

A STUDY OF NOMINAL-CLAUSAL RELATIONS IN MANDARIN CHINESE

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A STUDY OF NOMINAL-CLAUSAL RELATIONS IN MANDARIN CHINESE

This dissertation reexamines a variety of prenominal clauses in Mandarin Chinese and provides a simpler, more comprehensible, and less chaotic view of the nominal-clausal relations. In particular, it is argued that gapless clauses (a.k.a. "gapless relative clauses"), and content clauses (a.k.a. "complement clauses") should be treated on a par with adjunct relative clauses, all of which contain an adjunctivizer selecting a phonetically empty nominal operator as its complement.

Unlike in the argument relative clause construction, the head nominal modified by these adjunctive clauses cannot be identified as any argument of the predicate in the clause. The adjunctivizer performs the function of relating the head nominal to an adjunct in the eventuality of the gapless clause or the proposition of the content clause. The empty operator then moves to the periphery of the clause so that the clause can be locally predicated of the nominal to be modified. The adjunctivizers in adjunct relative clauses introduce what can be regarded as conventional adjuncts, i.e., location, time, instrument, manner, and reason, whereas the adjunctivizers in gapless clauses and content clauses introduce unconventional adjuncts (and hence have not been regarded as adjuncts in previous literature), such as cause, effect, attribute, component, degree, and content. I also explore the idea that the adjunctivizers may be underspecified and their values are ultimately determined in consultation with the pragmatics associated with the utterance.

This dissertation argues against the previous claim that gapless clauses should be treated along with content clauses as the complement of the head nominal by showing that the alleged

syntactic and semantic evidence is either problematic or insufficient. It will also provide syntactic arguments for the operator movement, the landing site of operator and its association with the head nominal, and the nominal status of operator. In addition, it will offer formal semantic derivations reflecting such syntactic analyses for the different kinds of prenominal clauses. The proposed approach revises and extends previously proposed similar but distinct notions of adjunct operators, pointing out their shortcomings.

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1. Introduction

Chapter 1 provides an overview of the main empirical problems this dissertation deals with and summarizes its main claims.

1.1 Overview of prenominal clausal modifiers in Chinese

Chinese has different types of clausal modifiers of nominal heads. The most familiar type is (1), the NPs containing gapped relative clauses (RCs). In these NPs, the head nominal corresponds to a gap inside the modifying clause, which can be an argument or an adjunct.¹

(1) *Gapped relative clauses*

a. *Argument relative clauses (RCs with an argument gap)*

	张三	买	的	手机	
[NP [ArgRC	Zhangsan	mai	[e] _i	de]	shouji]
	Zhangsan	buy	DE		cell phone
	'the cell phone Zhangsan bought'				

b. *Adjunct relative clauses (RCs with an adjunct gap)*

	张三		修	车	的	地方	
[NP [AjetRC	Zhangsan	[e] _i	xiu	che	de]	difang]	
	Zhangsan		fix	car	DE	place	
	'the place where Zhangsan fixed the car'						

Following the tradition from Aoun and Li (2003) and Huang, Li and Li (2009), I will refer to the clauses in (1a) and (1b) as "argument relative clauses" and "adjunct relative clauses,"

1. The abbreviations used in the Chinese data are as follows: BEI = passive marker; CL = classifiers (not to be confused with CL indicating "clause" in labelled bracketings); DE = nominal modifier creating particle *de*; EMP = emphatic marker; EXP = experiential marker; NEG = negation marker; NEG-PERF = negative perfective aspect marker; PERF = perfective aspect marker; PROG = progressive marker; SFP = sentence final particles.

respectively. Notice that these labels are given not because the whole relative clause can be an argument or adjunct of the nominal head but because the gap therein is interpreted as an argument or an adjunct.

In (1a), the head *shouji* 'cell phone' is related to the direct object of the verb. In (1b), the head *difang* 'place' is related to an adjunct gap in the modifying clause as the place of the event.

Another type of prenominal clause is what people usually call "complement clause" since the modifying clause is considered to be the complement of a nominal predicate. The head usually is a nominal counterpart of a verb such as *claim*, *assumption*, and *belief*, or nouns such as *rumor*, *idea*, and *fact*. One example is shown in (2).

(2) Complement clauses

	张三	离婚	的	声明	
[NP [CompCL	Zhangsan	lihun	de]	shengming]	
	Zhangsan	divorce	DE	claim	
	'the claim that Zhangsan is divorced'				

In addition, Chinese has a special type of relative clause as in (3), which is called a "gapless relative clause" since the head nominal cannot be identified as any gap inside the modifying clause. (Japanese and Korean are also known to have a similar construction.)

(3) Gapless relative clauses

	张三	弹	钢琴	的	声音	
[NP [GaplessCL	Zhangsan	tan	gangqin	de]	shengyin]	(CL = clause)
	Zhangsan	play	piano	DE	sound	
	Lit: '(the) sound [Zhangsan plays the piano]'					
	'the sound that arises/arose from Zhangsan's playing the piano'					

In (3), the head *shengyin* 'sound' does not seem to relate to any position inside the modifying clause. In Chapter 2, more data concerning each type of clausal modifiers will be provided.

Throughout the dissertation, I will refer to relative clause constructions in (1) and abbreviate them as "ArgRC" (argument relative clause) and "AjctRC" (adjunct relative clauses), respectively. The construction in (2) will be called "complement clauses (CompCL)." In a later chapter, however, it will be labeled "Content clauses (ContCL)," and assimilated to gapless relative clauses.

The name "gapless relative clause," however, is rather controversial and misleading since previous literature has not agreed on whether they are truly relative clauses or gapless. On the one hand, Cheng and Sybesma (2005), Ning (1993), and Tsai (1997) treat them as one type of relative clause. On the other hand, Aoun and Li (2003), Huang et. al (2000, 2009), Huang (2016), and Tsai (2008) argue that they are not relative clauses but complement clauses selected by predicative nominal heads. For example, Huang et. al (2009: 234) claim that the gapless clause "is more like a Head noun with a preposition and XP (a PP) in English, such as [*the price [for him killing the boy]*], [*the sound [of his singing]*]...rather than being a counterpart of the English [Head + Relative clause]." Pursuing an analysis similar to Huang et. al's approach, Zhang (2008) claims that gapless clauses should be at Spec, NP, which act as subjects predicated by the nominal heads as predicates.²

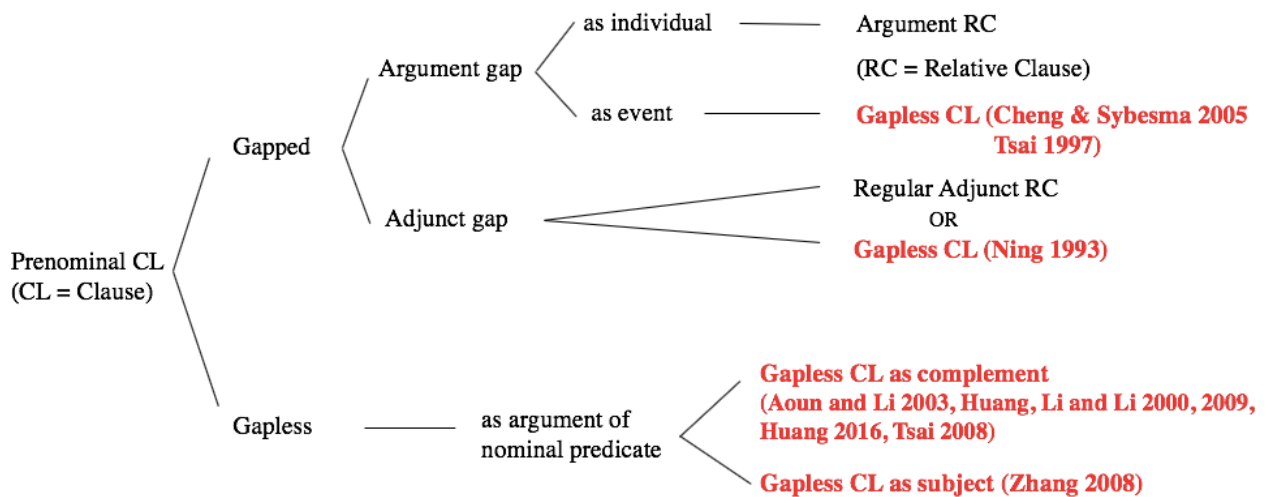
Moreover, some previous studies argue that gapless relative clauses are not truly gapless. Postulating a gap within the prenominal clause, Ning (1993) argues that there is an adjunct gap

2. Both Zhang (2008) and the other studies that argue for a complement status of gapless clauses assume that the predicative head nominals are a particular kind of nominal, i.e., relational nouns. These nominals have an variable that needs to be filled by the gapless clause. To do so, the head nominal needs to be predicated of the gapless clause. For more discussion of relational nouns, please refer to Sections 4.1.2 and 6.2.2.

in the modifying clause created by the movement of a relative operator. In addition, Tsai (1997) and Cheng and Sybesma (2005) argue that there is an implicit event argument in the clause bound by a base-generated operator. On the other hand, Aoun and Li (2003), Huang et al. (2000, 2009), Huang (2016), Zhang (2008) and others argue that there indeed is no gap inside the clause.

The distinctions and correlations among the analyses of different types of prenominal clauses proposed in the literature can be summarized as in (4).

(4) Different categorizations of prenominal clauses in the literature



As can be seen from the highlights in (4), there are at least four major distinct analyses of gapless clauses in the literature, two of which postulate a gap in the clause while two others do not.

Given these controversies over gapless relative clauses, I will refrain from using the term "gapless relative clauses" to avoid potential ambiguity and confusion. Instead, I will just appeal to the observational characteristic of this construction and use the neutral label "gapless clauses (gaplessCL)" to refer to it.

1.2 Overview of the dissertation

This dissertation reexamines a variety of prenominal clauses in Mandarin Chinese. More specifically, in the spirit of Ning's analysis (1993) (described in Chapter 4), but revising and extending his analysis, I will argue that gapless clauses and content clauses have a syntactic and semantic structure as adjunct relative clauses.

This study crucially differs from Ning's in proposing what I call an "adjunctivizer," an archi-category in syntax which subsumes prepositions (and postpositions). It introduces some specific types of adjunct phrases into gapless clauses whose semantico-pragmatic functions may go beyond the standardly recognized adjunct expressions. An adjunctivizer head is analyzed as selecting an empty nominal operator as its complement ($[_{A_{jctvP}} \text{Adjunctivizer } [_{NP} \text{OP }]]$). The operator moved out of an adjunctivizer phrase is analyzed as binding a trace as its variable inside the modifying clause. This proposal will be spelled out and argued for in Chapter 5.

Accordingly, I argue against the complement analysis, which treats gapless clauses as the complement and hence do not involve any gap corresponding to the nominal head. In Chapter 6, I will provide counter-evidence to the arguments for the complement analysis offered in Huang (2016), which is summarized in Chapter 4.

In Chapter 7, I will also provide a semantic analysis for gapless clauses built upon the semantics of the adjunctivizer. Appealing to the adjunctivizer, I also derive semantic analysis including adjunct relative clauses and complement clauses (my content clauses). My analyses will offer a new way of categorizing various types of prenominal clausal modifiers in Chinese, which will lead me to argue that all kinds of Chinese prenominal clauses are gapped. In argument relative clauses, the gap is created by the direct movement of the head nominal out of the modifying clause.

In all the other types including adjunct relative clauses, gapless clauses, and content clauses, the gap is created by an empty operator moving out of an adjunctivizer phrase.

Before the dissertation moves onto the discussion of gapless clauses, it summarizes the analyses of some basic syntactic properties of Mandarin Chinese in Chapter 2, and the syntactic structures of argument relative clauses and adjunct relative clauses in Chapter 3 from previous literature. These assumptions will become relevant to the discussions in the later chapters.

2. Background

The chapter will first provide background knowledge of Chinese syntax relevant to this dissertation in Section 2.1. Then Section 2.2 will illustrate various kinds of prenominal clauses in Chinese, the primary empirical data this study investigates.

2.1 Some basics of Chinese syntax

This section describes the specific views that I adopt on the syntax of Mandarin Chinese, all of which will be relevant to the research presented below. They include: (i) both hierarchical and linear structures within sentences and nominal phrases, (ii) the function of *de* appearing in prenominal clausal modifiers, and (iii) the diversified use of prenominal adjectives.

2.1.1 Word order in Chinese

The word order of Chinese has been greatly debated in the literature. On the one hand, Li and Thompson (1974, 1975, 1981) and Tai (1973) made the influential claim that Chinese is an SOV (Subject-Object-Verb) language. On the other hand, however, subsequent studies convincingly argued that Chinese involves SVO basic word order, pointing out the insufficiency of the arguments made for the SOV order (Chu 1979, Huang 1978, Li 1979, Li 1990, Mei 1979, Sun and Givon 1985, Paul 2013, Mulder and Sybesma 1992, Whitman and Paul 2005). In this brief introduction, I will simply follow the latter studies in assuming that Chinese is an SVO language without providing further arguments from those studies.

What makes it difficult to identify the basic word order in Chinese is the observation that Chinese appears to be head-initial in VP but head-final in NP (Huang 1982). This cross-categorical disharmony has posed a challenge to the typological generalizations observed among

languages since Greenberg (1963), who pointed out that cross-linguistically a trend is for one language to have the same head directionality across syntactic categories.

First, the VP and its extended functional projections Mod(al)P and Asp(P) are head-initial as shown in (1).³

- (1) a. 张三 喜欢 书
 Zhangsan [VP **xihuan** [NP shu]]
 Zhangsan like book
 'Zhangsan likes books.'
- b. 张三 可能 喜欢 书
 Zhangsan [ModP **keneng** [VP xihuan shu]]
 Zhangsan may like book
 'Zhangsan may like books.'

3. Other word orders are also possible when topic or focus is involved (Hsu 2013, Li and Thompson 1986, Shyu 2014, among others).

- (i). a. SOV
 A. 你 什么 写完 了
 ni **shenme**_i xiewan-le *t*_i ?
 you **what** write-PERF
 'What did you finish?'
 B. 我 是 作业 写完 了
 wo (shi) **zuoye** xiewan-le *t*_i .
 I EMP **assignment** write-PERF
 'I finished the assignment.'

Hsu (2013: 51, modified)

- b. OSV
 那 本 书 张三 喜欢
na-ben **shu**, Zhangsan,_i xihuan
 that-CL book Zhangsan like
 'Speaking of that book, Zhangsan likes (it).'

In (ia), as an answer to the *wh*-question, the object *zuoye* 'assignment' in answer B is the focus of the sentence against the relevant alternatives in the background. The focus status of *zuoye* 'assignment' can be supported by the fact that it can optionally occur with the emphatic marker *shi* as shown in (ia). This information structure yields an SOV order. In (ib), the object is moved to the external topic position above the subject *Zhangsan*. The speaker is making a comment about that particular book known by both the speaker and hearer in the discourse. In this section, I will not consider the topic and focus constructions.

- c. 张三 看了 那本 书
 Zhangsan [AspP *kani-le* [VP *t_i* na-ben shu]]
 Zhangsan read-PERF that-CL book
 'Zhangsan has read that book.'

In (1a), the verb takes the complement *shu* 'book' post-verbally. In (1b), the modal takes VP as its complement to the right. In (1c), although the aspect marker *-le* occurs to the right of the verb, the verb is often claimed to move from within VP to AspP as indicated in the sentence.

Therefore, AspP can also be considered to be head-initial.⁴

In addition, adverbs and phrasal adjuncts such as PP adjuncts occur pre-verbally as in (2).

- (2) 他 昨天 在 学校 等了 半个 小时
 ta zuotian [PP **zai** **xuexiao**] deng-le *ban-ge* *xiaoshi*
 he yesterday at school wait-PERF half-CL hour
 'Yesterday, he waited for half an hour at school.'

4. As suggested by Thomas Grano, the direct piece of evidence for AspP to be head-initial deals with the fact that the non-affixal progressive marker (*zheng*)*zai* and the negative perfective aspect marker (*mei*)*you* appear pre-verbally, as shown in (i) and (ii), respectively.

- (i). 我 正 在 看 书
 wo [AspP (**zheng**)**zai** [VP kan shu]]
 I PROG read book
 'I'm reading a book'.
 (ii). 我 没 有 写 作业
 wo [AspP (**mei**)**you** [VP xie zuoye]]
 I NEG-PERF write assignment
 'I didn't write the assignment'.

In (i) and (ii), (*zheng*)*zai* and (*mei*)*you* are the head of AspP taking VP as their complement.

Note that certain adverbs denoting frequency or duration occur post-verbally such as *ban-ge xiaoshi* 'half an hour' in (2). They are typically treated as complement of the verb. Paul (2013) calls them 'quasi' arguments'.

Unlike the VP domain, NPs in Chinese are strictly head-final. Therefore, any phrase, be it an adjunct or an argument, appears to the left of the head nominal within a nominal phrase, as shown in (3).

- (3) a. 爸爸 的 帽子
 [NP [NP **baba** **de**] maozi]
 father **DE** hat
 'father's hat'
- b. 聪明 的 学生
 [NP [AP **congming** **de**] xuesheng]
 smart **DE** student
 'smart student'
- c. 昨天 来 的 教授
 [NP [CP **zuotian** **lai** **de**] jiaoshou]
 yesterday **come** **DE** professor
 'the professor who came yesterday'
- d. 罗马 的 毁灭
 [NP [NP **luoma** **de**] huimie]
 Rome **DE** destruction
 'the Rome's destruction'
- e. 对 理论 的 批评
 [NP [PP **dui** **lilun** **de**] piping]
 on **theory** **DE** criticism
 'the criticism on the theory'

In (3), phrases with various categories, i.e., NP, AP, CP, PP appear prenominally. Moreover, all the prenominal phrases are associated with the head nominal using the particle *de*. In Section 2.1.3, I will discuss *de* in more detail in the context of relative clauses.

In addition, some functional elements like a demonstrative and a "numeral-classifier" also occur in prenominal positions as shown in (4).

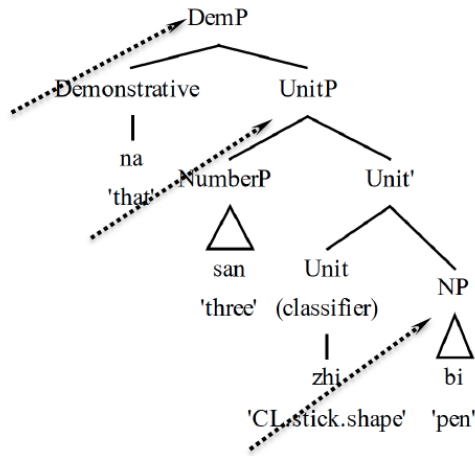
- (4) 那 三顶 爸爸 的 帽子
 [**na** **san-ding** baba de maozi]
 that three-CL farther DE hat
 'those three father's hats'

In the next section, I will discuss my assumption of the Chinese NP structure in more detail.

2.1.2 Overview of Chinese NP structure

This study does not argue for a specific internal structure of a nominal phrase in Chinese, leaving it open whether Chinese involves a DP or not. For the sake of concreteness, however, I will adopt the "3-layer" internal structure of nominal expressions proposed in Hsu (2013), as shown in (5a), which portrays the structure of (5b).

(5) a. The 3-layer internal structure of nominal phrases in Chinese



(Hsu, 2013: 133)

b. 那 三枝 笔
na san-zhi bi
that three-CL pen
'those three pens'

Under this analysis, the core nominal projection (NP) can be accompanied by two distinct higher projections: Dem(onstrative) Phrase and Unit Phrase (headed by a classifier labeled "Unit") in this hierarchical order. The Demonstrative Phrase is headed by a demonstrative. The Unit Phrase is headed by a classifier with the Numeral Phrase being at its specifier. It is also assumed that DemP need not be projected when a demonstrative does not appear, allowing the entire nominal expression to be realized as UnitP, as shown in (6).

(6) 三枝 笔
[UnitP san-zhi bi]
 three-CL pen
 'three pens'

According to Hsu (2013), this analysis correctly captures the fact that numerals cannot occur by themselves without classifiers. It follows since numerals appear only as the specifier of the classifier, the head of UnitP, as illustrated by (7).

- (7) 三 笔
 *san bi
 three pen
 Intended: 'three pens'

Also, according to Hsu (2013), the arrows in the tree in (5a) above indicate three different positions where prenominal modifiers appear within the nominal structure, which correspond to the left edges of these three maximal projections. For example, the prenominal clauses can occur as in any of (8).

- (8) a. 没人 要 的 那 十 本 书
 [CL1 *meiren* *yao* *de*] [DemP na [UnitP shi ben [NP shu]]]
 nobody like DE that ten CL book
 '[those ten volumes of books] that nobody likes'
 (Hsu 2013: 132, modified)
- b. 那 没人 要 的 十 本 书
 [DemP na [CL2 *meiren* *yao* *de*] [UnitP shi ben [NP shu]]]
 that nobody like DE ten CL book
 'those [ten volumes of books that nobody likes]'
 (Hsu 2013: 132, modified)

- c. 那 十 本 没人 要 的 书
 [DemP na [UnitP shi ben [CL3 *meiren* *yao* *de*] [NP shu]]]
 that ten CL nobody like DE book
 'those ten volumes of [books that nobody likes]'
- (Hsu 2013: 132, modified)

In (8a), a clausal modifier (CL1) appears higher than the demonstrative, the number, and the classifier. In (8b), it appears below the demonstrative but above the number and the classifier, and in (8c), it appears below the demonstrative, the number and the classifier.⁵ To simplify the picture, I will mostly deal with CL3 in this dissertation and let the prenominal clause modify NP.

