning's analysis.

(234) [$_{IP}$ Mary [$_{VP}$ [$_{V'}$ tán gāngqín [$_{VP}$ [$_{V}$ fāchū   ] shēngyīn]]]].
         Mary   play piano   produce   sound

         'Mary produced sound by playing the piano.'

Based on this structure, we observe that it is still unacceptable for the verb *tán* 'play' to take the tense markers before undergoing relativization.

(235) * [$_{IP}$ Mary [$_{VP}$ [$_{V'}$ **tán-*le*/*guò***   gāngqín [$_{VP}$ [$_{V}$ fāchū   ] shēngyīn]]]].
         Mary   play-PRF/PST piano   produce   sound

         Intended. 'Mary produced sound by playing the piano before.'

Cheng and Sybesma (2005) also point out that it is not acceptable to have aspectual markers in gapless relatives. Consider the following example.

(236) $^{??}$ Zhè jiù   shì [$_{NP}$ [Mary **chàng-*le*** gē   ] de nà-zhǒng shēngyīn]
         this exactly be   Mary sing-PRF song DE that-CL   voice

         Intended. 'the voice that Mary had when he sang (the) song before.'

I will return to why (236) is marked with double-question as opposed to asterisk below. Cheng and Sybesma (2005) have claimed a different reason for the ungrammaticality of (236) namely, that is gapless relatives have to be interpreted generically. However, the use of aspectual particles is not the only way to achieve a temporal reading. Zhang (2015) points out that a gapless relative can have a temporal expression by adding a temporal adverb.

(237) [[Lǎnglǎng **nà   tiān** tán gāngqín de] shēngyīn] hěn bàng.
         Langlang that day play piano   DE sound   very good

         'The sound of Langlang's playing the piano that day was very good.'

Therefore, it is problematic to claim that gapless relatives have to be interpreted generically because they cannot have temporal readings by applying tense markers. I assume that it is the dual underlying structures that trigger the ungrammaticality of (236): it is prohibited to tense mark the verb when (236) is in a serial verb structure; it is acceptable to do so when (236) is as an adjunct relative.

The reason why I have marked (236) with a double-question mark is that I observe that it is less unacceptable for (236) to have tense marks compared with (233). This is because (236) is ambiguous while (233) is not. Remember that I propose that there

are three types of gapless relatives. Ambiguous gapless relatives can be analysed in two different ways. As for unambiguous gapless relatives, they can only be analysed in one way. For instance, (233) can only be analysed in a serial verb structure which we can only tense mark the main verb, according to our discussion. In contrast, for (236), aside from the serial verbs structure, it can also be analysed as an adjunct relative. Based on our previous discussion, (238) is one of the underlying structures of (236).

(238) [$_{IP}$ Mary [$_{V'}$ [$_{PP}$ yǐ   nà-zhǒng shēngyīn (lái)] [$_{V'}$ **chàng-guò** gē   ]]].
          Mary   with that-CL   voice   for   sing-PST   song
        'Mary sang songs with that voice.'

As an adjunct relative, the verb *chàng* 'sing' can be marked by the past tense marker *guò*. Regarding ambiguous gapless relatives, to confirm if they can have aspectual markers, we need to confirm which structure a gapless relative has in the first place.

The other piece of evidence for showing that the overt verb inside a gapless relative clause is not the main verb of the clause is that the verb cannot be reduplicated in the A-*not*-A pattern used in Mandarin for Polar Questions. In Ning's putative base structure, the abstract verb corresponds to a resultative verb in a structure like:

(239) Mary chàng gē   fāchū   shēngyīn.
        Mary sing   song produce sound
        'Mary produced sound by singing songs.'

In such structures, the resultative verb is the main verb, as shown by *A-not-A* questions. This is because only the main verb of a clause can be reduplicated in Polar Questions (Paul, 2008).

(240)   a. * Mary **chàng-méi-chàng** gē   fāchù   shēngyīn?
                Mary sing-not-sing   song produce sound
              Intended. 'Did Mary produce sound by singing songs?'
         b. Mary chàng gē   **fā-méi-fāchū**   shēngyīn?
              Mary sing   song produce-not-produce sound
              'Did Mary produce sound by singing songs?'

This contrasting examples shows that the main verb in a resultative gapless relative is *fāchū*. So this would suggest that, if a GRC is resultative with a null verb, it's the null verb that would be the main verb, rather than being an adjunct. These two arguments suggest that the overt verb inside this type of gapless relative is not the matrix verb. The matrix verb is the abstract resultative verb which is covert on the surface. In Section 5.4.2, I will further argue that this type of gapless relatives has a reduced serial verb structure with a deleted matrix verb.

To sum up, there are two problems I have raised for Ning's analysis of gapless relativizations. The first one is that the generalization that there is a resultative relationship between the head noun and the VP of a gapless relative clause does not always hold. The head nouns of some gapless relativizations cannot be analysed by such a resultative relation. Further, it is not necessary to analyse these gapless relativizations in this way. I have pointed out that these gapless relatives in fact involve a condition/manner/property adjunct PP. The head noun of these gapless relatives appears as the complement of an adjunct PP which modify the VP inside the gapless relative. Therefore, these gapless relatives can be treated the same as normal adjunct relatives.

The second problem concerns the status of the two VPs in Ning's proposed underlying structure for resultative gapless relatives. I have given the evidence which suggests that the overt verb inside a resultative gapless relative clause is not the main verb of the clause, but rather than the covert abstract verb is.

5.3.2 Aoun and Li's (2003) Proposal: Gapless Relatives are Noun Complement Clauses

The idea of treating gapless relative clauses as noun complement clauses first appears in Aoun and Li (2003) and has been further adopted by Huang, Li and Li (2009) among others. Aoun and Li argue that gapless relative clauses are not relative clauses but are rather noun complement clauses. Their first argument is that the English translations of gapless relatives are in the form of English gerunds. The second is that the head noun of a gapless relative clause does not show the long distance dependencies typical of relative clauses. Aoun and Li conclude that gapless relatives are not true relative clauses.

Consider the examples of gapless relative clauses given in Aoun and Li (the allocated brackets are based on Aoun and Li's HRA of Mandarin Chinese relative clauses).

(241) a. Zhè jiù   shì [$_{NP}$ [$_{CP}$ tā chàng-gē de] shēngyīn   ].
           this exactly be   he sing-song DE   voice/sound
           'This is the voice/sound of his sing***ing*** song.'
       b. Zhè jiù   shì [$_{NP}$ [$_{CP}$ tā zuò-è   de] hòuguǒ   ].
           this exactly be   he do-evil DE   consequence
           'This is the consequence of his evil do***ing***.'
       c. Zhè jiù   shì [$_{NP}$ [$_{CP}$ tā kǎo-shì   de] jiéguǒ].
           this exactly be   he take-exam DE   result

131

'This is the result of his exam-tak***ing***.'

As shown above, the English interpretation of each example has the form [$_{NP}$ Head [$_{PP}$ *of* XP(pronoun + gerund)]]. The gerund containing PPs in English bear, according to Aoun and Li, a relation to their head nouns which is parallel to the relation that the "gapless" CPs bear to their head nouns in Mandarin. Therefore, regarding the English interpretations of gapless relatives, Aoun and Li argue that the gapless relative clauses are complement clauses to the head nouns.

In addition to this, Aoun and Li further point out that the head noun of a gapless relative cannot relate to the gapless relative clause when the gapless relative clause is itself embedded in the other clause. Recall that the head noun of a relative clause can show long-distance dependencies. No matter how far away the head noun moves, it still can relate to the embedded relative clause.

(242)   Zhè jiù   shì [$_{DP}$ nà-běn [$_{CP}$ Emma shuō [$_{CP}$ Eric rènwéi [$_{CP}$ Ann
        this exactly be   that-CL   Emma say   Eric think   Ann
        xiāngxìn [$_{CP}$ Kelly xiě-le   liǎngnián t_i de]]]] shū$_i$].
        believe   Kelly write-PERF two-years   DE   book

        'This is the book that Emma says that Eric thinks that Ann believes that Kelly has written for two years.'

Aoun and Li, however, show that the head nouns of gapless relative clauses cannot be moved as freely as the head nouns of normal relative clauses. Consider the examples they provide.

(243)   a. Zhè jiù   shì [[wǒ xǐhuān [tā chàng gē   ] de] shēngyīn].
           this exactly be   I   like   he sing   song DE sound
           'This is the sound of my liking him singing.' (≠'the voice of his singing')

      b. Zhè jiù   shì [[wǒ tīngshuō [tā zuò-è   ] de] hòuguǒ   ].
           this exactly be   I   hear   he do-bad DE consequence
           'This is the consequence of my hearing him do evil.' (≠'the consequence of his doing evil')

Compared with their originals in (241a) and (241b), which have a single CP layer, it is impossible for the head nouns *shēngyīn* 'sound' and *hòuguǒ* 'consequence' to relate to the gapless relative when an extra CP layer has been added to the original CP. Therefore, as shown in the translations in (243a) and (243b), the interpretations cannot be 'the sound of his singing that I like' and 'the consequence of his doing evil

that I heard'. Based on the English gerundive interpretations and the lack of long-distance dependencies, Aoun and Li conclude that gapless relatives are complement clauses rather than true relative clauses.

5.3.2.1 Evidence against Aoun and Li's Complementation Proposal

5.3.2.1.1 Coordination Constructions

The first piece of evidence that suggests that Aoun and Li's conclusion is incorrect involves coordination constructions and the conjunctions used in these constructions in Mandarin Chinese. Coordination is one of the well-known diagnostic that we use to determine constituent structure. Zhang (2008) first adopts coordination as one of the criteria to distinguish gapless relatives from normal relatives and noun complements. However, Tsai's discussion brings out the important aspects of the data more clearly, so I focus on these here. Consider the following.

(244) Zhāngsān tóngshí   wéndào [[*Gapless RC* māmā chǎo cài   de] gēn
       Zhangsan simultaneously smell   Mom fry   vegetable DE   and
       [*Normal RC* tā zuì   huáiniàn de] wèidào].
               he most miss   DE smell

       'Zhangsan simultaneously smells the smell of Mom's frying vegetables and also what he misses.'   (Tsai, 2008:112)

   The grammaticality of (244) implies that gapless relative clauses are structurally consistent with normal relative clauses. In (244), the elements in coordination are overtly clausal, and we can take the following to be the underlying structure of (244).

(245) **The Underlying Structure of (244)**

       Zhāngsān tóngshí   wéndào [[*GRC* māmā chǎo cài   de ~~wèidào~~]
       Zhangsan simultaneously smell   Mom fry   vegetable DE
       gēn [*NRC* tā zuì   huáiniàn de ~~wèidào~~] wèidào].
       and   he most miss   DE   smell

As shown above, the first coordinated element is the remnant of a gapless RC and its head noun has been deleted or moved. I use the same pattern that we have used for conjoining gapless relatives and normal relatives to see if normal relatives can conjoin with noun complement clauses. Consider an example of coordination of a normal relative clause and a noun complement clause below.

(246) ??? Emma gàosù-le   wǒ [[*Normal RC* nǐ   tīngshuō de] hé [*NCC* Ann
        Emma tell-PERF me   you hear   DE and   Ann
       cízhí   de] yáoyán].
       quit-her-job DE   rumor

Intended. 'Emma told me the rumor that you heard and that Ann quit her job.'

It is impossible to delete/move the head noun of the relative clause when it coordinates with a noun complement clause, which implies that relative clauses cannot coordinate with noun complement clauses. The coordination evidence then suggests that gapless relatives are structurally dissimilar to complement clauses, and are more closely related to normal relative clauses. In the next subsection, we will give more evidence showing that the gapless relative construction differs from the noun complement construction.

5.3.2.1.2 Comparative Constructions

An additional piece of evidence showing that gapless relative constructions are syntactically distinct from noun complement constructions involves comparative constructions. Tsai (2008) has noted that gapless relative clauses and noun complements show different deletion properties when interacting with comparatives. He firstly shows that both gapless relative clauses and noun complement clauses can delete the duplicate elements in the second clause, as shown below.

(247)   a. **Gapless relative construction**

[**Zhāngsān** zuòbì de xiàchǎng] hěn cǎn, [**Lǐsì**
  Zhangsan cheat DE result   very miserable   Lisi
~~zuòbì de xiàchǎng~~] yě shì/yíyàng.
cheat DE result   also is/the same

'The result of Zhangsan's cheating is miserable, and so is Lisi's.'

   b. **Noun complement construction**

[**Zhāngsān** zuòbì de yáoyán] lìng rén jīngyà, [**Lǐsì**
  Zhangsan cheat DE rumor   make people surprise   Lisi
~~zuòbì de yáoyán~~] yě shì/yíyàng.
cheat DE rumor   also is/the same

'The rumor of Zhangsan's cheating is surprising, and the rumor of Lisi's cheating is too.'

(Tsai, 2008:119-120)

In (247), there is no problem to deleting the repeated elements *zuòbì de xiàchǎng* 'the result of cheating' and *zuòbì de yáoyán* 'the rumor of cheating' in the second clauses of both cases. However, we will see that it is impossible to do so when noun complement clauses appear in comparatives. This will provide another argument that gapless relatives are more akin to relative clauses than they are to noun complement

clauses.

Before getting into the details, I will briefly introduce how comparatives work in Mandarin Chinese. There are several significant properties of Mandarin Chinese comparatives which are different from English comparatives. In Mandarin, there is no adjectival inflection to show comparative degree. Further, the APs in comparatives follows the comparative conjunct sequence rather than appearing in between two compared objects. In addition to these, compared with the position of 'than' in English comparatives, *bǐ* appears in a position between the two comparees in Mandarin comparatives[1]. Consider the following examples, one with a predicative adjective and one with an adverbial comparative. [2].

(248)   a.   John bǐ   Mary [$_{AP}$ gāo].
        John than Mary   tall
        'John is taller than Mary.'

        b.   John bǐ   Mary [$_{VP}$ pǎo de kuài].
        John than Mary   run DE fast
        'John runs faster than Mary.'

Tsai observes that it is possible to delete the duplicate elements in the standard position when two compared objects are gapless relatives [3] (see (249a)). By contrast, it is impossible to do so when the compared objects are noun complements (see (249b)).

(249)   a.   **Gapless relative construction**

        [**Zhāngsān** zuòbì de xiàchǎng] bǐ   [**Lǐsì** ~~zuòbì de xiàchǎng~~]
          Zhangsan   cheat DE result   than   Lisi
        cǎn.
        miserable

        'The result of Zhangsan's cheating is more miserable than Lisi's.'

        b.   **Noun complement construction**

        * [**Zhāngsān** zuòbì de yáoyán] bǐ   [**Lǐsì** ~~zuòbì de yáoyán~~] gèng
          Zhangsan   cheat DE rumor   than   Lisi   more
        lìng   rén   jīngyà.
        make people surprise

---

[1] In Mandarin Chinese, *bi* is a common particle used in comparatives. Apart from *bi*, there are some other particles that can also be used to introduce a comparative, for instance, *yú*, *guò*, or appearing without any particle.

[2] The particle *de* in (248b) is different from the one we use in relativizations having a different written character

[3] Following Erlewine (2018), in a comparative, we call the elements preceding *bi target* and the elements following *bi standard*.

Intended. 'The rumor of Zhangsan's cheating is more surprising than the rumor of Lisi's cheating.'

<div align="right">(Tsai, 2008:120)</div>

In (249a), the duplicated content *zuòbì de yáoyán* 'the result of cheating' in the second relative clause can be deleted without changing the meaning of the sentence. However, a similar deletion cannot be applied to (249b). Tsai does not provide an explanation for this phenomenon, but it clearly shows that, again, GRCs behave unlike noun complement clauses. In the next chapter, we will focus on this phenomenon and provide more data to show that there is a structural difference that triggers it.

5.3.2.1.3   Long Distance Dependency

Unbound dependency constructions (henceforth UDC) have been regarded as a diagnostic to distinguish relative clauses from noun complement clauses in Cha (1998). More specifically, this construction can be used to diagnose if a noun phrase can long distance move from its original position, which is one of relativization's properties. Aoun and Li point out that Mandarin gapless relatives cannot show long distance dependency, as we discussed around (243). However, in Cha (1998), unbound dependency constructions are used to prove that gapless relatives are more likely to be real relative clauses rather than noun complement clauses in Korean. Consider the Korean example in the following.

(250)   [[sayngsen-i tha-n-ta-ko   ] *Susie-ka   mit-nun   ] [NP
        fish-NOM   burn-PRES-DECL-COMP   Susie-NOM believe-ADN

naymsay]
smell

'the smell which Susie believes comes from fish burning'

Furthermore, a similar generalization can also be made in Mandarin Chinese. Zhou (2012) observes that Mandarin Chinese gapless relatives can also show long distance dependencies. Let's have a look at the examples cited from Zhou.

(251)   a. **Gapless relative clause**

[*tā suǒ xiāngxìn de* [Zhāngsān xiě   shū   de]] [NP bàochóu]
he SUO believe   DE   Zhangsan write book DE   reward

'the reward of Zhangsan's writing the book which he believes. (he believes the reward)'

b. **Noun complement clause**

[*tā suǒ xiāngxìn de* [wǒmén dǎ   qiú de]] [NP tíyì   ]
he SUO believe   DE   we   paly ball DE   proposal

'the proposal that he believes that we play the ball'

(Zhou, 2012:50)

It is worth noting that the order between a relative clause and an inserted clause to a noun phrase are different in these two languages. In Korean, the position of an additional clause is between the relative clause and the noun phrase. In Mandarin Chinese, the additional clause is attached to the left of the relative clause directly, as shown above. Also in these examples, Zhou uses a special particle, SUO[4], which is used for object relativizations, in the inserted clauses.

Zhou's (2012) explanations for this pair of examples are that the head noun *reward* in (251a) can still relate to the relative clause *Zhangsan's writing the book* after embedding the relative clause into the other clause *he believes*. In (251b), however, the relation between the head noun and the complement clause is interrupted by the added clause. Zhou's observations are opposite to Aoun and Li's (2003) opinion which argues that a head noun cannot relate to a gapless relative clause when the relative clause is embedded inside the other clause. In other words, Mandarin gapless relativizations can show long distance dependency.

I agree with Zhou's final argument that Mandarin gapless relatives, just like real relative clauses, can show long distance dependencies. However, the ways that Zhou (2012) illustrates the phenomenon is problematic. It seems that she mixes up the concepts of stacking and embedding. Let's have a look at the following pair of examples, including an example repeated from Zhou (2012).

(252) a. [*tā suǒ xiāngxìn de* [Zhāngsān xiě shū de]] [$_{NP}$ bàochóu]
     he SUO believe DE Zhangsan write book DE reward

    'the reward of Zhangsan's writing the book which he believes'

  b. [*tā xiāngxìn* [Zhāngsān xiě shū de]] [$_{NP}$ bàochóu]
     he believe Zhangsan write book DE reward

    'the reward of Zhangsan's writing the book which he believes'

The gapless relatives are embedded in the other clauses in both examples. The difference between them is that Zhou's example cannot show a long distance dependency because it involves a stacking structure of relativizations, as indicated by the *de* particle after *xiāngxìn*, believe. The second example is a real gapless embedding structure which patterns with the examples in Aoun and Li (2003). Therefore, I will use examples patterning with (252b) in our future discussion. In addition to this, I find

---

[4]SUO is a particle used for nominalization in Mandarin. The simple composition of SUO and a transitive verb can express a nominal meaning, e.g. *suo jian* 'the XP that I see' , *suo wen* 'the event that I hear', *suo ai* 'the person that I love'. These compositions are regarded as the ellipsis form of the following structure: NP + SUO + V + DE + NP.

that Aoun and Li's examples, which used for claiming that gapless relatives cannot show long distance dependencies, involve issues of bridge verbs. Recall that the matrix predicates appearing in Aoun and Li's examples are *xǐhuān* 'like', *tīngshuō* 'hear' etc. which I assume to be non-bridge verbs. It is widely accepted that non-bridge verbs tend to forbid the extraction of their complements (Erteschik-Shir, 1973, Tsai, 1994). Therefore, I will use more compelling and less controversial bridge verbs, such as *yǐwéi* 'think/believe', *cāicè* 'guess', *shuō* 'say', which I adopt from Tsai (1994), in our examples to illustrate the facts, as shown below.

(253) **Gapless relative clause**

    a. Zhè jiù   shì nà-zhǒng [*Zhāngsān yǐwéi* [mǎ   cǎi-zài
        this exactly be that-CL   Zhangsan think   horse step-on
        dìmiànshàng   de]] [$_{NP}$ shēngyīn].
        ground-surface DE   sound

        'This is the sound that Zhangsan thinks that horses have when stepping on the ground.'

    b. Zhè jiù   shì nà-zhǒng [*Zhāngsān cāicè* [Lǐsì kǎoshì   de]] [$_{NP}$
        this exactly be that-CL   Zhangsan guess   Lisi examine *de*
        chéngjì].
        result

        'This is the result that Zhangsan guesses that Lisi have after examination.'

(254) **Noun complement clause**

    a. Zhè jiù   shì [*Zhāngsān yǐwéi* [Lǐsì chídào de]] [$_{NP}$ yáoyán].
        this exactly be   Zhangsan think   Lisi late   DE   rumor

        'This is the rumor that Zhangsan thinks Lisi was late.'

    b. Zhè jiù   shì [*Zhāngsān cāicè* [Lǐsì zuòbì de]] [$_{NP}$ shìshí].
        this exactly be   Zhangsan guess   Lisi cheat DE   fact

        'This is the fact that Zhangsan guesses Lisi has cheated.'

In (253a) and (253b), the head nouns *shēngyīn* 'sound' and *chéngjì* 'result' can relate to the embedded gapless relative clauses 'horses step on the ground' and 'Lisi examined'. By contrast, in (254a) and (254b), the head nouns *yáoyán* 'rumor' and *shìshí* 'fact' cannot relate to the embedded complement clauses 'Lisi was late' and 'Lisi has cheated'. Rather, the sentence have the meaning that what was rumoured what that Zhangsan thinks that Lisi was late, and what is the fact is that Zhangsan guesses Lisi has cheated. I conclude from this, once again, that GRCs behave unlike noun complement clauses: GRCs and normal relatives can establish a long distance relationship, across bridge verbs, between the head noun and a more deeply embedded clause. Noun complement clauses do not do this.

5.3.2.1.4   Summary

In this subsection, we have presented Aoun and Li's (2003) complementation view of Mandarin Chinese gapless relatives. With respect to the ability to manifest long distance dependencies, they suggest treating gapless relativizations as complementations. I find that it is not the gapless relatives that make those examples to be ungrammatical. It is the predicates used in the examples, which are identified as non-bridge verbs, that obstruct the extraction of their complement lead to the unacceptable results. Furthermore, we have presented two further types of constructions, coordinations and comparatives, to show that gapless relative constructions do not pattern with noun complement clauses but do pattern with relative clauses.

5.3.3   Cheng and Sybesma's (2005) proposal

It is well-known that there is a modification relation between a relative clause and a head noun, therefore, we apply the rule *predicate modification* when combining a modifier, which can be clausal or phrasal, and the expression being modified (Heim and Kratzer, 1998). Cheng and Sybesma (2005) propose that there is a predication relation rather than a modification relation between a head noun and a gapless relative clause. In other words, they treat normal relativizations and gapless relativizations as two different structures. Generally, Cheng and Sybesma's analysis of relativizations is based on an operator variable construction. The particle *de* is treated as a predicate abstractor and the gap as a variable bound by *de*. They call the bound variable of argumental relative clauses an argument variable, and that of adjunct relative clauses an adjunct variable. For gapless relative clauses, they propose that the bound variable is an event variable. In the following discussion, I will show why they propose an event variable for gapless relatives and argue against their overall approach.

There are two important properties of gapless relativizations that Cheng and Sybesma point out in their discussion. The first one is that the verb contained in a gapless relative clause must be an activity verb rather than a stative/adjectival verb. Note that this is true for the verbs contained in the gapless relatives in our previous discussion, such as *chàng$_V$ gē$_N$* 'sing songs', *kǎo$_V$ yú$_N$* 'roast fish', *pǎobù$_V$* 'run', *zuòbì$_V$* 'cheat' etc. Compare the following examples of gapless relative clauses with active verb and non-active verb.

(255)   a. **Gapless RC with active verb**

[Zhāngsān tiàowǔ de] zīshì
Zhangsan dance   DE   posture

'the posture of Zhangsan's dancing'

   b. **Gapless RC with stative verb**

?? [tā hěn gāo de] yǐngzi
    he very tall DE   shadow

Intended: 'the shadow reflecting that he is tall'

(Cheng and Sybesma, 2005:71)

As shown in (255b), it is illicit for a clause, which contains a stative/adjectival predi-
cate, e.g. *gāo* 'tall', to be a gapless relative clause. Based on this, the second proposed
property of gapless relatives is that the describing activity in the gapless relative clause
must be generic, which is true for gapless relatives but not normal gapped relatives.
That means a gapless relative cannot be temporally bound. Consider the following
examples.

(256)   a. **Gapless relative clause**

* [tā chàng-*guò* nà-shǒu gē   de] shēngyīn
   he sing-EXP   that-CL song DE   voice

Intended: 'the voice that he had when he sang the song before'

   b. **Gapped relative clause**

[tā chàng-*guò* de] nà-shǒu gē
  he sing-EXP   DE   that-CL song

'the song that he sang before'   (Cheng and Sybesma, 2005:72)

GUO is an experiential aspectual marker usually following verbs to express past activi-
ties. In normal gapped relative clauses, an event variable is bound by an aspectual
operator which allows the event to relate to some spatial location. Therefore, in
(256b), the event *he sings* is bound by the experiential aspectual operator *guò*, and
the gap is bound by the operator *de*. However, this is not the case for (256a). The
event in the gapless relative clause cannot be expressed temporally because it cannot
host an aspectual marker. Since the event in the gapless relative lacks an aspectual
operator to be bound, Cheng and Sybesma argue that it is the operator *de* that binds
the event variable in the gapless relative. There is no gap in a gapless relative clause,
therefore the operator *de* lacks a normal argument variable to be bound. Remember
that Cheng and Sybesma propose that the operator *de* and the gap in the gapped
relative clause can be interpreted as predicate abstraction, therefore, *de* can bind the

argument variable.

According to Cheng and Sybesma's arguments, the semantic type of a normal relative clause is $< e, t >$ and the type of a gapless relative clause is $< \varepsilon, t >$[5]. This indicates that a gapless relative clause looks for an event variable or a property of events. Recall that Cheng and Sybesma propose that a gapless relativization involves a predication relation rather than a modification relation. Therefore, a gapless relative clause requires an event variable.

However, Cheng and Sybesma's claim appears to be too strong. For instance, it is not appropriate to treat a noun like *xiàolǜ* 'efficiency', the head of the gapless relative clause in (257) as involving an event variable. Thus, for cases involving this kind of head noun, the proposed operator variable constructions have no appropriate variable to bind. Let's have a look at the following example and the tree structure for the gapless relative.

(257)   Zhāngsān hěn xīnshǎng [$_{DP}$ [Lǐsì jiějué shìqíng de] [$_{NP}$ xiàolǜ   ]].
        Zhangsan very admire   Lisi solve matter DE   efficiency

        'Zhangsan admired the efficiency of Lisi's solving problems very much.'
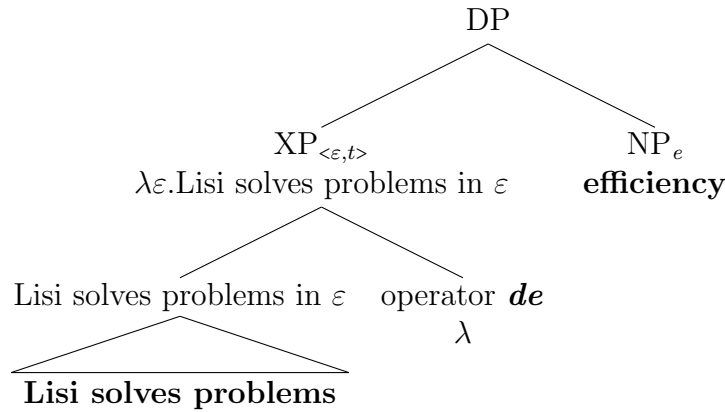
As shown in the tree above, the operator *de* and the relative clause 'Lisi solves problems' are composed into a predicate which can predicate of the head noun *xiaolü* 'efficiency'. The event of *solving* is bound by *de*, since Cheng and Sybesma argues that there is no temporal operator in the gapless relative. However, it is not possible to treat *efficiency*-type of head nouns as event variables.

---

[5]ε represents for the type of events.

A second problem of Cheng and Sybesma's proposal is about the interpretation of the verbs included in gapless relative clauses. Recall that Cheng and Sybesma claim that these verbs cannot take any aspectual markers because they propose that gapless relatives can only be interpreted as generic. However, Zhang (2015) points out, as I noted above in section 5.3.1, that aspectual markers are not the only way for gapless relative clauses to achieve a temporal reading. Temporal adverbs, e.g. *nà tiān* 'that day', *zuótiān* 'yesterday', *shàngyícì* 'last time', *jīngcháng* 'often', can be used to achieve a temporal interpretation.

(258) [[Lǎnglǎng **nà tiān** tán gāngqín de] shēngyīn] hěn bàng.
       Langlang that day play piano   DE   sound   very good
       'The sound of Langlang's playing the piano that day was very good.'

(Zhang, 2015:223)

Zhang argues that the unacceptability of aspectual markers in gapless relative clauses is not explained by the idea that the gapless relative clauses can only be generic. It is rather because their syntactic structures do not allow them to have aspectual markers. Therefore, gapless relative clauses do not have to be generic semantically. In addition to this, Zhang argues that missing a bound variable may not trigger the illicitness of the aspectual operator. An aspectual operator is illicit because the semantic type of the operator does not meet the type requirement of the head nouns of a gapless relative. I will provide more details of Zhang's (2015) argument for gapless relativizations in the next section.

5.3.4   Zhang's (2015) proposal: Gapless Relative Clauses as Reduced Relative Clauses

Zhang (2015) provides a new approach to Mandarin gapless relatives. Her idea is to treat gapless relatives as a third type of relative construction. Zhang argues, on the one hand, that gapless relatives are true relatives, but on the other hand, gapless relatives are different from the other two types of relative clauses. Zhang disagrees with Ning's (1993) uniform analysis of adjunct relative clauses and gapless relative clauses, Aoun and Li's (2003) complementation proposal, and Cheng and Sybesma's (2005) argument that gapless relatives can only be generic. I have illustrated some of Zhang's objections to these analyses in the preceding sections.

Zhang proposes that gapless relatives have fewer projections than other normal relative clauses and are a kind of reduced relative. According to Zhang, a gapless relative clause lacks a AspP layer and only has a *v*P layer. Since it lacks the AspP

projection, the verb inside the gapless relative cannot be marked by aspectual particles. Now, let's proceed to Zhang's (2015) approach of gapless relatives first and continue to the core of Zhang's analysis in Section 5.3.3.2

5.3.4.1   Two Features of Gapless Relative Clauses

The first feature that Zhang (2015) draws attention to is that the subject of a gapless relative clause can be marked with the genitive case unlike the subject of a normal relative clause which is marked with the nominative case. Zhang observes that it is possible to add an additional particle *de*, which can be used to assign genitive case in Mandarin, in a position between the subject and the verb of a gapless relative, as shown below.