In addition, the head of the entire nominal phrase is regarded as an NP, i.e., a full-fledged phrase rather than a lexical category N under this analysis. Note in particular that the prenominal clause (CL3) in (8c) is analyzed as modifying an NP rather than an N. The phrasal status of the nominal head can be verified in more than one way. Firstly, unlike in English, any bare noun in Chinese, countable or uncountable, can occur in argument positions as in (9a), where the bare noun *mao* ‘cat’ at the object position is equal to any of English NPs like *a cat*, *the cat*, *cats* and *the cats*.⁶ Following Chierchia (1998), this paper assumes that bare nouns in Chinese are NPs. Consequently, the head associated with the prenominal clauses is analyzed as an NP, as illustrated in (9b).

5. Researchers disagree on whether a clausal modifier is interpreted as restrictive or appositive when it appears in the three possible modifier positions in (5). Some studies argue that CL1 in (8a) is restrictive, while CL3 in (8c) is appositive (Chao 1968, Huang 1982, Huang et. al 2009). Others argue that CL1 and CL3 are both restrictive (Zhang 2001, Gobbo 2005, Lin and Tsai 2015). Still others argue that CL1 is restrictive, while CL3 can be both restrictive and appositive (Constant 2011). Additionally, some studies claim that CL1 involves focus (Constant 2011, Hsu, 2017). On the other hand, there has not been much discussion about CL2 in (8b) since it is acknowledged that this structure is marked and rare (Huang et. al, 2009). I will not address this issue in this dissertation.

6. In Chinese, the unspecified definiteness and plurality of NPs can be disambiguated by the context.

- (9) a. 张三 看见 了 猫
 Zhangsan kanjian-le **mao**
 Zhangsan see-PERF cat
 ‘Zhangsan saw a cat/the cat/cats/the cats.’
- b. 张三 看见 了 的 猫
 [[ArgRC Zhangsan kanjian-le [*e*]_i de] [NP **mao**]_i]
 Zhangsan see-PERF DE cat
 ‘the cat(s) that Zhangsan saw’

Such an assumption can be supported by the fact that the head associated with prenominal clauses can be modified by adjectives as in (10), where the head *shu* ‘book’ is modified by the adjective *guoshi* ‘old-fashioned’.

- (10) 没人 要 的 过时 的 书
 [[CL3 meiren yao [*e*]_i de] [NP [AdjP **guoshi** de] [NP **shu**]_i]
 nobody like DE old-fashioned DE book
 ‘the old-fashioned book(s) that nobody likes’

This assumption becomes very important when the syntax of argument relative clauses is discussed in Chapter 3.

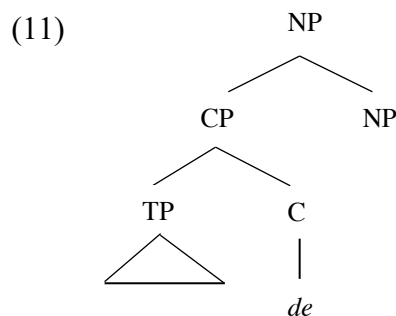
2.1.3 The modifier-creating particle *de*

The core function of *de* in Chinese is to mark prenominal modifiers.⁷ As is well-known, it can be extensively used with various phrasal categories that modify nominals, including adjective phrases, nominal phrases, prepositional phrases, relative clauses, etc., as exemplified above by

7. This is a rather simplified view. To be accurate, *de* can also occur with prenominal complements, as shown in (3d-e). However, since *de* does not play any role in my analysis of prenominal clauses, and since I will only deal with prenominal clauses, which are considered as modifiers in my analysis, I will ignore the cases of *de* with prenominal complements.

the example in (3). In the literature, there have been numerous debates about how to categorize *de* and whether *de* has a unified analysis in different environments.

A thorough analysis of *de* is certainly beyond the scope of this study. Therefore, I will simply take a stance on the function of *de* in the context of clausal modifiers. Specifically, not knowing any other good position to place *de* above sentential modifiers, I will tentatively adopt the widely-accepted analysis of treating clausal modifiers like relative clauses as CPs and *de* as the complementizer C (Aoun and Li 2003, Cheng 1986, Lin 2010, Ning 1993, Paul 2007, Xu 1997). According to this approach, *de* is the complementizer selecting the modifying TP. The CP then is adjoined to (or pair-merged with) the head NP as an adjunct, as in (11). I will also assume below that gapless clauses also involve such a construction.



The head directionality of CP is one of the most controversial topics in Chinese linguistics. While some studies treat CP as head-final (Aldridge 2011, Biberauer et al. 2009, Cheng 1986, Ning 1993), others treat it as head-initial (Cheng et al. 1996, Cheung 2009, Lin 2010, Simpson and Wu 2000, Simpson 2014, Xu 1997, Wu 2000).⁸ The latter studies argue that Chinese is an SVO language and most syntactic categories in Chinese are head-initial except for NPs (Huang

8. Aoun and Li (2003) deliberately avoid this issue as they used a triangle to represent CP.

1982) as reviewed in Section 2.1.1. Given the scope of this study, I will not commit to any particular view about head-complement directionality in CP, following Li (2006), Sybesma and Li (2007) and Paul (2014). For the sake of simplicity, I will simply adopt the head-final analysis since I do not think it will actually matter for my analysis of gapless clauses. The head-final analysis is simpler than the head-initial analysis in that the latter will involve some sort of movement from TP to [Spec, CP].

2.1.4 Two kinds of NP structures with adjectives in Chinese

Following Sproat and Shih (1988, 1991), Feng (2001), Paul (2005, 2010), and Hsu (2013), I assume that adjectives, which are always placed prenominally in Chinese, participate in two kinds of NP structures: one kind involves the modifier-creating particle *de* as in (12a) (*de*-marked adjectives) and the other kind does not involve *de* as in (12b) (*de*-less adjectives).

(12) a. 红 的 球
 hong **de** qiu
 red **DE** ball
 'red ball(s)'

b. 红 球
 hong qiu
 red ball
 'red ball(s)'

(Hsu 2013: 187)

Following Paul (2005, 2010) and Hsu (2013), I assume that *de*-marked adjectives modify NPs on a phrasal level, i.e., they will adjoin to N' as adjuncts, while *de*-less adjectives can either modify nominals on a phrasal level or on a lexical level forming compound nouns. My focus of this

section is to show that both *de*-marked adjectives and *de*-less adjectives can be on a phrasal level, since this will become relevant in my arguments in the later sections.

The first piece of evidence that these adjectives are on a phrasal level comes from head ellipsis as in (13) (Paul 2005, 2010).

- (13) A. 你 觉得 黄 的 衬衫 好看 还是 红 的
 ni juede [NP1 **huang** (**de**) chenshan] haokan haishi [NP2 **hong** (**de**)
 you think **yellow** **DE** shirt pretty or **red** **DE**
 衬衫 好看
chenshan] haokan?
 shirt pretty
 'Which one do you think is prettier: the yellow shirt or the red shirt?'
- B. 我 觉得 黄 的 好看
 wo juede [NP **huang** **de** Ø] haokan
 I think **yellow** **DE** pretty
 'I think the yellow one is prettier.'

In answer B, the head of the NP marked by the adjective *huang* can be elided. This is true whether the NP *huang (de) chenshan* 'yellow shirt' in question A is marked with *de* or without *de*.⁹ This suggests that the adjective and the head in *huang (de) chenshan* 'yellow shirt' are combined on a syntactic level making the head nominal accessible to the syntactic rule of deletion. On the other hand, if the adjective forms a compound noun with the head on a lexical

9. Note that the marker *de* cannot be elided along with the head nominal in answer B even when its antecedent NP in question A is not marked with *de*. Although I am not sure why *de* needs to be present, I do not think this will pose a problem for *de*-less adjectives, since the issue here is to show whether the NP head can be elided or not. As pointed out by Steven Franks (p.c.), the necessity for *de* to be present when the head is elided may tell us something important about the function of *de*. I plan to research it in the future.

level, the head nominal should not be visible to the syntactic rule. In other words, according to the Lexical Integrity Hypothesis, syntactic rules cannot access the word-internal structure.

In addition, Paul (2005, 2010) observes another piece of evidence for the phrasal level of these adjectives based on the order restriction commonly observed among languages. First, consider the English and German examples in (14) and (15).

(14) Size > Color

- a. small green vase
- b. *green small vase

Sproat and Shih (1991: 565)

(15) Size > Color

- a. ein kleines rotes auto
 a little red car
 'a little red car'
- b. ?/*ein rotes kleines auto
 a red little car
 'a little red car'

Kotowski (2015: 119)

Kotowski (2015: 119)

In both English and German, the adjective *small* denoting size should proceed the adjective *green* or *red* denoting color but not vice versa. The same order restriction is observed in Chinese with *de*-less adjectives in (16) (Feng 2001, Paul 2005, 2010, Sproat and Shih 1988, 1991, Scott 1998, 2002).

(16) Size > Color

- a. 大 白 盘子
 da **bai** panzi
 big **white** plate
 'a big white plate'

(Feng 2001: 170)

b. 白 大 盘子
 *bai da panzi
 white big plate
 Intended: 'a big white plate'

(Feng 2001: 170, modified)

As shown in (16), *da* 'big' can precede *bai* 'white' but not vice versa. This order restriction is assumed to exist in syntax and does not apply word-internally. Thus we see that some compound words demonstrate a different pattern as in (17).

(17) Color > Size

a. 白 大 褂
 bai da -gua
 white big gown
 'a white unlined long gown'

(Feng 2001: 170, modified)

b. 大 白 褂
 *da bai -gua
 big white gown
 Intended: 'a white unlined long gown'

(Feng 2001: 170, modified)

In (17), the adjective relating to color, i.e., *bai* 'white' needs to precede the adjective relating to size, i.e., *da* 'big', thus showing the opposite order to the previous examples in (16). Feng argues that this is because *da-gua* 'unlined long gown' is a compound word, the internal structure of which cannot be altered by the syntactic rules based on the Lexical Integrity Hypothesis. On the other hand, the order restriction does not apply to the compound word *da-gua* 'unlined long gown'.

In terms of *de*-marked adjectives, they always precede the *de*-less adjectives as shown in (18).

- (18) a. 一个 大 的 白 盘子
 yi-tiao **da de** bai panzi
 one-CL **big DE** white plate
 'a white plate that is big'
- b. 一条 白 大 的 盘子
 *yi-tiao bai **da de** panzi
 one-CL white **big DE** plate
 'a white plate that is big'

In (18), *de*-marked adjectives need to proceed *de*-less adjectives and not vice versa. Since *bai panzi* 'white plate' is shown to be a syntactic phrase, the *de*-marked adjective *da-de* 'big' should also be on the phrasal level.¹⁰

The different syntactic levels of adjectives will become relevant when I discuss the arguments made by Huang (2016) concerning the syntax of gapless clauses in Section 6.2.1.

2.2 Different types of prenominal clausal modifiers

In each of the three subsections that follow (2.2.1-2.2.4), I will catalog and briefly describe each kind of prenominal clausal modifier identified in Section 1.1., paying attention to their crucial distinctions. After presenting the main data, I will spell out, in later chapters, their syntactic analyses, some of which are inherited from previous works, and other analyses are newly proposed.

10. This shows that the *de*-marked adjectives should be higher in the tree than *de*-less adjectives.

2.2.1 Argument relative clauses

The first type of prenominal clause I would like to describe is argument relative clauses as in (19) below. The head nominal of this type of relative clause construction directly corresponds to the argument of the predicate in the relative clause.

(19) Subject relative clauses

- a. 昨天 来过 的 男孩
[NP [ArgRC zuotian lai-guo de] nanhai]
 yesterday come-EXP DE boy
 'the boy who came yesterday'
- b. 崇拜 爸爸 的 儿子
[NP [ArgRC chongbai baba de] erzi]
 admire farther DE son
 'the son who admires (his) father'

Object relative clauses

- c. 李四 买 的 书
[NP [ArgRC Lisi mai de] shu]
 Lisi buy DE book
 'the book that Lisi bought'
- d. 张三 喜欢 的 那个 女孩
[NP [ArgRC Zhangsan xihuan de] na-ge nühai]
 Zhangsan like DE that-CL girl
 'the girl who Zhangsan likes'

In (19a-b), the head nominal corresponds to the subject of the predicate of the relative clause. In (a), *nanhai* 'boy' is the subject of the predicate *lai* 'come'. Similarly, in (b), *erzi* 'son' is the subject of the predicate *chongbai* 'admire'. In (19c-d), the head nominal is the object of the predicate in

the clause. In (c), *shu* 'book' is the object of the predicate *mai* 'buy'. In (d), *na-ge nühai* 'that girl' is the object of the predicate *xihuan* 'like'.

2.2.2 Adjunct relative clauses

The second type is adjunct relative clauses. In this type of relative clause construction, the head nominal is commonly recognized as part of the adjunct interpretation in the eventuality of the relative clause as shown in (20) (the term "eventuality" covers both events and states).

- (20) a. 张三 工作 的 城市
 [NP [AjctRC Zhangsan gongzuo de] chengshi]
 Zhangsan work DE city
 'the city where Zhangsan works'
- b. 张三 工作 的 地方
 [NP [AjctRC Zhangsan gongzuo de] difang]
 Zhangsan work DE place
 'the place where Zhangsan works'
- c. 张三 修 车 的 那个 下午
 [NP [AjctRC Zhangsan xiu che de] na-ge xiawu]
 Zhangsan fix car DE that-CL afternoon
 'that afternoon when Zhangsan fixed the car'
- d. 张三 修 车 的 时间
 [NP [AjctRC Zhangsan xiu che de] shijian]
 Zhangsan fix car DE time
 'that time when Zhangsan fixed the car'
- e. 张三 对代 李四 的 方式
 [NP [AjctRC Zhangsan duidai Lisi de] fangshi]
 Zhangsan treat Lisi DE manner
 'the manner Zhangsan treats Lisi'

- f. 张三 修 车 的 钳子
 [NP [AjetRC Zhangsan xiu che de] qianzi]
 Zhangsan fix car DE plier
 'the plier with which Zhangsan fixed the car'
- g. 张三 没 来 的 原因
 [NP [AjetRC Zhangsan mei lai de] yuanyin]
 Zhangsan NEG come DE reason
 'the reason why Zhangsan didn't come'
- h. 张三 跟 他 说话 的 那 个 人
 [NP [AjetRC Zhangsan **gen tai** shuohua de] [na-ge ren]i]
 Zhangsan **with he** speak DE that-CL person
 'that person Zhangsan spoke with'
- i. 张三 从 那 里 来 的 小 镇
 [NP [AjetRC Zhangsan **cong nali** lai de] xiaozhenj]
 Zhangsan **from there** come DE town
 'the town where Zhangsan came from'

In the adjunct relative clause construction, the head nominal usually refers to location, time, manner, instrument, or reason involved in the eventuality denoted by the entire relative clause. For example, in (20a), the head *chengshi* 'city' indicates the concrete location where Zhangsan works. In (20c), the head *na-ge xiawu* 'that-CL afternoon' is the concrete time during which Zhangsan fixed the car. The head can also denote generic nouns such as *didian* 'place' as in (20b) and *shijian* 'time' as in (20d). The generic noun *fangshi* 'manner' in (20e) refers to the manner of the event. In (20f), the head *qianzi* 'pliers' specifies the concrete instrument that Zhangsan used to fix the car. In (20g), the generic head nominal *yuanyin* 'reason' denotes the reason for an event. (20h) and (20i) are different from the rest of the examples in that they contain an overt preposition (to be called an adjunctivizer later) and a resumptive pronoun that refers to the head nominal in the relative clause. In (20h), the head *na-ge ren* 'that person' identifies the referent of

the resumptive pronoun within the adjunct expression, which is overtly realized due to the presence of *gen* 'with'. Similarly, in (20i) the head *xiaozhen* 'town' identifies the referent of the resumptive pronoun in the adjunct overtly realized due to *cong* 'from'. Contrary to these cases, no overt prepositions can be expressed in the relative clauses in (20a-g). Should there be one, the sentence would become ungrammatical, as illustrated in (21).

- (21) a. 张三 在 那里 工作 的 城市
 *_{[NP [A_{jet}RC} Zhangsan **zai** **nali** gongzuo de] **chengshi**]
 Zhangsan **at** **there** work DE **city**
 Intended: 'the city where Zhangsan works'
- b. 张三 用 它 修 车 的 钳子
 *_{[NP [A_{jet}RC} Zhangsan **yong** **ta** xiu che de] **qianzi**]
 Zhangsan **with** **it** fix car DE **plier**
 Intended: 'the plier with which Zhangsan fixed the car'

In Chapter 7, I will attempt to account for such a contrast, appealing to the blocking effect involving adjunctivizers.

2.2.3 Gapless clauses

This section shows more data about gapless clauses in (22).

- (22) a. 张三 做 饭 的 味道
 [_{NP [GaplessCL} Zhangsan zuo fan de] weidao]
 Zhangsan cook rice DE smell
 'the smell that arises/arose from Zhangsan's cooking a meal'

- b. 张三 救 人 的 回报
 [NP [GaplessCL Zhangsan jiu ren de] huibao]
 Zhangsan save people DE reward
 'the reward that came from Zhangsan saving the person/people'
- c. 张三 卖 书 的 钱
 [NP [GaplessCL Zhangsan mai shu de] qian]
 Zhangsan sell book DE money
 'the money that was earned from Zhangsan's selling (the) books'
- d. 张三 跳舞 的 样子
 [NP [GaplessCL Zhangsan tiaowu de] yangzi]
 Zhangsan dance DE appearance
 'the way that Zhangsan looks when he dances'
- e. 张三 处理 事情 的 效率
 [NP [GaplessCL Zhangsan chuli shiqing de] xiaolü]
 Zhangsan deal.with things DE efficiency
 'the efficiency with which Zhangsan deals with things'
- f. 张三 追求 真理 的 探究心
 [NP [GaplessCL Zhangsan zhuiqiu zhenli de] **tanjiuxin**]
 Zhangsan pursue truth DE inquisitive.mind
 'the inquisitive mind **that urged** Zhangsan to pursue the truth'
- g. 张三 跳舞 的 舞伴
 [NP [GaplessCL Zhangsan tiaowu de] wuban]
 Zhangsan dance DE dancing.partner
 'the dancing partner of Zhangsan'

As mentioned in the introduction, there is no visible gap in the gapless clause that can be identified with the head nominal of the construction. For example, in (22a), the head *weidao* 'smell' cannot be associated with any argument of the predicate *zuo* 'cook' since its subject is already expressed as *Zhangsan*, and its object as *fan* 'rice'. In addition, *weidao* 'smell' is not commonly interpreted as part of an adjunct expression modifying the event of Zhangsan's

cooking (rice). The same can be said about the head nominals *huibao* 'reward', *qian* 'money', *yangzi* 'appearance', *xiaolü* 'efficiency', *tanjiuxin* 'inquisitive mind', *wuban* 'dancing partner' in (22b-g). In Chapter 7, I will attempt to identify and clarify the possible types of semantic relations involved between the head nominal and the eventuality of the gapless clause. More specifically, I will broaden our concept of adjuncts and assimilate gapless clauses with adjunct relative clauses. I will argue that each gapless clause involves an adjunctivizer that identifies the head nominal as part of an adjunct, which is interpreted in the eventuality denoted by the clause. In Chapter 5, I will also demonstrate that gapless clauses exhibit similar syntactic behaviors with adjunct relative clauses.

2.2.4 Content clauses

The last kind of prenominal clause to be described is content clauses, as exemplified in (23) below. As mentioned before, this type of prenominal clause is traditionally characterized as a complement clause of the head nominal regarded as a deverbal predicate.