(259)   **Gapless relative clause**

Lǎnglǎng **de** chàng-gē de shēngyīn
Langlang DE sing-song DE voice

'the voice of Langlang's singing songs'

The reason why Zhang regards this inserted *de* as a genitive marker is that the presence and absence of the genitive marker *de* are optional in Mandarin, according to Paul (2007). Consider the examples below, showing how the genitive *de* functions in ordinary possessives.

(260)   a. wǒ zhè-běn shū
            I   this-CL book

            'this book of mine'

        b. wǒ **de** zhè-běn shū
            I   DE this-CL book

            'this book of mine'

(261)   a. wǒ měilì-de   jiāxiāng
            I   beautiful-DE hometown

            'my beautiful hometown'

        b. wǒ **de** měilì-de   jiāxiāng
            I   DE beautiful-DE hometown

            'my beautiful hometown'

(Zhang, 2015:222)

From the above examples, it shows that the genitive *de* is optional in these possessive constructions. In (260b), the genitive *de* can appear between a pronoun and a DP. In

(261b), the genitive *de* can appear before an AP. Zhang tries to extend this generalization to gapless relatives and regards this as a feature of gapless relatives. It is this feature that makes gapless relatives so different from other normal relative clauses. Consider the cases where the normal relatives appear with genitive *de* in (262).

(262)   a. **Normal gapped relative clause**

Zhāngsān (* **de**) chàng-guò de gē
Zhangsan   DE sing-PST   DE song

Intended: 'the song that Zhangsan sang'

b. **Adjunct relative clause**

Zhāngsān (* **de**) shàngkè   de jiàoshì
Zhangsan   DE have-class DE classroom

Intended: 'the classroom where Zhangsan had class'

Given this difference in subject licensing Zhang treats gapless relatives as a third type of relative clause in Mandarin, distinguishing them from other structurally relative clauses.

The second feature that Zhang points out for gapless relatives is that the structures of Mandarin Chinese gapless relatives must have fewer layers than other normal relative clauses. According to Zhang's proposal, a gapless relative only has a nominalized *v*P layer while a normal relative clause can have levels of structures up to CP.

Before getting into our focus, let's consider how verbs behave under different requirements of tenses in Mandarin Chinese. In Mandarin, it is difficult to recognize the syntax of a verb depending on its morphology. When a verb occurs following the other verb, it can appear in an infinitival form and a gerundial form in English, whereas in Mandarin, verbs usually do not change in forms. Consider the following examples.

(263)   a. He wants **to** sing a song.
        b. tā xiǎng chàng-(*zhe) shǒu gē.
           he want sing-ASP   CL   song
           'He wants to sing a song.'

(264)   a. He likes sing**ing**.
        b. ta xǐhuān chàng-(*zhe) gē.
           he like   sing-ASP   song
           'He likes singing.'

The bare complement VPs in (263) and (264) occur in the vP levels since they cannot take any aspectual particles. Furthermore, in Mandarin, verbal phrases can appear in argument positions without changing their forms.

(265)   a. Sing**ing** is an idiot's basic skill.

        b. Chàng gē   shì yí-gè   ǒuxiàng de jībǐn jìnéng.
           sing   song be one-CL idiot   DE basic skill
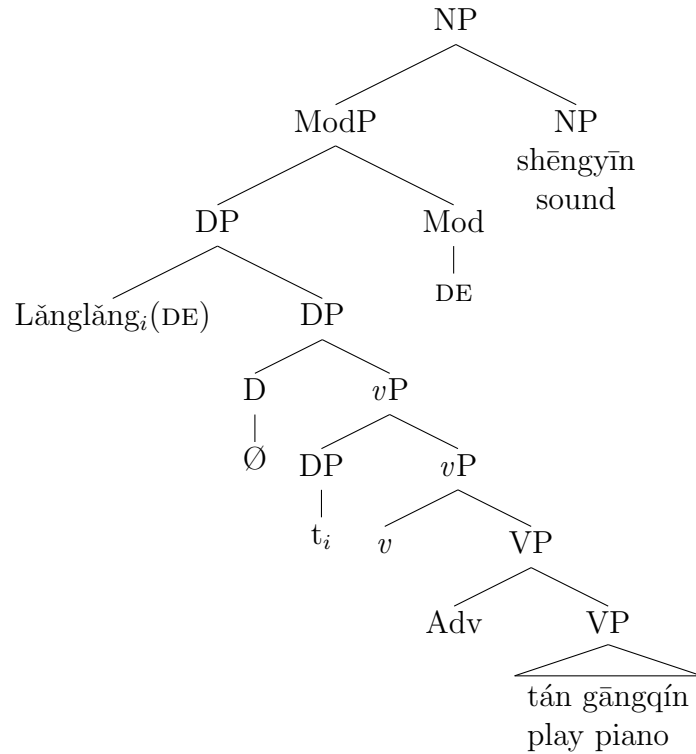   'Singing is an idiot's basic skill.'

In this pair of examples, the VP 'singing (songs)' occurs in the nominalized vP layer and the copulas, *is* in English and *shì* in Mandarin, appear as the main verbs of the clause. Zhang proposes that the VPs contained in gapless relatives pattern with this kind of nominalized complement VPs. In other words, Zhang proposes that gapless relatives only have a vP layer for the VPs, motivated by the impossibility of marking them with aspectual markers. Following this, gapless relatives are structurally smaller than other normal relative clauses.

    Zhang further asserts that these two properties are also observed in languages other than Mandarin, given Krause's (2001) investigation of reduced relative clauses in Altaic languages and Miyagawa's (2008) in Japanese, both of which claim that reduced relative clauses have a genitive subject and fewer levels of structure. As a result, Zhang concludes that Mandarin gapless relatives are reduced relative clauses.

5.3.4.2   The Proposal

Zhang claims that gapless relative clauses are reduced relative clauses and proposes a novel structure for gapless relative clauses which is inspired by Miyagawa's (2008) proposed structure for Japanese reduced relatives. The structure that Zhang suggests for gapless relatives is sketched below.

(266)   Zhāngsān (de) tán gāngqín de shēngyīn
        Zhangsan GEN play piano   DE sound
        'the sound of Zhangsan's playing the piano'

```
                              NP
                         ╱         ╲
                    ModP            NP
                  ╱      ╲        shēngyīn
                DP        Mod      sound
              ╱    ╲       │
    Lănglăng_i(DE)  DP    DE
                  ╱    ╲
                 D      vP
                 │    ╱    ╲
                 Ø   DP     vP
                     │    ╱    ╲
                    t_i  v      VP
                          ╱         ╲
                        Adv          VP
                                   ╱    ╲
                              tán gāngqín
                              play piano
```

(Zhang, 2015:225)

In this tree diagram, we can see that Zhang treats *de* as a modifier marker heading the gapless/reduced relative clause [6]. Inside the relative clause, we can see that the body of the relative clause is labelled as a DP rather than as a CP as in previous analyses of relative clauses. Additionally, this DP contains the subject DP, and a *v*P layer immediately appears following that subject. The subject of the relative clause moves to the specifier position of the external DP from the *v*P. According to Zhang's proposal, the movement of the subject is to receive the genitive case. Furthermore, the *v*P is nominalized by the null D head. Since the VP only has a *v*P layer, only adverbs can be adjoined, e.g. *nà-tiān* 'that day', *měitiān* 'everyday', to restrict the VP temporally, which explains the absence of aspectual marking. In this way, a gapless relative clause is a DP modifier to a noun phrase.

Following this, Zhang asserts that her proposed structure for gapless relatives has three important properties, which together argue for this approach. Most of the arguments are in agreement with Zhang (2008) and in disagreement with Tsai (2008).

---

[6]Zhang (2015) regards the head noun of a gapless relative clause as relational, which agrees with Zhang's (2008) proposal. A relational noun can be modified by a gapless relative clause, a nominalized VP, or a DP, thus, Zhang defines DE as a ModP head.

First of all, it is impossible for a gapless relative clause to coordinate with a normal relative clause. This is because these two kinds of relative clauses have different structures according to Zhang's approach of Mandarin relativization. More specifically, a gapless relative clause only has a vP layer, whereas a normal relative clause has a full CP structure. The second property is that gapless relative clauses cannot be stacked. Zhang claims that once a relational noun has been modified by a gapless relative clause, it cannot be modified by another relative clause simultaneously. The third property of gapless relative clauses is in line with Zhang (2008). A gapless relative clause cannot be omitted once it has adjoined to a noun phrase. Zhang improves Zhang's (2008) description, explaining it is the vP part of the gapless relative that cannot be omitted not the whole DP that cannot. The genitive subject can be omitted, as shown in (268).

(267) * Tā b'u xǐhuān wèidào.
      he not like   smell

      Intended: 'He does not like smell.' (Zhang, 2008)

(268) a. Tā b'u xǐhuān [[$_{DP}$ **Zhāngsān** [$_{vP}$ chǎo cài   ]] de] wèidào.
         he not like   Zhangsan   fry vegetable DE smell
         'He does not like the smell of Zhangsan's frying vegetable'.

      b. Tā b'u xǐhuān [[$_{VP}$ chǎo cài   ] de] wèidào.
         he not like   fry vegetable DE smell
         'He does not like the smell of frying vegetable'.

                          (Revised from Zhang, 2015: 227)

In (268a), the gapless relative clause which appears with an overt subject the included verb phrase has to be in a vP level. Whereas, Zhang explains that cases like (268b) can only have a VP projection.

The idea that the subject is licensed by an optional *de* has a number of problems. Recall that the presence of the genitive *de* is optional. However, it is unacceptable to have this genitive *de* when the VP has an adverbial modifier, as in (269).

(269) Lǎnglǎng (* de) zuótiān tán gāngqín de shēngyīn
   Langlang GEN yesterday play piano DE sound
      Intended. 'the sound of Langlang's playing the piano yesterday'

If there is a genitive *de* underlying and this genitive *de* is free to appear on the surface, its cooccurrence with the adverb should be acceptable.

A further issue emerges with ellipsis constructions. Let's consider the case where there is ellipsis of part of the gapless relative clause, as in the following.

(270) [Emma de chàng gē   de shēngyīn] hé [Lisa de   ] bù yíyàng.
       Emma GEN sing   song DE sound   and Lisa GEN   not same

The sound of Emma's singing songs differs from Lisi's.

In (270), we can see that the second gapless relative is incomplete because some duplicate elements are deleted. However, Zhang's approach fails to explain why we can have the residue because the deleted part of the second relative is not a constituent according to Zhang's proposed structure of gapless relatives, as shown in the following tree diagram standing for (270).

(271)
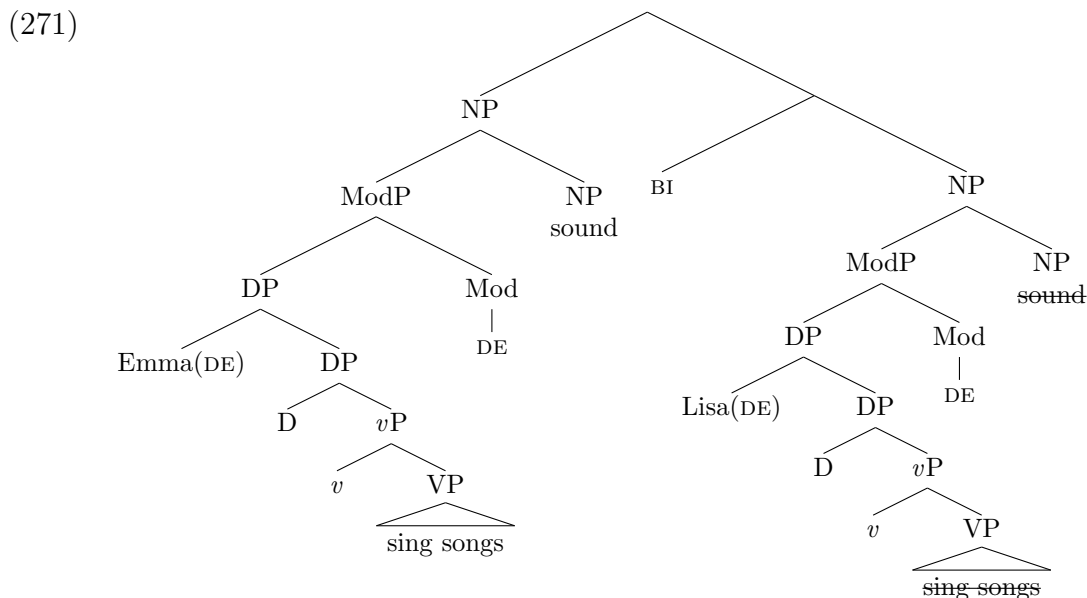
In (271), the elided string is *sing songs de sound*, but in Zhang's structure this is not a constituent. Zhang's analysis is certainly compelling in some respects, but the problems sketched above lead me to reject it as an approach to gapless relatives.

5.3.5 Summary

In this section, I have reviewed four well-known analyses of Mandarin gapless relative clauses, including Ning's (1993) VP adjunct approach, Aoun and Li's (2003) complementation approach, Cheng and Sybesma's (2005) event-variable approach and Zhang's (2015) DP modifier approach. Ning has provided a uniform analysis for gapless relatives and adjunct relatives. However, we find that the fixed resultative relation that Ning requires to hold inside gapless relatives is incorrect. Aoun and Li (2003) argue that gapless relatives are not real relative constructions, instead, they propose that gapless relatives should be analysed in a complementation structure. However, the interactions of gapless relatives and normal relatives with coordinate

constructions, comparative constructions and unbounded dependency constructions, suggests that the gapless relative is not a complement clause to a noun. In contrast to Aoun and Li (2003), Ning (1993), Cheng and Sybesma (2005), Zhang (2015) recognizes gapless relatives as a subtype of relative clauses. However, Cheng and Sybesma's proposal over-generalises that gapless relatives are generic and the proposed semantics is not applicable to some gapless relatives. Aside from this, the underlying structure that Zhang (2015) proposes for gapless relatives is also inadequate, as the deleted elements are not constituent in ellipsis construction. In the following section, we will try to illustrate our proposals of Mandarin gapless relatives and provide an alternative analysis for them.

5.4   An Alternative View of Gapless Relative Clauses

Previous analyses of gapless relative clauses have tended to include and analyse all of the gapless relatives in one approach. We observe that not all gapless relative clauses in the literature are really "gapless". Furthermore, some gapless relative clauses are semantically and syntactically ambiguous. Current analyses of gapless relative clauses may not recognise that there are various gapless relatives or be sensitive to the differences among gapless relatives. According to the nature of the head noun, I have classified gapless relatives into three kinds based on whether they are ambiguous: (i) adjunct gapless relatives, (ii) resultative gapless relatives, and (iii) ambiguous gapless relatives. Consider the representative examples of different kinds of gapless relatives in the following.

(272) **Type One: Adjunct Gapless Relative**

Zhè jiù   shì [[[$_{IP}$ Lisa jiějué shìqíng] de] xiàolǜ   ].
this exactly be   Lisa solve matter   DE   efficiency

'This is the efficiency of Lisa's solving problems.'

(273) **Type Two: Resultative Gapless Relative**

Zhè jiù   shì [[[$_{IP}$ Lisa zuò-è   ] de] hòuguǒ   ].
this exactly be   Lisa do-evil DE   consequence

'This is the consequence of Lisa's evildoing.'

(274) **Type Three: Ambiguous Gapless Relative**

Zhè jiù   shì [[[$_{IP}$ Lisa chàng gē   ] de] shēngyīn   ].
this exactly be   Lisa sing   song DE   sound/voice

'This is the sound of Lisa's singing songs.'

'This is the voice that Lisa had when she sang songs.'

As shown above, type one and type two gapless relatives are unambiguous. Only type three gapless relatives are ambiguous. We propose that only type two gapless relatives, which have a serial verb underlying structure, actually have a structure with no gap. For type one gapless relatives, we will show that they are not true gapless relatives but adjunct relatives, therefore, they can be analysed the same as adjunct relatives. For the last type of gapless relative, they can be analysed either as a true gapless relative, having a serial verb structure, or as an adjunct relative. To embrace all different types of gapless relatives, we provide an alternative analysis and approach for them. In the following section, we will explain why we have this classification and how to distinguish among gapless relatives.

5.4.1 Gapless Relatives as Adjunct Relatives

In this section, I will illustrate the first type of gapless relatives which I class as adjunct gapless relatives. There are three properties of this type of gapless relative that are shared by adjunct relatives. The first property involves the stacking structure of relative clauses. The second property is about the ordering of multiple clausal modifiers with respect to a noun. The third property is the optionality of the gapless relative with respect to a noun.

5.4.1.1 Similar Behaviour of Gapless Relatives and Adjunct Relatives

Tsai (2008) and Zhang (2008) have pointed out that gapless relatives are distinct from normal relative clauses because gapless relatives cannot be stacked. Zhang has asserted that the head noun of a gapless relative clause is a relational noun which can only license a single gapless relative. That is, once a relational head noun has already been modified by a gapless relative clause, it cannot be modified by other gapless relatives. Therefore, to have multiple gapless relative clauses is equal to modify a relational noun more than once. Consider the following example which includes a relational noun with multiple simple modifiers.

(275)   * Nǐ   yǒu   méi yǒu   wén-guò   [guòqī   niúnǎi de suānnǎi de qìwèi]?
      you have not have smell-PAST   out-of-date milk   DE yogurt   DE smell
      Intended.'Did you smell the smell of expired milk and yogurt?'

(276)   Nǐ   yǒu   méi yǒu   wén-guò   [[guòqī   niúnǎi] hé   [suānnǎi] de
      you have not have smell-PAST   out-of-date milk   and   yogurt   DE
      qìwèi]]?
      smell

'Did you smell the smell of expired milk and yogurt?'

The stacked structure in (275) is impossible, and to express the intended meaning a conjunction, *he*, is used, as in (276). (277) is a further example of this same effect.

(277) * Hěnduō rén   tīng-guò   [[Lǎnglǎng tán gāngqín de][Jínà lā
         A-lot-of people hear-PERF   Langlang play piano   DE   Jina play
      dàtíqín de] shēngyīn].
      cello   DE   sound

      Intended.'A lot of people heard the sound of Langlang's playing the piano and Jina's playing the cello.'

Law (2001) observes that not all kinds of adjunct relative clauses can be stacked. For instance, it is possible to stack time and place(location) adjunct relatives, while it is problematic to stack reason and manner adjunct relatives. Consider the examples of location adjunct relatives and manner adjunct relatives below.

(278) **Stacking** PLACE (LOCATION) **adjunct relative clauses**
   a. Mary invited Louis to [the **restaurant** [$_{RC}$ where Mary's mother met her father][$_{RC}$ where she liked to have lunch]].

   (Revised from Law, 2001:8)

   b. $^{?}$ Mary yāoqǐng Louis qù [[$_{RC}$ tā suǒ xǐhuān yòng wǔcān de][$_{RC}$
      Mary invite   Louise go   ta SUO like   have lunch   DE
      tāmāmā   yùjiàn-le tābàbà   de] nà-jiā **cāntīng**   ].
      her-mother met-PERF her-father DE   that-CL restaurant

(279) **Stacking** MANNER **adjunct relative clauses**
   a. $^{?}$* John wanted to know [the **way** [$_{RC}$ that Mary fixed her laptop][$_{RC}$ that she cleaned her laptop]].
   b. * John xiǎng zhīdào [[$_{RC}$ Mary xiū diànnǎo   de][$_{RC}$ tā   qīnglǐ
      John want know   Mary fix computer DE   she clean
      diànnǎo   de] fāngfǎ   ].
      computer DE   **method**
   c. * John yǐwéi zhè shì [[$_{RC}$ zhèngfǔ   guīfàn   shìchǎng de][$_{RC}$ fùmǔ
      John think this be   government regulate market   DE   parent
      guǎnjiào   háizi   de] cuòshī   ].
      take-care-of children DE   **measure**

Law provides an explanation for the ungrammaticality of the English multiple manner adjunct relatives shown in (279a). We assume that semantically nouns like *way* etc have their content 'filled in' by the relative clause, so adding in another

relative clause gives its content no where to go. Actually, not only the manner and reason adjunct relative clause, it is also difficult to stack other types of relative clauses in Mandarin Chinese. Larson and Takahashi (2002), Del Gobbo (2005) and Larson (2007) have pointed out that it is quite restricted to have multiple relative clauses to a noun in languages, such as Korean, Japanese, Turkish and Mandarin Chinese. This is why we have (278b) marked with question notation. The use of the particle *suo* may enhance the stacking possibility of the other types of relative clauses. However, the particle *suo* is limited to manner and reason adjunct relative clauses, according to Ting (2003).

(280) * Zhè jiù   shì [[Lǐsì SUO gōngzuò de] fāngfǎ/yuányīn].
         this exactly be   Lisi SUO work   DE   method/reason

         'This is the method/reason that Lisi works.'   (Ting, 2003:126)

We cannot enhance the ungrammaticality of (279b) by using *suǒ*. Regarding Law's observations about manner and reason adjunct relative clauses and our previous observations about gapless relative clauses at the beginning of this section, we treat the inability to being stacked as one shared behavior of manner and reason adjunct relative clauses and gapless relative clauses.

The second piece of evidence is about the ordering of clausal modifiers, including normal relative clauses, adjunct relative clauses and gapless relative clauses, when they are adjoined to a noun. Tsai (2008) provides examples of a gapless relative clause which appears with a left-adjoined normal relative clause. Consider the example we cited from Tsai (2008) below.

(281) **Normal RC + Gapless RC**
       a. Zhè jiù   shì [$_{RC}$ **Zhāngsān suo pāidào de** [$_{GRC}$ Lǐsì pǎobù de
          this exactly be   Zhangsan SUO capture DE   Lisi run DE

          zīshì   ]].
          posture

          'This is the posture that Lisi had when he run that Zhangsan captured.'
       b. * Zhè jiù   shì [$_{GRC}$ Lǐsì pǎobù de [$_{RC}$ **Zhāngsān suo pāidào de**
            this exactly be   Lisi run DE   Zhangsan SUO capture DE

            zīshì   ]].
            posture

This shows that it is possible for a head noun which has been modified by a gapless relative to have an additional adnominal which is a normal relative clause. Furthermore, it shows the ordering of a gapless relative and a normal relative cannot be switched. If the order between the gapless relative and the normal relative clause is changed, the original meaning cannot be interpreted. We find the same restriction

of ordering when a noun phrase is modified by an adjunct relative clause and a normal relative clause, as shown in the following.

(282) **Normal RC + Manner Adjunct RC**

    a. Zhè jiù   shì [$_{RC}$ Lǐ Xiàozhǎng zhíxíng   de [$_{RC}$
       this exactly be   Li president carry-out DE
       <u>fùmǔ guǎnjiào háizi de</u>   cuòshī]].
       parent take-care-of children DE measure
       'This is the measure that parents take care of their children that President Li carries out.'

    b. ??? Zhè jiù   shì [$_{RC}$ <u>fùmǔ guǎnjiào háizi de</u>   [$_{RC}$ Lǐ Xiàozhǎng
       this exactly be   parent take-care-of children DE   Li president
       zhíxíng   de cuòshī]].
       carry-out DE measure

(283) **Normal RC + Instrument Adjunct RC**

    a. Zhè jiù   shì [$_{RC}$ wǒ jìlù-guò   de [$_{RC}$ <u>Mary xiū shǒubiǎo de</u>
       this exactly be   I record-PAST DE   <u>Mary fix watch DE</u>
       shǒufǎ   ]].
       technique
       'This is the technique that Mary fixed a watch that I recorded.'

    b. ?? Zhè jiù   shì [$_{RC}$ <u>Mary xiū shǒubiǎo de</u> [$_{RC}$ wǒ jìlù-guò   de
       this exactly be   <u>Mary fix watch DE</u>   I record-PAST DE
       shǒufǎ]].
       school

As shown above, the ordering of a normal relative clause and a manner/instrument adjunct relative clause cannot be changed. The order of relative clauses adjoined to the head noun is not free in Mandarin Chinese (Del Gobbo, 2005; Lin, 2008; Huang, 2016). Therefore, I assume that the manner adjunct relative and gapless relative need to be closer to the head noun than the argument relative clauses. This again suggests that it is reasonable to assimilate this type of gapless relative clause to adjunct relatives.

The third piece of evidence is about the optionality of a gapless relative in a noun phrase. Zhang (2008), however, has argued that a gapless relative is not optional with respect to the head noun it modifies, which feeds the idea that gapless relatives are not true relative clauses.

(284) Tā bù xǐhuān *(wǒ chǎo cài   de) wèidào.
     he not like   I   fry vegetable DE   smell

'He does not like the smell of my frying vegetables.'

(Zhang, 2008:1010)

Tsai (2008) disagrees with Zhang's view and claims that, with careful scrutiny, the omission of a gapless relative does not affect the grammaticality of a sentence. Aside from this, we observe that the ungrammaticality of (284) is not caused by the omission of the GRC. The expression can be enhanced by adding a determiner. Consider the examples of gapless relatives below and compare them with the examples of adjunct relatives following them.

(285) **Gapless RCs**

    a. Mary míshàng-le   [$_{RC}$ (**Ann chànggē de**) nà-zhǒng shēngyīn].
        Mary fascinate-PERF   Ann sing-song DE that-CL sound

        'Mary is fascinated by the sound of Ann's singing songs.'

    b. [$_{RC}$ (**Mary pǎobù de**) sùdù] hěn kuài.
              Mary run   DE speed very fast

        'The speed of Mary's running is very fast.'

(286) **Normal RCs**

    a. MANNER **adjunct RC**

        Mary xuéhuì-le   [$_{RC}$ (**Ann tán gāngqín de**) nà-gè   fāngfǎ].
        Mary learn-PERF   Ann play piano   DE that-CL way

        'Mary leaned the way that Ann played piano.'

    b. REASON **adjunct RC**

        Mary zhīdào-le   [$_{RC}$ (**Ann táopǎo   de**) yuányīn].
        Mary know-PERF   Ann run-away DE   reason

        'Mary knew the reason why Ann ran away.'

As shown in (285), gapless relatives are optional with respect to the noun phrase that they modify. This is the same for the manner and reason adjunct relatives shown in (286). In the next section, I will illustrate how to include this type of gapless relatives into the analysis of adjunct relatives.

5.4.1.2 How to Analyse Gapless Relatives as Adjunct Relatives

Following our discussion above, we will regard the type one gapless relatives as adjunct relatives. Let's briefly look through some examples which are well-known as gapless relatives in the literature. I classify these as adjunct gapless relatives, as shown below.

(287) **Type One Gapless Relatives**

    a. Zhè jiù   shì [[[$_{IP}$ Ann pǎobù] de] nà-gè   zīshì   ].
       this exactly be   Ann run   DE   that-CL posture

       'This is the posture that Ann had while running.'

    b. Zhè jiù   shì [[[$_{IP}$ Lisa mǎi shèbèi   ] de] nà-bǐ   yùsuàn].
       this exactly be   Lisa buy equipment   DE   that-CL budget

       'This is the budget of Lisa's buying equipments.'

    c. Zhè jiù   shì [[[$_{IP}$ Ann qiánjìn   ] de] bùfá/sùdù].
       this exactly be   Ann forward-go   DE   pace/speed

       'This is the pace/speed of Ann's moving forward.'

    d. Zhè jiù   shì [[[$_{IP}$ Lisa jiějuè shìqíng] de] xiàolǜ   ].
       this exactly be   Lisa solve matter   DE   efficiency

       'This is the efficiency of Lisa's solving problems.'

The head noun of this type of gapless relatives can be reanalysed as the argument of a manner/instrument PP adjunct because the head nouns of this type of gapless relative clauses can be regarded as some sort of manner or instruments. Before getting into the details of how to analyse these gapless relatives, let's consider how to analyse a manner/instrument adjunct relative in first. Examples of normal manner and instrument adjunct relatives are repeated below.

(288)   a. MANNER **Adjunct Relative**

       Dàjiā   dōu cáiyòng [$_{RC}$ Mary xué   gāngqíng de nà-gè   fāngfǎ].
       everyone all   adopt   Mary learn piano   DE that-CL way

       'Everyone adopts the way Mary learned to play the piano.'

    b. INSTRUMENT **Adjunct Relative**

       Lisa nòngdiū-le [$_{RC}$ tā   māmā kàn   shū   de nà-fù   yǎnjìng].
       Lisa lose-PERF   her mother watch book DE that-CL glasses

       'Lisa lost the the pairs of glasses that her mother read books with.'

It is possible to move back the head noun *fāngfǎ* 'way' and *yǎnjing* 'glasses' into the relative clause as complements of a preposition, according to our previous analyses of adjunct relative clauses. For these types of adjunct relatives, we need to use the circumpositional structure, the postposition of which can be covert, to reconstruct the head nouns in their original position. Therefore, the adjunct relatives included in (288) can be represented as in the following.

(289)   a. Mary [$_{PP}$ **yǐ**   **nà-gè fāngfǎ (lái)**] xué   gāngqíng.
       Mary   accord-to that-CL way   for   learn piano

       'Mary learned to play the piano in that way.'

b. Mary māmā [$_{PP}$ **yǐ**   **nà-fù** **yǎnjìng (lái)**] kàn   shū.
Mary mother   accord-to that-CL glasses   for   watch book
'Mary's mother read books with that pairs of glasses.'

The gapless relatives shown in (287) can also be represented in the same way by adopting the circumpositional structure.

(290)   a. Ann [$_{PP}$ **yǐ**   **nà-gè zīshì** **(lái)**] pǎobù.
           Ann   accord-to that-CL posture for   run
           'Ann ran in this posture.'

        b. Lisa [$_{PP}$ **yòng nà-bǐ** **yùsuàn (lái)**] mǎi shèbèi.
           Ann   use   that-CL budget for   buy equipment
           'Lisa bought equipments with that budget.'

        c. Ann [$_{PP}$ **yǐ**   **nà-zhǒng bùfǎ/sùdù (lái)**] qiánjìn.
           Ann   accord-to that-CL   pace/speed for   forward-go
           'Ann moved forward at that pace/speed.'

        d. Lisa [$_{PP}$ **yǐ**   **nà-zhǒng xiàolǜ** **(lài)**] jiějué shìqíng.
           Lisa   accord-to that-CL   efficiency for   solve matter
           'Lisa solved problems at that efficiency.'

Additionally, we have a piece of evidence for the existence of this PP adjunct in gapless relatives. Cha (1998) notes that adjunct relatives can include the [P + Resumptive Pronoun] sequence but gapless relatives cannot do so in Korean. However, we observe that such a PP sequence can appear in gapless relatives in Mandarin. Since the head nouns of these types of relative clauses are usually not referential objects, we do not use the same kind of resumptive pronoun as found in normal relative clauses, e.g. *ta* 'it'. Instead, we find pronouns like *zhī* 'this' and *cǐ* 'this' which represent these *manner*-like head nouns. Consider examples of manner relatives and gapless relatives that appear with the *resumptive*-included PP sequence below.

(291)   Manner **Adjunct Relative**

       Měi-gè   rén   dōu cáiyǒng [$_{RC}$ Mary [$_{PP}$ **yǐ**   **zhī (lái)**] xué
       every-CL person all   adopt   Mary   accord-to this for   learn
       gāngqíng de fāngfǎ].
       piano   DE way

       'Everyone adopts the way Mary had it when she learned to play the piano.'
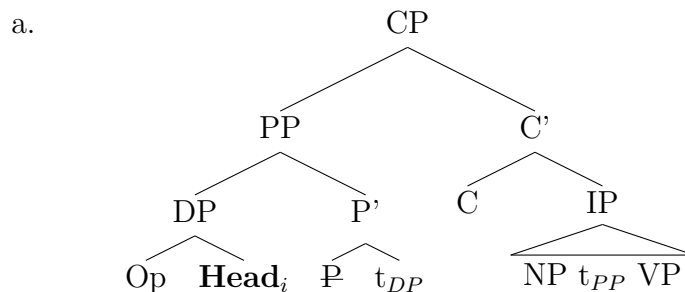
(292) **Gapless Relatives**

    a. Mary mófǎng [$_{GRC}$ Ann [$_{PP}$ **yǐ**   **zhī lái**] pǎobù de nà-gè
       Mary imitate   Ann   accord-to this for run   DE that-CL
       zīshì   ].
       posture

       'Mary imitated the posture that Ann had it while running.'

    b. Lee jiàoliàn gōngbù-le   [$_{GRC}$ Ann [$_{PP}$ **yǐ**   **zhī lái**] qiánjìn
       Lee coach publish-PERF   Ann   accord-to this for forward-go
       de bùfá/sùdù].
       DE pace/speed
       'Coach Lee published the pace/speed of Ann's moving forward.'

There are a number of gapless relatives belonging to this manner type of adjunct relatives. In addition to the examples in (287), (293) provides examples of *manner*-type gapless relatives.

(293)   a. Zhè jiù   shì [[[$_{IP}$ Ann zhùshì Mary] de] mùguāng].
       this exactly be   Ann stare Mary DE sight
       'This is the sight of Ann's staring at Mary.'

    b. Zhè jiù   shì [[[$_{IP}$ Ann miànduì shībài] de] tàidù   ].
       this exactly be   Ann face   failure DE attitude
       'This is the attitude of Ann's facing failure.'

    c. Zhè jiù   shì [[[$_{IP}$ Ann pīpíng Mary] de] yǔqì].
       this exactly be   Ann criticize Mary DE   mood
       'This is the mood of Ann's criticizing Mary.'

In the following, we will discuss the derivation of this *manner*-type gapless relative clauses. According to the facts discussed, we believe that this type of gapless relative involves a *manner*-kind adjunct and can be derived following the analysis we use for manner/instrument adjunct relatives. Recall the syntactic derivation of manner/instrument adjunct relatives in the last chapter.

(294)   [$_{DP}$ [$_{IP}$ NP t$_g$ VP] [$_D$ DE [$_{CP}$ [$_{PP}$ [Op **Head**]$_j$ [P t$_j$]]$_g$ t$_{IP}$]]]

    a.

157

b.
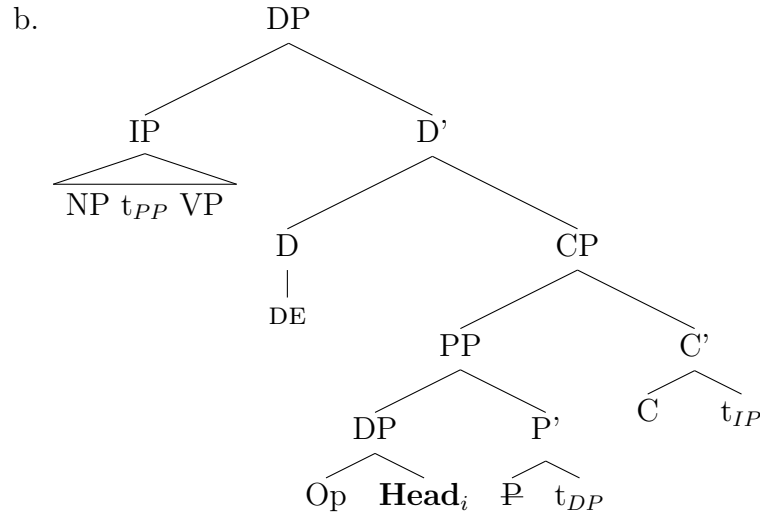
We can apply this structure to type one gapless relatives as follows:
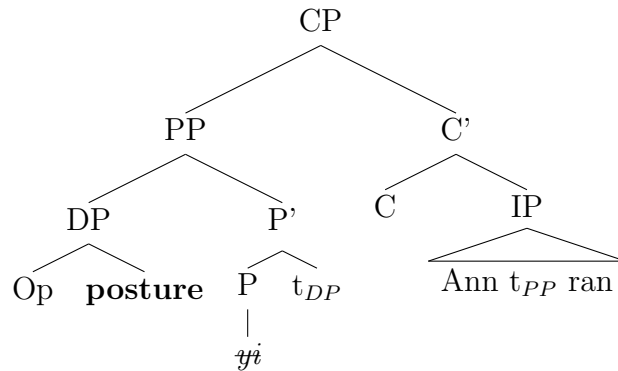
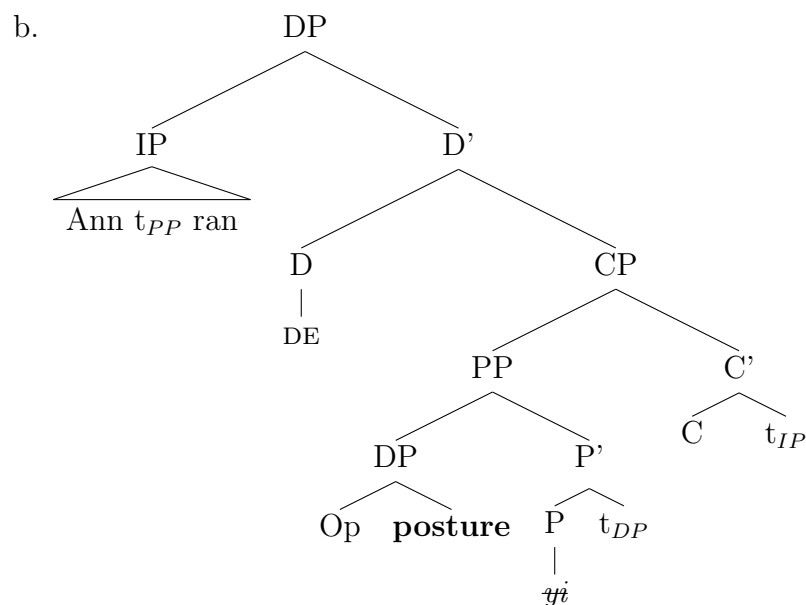(295)   [[[Ann pǎobù] de] zīshì   ]
          Ann run   DE   posture
        'the posture that Ann had while running.'

(296)   **The derivation of (295)**
        a. $[_{CP}$ $[_{IP}$ Ann $[_{PP}$ *yi* Op **posture**] run]]
        b. $[_{CP}$ $[_{PP}$ *yi* Op **posture** $]_g$ $[_{IP}$ Ann t_g run]]
        c. $[_{DP}$ $[_D$ DE $[_{CP}$ $[_{PP}$ [Op **posture** $]_j$ [~~*yi*~~ t_j]$]_g$ Ann t_g run]]]
        d. $[_{DP}$ $[_{IP}$ Ann t_g run] $[_D$ DE $[_{CP}$ $[_{PP}$ [Op **posture** $]_j$ [~~*yi*~~ t_j]$]_g$ t_{IP}]]]

(297)   a.

158

b.

DP
├── IP
│   └── Ann t$_{PP}$ ran
└── D'
    ├── D
    │   └── DE
    └── CP
        ├── PP
        │   ├── DP
        │   │   ├── Op
        │   │   └── **posture**
        │   └── P'
        │   ├── P
        │   │   └── ~~yi~~
        │   └── t$_{DP}$
        └── C'
            ├── C
            └── t$_{IP}$

The derivation given above expresses that the head noun of a gapless relative is originally contained in a PP adjunct which is introduced by the preposition *yi*. In the first, the PP adjunct moves to Spec CP position. Then, inside the PP, the head noun moves to the specifier position of the PP to enable us to delete the preposition, according to Collins's (2007) null Ps analysis. Therefore, the preposition becomes unpronounced on the surface when its specifier position is occupied. In the final, we move the rest IP to the Spec DP to fix the word order.

Treating this type of gapless relatives as similar to manner/instrument adjunct relatives can solve the problems of Ning (1993) that are raised by Cheng and Sybesma (2005), Tsai (2008) among others. Most of their objections to Ning's (1993) analyses of gapless relatives are about the resultative relationship between the VP adjunct and the main VP inside the gapless relative clause. In my approach to the first type of gapless relatives, there is no resultative relationship between the adjunct and the main VP inside the gapless relative clause. Instead, the generated adjunct has a *manner*-kind of restriction of the main VP.

5.4.2 Gapless Relatives as Resultative Relative Clauses

In this section, we move to our second type of gapless relatives which has a resultative meaning. This type of gapless relatives has less structure than full relatives. To some extent, our proposal for the second type of gapless relatives is inspired by Ning's (1993) proposal concerning gapless relatives. Recall that Ning suggests that

the head noun of a gapless relative is embedded in a VP adjunct via being introduced by an *obtain*-like verb and this VP adjunct follows the existing VP. I will argue that the VP in Ning's (1993) proposal is not an adjunct; instead, it is the matrix VP of the gapless relative before relativization. In other words, gapless relatives are not adjunct relatives but are argumental relatives. There is an important construction, the serial verb construction (SVC), involved in our analysis of this type of gapless relative. Thus, I will introduce this construction in brief before explaining why this type of gapless relative involves the SVC.

5.4.2.1 Serial Verb Constructions in Mandarin Chinese

The classical approach to serial verb constructions in Mandarin follows Li and Thompson (1981), who distinguish four kinds of SVC. Li and Thompson define a serial verb construction as containing multiple VPs or clauses juxtaposed without any marker, which used to express the relationship, in between them. Since only the first type of SVC is involved in my analysis, I will only discuss this type. The first type of SVC can be further divided into four subtypes, including *circumstance*, *purpose*, *alternating* and *consecutive*. A serial verb construction may have one or more of these four interpretations, as shown below.

(298) Wǒmén kāi huì   tǎolùn nà-gè   wèntí.
      we   hold meeting discuss that-CL problem

  a. 'We'll hold a meeting to discuss that problem.' (purpose)
  b. 'We'll discuss that problem holding a meeting.' (circumstance)

(299) Tā tiāntiān   chàng gē   xiě   zì.
      he every-day sing   song write letter

      'Every day he sings songs and writes letters.' (consecutive/alternating)

(Paul cited from Li and Thompson, 2008:370)

More precisely, I assume that the situation involved in the second type of gapless relative is the same as (298). Li (2018) notes that there is only one main verb in the examples of (298). The other verb inside the sentence can belong to an *adjunct clause* or a *purpose clause*, depending on the position it appears in, either to the right or to the left of the matrix VP. Chan (2002) also proposes that, in an SVC, only one of the VPs can be the matrix VP and the rest of the VPs are modifiers to the matrix VP. The structures of the two different readings of (298) are given in (300) respectively.

160

(300) a. Wǒmén$_i$ [$_{vP}$ [$_{adjunct\ clause}$ PRO$_i$ kāi   huì   ] [$_{vP}$ tǎolùn nà-gè
        we   hold meeting   discuss that-CL
        wèntí   ]].
        problem
        'We'll discuss that problem holding a meeting.'

     b. Wǒmén$_i$ [$_{vP}$ kāi   huì   [$_{purpose\ clause}$ PRO$_i$ tǎolùn nà-gè   wèntí   ]].
        we   hold meeting   discuss that-CL problem
        'We'll hold a meeting to discuss that problem.'

(Paul, 2008:372)

The distinction between (300a) and (300b) can be revealed by the presence of the perfective marker *le* and the acceptability of the A-*not*-A structure. Only the matrix verb can be suffixed by the aspectual marker *le* and be reduplicated in the A-*not*-A structure. (298) is an ambiguous example which can be analysed as either (300a) or (300a) because two verbs can be marked by *le* and display the A-*not*-A formation. I will adopt an unambiguous example to illustrate how the tests work to distinguish the matrix verb from the other verbs in a serial verbs sequence, as shown below: (302) tests the distribution of the aspectual marker le, while (303) shows what happens under A-*not*-A reduplication.

(301) **Original sentence**

       Mary [pǎo$_{V1}$ shànglái [zháo$_{V2}$ Ann]].
       Mary   run   up-come find   Ann

       'Mary ran up to find Ann.'

(302) **Test 1: Suffixing *le***

       Mary **pǎo**-(*le*) shànglái zhǎo-(*le) Ann.
       Mary run-PERF up-come find   Ann

       'Mary ran up to find Ann.'

(303) **Test 2: Duplicating as A-*not*-A**
       a. Mary **pǎo**-*méi*-**pǎo** shànglái zhǎo Ann?
          Mary run-not-run   up   find Ann
       b. * Mary páo shànglái **zhǎo**-*méi*-**zháo** Ann?
            Mary run up-come find-not-find   Ann
          'Did Mary run up to find Ann?

The results of the two tests show that the V_1 *pǎo* 'run' of (301) is the main verb and the V_2 *zhǎo* 'find' is the verb contained in the subordinate clause of V_1. This is because *pǎo* 'run' can be suffixed by the aspectual *le* and be reduplicated in the A-*not*-A structure while *zhǎo* 'find' cannot. Therefore, we conclude (301) has the following underlying structure.

(304) Mary$_i$ [$_{vP}$ pǎo shànglái [$_{\textbf{purpose clause}}$ PRO$_i$ zháo nǐ   ]].
       Mary   run up   find you

       'Mary ran up to find you.'

Aside from these two tests, there are two additional tests that can help to confirm the identities of the verbs in SVCs. The third test involves modals, and is inspired by Grano (2017). Grano (2017) has argued that the root modal *néng* 'be able to' and the epistemic modal *keneng* 'be likely to' are different because *neng* combines with a nonfinite TP while *kěnéng* combines with a finite TP. Additionally, the epistemic modality takes scope over the root modality and both the tense and aspect, as schematized below.

(305) $\text{Mod}_{epistemic} > \text{Tense} > \text{Aspect} > \text{Mod}_{root}$

(Hacquard cited in Grano, 2017:10)

As shown in this hierarchy, the epistemic modal *keneng* 'be likely to' takes scope over aspect, which means that only *keneng* 'be likely to' can appear to the left of a verb which is aspectually marked. Turning back to our original example (301), we can only put *keneng* on the left of the whole string of serial verbs and cannot put it in between the verbs, as shown below.

(306) **Test 3: Locating *keneng***

       Mary (kěnéng) pǎo$_{V1}$ shànglái (*kěnéng) zhǎo$_{V2}$ Ann.
       Mary be.likely run   up-come be.likely find   Ann

       'Mary ran up to find Ann.'

If the matrix verb of the sentence is the V_2 *zhǎo* 'find' rather than the V_1 *pǎo* 'run', the epistemic modality *kěnéng* should be able to appear in both positions. This result is then consistent with the findings from the two tests discussed above. Using modality to identify the main verb in a serial verb sequence has also been demonstrated in Li (2018) who, in addition, shows that sentential adverbs, e.g. *jūrán* 'unexpectedly', *yídìng* 'definitely', *guǒrán* 'just as expected', can also be used to distinguish the main verb in a serial verb sequence. The idea is that the sentential adverbs must take scope over the matrix verb. As shown in the following, the result, again, supports our previous prediction.

(307) **Test 4: Locating sentential adverbs**

Mary (jūrán)   pǎo$_{V1}$ shànglái (*jūrán)   zhǎo$_{V2}$ Ann.
Mary unexpectedly run   up-come unexpectedly find   Ann

'Mary ran up to find Ann.'

In the following section, we will apply these tests to diagnose the underlying structure of gapless relatives. After that, we will demonstrate how to derive this type of gapless relatives.

5.4.2.2 Gapless Relatives with Reduced Form of SVCs

Recall that Ning (1993) proposes that the head noun of a gapless relative can be reanalysed as the argument of a VP adjunct to modify the main verb of the gapless relative. This VP adjunct is headed by an *obtain*-type verb and it has a kind of resultative relationship with the matrix verb in the gapless relative clause.

(308) Zhèxiē jiù   shì [$_{GRC}$ Mary jiù   rén   de huíbào].
these   exactly be   Mary save people DE reward
'These are the reward of Mary's saving peeple.'

(309) [$_{IP}$ Mary [$_{VP}$ [$_{V'}$ jiù   rén   [$_{VP}$ [$_{V}$ **dédào**] huíbào]]]].
Mary   save people   get   reward
'Mary saved the people to get the reward.' (purpose)
'Mary got the reward by saving people.' (circumstance)

According to Ning (1993), (309) is the underlying structure of the gapless relative seen in (308). As shown in (309), there are two possible interpretations for the underlying structure of this gapless relative.

There is evidence that the verb contained in the VP 'get reward' in such structures is not the verb of a modifying adjunct, but is in fact the main verb of the construction. This evidence comes from applying the tests we discussed in the section 5.4.2.1, as follows:

(310) **Test 1: Suffixing *le***

Mary jiù-(***le**) rén   dédào-(***le***) huíbào.
Mary save-PERF people obtain-PERF reward

'Mary got the reward by saving people.'

163

(311)   **Test 2: Duplicating A-*not*-A**

    a. Mary jiù   ré   **dédào-*méi*-dédào** huíbào?
       Mary save people obtain-not-obtain   reward

       'Did Mary get reward by saving people?'

    b. * Mary **jiù**   ***méi*-jiù** rén   dédào huíbào?
       Mary save-not-save people   obtain reward

       Intended. 'Did Mary save people to get the reward?'

The results for these putative underlying structures show that the resultative verb *dédào* 'obtain' is the matrix verb rather than the verb *jiù* 'save', the opposite of Ning's (1993) claim. To confirm this, we further apply the other two tests to (309), as shown in the following.

(312)   **Test 3: Locating *keneng***

    Mary ($^{??}$kěnéng) jiù$_{V1}$ rén   (kěnéng) dédào$_{V2}$ huíbào.
    Mary be.likely   save people be.likely obtain   reward

    'Mary probably got the reward by saving people.'

(313)   **Test 4: Locating sentential adverbs**

    a. Mary (jūrán)   jiù$_{V1}$ rén   dédào$_{V2}$ huíbào.
       Mary unexpectedly save people obtain   reward

    b. Mary jiù$_{V1}$ rén   (jūrán)   dédào$_{V2}$ huíbào.
       Mary save people unexpectedly obtain   reward

       'Mary unexpectedly got the reward by saving people.'

In (312), *kěnéng* can only be put in a position between the two verbs, which shows that it is the verb *dédào* 'obtain' that is the main verb. In (313), as we mentioned before, sentential adverbs have to take scope over the main verb, therefore, it is not surprising that *jūrán* appears in a position that precedes both verbs. However, (313b) shows that the V_1 is not the main verb but V_2 is since *jūrán* can also be put in a position between the two verbs. I conclude that *dédào* 'obtain' is the matrix verb of the clause.

    Therefore, I propose that the gapless relative contained in (308) has the underlying structure as shown in (314). Based on this structure, the VP *jiù rén* 'save people' that appears on the surface of the gapless relative is not the matrix VP, but a subordinate clause modifying the covert VP.

(314)   Mary$_i$ [$_{vP}$ [$_{\textbf{clausal adjunct}}$ PRO$_i$ jiù   rén   ] [$_{vP}$ dédào huíbào$_{\textbf{Head}}$]]].
    Mary   save people   get   reward

    'Mary got the reward by saving people.'

To argue that the abstract verb is the main verb, I have adopted the verb *dédào* 'obtain' substantially to represent the origin of a gapless relative. This verb becomes covert in relativization. I propose to treat these *obtain*-kind verbs together as a light verb RESULT, inspired by the analyses of resultative verb constructions (henceforth RVCs) in Huang (1997, 2006), Huang, Li and Simpson (2014). This light verb denotes a kind of relationship between two arguments. In contrast to the other analyses of RVC's, the underlying structure of which involves a recursive structure, the proposed structure in my analysis involves a flat structure, in line with our previous discussion of serial verb construction. This is because adopting a recursive structure will imply that one of the arguments of *result* is the object of the first verb, which is problematic. According to our discussion, the other argument of RESULT is the adjunct clause. The underlying structure that I propose for the SVCs that involve a clausal adjunct is as represented below.

(315)   Mary$_i$ [$_{vP}$ [$_{\textbf{clausal adjunct}}$ PRO$_i$ saved people] [$_{vP}$ RESULT reward]]]
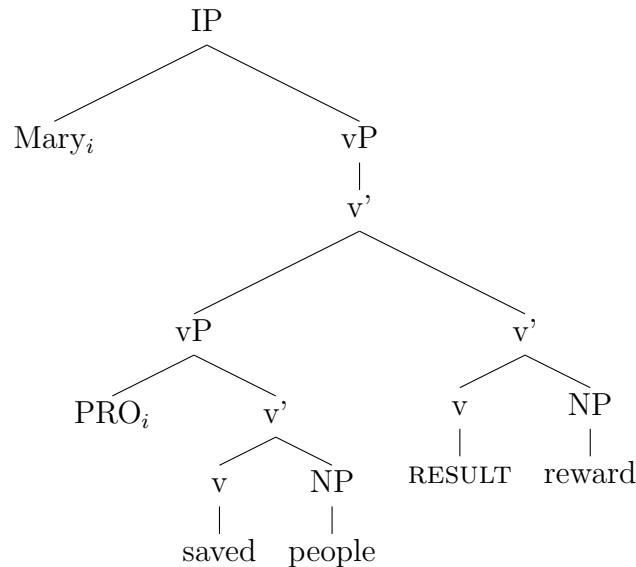
Since the verb *save* must have two arguments, one as an agent and the other as a theme, we assume there is a null PRO which is controlled by the subject of the main clause. This is because the person that gets the reward is the same person that saved people. The main verb RESULT becomes covert in a relative construction. In Mandarin Chinese, there are a number of unpronounced light verbs, such as, RESULT, BECOME, DO, in different situations. Consider below.

(316)   a. Yīfú   gānjìng-le.
           clothes clean-PERF

           'The clothes become clean.'   (Li, 2009:38)

b. Mary gōnzuò lèi-le.
Mary work   tired-PERF
'Mary worked tired.'

According to the interpretations of the examples given above, we give the underlying structures of these two examples as below.

(317)   a. [clothes [$_{VP}$ BECOME/DO clean].
        b. [Mary [$_{VP}$ work [$_{VP}$ RESULT/BECOME tired]]].

Given this, I now proceed to the explanation of how we can get a gapless relative from this structure as well as to accounting for the disappearance of a matrix verb when relativization takes place. I will take the gapless relative in (308) as an example to demonstrate how the gapless relative can be derived from (314).

(318)   [[[Mary jiù   rén   ] de] huíbào]
        Mary save people   DE   reward
        'the reward of Mary's saving people'

(319)   **The derivation of (318)**
        a. Mary$_i$ [$_{vP}$ [**clausal adjunct** PRO$_i$ saved people] [$_{vP}$ [$_{v'}$ RESULT reward]]]
        b. [$_{CP}$ reward$_m$ [$_{IP}$ Mary$_i$ [$_{vP}$ [**clausal adjunct** PRO$_i$ saved people] [$_{vP}$ [$_{v'}$ RESULT t$_m$]]]]]
        c. [[$_{IP}$ Mary$_i$ [$_{vP}$ [**clausal adjunct** PRO$_i$ saved people] [$_{vP}$ [$_{v'}$ RESULT t$_m$]]]] [DE [$_{CP}$ reward$_m$ t$_{IP}$]]

According to our discussions, we regard the sentence in (309), which is the original of the gapless relative included in (308), has the syntactic structure as shown in (320), repeated from (315).

(320)   a.

```
                          CP
                _____/    _____
            reward_m                IP
                            _____/    _____
                         Mary_i              vP
                                              |
                                              v'
                                      _____/    _____
                                    vP                  v'
                              ___/    \___          ___/    \___
                           PRO_i        v'         v          NP
                                    __/    \__      |          |
                                   v         NP   RESULT      t_m
                                   |         |
                                 saved     people
```

b.

```
                          DP
                 _____/    _____
              IP                       D'
         ____/  \____              __/    \__
        /          \             D          CP
  Mary_i [ PRO_i saved people ] RESULT t_m   DE     __/  \__
                                                reward_m   t_IP
```
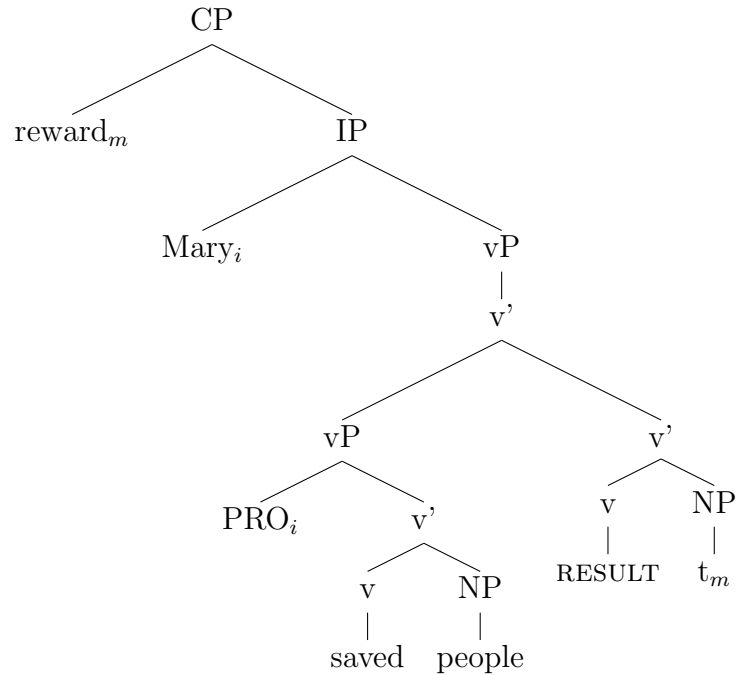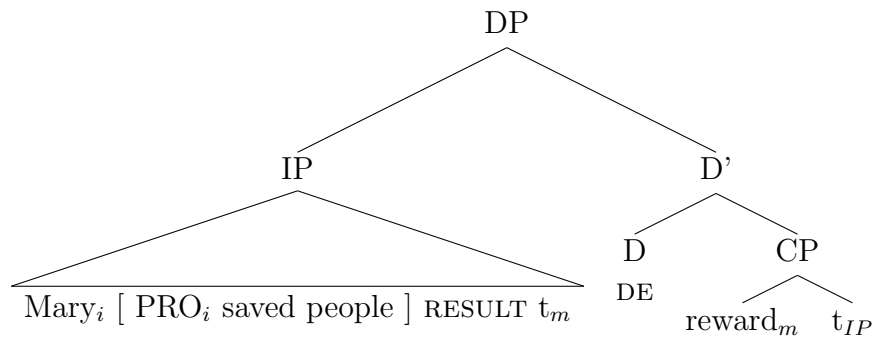
As depicted above, the head noun of a gapless relative is the object of the abstract verb RESULT which is unpronounced. Initially, the noun *huibao* 'reward' moves to the Spec CP position. Then, to capture the word order, we move the entire IP to the specifier position of DP where the relative clause precedes the head noun.

Accordingly, gapless relatives that can be analysed as serial verb constructions are not adjunct relatives but argument relatives. In this way, we turn to the question of what makes gapless relatives look so different from normal argument relatives on the surface. For normal argument relatives, it is relatively easier to figure out the gap position inside the relative clause. This is because the verb which selects the head

noun is overt on the surface of the relative clause. However, for the second type of gapless relative in our analysis, the gaps of these gapless relatives are not as easy to detect as those of normal relatives since the gaps are hidden with the disappearance of the main verb. Gapless relatives like the following, can be regarded as the second type of gapless relative.

(321) a. Zhè jiù   shì [[[$_{IP}$ Ann zuò è   de] nà-gè xiàchǎng].
          this exactly be   Ann do evil   DE   that-CL consequence
          'This is the consequence of Ann's evil doing.'

       b. Zhè jiù   shì [[[$_{IP}$ Lisa kǎo yú] de] nà-zhǒng wèidào].
          this exactly be   Lisa grill fish DE   that-CL   smell
          'This is the smell of Lisa's grilling fish.'

       c. Zhè jiù   shìi [[[$_{IP}$ Ann mài shū] de] qián   ].
          this exactly be   Ann sell book   DE   money
          'This is the money that Ann's selling books.'

       d. Zhè jiù   shì [[[$_{IP}$ Lisa tán gāngqín] de] shēngyīn].
          this exactly be   Lisa play piano   DE   sound
          'This is the sound of Lisa's playing piano.'

On the surface, these gapless relatives only have one vP layer. The other vP layer is hidden after the object being relativized and the verb becomes covert. Since it is easy to recognize that there is more than one vP layer inside these gapless relatives, just as that structure of them has been reduced, we call this type of gapless relative "reduced form relative clauses". There is a significant difference between the resultative gapless relatives and the adjunct gapless relative: overt verb contained in the resultative gapless relatives cannot be aspectually marked whereas the overt verb contained in the adjunct relatives can be aspectually marked.

(322) **Adjunct gapless relative**

       Zhè jiù   shì [Mary chàng-*zhè* gē   de shēngyīn].
       this exactly be   Mary sing-PROG song DE sound

       'This is the sound of Mary's singing.'

(323) **Resultative gapless relative**

       Zhè jiù   shì [Mary jiù-(*$guò$) rén   de huíbào].
       this exactly be   Mary save-PAST people DE reward

       'This is the reward of Mary's saving people.'

5.5   Chapter Summary

In first part of this chapter, I have provided four analyses of the Mandarin gapless relative clauses, namely Ning's (1993) VP adjunct approach, Aoun and Li's (2003) complementation approach, Cheng and Sybesma's (2005) event-variable approach and Zhang's (2015) DP modifier approach. Ning (1993) argues for a uniform analysis to gapless relatives and adjunct relatives. By contrast, Aoun and Li (2003) contend that gapless relatives are not real relative constructions and argue that gapless relatives have a complementation structure. Cheng and Sybesma (2005) assume that gapless relatives involve an event variable rather than an argument variable or an adjunct variable. Unlike Aoun and Li (2003), Ning (1993) and Cheng and Sybesma (2005), Zhang (2015) treats gapless relatives as a subtype of relative clauses and arises an alternative approach for gapless relatives.