- (23) a. 张三 活 下 去 的 信 心
 [NP [ContCL Zhangsan huo xiaqu de] xinxin]
 Zhangsan live down DE belief
 'the belief that Zhangsan continues to live'
- b. 张三 出 国 的 梦 想
 [NP [ContCL Zhangsan chu guo de] mengxiang]
 Zhangsan go.out country DE dream
 'the dream that Zhangsan goes abroad'

- c. 学校 要-不-要 扩大 招生 的 问题
 [NP [ContCL xuexiao yao-bu-yao kuoda zhaosheng de] wenti]
 school want-NEG-want expand recruit.student DE question
 'the question of whether the school should increase student enrollment'
 (Huang 2016: 440, modified)
- d. 张三 辍 学 的 事实
 [NP [ContCL Zhangsan chou xue de] shishi]
 Zhangsan drop school DE fact
 'the fact that Zhangsan dropped out of school'
- e. 张三 离婚 的 谣言
 [NP [ContCL Zhangsan lihun de] yaoyan]
 Zhangsan divorce DE rumor
 'the rumor that Zhangsan divorced'
- f. 中国 没 有 铁路 的 历史
 [NP [ContCL zhongguo mei you tielu de] lishi]
 China NEG have railway DE history
 'the history that China didn't have railway'
- g. 美国 在 华 投资 的 前景
 [NP [ContCL meiguo zai hua touzi de] qianjing]
 US in China invest DE prospect
 'the prospect that the U.S. is investing in China'
- h. 治疗 疾病 的 作用
 [NP [ContCL zhiliao jibing de] zuoyong]
 cure disease DE function
 'the function which is to cure disease'

Some head nominals of this type of prenominal clause can take a complement in their verbal forms such as "Zhangsan believes/dreams/claims that he can go abroad," while other head nominals such as *shishi* 'fact', *yaoyan* 'rumor', *lishi* 'history', and *qianjing* 'prospect', and *zuoyong* 'function' do not have a verbal form or cannot take a complement in their verbal forms. In Chapter 7, I will take up this type of prenominal clause and, first, argue that they should not be

analyzed as complement clauses, and second, propose their detailed semantic analysis. Based upon the semantic contents they are observed to involve, I will label them "content clauses" and analyze them as a yet another type of adjunct akin to but crucially distinct from gapless clauses described just above in Section 2.2.3.

3. Syntactic analysis of Chinese argument and adjunct relative clauses

This chapter will summarize two distinct syntactic analyses of relative clauses in Chinese, i.e., the promotion analysis for argument relative clauses and the operator-movement analysis for adjunct relative clauses. I will adopt the gist of these analyses, which were offered by Aoun and Li (2003) and Huang et. al (2009).¹¹

3.1 A promotion analysis: Direct movement of the head nominal

Under the so-called promotion analysis, the head nominal of the argument relative clause construction is claimed to be raised directly out of the modifying clause. The proposed structure of the NP in (1), for example, is shown in (2).

- (1) 我 喜欢 的 书 卖完 了
[NP wo xihuan de shu] mai-wan le
I like DE book sell-over SFP
'The book that I like is sold out.'

- (2) 我 喜欢 的 书
[NP [ArgRC wo xihuan t_i de] [NP **shu**]_i]
I like DE book
'the book that I like'

In (2), the head NP *shu* 'book' is moved from the direct object position in the relative clause, as indicated by the trace t_i . Aoun and Li (2003) and Huang et. al (2009) provide several syntactic

11. Ning (1993) also argues for an operator movement analysis for adjunct relative clauses. However, he did not provide syntactic arguments for such an analysis. Moreover, according to him, argument relative clauses have the same syntactic structure as adjunct relative clauses, both of which involve an operator. Again, he did not offer arguments for such an assumption.

arguments for this derivation in relation to the island effect, reconstruction effect, and idiom chunks. For example, argument relative clauses obey the Complex NP island constraint in (3), where the head *nühai* 'girl' cannot move out of the complex NP headed by *ren* 'people'. This is a piece of evidence for movement.

- (3)
-
- 我 认识 很多 喜欢 的 人 的 女孩
 * $[NP_2 [ArgRC_2 [NP_1 [ArgRC_1$ wo renshi t_i henduo xihuan t_k de] ren $_i$] de] [NP $nühai$] $_k$]
 I know many like DE people DE girl
 Intended: 'the girl $_k$ that I know many people $_i$ who $_i$ t_i like t_k '
 (Huang et. al 2009: 219, modified)

Secondly, the reconstruction effect can be observed in argument relative clauses. To begin with, let us confirm that *ziji* 'self' generally must be c-commanded by the quantified antecedent in order to be interpreted as its variable, as the contrast between (4a) and (4b) shows.

- (4) a. 我 叫 张三 劝 每个人 开 自己的 车子 过来
 wo jiao Zhangsan quan **meigeren $_i$** kai **ziji $_i$** de chezi guolai
 I ask Zhangsan persuade everyone drive self DE car come
 'I asked Zhangsan to persuade everyone to drive (her/him)self's car over.'
 (Huang et. al 2009: 220)
- b. 我 叫 张三 劝 每个人 打算 带来 的 同伴 开
 wo jiao Zhangsan quan [NP **meigeren $_k$** dasuan dailai t_i de **tongban $_i$**] kai
 I let Zhangsan persuade everyone plan bring DE partner drive
 自己的 车子 过来
ziji *_k de chezi guolai
 self DE car come
 'I asked Zhangsan to persuade the partner $_i$ that everyone $_k$ plans to bring t_i to drive (her/him)self *_k 's car over.'

In (4a), *meigeren* 'everyone' properly c-commands and binds the reflexive *ziji* 'self' within the object in the subordinate clause. However, in (4b), similar binding is prohibited since *ziji* 'self' is not c-commanded by the quantifier *meigeren*, which is located within the relative clause embedded in the subject NP. Now, examine the argument relative clause construction (5).

- (5)
- | | | | | | | | | | | | | | |
|--|-----|----------|----------|----------|------------------------------|------|----------------|--------|-----|-----|--------------------------|----|-------------------------------|
| 我 | 叫 | 张三 | 劝 | 每个人 | 开 | 过来 | 的 | 自己 | 的 | 车子 | | | |
| [[ArgRC | wo | jiao | Zhangsan | quan | <i>meigeren</i> _k | kai | t _i | guolai | de] | [NP | <i>ziji</i> _k | de | <i>chezi</i>] _i] |
| I | ask | Zhangsan | persuade | everyone | drive | come | DE | self | DE | car | | | |
| '(her/him)self's car that I asked Zhangsan to persuade everyone to drive over' | | | | | | | | | | | | | |
- (Huang et. al 2009: 220, modified)

Here, *ziji* 'self' is contained in the head NP and hence obviously fails to be c-commanded by any element within the relative clause at surface. It, however, can still be bound by *meigeren* 'everyone' in the relative clause. This puzzling phenomenon can be accounted for if it is assumed that the head NP originates from the position c-commanded by *meigeren* within the relative clause and moves to its surface position. That is, if the so-called promotion analysis is adopted, the reconstruction effect can be explained.

Furthermore, the components in idiomatic interpretations need to be interpreted together in order to have an idiomatic meaning. However, in argument relative clauses where one component of an idiom is in the head nominal and the other component is in the clause, the idiomatic interpretation is preserved, as in (6), suggesting a reconstruction effect of the head nominal.

generated head nominal, thereby establishing a correlation between the clause-internal trace and the head nominal. This matching process eventually allows the entire relative clause to function as a modifier of the head nominal.

The operator movement hypothesis is argued to be supported by the island effect, the reconstruction effect, and the intervention effect. I will discuss the island effect and reconstruction effect first. As for the intervention effect, I will raise concerns about the legitimacy of this test, which ultimately leads me not to adopt this test in this study.

First, adjunct relative clauses are subject to island constraints such as the adjunct island condition, as shown in (7).

- (7) 这 就是 如果 他 生气 我 会 不 高兴
 *zhe jiushi [[A_{ject}RC O_{pi} [A_{djunct} *ruguo* ta *t_i* shengqi] wo hui bu gaoxing
 this is if he angry I will not happy
 的 原因
 de] **yuanyin_i**]
 DE reason

*‘This is the **reason_i** I will not be happy [if he gets angry *t_i*].’¹²

(Huang et al. 2009: 222 modified)

In this sentence, the head *yuanyin* "reason" of the adjunct relative clause cannot be properly associated with a variable within the adjunct island. This a piece of evidence for movement.

In addition, adjunct relative clauses make a striking contrast to argument relative clauses, which have been claimed to involve the "promotion" of the head nominal from within the relative clause.

12. Notice that the head 'reason' needs to be interpreted as the reason for *his* being angry, not the reason for *my* being not happy. With the latter reading, the sentence is acceptable.

Recall that the head nominal of the argument relative clause construction induces a reconstruction effect on the variable binding of *ziji* 'self' in (5). Another example is demonstrated in (8).

(8) Argument relative clauses

我 想 看 你 说 每个人 带 回来 的 自己 的 朋友
 wo xiang kan [NP [ArgRC ni shuo *meigeren*_k dai *t*_i huilai de] [*ziji*_k de pengyou]_i]
 I want see you say everyone bring back DE self DE friend
 'I want to see (him/her)self's friend that you said that everyone brought.'

(Huang et. al. 2009, modified)

In (8), *ziji* 'self' in the head of the argument relative clause can be bound by *meigeren* 'everyone' in the modifying clause, suggesting that the head originates inside the clause before being moved to the head position.

On the other hand, in the adjunct relative clause construction, no such reconstruction effect can be induced by the head nominal, as shown in (9).

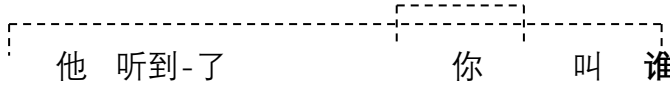
(9) Adjunct relative clauses

我 想 看 你 说 每个人 修 车 的 自己 的 地点
 *wo xiang kan [[AjetRC *O*_i ni shuo *meigeren*_k *t*_i xiu che de] [*ziji*_k de didian]]
 I want see you say everyone fix car DE self DE place
 *'I want to see (him/her)self's place in which you said that everyone fixed the car.'

In (9), *ziji* 'self' contained in the head nominal cannot be bound by *meigeren* 'everyone' in the modifying clause. This suggests that the head nominal in the adjunct relative clause construction is base-generated in its surface position instead of originating in the clause. Instead, what moves

is the operator from within the island to the peripheral position, as supported by the island effect earlier.

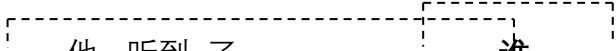
Finally, Huang et. al (2009) also appeal to the intervention effect in an attempt to show the presence of a null operator in this construction. They provide the contrast between (10a) and (10b) as their motivation.

- (10)
- a.  他 听到-了 你 叫 谁 修 车 的 原因?
*[Op_k ta tingdao-le [[A_{ijct}RC Op_i ni t_i jiao shei_k xiu che de] yuanyin_i]]?
he hear-PERF you ask who fix car DE reason
Intended: 'Who is the person such that he heard the reason why you requested that person to fix the car?' (Huang et al. 2009: 223 modified)
- b. 他 听到-了 你 叫 他 修 车 的 原因
ta tingdao-le [[A_{ijct}RC Op_i ni t_i jiao ta xiu che de] yuanyin_i].
he hear-PERF you ask he fix car DE reason
'He heard the reason why you requested him to fix the car.'
(Huang et al. 2009: 223 modified)

In (10a), the operator Op_i at the periphery of the relative clause associated with its trace is argued to intervene the interrogative operator Op_k in the matrix clause to be associated with the interrogative *wh*-phrase *shei* 'who' within the relative clause (as indicated by the crossing dashed lines). This sentence, therefore, cannot have a matrix interrogative reading. In contrast, no intervention effect arises in (10b) when the *wh*-phrase is replaced by a pronoun *ta* 'he' and the need to establish another operator-variable relation is eliminated.¹³

13. Note that the trace of the relative operator *t_i* must be located under the higher clause within the relative clause since the intended interpretation of (10a) is that the head nominal *yuanyin* 'reason' is "the reason why you requested" not "the reason he fixed the car."

However, I noticed that if we simplify the sentence as in (11) by eliminating the clausal subordination within the relative clause, it improves significantly.

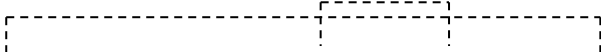
- (11) 
- 他 听到-了 谁 没 修 车 的 原因?
 [Op_k ta tingdao-le [[A_{jet}RC Op_i sheik t_i mei xiu che de] yuanyini]?
 he hear-PERF who NEG fix car DE reason
 'Who is the person such that you heard the reason why that person did not fix the car?'

Moreover, a sentence similar to (10a) also improves with appropriate pragmatic context.

Consider (12), which is structurally identical to (10a).

- (12) Context:

Recently, many students misbehaved in school and were put on disciplinary probation, including Zhangsan, Lisi, Wangwu, etc. In one meeting, their teacher was talking about the reasons for their probation. During the discussion, the principal passed by and overheard some of it. After the meeting, the teacher was curious to know the reason for whose probation the principal knew, so she came to the principal and asked "

- 
- 你 知道-了 我 叫 谁 留校 察看 的 原因?
 ?[Op_k ni zhidao-le [[Op_i wo t_i jiao sheik liuxiao chakan de] yuanyini]
 you know-PERF I ask who stay.school observe DE reason
 'Who is the person such that you have known the reason I asked that person to be on probation?'

Note also that it does not seem to play any crucial role whether the two operator-variable relations are nested or crossing since both (11) and (12) are properly interpretable.

Why the *wh*-interrogation in (10a) becomes difficult is not entirely clear, but there is a reason to suspect that this sentence may put some unneglectable semantico-pragmatic burden on

its intended interpretation. For example, in order to interpret (10a), one must presuppose that 1) there is an individual x who fixed the car, 2) the hearer (denoted by *ni* 'you') requested x to fix the car, 3) there is a specific reason why the hearer requested x (rather than someone else) to fix the car, and 4) some third party (referred to as *ta* 'he') heard what that reason was. The speaker presupposes all of 1)-4), and asks for the identity of x. The intended interpretation, in other words, requires a quite specific and elaborate pragmatic context, and it cannot be easily met in a null discourse context in which this sentence was presented for acceptability judgment. (See Kitagawa and Fodor (2003) for a similar discussion to account for a grammatical but dispreferred scope interpretation of a *wh*-interrogative in Japanese.) This may be the reason why a similar sentence improves when a certain specific context is given, as in (12). Moreover, it may also explain why the sentence sounds better when it is simplified as in (11), since the presuppositions needed to interpret this simplified sentence are also somewhat less complicated. One needs to presuppose 1) there is an individual x who fixed the car, 2) there is a specific reason why x fixed the car, and 3) some third party (referred to as *ta* 'he') heard what that reason was. The speaker presupposes all of 1)-3), and asks for the identity of x.

In fact, 2) just above is rather pragmatically unnatural since generally people do not need a special reason to fix a broken car. If we change the head nominal 'reason' to 'place', an appropriate context might become easier to imagine, as in (13).

- (13) 他 推荐了 谁 修 车 的 店
 [Op_k ta tuijian-le [[AjctRC Op_i sheik ti xiu che de] diani]]?
 he recommend-PERF who fix car DE store
 'Who is the person such that he recommended the store where that person fixes cars?'

In short, I find the reported intervention effect not entirely convincing as motivation for postulating an empty operator and its movement in adjunct relative clauses. Further pursuit of the properties of intervention effects also goes beyond the scope of this dissertation. I will therefore refrain from adopting this diagnostic in my discussion of both adjunct relative clauses and gapless clauses.

In sum, adjunct relative clauses are similar to argument relative clauses in demonstrating the island effect. However, contrary to argument relative clauses, they do not exhibit a similar reconstruction effect involving binding at the head nominal site. Huang et. al argue accordingly that the island effect is triggered by the movement of an operator in the adjunct relative clause while it is induced in the argument relative clause construction by the extraction of the head nominal out of the modifying clause.

Although I will revise its details, I adopt the gist of this syntactic analysis of adjunct relative clauses and will also add my semantic analyses in Chapter 7.

4. Syntactic analysis of Chinese gapless clauses

In this chapter, I will present the syntactic analyses of Chinese gapless clauses from the two previous works in the literature, which are directly relevant to this study. In the first one, Huang (2016) argues that Chinese gapless clauses are "noun complements," i.e., the complement clause of a nominal predicate. I will call this the complement approach. In the second study, Ning (1993) argues that gapless clauses have a similar derivation to adjunct relative clauses in that both involve movement of an empty operator and its trace is interpreted as a bound variable, which I will call the adjunct operator approach. Notice that the complement approach also includes the syntactic analysis of content clauses, which I will ultimately rebut in my own analysis.

4.1 Huang's (2016) complement approach

Huang (2016) argues that Chinese gapless clauses and content clauses are complements of the head N° contrary to argument relative clauses, which he analyzes as adjuncts to N-bar. He provides a series of tests to show the differences between the two types of structures, which I will go over in the following sections.

4.1.1 Order restriction

Firstly, Huang (2016) shows that content clauses (which are called complement clauses in his paper) generally occur closer to the head nominal than argument relative clauses, as illustrated by the contrast between (1a) and (1b).

(1) a. Argument relative clauses > Content clauses

她 提-出来 的 让 儿子 留学 的 想法
[NP [ArgRC ta ti-chulai de] [ContCL rang erzi liuxue de] xiangfa]
she proposed DE let son study DE idea

'the idea to let her son go study abroad that she proposed'

(Huang 2016: 441, modified)

b. *Content clauses > Argument relative clauses

让 儿子 留学 的 她 提-出来 的 想法
*[NP [ContCL rang erzi liuxue de] [ArgRC ta ti-chulai de] xiangfa]
let son study DE she proposed DE idea

Intended: 'the idea which she proposed such that she would let her son study abroad'

(Huang 2016: 441, modified)

Recognizing a similar contrast between argument relative clauses and gapless clauses in (2)

below, Huang argues that gapless clauses should also be analyzed as the complement of a nominal predicate.

(2) a. Argument relative clauses > Gapless Clauses

我 所 听到 的 李四 弹 钢琴 的 声音
[NP [ArgRC wo suo tingdao de] [GaplessCL Lisi tan gangqin de] shengyin]
I SUO heard DE Lisi play piano DE sound

'the sound that arises from Lisi playing the piano that I heard'

(Huang 2016: 469 modified)

b. *Gapless Clauses > Argument relative clauses

李四 弹 钢琴 的 我 所 听到 的 声音
*[NP [GaplessCL Lisi tan gangqin de] [ArgRC wo suo tingdao de] shengyin]
Lisi play piano DE I SUO heard DE sound

Intended: 'the sound that arose from Lisi playing the piano that I heard'

(Huang 2016: 469 modified)

(6) a. Argument relative clauses:

他 不 喜欢 我 买 的 手机
[[ArgRC ta bu xihuan wo mai de] **shouji**]
he NEG like I buy DE cell phone
'He does not like the cell phone that I bought.'

(Zhang 2008: 1008, modified)

b. 他 不 喜欢 手机
ta bu xihuan **shouji**
he NEG like cell phone
'He does not like cell phones.'

(Zhang 2008:1008, modified)

On the other hand, the head of the gapless clause construction in (7a) needs to rely on the eventuality expressed by the co-occurring clause and hence cannot occur on its own, as shown by the ungrammaticality of (7b).

(7) a. Gapless clauses:

他 不 喜欢 我 炒菜 的 味道
[[GaplessCL ta bu xihuan wo chaocai de] **weidao**]
he NEG like I cook DE smell
'He does not like the smell that arises from me cooking a meal.'

(Zhang 2008: 1008, modified)

b. 他 不 喜欢 味道
*ta bu xihuan **weidao**
he no like smell
'*He doesn't like smell.'

(Zhang 2008: 1008, modified)

4.1.3 Iteration restriction

Huang (2016: 448-449) also claims that argument relative clauses can be iterated, meaning that the head can be modified by multiple argument relative clauses as in (8), while gapless clauses cannot be iterated, as indicated in (9).

(8) Iterated Argument relative clauses

他 发出来 的 令 人 害怕 的 声音
[[ArgRC ta fa-chulai de] [ArgRC ling ren haipa de] shengyin]
he produce DE cause person afraid DE sound
'the sound that terrified others that he produced' (Huang 2016: 448, modified)

(9) Iterated Gapless clauses

他 弹 钢琴 的 我 拉 小提琴 的 声音
*[[GaplessCL ta tan gangqin de] [GaplessCL wo la xiaotiqin de] shengyin]
he play piano DE I play violin DE sound
Intended: 'the sound that arises/arose from me playing the violin and his playing
the piano' (Huang 2016: 448, modified)

According to Huang, this asymmetry arises because a nominal head can be syntactically modified by multiple adjuncts but cannot take multiple complements and hence not multiple gapless clauses, either. Such an idea was also expressed in Zhang (2008). In addition, Huang argues that adjuncts can be iterated because they can successively create subset denotations from the supersets defined by the head nominal, while complements can only fill argument positions.

4.1.4 Ellipsis restriction

Huang also discusses the distinct ability for the head to be elided in different types of prenominal clauses, first reporting the contrast between (10) and (11) below. While the head nominal in the relative clause construction can be elided, as in (10), the head nominal of content clauses cannot, as in (11).

(10) Argument relative clauses

他 买 的 手 表 比 你 买 的 好 看
[[ArgRC ta mai de] **shoubiao**] bi [[ArgRC ni mai de] \emptyset] haokan
he buy DE watch than you buy DE good-looking

'The wristwatch she bought is better looking than the one you bought.'

(Huang 2016: 451, modified)

(11) Content clauses

你 买 了 金 表 的 事 比 他 买 了 钻 戒 的
*[[ContCL ni mai-le jin biao de] **shi**] bi [[ContCL ta mai-le zuanjie de] \emptyset]
you buy-PERF gold watch DE fact than he buy-PERF diamond DE
更 夸 张
geng kuazhang
more ridiculous

Intended: '*The fact that you bought a gold watch is more ridiculous than the one that he bought diamond.'