In the second part of this chapter, I have illustrated my proposal for Mandarin gapless relatives. I showed that the gapless relatives in the literature can be divided into three different kinds: (i) adjunct gapless relative, (ii) reduced gapless relatives and (iii) ambiguous gapless relatives. The first and the second type of gapless relative can only be analysed in one structure, either adjunct relative constructions or serial verb constructions. By identifying three shared properties of the first type of gapless relative and the manner/instrument adjunct relatives, I have argued that the first type is a not true gapless relative because they can be analysed the same way as manner/instrument adjunct relatives. For those gapless relatives which can be analysed in a serial verb structure, I have adopted four tests to argue that the matrix verb of the serial verbs sequence is the covert verb. Only those belonging to the second type are true gapless relatives since they have a reduced structure on the surface and their gaps are hidden by the covertness of the vP layer. The third type of gapless relative is a combination of the first and second types. Since they can be analysed in either structure, we call them ambiguous gapless relatives. This may be a piece of evidence to distinguish these two types of gapless relative. In addition to this, to distinguish gapless relatives, we can also think of the possible relationships between the overt verbs and the head nouns.

Chapter 6

Relative Construction in Comparative

6.1 Introduction

Tsai (2008) observes that gapless relative clauses behave differently from noun complement clauses in comparatives. This chapter examines how the analyses I have developed for gapless relatives in the preceding chapters can capture this observation. I will first introduce the syntax and semantics of comparatives in English and Mandarin Chinese. I will then examine how previous literature has approached Mandarin comparatives and argue that a version of Erlewine's (2018) approach is most successful. In the final section, I will apply this approach, combining it with my analysis of gapless relatives, to explain Tsai's observation. Roughly speaking, our discussion involves three type of comparative deletion, including deletion of the head noun, deletion of the relative clause and deletion of VP and the head noun. Before applying deletion, I propose to topicalize the reminder first. This is because we need to delete the overlapping elements as a constituent. We observe that argument relatives, adjunct relatives and gapless relatives all allow that three types of deletion but noun complements only allow one type, deletion of the noun. Further, there is an asymmetry between subject relatives and object relatives. I argue that applying the proposed derivations of adjunct relatives and gapless relatives can show why this three types of relative constructions allows such deletions and why there is a subject-object asymmetry.

This chapter contains two main sections. In the first section, we introduce the canonical structure and analyses of comparative constructions in English and Mandarin Chinese and adopt an analysis in our following discussion. In the second section, we apply the analysis of comparative and the proposed analysis of adjunct relatives

and gapless relatives to explain the deletion behaviour of relative construction and noun complement construction.

6.2 Theories of comparatives

6.2.1 Comparatives in English

This section introduces some core concepts in the analysis of the syntax of comparatives. Consider the English example in (324):

(324) $\overbrace{John}^{Target}$ is $\underbrace{taller}_{DegreePredicate}$ $\underbrace{than}_{StandardMarker}$ $\overbrace{Mary}^{Standard}$.

In (324), the target is the entity that is being compared to another entity, which provides a standard of comparison. In (324), *John* is being compared to *Mary*, so *John* is the **Target** and *Mary* the **Standard**. The property of the two entities that is being compared is given by the degree predicate (*taller* in (324)), and the syntax of the comparative in English involves a special particle, *than*, which is known as the **Standard Marker**. The degree predicate in English has a special suffix, *-er*, which we can call the **Comparative Operator** (which can also be the free morpheme *more* in English). The literature also uses other terminology (e.g. Bhatt and Takahashi (2011) call the *Target* the *Associate* and the *Standard* the *Remnant*). I will stick to the terminology displayed in (324) in this chapter.

Semantically, comparatives measure and order individuals along some dimension (height, length etc). Entities cannot be compared directly. A comparison, in fact, is made over **degree descriptions**. There are two degree descriptions that are relevant to the meaning of (324). The relationship between them is ordered along a scale of height; in (324) that the former is stated to exceed the latter. Therefore, in order to make a comparison over two entities, we need to map entities into degree descriptions. There are various ways to do this, which we will examine below.

Two major analyses of comparatives have been pursued in the literature: one claims that the Standard is always clausal in nature, so that (324) is ultimately to be analysed as (325).

(325)   John is taller than [Mary is ~~tall~~].

The other analysis takes there to be two types of comparative roughly reflecting the

surface structure: one is phrasal, as in (324) and one clausal, as in (325). The next section examines these issues.

6.2.2 Analyses of English Comparatives: Clausal vs Phrasal

6.2.2.1 Clausal Analyses: 2-place *-er*

Let us first look at comparatives where the standard is clearly clausal. The classical analysis of these involves movement of a null operator within the standard, where the operator is understood as creating a predicate of degrees (Bresnan, 1973, 1975; Chomsky, 1977). The movement of the null operator is successive cyclic and sensitive to island constraints.

(326)   a.   John is taller than Mary is.
         b.   John is taller than [$_{clausal\ standard}$ Op λd Mary is ~~d-tall~~]

         c.   * John is taller than [Mary believes [the rumor that [he is ⎯⎯]]]

(Erlewine, 2018:6)

As we have seen, the standard can also appear as a simple noun phrase, as opposed to a clause. In English, Bresnan (1975) and Bhatt and Takahashi (2011) argue that even in these cases the standard is a clause, and an operation of comparative deletion removes the predicate, as in (327b):

(327)   a.   John is taller than Mary.
         b.   John is taller than [Mary ~~is tall~~].

Further, Bhatt and Takahashi (2011) argue that this is an area of cross-linguistic variation. In the clausal analyses, the morpheme *-er* is treated semantically as a two-place operator which takes two degree descriptions as its arguments. The denotation of the two-place comparative operator is sketched below (cf. Heim, 1985):

(328)   ⟦ -er$_{2-place}$ ⟧ = $\lambda P.\lambda Q$ [max(P) > max(Q)]

Since the comparative operator needs to take two degree descriptions as arguments, we need to move the operator *-er* to a higher position in which the comparative operator scopes over the target and the standard. The clausal analyses show that the movement of the operator *-er* also plays a role in generating the degree description of the target (Heim, 2000; Bhatt and Pancheva, 2004). According to Bhatt and Takahashi (2011), the derivation is depicted below, following the corresponding semantics of (327a).

(329)   John is taller than Mary is.
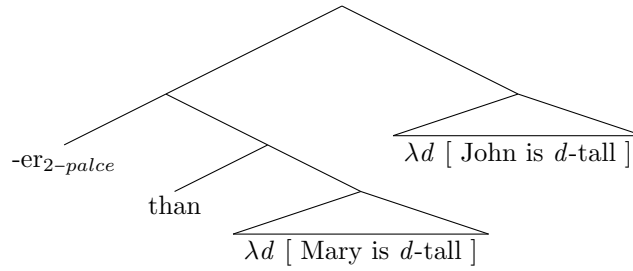
a. $[\![(329)]\!] = [\![$ -er$_{2-place}$ $]\!]$ ($\lambda d'$. Mary is d'-tall)(λd. John is d-tall)

b. $[\![(329)]\!] = 1 \Longleftrightarrow \max(\lambda d$. John is d-tall) $> \max(\lambda d'$.Mary is d'-tall)

(329a) indicates that the denotation of the sentence is given by the denotation of the comparative operator -*er* when it takes the two degree descriptions as arguments. (329b) indicates the truth conditions of the sentence: there is a range of height to the exclusion of Mary's height and John's height must be in this range. It can also be diagrammed as follows:
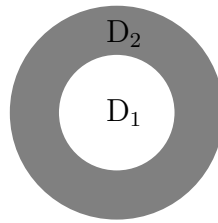
D$_2$ stands for the degree description of the target and D$_1$ stands for the degree description of the standard. This figure demonstrates the denotation of (326)/(329): the expression can be true if and only if the height of the target falls in the grey part of the figure.

Recall that the clausal approach analyses phrasal comparatives like (324) as underlying clauses. However, there are some phrasal standards, such as, *degree names*, which denote a degree description directly, and hence are not clausal. Bhatt and Takahashi (2011) argue that the 2-place comparative operator -*er* inside this kind of comparative takes the degree description of the Target and the degree name in the Standard directly as its arguments. Consider (330).

(330)　John is taller than **four feet**.

The complement of *than* here is a degree name 'four feet' denoting a set of degrees of length up to and including four feet. Thinking of this diagrammatically, in the figure below, the height of John exceeds the maximum (edge) of the inner circle, which represents the height of 4 feet or lower.
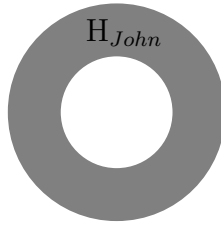
The semantics of (330) is given in the following.

(331) a. $[\![(330)]\!] = [\![$ -er$_{2-place}$ $]\!]$ (λd. John is d-tall)($\lambda d'$. d' = 4 feet)

   b. $[\![(330)]\!] = 1 \Longleftrightarrow$ max (λd. John is d-tall) > max ($\lambda d'$. d' = 4 feet)

Considering examples with phrasal standards like (330), Bhatt and Takahashi conclude that the 2-place degree head is not limited to clausal comparatives.
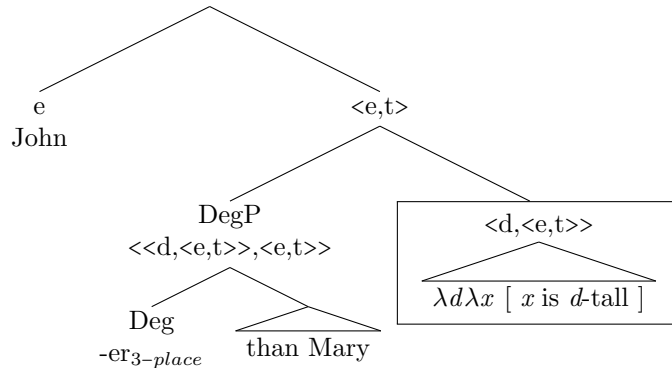
6.2.2.2 Phrasal Analysis

In this section, I will introduce the alternative approach to phrasal comparatives. The phrasal analysis is also known as the **Direct Analyses**. This approach treats phrasal standards as involving NPs with no ellipsis (Bhatt and Takahashi, 2011). However, it is not possible to compare two individuals/entities directly. Apart from the two individuals, there has a predicate of individuals and degrees to make a relation between an individual and a degree. Therefore, in the phrasal analysis, the comparative operator needs to take three elements: two individuals and a predicate of individuals and degrees. The denotation of the 3-place comparative operator is given in the following.

(332) $[\![$ -er$_{3-place}$ $]\!] = \lambda y.\lambda P.\lambda x.$ [max (P(x,d)) > max (P(y,d))]

According to Bhatt and Takahashi's (2011) assumption, the predicate of individuals and degrees is generated by two movement operations: the target *John* moves first to generate a predicate of individuals, then the degree phrase moves and targets this predicate of individuals, as represented in (333) where we use an English example for illustrating the idea.

(333)   John is taller than Mary.

```
                         /\
                        /  \
                       /    \
                      e     <e,t>
                    John     /\
                            /  \
                           /    \
                         DegP    ┌──────────────────────┐
                     <<d,<e,t>>,<e,t>> │       <d,<e,t>>        │
                       /\         │        /\             │
                      /  \        │       /  \            │
                    Deg   \       │  λdλx [ x is d-tall ] │
                  -er_{3-place}  than Mary └──────────────────┘
```

(Bhatt and Takahashi, 2011:586)

a. $[\![(333)]\!] = [\![\text{-er}]\!]$ (Mary)$(\lambda d.\lambda.x.\ x$ is d-tall)(John)
b. $[\![(333)]\!] = 1 \iff \max(\text{John is } d\text{-tall}) > \max(\text{Mary is } d'\text{-tall})$

A prominent way in which this approach differs from clausal analyses is that the comparative operator in the phrasal analysis needs to take a predicate of individuals and degrees additionally. In the clausal analyses, the arguments are degree descriptions already therefore the comparative operator can take them as arguments directly. Compared with the clausal analysis, in the phrasal analysis, the comparative operator takes two individuals as arguments. So, an additional operation is needed to convert the individual arguments into degree arguments.

Bhatt and Takahashi (2011) argue that the Direct Analysis cannot be work in English according to a piece of evidence from binding. Under the Direct Analysis, the binding properties of the Standard do not have any relationship with those of the Target. If this is correct, it should be possible to have the following coreference which is in contrast with the fact.

(334)   a. * More people talked to him$_i$ about Sally than about Peter$_i$'s sister.
        b. * More people expect him$_i$ to overtake Sally than Peter$_i$'s sister.

(Bhatt and Takahashi, 2011:587-588)

(335)   **Underlying structure of (334a) and (334b):**
        a. * More people talked to him$_i$ about Sally [than ~~d-many people talked to him$_i$~~ about Peter$_i$'s sister].
        b. * More people expect him$_i$ to overtake Sally [than ~~d-many people expect him$_i$ to overtake~~ Peter$_i$'s sister].

175

Since the Standard *Peter's sister* which contains the R-expression is not c-commanded by an element that c-commands the Target, the pronoun *him* can refer to the R-expression *Peter*, under the Direct Analysis. Therefore, Bhatt and Takahashi (2011) conclude that only the Reduction Analysis is available in English.

In Mandarin Chinese, also, it is problematic to treat the phrasal standard in an example like (336) as an argument directly. In (336), we compare the speed of Zhangsan and the speed of the car. More specifically, it is the speed of Zhangsan's walking and the speed of the car's running. The verb, which is supposed to be *pǎo* 'run', used for *chē* 'car' is missing in standard position of (336).

(336) [$_{Target}$ Zhāngsān] zǒulù   bǐ   [$_{Standard}$ chē] hái   kuài.
          Zhangsan   walk-road than   car   even fast

      'Zhangsan walked faster than a car.'

Following the phrasal analysis, the comparative operator would take *Zhāngsān* and *chē* 'car' as arguments, and a predicate of individuals and degrees as a further argument. The LF of (336) is depicted in the following.

(337)
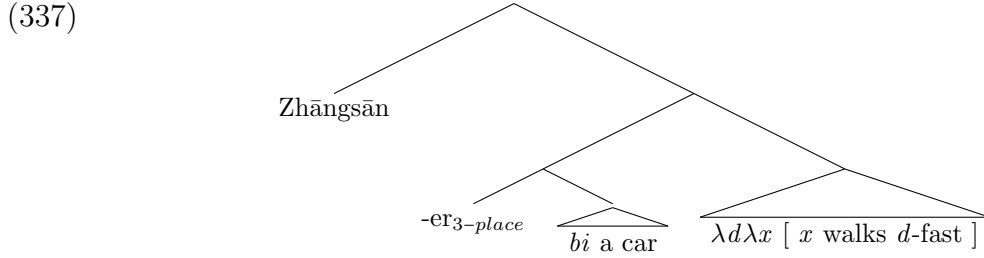
The problem here is that the standard *chē* 'car' is predicated to take part in the same *walking*-event as the target *Zhāngsān* does. This is because the comparative operator takes just three arguments, one of which is the predicate $\lambda d.\lambda x.$ x walks d fast. However, it is problematic to use the verb *zǒulù* 'walk' for *che* 'car'. (336).

(338)   * [$_{Target}$ Zhāngsān] zǒulù   bǐ   [$_{Standard}$ chē] zǒulù   hái   kuài.
             Zhangsan   walk-road than   car   walk-road even fast

      Intended: 'Zhangsan walked faster than a car.'

(338) shows that it is ungrammatical for us to use the same verb for the standard as for the target. As mentioned above, it supposes the same action for the standard as for the target, which is not always correct.

Clausal analyses are more flexible, and can deal with comparatives which of this type by assuming that the clause containing the target and the clause containing
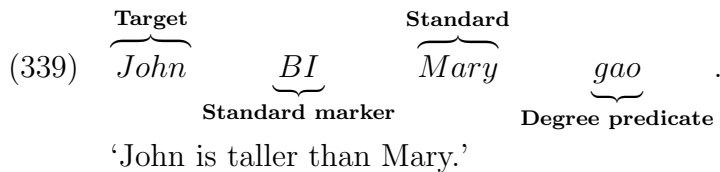
the standard are mismatched. I turn to a particular approach (Erlewine, 2018) to addressing this problem in the next section.

In this section, I have given a preliminary sketch of the syntax and semantics of comparatives. Outlining two main approaches to analysing comparatives. One is the clausal analysis which assumes: (i) elements following *than* are always clausal in syntax; (ii) the comparative operator is a 2-place predicate taking two degree descriptions as arguments. The other is the phrasal analysis which assumes: (i) apparent NP elements following the standard marker are phrasal in the syntax; (ii) the comparative operator is a 3-place predicate taking as arguments two individuals and a predicate of individuals and degrees. I have illustrated one particular issue in using the phrasal analysis to analyse BI-Comparatives in Mandarin. In the next section, I will take a deeper look at these BI-comparatives.

6.3 Mandarin Chinese BI-comparatives

BI-comparatives in Mandarin Chinese have most of the surface properties that English comparatives have, including a **target**, a **standard**, a **standard marker**, and a **degree predicate**. However, BI-comparatives lack an overt comparative morpheme analogous to English *-er* or *more*. The canonical structure of a BI-comparative is depicted below.

(339) **Target** **Standard**
       John   *BI*   *Mary*   *gao*   .
       Standard marker   **Degree predicate**

'John is taller than Mary.'

The order of the components of Mandarin Chinese comparatives is slightly different from that in English. In the BI-comparative, the degree predicate follows all other constituents. Supposing the standard marker *bǐ* and the standard itself compose as a *bǐ*-phrase (analogous to the *than*-phrase in English), then the difference between Mandarin Chinese and English comparatives is the reversed order of the *than*P and the degree predicate. [1]

---

[1] *Bi* is a complicated particle in Mandarin, which has been analysed as a verb, an adjective, an adverb, and a noun. I will introduce the verbal and the adjectival uses of BI here.

(1) a. Wǒ hé   nǐ [$_V$ bǐ   ] huàhuà.
         I   with you   compare   paint
         'I compare my painting ability with yours.'

I have enumerated some representative examples of BI-comparatives below.

(340) **BI-comparatives with simple NPs as targets and standards**

    a. John bǐ   Mary [$_{AP}$ gāo].
       John than Mary   tall

       'John is taller than Mary.'

    b. John bǐ   Mary [$_{VP}$ huì huàhuà].
       John than Mary   can paint
       'John can paint better than Mary.'

    c. John bǐ   Mary [$_{AP}$ [$_{VP1}$ huà   mǎ   [$_{VP2}$ huà   ]] dé hǎo   ].
       John than Mary   paint horse   paint   DE good
       'John paints horses better than Mary does.'

The targets and the standards included in the examples above are all simple noun phrases. In (340a), the comparison is made between the heights of John and Mary. In (340b), it is the painting abilities of John and Mary that are being compared. The BI-comparative in (340c) has interacted with another structure which is known as the 'postverbal adverb structure' (or manner verb-double constructions in Erlewine (2018)). The degree predicate within that AdvP is an adverb used to modify the verb 'huà' *paint*. Furthermore, the particle *de* is an adverbial particle which has the same pronunciation (but a different representation in terms of written character) as other *de* particles in Mandarin Chinese. We will return to this structure later in our discussion.

In BI-comparatives, apart from NPs, the targets and the standards can also appear as VPs and PPs, as pointed out by Liu (1996). Consider the examples below.

(341)   a. **BI-comparative with VPs**

       John [$_{VP}$ huàhuà] bǐ   [$_{VP}$ chànggē   ] hǎo.
       John   paint   than   sing-song   well

       'John's painting is better than his singing.'

     b. **BI-comparative with PPs**

       John [$_{PP}$ yòng jiǎndāo] kāi   píngzi bǐ   [$_{PP}$ yòng kāipínqì] kuài.
       John   use scissors open bottle than   use opener   fast

       'John opening the bottle with scissors is faster than with an opener.'

---

      b. Zhè yàng de rén   zài-shū-zhōng [$_{Adj}$ bǐbíjiēshì   ].
        this kind DE person in-the-book   everywhere
        'This kind of person is everywhere in the book.'

In both cases, the phrases in the standards have the same subjects as their targets. The bracketed constituents are the elements that contrast between the target and standard.

The target and the standard can also appear as a complex noun phrase and a possessive. Consider the examples of comparatives with possessives and complex noun phrases below.

(342) a. **BI-comparative with Possessives**

[$_{NP}$ John-de cháhú] bǐ   [$_{NP}$ Mary-de bēizi] [$_{AP}$ duō/dà/gāo   ].
John-DE teapot   than   John-DE cup   many/large/tall

'John's teapots are more/larger/taller than Mary's cups.'

b. **BI-comparative with RCs**

[$_{RC}$ John zǒu-guò de qiáo] bǐ   [$_{RC}$ Mary zǒu-guò de lù   ] [$_{AP}$
John walk-ASP DE bridge   than   Mary walk-ASP DE road

duō].
many

'The bridges that John walked are more than the roads that Mary walked.'

In (342a), the number of teapots that John possesses is compared with the number of cups that Mary possesses. In (342b), the number of bridges that John has walked over is compared with the number of roads that Mary has walked along. These examples will serve as a basis for understanding how relative clauses interact with BI-comparatives and how comparative deletion affects the formation of relative clauses in what follows. We will specifically focus on why comparatives built on subject relative clauses are degraded compared to those built on object relative clauses ((343b) vs (343a)) and on how the structure of gapless relative clauses interacts with comparatives (343c).

(343) a. **Object relative clause**

[Zhāngsān <u>mǎi de shū</u>] bǐ   [Lǐsì] duō.
Zhangsan buy DE book   than   Lisi   many

'The books that Zhangsan bought is more than the books that Lisi bought.'

b. **Subject relative clause**

?? [<u>Mǎi</u> shū   <u>de dàrén</u>] bǐ   [CDs] duō.
buy book DE adult   than   CDs   many

Intended. 'Adults who bought books are more than adults who bought CDs.'

c. **Gapless relative clause**

[Zhāngsān zuòbì de xiàchǎng] bǐ   [Lǐsì] cǎn.
  Zhangsan cheat DE result   than   Lisi   miserable

'The result of Zhangsan's cheating is more miserable than Lisi's.'

6.3.1 Previous Analyses of Mandarin BI-comparatives

6.3.1.1 Clausal Analyses: Obligatory Deletion

Assuming a clausal analysis, we might argue that, unlike in English, comparative deletion is obligatory in Mandarin (e.g. Liu, 1983). According to Liu, deletion applies to seven types of elements: head nouns (see (344a)); the combinations of a head noun and the particle DE; clausal modifiers; VPs (see (344b)), and the combinations of part of a clausal modifier and a head noun (see (344c)):

(344)   a. **Possessee Deletion**:

[John de   xīnqíng] bǐ   [Mary de   (* xīnqíng)] hǎokàn.
  John GEN mood   than   Mary GEN   mood   good

'John's mood is better that Mary's.'

b. **VP Deletion**:

John [$_{VP}$ shuìjiào] bǐ   Mary [$_{VP}$ (* shuìjiào)] zǎo.
John   sleep   than Mary   sleep   early

'John sleeps earlier than Mary.'

c. **Deletion of Part of a Clausal Modifier and a Head Noun**:

[John qiánjìn de jiǎobù   ] bǐ   [Mary (* qiánjìn de jiǎobù   )]
  John go-forward DE step   than   Mary   (go-forward DE step)
kuài.
fast

Lit. 'The steps that John goes forward are faster than Mary.'

(cited from Liu (1983:841-843))

In (344a), the comparison is the quality of the books that John possesses and the quality of the books that Mary possesses. The possessees are syntactically identical, thus, *shū* 'book' contained in the standard can be elided. In (344b), the timing of

180

John's going to sleep is compared with that of Mary. The overlapping VP *shuìjiào* 'sleep' is deleted. Along with the deletion operation applying in the first two examples, in (344c), what is being deleted looks like a non constituent so it superficially seems that there are two deletion operations. This last type of deletion phenomenon is the focus of the following discussion.

Additionally, regarding possessee deletion, Shao (1990) has pointed out that it is optional to delete the particle *de*, contained in the complement of *bǐ*, together with the possessee, leading to a more phrasal appearance to the example. Thus, (344a) can be amended as below.

(345) [John de   xīnqíng] bǐ   [Mary ~~de xīnqíng~~] hǎo.
       John GEN mood   than   Mary GEN mood   good

'John's mood is better than Mary's.'

Liu (1996), in line with Chomsky's (1977) analysis of English comparatives, proposes an analysis for the syntax of BI-comparatives. The underlying structure of BI-comparative he proposes is sketched in (346).

(346) $[_{IP}$ **Target** $[_{PP}$ *bǐ* $[_{CP}$ $[_{CP}$ **Standard** $[_{IP}$ $[_{I'}$ e]]]]] degree predicate]]

Following Chomsky (1977), Liu (1996) proposes an I' deletion inside the clause that contains the standard. A difference from the structure of English comparatives is that the *bi*-clause is embedded by the clause that contains the target. In English comparatives, the *than*-clauses are right-adjoined to the target clause. Another difference between English comparatives and BI-comparatives is the way that the deletion operates. Liu (1996) argues that it is a case of *antecedent-contained deletion* rather than by the operator movement Chomsky suggests for English comparatives. This is because Liu argues that there is no movement involved in BI-comparatives. In turn, this is motivated by the observation that BI-comparatives do not have the unbounded dependency effect that English comparatives have. Consider below.

(347) a. John is happier $[_{PP}$ than $[_{CP}$ Op_i $[_{IP}$ Louis thinks $[_{CP}$ that $[_{IP}$ Mary is t_i]]]]]

       b. *John jīntiān $[_{PP}$ *xīnqíng* $[_{CP}$ Louis rènwéi $[_{CP}$ Mary zuótiān $[_{I'}$ e]]]]
           John today   than   Louis think   Mary yesterday
           gāoxìng].
           happy

           Intended. 'John is happier today than Louis thinks that Mary was yesterday.'

(347a) illustrates that the gap inside an English comparative can be embedded in another clause so there is an unbounded dependency effect. Mandarin BI-constructions

do not allow this.

However, it is also difficult to explain cases like (348), which we already discussed with reference to the phrasal analysis above in 6.2.2.2, in the framework of Liu (1996) which operates comparative deletion to the parallel clauses in the BI-comparatives. According to Liu, the parallelism requires that the complement of *bǐ*, the Standard, must be interpreted the same way as the Target in the matrix clause.

(348) a. Zhāngsān zǒulù   bǐ   chē hái   kuài.
        Zhangsan walk-road than car even fast

        'Zhangsan walked faster than a car.'

     b. * Zhāngsān zǒulù   bǐ   chē zǒulù   hái   kuài.
         Zhangsan walk-road than car walk-road even fast

         'Zhangsan walked faster than a car.'

In the framework of the traditional clausal analysis, the complement of *bǐ*, the clause that contains the standard, is supposed to have an identical interpretation with the target clause, in line with the parallelism. As I have pointed out before, it is not suitable to use the verb *zǒulù* 'on foot walk' for *chē* 'car' to have the interpretation *car's running*. In other words, the deleted verb in the clause following *bǐ* is not the same as the verb that appears in the clause preceding *bǐ*. I will provide more arguments against the analysis of BI-comparatives under the framework of Liu's analysis in the next section.

6.3.1.2   Phrasal Analyses

Erlewine (2007) has argued that BI-comparatives require a phrasal analysis rather a clausal analysis on two grounds. One is that it is impossible to embed a clause in BI-comparatives, (see also Liu (1996)), whereas, it is possible to do so in English comparatives, as can be seen in the following contrast:

(349) John is taller than [Mary thinks [that he is _____]].

(350) * John bǐ   [Mary rènwéi [tā _____]] gāo.
       John than   Mary think   he   tall

       Intended. 'John is taller than Mary thinks he is.'

(Erlewine, 2018:9)

In Section 6.3.1.1, I mentioned that the possibility of embedding the standard clause indicates the presence of a degree operator which needs to undergo A-bar movement in the clausal analysis.

The other argument that Erlewine makes is that BI-comparatives lack subcomparatives. As shown in (351), an English comparative can be used to compare the height of the chair and the width of the table. However, it is not possible to use the BI-comparative to compare two different degree descriptions, as can be seen in (352).

(351)   My chair is taller than your table is wide.

(352)   * Wǒ de   yǐzi gāo bǐ   nǐ   de   zhuōzi kuān.
        I   GEN chair tall than you GEN table   wide
        Intended. 'My chair is taller than your table is wide.'

Languages which allow subcomparatives have a structure for comparatives which allows the standard and the target to adjoin to their corresponding gradable predicates. As for BI-comparatives, Erlewine (2018) has argued that the local predicate of the target clause must be identical with the predicate of the standard clause. This means only one predicate is allowed in a BI-comparative. The predicate of the target which is phonologically covert must be identical to the predicate of the standard. Returning to (352), the degree predicate of the target clause, $gāo$ 'tall', is not identical with the degree predicate of the standard clause, therefore it cannot be deleted. According to the deletion requirement proposed by Erlewine (2018), (352) is ungrammatical because of the appearance of two different predicates. Therefore, subcomparatives are impossible in BI-comparatives. Because of these two properties of BI-comparatives, there is a recent trend to propose a phrasal analysis for the BI-comparative (Erlewine, 2007; Lin, 2009, among others).

Erlewine (2007) proposes to treat BI-comparatives as explicit comparison. According to Kennedy (2007), explicit comparison is to establish an ordering between entities x and y with respect to gradable property g using special morphology whose conventional meaning has the consequence that the degree to which x is g exceeds the degree to which y is g. Implicit comparison is to establish an ordering between entities x and y with respect to gradable property g using the positive form by manipulating the context or delineation function in such a way that the positive form is true of x and false of y. In English, explicit comparison involves the comparative morpheme -er, while implicit comparison does not (see (353)).

(353)   Compared to that building, this one is tall.

As for Mandarin Chinese, Erlewine argues that BI-comparative is an instance of explicit comparison because BI-comparative yields crisp judgment. Let's have a look at the following example. Although (354) is ambiguous between a clausal reading and a phrasal reading in English, its counterpart in BI-comparative, as shown in (355), is not ambiguous. In English, the sentence can mean "John likes Tom more than Mary likes Tom" and "John$_i$ likes Tom more than he$_i$ likes Mary".

(354)   John likes Tom more than Mary.

(355)   John bǐ Mary xǐhuān Tom.
        John BI Mary like   Tom

        'John likes Tom more than Mary does.'

Semantically, Erlewine proposes that the comparative operator which is phonological null takes individuals (entities) as arguments instead of taking degree descriptions as arguments, where, in (355), the arguments are *John* and *Mary*. He regards *bi* as a verbal functional head which introduces a DP in its specifier and Merges above a voice head *v*. *Bǐ* is moved from a position inside the standard clause to its surface position which is between the target and the standard. The derivational structure of BI-comparatives is as represented below.

(356)
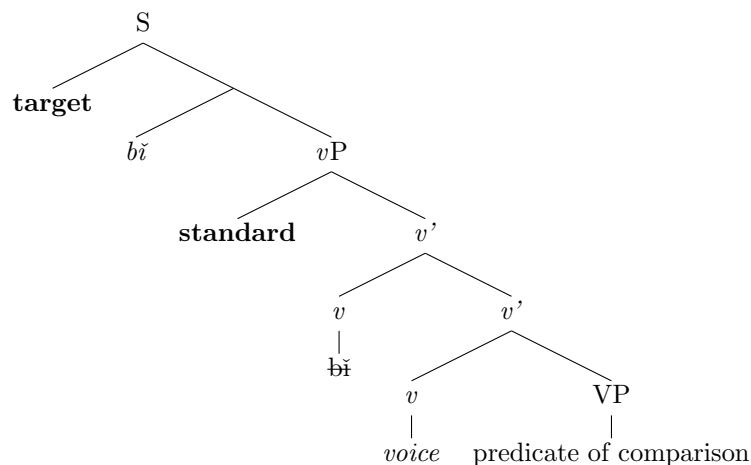
(Erlewine, 2007:32)

As shown in the tree structure, *bǐ* is the head of the extended projection of VP. The standard is in the specifier position of that *v*P. There is another *v* head, *voice*. This *voice* head is used to introduce a predicate of individuals and eventuality variables. The semantics of *voice* and *bǐ* are sketched in (357). *Voice* is merged with a predicate of comparison first (semantically composing via *Event Identification* (Kratzer, 1996)). Erlewine (2007) proposes the predicate of comparison to be a *proposition-taking* predicate.

(357)   a. $[\![\text{voice}_{active,experiencer}]\!] = \lambda x \lambda \epsilon . \text{Exp}(x,\epsilon)$
        b. $[\![\text{BI}]\!] = \lambda G_{<e,<\epsilon,t>}\lambda y \lambda x \lambda \epsilon_1 . \exists \epsilon_2 (G(x,\epsilon_1) \wedge G(y,\epsilon_2) \wedge \epsilon_1 \ggg \epsilon_2)$

(Erlewine, 2007:33)

According to Erlewine's (2007) explanation, there are three functions of the semantics of *bi*. First, there are two external arguments, x and y, corresponding to participants

in the eventualities denoted by the two eventuality variables, ϵ_1 and ϵ_2. Second, *bi* can existentially bind the eventuality variable in the standard. The final function is that the the eventualities are formed by the notation $\ggg$ which defines an intensity ordering. This requires two eventualities have to be comparable. The BI-comparative in (355) has the semantics as represented in (358).

(358) $[\![(355)]\!] = \exists s_1 \exists s_2 (\text{like}(\text{TOM},s_1) \land \text{Exp}(\text{JOHN},s_1) \land \text{like}(\text{TOM},s_2) \land \text{Exp}(\text{MARY},s_2) \land \epsilon_1 \ggg \epsilon_2)$
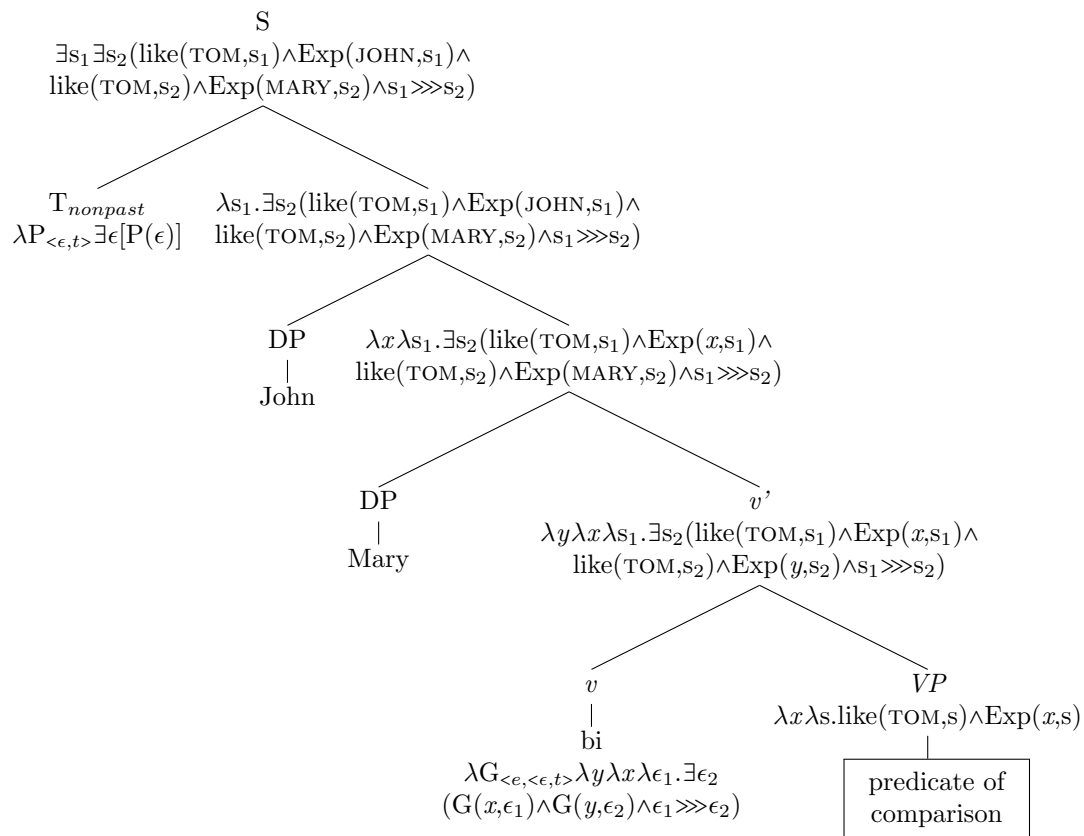
In this example, it is only possible to make a comparison of the subject positions of the target clause and the standard. The event semantics contained above can illustrate why there is no ambiguity in Mandarin Chinese. After merging the VP with *bi*, the internal argument (object) of the *liking*-event is fixed, which means the internal argument cannot be changed during the course of the derivation. In this way, it is not possible to have a phrasal reading.

Lin (2009) also argues for a phrasal analysis of BI-comparatives. He agrees that BI-comparatives are inherently phrasal, however, he further points out that there is a challenge for the prevalent phrasal analyses which appeal for a 3-place degree

head. Tsao (1989), as cited in Lin (2009), has demonstrated that there is a kind of BI-comparative, called 'multiple-topic comparison', which can take more than two individual arguments, as shown in (359).

(359) [John zuótiān   zài jiā   ] bǐ   [Mary jīntiān zài xuéxiào] kāixīn.
       John yesterday at home   than Mary today at school   happy
       'John was happier at home than Mary was at school today.'

Lin regards the *time* and the *location PP*, appearing in the target and the standard, as parts of the argument structure of the predicate. In this way, *John zuótiān zài jiā* is built up as a complex target, and there are three topics included in this target. However, the 3-place degree operator cannot quantify over more than one comparison. In order to deal with cases involving multiple comparisons, Lin (2009) proposes to treat the original 3-place degree operator as a dyadic degree operator, which can quantify over more than one object. Lin's (2009) revised phrasal analysis is inspired by Xiang's (2005) DegP-shell structure. A difference from Xiang (2005) is that the DegP-shell is projected as an adjunct to the gradable predicate in Lin's (2009) proposed structure. The degree-phrase is a recursive structure, as represented in (359).

(360)
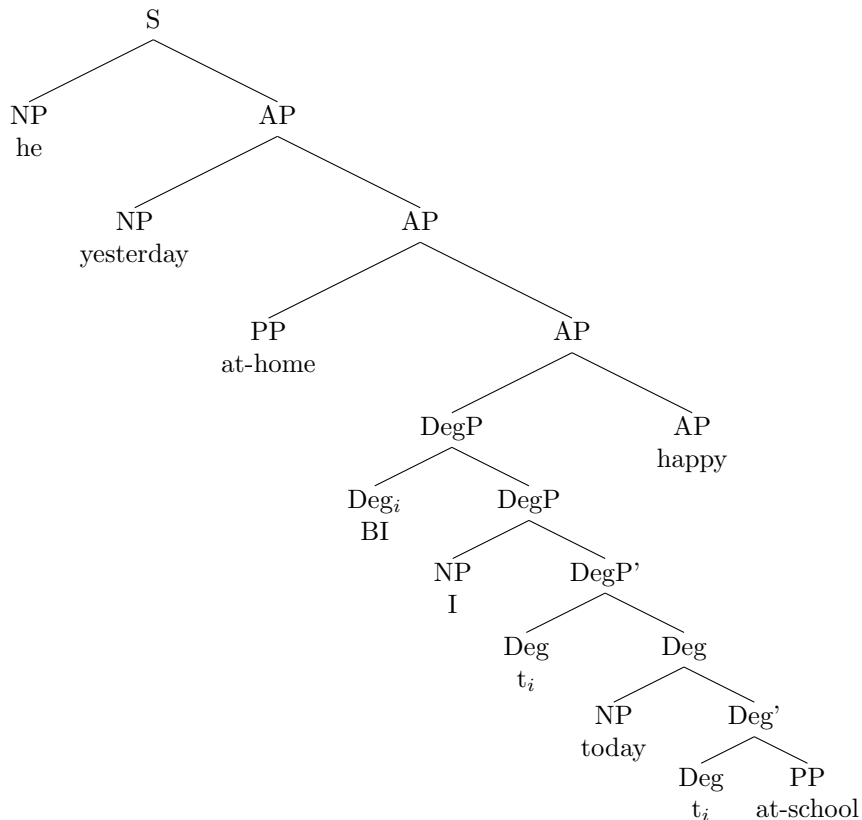
As shown in (360), the degree head originates in the head position of the bottom degree-phrase. In order to take the three different arguments, the degree head has to raise from the lowest position to the highest position.

However, Lin's (2009) analysis has difficulty analysing cases when the manner verb-copy construction is involved in the BI-comparative. In such case, it is not possible to regard the target and the standard clauses as arguments. Consider the example below to have a preliminary understanding of the manner verb-copy construction.

(361) [$_{TP}$ Mary [$_{VP1}$ chànggē [$_{VP2}$ chàng de   [$_{AP}$ hǎo]]]].
       Mary   sing-song   sing DE$_{compl}$ well
       'Mary sings well.'
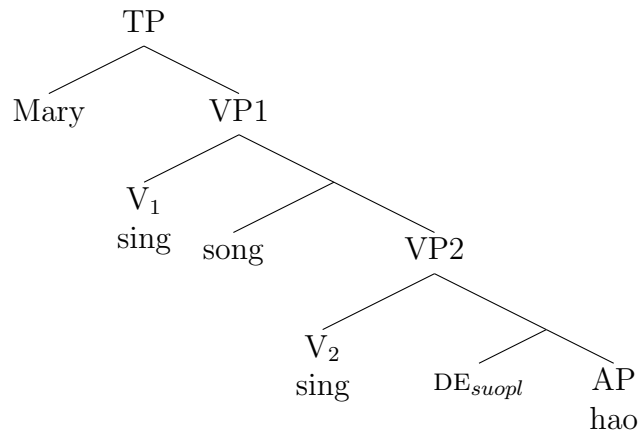
In (361), the AP *hǎo* 'well' functions as an adverb modifying the verb *chàng* 'sing'. In the manner verb-copy construction, the adverb must appear in a postverbal position following *de*. For BI-comparatives that involve the manner verb-copy construction, as in (362), it is not possible to regard the combination *Mary chànggē* as an argument. This is because the degree predicate *hǎo* 'well' which is an adverb can only modify the VP *chànggē* 'sing songs'. Lin's (2009) example in (360) can be split into three different interpretations: (i) he is happier than me; (ii) yesterday is happier than today; (iii) being at home is happier than being at school. The degree predicate 'happy' can be distributed to the three pairs of comparisons without problems. However, it is not possible to do so in (362).

(362) Mary chànggē bǐ   John **chàng de**   hǎo.
       Mary sing-song than John sing   DE$_{compl}$ well
       'Mary sings better than John.'

Under Lin's analysis, this example has two different interpretations: (i) Mary is better than John; (ii) Mary sings better than John. The predicate appears as an adjective in the former interpretation, whereas the predicate is an adverb in the latter interpretation. So applying Lin's proposed structure to analyse this type of BI-comparative disorders the identity of the predicate. In sum, there are various arguments supporting the view that the standards of BI-comparatives are radically phrasal. The illicitness of embedding the standard clause and the lack of subcomparatives strongly suggest a phrasal analysis. Erlewine (2007) proposes a phrasal analysis which applies a predicate of individuals and eventuality variables. Lin (2009) proposes a phrasal analysis with a dyadic degree head for BI-comparatives, which can deal with multiple comparisons simultaneously. However, the phrasal analyses have difficulties in analysing comparatives that involve the postverbal adverb structures and the comparatives that have an asymmetrical structure of the target and the standard. In the next section, I will introduce Erlewine's (2018) new proposal for BI-comparatives.

6.3.1.3 Erlewine's (2018) New Analysis of BI-comparatives

Erlewine (2018) has proposed a new clausal analysis for Mandarin BI-comparatives. This new clausal analysis differs from previous analyses in two crucial respects: (i) Erlewine articulates the details of the mechanics of the ellipsis operation; (ii) Erlewine proposes to abandon the usage of degree abstraction in his new clausal analysis. In the framework of Erlewine (2018), a BI-comparative consists of two parallel TPs on the two sides of *bǐ* which is a clausal conjunction connecting the two TPs. The proposed underlying structure of BI-comparatives from Erlewine (2018) is depicted below.

(363)   [$_{TP1}$ John] bǐ [$_{TP2}$ Mary gāo].
         John   BI   Mary tall

'John is taller than Mary.'
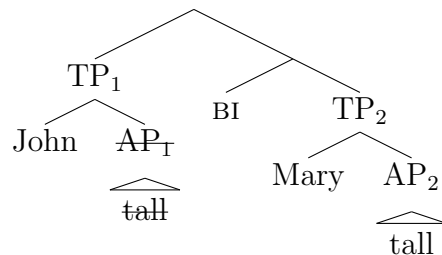
(Erlewine, 2018:12)

This structure is different from Liu's (1996) clausal analysis of BI-comparatives that we mentioned in Section 6.3.1.1. On Liu's analysis, the embedded *bǐ*-phrase structure treats the overt predicate as a predicate of the target. The structure in (363) shows

188

that Erlewine proposes that the predicate appearing on the surface belongs to the standard underlyingly rather than to the target. In other words, it is the predicate of the target that gets deleted by the deletion operation. Furthermore, Erlewine states an explicit rule for the derivation of BI-comparatives, the **Comparative Deletion Requirement**. The statement of CDR, as well as the definition of *local predicate* which is an important notion in the CDR, are as below.

(364) **Comparative Deletion Requirement:**
In a BI-comparative, elide a *local predicate* of the target TP under identity with a local predicate of the standard TP. If the target TP has no elidable local predicate, the derivation is illicit.

(365) **Local predicate:**
Given a TP β, α is a local predicate of β iff (a) α is a VP or a predicative AP, (b) β dominates α, and (c) there is no TP which is dominated by β and dominates α.

(Erlewine, 2018:12)

According to Erlewine (2018), the CDR can account for the lack of subcomparatives in BI-comparatives. The rule forces deletion of the local predicate of the target TP when it is identical with the local predicate of the standard TP. However, in a subcomparative, the predicate contained in the target TP and that contained in the standard TP are always different from each other. Consider (366).

(366) * $[_{TP1}$ John gāo $]$ bǐ $[_{TP2}$ Mary shòu $]$.
      John tall   BI   Mary thin

Intended. 'John is taller than Mary is thin.'

Derivational structure: $[_{TP1}$ John $[_{AP1}$ tall $]]$ BI $[_{TP2}$ Mary $[_{AP2}$ thin $]]$

This example is an analog of English subcomparatives. The deletion operation cannot be applied to this example because the local predicate of *John* is not identical to the local predicate of *Mary*, which violates the requirement given in (364) thus resulting in ungrammaticality.

Additionally, the lack of embedded standards in BI-comparatives can also be explained by the CDR. Since the deletion operation can only be applied to a local predicate, the presence of an intermediate TP, embedding the standard clause, will ensure non-identity, as in (367).

(367) * John bǐ $[_{TP}$ Louis rènwéi $[_{TP}$ Mary gāoxìng $]]$
      John BI   Louis think   Mary happy

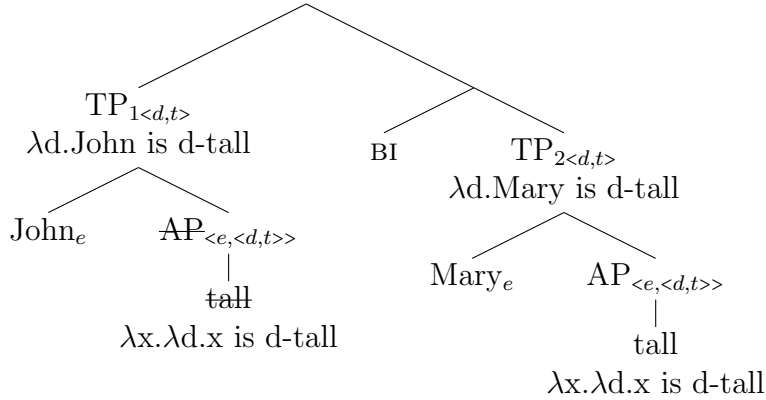Intended. 'John is happier than Louis thinks Mary is.'

Derivational structure: [$_{TP1}$ John [$_{AP1}$ ~~happy~~]] bi [$_{TP2}$ Louis thinks [$_{TP3}$ Mary [$_{AP3}$ happy]]]

As shown in the derivation, it is the illicit deletion of AP$_1$ that gives rise to the ungrammaticality of (367). AP$_3$ is not a local predicate of TP$_2$, so the CDR does not license deletion of AP$_1$, even though they are identical.

Given the syntax of the new clausal analysis above, I will turn to the semantics of this analysis. Similarly to the other clausal analyses, Erlewine also treats *bi* as a two-place degree operator taking two degree descriptions as its arguments and defining the order between the degrees. The denotation of *bi* is as represented in (368).

(368) $[\![\text{BI}]\!] = [\![er_{2-place}]\!] = \lambda D_{2<d,t>}. \ \lambda D_{1<d,t>}. \ max(D_1) > max(D_2)$

(369) [$_{TP1}$ John] bǐ [$_{TP2}$ Mary gāo].
       John   BI   Mary tall
   'John is taller than Mary.'

(370) $[\![\text{BI}]\!] ([\![\text{TP}_2]\!])([\![\text{TP}_1]\!])$
    $= 1 \Longleftrightarrow max([\![\text{TP}_1]\!]) > max([\![\text{TP}_2]\!])$
    $= 1 \Longleftrightarrow max(\lambda d. \text{ John is d-tall}) > max(\lambda d. \text{ Mary is d-tall})$

The predicate *tall* of type *<e,<d,t>>* takes an individual as argument first via *Functional Application* (Heim and Kratzer, 1998) and gives back a degree predicate of type *<d,t>*. In (370), we can see *bǐ* takes two TPs (degree descriptions) as arguments, in line with the semantic description of *bǐ* in (368). The target clause describes the *height of John* and the standard clause describes the *height of Mary*. The last line in (370) is the explicit denotation of (369) which expresses that the height of John exceeds, at least, the maximal height of Mary.

On this basis, Erlewine (2018) claims that the new clausal analysis can tackle the cases of BI-comparatives that have a deleted complex predicate which is fundamentally different from the other predicate. I have mentioned that most analyses have difficulty in analysing this kind of comparative. This kind of comparative involves a structure called a postverbal adverb structure or manner verb-doubling constructions, repeated (361) in the following.

(371)   [$_{TP}$ Mary [$_{vP}$ chàng [$_{VP}$ gē   [$_V$ chàng [de   [$_{AP}$ hǎo]]]]].
        Mary   sing   song   sing   DE$_{compl}$ well
        'Mary sings well.'
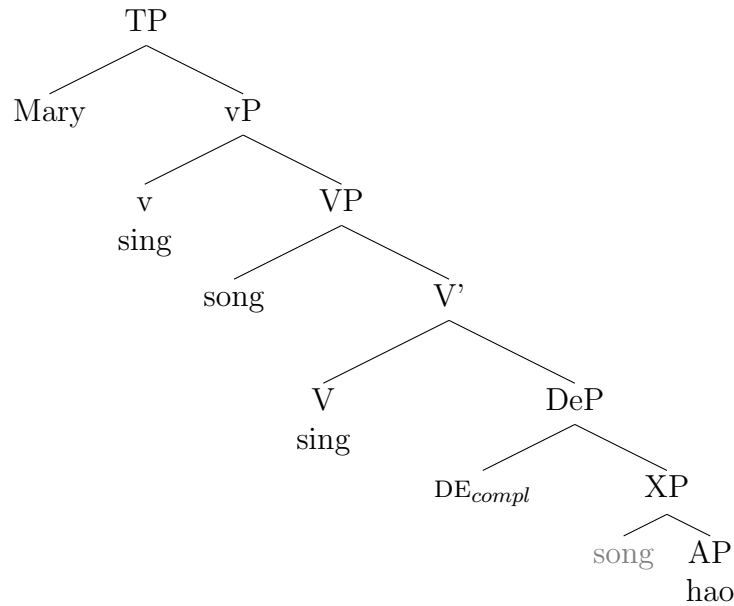
As shown in the tree structure above, V$_2$ is the main verb of the sentence. V$_1$ is a copy of V$_2$ which is derived by movement without deleting the original V$_2$ (Cheng, 2007). It can have a variant which appears without VP$_1$, as in (372).

(372)   [$_{TP}$ Mary [$_{VP}$ chàng [de   [$_{AP}$ hǎo]]]].
        Mary   sing   DE$_{compl}$ well
        'Mary sings well.'

De is obligatory in these constructions[2]. Erlewine (2018) adopts Cheng's (2007) analysis of postverbal adverb structures and shows how it interacts with his new

---

[2]The postverbal *de* is different from the nominal *de* we have encountered in relative clauses or adjectival phrases. It usually appears after a single verb, as in (372), or in intensive constructions like (1).

clausal analysis of BI-comparatives. For the comparatives that involve the verb-doubling constructions, the relevant predicate to which the CDR applies is the whole VP, as can be seen in (373).

(373) **Include the Verbal Predicate in a Standard TP**

[[John] [bǐ [$_{TP2}$ Mary [$_{VP2}$ pǎo [de   [$_{AP2}$ kuài]]]]]].
  John   BI   Mary   run DE$_{compl}$ fast

'John runs faster than Mary (does).'
Derivational structure: [$_{TP1}$ John [$_{VP1}$ ~~run [DE [$_{AP1}$ fast]]~~] BI [$_{TP2}$ Mary [$_{VP2}$ run [DE [$_{AP2}$ fast]]]]]

Consider, however, a case where the whole VP is not deleted and which is grammatical in Mandarin:

(374) **Include the Verbal Predicate in a Target TP**

[$_{TP1}$ John [$_{VP1}$ pǎo de   ]] bǐ [$_{TP2}$ Mary [$_{AP2}$ kuài]].
    John   run DE$_{compl}$ BI   Mary   fast

'John runs faster than Mary does.'
Derivational structure: [$_{TP1}$ John [$_{VP1}$ run [DE ~~[$_{AP1}$ fast]~~]]] BI [$_{TP2}$ Mary [$_{AP2}$ fast]]

The derivation shows that if the remaining verbal predicate appears in the target clause rather than in the standard clause, the TPs on the both sides of *bǐ* do not need to have a parallel structure. In other words, the target clause can have the underlying elements that the standard clause has but not vice versa.

Furthermore, it is also problematic for both TP$_1$ and TP$_2$ to appear with identical verbal predicates simultaneously on the surface. Consider below.

(375) **Delete the AP in the target only**

$^{??/*}$ [$_{TP1}$ John [$_{VP1}$ pǎo [de   ]]] bǐ [$_{TP2}$ Mary [$_{VP2}$ pǎo [de   [$_{AP2}$
     John   run DE$_{compl}$ BI   Mary   run DE$_{compl}$
kuài]]]].
fast

---

(1)   John jīntiān xīnqíng hǎo   de   hěn.
     John today mood   good DE$_{compl}$ very
    'John had a very good mood today.'

'John runs faster than Mary does.'

Derivational structure: $[_{TP1}$ John $[_{VP1}$ run [DE $\cancel{[_{AP1} \text{ fast }]}$]]] BI $[_{TP2}$ Mary $[_{VP2}$ run [DE $[_{AP2}$ fast]]]]

Erlewine claims that comparatives like (375), can be excluded by the CDR. The CDR would allow deletion of AP_1. However, Erlewine proposes that, in addition to the fact of obligatory deletion of the predicate, we also need to elide the repeated materials in this comparatives. This means deleting the AP_1 in the target clause is then insufficient, therefore, the example is problematic. Aside from deleting the predicate, It is also necessary to delete the other identical elements in the target.

Recall the example has the verbal predicate in the target clause only. As mentioned before, it is difficult to analyse comparatives, as in (374) and (376) below, in the framework of the previous analyses. This is because, in the frameworks of the previous analyses, these kinds of comparatives are supposed to have a parallel structure on the two sides of *bǐ*. However, these constructions do not follow this pattern and yet they are acceptable.

(376) $[_{TP1}$ John $[_{VP1}$ pǎo de   ]] bǐ $[_{TP2}$ fēijī $[_{AP2}$ kuài]].
             John   run DE_{compl} BI   plane   fast
       'John runs faster than a plane.'

       Derivational structure: $[_{TP1}$ John $[_{VP1}$ run [DE $\cancel{[_{AP} \text{ fast }]}$]]] BI $[_{TP2}$ plane $[_{AP2}$ fast]]

As we discussed in the Section 6.3.1.1, applying a parallel structure to analyse this type of BI-comparative has a problem of explaining how to apply deletion the covert verb in the clause on the left of *bǐ*. To avoid this problem, Erlewine proposes that a parallel structure is not necessary for this BI-comparative which has the overt VP in TP_1 rather than in TP_2. Following this, it is not necessary to use the verb *pǎo* 'run' for the standard *fēijī* 'plane'. In this way, there is no need to apply deletion in the standard clause and no problem for the CDR arises. However, it is unclear why (376) has a different underlying structure from (377). Consider below.

(377) $[_{TP1}$ John $[_{VP1}$ pǎo de   ]] bǐ $[_{TP2}$ fēijī $[_{VP2}$ fēi de $[_{AP2}$ kuài]]].
             John   run DE_{verbal} BI   plane   fly DE_{verbal} fast
       'John runs faster than planes fly.'

       Derivational structure: $[_{TP1}$ John $[_{VP1}$ run [DE $\cancel{[_{AP} \text{ fast }]}$]]] BI $[_{TP2}$ plane $[_{VP2}$ fly [DE $[_{AP2}$ fast]]]]

The underlying structure in (376) shows that it is the speed of John's running and the speed of the plane that are being compared. It is the subject of the standard clause that the degree predicate *kuài* 'fast' modifies, whereas, the deleted degree predicate

193

in the target clause modifies the VP rather than the subject of the target clause. It is problematic to apply deletion to the covert degree predicate because the categories of the modifiees of the degree predicate are different, namely the degree predicate is an adverb in the target clause while it is an adjective in the standard clause. Therefore, it is problematic to regard the covert degree predicate in the target clause as completely identical to the overt degree predicate in the standard clause, based on the underlying structure in (376).

Given this, I suggest that it is necessary to analyse comparatives via a parallel structure, in order to avoid the problem that the degree predicate has different identities in a comparative. In (376), the AP in the standard clause does not modify the noun. The TPs conjoined by *bǐ* are parallel. The standard clause must contain a VP layer. The verb of that VP is fundamentally covert on the surface which is not caused by deletion. In this way, the underlying structure of (376) can be revised as represented below.

(378)   [$_{TP1}$ John [$_{VP1}$ pǎo de   ]] bǐ [$_{TP2}$ fēijī   [$_{AP2}$ kuài]].
        John   run DE$_{verbal}$ BI   airplane   fast

'John runs faster than an airplane does.'

Derivation: [$_{TP1}$ John [$_{VP1}$ run [DE [$_{AP1}$ ~~fast~~]]] BI [$_{TP2}$ airplane [$_{VP2}$ ~~fly~~ [~~DE~~ [$_{AP2}$ fast]]]]

As shown in (378), there is a general motion verb involved. The verb in the target must entail the verb in the standard, therefore, we cannot have a comparative like *John runs faster than an airplane costs*. In the next section, I will adopt Erlewine's (2018) clausal analysis in the future discussion of comparatives that involve a complex noun phrase. In addition to this, I will apply a strict parallel structure to comparatives in the derivation of the analyses.

6.3.2   Summary

In this section, I have illustrated Erlewine's (2018) new proposal for BI-comparatives. Erlewine (2018) proposes to have parallel TPs on the two sides of *bǐ*. The overlapping degree predicate in the target clause gets deleted under the *comparative deletion requirement*. According to Erlewine, this novel clausal analysis provides a better explanation for the behaviour of comparatives that have the degree predicate in the target clause only because the approach does not require perfectly parallel structures. However, I have pointed out that Erlewine's proposed underlying structure results in a problem of applying deletion that a covert degree predicate has a different identity with an overt degree predicate. Therefore, I argued for having a restrict parallel structure for BI-comparatives. In the following analyses of comparatives that interact

with a complex noun phrase, I will adopt Erlewine's (2018) clausal analysis and supplement with a strict parallel underlying structure for BI-comparatives.

6.4 Complex Noun Phrases in Bi-Comparatives

As I mentioned at the very beginning of this chapter, Tsai (2008) suggests that comparative constructions can be used to distinguish gapless relative clauses from noun complement clauses in Mandarin. In this section, I will use that initial observation, together with the discussion on comparatives so far, to provide an account of why this is the case.

Tsai (2008) shows that gapless relative clauses and noun complements have consistent behaviour in ellipsis, as shown in (379) and (380), but they do not behave consistently when comparative constructions are involved, as in (381) and (382). In a normal ellipsis construction, the underlined material in (379) and (380) can be substituted by *yě shì* 'also is' in the second clause which then has the same interpretation as the preceding clause. Recall that though Tsai makes the observation, he has no explanation for the effect.

(379) **Gapless Relative Clause**

Zhāngsān <u>zuòbì de xiàchǎng hěn cǎn</u>,   Lǐsì yě   shì.
Zhangsan cheat DE result very miserable Lisi also is

'The result of Zhangsan's cheating is miserable, and so is Lisi's.'

(380) **Noun Complement Clause**

Zhāngsān <u>zuòbì de de yáoyán lìng rén jīngyà</u>,   Lǐsì yě   shì.
Zhangsan cheat DE rumor make people surprising Lisi also is

'The rumor of Zhangsan's cheating is surprising, and the rumor of Lisi's cheating is, too.'

When ellipsis couples with comparatives, however, the results are unexpected. Tsai points out that comparative deletion is grammatical in gapless relative clauses, as in (381). Noun complement clauses, in contrast, do not allow comparative deletion, as in (382).