(Huang 2016: 451, modified)

On the other hand, it is claimed that ellipsis is rejected in the gapless clause construction, as indicated in (12).

(12) Gapless clauses

a. 张 三 唱 歌 的 声 音 比 李 四 哭 的 还
*[[GaplessCL Zhangsan chang ge de] shengyin] bi [[GaplessCL Lisi ku de] \emptyset] hai
Zhangsan sing song DE sound than Lisi cry DE more

难 听

nanting.

bad-to-hear

'The sound of Zhangsan singing is more horrible than that of Lisi crying.'

(Huang 2016: 450, modified)

- b. 李四 贪污 的 后果 比 他 逃税 的 更
 *[[GaplessCL Lisi tan-wu de] houguo] bi [[GaplessCL ta tao-shui de] Ø] geng
 Lisi embezzle DE conseq. than he evade-tax DE more
 难忘
 nanwang
 unforgettable
 'The consequence that came from Lisi's embezzlement is more unforgettable than
 that of his tax evasion.' (Huang 2016: 450, modified)

Huang argues that the reason for this contrast is that gapless clauses and content clauses are the complement of the N° and ellipsis in Chinese can target N-bar but not N° or NP.

4.1.5 Nominalization restriction

Huang (2016) also attempts to support his complement analysis of gapless and content clauses, analyzing what he regards as the nominalization of relative clauses by the nominalizer *de*. He points out, first, that argument relative clauses can undergo this nominalization, as shown by the examples in (13).

(13) *Argument relative clauses*

- a. 来 参加 比赛 的
 [NP [ArgRC lai canjia bisai] de]]
 come participate race DE
 'the ones that came to participate in the race' (Huang 2016: 453, modified)
- b. 他们 要 买 的
 [NP [ArgRC tamen yao mai] de]]
 they want buy DE
 'what they want to buy' (Huang 2016: 453, modified)

clauses can be divided into three (or four) subcategories: 1) a nominalizing *de*, 2) a functional head selecting an adjunct (or a specifier that can allow head ellipsis at the N-bar level), and 3) an *of*-like element for complements of the head nominal, which does not support N-bar ellipsis.

4.1.6 *Suo* restriction

Huang (2016) further reports some distinct behaviors exhibited by argument relative clauses and gapless clauses. For example, he points out that argument relative clauses allow the particle *suo*, a residue of the object relative pronoun from Classical Chinese, as in (15), but gapless clauses do not allow this particle as in (16).

(15) Argument relative clauses

	张三	所	跳	的	舞	
[[ArgRC	Zhangsan	<i>suo</i>	tiao	<i>ti</i>	de]	wui]
	Zhangsan	SUO	dance	DE		dance
	'the dance that Zhangsan did'					(Huang 2016: 446, modified)

(16) Gapless clauses

	张三	所	弹	钢琴	的	声音
*[[GaplessCL	Zhangsan	<i>suo</i>	tan	gangqin	de]	shengyin]
	Zhangsan	SUO	play	piano	DE	sound
	'the sound that Zhangsan plays the piano'					(Huang 2016: 446, modified)

Huang argues that *suo* in (15) implies the existence of an object gap in the relative clause.

However, he continues, since gapless clauses (content clauses) are propositions and serve as the complement of the head, *suo* is not allowed in (16).

4.1.7 Locality restriction

Huang (2016) further claims that an argument relative clause can be properly associated with the head nominal in a long-distance fashion even when it is embedded in another clause as in (17) below, while the head of gapless clauses as complements of nominal predicates cannot provide such an interpretation, as indicated in (18).

(17) Argument relative clauses

这	就是	我	听说		李四	最	喜欢		的	舞伴	
zhe	jiushi	[wo	tingshuo	[ArgRC	Lisi	zui	xihuan	t _i]	de]	wuban _i]
this	is		I	hear		Lisi	most	like	DE	partner	

'This is the dancing partner_i that I heard that Lisi likes t_i most.'

(Huang 2016: 449, modified)

(18) Gapless clauses

这	就是	我	听说		李四	跳舞		的	舞伴	
*zhe	jiushi	[wo	tingshuo	[GaplessCL	Lisi	tiaowu]	de]	wuban]
this	is		I	hear		Lisi	dance	DE	partner	

'This is the dancing partner such that I heard that Lisi dances/danced with that dancing partner.'

(Huang 2016: 449, modified)

Huang argues that in argument relative clauses, the head nominal is associated with a variable in the relative clause. Syntactically, the variable can be a trace resulting from A-bar movement as indicated in (17); or it can be a *pro* (or a resumptive pronoun). However, in gapless clauses as complements, there is no such variable-binding relationship, and the head nominal as a predicate needs to be saturated with the whole complement clause instead of any of its subparts. He claims that this is the reason why the embedded gapless clause cannot be properly interpreted in (18), giving rise to abnormality.

4.1.8 Coordination restriction

Relying on the contrast between (19)-(20) and (21) below, Huang (2016) further argues that argument relative clauses and gapless clauses cannot be conjoined as the "same kind" of clause. For example, an argument relative clause can be coordinated with another argument relative clause as in (19), and a gapless clause can be coordinated with its own kind as in (20). However, an argument relative clause and a gapless clause cannot be coordinated, as shown in (21).

(19) Two Argument relative clauses

张三 所 发出来 跟 李四 所 听到 的 声音
[[ArgRC Zhangsan suo fa-chulai] gen [ArgRC Lisi suo tingdao de] shengyin]
Zhangsan SUO produce and Lisi SUO heard DE sound
'that sound that Zhangsan produced and Lisi heard'
(Huang 2016: 447, modified)

(20) Two Gapless clauses

张三 弹 钢琴 跟 李四 吹 口哨 的 声音
[[GaplessCL Zhangsan tan gangqin] gen [GaplessCL Lisi chui koushao de] shengyin]
Zhangsan play piano and Lisi blow whistle DE sound
'the sound that arises from Zhangsan playing the piano and Lisi blowing the whistle'
(Huang 2016: 447, modified)

(21) One Argument relative clause & One Gapless clause

张三 所 听到 的 跟 李四 吹 口哨 的 声音
*[[ArgRC Zhangsan suo tingdao de] gen [GaplessCL Lisi chui koushao de] shengyin]
Zhangsan SUO heard DE and Lisi blow whistle DE sound
'the sound that arises/arose from Lisi blowing the whistle and that Zhangsan heard'
(Huang 2016: 448, modified)

Huang considers that the reason why argument relative clauses and gapless clauses cannot be coordinated is that the former is an adjunct to NP while the latter is a complement of the head N°. In addition, Huang (2016: 448) also argues that the reason why coordination of the mixed

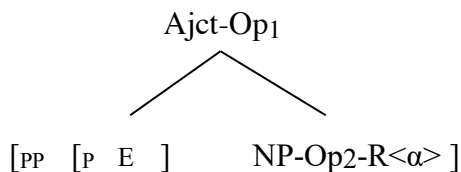
types is not licit is that they are of different semantic types: an argument relative clause is a predicate (of type $\langle e, t \rangle$), while a gapless clause is an argument (of type $\langle e \rangle$, $\langle \epsilon \rangle$, or $\langle s, t \rangle$ denoting individuals, events, or propositions, respectively).

4.2 Ning's (1993) adjunct operator approach

Unlike Huang (2016), Ning (1993) argues that gapless clauses should be treated on a par with adjunct relative clauses. First, Ning claims that Chinese adjunct relative clauses involve a phonetically empty adjunct relative operator, which moves to the peripheral position of the clause and binds a variable in the clause.¹⁴ Ning argues that Chinese adjunct relative operators are counterparts of English single-word adjunct relative operators, i.e., *where*, *when*, *how* and *why* in that both of them have the same LF decomposition as stated in Ning's LF Decomposition Rule in (22).¹⁵

(22) The LF Decomposition Rule (for Single-word Adjunct Operators):

An adjunct operator (overt or covert) is decomposed into a PP containing an unspecified preposition and an NP operator with a restriction in:



where α is a collection of restrictions.

(Ning 1993: 28, modified)

14. Although Ning does not provide syntactic arguments for operator movement in adjunct relative clauses, I demonstrated arguments for operator movement from Aoun and Li (2003) and Huang et. al (2009) in Section 3.2.

15. The relative operator in the instrument adjunct relative clauses is "with which" as in the sentence "the plier with which I fixed my car." The operator here is not a single word; however, Ning argues that it used to be one word "wherewith" in Middle English.

The top operator (Ajct-Op1) in (22) corresponds to a single-word adjunct relative operator, which is overt in English and covert in Chinese. This operator can be lexically decomposed into a covert preposition [_P E] and a covert NP operator (NP-Op2), which is restricted by its domain $R\langle\alpha\rangle$ (R means restriction).¹⁶

Ning's assumption is that LF representation of an operator is the reflection of its morphological composition. He states that the composition of operators along this line can be traced back to the discussion of *wh*-operators in the earlier studies (Chomsky 1964, 1995, Kuroda 1965, Nishigauchi 1986, Kim 1990, Watanabe 1991), in which it is claimed that *wh*-operators can be decomposed into a *wh*-feature, an indefinite quantifier, and the restriction on the quantifier. Relative operators, on the other hand, can be represented in a similar way at LF such as *who* and *where* in (23) and (24).

16. In contrast to single-word operators, Ning assumes that non-single-word operators have a different LF decomposition. Specifically, non-single-word operators refer to those in pied-piped *wh*-questions and relative clauses such as (i).

- (i). a. **Whose hat** is on the floor?
 b. **In which house** did you meet John?
 c. the girl **whose hat** is very pretty
 d. the house **in which** you met John

According to Ning, one difference between these operators and single-word operators is that the restrictions of these operators, i.e., hats and houses in (i) are spelled out overtly in both surface structure and LF, which are not part of the morphology of the operator. The difference can be seen from the contrast in (ii). Ning calls these restricting words to distinguish them from the abstract restricting terms.

- (ii). a. Q: **In which place** did John live?

A: i. (In) that **place**.

ii. (In) that ***house**.

(Ning 1993: 24, modified)

- b. Q: **Where** did John live?

A: i. In that **place**.

ii. In that **house**.

(Ning 1993: 24)

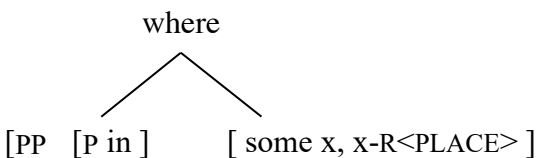
In (iia), since the restriction of the pied-piped *wh*-phrase, i.e., 'place', is spelled out at the surface structure of the question, it is not licit to use 'house' to answer the question. On the contrary, in (iib), the restriction of *where* is an abstract restricting term <PLACE> at LF. Both 'place' and 'house' belong to the set denoted by such restriction and thus both answers are allowed.

- (23) a. the man_i [who_i I saw t_i] Ning (1993: 23, modified)
 b. the man_i [CP [some x, x=R<PERSON>]_i [I saw x]] Ning (1993: 23)

- (24) a. the house_i [where_i John lived t_i]
 b. the house [CP [in some x, x=R<PLACE>]_i [John lived x]]

The relative operator as a semi-quantifier quantifies over the restricting domain. The domain specifies the set to which the operator applies. In (23) and (24) the restricting domains are a set of people and places, respectively. In (24), the adjunct relative operator *where* is different from the NP relative operator *who* in that it contains a visible preposition "in" at LF. The indefinite quantifier *some x* presupposes that there is a person in (23) and a place in (24). Thus, the morphological composition of *who* and *where* can be shown as (25).

- (25) a.  Ning (1993: 22)

- b. 

However, to assume that there is a specific preposition "in" in the morphological composition of *where* in *wh*-questions and relative clauses is not always accurate. Consider (26) and (27).

(26) Q: **Where** did John live?

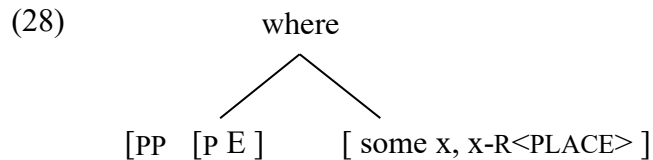
- A: (i) **In** that house.
(ii) **Under** the bridge.
(iii) **Behind** the igloo.

Ning (1993: 25)

- (27) a. the bed **where** the cat caught the mouse
b. the bed **under which** the cat caught the mouse
c. the bed **in which** the cat caught the mouse
d. the bed **near which** the cat caught the mouse

Ning (1993: 29)

The *where wh*-question in (26) can potentially be answered using any of the prepositions in (i)-(iii) of (26). The relative clause with *where* as the relative operator in (27) can be interpreted using any of the prepositions in (27). This suggests that the preposition in (25) for *where* should be underspecified. Thus, (25) should be revised as (28).



It seems that the relative operator denoting place, which is covert in Chinese as in (29) below, is also underspecified for its preposition as shown by its ambiguous interpretability expressed by more than one overt adposition in (29).

- (29)
- | | | | | | |
|------------------------|-----|-------|--------|-------|-----------------|
| | 猫 | 捉 | 老鼠 | 的 | 床 |
| [[A _{ject} RC | mao | zhuo | laoshu | de]] | chuang] |
| | cat | catch | mouse | DE | bed |

'the bed **where** the cat caught the mouse'

(Ning 1993: 111 modified)

- b. 猫 在 床 上 / 下 / 里 捉 老鼠
 mao zai chuang { **shang** / **xia** / **li** } zhuo laoshu
 cat at bed on under inside catch mouse
 'The cat caught the mouse **in/under/inside** the bed.' (Ning 1993: 110 modified)

Compared to the place relative operator, the preposition in the manner relative operator *how* in English seems to be more limited, as shown in (30a), where it can only be paraphrased using the preposition *in*, as shown in (30b).

- (30) a. { the way / how } he fixed his car
 b. He fixed the car **in** this way.

The same restriction is found with the Chinese covert manner adjunct operator as in (31a), where the only prepositions that can be used to paraphrase it are *yi* and *yong*, both of which mean 'with', as shown in (31b).

- (31) a. 他 修 车 的 方法
 [[A_{ject}RC ta xiu che de] fangfa]
 he fix car DE way
 'the way he fixed the car' (Ning 1993: 125 modified)
- b. 他 以 / 用 这种 方法 修 车
 ta { **yi** / **yong** } zhe-zhong fangfa xiu che
 he with / with this-CL way fix car
 'He fixed the car in this way.'

Let us then look at the restricted domain R-< α > in (22). Ning argues that the adjunct operator has four types of domains, i.e., <PLACE>, <TIME>, <MANNER/INSTRUMENT> and <REASON>, each

of which indicates the type of adjunct within the relative clause that the head nominal is associated with. The four types of adjunct relative clauses and their LF representations are shown in (32)-(36).¹⁷

(32) a. Place adjunct relative clauses:

他 修 车 的 店
 [[A_{ject}RC ta xiu che de] dian]
 he fix car DE shop
 'the shop where he fixed the car'

b. [[[PP [P E] **O_{pi}-R<PLACE>**]_k [ta xiu che t_k] de] **dian_i**]
 he fix car DE shop

(33) a. Time adjunct relative clauses:

他 修 车 的 那个 晚上
 [[A_{ject}RC ta xiu che de] na-ge wanshang]
 he fix car DE that-CL afternoon
 'that evening when he fixed the car'

(Ning 1993: 95, modified)

b. [[[PP [P E] **O_{pi}-R<TIME>**]_k [ta xiu che t_k] de] **xiawu_i**]
 he fix car DE afternoon

(34) a. Manner adjunct relative clauses:

他 修 车 的 方法
 [[A_{ject}RC ta xiu che de] fangfa]
 he fix car DE way
 'the way he fixed the car'

(Ning 1993: 125 modified)

b. [[[PP [P E] **O_{pi}-R<MANNER>**]_k [ta xiu che t_k] de] **fangfa_i**]
 he fix car DE manner

17. In the LF decompositions of these operators, Ning did not include the indefinite quantifier "some x." I would assume that he omitted this part for simplicity of representation.

(35) a. *Instrumental adjunct relative clauses:*

他 修 车 的 钳子
 [[A_{jectRC} ta xiu che de] qianzi]
 he fix car DE pliers

'the pliers with which he fixed the car' (Ning 1993: 125 modified)

b. [[[PP [P E] **Op_i-R<INSTR>**]_k [ta xiu che t_k] de] **qianzi_i**]
 he fix car DE pliers

(36) a. *Reason adjunct relative clauses:*

他 修 车 的 原因
 [[A_{jectRC} ta xiu che de] yuanyin]
 he fix car DE reason

'the reason why he fixed the car' (Ning 1993: 95, modified)

b. [[[PP [P E] **Op_i-R<REASON>**]_k [ta xiu che t_k] de] **yuanyin_i**]
 he fix car DE reason

In (32a), for example, the null adjunct operator is composed of an empty preposition and the restricted domain <PLACE> which specifies the set to which the operator applies, i.e., the set of places. The content of each null preposition in (33)-(36) is specified in a similar fashion based upon the restrictive domain TIME, INSTR, and REASON, respectively.

Furthermore, Ning argues that the operator-variable chain composed of the entire adjunct operator and its trace in the above examples is to be constrained by his condition on legitimate Operator-variable Construction as stated in (37).

(37) Condition on legitimate Operator-variable Construction (Ning 1993: 39):

An operator-variable construction is legitimate iff

a. the operator is restricted

and

b. the restricted operator c-commands its variable

In (38a) and (39a), the entire adjunct relative operator moves from the adjunct relative clause to the periphery. Then it is reconstructed back to the original position in the clause, as in (38b) and (39b). Finally, the nominal operator moves again to the periphery in (38c) and (38c) so that the condition on legitimate operator-variable construction can be met.¹⁸

Ning (1993) argues that gapless clauses can be analyzed analogously to adjunct relative clauses in which there is an adjunct gap. However, he claims that the adjunct cannot be decomposed into a single-word relative operator, as it can in adjunct relative clauses since it is not within the four domains, i.e., PLACE, TIME, MANNER/INSTRUMENT and REASON.¹⁹ One possible solution, according to Ning, is to assume that the head nominal in gapless clauses comes to be associated with a *resultative* VP adjunct rather than a PP adjunct. The VP adjunct is headed by a covert verb interpreted as having the general meaning of "obtain."²⁰ Consider the gapless

18. Ning's reconstruction can be restated using the copy theory of movement (Chomsky 1995: 185-187). (38) and (39) will be something like (i) and (ii).

(i). a. Place adjunct relative clauses

[[OP_i-R<PLACE> [ta xiu che [PP [P E] t_i]] de] dian_i]
he fix car DE shop

b. [[PP {PP E} OP_i-R<PLACE>] [ta xiu che [PP [P E] OP_i-R<PLACE> (=t_i)]] de] dian_i
he fix car DE shop

(ii). a. Manner adjunct relative clauses

[[OP_i-R<MANNER> [ta xiu che [PP [P E] t_i]] de] fangfa_i]
he fix car DE way

b. [[PP {P E} OP_i-R<PLACE>] [ta xiu che [PP [P E] OP_i-R<PLACE> (=t_i)]] de] fangfa_i
he fix car DE way

19. Recall that Ning assumes that only the counterparts of the English overt adjunct relative operator, i.e., *where*, *when*, *with* *which*, and *why* can be analyzed as single-word relative operators that are covert in Chinese.

20. Ning (1993: 138) describes the entire VP2 as "a single-word adjunct operator of the internal composition containing an empty verb having the general meaning of 'obtain'."

clauses in (40a)-(42a), which has concealed interpretations expressed by the resultative VP adjuncts as in (40b)-(42b).²¹

(40) a. 他 唱 歌 的 声音
 [NP [GaplessCL ta chang ge de] shengyin]
 he sing song DE sound
 'the sound that arises from his singing a song' (Ning 1993: 136)

b. 他 唱 歌 发出了 声音
 ta [VP1 chang ge] [VP2 **fachu-le** shengyin]
 he sing song **produce**-PERF sound
 'He produced the sound while singing.' (Ning 1993: 137, modified)

(41) a. 他 救 人 的 回报
 [NP [GaplessCL ta jiu ren de] huibao]
 he save people DE reward
 'the reward that came from his saving the person/people'

b. 他 救 人 得到了 回报
 ta [VP1 jiu ren] [VP2 **dedao-le** huibao]
 he save people **obtain**-PERF reward
 'He saved the person/people to get the reward.' (Ning 1993: 137, modified)

(42) a. 他 卖 书 的 钱
 [NP [GaplessCL ta mai shu de] qian]
 he sell book DE money
 'the money that was earned from Zhangsan's selling (the) books'

21. As will be discussed in Section 6.1, I question Ning's translation of (41), in which VP2 is translated as a purpose clause acting as an adjunct. I will argue that VP2 should be regarded as the main verb of the sentence, and that the sentence should be translated as "He got the reward by saving the person/people." Also note that Ning's translation of (40) and (42) is not consistent with his claim that VP2 is an adjunct since VP2 is translated as the main verb in English.