(381) **Gapless Relative Clause**

[Zhāngsān <u>zuòbì de xiàchǎng</u>] bǐ   Lǐsì cǎn.
 Zhangsan cheat DE result   than Lisi miserable

'The result of Zhangsan's cheating is more miserable than Lisi's.'

(382) **Noun Complement Clause**

* [Zhāngsān <u>zuòbì de de yáoyán</u>] bǐ   Lǐsì gèng lìng rén   jīngyà.
Zhangsan <u>cheat DE rumor</u>   than Lisi more make people surprise

Intended: 'The rumor of Zhangsan's cheating is more surprising than the rumor of Lisi's cheating.'

In (381), we can compare the degree of miserableness between Zhangsan and Lisi if the underlined part is deleted in the standard. However, in (382), an interpretation where comparison is made over the degree of surprise caused by the rumor of Zhangsan's cheating versus Lisi's is illicit. This is because it is impossible for the standard to copy the target's description. To receive the intended interpretation, it is necessary to have a standard which is surface identical to the target on the surface.

(383) **Noun Complement Clause**

[Zhāngsān <u>zuòbì de de yáoyán</u>] bǐ   [Lǐsì <u>zuòbì de de yáoyán</u>] gèng
Zhangsan <u>cheat DE rumor</u>   than Lisi <u>cheat DE rumor</u>   much

lìng rén   jīngyà.
make people surprise

'The rumor of Zhangsan's cheating is more surprising than Zhangsan himself.'

However, Tsai (2008) concludes that gapless relative clauses are just a type of complex noun phrase rather than a relative construction in particular, using evidence from Japanese gapless relatives, which seem to be similar in surface structure and semantic properties. First, he argues there is an aboutness relation between a gapless clause and a head noun, which means the interpretation of a gapless relative has to be got by some semantic or pragmatic conventions. Second, the order between a gapless relative clause and a head noun is similar to the order between an adjectival modifier and a noun. Therefore, he proposes gapless relatives are sentential modifiers. However, there are substantial differences between the gapless relatives in these two languages, namely, the particle *de* has to appear between a gapless relative clause and a head noun, while there is no such requirement for a specialized particle in Japanese gapless relatives. Furthermore, we observe that some Japanese examples which is regarded as gapless relatives cannot be regarded as gapless relatives in Mandarin Chinese. Consider the following examples.

(384) $[_{NP}$ $[_{IP}$ syuusyoku-ga   muzukasii $][_{NP}$ buturigaku]]
getting-job-NOM is-hard   physics
'physics, which is hard to get a job in'

(385)   [$_{NP}$ [$_{IP}$ gōngzuò hěn nán   zhǎo   ] de [$_{NP}$ wùlǐxì]]
                 job   very difficult look-for DE   physics

   'physics, which is hard to get a job in'

(Chinese, Tsai, 2008:122)

In (384), *getting a job* is an NP in the clause. In contrast, it is impossible to do so in Mandarin Chinese. As shown in (385), the VP *get a job* has been separated and the noun *job* is topicalized inside the IP. So the correct word order of this examples is:

(386)   [$_{NP}$ [$_{IP}$ hěn nán   zhǎo   gōngzuò] de [$_{NP}$ wùlǐxì]]
                 very difficult look-for job   DE   physics

   'physics which is hard to get a job in'

However, (386) is a subject-relativized clause rather than a gapless relative. Therefore, I will adopt a different approach, taking the behaviour of gapless relatives in comparative deletion constructions as a piece of additional evidence for arguing that gapless relatives have similar underlying structure to other relative clauses. Consider some examples of BI-comparatives which include argument/adjunct relative clauses as targets and standards.

(387)   **Argument Relative Clauses**

   a. [Zhāngsān <u>chuān de yīfú</u>   ] bǐ   Lǐsì jiǎngjiū.
       Zhangsan <u>wear DE clothes</u>   than Lisi fashionable

       Lit. 'Zhangsan is more well-dressed than Lisi.'

   b. [Zhāngsān <u>xiě de zì</u>   ] bǐ Lǐsì hǎo.
       Zhangsan write DE character   bi Lisi good.

       'The characters that Zhangsan wrote are better than the characters that Lisi wrote.'

(revised from Li, 1986:295)

(388)   **Adjunct Relative Clauses**

   a. [Zhāngsān <u>shàng xué de shíjiān</u>] bǐ   Lǐsì zǎo.
       Zhangsan <u>go study DE time</u>   than Lisi early

       'The time that Zhangsan went to study is earlier than Lisi.'

   b. [Zhāngsān <u>shàng kè de jiàoshì</u>   ] bǐ   Lǐsì yuǎn.
       Zhangsan <u>go class DE classroom</u>   than Lisi far

       'The classroom that Zhang had classes is farther than Lisi.'

In the examples above, it is the dressing behaviours, the handwritings, the timing of going to study and the distance between Zhangsan's and Lisi's classrooms that are being compared. (387), (388) and the gapless relative in (381) have the same surface structure after deletion: only the subject of the relative clause is left in the standard position, the other parts of the relative clause are deleted.

I agree that the comparative construction is a plausible diagnostic for differentiating gapless relative clauses from noun complement clauses, in line with Tsai (2008). In the remainder of this chapter, I will illustrate that the alternative analysis of gapless relatives given in the previous chapter, which analyses gapless relatives under a head-raising underlying structure, can provide an explanation for the distinction between relative clauses (includes argument NP relatives, adjunct relatives, adjunct gapless relatives and resultative gapless relatives) and noun complement clauses in term of comparative deletion. Furthermore, I will show that analysing relative clauses in the head raising underlying structure can also give a better explanation for the different deletion possibilities of relative clauses in comparatives. I will begin with normal relative clauses then proceed to noun complement clauses and finally gapless relatives.

6.4.1   Comparative Deletion of Normal RCs

Before proceeding to the analysis, it is worth noting that we need to analyse normal relative clauses in comparatives type by type. This is because I will show that comparative deletion behaves differently between object-relativized clauses and subject-relativized clauses. In other words, I will divide the normal relative clauses in the following analyses into two subtypes: object-relativized clauses and subject-relativized clauses (to the exclusion of adjunct relatives, because I will illustrate the analysis of adjunct relative in the relevant section that I discuss object-relativized clauses and subject-relativized clauses). Those examples we mentioned in (387) belong to the category of object-relativized clauses, repeated in the example below, along with a new example of subject-relativized clauses.

(389)   a. **Object-relativized Clause (ORC)**:

[Zhāngsān zǒu-guò _____ de **qiao**] bǐ [Lǐsì zǒu-guò _____ de
  Zhangsan walk-ASP   DE bridge   than   Lisi walk-ASP   DE
lù] hái duō.
road   more many

'The bridges that Zhangsan walked are more than the roads that Lisi walked.'

b. **Subject-relativized Clause (SRC):**

[_____ xǐhuān guàngjiē de **nǚrén**] bǐ   [_____ xǐhuān dǎyóuxì   de
      like   shopping DE female   than   like   play-game DE

nánrén] duō.
male   many

'The females that like shopping are more than the males that like playing games.'

c. **Adjunct Relative Clauses (ARJ):**

[Zhāngsān _____ shàng xué   de **xuéxiào**] bǐ   [Lǐsì _____ shàng
  Zhangsan   go   study DE school   than   Lisi   go

bān de **gōngsī**] yuǎn.
work DE company   far

'The school that Zhangsan went to study is further than the company than Lisi went to work.'

The examples given above are represented without any deletion. I will not count the adjunct relatives into these two subtypes of relative clauses because I observe that adjunct relatives can result in similar deletion possibilities to both subtypes. I will adopt Erlewine's (2018) clausal approach to BI-comparatives in the following analyses. After sketching the basic examples of the three types of relative clauses, we proceed to the examples containing comparative deletion.

6.4.1.1 Deletion of The Head NPs

The first type of comparative deletion discussed here is NP deletion: the remnant of the deletion is the body of relative constructions, and only the head noun of the relative clause is deleted. The deleted NP is required to be identical to its antecedent. Compared with the next two types of comparative deletion, this type of deletion does not require topicalization. Both subtypes of relative clauses show no differences when deletion takes place.

(390)   a. **Object-relativized Clause**

[Zhāngsān mǎi de shū   ] bǐ   [Lǐsì xiě   de] duō.
  Zhangsan buy DE book   than   Lisi write DE   many

'The books that Zhangsan bought are more than the books that Lisi wrote.'

b. **Subject-relativized Clause**

[Mǎi shū   de dárén] bǐ   [mǎi CDs de] duō.
buy book DE adult   than   buy CDs DE   many

'Adults who bought books are more than adults who bought CDs.'

c. **Adjunct Relative Clause**

[Zhāngsān shàng xué   de dìfāng] bǐ   [Lǐsì shàng bān   de] dà.
Zhangsan go   study DE place   than   Lisi go   work DE   large

'The place that Zhangsan went to study is larger than the place that Lisi went to work.'

The derivations of object-relativized and subject-relativized clauses are sketched below along with their respective tree diagrams. The tree structures are constructed under Erlewine's (2018) assumptions about comparatives. Since the adjunct relatives result in the same as the object-relativized and subject-relativized clauses, I will not give the derivation of applying deletion to the adjunct relatives in detail.

(391)   [$_{TP}$ [Zhāngsān mǎi de <u>shū</u>] ~~duo~~] BI   [$_{TP}$ [Lǐsì xiě   de ~~shū~~] duō
        Zhangsan buy DE book   many   than   Lisi write DE book   many
        ].

200
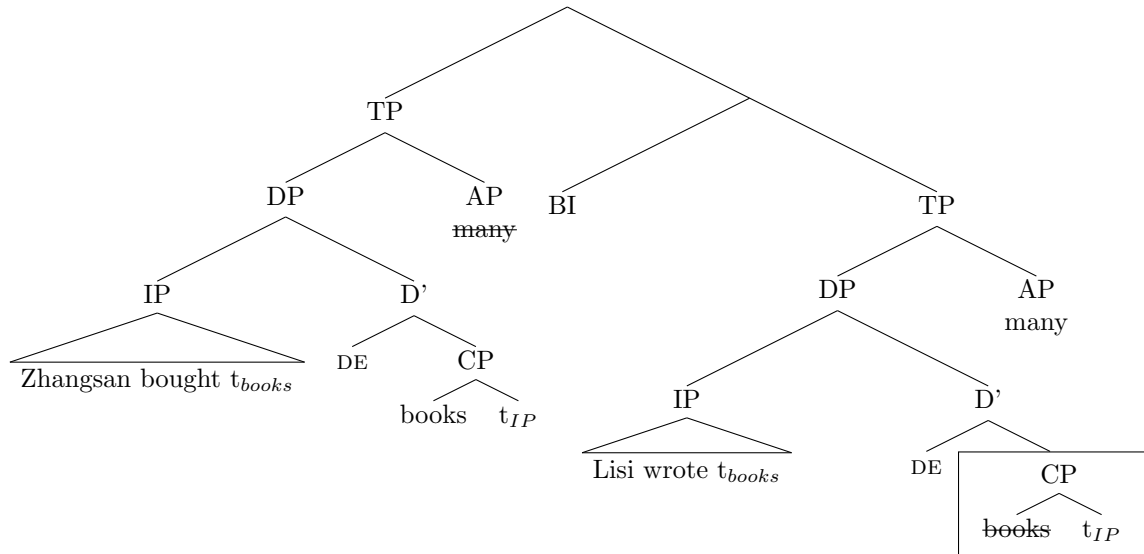
(392) [$_{TP}$ [Măi shū   de <u>dárén</u>] ~~duō~~] BI   [$_{TP}$ [măi CDs de ~~dàrén~~] duō   ].
       buy book DE adult   may   than   buy CDs DE adult   many

```
                                    TP
                    ┌────────────────┴────────────────┐
                   TP                                  │
            ┌───────┴───────┐                          │
           DP              AP      BI                 TP
       ┌────┴────┐        ~~many~~           ┌─────────┴─────────┐
      IP         D'                         DP                  AP
   ┌───┴───┐  ┌───┴───┐                ┌─────┴─────┐          many
t_adults bought books DE  CP          IP          D'
                      ┌───┴───┐    ┌───┴───┐    ┌───┴───┐
                   adults   t_IP  t_adults bought CDs  DE    CP
                                                     ┌──────┴──────┐
                                                  ~~adults~~     t_IP
```
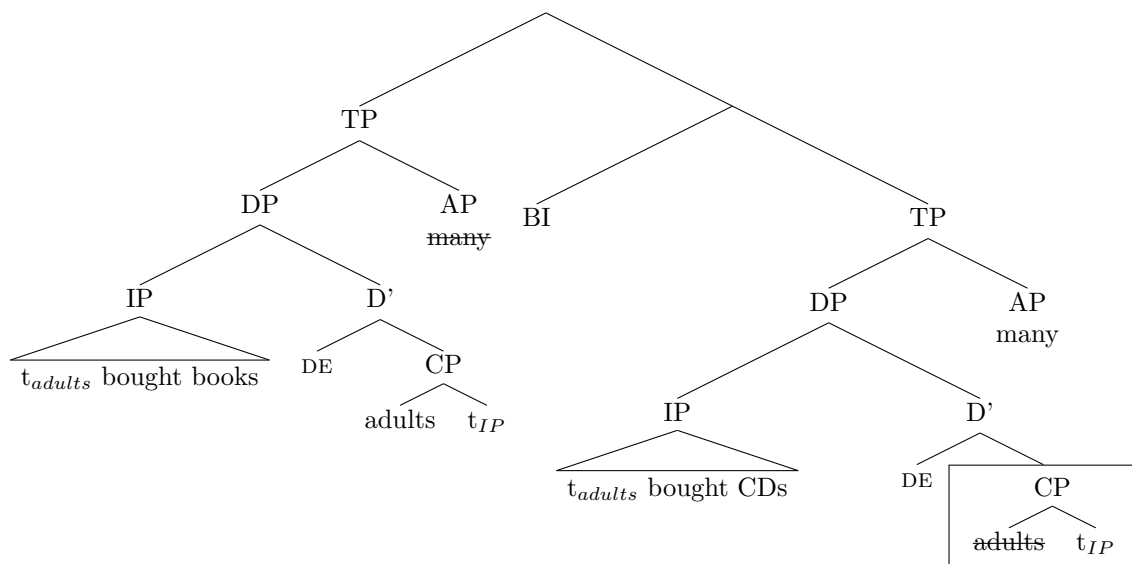
The head nouns of the relative clauses in the standard positions can be deleted because they have repeated part of the content contained in the target positions. The spell-outs of the examples show that the overlaps in (391) and (392) are the head noun of the relative clause. By contrast, their derivations show that it is the CP which includes the head noun and the trace of the IP that has been deleted.

6.4.1.2   Deletion of The Body of RCs

The second type of comparative deletion is RC deletion: the remnant of the deletion is the head noun of the relative clause, the body of the relative clause is deleted, which is in contrast to the first type of comparative deletion.

(393)   a. **Object-relativized Clause**

[Zhāngsān măi de shū   ] bǐ   [CDs] duō.
 Zhangsan buy DE book   than   CDs   many

‘The books that Zhangsan bought are more than the CDs that Zhangsan bought.’

         b. **Subject-relativized Clause**

[Măi shū   de dàrén] bǐ   [xiǎohái] duō.
 buy book DE adult   than   children   many

‘Adults who bought books are more than children who bought books.’

c. **Adjunct Relative Clause**

[Zhāngsān shàng-guò bān de xiǎo gōngsī] bǐ [dà gōngsī]
 Zhangsan go-PAST work DE small company than large company
duō.
many

'The small companies that Zhangsan went to work are more than the large companies that Zhangsan went to work.'

On the surface, it is the whole sequence preceding the head noun that gets deleted by the deletion operation. Based on the assumptions given about the underlying structure of relative clauses we have adopted, there are two possible ways to apply the deletion: one way is to delete overlapping material one by one, the other way is to delete the overlapping material as a single constituent. The reason that applying deletion one-by-one is not plausible is that it is problematic to delete the particle *de* alone. Consider the following structure as the underlying structure of (393a).

(394) [Zhāngsān mǎi de shū] BI [Zhāngsān mǎi de CDs] duō.
 Zhangsan buy DE book than Zhangsan buy DE CDs many
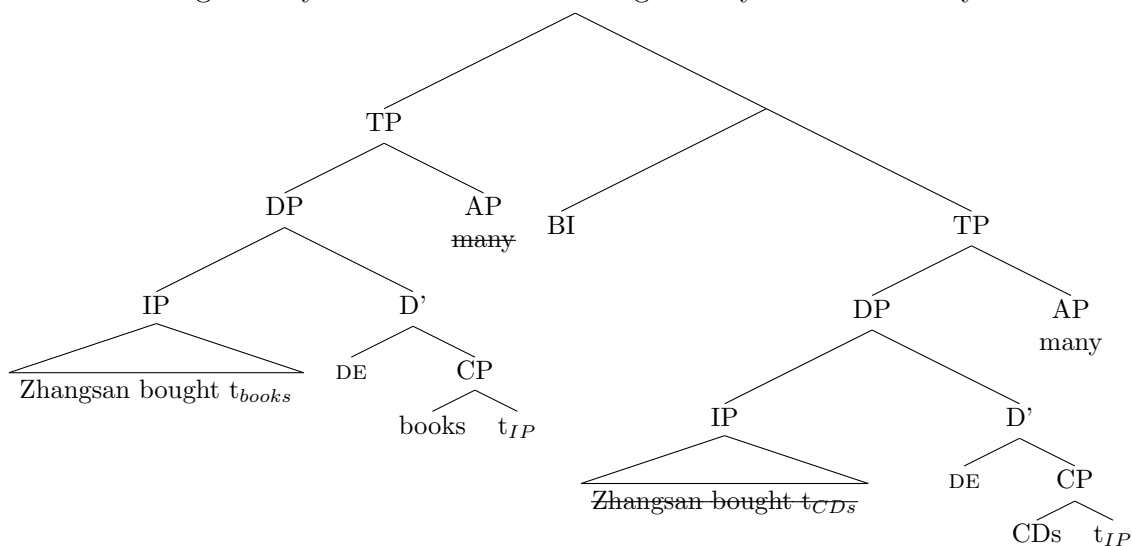
Recall that overlaps in the standard position can be deleted because they have content which has already been mentioned in the target clause. As for the particle *de*, it is a semantically vacuous word, thus, it cannot be deleted via checking content. Instead, *de* can only be deleted as a structural element when it combines with other constituents. Nevertheless, *de* is deleted. If we were to delete *de* separately from *ZS bought t*, we would need to revise our statement of how comparative deletion works

just to allow this. Given this, I will adopt the more conservative position that *de* is deleted as part of the constituent that is targeted by comparative deletion. I will therefore adopt an account where comparative deletion applies to a constituent as a whole. I will briefly discuss afterwards some further reasons not to take comparative deletion to apply to multiple constituents simultaneously.

To avoid the problem of deleting the particle *de* as a single unit, I propose to apply the second method of deletion which is to delete all overlapping materials as a whole constituent. In order to delete all the overlapping materials as a single constituent, the remnant needs to move out of the scope of deletion. I regard this movement as a kind of nominal-internal topicalizations, inspired by Hsu (2014).

In Hsu (2014), the phenomenon of reversed ordering between a demonstrative and an NP in Mandarin Chinese has been analysed as a type of topicalization occurring at the nominal periphery. Consider (395):

(395)   Qǐng géi wǒ [[guǒzhī$_i$]$_{Top}$ liǎng-bēi t_i].
        Please give me   juice   two-CL

        'Please give me juice, two cups (of it).'   (Hsu, 2014:154)

Hsu (2014) only tackles cases of simple noun phrases which are modified by a number-classifier sequence. However, it is also possible to topicalize the NP which is modified by an adjective. Consider the following examples.
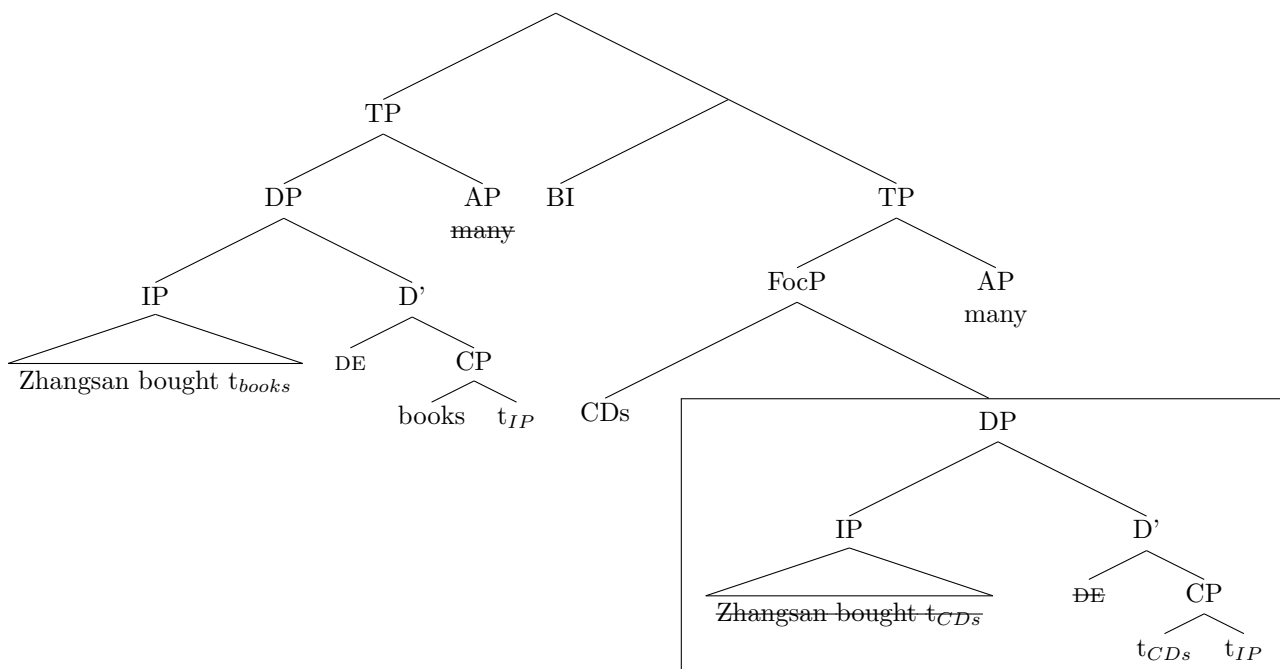
(396)   a. Mary lǎoshì   [[tóufà$_i$] luàn-zāo-zāo-de t$_i$].
           Mary always-is   hair   messy-DE

           'Mary is always with messy hair.'

        b. Mali yǒu gè [[wáwá$_i$] máo-róng-róng-de t$_i$].
           Mary have CL   doll   brushy-DE

           'Mary has a brushy doll.'

The shifted order between the adjective and the noun phrase in (396a) and (396b) is because of the topicalization of NPs, in line with Hsu's (2014) nominal-internal topicalization. Even more tellingly, it turns out that nominal-internal topicalization can happen in complex noun phrases as well, in relative NPs for example, as illustrated below.
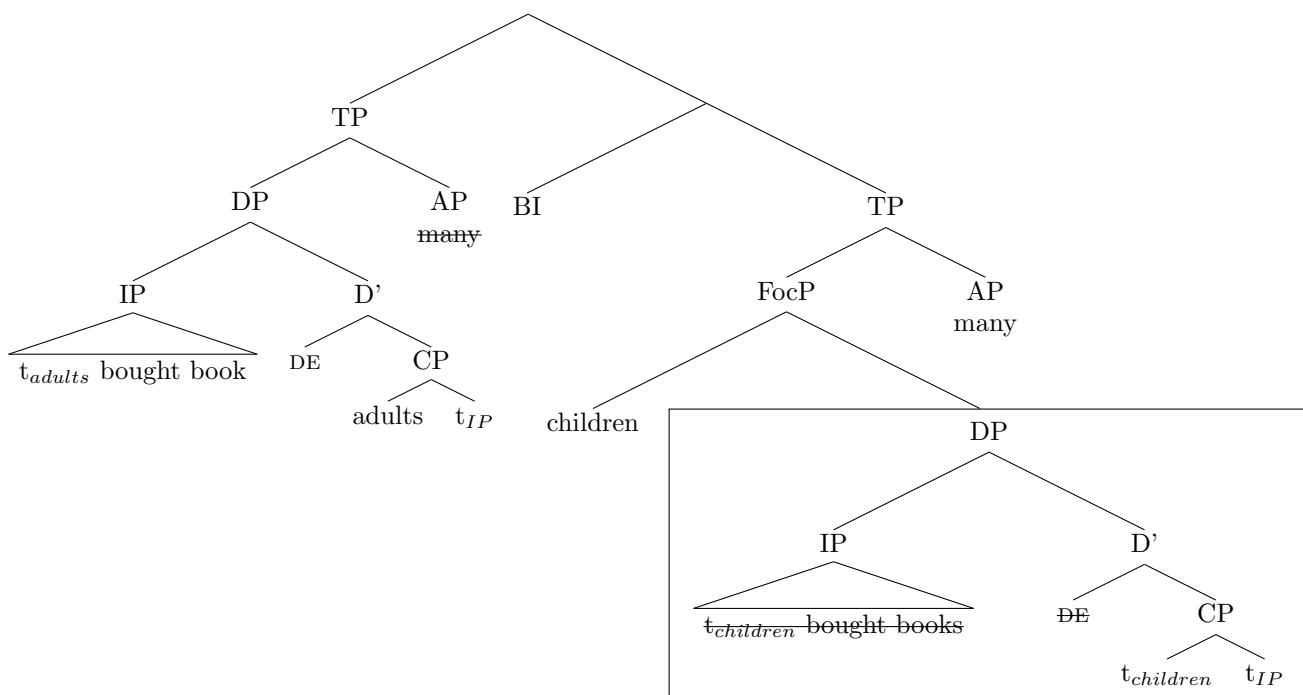
(397)   Wǒ tuījiàn   nǐ qù kàn   [[zhè liáng-běn shū$_i$] wǒ gāng mǎi de t$_i$].
        I   recommend you go watch   this two-CL   book I   just buy DE

        'I recommend you to read these two books that I just bought.'

On this basis, let's turn back to the derivations of relative clauses in BI-comparatives, looking at how nominal-internal topicalization works to leave the relevant remnant elements. The underlying structures of (393a) and (393b) are represented below.

(398) [[<u>Zhāngsān mǎi de</u> shū] ~~duō~~] BI   [[~~Zhangsan mai de~~ CDs] duo   ].
Zhangsan buy DE book   may   than   Zhangsan buy DE CDs   many

TP
  DP
    IP
      Zhangsan bought t$_{books}$
    D'
      DE
      CP
        books   t$_{IP}$
  AP
    ~~many~~
BI
TP
  FocP
    CDs
    DP
      IP
        ~~Zhangsan bought t$_{CDs}$~~
      D'
        ~~DE~~
        CP
          t$_{CDs}$ t$_{IP}$
  AP
    many

(399) [$_{TP}$ [<u>Mǎi shū de</u>   dàrén] ~~duō~~] BI   [$_{TP}$ [~~mǎi shū de~~   xiǎohái] duō   ].
buy book DE adult   many   than   buy book DE children   many

TP
  DP
    IP
      t$_{adults}$ bought book
    D'
      DE
      CP
        adults   t$_{IP}$
  AP
    ~~many~~
BI
TP
  FocP
    children
    DP
      IP
        ~~t$_{children}$ bought books~~
      D'
        ~~DE~~
        CP
          t$_{children}$ t$_{IP}$
  AP
    many

According to the tree diagrams, we can see that the deleted elements are not just the body of a relative construction, instead, it is the whole DP that is deleted. The head nouns *CDs* and *children* raise to a topic position above DP, then the remainder is deleted. Based on this, one might raise an objection to the head raising analysis: it requires this extra operation. However, I will argue that there is sufficient motivation to adopt this approach.

6.4.1.3   Deletion of VPs and Head NPs

The third type of comparative deletion is the pivotal type of deletion in this discussion. This is because the possibility of this type of deletion can help to isolate gapless relative clauses from noun complement clauses. In addition, I will show that only the HRA can tackle this type of deletion which shows an asymmetry between object and subject relativization, not captured by alternative analyses. Let's consider how it works in normal relative clauses first:

(400)   a. **Object-relativized Clause**

[Zhāngsān mǎi de shū] bǐ   [Lǐsì] duō.
 Zhangsan buy DE book   than   Lisi   many

'The books that Zhangsan bought is more than the books that Lisi bought.'

b. **Subject-relivized Clause**

?? [Mǎi shū   de dàrén] bǐ   [CDs] duō.
   buy book DE adult   than   CDs   many

'Adults who bought books are more than adults who bought CDs. '

Intended. 'More adults bought books than bought CDs.'

The remnant in the standard position is an NP which is not the head of the relative clause but an argument within the relative clause. For this type of deletion, only object-relativized clauses are possible. I will show below that this is because only the subject of the relative can be topicalized. Similar results can be observed from comparatives containing adjunct relatives, consider below.

(401)   **Adjunct Relative Clause**
      a. **Subject remains in standard**

[Zhāngsān xué   gāngqín de fāngfǎ] bǐ   [Lǐsì] duō.
 Zhangsan learn piano   DE way   than   Lisi   many

'The ways that Zhangsan learned to play the piano are more than the ways that Lisi learned to play the piano.'

b. **Object remains in standard**

?? [Zhāngsān xué   gāngqín de fāngfǎ] bǐ   [xiǎotíqín] duō.
Zhangsan learn piano   DE way   than violin   many

'The ways that Zhangsan learned to play piano are more that violins.'