- b. 他 卖 书 赚了 一些 钱
 ta [VP1 mai shu] [VP2 **zhuan**-le yixie qian]
 he sell book **earn**-PERF some money
 'He made some money by selling books.' (Ning 1993: 137, modified)

In (40b)-(42b), the VP adjunct (VP2) is claimed to be generated in addition to VP1, the predicative VP of the sentence, and it is headed by a covert verb interpreted as having the general meaning of "obtain," e.g., *fachu* 'produce', *dedao* 'obtain', and *zhuan* 'earn'.

On the contrary, Ning claims that when the verb of the adjunct VP does not have the meaning of "obtain" as in (43a) and (44a), no gapless clauses can be formed as in (43b) and (44b).

- (43) a. 他 卖 车 还 账
 ta [VP1 mai che] [VP2 **huan** zhang]
 he sell car **pay** bill
 'He sold his car to pay the bill.' (Ning 1993: 138, modified)

- b. 他 卖 车 的 账
 *[NP [GaplessCL ta mai che de] zhang]
 he sell car DE bill
 'the bill he (paid) by selling his car' (Ning 1993: 139, modified)

- (44) a. 他 唱 歌 哄 孩子
 ta [VP1 chang ge] [VP2 **hong** haizi]
 he sing song **lull** baby
 'He sang to lull the baby.'

- b. 他 唱 歌 的 那个 孩子
 *[NP [GaplessCL ta chang ge de] na-ge haizi]
 he sing song DE that-CL baby
 'the baby which he lulled by singing' (Ning 1993: 139, modified)

5. Proposal: Empty operators – Their movement and association with higher nominals

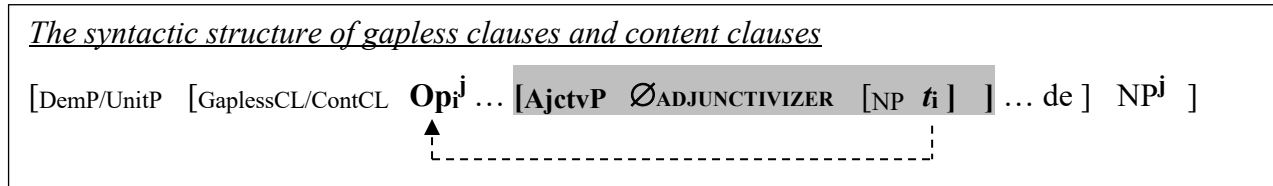
Let us start with an overview of the claims I will make and elaborate on in Chapters 6 and 7 and their related analyses. First, this study follows Ning's (1993) approach in treating gapless clauses on a par with adjunct relative clauses, and analyzes both of them as involving an operator-variable relationship induced by the movement of an empty operator. In addition, I will also analyze content clauses as involving an operator-variable construction similar to gapless clauses. Crucially, however, I do not treat the empty operator per se as an adjunct or as a VP. Instead, I will postulate what I will call Adjunctivizer Phrase, which is headed by an empty adjunctivizer selecting an empty nominal operator as its complement.

In Section 5.1, I will spell out the three main claims of this dissertation regarding operator movement, the landing site operator, and the notion of adjunctivizer selecting an empty nominal operator. Each claim will be argued for in Section 5.2-5.4. More specifically, in Section 5.2, I will provide syntactic arguments to support the operator movement approach to gapless relative clauses, which Ning (1993) neglected to provide. Section 5.3 will discuss the restrictions imposed on operator movement in general and in gapless clauses in particular, attempting to find out where exactly the operator must land within these prenominal clauses. In Section 5.4, I will argue for the nominal status of the empty operator selected by the adjunctivizer. I will however, postpone the discussion about the adjunctivizer and its function until Chapter 7, where I will spell out the semantic derivations of various prenominal clausal modifiers and the function of the adjunctivizer as well.

5.1 Proposed analyses of gapless clauses and content clauses

This study assumes the syntactic structure of gapless clauses and content clauses in (1).

(1)



In (1), the gapless clause (content clause) as a modifier is adjoined to the head nominal. There is an Adjunctivizer Phrase (AjctvP) headed by an empty adjunctivizer (to be briefly illustrated directly below), which selects an empty nominal operator (Op) as its complement. I will argue below that the operator undergoes movement (or is internally merged) to the periphery of the gapless clause in order to let this clause and the head nominal be locally associated and undergo semantic composition in a specific way. An approach similar to (though crucially distinct from) this can be observed in numerous previous works, most of which postulate an empty operator and its movement, which is claimed to give rise to some extra syntactic and/or interpretive process. For example, Chomsky (1986a) argues that such a relation in a relative clause construction in English is established via the "rule of predication," and Browning (1987) argues that it is established when an "agreement chain" is formed. As has often been noted, the association between the higher nominal and the operator moved within the related clause seems to involve a relation qualitatively distinct from regular binding. Reflecting this observation, the association between Op and NP in (1) is indicated by co-superscripts. I will discuss how this relation is established in more detail in Section 5.3.

The proposed syntactic structure of gapless clauses is different from Ning's structure in two aspects. Firstly, as an archi-category of a preposition, I introduce "adjunctivizer," which turns an NP into an adjunct. "Adjuncts" introduced by the adjunctivizer naturally include notions such as place, time, instrument, and manner. I will argue, however, that what I have called

gapless clauses and content clauses crucially involve some adjunct notions that go beyond such standard types of adjuncts.

Secondly, recall that Ning assumes a complex adjunct operator that serves as the link between the head nominal and the modifying clause. However, I argue that the operator should be nominal and is selected by an empty adjunctivizer in the Adjunctivizer Phrase (AjctvP). The combination of the empty adjunctivizer and the nominal operator permits the head nominal to be linked to the adjunctivizer phrase and interpreted as its part within the gapless clause. This dovetailing establishes the modification of a nominal by a gapless clause/content clause, which otherwise looks quite mysterious.

I also argue that this analysis appealing to an adjunctivizer can be extended to adjunct relative clauses. Consequently, all prenominal clauses in Chinese that do not involve an argument gap can have a unified analysis under this approach. This hypothesis will be elaborated in Chapter 7 when the semantics of each kind of prenominal clause is discussed.

In the next three sections, I will present arguments for operator movement, the landing site of the operator and its association with the head nominal, and the nominal status of the operator as a complement of the adjunctivizer.

5.2 Arguments for operator movement

In Chapter 3, we saw the diagnostic tests for the involvement of operator movement in adjunct relative clauses presented by Huang et. al (2009). This section will examine the syntactic behaviors of gapless clauses and content clauses in regard to those tests. The analyses presented below will support the hypothesis that, similarly to adjunct relative clauses, gapless clauses and

content clauses involve the movement of an empty operator, which comes to be associated with the base-generated head of the entire nominal construction.

First, recall that adjunct relative clauses obey adjunct islands, as shown in (7) in Chapter 3, repeated here in (2).

- (2) 这 就是 如果 他 生气 我 会 不 高兴
 *zhe jiushi [[A_{jt}RC **Op_i** [Adjunct *ruguo ta t_i shengqi*] wo hui bu gaoxing
 this is if he angry I will not happy
 的 原因
 de] **yuanyin_i**]
 DE reason
 *'This is the **reason_i** I will not be happy [if he gets angry **t_i**].'

(Huang et al. 2009: 222 modified)

Another example of the adjunct relative clause involving a long-distance extraction is shown in (3a). Such long-distance extraction is not possible when it is out of a complex NP island involving a relative clause as shown in (3b).

- (3) a. 这 就是 我 听说 他 修 那部 车 的 车场
 zhe jiushi [NP [A_{jt}RC **Op_i**^j wo tingshuo [CP ta t_i xiu nabu che] de] chechang^j]
 this is I hear he fix that-CL car DE garage
 'This is the garage such that I heard he fixed the car there.'

(Huang, Li and Li 2000: 3, modified)

- b. 这 就是 我 卖 他 修 的 那部 车
 *zhe jiushi [NP [A_{jet}RC **Op**_i^j wo mai [CNP ta t_i xiu t_k de [nabu che]_k]
 this is I sell he fix DE that-CL car
 的 车场
 de] chechang^j]
 DE garage
 'This is the garage_i where I sold the car_k he fixed t_k t_i.'

In (3a), the operator can move from the embedded clause to the periphery of the relative clause. Consequently, the head nominal *chechang* 'garage' can be interpreted as 'the place where he fixed the car'.²² However, in (3b), the extraction of the operator out of the complex NP island is not possible, hence the ungrammaticality of the sentence. In a sense, the adjunct relative clause can be extended to a higher clause in (3a) but not in (3b) because the operator movement necessary for the legitimate interpretation is blocked by a complex NP island.

Similarly, as shown in (4), gapless clauses and content clauses also exhibit the adjunct island effect.²³

22. Another possible reading of the same string of words is that I was in the garage when I heard that he fixed the car, with the operator originating from the position in the higher clause. We are not concerned with this reading in this case.

23. I will wait until Section 5.3.2 to discuss the long-distance extraction of gapless and content clauses without islands, since the interpretation of these sentences are more complicated than one expect at first.

(5) Complex NP Island:

a. Gapless clauses:

这 就是 我 参加 他 弹 钢琴 的 音乐会
 *zhe jiushi [NP [GaplessCL **Op_i^j** wo canjia [CNP [CP ta **t_k** **t_i** tan gangqin de] yinyuehui_k]
 this is I attend he play piano DE concert
 的 声音
 de] shengyin^j]
 DE sound

Intended: 'This is the sound_i that arose from my attending the concert_k where he played the piano $t_k t_i$.'

b. Content clauses:

这 就是 我 参观 他 克服 癌症 的
 *zhe jiushi [NP [ContCL **Op_i^j** wo canguan [CNP [CP ta **t_k** **t_i** kefu aizheng de]
 this is I visit he conquer cancer DE
 医院 的 信心
 yiyuan_k] de] xinxin^j]
 hospital DE belief

Intended: 'This is the belief_i that I attended the hospital_k where he will conquer the cancer $t_k t_i$.'

In (5), the empty operator moves out of a complex NP island in the gapless clause and the content clause. This island is headed by the object of the predicate of the modifying clause, i.e., *yinyuehui* 'concert' in (5a) and *aizheng* 'cancer' in (5b).

Finally, gapless clauses also exhibit the *wh*-island effect, whether the gapless clause to be extended to a higher clause itself constitutes a *wh*-island or is embedded in such an island, as shown in (6).

b. Adjunct relative clauses

我 想 看 你 说 每 个 人 修 车 的 自 己 的 地 点
*wo xiang kan [[AjctRC **Op**_i ni shuo **meigeren**_k *t*_i xiu che de] [**ziji**_k de **didian**]]
I want see you say everyone fix car DE self DE place
*'I want to see (him/her)self's place in which you said that everyone fixed the car.'

Contrary to argument relative clauses but similar to adjunct relative clauses, gapless and content clauses also exhibit no reconstruction effect, as shown in (9).

(9) Gapless clauses:

a. 这 就 是 每 个 人 周 末 卖 书 的 自 己 的 钱
*zhe jiushi [NP [GaplessCL **Op**_i **meigeren**_k zhoumo *t*_i mai shu de] [**ziji**_k de **qian**_j]]
this is everyone weekend sell book DE self DE money
Intended: 'This is (him/her)self's money that was earned by everyone selling (the) books on the weekend.'

b. Content clauses

这 就 是 每 个 人 出 国 的 自 己 的 计 划
*zhe jiushi [NP [ContCL **Op**_i **meigeren**_k *t*_i chu guo de] [**ziji**_k de **jihua**_j]]
this is everyone go country DE self DE plan
Intended: 'This is (him/her) self's plan that everyone goes abroad.'

Both in (9a) and (9b), *ziji* 'self' cannot be bound by *meigeren* 'everyone' in the prenominal clause. If the gapless and content clause constructions do not involve the "promotion" of the head NP but rather is base-generated, so that the head NP comes to be associated with an empty operator moved to the periphery of the clause, we can explain why no reconstruction effect is observed while island effects are observed.

5.3 Arguments for the proposed landing site of the operator

This section will attempt to justify the proposed landing site of the empty operator in gapless clauses and its association with the head nominal. The argument presented below will be in harmony with the oft-adopted assumption in the syntax literature that the empty operator should be in a local position with the antecedent it is coindexed with (Browning 1987, Chomsky 1982, 1986a, 1986b, Franks 1992, Huang et. al 2009, Safir 1986, Stowell 1985, 1986, among others). In Section 5.3.1, I will first discuss the locality issue in English concerning *tough* constructions, parasitic gap constructions and relative clause constructions. I will then introduce Chomsky's and Browning's mechanisms to associate the operator and the head nominal in relative clause constructions. In Section 5.3.2, I will turn to Chinese and analyze how such a locality condition imposed on the empty operator can be used to explain certain phenomena in gapless and content clauses.

5.3.1 Locality condition in various structures in English

Firstly I will discuss *tough* constructions in English. In a *tough* construction such as (10), there is a "missing" object in the embedded infinitival clause which is identified with the matrix subject, i.e., *John*.

(10) a. John is easy to please.

b. John_i is easy [Op_i [PRO_j to please e_i]].

Some previous studies posit that there is an empty operator in the Spec, CP of the embedded infinitival clause that binds the variable in the embedded clause as in (10) (Akmajian 1972, Browning 1987, Chomsky 1977, Hicks 2009, Jones, 1991, Keine and Poole 2015, Rezac 2006, Salzmann 2015). Chomsky (1986a) tried to capture the association between this operator and the higher NP as its "antecedent" in terms of the rule of predication. In (10), only *John* is in an appropriate position to be treated as the subject of the predicate "easy to please e_i ." It then is assumed that the subject *John* assigns its value to the operator and specifies the range of the variable it binds. The process can be shown in (11).²⁴

- (11) a. **John_i** is easy [**Op_k** [PRO_j to please e_k]].
 b. **John_i** is easy [**Op_{k=i}** [PRO_j to please $e_{k=i}$]].

By being coindexed with the antecedent ($k=i$), the value of the operator and variable is said to be specified by the antecedent. Note, however, the coindexation of the antecedent and the operator here is a little misleading since the association between them cannot be binding. Therefore, I assume here that there is a distinctive type of association between the antecedent and the operator, which I will indicate using superscripts. (11) thus will be indicated as (12).

- (12) **Johnⁱ** is easy [**Op^{k=i}** [PRO_j to please e_k]].

24. Stowell (1985) expresses a similar idea, arguing that the operator is bound by the antecedent *John* in an A-position which assigns the range of the empty operator. Here the range of the operator is the set denoted by *John*. In addition, he argues that the operator should be identified with the antecedent in terms of [\pm wh]. Since *John* has the feature [-wh], the feature value [-wh] should be identified on the operator.

In order for the operator to be in a local position with the antecedent, it needs to move from the lower position. Chomsky (1986a: 110) supports the operator movement by observing that the operator-variable relation in (12) is subject to his Subjacency condition, as shown by the island effect in (13).

- (13) a. **Johnⁱ** is too stubborn [**Opⁱ** [PRO to expect [CP [anyone to talk to *e_i*]]]]
Chomsky (1968a: 110, modified)
- b. ***Johnⁱ** is too stubborn [**Opⁱ** [PRO to visit [_{CNP} anyone [CP who [talked to *e_i*]]]]]]
Chomsky (1968a: 110, modified)
- c. ***Johnⁱ** is too stubborn [**Opⁱ** [PRO to ask [*wh-island_1* why [Tom wondered [*wh-island_2* who [talked to *e_i*]]]]]]]]
Chomsky (1968a: 110, modified)

(13a) is grammatical since no island exists in the structure. (13b) and (13c), on the other hand, exhibit island effects involving a Complex NP island and *wh*-islands, respectively. In (13b), the variable is inside the complex NP headed by *anyone*. In (13c), the variable is embedded in two CPs whose specifiers are occupied by two *wh*-phrases.²⁵ The ungrammaticality of the above examples patterns with the Subjacency effect in *wh*-movement as shown in (14).

- (14) a. **Who** do you expect [CP [anyone to talk to *e*]]
Chomsky (1968a: 110, modified)
- b. ***Who** did you visit [_{CNP} anyone [CP who [talked to *e*]]]]
Chomsky (1968a: 110, modified)

25. Compare (13) with the examples in (i).

- (i) a. John is too stubborn to expect anyone to talk to **Bill** Chomsky (1968a: 110, modified)
b. John is too stubborn to visit anyone who talked to **Bill** Chomsky (1968a: 110, modified)
c. John is too stubborn to ask why Tom wondered who talked to **Bill**
Chomsky (1968a: 110, modified)

(i) is similar to (13) except that the variable position is filled by *Bill*. Since there is no operator or variable in the construction, no island effect is relevant in (ib) and (ic) and the sentences are grammatical.

- c. ***Who** did you ask [*wh-island*₁ why [Tom wondered [*wh-island*₂ who [talked to *e*]]]]
Chomsky (1968a: 110, modified)

Similar to (13b) and (13c), (14b) and (14c) are ungrammatical because the operator moves out of the Complex NP island and *wh*-island and hence violates the Subjacency. Importantly, the fact the operator moves all the way to the higher CP in the *tough* construction (13b-c) exhibiting island effects shows that it needs to be in a local relation with the antecedent, i.e., *John*.

Secondly, a locality restriction on the association between the empty operator and its antecedent is also observed in the parasitic gap construction, although the analysis of the locality condition is assumed to be different. To begin with, the parasitic gap construction as in (15) below is analyzed as involving an empty operator by some researchers.

- (15) **Who_i** did John describe [*Adjct island* without examining any pictures of ____ **i**] ?

If we regarded the gap in the adjunct phrase in (15) as the extraction site of the *wh*-phrase *who* located under the matrix CP, their direct association would involve extraction out of the adjunct island. It should therefore induce the violation of constraints like Subjacency and the CED (Chomsky 1973, Huang 1982). However, the sentence is grammatical (though slightly awkward), which suggests that this sentence involves a more complex structure. It is proposed that there is an empty operator at the periphery of the adjunct island which mediates the *wh*-operator and the empty category, as shown in (16) (Chomsky 1986b, Contreras 1984, Engdahl 1983, Stowell 1985, among others).

(16) **Who_i** did John_j describe **t_i** [Adjct island without [**O_pi** [PRO_j examining [any pictures of **e_i**]]]]
 (Stowell 1985: 316, modified)

In (16), the overt *wh*-phrase binds the variable t_i outside the adjunct island, and the null operator binds the variable e_i within the adjunct island. Consequently, no island violation arises and the sentence is grammatical. Furthermore, the null operator O_{pi} takes the trace t_i left by overt *wh*-operator as its "antecedent." In order for the null operator to be locally coindexed with the higher trace, it needs to be raised to the left periphery of the gerund phrase.

The operator movement can be supported by the island effect observed in Kayne (1983) and Contreras (1993) as shown in (17).

(17) *Who_i did John describe **t_i** [Adjct island without [**O_pi** [[Subj island any pictures of **e_i**] being on file]]]?
 (Kayne 1983, modified)

b. *Which articles_i did you file **t_i** [Adjct island₁ after [**O_pi** [going home [Adjct island₂ without [PRO reading **e_i**]]]]]?
 (Contreras, 1993, modified)

In (17a), the parasitic gap is further embedded in a subject phrase within an adjunct phrase. Therefore, when the operator base-generated therein moves to the periphery of the gerundive complement of *without*, it will be extracted out of the Subject island, and the ungrammaticality of the sentence arises. In (17b), the parasitic gap in an adjunct phrase is embedded within another adjunct as an island. If the operator moves to the periphery of the higher adjunct phrase, it will be extracted out of the adjunct island created by the lower adjunct phrase.

Alternatively, we could assume that the operator moves locally within the lower phrase as in (18).

(18) a. *Who_i did John describe t_i [Adjct island without [[Subj island **Op**_i any pictures of e_i] being on file]]? (Kayne 1983, modified)

b. *Which articles_i did you file t_i [Adjct island_1 after going home [Adjct island_2 without **Op**_i PRO reading e_i]]? (Contreras, 1993, modified)

The ungrammaticality of both sentences in (18) is not caused by the failure of the overt *wh*-phrase's or the null operator's binding because the *wh*-phrase still locally binds the variable t_i , and the null operator locally binds the variable e_i without causing any island violation. However, in this case, the operator is not able to be locally associated with the *wh*-trace since they are separated by the subject island and the adjunct island, respectively. We can, in other words, ascribe the ungrammaticality of sentences involving the legitimate syntactic derivation in (18) to the violation of the locality restriction imposed on the association between the empty operator and its antecedent, as pointed out by Contreras (1993).

On the other hand, Browning (1987) and Contreras (1993) analyze the operator in parasitic gaps as an intermediate trace in the A'-chain headed by the matrix *wh*-phrase. They claim that, unlike *tough* constructions, the locality condition imposed on the association between the operator and the *wh*-trace as its antecedent is based on the more general requirement that intermediate traces be subjacent to each other in an A'-chain headed by the *wh*-phrase (Browning

1987, Contreras 1993).²⁶ Treating the operator as an intermediate trace, Browning further assumes that it can be deleted at LF.

Finally, let us turn to relative clause constructions in English. It is well-known that overt relative operators need to be in the highest Spec, CP within relative clauses, as in (19). They cannot be in the Spec of any lower CP, as shown in (19).

(19) a. the man [CP **who**_i [IP I know [CP [IP Bill likes e_i]]]]
(Browning 1987: 59, modified)

b. *the man [CP [IP I know [CP **who**_i [IP Bill likes e_i]]]]
(Browning 1987: 59, modified)

This is generally assumed to be the case for empty operators as well. Therefore, (20a) but not (20b) is assumed to be the correct representation.

(20) a. the man [CP **Op**_i [IP I know [CP [IP Bill likes t_i]]]]
(Browning 1987: 59, modified)

b. *the man [CP [IP I know [CP **Op**_i [IP Bill likes t_i]]]]
(Browning 1987: 59, modified)

26. Browning (1987) argues that the operator in parasitic gaps cannot get coindexed with its antecedent. According to her, the predicate in this case is a PP and can only be predicated of the sentential E(vent)-position, i.e., the event argument that the verb possesses (Davidson 1967). However, the E-position cannot identify the operator unlike an NP. Therefore, the operator cannot be co-indexed in the agreement chain.

Moreover, there is certainly an association between the head and the relative operator as shown by the English examples in (21).

(21) a. [DP The **girl** [who/*which [went to school yesterday]] was missing today.
└──────────┘

b. [DP The **cell phone** [which/*who [I bought yesterday]] was missing today.
└──────────┘

In (21a), the head *girl* denotes a human, only the relative operator 'who' but not 'which' can be used. Reversely, when the head denotes a non-human such as *cell phone* in (21b), only 'which' can be used.

Moreover, in languages that have richer morphology, relative operators agree with the head nominal in Φ -features such as gender, number, and person. For example, the German relative operator *die* matches the head nominal in Φ -features as shown in (22).²⁷

(22) a. [der **Mann** [_{ArgRC} **den** Peter getroffen hat]]
the **man** **who.MASC.3SG.ACC** Peter met has
└──────────┘ (Brandt and Fuß 2014, 298, modified)

27. De Vries (2002) points out that the case of the relative pronoun does not necessarily match that of the head nominal. He gives the German example in (i).

(i) Ich fürchte den **Herrn** **der**
I fear the.MASC.3SG.ACC gentleman.MASC.3SG.ACC who. MASC.3SG.NOM
eine Pistole trägt.
a gun carries

'I fear the gentleman who carries a gun.' (De Vries 2002: 118)

In (i), the head of the relative clause, i.e., *Herrn* 'gentleman' has the accusative case; however, the relative pronoun *der* 'who' is nominative.

- b. [die **Frau** [ArgRC **die** Peter getroffen hat
the **woman** **who.FEM.3SG.ACC** Peter met has
└──────────────────┘ (Brandt and Fuß 2014, 298, modified)
- c. [das **Auto** [ArgRC **das** Peter fährt
the **car** **who.NEUT. 3SG.ACC** Peter drives
└──────────────────┘ (Brandt and Fuß 2014, 298, modified)
- d. [die **Männer/Frauen/Autos** [ArgRC **die** Peter gesehen hat]
the **men/women/cars** **who.PL** Peter seen has
└──────────────────┘ (Brandt and Fuß 2014, 298, modified)

Chomsky (1982: 92-93) discusses an LF process of co-indexing the relative pronoun and the head nominal as shown in (23).

- (23) a. [the [man]_{*i*} [who_{*j*} John saw *t_j*]]
b. [the [man]_{*i*} [who_{*i*} John saw *t_i*]]

In (23a), operator-variable binding does not hold between the head nominal and the relative pronoun and hence they are not coindexed. Instead, their association is established when the relative clause (as an open expression according to Chomsky) is predicated of the head nominal. This LF process identifies the index *i* with *j* in (23b) and establishes the chain of identification as indicated by *i* in (23b). Since the association between the operator and the antecedent here is distinct from syntactic binding, it will be indicated with co-superscripts in this study, as in (24).

- (24) [the [man]^{*j*} [who_{*i*}^{*i=j*} John saw *t_i*]]

Safir (1986: 678) further proposes that the operator needs to be in the highest Spec CP position in order to be coindexed with the head.²⁸ I will identify what has been called predication in the analyses of the relative clause construction as a formal semantic process of Predicate Modification. In Chapter 7, I will propose a semantic analysis of all of relative, gapless, and content clauses in Chinese, where it is claimed that such a semantic process is induced when an empty operator undergoes movement and associates the clausal modifier with the head nominal in a local fashion.

Browning (1987: 61) gives a more detailed account for how the association between the head nominal and the relative operator is achieved through predication. Following Williams (1980), she proposes that, in this specific type of predication, the predicate needs to be linked to its subject by some "agreement chain" such as that which holds between the subject, i.e., the head nominal, and the category in the Spec of the predicate, i.e., the relative operator, as shown in (25).²⁹

28. Chomsky (1986a: 85) proposes "strong binding" and Safir (1986) proposes "R-binding" to capture the identity relation between the head and the relative operator, which may be comparable to what I indicate with co-superscripting in (24).

29. Following Williams (1980), Browning (1987: 62) assumes that a subject-predication relation is legitimate if it meets one of the conditions in (i).

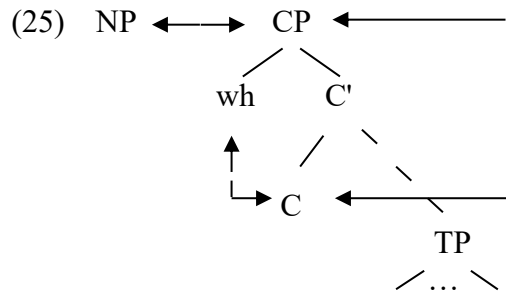
- (i). A subject-predicate relation is licensed if:
- a. the subject discharges the external θ -role of the predicate or
 - b. the subject agrees with a chain contained in the predicate.

On one hand, (ia) is applied to simple predication such as (ii).

- (ii). [SUBJECT John] [PREDICATE died].

(ii) is a simple sentence. The verb phrase headed by *die* is predicated of the subject *John*. The subject receives an external theta-role from the VP as its external argument via the predication relation.

On the other hand, (ib) is applied when the predicate involves a clause such as TP or CP. In this case, the subject does not receive any theta-role. Instead, it is connected with the predicate by being in an agreement relation with the operator chain contained in the predicate.



(Browning 1987: 61, modified)

In (25), the NP head is the subject and the relative clause is the predicate. They agree with each other as being a subject and a predicate. The head C agrees with the *wh*-relative operator by Spec-head agreement, which is reflected in its maximal projection CP. When the NP and CP undergo predication, the relative operator in the Spec of CP can be identified with the head NP via the agreement chain established by the head-label identification between C and CP. Under this approach, it can be considered that the motivation for the operator movement is to establish an agreement chain with the head nominal in a local position, whether the operator is overt or covert. This can explain the association between the relative pronoun and the head nominal in English and German in (21) and (22). In English, the relative operators *who* and *which* agree with the head in terms of [\pm human] feature. In German, the relative operator *die* agrees with the head in Φ -features. Browning further assumes that agreement between subjects and predicates exists in all languages even when it is not morphologically overt. When the relative operator is null, it inherits the features from the head nominal.

5.3.2 Locality condition in Chinese gapless and content clause constructions

I will now examine the locality condition between the empty operator and the head nominal in gapless clauses in Chinese. First of all, a locality condition may explain the ungrammatical cases demonstrated earlier with the island effect such as (26).

(26) a. Adjunct island (Gapless clauses):

这 就是		如果 他 弹 钢琴 我 会
*zhe jiushi [NP [GaplessCL	O_{pi}^j [Adjunct	ruguo [CP ta <i>t_i</i> tan gangqin]] wo hui
this is		if he play piano I will
高兴 的 声音		
gaoxing de] shengyin ^j]		
happy DE sound		

'This is the sound I will be happy [if he play the piano] and arises.'

b. Wh-island (Gapless clauses):

这 就是		我 想知道		谁 认为
*zhe jiushi [NP [GaplessCL	O_{pi}^j	wo xiangzhidao [CP[+WH]	shei	renwei
this is		I wonder	who	think
张三 弹 钢琴 的 声音				
[CP Zhangsan <i>t_i</i> tan gangqin]]	de]	shengyin ^j]		
Zhangsan play piano	DE	sound		

'This is the sound that I wonder who think it arose from Zhangsan's playing the piano.'

(26a) and (26b) contain an adjunct island and a *wh*-island, respectively. In each structure, if the operator remains in the island without moving out to the periphery of the gapless clause, it does not violate any island constraint. However, this will not save the ungrammaticality of these sentences since the operator is too far away from its antecedent, i.e., the head nominal, and thus violates the locality condition.

Secondly, some observations on the restricted interpretability of the gapless clause construction may also support such a hypothesis. To begin with, recall that the head nominals in the gapless clause construction as in (27) below do not find any corresponding gaps within the modifying clauses, but they are interpreted as expressing a variety of semantic relations closely associated with the eventualities expressed by those modifying clauses.

- (27) 张三 弹 钢琴 的 声音
 [NP [GaplessCL Zhangsan tan gangqin de] shengyin]
 Zhangsan play piano DE sound
 'the sound that arises/arose from Zhangsan's playing the piano'

In this particular example, for instance, the head nominal *shengyin* 'sound' comes to indicate the effect arising from the modifying gapless clause *ta tan gangqin* 'he plays/played/will play the piano', the eventuality expressed there indicating its cause.³⁰

Observe now that both of the two examples in (28) and (29) below embed the same gapless clause *ta tan gangqin* 'he plays/played/will play the piano', which is to be associated with the head nominal *shengyin* 'sound' located higher.

- (28) 这 就是 我 想象 张三 弹 钢琴 的 声音
 zhe jiushi [NP [GaplessCL wo xiangxiang [Zhangsan tan gangqin] de] shengyin^j]
 this is I imagine Zhangsan play piano DE sound
 'This is the (imaginary) sound that arose/arises from my imagining (fantasizing) that he played/will play the piano.'

- (29) 这 就是 我 知道 张三 弹 钢琴 的 声音
 #zhe jiushi [NP [GaplessCL wo zhidao [Zhangsan tan gangqin] de] shengyin^j]
 this is I know Zhangsan play piano DE sound
 'This is the sound that arose/arises from my knowing that he played/will play the piano.'

We can in fact imagine three potential ways in which the scope of the operator is determined in each example, as indicated in (30) and (31), respectively.

30. The tense and aspect of the intended interpretation should probably be adjusted as past, present, or future for natural pragmatics.

- (30) a. [**OP_i** I know **t_i** [...]] sound
 b. [**OP_i** I know [.. **t_i** ..]] sound
 c. [I know [**OP_i** ... **t_i**]] sound
- (31) a. [**OP_i** I imagine **t_i** [...]] sound
 b. [**OP_i** I imagine [.. **t_i** ..]] sound
 c. [I imagine [**OP_i** ... **t_i**]] sound

Assuming that where the operator originates, i.e., the trace position, provides us with a clue as to which eventuality is to be interpreted as the source (cause) of the sound arising as its effect, we can describe a semantic interpretation of the sentence reflecting each of the three potential scope relations, as pointed out to me by Yoshihisa Kitagawa (p.c.).

Let us start with (30a) and (31a), where the operator originates in the higher clause and is dislocated to its periphery. The full constructions are shown in (32) and (33).

- (32) 这 就是 我 想象 张三 弹 钢琴 的
 zhe jiushi [NP [GaplessCL **OP_i** wo **t_i** xiangxiang [Zhangsan tan gangqin] de]
 this is I imagine Zhangsan play piano DE
 声音
 shengyin^j]
 sound
 'This is the (imaginary) sound that arose/arises from my imagining (fantasizing) that he played/will play the piano.'

(33) 这 就是 我 知道 张三 弹 钢琴 的
 #zhe jiushi [NP [GaplessCL **Opi**^j wo t_i zhidao [Zhangsan tan gangqin] de]
 this is I know Zhangsan play piano DE
 声音
 shengyin^j]
 sound
 Intended: 'This is the sound that arose/arises from my knowing that he played/will play the piano.'

The representations in (32) and (33) would satisfy the locality condition imposed on the operator in syntax and may potentially give rise to a proper interpretation. A contrast arises between the two examples, however, because pragmatically, the sound being the effect of one's fantasizing the event of someone playing the piano as in (32) is easily imagined while the sound being the effect of one's knowing the event of someone playing the piano as in (33) is not. To put it another way, the cause of the sound being one's fantasizing that someone's playing the piano is natural but being one's knowing that someone played the piano is unlikely.

Two other scope relations are also potentially possible for both examples. One of them arises from the derivations illustrated by (30b) and (31b), respectively, the full constructions of which are shown in (34) and (35).

(34) 这 就是 我 想象 张三 弹 钢琴 的 声音
 %zhe jiushi [NP [GaplessCL **Opi**^j wo xiangxiang [Zhangsan t_i tan gangqin] de] shengyin^j]
 this is I imagine Zhangsan play piano DE sound
 'This is the sound which I imagined (pretended/fantasized/visualized) had arisen from his playing the piano.'

(35) 这 就是 我 知道 张三 弹 钢琴 的
#zhe jiushi [NP [GaplessCL **Op**_i^j wo zhidao [Zhangsan t_i tan gangqin] de]
this is I know Zhangsan play piano DE
声音
shengyin^j]
sound
Intended: 'This is the sound which I know arose/arises from his playing the piano.'

(34) and (35) let the CP denote a property and allow it to be correctly composed with the nominal *sound* in semantics, yielding the reading "the sound which has a **property** such that I imagine/know the **proposition** that it arose/arises from his playing the piano." The derivations illustrated in (34) and (35) would also satisfy the syntactic locality condition imposed on the operator-nominal association. Let us start from the interpretation of (34). Huang et. al (2009) deem the interpretation in (34) to be impossible. My impression is that it is not impossible but would require a rather elaborate context to become felicitous. This interpretation seems to be more readily available, for example, if we imagine the following context. Zhangsan is a very promising budding pianist, and his piano teacher is now playing a recording of some famous pianist's performance. The speaker, of course, knows that Zhangsan is not performing in that recording, but he confidently tells the hearer that he can imagine that Zhangsan will produce a piano sound of equally high quality after two more years of training under him with the sentence:

(36) 这 就是 我 想象 张三 两 年 后 弹
 zhe jiushi [NP [GaplessCL **Opⁱ** wo xiangxiang [Zhangsan liang nian hou **t_i** tan
 this is I imagine Zhangsan two year after play
 钢琴 的 声音
 gangqin] de] shengyin^j]
 piano DE sound
 'This is the sound which I imagined (pretended/fantasized/visualized) had arisen from his
 playing the piano two years from now.'

Therefore, I am inclined to consider that the source of the detected difficulty in (34) is pragmatic rather than grammatical in nature. Let me also observe that psychology verbs such as *huiyi* 'recall' also seem to license a similar long-distance reading quite easily, as in (37).

(37) 这 就是 我 回想 张三 弹 钢琴 的 声音
 zhe jiushi [NP [GaplessCL **Opⁱ** wo **huixiang** [Zhangsan **t_i** tan gangqin] de] shengyin]
 this is I **recall** Zhangsan play piano DE sound
 'This is the sound which I recall arose/arises from his playing the piano.'

In addition, the interpretation of (35) might also involve some extra semantico-pragmatic burden, which may require "know" to foreground the complement, elevating its status to something close to assertion in such a way that the sentence will be interpreted almost like involving "I know" as a parenthetical (cf. "John, I know, is honest." Similarly, "I think [he left]" to be interpreted as "John, I think, left," or even almost as "He left."). As suggested by Thomas Grano (p.c.), the degradation of (35) may be due to the pragmatics of *zhidao*, which cannot foreground the

complement as easily as verbs such as *renwei/juede* 'think', *yiwei* 'thought', *cai* 'guess', and *tuice* 'speculate'. These can allow a long-distance reading at least for some speakers as in (38)-(39).³¹

- (38) 这 就是 我 认为 觉得 以为 张三 弹
 %zhe jiushi [NP [GaplessCL Opi^j wo **renwei/juede/yiwei** [Zhangsan ti tan
 this is I **think thought** Zhangsan play
 钢琴 的 声音
 gangqin] de] shengyin]
 piano DE sound
 'This is the sound I think/thought arose/arises from Zhangsan's playing the piano.'

- (39) 这 就是 我 猜 推测 张三 弹
 %zhe jiushi [NP [GaplessCL Opi^j wo **cai/ tuice** [Zhangsan ti tan
 this is I **guess speculate** Zhangsan play
 钢琴 的 声音
 gangqin] de] shengyin]
 piano DE sound
 'This is the sound I guess arose/arises from Zhangsan's playing the piano.'

The contrast between *zhidao* 'know' on the one hand and *renwei/juede* 'think', *yiwei* 'thought', and *cai* 'guess', *tuice* 'speculate/surmise' on the other can also be captured by the example in (40).

- (40) Q: 他 来了 吗
 ta lai-le ma
 he come-PERF SFP
 'Did he come?'
 A: 我 认为 觉得 他 来 了
 wo **renwei/juede** ta lai le
 I **think** he come SFP
 'I think he came.'

31. The difference between *renwei* and *juede* is that *juede* is usually used in an informal context, while *renwei* is used more formally.

A': 我 猜/ 推测 他 来 了
 wo **cai/ tuice** ta lai le
 I **guess speculate** he come SFP
 'I guess/speculate he came.'

A'': 我 以为 他 来 了 其实 他 没 来
 wo **yiwei** ta lai le, (qishi ta mei lai)
 I **thought** he come SFP actually he NEG come
 'I thought he came, (but actually he didn't).'

A''': 我 知道 他 来 了
 #wo **zhidao** ta lai le
 I **know** he come SFP
 'I know he came.'

In (40), *renwei/juede* 'think, *yiwei* 'thought', *cai* 'guess', and *tuice* 'speculate' are permitted in the answer, while *zhidao* 'know' is not, even though the sentence is grammatical. This could be because these words have different degrees of commitment to the proposition they select, with *zhidao* 'know' having the most degree of commitment among them and other words having less degrees of commitment. This may explain their different abilities to foreground the complement and the contrast in acceptability of the long-distance readings in (35) and (38)/(39).³²

32. Note that this contrast in verbs also applies in argument relative clauses. In the following example, while *renwei* 'think' selecting an embedded clause sounds fine at least to some speakers, *zhidao* 'know' within the same structure sounds unacceptable.

- (i). a. 这 就是 我 认为 他 买 的 手机
 %zhe jiushi [NP [ArgRC Op_i^j wo **renwei** [ta mai t_i] de] shouji]
 this is I **think** he buy DE cell phone
 'This is the cell phone that I think he bought.'
- b. 这 就是 我 知道 他 买 的 手机
 #zhe jiushi [NP [ArgRC Op_i^j wo **zhidao** [ta mai t_i] de] shouji]
 this is I **know**he buy DE cell phone
 'This is the cell phone that I know he bought.'

In (i), the head nominal *shouji* 'cell phone' serves as the object of the embedded clause. The anomaly of (b) should be surprising and quite mysterious if we assume that long-distance extraction of variable is allowed in argument relative clauses following Huang at al. (2009) and Huang (2016). On the other hand, if we take into consideration the extra semantico-pragmatic burden involved in this structure and the different abilities of *renwei* 'think' and *zhidao* 'know' in foregrounding the complement as mentioned

Quite importantly, on the other hand, examples (28) and (29) both reject the interpretations to be induced by the derivations as illustrated in (30c) and (31c), which fail to satisfy the locality condition on the operator-nominal association. Their syntactic analyses are indicated in (41) and (42).

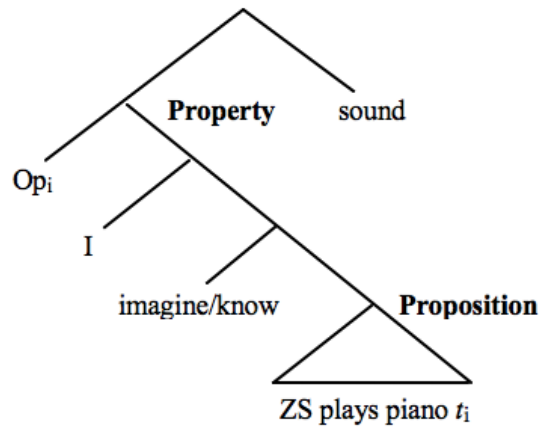
(41) 这 就是 我 想象 他 弹 钢琴 的 声音
 *zhe jiushi [[GaplessCL wo xiangxiang [**Op_i^j** ta t_i tan gangqin] de] **shengyin^j**]
 this is I imagine he play piano DE sound
 Intended: 'This is the sound such that I imagine a **property** of arising from Zhangsan's playing the piano.'

(42) 这 就是 我 知道 他 弹 钢琴 的 声音
 *zhe jiushi [[GaplessCL wo zhidao [**Op_i^j** ta t_i tan gangqin] de] **shengyin^j**]
 this is I know he play piano DE sound
 Intended: 'This is the sound such that I know a **property** of arising from Zhangsan's playing the piano.'