Intended. 'The ways that Zhangsan learned to playing the piano are more the ways that he learned to play the violin,'

When the subject is not deleted in the standard, comparative deletion is possible, while this is not possible if the object is the element in the standard that escapes deletion. In the following, I will show why this is the case. Consider first (400a), given here with more detailed structure:

(402)   [$_{TP}$ [Zhāngsān <u>mǎi de shū</u>   ] ~~duō~~] BI   [$_{TP}$ [Lǐsì ~~mǎi de shū~~   ] duō   ].
Zhangsan buy DE book   many   than   Lisi buy DE book   many
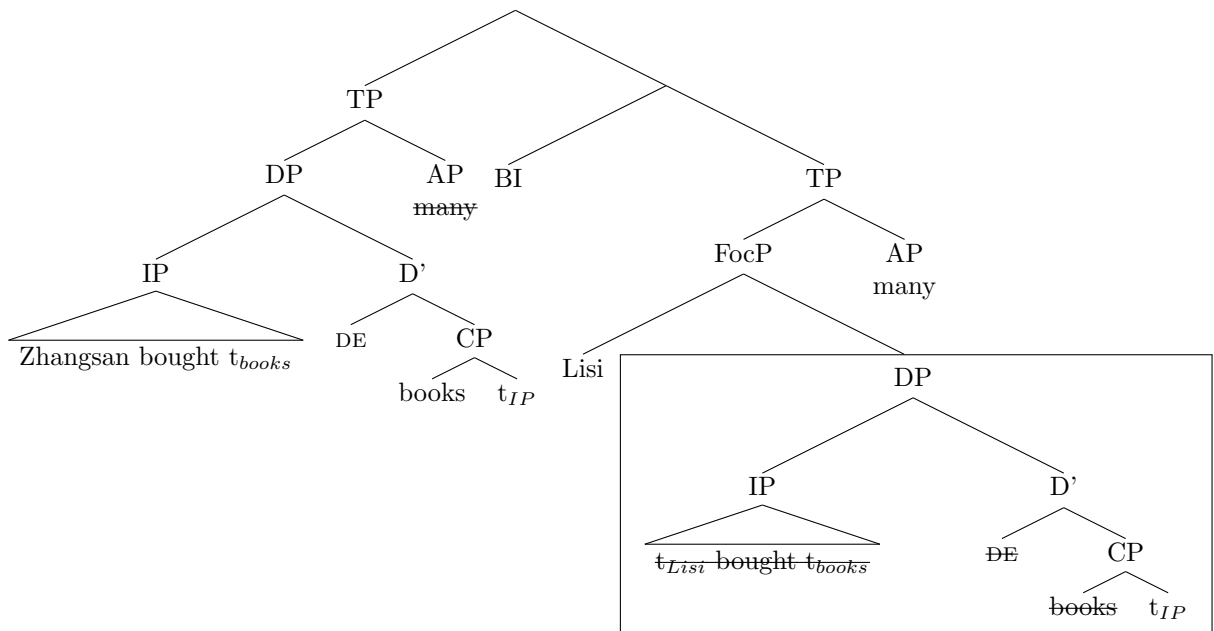
As mentioned at the beginning of the last section, the head noun of the RC can be moved to the focus position to escape from the deletion site. I suggest that in (400a), the subject of the deleted relative clause moves to the Focus position, followed by comparative deletion of the remainder. Here is where the advantage of adopting a head raising analysis comes in. Since in this analysis, the fronted element is an IP, the subject in the specifier of TP can be further extracted to the Focus position in DP without violating the condition that a relative clause is usually an island. The

movement is within the DP.

Now, let's turn to how comparative deletion applies in subject-relativized clauses, where the element remaining in the standard is the object.

(403) ?? [$_{TP}$ [<u>Mǎi</u> shū DE dàrén] ~~duō~~] BI   [$_{TP}$ [~~mǎi~~ CDs ~~DE dàrén~~] duō].
        buy book DE adult   than   buy CDs DE adult   many
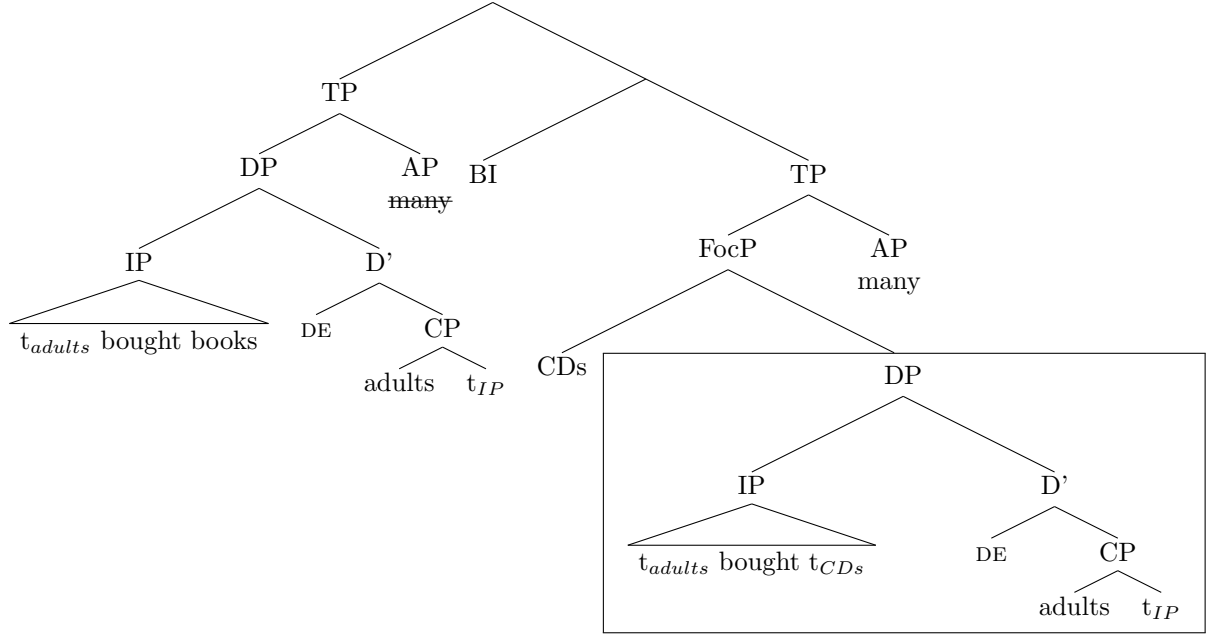

To delete the overlapping elements as a constituent, the object *CDs* must move to the focus position. However, the unacceptability of (403) suggests that we cannot move the object *CDs* out of the relative clause when the subject is relativised. I assume that there is a constraint restricting the extraction of the object in such cases, perhaps related to the fact that focusing the subject does not change the word order but focusing the object does. Exactly how to derive this is not obvious, and I leave deriving this observation to future research, as it is not central to the point I am making here, which is merely that the head raising analysis of gapless relatives defended in the previous chapter can be combined with Erlewine's analysis of comparatives to provide an account of Tsai's observations. Following this, we cannot extract the object out of a subject-relativized clause. Because of the failure of extracting the object, it is not possible to delete the DP as like in (402).

As for adjunct relative clauses, it is also possible to compare an RC with an NP which is supposed to be the subject of the relative clause. However, comparing an RC

with an NP which is supposed to be the object of the relative clause is prohibited. This is because PP adjuncts always originate in a preverbal position in Mandarin Chinese, a position which we assume to be higher than the postverbal object, given the standard phrase structure of the language (see discussion in Chapter 4). In other words, if we move the object out of an adjunct relative, the movement of this would still cross the trace of a relativized PP adjunct. The structure of (401b) is represented in (404) below.
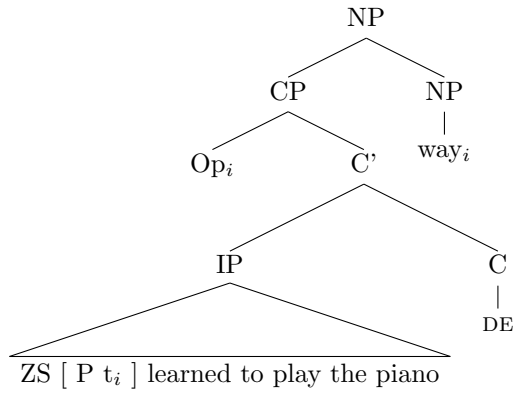
(404) ?? [$_{TP}$ [Zhāngsān xué   gāngqín de fāngfǎ] ~~duō~~] BI   [$_{TP}$ [
          Zhangsan learned piano   DE way   many   than
       ~~Zhāngsān xué~~ xiǎotíqín ~~de fāngfǎ~~] duō   ].
   Zhangsan learn violin   DE way   many
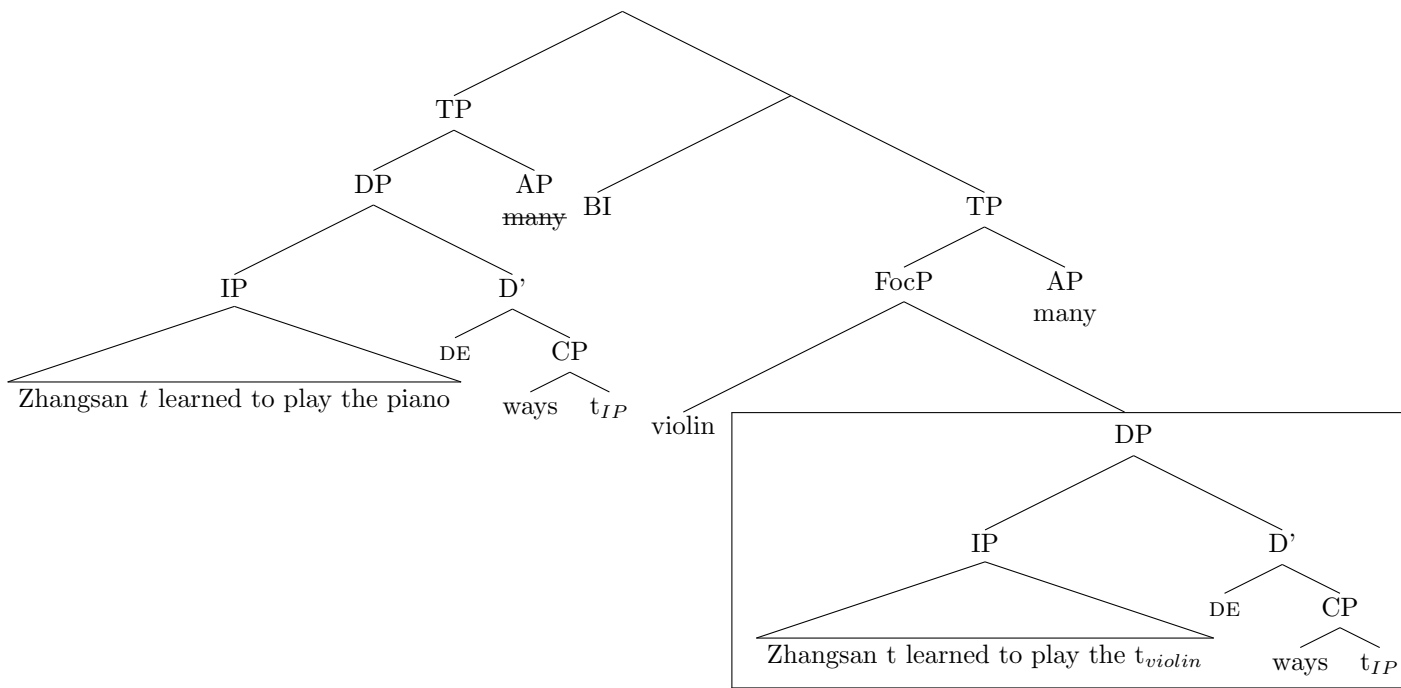
Let us now turn to the question of how this kind of explanation would work in an analysis of relativization that adopts a head external approach for adjunct relativization.Consider (401a) using an operator movement structure as in (405).

(405) [$_{NP}$ [$_{CP}$ Op$_i$ [$_{C'}$ [$_{IP}$ ZS [P t$_i$] learned to play the piano] [$_C$ *de*]]] way$_i$]

```
                        NP
                   ╱         ╲
                 CP            NP
              ╱      ╲          │
           Op_i       C'      way_i
                   ╱      ╲
                 IP         C
              ╱─────╲       │
                            DE
      ZS [ P t_i ] learned to play the piano
```

(406) [$_{TP}$ [ZS   xué   gāngqín de fāngfǎ] ~~duō~~] BI   [$_{TP}$ [LS xué   gāngqín de
           Mary learn piano   DE way   many   than   LS learn piano   DE
       fāngfǎ] duō   ].
       way   many

```
                                      TP
                            ╱                    ╲
                           TP                      ╲
                      ╱         ╲    BI              TP
                    NP           AP                ╱    ╲
                 ╱      ╲      many             FocP     AP
               CP        NP                    ╱    ╲   many
            ╱      ╲      │                  ╱        ╲
          Op_i      C'   way_i                         NP
                 ╱    ╲                             ╱      ╲
               IP       C                         CP        NP
            ╱────╲      │                      ╱      ╲      │
                       DE                   Op_i       C'   way_i
    ZS [ P t_i ] learned to play the piano           ╱    ╲
                                                   IP       C
                                                ╱────╲      │
                                                           DE
                                  LS [ P t_i ] learned to play the piano
```
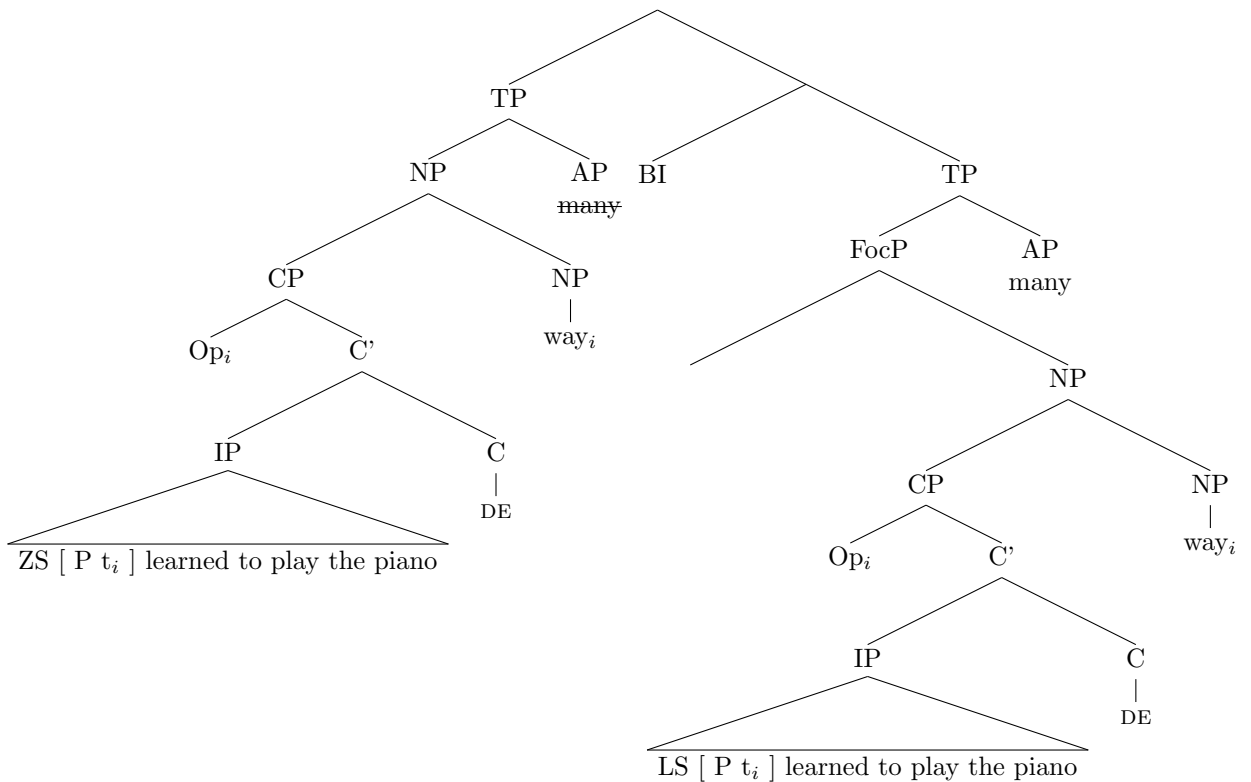
In such a structure, an analysis where elements move to an NP internal focus

position is unavailable to us as this movement would require the subject to extract from a CP whose specifier is filled by an operator. It would follow that comparative deletion in such a structure would be unable to apply to a single constituent. The HRA approach, in contrast, is compatible with the analysis developed above.

To sum up, I have examined three different types of comparative deletion which are possible for relative clauses contained in BI-comparatives: (a) deletion of the head of the relative, (b) the deletion of the relative clause itself, and (c) deletion that combines these two in different ways. According to the discussion, the second and the third type of deletion are, in fact, DP deletion while head NP deletion is CP deletion. On this basis, I have shown that: for comparatives containing object-relativized clauses, all three types of comparative deletion are possible; for comparatives containing subject-relativized clauses, only the first two types, the RC deletion and the head NP deletion, are possible; for comparatives containing adjunct relatives, the first two types of deletions are possible, while the availability of the third type of deletion depends on the identity of the element to be topicalized. In the next section, I will proceed to the discussion of noun complement clauses in BI-comparatives.

6.4.2 Comparative Deletion of Noun Complement Clauses

6.4.2.1 Theoretical Backgrounds of NCCs

I will briefly introduce the structure of noun complement clauses in Mandarin Chinese first. Following the analysis of normal relative clauses in the previous discussion, I will continue to adopt Simpson's (2001, 2002) analysis, in line with Kayne (1994) of noun complement clauses. The proposed derivation of NCCs is that the complement clause is originally on the right of the noun, as represented in (407).

(407) Zhāngsān zuòbì de yáoyán
       Zhangsan cheat DE rumor
       'the rumor of Zhangsan's cheating'

       Derivation: $[_{DP}$ $[_{CP}$ Zhangsan cheats $]_i$ $[_D$ DE $[_{NP}$ rumor t_i $]]]$

210
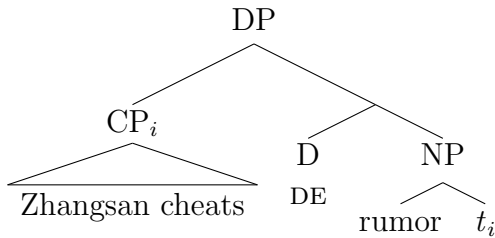
The particle *de* in noun complement clauses is treated as a determiner just as in relative clauses. The complement clause *Zhangsan cheats* is originally a rightwards complement of the noun *rumor*. Since NCCs in Mandarin Chinese are head-final, the complement clause moves to the specifier position of the DP. Compared with the derivational structure of relative clauses, the derivational structure of complement clauses only includes one step of movement. In addition to this, there are several important points of the derivation of complement clauses different from relative clauses: (a) the noun does not originate inside the clause, but rather takes the clause as an argument; (b) the complement clause is moved as a CP to the Spec DP position, as opposed to moving as a TP to the specifier of DP. I now show how this interacts with comparative deletion.

6.4.2.2 The Analysis of NCCs in BI-comparatives

Let me repeat Tsai's (2008) example of noun complement clauses. Consider the example in (408), which has the analysis in (409).

(408) * [Zhāngsān <u>zuòbì de yáoyán</u>] bǐ   [Lǐsì] gèng lìng rén   jīngyà.
       Zhangsan <u>cheat DE rumor</u>   than   Lisi   much make people surprise

Intended: 'The rumor of Zhangsan's cheating is more surprising than the rumor of Lisi's cheating.'

(409) * [$_{TP}$ [$_{NCC}$ Zhangsan <u>cheats DE rumor</u>] ~~surprise~~] BI [$_{TP}$ [$_{NCC}$ Lisi ~~cheats DE rumor~~] surprise].
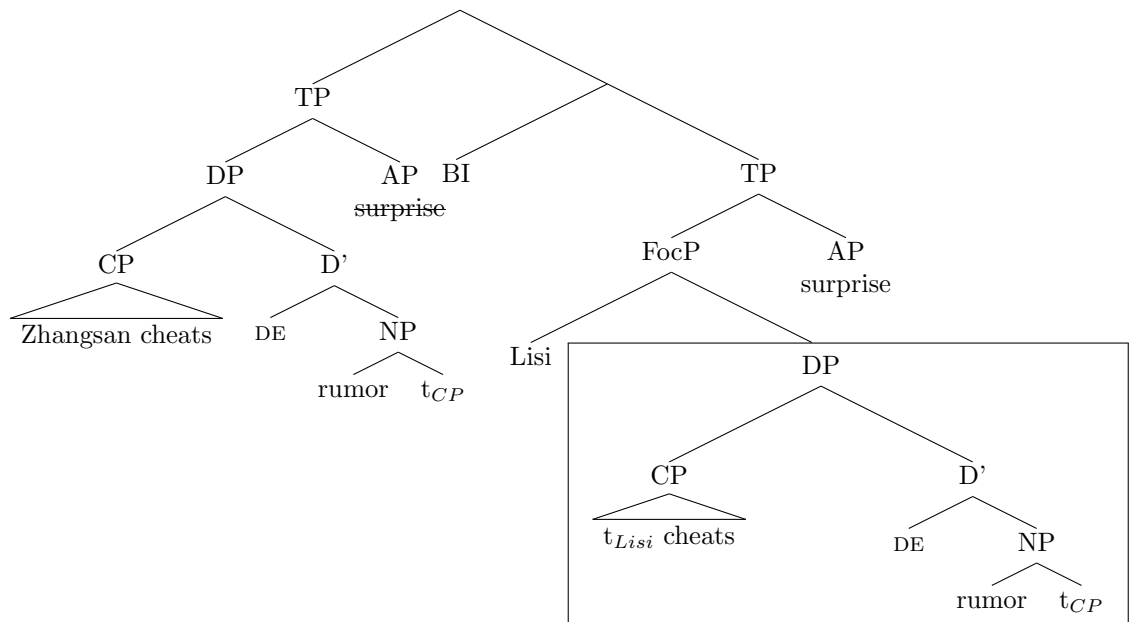
Recall that extracting the subject (the non-overlapped element) can help to group the overlapped elements as a proper constituent for deletion. However, comparative deletion is banned in (409) because it is not possible to move the remnant, the subject *Lisi*, out of the deletion site. As shown in (409), the subject *Lisi* is extracted from a CP which is larger than the IP that involves in our previous discussion, thus, the subject *Lisi* needs undergo cyclic movement: moves to Spec CP first and then moves to the focus position. However, Pan and Hu (2000) and Yu (2014) point out that it is impossible to move the elements of an NCC cyclically.

(410) * Xiāoxī$_i$, wǒ tīngshuō-le Lǐsì dǎ-le   Zhāngsān de t$_i$.
news   I   hear-PERF Lisi hit-PERF Zhangsan DE

Intended.'I have heard the news that Lisi hit Zhangsan.'

Additionally, in contrast to the RCs, there is no such focus position inside an NCC.

(411)   a. * Wǒ tīngshuō-le [yáoyán$_i$ [$_{NCC}$ Lǐsì zuòbì de t$_i$]].
I   hear-PERF   rumor   Lisi cheat DE

Intended.'I have heard a rumor that Lisi cheats.'

   b. * Wvo tīngshuō-le [xiāoxī$_i$ [$_{NCC}$ Lǐsì dǎ-le   Zhāngsān de t$_i$]].
I   hear-PERF   news   Lisi hit-PERF Zhangsan DE

Intended.'I heard a news that Lisi hit Zhangsan.'

Therefore, returning to (409), although the subject *Lǐsì* can move to Spec CP position, it cannot move to a further position so we cannot delete the overlapping materials as a constituent. In this way, we can only delete the overlapping elements one by one and will face the problem of deleting the particle *de* again. Therefore, it is impossible for us to have a comparative like (408).

6.4.3   Comparative Deletion of Gapless Relative Clauses
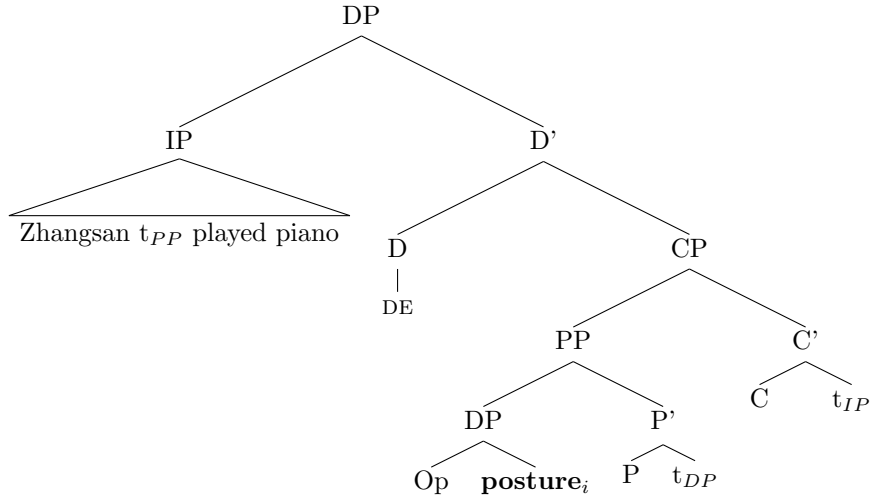
6.4.3.1   Theoretical Backgrounds of Gapless RCs

In the last chapter, I have argued that gapless relatives can be classified into two types: one is just manner/instrument adjunct relatives, the other is as resultative relatives which contain a clausal adjunct. The derivational structure of these two types of gapless relatives are demonstrated below.

(412) ***Adjunct*-type Gapless RC**

Zhāngsān tán gāngqín de zīshì
Zhangsan play piano   DE posture

'the posture that Zhangsan had while playing the piano'

Derivation: $[_{DP}$ $[_{IP}$ Zhangsan t_{PP} played piano $]$ $[_D$ DE $[_{CP}$ $[_{PP}$ posture$_i$ P t_i $]$ $[_C$ t_{IP} $]]]]$

```
                          DP
                 _____/    _____
                IP                      D'
           ____/  \____            ____/  \____
     Zhangsan t_PP played piano   D            CP
                                  |        ____/  \____
                                  DE      PP          C'
                                      ___/  \___      /  \
                                     DP        P'    C    t_IP
                                    /  \       /  \
                                   Op  posture_i  P  t_DP
```
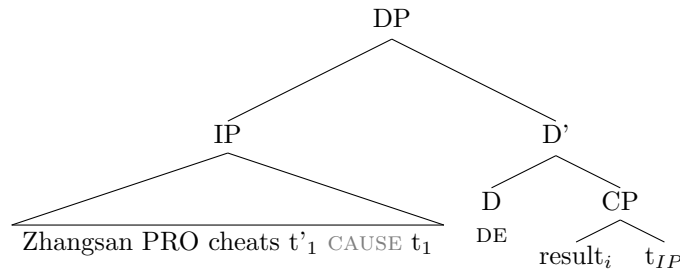
(413) **Resultative Gapless RC**

Zhāngsān zuòbì de xiàchǎng
Zhangsan cheat DE result

'the result of Zhangsan's cheating'

Derivation: $[_{DP}$ $[_{IP}$ Zhangsan$_i$ $[_{vP}$ $[_{\textbf{clausal adjunct}}$ PRO$_i$ cheats $]$ $[_{vP}$ $[_{v'}$ CAUSE t$_m$ $]]]]$ $[$ ***de*** $[_{CP}$ result$_m$ t$_{IP}$ $]]$

```
                        DP
               _____/    _____
              IP                      D'
         ____/  \____              __/  \__
  Zhangsan PRO cheats t'_1 CAUSE t_1  D      CP
                                     DE     /  \
                                       result_i  t_IP
```

The first type of gapless relatives can be reanalysed as an adjunct relative. Therefore, as I mentioned in Section 6.4.1.3, it is possible to delete all the overlapping elements and leave the subject of the gapless relative remaining in the standard position. As for the second type of gapless relatives, the underlying structure of which involves a serial verb structure, it behaves in the same way as argument relative

clauses. The gapless relative mentioned in Tsai's (2008) examples belong to the second type of gapless relatives. Therefore, I will apply the derivational structure of the second type of gapless relatives in the following analysis.

### 6.4.3.2   The Analysis of Gapless RCs in BI-comparatives

In this section, I show how comparative deletion applies to gapless relatives in BI-comparatives. I will use the derivational structure of gapless relatives that I provided in the last section to see why comparative deletion can occur in the standard of BI-comparatives which is saturated by a gapless relative. I have repeated the example of gapless RCs in BI-comparatives from Tsai (2008) below.

(414)   [Zhāngsān <u>zuòbì de xiàchǎng</u>] bǐ   [Lǐsì] cǎn.
        Zhangsan <u>cheat DE result</u>   than   Lisi   miserable

   'The result of Zhangsan's cheating is more miserable than Lisi's.'

According to the analysis that Tsai (2008) provides, this example, has a structure where the standard position includes a gapless relative rather than a simple NP. Using Erlewine's analysis of comparative deletion gives us (415):

(415) $[_{TP} [_{GRC}$ Zhangsan <u>cheats DE result</u>] ~~miserable~~] BI $[_{TP} [_{GRC}$ Lisi ~~cheats DE result~~] miserable].
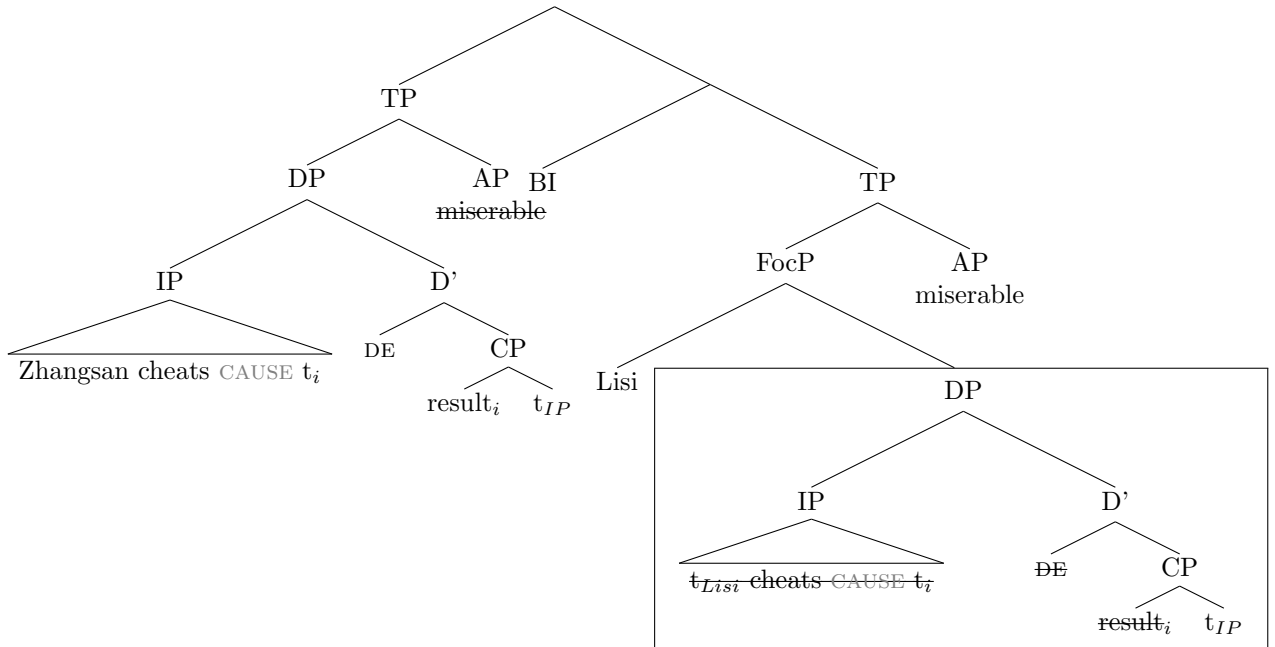
   In order for comparative deletion to apply to a single constituent, the subject of the Standard, *Lǐsì*, undergoes movement to a focus position, just as we saw for

relative clauses. This is possible because the extraction takes place from a fronted IP, and does not require that the topicalization cross any trace of a relativized element.

Turning to the other type of gapless relative, namely *adjunct*-type gapless RCs, we can also apply comparative deletion to the Standard, as shown in the following:

(416) [Zhāngsān <u>tán gāngqín de zīshì</u>] bǐ   [Lǐsì] biāozhǔn.
       Zhangsan play piano DE posture   than   Lisi   regular

'The posture that Zhangsan had while playing the piano is more regular than that Lisi had.'