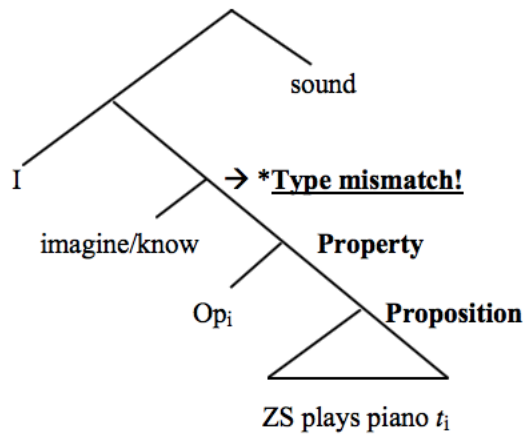
What is note-worthy is that the interpretations that are forced to arise from such derivations would be something like "the sound such that I know/imagine a **property** of arising from Zhangsan's playing the piano." Since the operator is moved only to the periphery of the lower CP, the higher predicate 'know'/'imagine' would be forced to be composed with its complement denoting a property (of type <e,t>) rather than a proposition (of type <t>). This is expected to induce a type mismatch and hence uninterpretability. The contrast between the legitimate semantic composition arising in (34) or (35) and the illegitimate one arising in (41) or (42) can be illustrated in (43):

before, the pattern in argument relative clauses is not that different from that in gapless and content clauses we saw earlier.

(43) a. Legitimate semantic composition in (34)/(35):



b. Illegitimate semantic composition in (41)/(42):



The implication of such an observation is that what has been recognized as a problem induced by the locality condition imposed on the operator-nominal association in the syntax of the gapless clause construction may be reducible to a semantic anomaly.

Now let us return to content clauses. We will focus on the scope relation where the operator originates in the embedded clause in order to show that long-distance extraction is possible when no islands are involved. Compare (44) with the ungrammatical examples in Section 5.1.

(44) a. 这 就是 我 认为/觉得 他 明天 逃 课
 %zhe jiushi [NP [ContCL **Op**_i^j wo **renwei/juede** [ta mingtian t_i tao ke]
 this is I **think** he tomorrow escape class
 的 计划
 de] jihua]
 DE plan
 'This is the plan I think that he skips class tomorrow.'

(44) is grammatical at least for some speakers. On the other hand, similar structure with *zhidao* 'know' does not sound acceptable, as in (45).

(45) 这 就是 我 知道 他 明天 逃 课 的 计划
 #zhe jiushi [NP [ContCL **Op**_i^j wo **zhidao** [ta mingtian t_i tao ke] de] jihua]
 this is I **know** he tomorrow escape class DE plan
 'This is the plan I know that he skips class tomorrow.'

Therefore, content clauses demonstrate the similar pattern with gapless clauses with respect to verbs such as *renwei/juede* 'think' and *zhidao* 'know', which can be attributed to their different abilities to foreground the complement clause.

In Chapter 7, a formal semantic analyses of various constructions involving a prenominal clausal modifier will be proposed, which will nicely dovetail with this speculation, matching what Chomsky (1986) tried to capture as a locality condition imposed on the rule of predication at least in the relative clause construction.

To sum up, this section has provided arguments for the landing site of the empty operator in operator movement. Specifically, the operator needs to be moved to Spec, CP to be locally associated with the head nominal. In Section 5.3.1, I first presented some constructions in English including *tough* constructions, parasitic gap constructions and relative clause

constructions, which much previous literature assumed to involve an empty operator. The empty operator should be in a local position with the antecedent it is coindexed with to be associated. In terms of *tough* constructions and relative clause constructions, Chomsky (1986a) argued that the association is established by the rule of predication and Browning (1987) further specified an agreement chain in the process of predication. In terms of parasitic gap constructions, it is assumed that there is a more general requirement for the association between the operator and the antecedent in the A-bar chain. In Section 5.3.2, I argued that a similar locality restriction can be imposed between the empty operator and the head nominal in gapless and content clause constructions, which provides an alternative explanation for the island effects and the restricted interpretability observed in these constructions.

5.4 Arguments for the nominal status of the operator

Ning argues that the empty relative operator that undergoes movement in relative clauses in Chinese is an adjunct that corresponds to the English single *wh*-adjunct relative operators, i.e., *where*, *when*, *how*, *why*. However, there is evidence from English free relatives which shows that these adjunct relative operators in fact are nominals.

To begin with, Caponigro (2004) and Caponigro and Pearl (2008, 2009) observe that free relatives (FR) can function either as an NP or as a PP, as shown in (46).³³

(46) a. Lily **adores** [FR *where* this very tree grows]. FR = NP

33. To be precise, what Caponigro and Pearl referred to here should be called an adjunct phrase rather than PP. I will, however, summarize their arguments as they are, and keep using the label PP throughout this section even where it is not a precise label. Note also that FR only occurs with the *wh*-phrases *where*, *when*, and *how*. Thus, it cannot support the nominal nature of *why*. I will simply assume that it is also the case with *why* in this dissertation and leave it for future research.

- b. Lily **napped** [FR *where* this very tree grows]. FR = PP
- c. Lily **dreaded** [FR *when* Jack had to go]. FR = NP
- d. Lily **cried** [FR *when* Jack had to go]. FR = PP
- e. Lily **loathes** [FR *how* all thieves work] – secretly. FR = NP
- f. Lily **works** [FR *how* all thieves work] – secretly. FR = PP

Caponigro and Pearl (2008: 4, modified)

In (46a,c,e), the FRs are complement of the verbs *adore*, *dread*, and *loath*, which select NPs. The FRs in (46b,d,f), on the other hand, are occurring with *nap*, *cry*, and *work*, which can be modified by PPs but cannot select NPs denoting place, time or manner. The co-occurring restrictions of these verbs can be confirmed by (47a) and (47b), respectively.

- (47) a. Lily **adores/dreads/loathes** [NP the place]/*[PP *of* the place].
- b. Lily **napped/cried/worked** [PP *on* the sofa]/*[NP the sofa].


Secondly, the gap inside the FR can only be a PP, as demonstrated in (48).

- (48) a. Lily adores [FR *where* this very tree **grows** [PP ____]].
- b. ?*Lily adores [FR *where* Jack **despises** [NP ____]].

In (48a), the verb *grow* inside the free relative clause can be modified by a PP, while in (48b), the verb *despise* can only select an NP object. Such co-occurring possibilities of these verbs can be independently confirmed in (49).


- (49) a. Trees don't **grow** [**PP** *in this garden*].
 b. Jack **despises** [**NP** *this garden*].

Note here that the FR as a whole in (48) is selected by *adore*, which only selects NPs. *Where* as the head of the FR therefore must be analyzed as a nominal. At the same time, however, *where* must be analyzed as a PP within the FR. In order to reconcile this discrepancy, Caponigro and Pearl postulate an adjunct PP headed by a silent P in the gap position inside FR, as shown in (50).

- (50) Lily adores [_{FR} *where_i* this very tree grows [_{PP} [_P \emptyset] [_{NP} *t_i*]]]
- 

In (50), the nominal *wh*-operator *where* is selected by this phonetically empty P head. It then moves from inside the free relative to its periphery, where it is interpreted as the nominal head of the FR. Crucially, this silent P in (50) is generated in syntax instead of being part of the lexically decomposed adjunct operator. Consequently, we can analyze the relative operator *where* as a nominal and let its maximal projection be selected by the transitive verb *adore*.

The syntactic postulation of the silent P in this construction can be independently motivated by the observation that it is sometimes visible, as in (51).

- (51) Jake disliked [_{FR} *where_i* we just ran [_{PP} [_P **past**] [_{NP} *t_i*]]] --it smelled funny.
- 

Caponigro and Pearl (2008: 4, modified)

Caponigro and Pearl also argue that when the FR functions as a PP in the matrix clause, there is another silent P generated in the matrix clause that selects FR, as in (52).

(52) Lily napped [PP [P \emptyset] [FR *where* this very tree grows]].

The syntactic postulation of such a silent P is also motivated when we see that it can also be visible as in (53).

(53) Lily lives [PP [P **near**] [FR *where* we had dinner last night]].

Caponigro and Pearl (2008: 11, modified)

Both FR-external and FR-internal silent Ps can be visible at the same time, as in (54).

(54) Lily lives [PP1 [P1 **near**] [FR *where*_i we have to fly [PP2 [P2 **through**] [NP *t*_i]] on our way to Vancouver]].

Caponigro and Pearl (2008: 11, modified)

Caponigro and Pearl argue that the same observation should be generalized to *wh*-questions.

First, adjunct *wh*-phrases such as *where*, *when*, and *how* can only originate in a PP gap position in a *wh*-question as in (55a), but not in an NP gap position, as in (55b).

(55) a. *Where/when/how* did Lily **nap** [PP ____] ?

Caponigro and Pearl (2008: 13, modified)

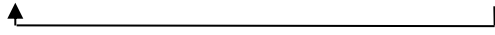
b. **Where/when/how* did Lily despise [NP ____] ?



Caponigro and Pearl (2008: 13, modified)

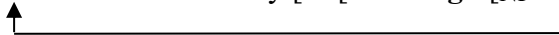
Huang (1982: 536) argues that the PP gap as in (55) should contain a silent P in a sentence, which selects a nominal *wh*-phrase. Such a prepositional head can sometimes show up overtly in *wh*-questions as well, as in (56).

(56) a. *Where* did we just run [PP [P **past**] [NP *t*]]?



Caponigro and Pearl (2008: 13, modified)

b. *Where* do we have to fly [PP [P **through**] [NP *t*]] on our way to Vancouver?



Caponigro and Pearl (2008: 13, modified)

Analyzing the relative pronouns *where*, *when*, and *how* as nominals can also be motivated when we examine the behaviors of "non-*wh*" local, temporal, and manner nominal expressions in English. As observed by Larson (1985), such nominal expressions can occur not only in a PP position as in (57a)-(59a), but also in an NP position as in (57b)- (59b).

(57) a. I went [PP **home**].

Caponigro and Pearl (2008: 2, modified)

cf. I went [PP **to the store**].

b. [NP **Home**] never changes.

Caponigro and Pearl (2008: 2, modified)

cf. [NP **It**] never changes.

(58) a. John arrived [PP **yesterday**].

Larson (1985, 596, modified)

cf. John arrived [PP **in the morning**].

- b. [NP *Yesterday*] was fantastic. Caponigro and Pearl (2008: 2, modified)
cf. [NP *It*] was fantastic.

- (59) a. You pronounced my name [PP *that way*]. Larson (1985, 598, modified)
cf. You pronounced my name [PP *in that fashion*]

- b. [NP *That way*] was not feasible. Caponigro and Pearl (2008: 2, modified)
cf. [NP *That*] was not feasible.

Following Emonds (1987) and McCawley (1998), Caponigro and Pearl assume that when these nominal expressions occur in a PP position, they are selected by a silent P as illustrated in (60).

- (60) You have lived [PP [P \emptyset] *there*].

This analysis permits us to capture the otherwise puzzling dual properties of these nominal expressions, and at the same time indirectly supports the same analysis of the *wh*-expressions observed above. Note that both groups of expressions are limited to those which denote location, time, and manner, as Caponigro and Pearl point out.

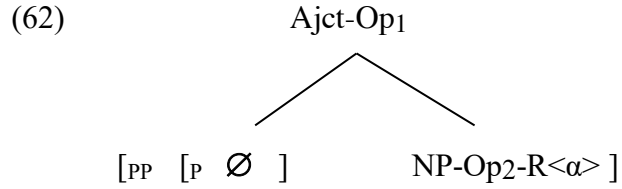
In Chinese as well, there is evidence that the *wh*-expressions meaning *where*, *when* and *how* should be analyzed as nominals. Consider (61) below where the *wh*-expression *nali* 'where' and *shenmeshihou* 'when' can appear as a nominal complement of a preposition.

- (61) a. 张三 一般 在 哪里 修 车
 Zhangsan yiban ??(**zai**) nali xiu che?
 Zhangsan normally **at** where fix car
 'Where does Zhangsan normally fix the car?'
- b. 张三 一般 在 什么时候 跑步
 Zhangsan yiban (**zai**) shenmeshihou paobu?
 Zhangsan usually at when run
 'When does Zhangsan usually go running?'

In (61a), the preposition *zai* 'at' is overt. This shows that *nali* 'where' there should probably be analyzed as an NP rather than a PP. In fact, the sentence sounds quite degraded without the preposition. Similarly, in (61b), the preposition *zai* 'at' can optionally be overt with the *wh*-expression *shenmeshihou* 'when'. This suggests that the analysis of English *wh*-expressions summarized above can be directly extended to Chinese.

Thus, if Ning's insight is on the right track and the empty relative operator in adjunct relative clauses in Chinese corresponds to the English single *wh*-adjunct relative operators like *where* and *when*, we are led to consider that they all are nominal in category. There in fact are several advantages of treating adjunct operators as nominals. One advantage is that we do not need to adopt Ning's complex adjunct operator as in (62) below and hence need not move the entire adjunct operator (Ajct-Op₁) to the periphery of the relative clause and reconstruct it back to the original position, and then move out only the nominal operator (NP-Op₂-R< α >) again at LF,³⁴ as illustrated in (63).

34. Or apply partial LF deletion along the lines of Chomsky's (1995) copy and deletion analysis of reconstruction.



where α is a collection of restrictions. (Ning 1993: 28, modified)

- (63) a. [RC [Ajct-Op1 [P Ø] NP-Op2-R<α>]₁ [... t₁ ...] de] head NP
-
- b. [RC _____ [... [Ajct-Op1 [P Ø] NP-Op2-R<α>]] de] head NP
-
- c. [RC NP-Op2-R<α> [... [Ajct-Op1 [P Ø] t₂] ...] de] head NP²
-

Another important advantage will be clarified in the semantic analysis of various prenominal clauses in Chinese discussed in Chapter 7.

b. Japanese data

[NP [GaplessCL atama-ga yokunaru] **hon**]
 brain-NOM gets better **book**
 'the book **which makes** one's brain gets better (= becomes smarter)'
 (Matsumoto (1997: 48), modified)

c. Korean data

[NP [GaplessCL John-i nemeci n] **tol**]
 John-NOM fell REL **stone**
 'the stone **which made** John fell'
 (Cha (2005:67), modified)

d. Chinese data

中国 没有 铁路 的 历史
 [NP [ContCL Zhongguo meiyou tielu de] **lishi**]
 China no railway DE **history**
 'the history that China did not have railways'

In (2a), the head *lunkuo* 'silhouette' cannot be treated as the result of Zhangsan's dancing. Rather, it can be treated as a component for the dancing event. (2b) and (2c) are data from Japanese and Korean, the head *hon* 'book' and *tol* 'stone' can be seen as the cause for the event of one's getting smarter and that of John's falling, respectively. Finally, in (2d), *lishi* 'history' is characterized by China's lack of railways. In Chapter 7, I will analyze (2d) as a content clause, in which the proposition of China's lack of railways can be treated as the content of the history. I will also identify and classify several different types of head-clausal relations in gapless clauses and content clauses.

Secondly, it is rather questionable if VP2 in (1) (repeated below) can be interpreted as a resultative VP-adjunct as Ning claims.

(1) [NP [GaplessCL **Op**_i ta [VP₁ mai shu] [VP₂ [v Ø_{OBTAIN}] **t**_i] de **qian**_i]
 he sell book DE money

As pointed out by Paul (2008), when two VPs (VP1 and VP2) appear in a sentence as in (3) below, VP2 is interpreted either as a matrix VP, exhibiting what she calls "circumstance" interpretation as in (i), or as an adjunct VP, exhibiting "purpose" interpretation as in (ii).

- (3) 他们 开 会 讨论 那个 问题
 tamen [VP1 kai hui] [VP2 taolun na-ge wenti]
 they hold meeting discuss that-CL problem
 (i) 'They'll discuss that problem holding a meeting.' ("Circumstance" interpretation)
 (ii) 'They'll hold a meeting to discuss that problem.' ("Purpose" interpretation)
 (Paul 2008: 372, modified)

In all of the NPs containing a gapless clause in (4) below, however, none of the alleged VP2s seem to be interpretable as a resultative VP-adjunct (or even as a purpose VP-adjunct).

- (4) a. 他 救 人 的 回 报
 [NP [**O_{pi}** [VP1 ta jiu ren] [VP2 [V \emptyset OBTAIN] *t_i*] de] huibaoi]
 he save person DE reward
 'the reward he obtained by saving the person/people'
- b. 他 唱 歌 的 声 音
 [NP [**O_{pi}** [VP1 ta chang ge] [VP2 [V \emptyset OBTAIN] *t_i*] de] shengyin_i]
 he sing song DE sound
 'the sound he produced while singing'
- c. 他 卖 书 的 钱
 [NP [**O_{pi}** [VP1 ta mai shu] [VP2 [V \emptyset OBTAIN] *t_i*] de] qiani]
 he sell book DE money
 'the money he earned by selling books'
- d. 他 杀 人 的 下 场
 [NP [**O_{pi}** [VP1 ta sha ren] [VP2 [V \emptyset OBTAIN] *t_i*] de] xiachang_i]
 he kill people DE consequence
 'the ignominious consequence he obtained because he killed people'

In fact, when those verbs which Ning considers to have a general meanings of "obtain" (p. 138) appear as the verbal head as in (5) below, VP2 seems to be interpretable only as the matrix VP in each example.

- (5) a. 他 救 人 得到 的 回报
 [NP [(O_{pi}) [VP1 ta jiu ren] [VP2 **dedao** t_i] de] huibao_i]
 he save person **obtain** DE reward
 'the reward he obtained by saving the person/people'
- b. 他 唱 歌 发出 的 声音
 [NP [(O_{pi}) [VP1 ta chang ge] [VP2 **fachu** t_i] de] shengyini]
 he sing song **produce** DE sound
 'the sound he produced while singing'
- c. 他 卖 书 赚 的 钱
 [NP [(O_{pi}) [VP1 ta mai shu] [VP2 **zhuan** t_i] de] qiani]
 he sell book **earn** DE money
 'the money he earned by selling books'
- d. 他 杀 人 得到 的 下场
 [NP [(O_{pi}) [VP1 ta sha ren] [VP2 **dedao** t_i] de] xiachangi]
 he kill people **obtain** DE consequence
 'the consequence he obtained because he killed people'

In short, a phonetically empty "resultative VP-adjunct" does not seem to be an adequate device to capture the interpretations arising in the gapless clause construction.

6.2 Problems with Huang's (2016) complement analysis of gapless clauses

As summarized in Chapter 4, Huang (2016) presents a series of tests which he claims to show that there is a contrast between (argument) relative clauses on the one hand and gapless clauses

and content clauses on the other hand. It led him to claim that relative clauses are adjuncts while gapless clauses and content clauses are complements of nominal predicates. This section will attempt to show that most of those tests are either problematic or insufficient and therefore do not necessarily prove that gapless clauses and content clauses are complements. In addition, I will show that adjunct relative clauses behave very similarly to gapless clauses and content clauses in many respects when we apply the same diagnostic tests. The symmetry between adjunct relative clauses and gapless clauses will further strengthen my argument that gapless clauses are not complements.

6.2.1 Order restriction

First, recall Huang's (2016) argument for the complement analysis of gapless clauses based upon the word order contrast in (2) in Chapter 4 (repeated here as (6)).

(6) a. Argument relative clauses > Gapless clauses

我 所 听到 的	李四 弹 钢琴 的 声音
[ArgRC wo suo tingdao de]	[GaplessCL Lisi tan gangqin de] shengyin
I SUO heard DE	Lisi play piano DE sound
'the sound that arose from Lisi playing the piano that I heard'	

b. #Gapless clauses > Argument relative clauses

李四 弹 钢琴 的	我 所 听到 的 声音
#[GaplessCL Lisi tan gangqin de]	[ArgRC wo suo tingdao de] shengyin
Lisi play piano DE	I SUO heard DE sound
Intended: 'the sound that I heard which arose from Lisi playing the piano'	
(Huang 2016: 469, modified)	

It indeed seems to give rise to awkwardness when a gapless clause is separated from the head

nominal with the intervention of a relative clause as in (6) above. A similar contrast is also observed when an argument relative clause and a content clause are paired as in (7).

(7) a. Argument relative clauses > Content clauses

她 提-出来 的 让 儿子 留学 的 想法
 [ArgRC ta ti-chulai de] [ContCL rang erzi liuxue de] xiangfa
 she proposed DE let son study.abroad DE idea
 'the idea to let her son go study abroad that she proposed'

b. #Content clauses > Argument relative clauses

让 儿子 留学 的 她 提-出来 的 想法
 #[ContCL rang erzi liuxue de] [ArgRC ta ti-chulai de] xiangfa
 let son study.abroad DE she proposed DE idea
 Intended: 'the idea that she proposed to let her son study abroad'

(Huang 2016: 441, modified)

It is not clear, however, whether this order restriction should be ascribed to the complement status of gapless and content clauses. In fact, a similar order restriction can be observed even between argument relative clauses and adjunct relative clauses, as illustrated by the contrast between (8a) and (8b).