Underlying Structure: [$_{TP}$ [$_{GRC}$ Zhangsan <u>plays the piano DE posture</u>] ~~regular~~] BI [$_{TP}$ [$_{GRC}$ Lisi ~~plays the piano DE posture~~] regular]
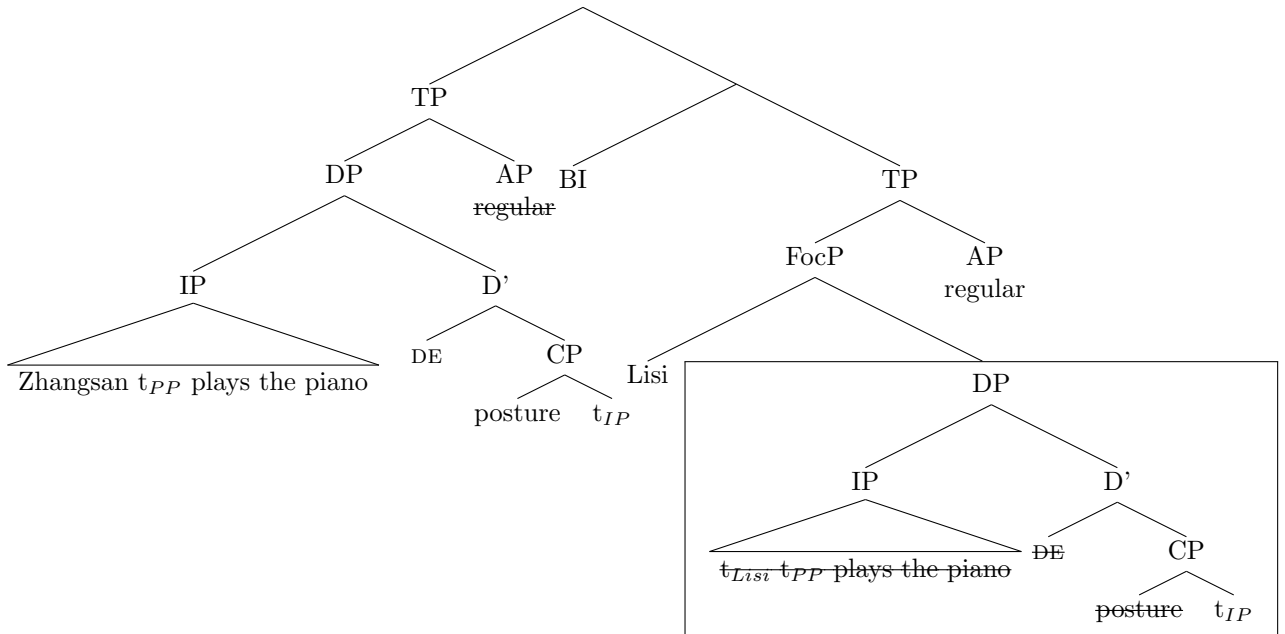
As same as the previous derivation, *Lisi*, the subject of the Standard, moves to the focus position, in order to delete the overlapping elements as a constituent. Since the element that remains in the standard is a subject, the movement path of it does not cross the trace path of a head noun and therefore does not lead to ungrammaticality. However, if the element that remains in the standard is an object, it would be ungrammatical because it violates PCC.

(417) * [Zhāngsān <u>tán gāngqín de zīshì</u>] bi   [xiǎotíqín] biāozhǔn.
         Zhangsan <u>play piano DE posture</u>   than   violin   regular

Intended. 'The posture that Zhangsan had while playing the piano is more regular than that he had while playing the violin.'

6.4.4 Summary

The idea of analysing relative clauses in BI-comparatives in this section is inspired by a pair of examples from Tsai (2008). The grammaticality of the examples shows that gapless relatives are structurally different from noun complement clauses. The analysis developed above aims to have a better understanding of the distinction between (gapless) relative clauses and noun complement clauses. Importantly, it is also an application of the alternative analysis that I provided in the last chapters for adjunct and gapless relative clauses. The results illustrate that analysing relative clauses, including argument, adjunct and gapless relatives, in the framework of the HRA can result in a better understanding and explanation of the complex phenomena of deletion in BI-comparatives that includes relative clauses. In addition, it can also reveal the distinction between subject-extraction and object-extraction from relative clauses.

In order to provide the background of how deletion works in BI-comparatives that contain complex noun phrases, I examined the argument and adjunct relatives first. I have demonstrated three types of deletion, namely deletion of the relative head, deletion of the relative clause and the combination of the two. The elements or the combination of them that need to be deleted are apparently, on the surface, non-constituents. However, I have suggested to apply topicalization to the remnant element in order to allow comparative deletion in Mandarin to apply to constituents. On this basis, after applying deletion to the standard in comparatives, the results are that:

	a head noun	a clause	the subject of a clause	the object of a clause
ORCs	√	√	√	×
SRCs	√	√	×	×
GRCs	√	√	√	×
NCCs	×	√	×	×

Object-relativized constructions allow the head noun, the relative clause or the subject of the relative clause to remain after comparative deletion. Subject-relativized constructions allow only the head noun or the relative clause to remain. Gapless relative constructions, containing *adjunct*-type gapless relatives and resultative gapless relatives, allow the head noun, the relative clause or the subject of the relative clause to remain. Noun complement constructions allow the head noun to remain.

6.5 Chapter Summary

At the beginning of this chapter, I introduced the syntax and semantics of comparatives in English and Mandarin Chinese. I reviewed the analyses of comparatives in the

literature. These can be mainly classified into two types: clausal analyses and phrasal analyses. Syntactically, clausal analyses propose that the Standard of comparison is syntactically a full clause. In contrast, the Phrasal Analysis takes the standard to syntactically be a DP. Semantically, clausal analyses involve a 2-place degree operator that takes the target degree description and the standard degree description as arguments. Phrasal analyses involve a 3-place degree operator that takes the target individual, the standard individual, and a predicate of individuals and degrees as arguments.

Analyses of BI-comparatives can also be divided into two different approaches. Erlewine (2007) proposes a phrasal analysis for BI-comparatives motivated by the fact that BI-comparatives lack embedded standards and by the behaviour of subcomparatives. Lin (2009) also proposes a phrasal analysis for BI-comparatives, the proposed derivation of which contains an recursive DegP structure. As for clausal analyses, Liu (1983) first proposes a clausal analysis for BI-comparatives which demands a strict comparative deletion operation. Liu (1996) proposes an antecedent-contained I' deletion analysis for BI-comparatives. However, these clausal analyses fail to example why BI-comparatives cannot have an embedded standard and have subcomparatives. Erlewine's novel clausal analysis can account for these problems of BI-comparatives. He has created a parallel-TPs structure for BI-comparatives as well as come up with a rule called the *comparative deletion requirement* to define the deletion happening in BI-comparatives. In line with Erlewine's (2018) clausal analysis, I further claimed a strict parallel structure for BI-comparatives where the content of the deleted verb is entailed by the content of the target verb..

Finally, I have applied Erlewine's (2018) clausal analysis integrated with the proposed analyses for relative clauses in Mandarin Chinese to examine the phenomenon pointed out by Tsai (2008). The phenomenon involves comparatives that interact with complex noun phrases, gapless relatives and noun complement clauses. Among the analyses of comparatives interacting with normal relative clauses, including argument relative clauses and adjunct relative clauses, it illustrates that a better understanding and explanation of the comparative deletion happening to relative clauses can be gained in the framework of the HRA. In addition, it shows that HRA is a helpful approach to see the distinction between relative constructions and noun complement constructions as well as subject-relativized clause and object-relativized clauses in terms of explaining their different interactions with BI-comparatives.

Chapter 7

Conclusion

In this thesis, I have examined the theoretical analyses of relative constructions in Mandarin Chinese, including NP relative constructions, adjunct relative constructions and gapless relative constructions. I have adopted a position that relative constructions containing gaps require a head raising analysis, distinguishing these from resumptive relative constructions which require a base-generation analysis. As for adjunct relative constructions, I have pointed out that they too call for a head raising analysis rather than involving operator movement. Aside from this, I have argued against the traditional views of gapless relatives which propose they are not true relative clauses or which treat gapless relatives as a distinct type of relative clause.

I have argued that there are two subtypes of gapless relatives depending on the semantics of the head noun: *manner*-kind nouns and *result*-kind nouns. For the gapless relatives that involve *manner*-kind head nouns, I have proposed to analyse these as (manner) adjunct relatives. For the gapless relatives that include *result*-kind head noun, I have proposed to analyse these as a reduced form of argument relatives. Therefore, both types of gapless relatives have a gap, in contrast to the traditional analyses of gapless relatives. In the final part of this thesis, I have shown that deriving relative constructions through a head raising strategy in the framework of antisymmetry can provide a better explanation for the data noted by Tsai and can explain the behaviour of relative constructions in comparative deletion contexts. Therefore, I have concluded that not only gapped NP relativizations but also gapped adjunct relativizations and gapless relativizations demand a head raising analysis rather than an operator movement or non-movement analysis.

Overall there are two important claim that I laid out in this thesis. One is that we have proposed a unified analysis for different types of relative clauses. Relative constructions which contain a gap, including argument, adjunct and gapless relative constructions, are derived by a head raising strategy. Relative constructions which

contain a resumptive pronoun are derived by base generation. The other claim is that there are two different type of gapless relatives. The distinction is based on the different semantics of the head noun. This means that there are semantic differences between the head nouns of the two types of gapless relatives that track the syntactic differences I have identified. In this thesis, I have not discussed in detail how to analyse different nominal semantics, focussing rather on their syntactic effects. I leave the semantics of the nominals to future research.

Ultimately, there are a number of open questions. We know that Korean and Japanese also have gapless relatives. It would be interesting to look at whether we can also have the same classification of gapless relatives in these two languages and to explore how deletion operates in the (gapless) relatives in comparatives or other ellipsis constructions. To see if it is possible to extend the same structure of Chinese gapless relatives to Japanese and Korean gapless relatives, we need to examine whether these languages have some specific structures. For example, we have proposed that the resultative gapless relatives involve a serial verb structure. It is important to know whether these languages have this structure. If they do not, we may create such a resultative relationship inside a gapless relative in other ways, for instance, in semantics. Cha (2005) also distinguishes Korean gapless relatives into two types: one denotes properties of things, the other one involves a cause-effect relation between the clause and the head noun. However, Cha shows this relation via semantics rather than syntax. I leave these to future work.

A final issue is how to understand the acquisition of what I have argued is a highly complex system. There are numerous ways to build a relative clause, some involving a gap on the surface, while others do not. The clues to which particular structure is involved are not obvious, especially given the multifunctional nature of the particle *de* in Mandarin. My own view is that there is a tight relationship between the semantics of relativization, and its syntax, so that a child acquiring the system can use both syntactic and semantic clues to acquire the system as a whole. In future work, I plan to explore in more depth the syntax-semantics relationships that govern the expression of gapless relative meanings.

Bibliography

Adger, David. 2011. "Bare resumptives." *Resumptive pronouns at the interfaces* 5:343–366.

Adger, David, Alex Drummond, David Hall and Coppe van Urk. 2017. "Is there Condition C Reconstruction?".

Alexiadou, Artemis. 2000. *The Syntax of Relative Clauses.* Vol. 32 John Benjamins Publishing.

Alotaibi, Mansour and Robert D Borsley. 2013. "Gaps and resumptive pronouns in Modern Standard Arabic.".

Aoun, Joseph E, Elabbas Benmamoun and Lina Choueiri. 2009. *The syntax of Arabic.* Cambridge University Press.

Aoun, Joseph and Yen-hui Audrey Li. 2003. *Essays on the representational and derivational nature of grammar: The diversity of wh-constructions.* MIT press.

Arsenijević, Boban. 2009. "Clausal complementation as relativization." *Lingua* 119(1):39–50.

Bayer, Josef and Lisa Lai-Shen Cheng. 2017. "Wh-in-Situ." *The Wiley Blackwell Companion to Syntax, Second Edition* pp. 1–44.

Bhatt, Rajesh. 2002. "The raising analysis of relative clauses: Evidence from adjectival modification." *Natural language semantics* 10(1):43–90.

Bhatt, Rajesh and Sabine Iatridou. 2012. Comments on Reconstructing Reconstruction. In *Workshop on resumptive pronouns, Hebrew University of Jerusalem.*

Bhatt, Rajesh and Shoichi Takahashi. 2011. "Reduced and unreduced phrasal comparatives." *Natural Language & Linguistic Theory* 29(3):581–620.

Bianchi, Valentina. 2000. "The raising analysis of relative clauses: A reply to Borsley." *Linguistic Inquiry* 31(1):123–140.

Bird, Charles. 1968. "Relative clauses in Bambara." *Journal of West African Languages* 5(1):35–48.

Borsley, Robert D. 1992. "More on the difference between English restrictive and non-restrictive relative clauses." *Journal of Linguistics* 28(1):139–148.

Borsley, Robert D. 1997. "Relative clauses and the theory of phrase structure." *Linguistic Inquiry* pp. 629–647.

Brame, Michael. 1968. "A new analysis of the relative clause: Evidence for an interpretive theory." *Unpublished manuscript, MIT* .

Bresnan, Joan. 1975. "Comparative deletion and constraints on transformations." *Linguistic Analysis* 1(1):25–74.

Bresnan, Joan W. 1973. "Syntax of the comparative clause construction in English." *Linguistic inquiry* 4(3):275–343.

Büring, Daniel. 2005. *Binding theory.* Cambridge University Press.

Carlson, Greg N. 1977. "Amount relatives." *Language* pp. 520–542.

Cha, Jong-Yul. 1998. Relative clause or noun complement clause: The diagnoses. In *Proc. 11th International Conference on Korean Linguistics.* pp. 73–82.

Cha, Jong-Yul. 2005. *Constraints on clausal complex noun phrases in Korean with focus on the gapless relative clause construction.* Citeseer.

Chao, Yuen Ren. 1965. *A grammar of spoken Chinese.* Univ of California Press.

Chen, Sherry Yong. 2017. "Movement constraints on the relative order of double topics in Mandarin Chinese." *Toronto Working Papers in Linguistics* 38.

Chen, Zhongli. 2002. The syntax of chinese relative construction. Master's thesis Guangdong University of Foreign Studies.

Chen, Zongli and Norbert Corver. 2013. "Feature inheritance and the Comp-trace effect in Chinese relative clauses: The case of suo." *Ms., University of Utrecht* .

Cheng, Lisa L-S and Rint Sybesma. 2005. "A Chinese relative." *Organizing Grammar: Studies in Honor of Henk van Riemsdijk* pp. 69–76.

Cheng, Lisa Lai-Shen. 2007. "Verb copying in Mandarin Chinese." *The copy theory of movement* 107:151.

Chomsky, Noam. 1977. "On wh-movement." *Formal syntax* pp. 71–132.

Chomsky, Noam. 1993. "A minimalist program for linguistic theory.".

Chomsky, Noam. 1995. "Categories and transformations." *The minimalist program* 219:394.

Chomsky, Noam and Howard Lasnik. 1977. "Filters and control." *Linguistic inquiry* 8(3):425–504.

Cinque, Guglielmo. 2003. The prenominal origin of relative clauses. In *Workshop on Antisymmetry and Remnant Movement, New York University.* Vol. 31.

Cinque, Guglielmo. 2011. "On double-headed relative clauses." *Linguística. Revista de Estudos Linguísticos da Universidade do Porto. 6.* .

Cinque, Guglielmo. 2015. "Three phenomena descriminating between "raising" and "matching" relative clauses." *Semantic-Syntax Interface* 2(1).

Collins, Christopher, Lisa Levinson and Oana Savescu-Ciucivara. 2007. "Home Sweet Home.".

Dayal, Veneeta. 2012. *Locality in WH quantification: Questions and relative clauses in Hindi.* Vol. 62 Springer Science & Business Media.

De Vries, Mark. 2006. "Possessive relatives and (heavy) pied-piping." *The Journal of Comparative Germanic Linguistics* 9(1):1–52.

Del Gobbo, Francesca. 2001. "Appositives schmappositives in Chinese." *UCI Working Papers in Linguistics* 7:1–25.

Del Gobbo, Francesca. 2005. Chinese relative clauses: restrictive, descriptive or appositive? In *Brugè, Laura et al.(eds.), Contributions to the thirtieth Incontro di Grammatica Generativa, Venezia: Libreria Editrice Cafoscarina, 2005, pp. 207-305.* Venezia, Libreria Editrice Cafoscarina.

Del Gobbo, Francesca. 2007. "A comparison between Japanese and Chinese relative clauses." *Working Papers in Linguistics, 17, 2007, pp. 177-197.* .

Del Gobbo, Francesca. 2010. "On Chinese appositive relative clauses." *Journal of East Asian Linguistics* 19(4):385–417.

Djamouri, Redouane, Waltraud Paul and John Whitman. 2013. "Postpositions vs. prepositions in Mandarin Chinese: The articulation of disharmony." *Theoretical approaches to disharmonic word orders* pp. 74–105.

Dryer, Matthew S. 2005. "Order of relative clause and noun." *The world atlas of language structures* pp. 366–369.

Erlewine, Michael Yoshitaka. 2007. *A new syntax-semantics for the Mandarin bi comparative.* University of Chicago.

Erlewine, Michael Yoshitaka. 2012. Share to compare: The Mandarin bǐ comparative. In *Proceedings of the 29th West Coast Conference on Formal Linguistics. Somerville, MA: Cascadilla Proceedings Project.* Citeseer pp. 54–62.

Erlewine, Michael Yoshitaka. 2018. "Clausal comparison without degree abstraction in Mandarin Chinese." *Natural Language & Linguistic Theory* 36(2):445–482.

Erteschik-Shir, Nomi. 1973. On the nature of island constraints. PhD thesis Massachusetts Institute of Technology.

Fabb, Nigel. 1990. "The difference between English restrictive and nonrestrictive relative clauses." *Journal of linguistics* 26(1):57–77.

Fehri, A Fassi. 2013. *Issues in the structure of Arabic clauses and words.* Vol. 29 Springer Science & Business Media.

Fukui, Naoki and Yuji Takano. 2000. "Nominal structure: An extension of the symmetry principle." *The derivation of VO and OV* pp. 219–254.

Grano, Thomas. 2017. "Finiteness contrasts without Tense? A view from Mandarin Chinese." *Journal of East Asian Linguistics* 26(3):259–299.

Grosu, Alexander and Fred Landman. 1998. "Strange relatives of the third kind." *Natural language semantics* 6(2):125–170.

Hacquard, Valentine. 2006. Aspects of modality PhD thesis Massachusetts Institute of Technology.

Harris, Jesse A. 2008. On the syntax and semantics of Heim's ambiguity. In *Proceedings of the 27th West Coast Conference on Formal Linguistics.* Citeseer pp. 194–202.

Heck, Fabian. 2009. "On certain properties of pied-piping." *Linguistic Inquiry* 40(1):75–111.

Heim, Irene. 1979. Concealed questions. In *Semantics from different points of view.* Springer pp. 51–60.

Heim, Irene. 1985. "Notes on comparatives and related matters." *Ms., University of Texas, Austin* .

Heim, Irene. 2000. Degree operators and scope. In *Semantics and linguistic theory.* Vol. 10 pp. 40–64.

Heycock, Caroline. 1995. "Asymmetries in reconstruction." *Linguistic inquiry* pp. 547–570.

Heycock, Caroline. 2005. "On the interaction of adjectival modifiers and relative clauses." *Natural Language Semantics* 13(4):359–382.

Horvath, Julia. 2006. "Pied-piping." *The Blackwell companion to syntax* 3:569–630.

Hsu, Yu-Yin. 2014. "Nominal internal and external topic and focus: Evidence from Mandarin." *University of Pennsylvania Working Papers in Linguistics* 20(1):17.

Huang, C-T. 2016. "The Syntax and Semantics of Prenominals: Construction or Composition?" *Language and Linguistics* 17(4):431–475.

Huang, C-T James. 1982*a*. "Move wh in a language without wh-movement." *The linguistic review* 1(4):369–416.

Huang, C-T James. 1984. "On the distribution and reference of empty pronouns." *Linguistic inquiry* pp. 531–574.

Huang, C-T James. 1997. "On lexical structure and syntactic projection." *Chinese languages and Linguistics* 3:45–89.

Huang, C-T, Y-H Li and Yafei Li. 2009. *The Syntax of Chinese.* Cambridge University Press.

Huang, Cheng-Teh James, Yen-hui Audrey Li, Andrew Simpson and John Wiley. 2014. *The handbook of Chinese linguistics.* Wiley Online Library.

Huang, CT. 1982*b*. "James. 1982." *Logical relations in Chinese and the theory of grammar* .

Huang, James. 2006. "Resultatives and unaccusatives: a parametric view." *Bulletin of the Chinese Linguistic Society of Japan* 2006(253):1–43.

Huang, Z Nick. 2015. On syntactic tense in Mandarin Chinese. In *Proceedings of the 27th North American Conference on Chinese Linguistics.* Vol. 2 pp. 406–423.

Ishizuka, Tomoko. 2008. "Restrictive and non-restrictive relative clauses in Japanese: Antisymmetric approach." *Department of Linguistics, UCLA* .

Jackendoff, Ray. 1975. "Tough and the trace theory of movement rules." *Linguistic Inquiry* 6(3):437–447.

Jackendoff, Ray. 1977. "X-bar syntax.".

Jiang, Yueqiu and Øivin Andersen. 2017. "Serial verb constructions in Mandarin Chinese." *International Journal of Linguistics* 9(5):184–196.

Kamio, Akio. 1977. "Restrictive and non-restrictive relative clauses in Japanese." *Descriptive and applied linguistics* 10:147–168.

Karlsson, Fred. 2010. "Syntactic recursion and iteration." *Recursion and human language* pp. 43–67.

Kayne, Richard S. 1994. *The antisymmetry of syntax*. Mit Press.

Kayne, Richard S. 2005. *Movement and silence*. Oxford University Press.

Kayne, Richard S. 2014. "Why isn't this a complementizer." *Functional structure from top to toe* pp. 188–231.

Kayne, Richard S. 2017. "A note on some even more unusual relative clauses." *Order and structure in syntax I* p. 363.

Kennedy, Christopher. 2002. "Comparative deletion and optimality in syntax." *Natural Language & Linguistic Theory* 20(3):553–621.

Kennedy, Christopher. 2007. Modes of comparison. In *Proceedings from the annual meeting of the Chicago Linguistic Society*. Vol. 43 Chicago Linguistic Society pp. 141–165.

Koopman, Hilda Judith and Anna Szabolcsi. 2000. *Verbal complexes*. MIT Press.

Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase structure and the lexicon*. Springer pp. 109–137.

Kratzer, Angelika and Irene Heim. 1998. *Semantics in generative grammar*. Vol. 1185 Blackwell Oxford.

Krause, Cornelia Cornelia Ann. 2001. On reduced relatives with genitive subjects PhD thesis Massachusetts Institute of Technology.

Larson, Richard and Naoko Takahashi. 2002. Order and interpretation in Japanese relative clauses. In *Annual Meeting of the Linguistics Society of America. San Francisco*.

Larson, Richard and Naoko Takahashi. 2007. Order and interpretation in prenominal relative clauses. In *Proceedings of the Workshop on Altaic Formal Linguistics II. MIT Working Papers in Linguistics*. Vol. 54 pp. 101–120.

Law, Paul. 2001. "Some issues in English and Chinese relative clauses." *Ms., Freie Universitat, Berlin* .

Lebeaux, David. 2000. *Language acquisition and the form of the grammar.* John Benjamins Publishing.

Li, Chao. 2009. "On the Headedness of Mandarin Resultative Verb Compounds." *Concentric: Studies in Linguistics* 35(1).

Li, Charles N, Sandra A Thompson and Sandra A Thompson. 1981. *Mandarin Chinese: A Functional Reference Grammar.* Univ of California Press.

Li, Linding. 1986. "Sentence Patterns in Modern Chinese." *Beijing: Shangwu Yinshuguan* .

Li, Weizhong. 2007. The Study of "You" Sentence and "You" Preposition Frame. Master's thesis Soochow University.

Li, Wendan. 2018. In Complex Predicates: Grounding of Verb Phrases. In *Grounding in Chinese Written Narrative Discourse.* Brill Rodopi pp. 138–172.

Li, Yuecao. 2008. Study on Prepositional Structure "Wei X Er Y". Master's thesis Central China Normal University.

Lin, Jo-wang. 2003. "On restrictive and non-restrictive relative clauses in Mandarin Chinese." *Tsinghua Journal of Chinese Studies* 33(1):199–240.

Lin, Jo-wang. 2009. "Chinese comparatives and their implicational parameters." *Natural Language Semantics* 17(1):1–27.

Lin, Jo-wang et al. 2008. "The order of stage-level and individual-level relatives and superiority effects." *Language and Linguistics* 9(4):839–864.

Liu, Chen-Sheng Luther. 1996. "A note on Chinese comparatives." *Studies in the Linguistic Sciences* 26(1-2):217–235.

Liu, Yue-hua, Wen-yu Pan and Hua Gu. 1983. "1996." *A Practical Reference Book on Modern Chinese Grammar* .

McCloskey, James. 2006. "Resumption." *The Blackwell companion to syntax* pp. 94–117.

Miyagawa, Shigeru. 2008. Genitive subjects in Altaic. In *Proceedings of the workshop on Altaic formal linguistics (WAFL4), MITWPL.* Vol. 56 pp. 181–198.

Munn, Alan. 1994. A minimalist account of reconstruction asymmetries. In *Proceedings of NELS*. Vol. 24 pp. 397–410.

Ning, Chunyan. 1993. The overt syntax of relativization and topicalization PhD thesis University of California, Irvine.

Ning, CY. 1996. "De as a functional head in Chinese." *UCI Working Papers in Linguistics* 1:63–79.

Niu, Fangfang. 2015. Nominal Possession in Mandarin Chinese PhD thesis Queen Mary University of London.

Pan, Haihua and Jianhua Hu. 2000. "Head noun movement, focus, and topicalization in Mandarin Chinese." *Ms., City University of Hong Kong* .

Pan, Victor and Waltraud Paul. 2014. "Finiteness in Mandarin Chinese and the basic syntax of kěnéng." *Unpublished paper. URL http://crlao. ehess. fr/docannexe/file/1708/keneng_squib. pdf (2018-05-18)* .

Paul, Waltraud. 2007. "The insubordinate subordinator de in Mandarin Chinese." *Ms., CRLAO, Paris* .

Paul, Waltraud. 2008. "The serial verb construction in Chinese: A tenacious myth and a Gordian knot." *The Linguistic Review* 25(3-4):367–411.

Paul, Waltraud. 2014. *New perspectives on Chinese syntax.* Vol. 271 Walter de Gruyter GmbH & Co KG.

Pesetsky, David Michael. 1982. Paths and categories PhD thesis Massachusetts Institute of Technology.

Ross, John Robert. 1986. "Infinite Syntax!, Norwood.".

Safir, Ken. 1999. "Vehicle change and reconstruction in Ā-chains." *Linguistic inquiry* 30(4):587–620.

Sag, Ivan A. 1997. "English relative clause constructions." *Journal of linguistics* pp. 431–483.

Saito, Mamoru, T-H Jonah Lin and Keiko Murasugi. 2006. "N'-ellipsis and the structure of noun phrases in Chinese and Japanese.".

Sauerland, Uli. 2000. *Obligatory reconstruction and the meaning of traces.* Univ., Sonderforschungsbereich 340.

Sauerland, Uli. 2003. "Unpronounced heads in relative clauses." *The interfaces: Deriving and interpreting omitted structures* 61:205–226.

Sauerland, Uli and Noam Chomsky. 1998. *The meaning of chains.* Mit Working Papers in Linguistics.

Sauerland, Uli et al. 2000. Two structures for English restrictive relative clauses. In *Proceedings of the Nanzan GLOW.* Nanzan University Nagoya pp. 351–366.

Simpson, Andrew. 2001. "Definiteness agreement and the Chinese DP." *Language and Linguistics* 2(1):125–156.

Simpson, Andrew. 2002. "On the status of 'modifying'DE and the structure of the Chinese DP." *On the formal way to Chinese languages* pp. 74–101.

Simpson, Andrew et al. 2005. "Classifiers and DP structure in Southeast Asia." *The Oxford handbook of comparative syntax* pp. 806–838.

Stechow, Arnim von. 1984. "Comparing semantic theories of comparison." *Journal of semantics* 3(1-2):1–77.

Sybesma, Rint. 2004. "Exploring Cantonese tense." *Linguistics in the Netherlands* 21(1):169–180.

Tang, Ting-chi. 1979. "Guoyu yufa ynjiu lunji." *Studies in Chinese syntax]. Taipei: Student Book* .

Tsai, Hui-Chin Joice. 2008. "On gapless relative clauses in Chinese." *Nanzan Linguistics* 5.

Tsai, Wei-Tien Dylan. 1994. "On nominal islands and LF extraction in Chinese." *Natural Language & Linguistic Theory* 12(1):121–175.

Tsai, Wei-Tien Dylan. 1999. *On economizing the theory of A-bar dependencies.* Courier Corporation.

Tsao, Feng-Fu. 1989. "Comparison in Chinese: A topic-comment approach." *Tsing Hua Journal of Chinese Studies* 19:151–189.

Vergnaud, Jean-Roger. 1974. French relative clauses. PhD thesis Massachusetts Institute of technology.

Vries, Mark de et al. 2002. *The syntax of relativization.* LOT.

Xiang, Ming. 2005. *Some topics in comparative constructions.* Michigan State University. Department of Linguistics and Germanic, Slavic . . . .

Xu, Yi. 2009. "The syntax, processing and second language acquisition of Chinese relative clauses.".

Yang, Caimei. 2015. "Universal Merge and Chinese Relativization." *Language and Semiotic Studies* 1(2).

Yen-hui, Cheng-teh James Huang and Audrey Li. 1996. *New horizons in Chinese linguistics*. Vol. 36 Springer Science & Business Media.

Yu, Haopeng. 2014. "The syntax of topicalization of NP/DP after'DE'in Chinese." *Theory and Practice in Language Studies* 4(12):2594.

Zhang, Anqi. N.d. "Mandarin Gapless Relative Clauses as Reduced Relative Clauses." *Many thanks to our keynote speakers:* T. Florian Jaeger (University of Rochester)* Philippe Schlenker (New York University/Ecole Normale Supérieure, Paris)* David I. Beaver (University of Texas at Austin) Many thanks also to our supporters at the University of Texas at Austin.* Forthcoming.

Zhang, Niina et al. 2008. "Gapless relative clauses as clausal licensors of relational nouns." *Language and Linguistics* 9(4):1005–1028.

Zhou, Min and Jingquan Han. 2012. "A Phase-based Approach to the Derivation of Relative Constructions in Mandarin Chinese [J]." *Journal of Foreign Languages* 3:002.

Zhu, D. 1983. "Explainations on Grammar.".