(8) a. Argument relative clauses > Adjunct relative clauses

我 听说 的 他 开会 的 地点
 [ArgRC wo tingshuo de] [AjctRC ta kai hui de] didian
 I heard DE he open meeting DE place
 'the place where he had a meeting that I heard of'

b. #Adjunct relative clauses > Argument relative clauses

	他	开	会	的		我	听说	的	地点
#[A]jctRC	ta	kai	hui	de]	[ArgRC	wo	tingshuo	de]	didian
	he	open	meeting	DE		I	heard	DE	place

Intended: 'the place that I heard of where he had a meeting'

Since adjunct relative clauses are traditionally analyzed as adjuncts of NP in syntax, the contrast observed between (8a) and (8b) is unlikely to be reducible to the complement-adjunct distinction. In turn, this suggests that the contrast observed in (6) and (7) may not have originated from the complement status of gapless and content clauses, either.

If the contrasts observed in (6)-(8) were not due to the difference in the syntactic status of the involved prenominal clauses, what gave rise to them? One possibility is that the source of the observed restriction may be semantic and/or pragmatic in nature. Note that the gapless and content clauses seem to play a more essential role in determining the semantics of the head nominal in general compared to the semantic role of the intervening relative clauses. For example, the sound in (6) arose from Lisi's playing the piano, and the identity/content of the head nominal idea in (7) is that she let her son go study abroad. Such semantic coherence may be regarded as the reason why a gapless clause and a content clause need to occur closer to their head nominals. Since gapless/content clauses and their head nominals generally involve such strong semantico-pragmatic cohesion arising from the ontological and/or essential correlation between the two, it seems quite natural that they tend to require direct modification based upon syntactic proximity.

The contrast in (8) can be captured in a similar way based on the different semantico-pragmatic relations holding between the head nominal and each of the two relative clauses, although such a relation involving relative clauses probably does not indicate as strong cohesion

as in the case of gapless and content clause constructions. In (8), the cohesion seems to be stronger between "the reason" and "his not coming" than between "the reason" and "my hearing," which presumably induces the preference for the syntactic proximation between the head nominal and the adjunct relative clause over that between the nominal and the argument relative clause in (8). Since the nominal-clausal coherence in relative clause constructions is not so tight as in the gapless and content clause constructions, their order preference seems to be more strongly controlled by pragmatics, the judgments almost entirely dependent on each language user's perception of the nominal-clausal correlation. For instance, some Chinese speakers I consulted find no significant contrast or preference holding between (9a) and (9b), while some others find a slight preference in two opposite ways.

- (9) a. 我 经常 用 来 修 车 的 我 弟弟
 [ArgRC wo jingchang yong lai xiu che de] [AjetRC wo didi
 I often use come fix car DE I little.brother
 工作 的 车库
 gongzuo de] cheku
 work DE garage
 'the garage where my little brother works, which I often use to fix the car'
- b. 我 弟弟 工作 的 我 经常 用 来
 [AjetRC wo didi gongzuo de] [ArgRC wo jingchang yong lai
 I little.brother work DE I often use come
 修 车 的 车库
 xiu che de] cheku
 fix car DE garage
 'the garage which I often use to fix the car and where my little brother works'

Presumably, for some speakers, it does not express any more meaningful description of a garage in their mind whether one often uses it to fix the car or one's brother works there. On the other

hand, some other speakers find it a little more essential to connect the garage with what is described in either clause.

As suggested by Thomas Grano (p.c.), this line of account of order restrictions may be well matched with the order restriction manifested in prenominal adjectives. As mentioned in Section 2.1.4, an order restriction involving prenominal adjectives is commonly observed among languages (Sproat and Shih 1988, 1991, Scott 1998, 2002), as shown by the English examples in (10).

(10) a. Size > Color

- i. small green vase
- ii. *green small vase

b. Quality > Shape

- i. nice round plate
- ii. *round nice plate

Sproat and Shih (1991: 565)

Many previous studies have argued that the order restrictions are dependent on the semantic nature of the adjectives. For example, some studies argue that the distance of the adjective from the head is based on the subjectivity of the property denoted by the adjectives—less subjective adjectives are closer to the head nominal than more subjective ones (Hetzron, 1978; Hill, 2012; Quirk, Greenbaum, Leech, and Svartvik, 1985). For example, in (10), *small* which denotes the size is more subjective than *green* which denotes the color. This is because the size of an object is relative to the object: a big mouse is a very different size than a big elephant. In contrast, a color refers to a certain range of wavelengths, which should be independent of what the object is. Therefore, size adjectives should be judged less consistent among people than color ones. Other studies have used concepts such as absoluteness or definiteness to explain the order differences,

but all suggest that the order restriction of prenominal adjectives is based on semantic expectations.

Larson's (1998) discussion of individual-level and stage-level adjectives also supports this line of account for the order restriction of prenominals. First, Bolinger (1967) observed that prenominal adjectives have a "characterizing" reading. That is, they denote stable properties of the head nominal, as in (11a). On the other hand, postnominal adjectives denote transitory properties of the head, as in (11b).

- (11) a. the **visible** stars (include Capella, Betelguese, and Sirius) (Bolinger 1967)
b. the stars **visible** (include Capella, Betelguese, and Sirius) (Bolinger 1967)

In (11a), the natural reading of *visible stars* is that they refer to the stars "whose intrinsic brightness makes them visible to the unaided eye—stars of magnitude 5 or brighter on the standard astronomical scale" (Larson 1998: 12). On the contrary, in (11b), *stars visible* refers to those stars "that happen to be visible at present" (Larson 1998: 12).

In addition, Larson notices that prenominal adjectives can show the same distinction as in (12a) (cf. (12b)).

- (12) a. The [**visible** [**visible stars**]] include Capella. (Larson 1998: 12)
b. The [[**visible stars**] **visible**] include Capella. (Larson 1998: 12)

In (12a), there are two stacked prenominal adjectives. The *visible* closer to the noun denotes the inherent visibility of the stars, which corresponds to the intrinsic reading of the prenominal

adjective as in (12b). The *visible* further away from the noun denotes the transitory properties of the head, which is similar to the transitory reading of the postnominal adjective in (12b).

Therefore, both (12a) and (12b) can have the meaning that the intrinsically visible stars including Capella happened to be visible at that time. In addition, this intuition can be supported by (13).

- (13) a. The **invisible visible** stars include Capella (Larson 1998: 12)
b. *The **visible invisible** stars include Capella (Larson 1998: 12)

(13a) is semantically coherent, which can mean that the intrinsically visible stars that happen to be invisible at the time. On the other hand, (13b) is semantically incoherent since it means that intrinsically invisible stars are visible at that time. However, intrinsically invisible stars cannot be visible at any point; otherwise they should not be labelled as invisible stars. Based on the above evidence, Larson (1998) argues that individual-level adjectives should be further away from the head nominal than stage-level adjectives. In short, the ordering restriction of adjectives is based on the semantics of the adjectives. It is reasonable then to assume that prenominal clauses as adjuncts of NP also appeal to semantics in their ordering restriction.

Recall that Huang provides another argument for the complement status of gapless clauses, paying attention to prenominal adjectives. He claims that noun complements including gapless clauses are complements to the head N^0 and no adjectives should be able to occur between the complement and the head. Huang acknowledges that in some cases an adjective can occur between the content clause and the head noun as in (3) in Chapter 4 repeated here as (14). He argues that such an adjective morphologically combines with the head to form a compound noun.

- b. 他 救 人 的 丰厚 的 回报
 [NP [GaplessCL ta jiu ren de] [N' [Adj **fenghou (de)**] huibao]]
 he save people DE **generous DE** reward
 'the generous reward that arose because he saved the person/people'

Therefore, on the one hand, it may be the case that some "adjective+noun" constitutes compounds, since, as we mentioned in Chapter 2, *de*-less adjectives in Chinese can combine with the head nominal either in a lexical or a phrasal level. On the other hand, however, it cannot be used as evidence that gapless clauses are complements since *de*-marked adjectives may as well modify a nominal head even before a content clause or a gapless clause is merged with the head nominal.

The phrasal status of the intervening adjectives can be even more clearly demonstrated by making the adjectives obviously phrasal as in (17), where the adverb *shifen* 'very' is used to modify the adjectives. In these cases, *de* cannot be omitted and so it is not possible for the prenominal modifiers to combine with the heads to form compounds.

- (17) a. 他 作弊 的 十分 可耻 的 下场
 [NP [GaplessCL ta zuobi de] [N' [Adj **shifen kechi *(de)**] xiachang]]
 he cheat DE **very shameful DE** consequence
 'the very shameful consequences that came from his cheating'
- b. 他 救 人 的 十分 丰厚 的 回报
 [NP [GaplessCL ta jiu ren de] [N' [Adj **shifen fenghou *(de)**] huibao]]
 he save people DE **very generous DE** reward
 'the very generous reward that arose because he saved the person/people'

This observation suggests that one cannot appeal to the cohesiveness with a nominal head to argue for the complement status of any clause including gapless clauses and content clauses.

6.2.2 Head nominal restriction

Secondly, this study questions the view that the head nominal of a gapless clause construction needs to be relational and selects a clause expressing an event as its argument. Although it may be the case that *wuban* 'dancing partner' is relational in Huang's example in (18) below, there are other cases where the head is clearly not relational, and yet can license a gapless clause as shown in (19).

(18) *Gapless clauses*:

	张三	跳舞	的	舞伴	
[[GaplessCL	Zhangsan	tiaowu	de]	wuban]	
	Zhangsan	dance	DE	dancing partner	
	'Zhangsan's dancing partner'				(Huang 2016: 443, modified)

(19) *Gapless clauses*:

a.	他	卖	书	的	钱		
[[GaplessCL	ta	mai	shu	de]	qian]		
	he	sell	book	DE	money		
	'the money that was earned by his selling (the) books'						
b.	他	出	车祸	的	那	辆	车
[[GaplessCL	ta	chu	chehu	de]	na	liang	che]
	he	have	accident	DE	that-CL	car	
	'the car he was driving when he had an accident'						

In (19), the heads *qian* 'money' and *che* 'car' do not seem to be relational at all, as Matsumoto (1997: 115) also noted.

Furthermore, these two nouns can certainly occur on their own unaccompanied by any prenominal clause or anything indicative of their being relational, as in (20) below, contrary to the expectation of Zhang (2008) (See (7) in Chapter 4).

- (20) a. 我 喜欢 钱
 wo xihuan **qian**
 I like **money**
 'I like money.'
- b. 我 喜欢 车
 wo xihuan **che**
 I like **car**
 'I like cars.'

In addition, even nouns such as *weidao* 'smell' can occur on their own without the modification of the clause in the right context. For example, in (21), *weidao* does not refer to any special smell in the discourse.

- (21) 因为 他 的 病 他 闻不到 味道 了
 yinwei ta de bing , ta wen-bu-dao weidao le
 because he DE illness he smell-no-arrive smell SFP
 'Because of his illness, he can't sense smells anymore.'

In content clauses such as (22), the head nominals are also not necessarily relational nouns.

(22) Content clauses:

- a. 张三 出 国 的 梦想
 [[ContCL Zhangsan chu guo de] **mengxiang**]
 Zhangsan go abroad DE **dream**
 'the dream that Zhangsan will go abroad'
- b. 张三 离 婚 的 谣言
 [[ContCL Zhangsan lihun de] **yaoyan**]
 Zhangsan divorce DE **rumor**
 'the rumor that Zhangsan got divorced'

The head nominals *mengxiang* 'dream' and *yaoyan* 'rumor' can also occur alone, contrary to Zhang's test, as in (23).

- (23) a. 每个 人 都 要 有 梦想
mei-ge ren dou yao you **mengxiang**
every-CL person all will have **dream**
'Everyone should have dreams.'
- b. 有 一些 人 喜欢 散布 谣言
you yixie ren xihuan sanbu **yaoyan**
have some person like spread **rumor**
'Some people like to spread rumors.'

This shows that the awkwardness of the examples in Zhang (2008) could be because of semantics and pragmatics of the sentences rather than some property of the head nominals. Her tests for relational nominals, therefore, do not support Huang's claim that the head nominal of a gapless clause construction needs to be relational, either.

6.2.3 Iteration restriction

Zhang (2008) and Huang (2016) report their observation that argument relative clauses can be iterated, but gapless clauses cannot, as shown in (8)-(9) in Chapter 4, which are repeated here as (24) and (25) together with some additional examples.

(24) Argument relative clause

- a. 他 发出来 的 令 人 害怕 的 声音
[ArgRC ta fa-chulai de] [ArgRC ling ren haipa de] shengyin
he produce DE cause person afraid DE sound
'the sound that terrified others that he produced'
(Huang 2016: 448, modified)

- b. 长得 高高 的 留着 长 头发 的 对手
[ArgRC zhang-de gaogao de] [ArgRC liuzhe chang toufa de] duishou
grow tall DE keep long hair DE opponent
'the opponent who wears long hair and stands quite tall'
(Huang 2016: 449, modified)

(25) Gapless clauses

- a. 他 弹 钢琴 的 我 拉 小提琴 的 声音
*[GaplessCL2 ta tan gangqin de] [GaplessCL1 wo la xiaotiqin de] shengyin
he play piano DE I play violin DE sound
Intended: 'the sound that arises/arose from my playing the violin and his playing the piano'
(Huang 2016: 448, modified)
- b. 张三 下棋 的 李四 辩论 的 对手
*[GaplessCL2 Zhangsan xiaqi de] [GaplessCL2 Lisi bianlun de] duishou
Zhangsan play-chess DE Lisi debate DE opponent
Intended: 'the opponent with whom Zhangsan played/will play/plays the chess and Lisi debated/will debate/debates'
(Huang 2016: 449, modified)

They claim that this contrast supports their analyses discriminating these two prenominal clauses, the former as adjuncts and the latter as arguments, as summarized in Section 4.1.3.

However, Yoshihisa Kitagawa (p.c.) suggests the examples in (26), which are structurally similar to (25) but are pragmatic felicitous.

- (26) a. 我 用 钢琴 伴奏 的 他 用 小提琴
 [GaplessCL2 wo yong gangqin banzou de] [GaplessCL1 ta yong xiaotiqin
 I use piano accompany DE he use violin
 拉 主 旋律 的 曲调
 la zhu xuanlü de] qudiao
 play main melody DE tune
 'the tune that was performed with his playing the main melody on the violin
 and my playing the accompaniment on the piano'
- b. 我 唱 低 声部 的 他 唱 高
 [GaplessCL2 wo chang di shengbu de] [GaplessCL1 ta chang gao
 I sing low part DE he sing high
 声部 的 美妙 的 和声
 shengbu de] [meimiao de hesheng]
 part DE beautiful DE harmony
 'the beautiful harmony which arose from her singing the higher melody and
 his singing the lower melody'

One possibility is that the unacceptability of (25) is caused by some semantic incongruence of the modification achieved by the two gapless clauses, which does not arise in (26). In the hierarchy of noun modification, the gapless clause closer to the head first combines with the head and thus restricts the meaning of the head. In (25a), for example, the sound is produced by my playing the violin (GaplessCL1). Later, the second gapless clause, i.e., GaplessCL2, combines with the head nominal whose meaning is already restricted by the modification by GaplessCL1. However, it would be contradictory to combine the sound produced by my playing the violin with his playing the piano, thus causing the anomaly. Such a contradiction does not exist in (26) since the tune is produced both by the violin which plays the main melody and the piano which accompanies the violin, and the harmony is produced both by me singing the lower melody and him singing the higher melody. Thus it is pragmatically felicitous for both gapless clauses to

modify the same head in this case. In the same vein, we can also construct other gapless clauses such as (27).

- (27) 西红柿 当 主菜 的 蒜苗
 [GaplessCL2 xihongshi dang zhucan de] [GaplessCL1 suanmiao
 tomato serve as main.ingredient DE garlic.bulb
 当 配菜 的 味道
 dang peicai de] weidao
 serve as side.ingredient DE taste
 'the taste that arises/arose from using the garlic bulbs as the side ingredient
 and tomato as the main ingredient'

In the Chinese stir-fry, some vegetables may be considered as the main ingredients while others as the side ingredients. Thus, (27) can be uttered felicitously to describe the taste of a dish in which tomatoes are used as the main ingredient and garlic bulbs as the side ingredient. No contradiction between the two gapless clauses will arise. More examples of iterated gapless clauses are shown in (28).

(28) Gapless clauses

- a. 他 追求 真理 的 不怕 权贵 的 精神
 [GaplessCL2 tai zhuiqiu zhenli de] [GaplessCL1 proi bu pa quanguai de] jingshen
 he pursue truth DE no afraid authority DE spirit
 'the spirit because of which he is not afraid of the authority and can pursue the truth'
- b. 他 欺骗 员工 的 贪污 公款 的 后果
 [GaplessCL2 tai qipian yuangong de] [GaplessCL1 proi tanwu gongkuan de] houguo
 he cheat staff DE embezzle public funds DE conseq.
 'the consequences that came from his embezzling public funds and cheating the staff'

- c. 他 牺牲 自己的 英勇 救 人 的 回报
 [GaplessCL2 tai xisheng ziji de] [GaplessCL1 proi yingyong jiu ren de] huibao
 he sacrifice self DE brave save people DE reward
 'the reward that came from his bravely saving people and sacrificing himself'

In (28), the gapless clauses modifying the same head are closely related to each other in a relevant event(s). In (28a), his not being afraid of the authority occurs in the course of pursuing the truth, which is driven by a particular spirit. In (28b), his cheating the staff may be a necessary step for embezzling public funds. In (28c), his sacrificing himself is manifested in his bravely saving people. Since the gapless clauses in each case denote closely related event(s), which can be associated with the head nominal altogether, no contradiction will arise. This is in contrast to the allegedly ungrammatical cases in (25), where the gapless clauses are difficult to relate in the absence of any context, and therefore would result in a contradictory interpretation when they modify the same head.

A similar account can be made for content clauses. The following content clauses are iterated and no semantic incongruence arises.

- (29) a. 张三 远渡重洋 的 为 家人
 [ContCL2 Zhangsan; yuanduchongyang de] [ContCL1 proi wei jiaren
 Zhangsan travel.across.the.ocean DE for family
 光宗耀祖 的 梦想
 guangzongyaozu de] mengxiang
 bring.glory.to.ancestors DE dream
 'the dream that Zhangsan brings glory to his family and travels abroad'
- b. 企业 裁减 人员 的 缩减 开支 的 计划
 [ContCL2 qiye; caijian ren yuan de] [ContCL1 proi suojian kaizhi de] jihua
 enterprise cut.down staff DE reduce spending DE plan
 'the plan that the enterprise will reduce the spending and cut down the staff'

6.2.4 Ellipsis restriction

Recall Huang's (2016) argument for the complement status of gapless clauses based upon (10) and (11) in Chapter 4 (repeated below as (30) and (31)), in which the head nominal preceded by a content clause or a gapless clause cannot be elided.

(30) *Content clauses*

- 你 买了 金 表 的 事 比 他 买了
*[[ContCL ni mai-le jin biao de] **shi**] bi [[ContCL ta mai-le
you buy-PERF gold watch DE **fact** than he buy-PERF
钻戒 的 更 夸张
zuanjie de] \emptyset] geng kuazhang
diamond DE more ridiculous
'*The fact that you bought a gold watch is more ridiculous than the one that he
bought diamond.'
(Huang 2016: 451, modified)

(31) *Gapless clauses*

- a. 张三 唱 歌 的 声音 比 李四 哭 的 还
*[[GaplessCL Zhangsan chang ge **de**] **shengyin**] bi [[GaplessCL Lisi ku de] \emptyset] hai
Zhangsan sing song DE **sound** than Lisi cry DE more
难听
nanting.
bad-to-hear
Intended: 'The sound that arises from Zhangsan singing is more horrible than that
from Lisi crying.'
(Huang 2016: 450, modified)
- b. 李四 贪污 的 后果 比 他 逃税 的 更
*[[GaplessCL Lisi tan-wu de] **houguo**] bi [[GaplessCL ta tao-shui de] \emptyset] geng
Lisi embezzle DE **conseq.** than he evade-tax DE more
难忘
nanwang.
unforgettable
Intended: 'The consequences that came from Lisi's embezzlement is more
unforgettable than those from his tax evasion.'
(Huang 2016: 450, modified)

He claims that the head nominal cannot be elided here because it is an N⁰ selecting a content clause or a gapless clause as its complement, and that ellipsis can only target N-bar but not N⁰ or NP. Based upon this analysis, he concludes that not only content clauses but also gapless clauses are complements to nominal predicates. He contrasts these cases with the successful ellipsis of a head nominal following the argument relative clause as in (32), which he analyzes as an adjunct.

(32) *Argument relative clauses*

他 买 的 手表 比 你 买 的 好看
 [[ArgRC ta mai de] **shoubiao**] bi [ArgRC ni mai de] Ø] haokan.
 he buy DE watch than you buy DE good-looking
 'The wristwatch she bought is better looking than the one you bought.'
 (Huang 2016: 451, modified)

As noted by Huang et. al (2009: 226), however, the head nominal cannot be elided in adjunct relative clauses, either, as shown in (33).

(33) *Adjunct relative clauses:*

他 不 能 来 的 原因 我 知 道 了 你 不 能
 [[AjetRC ta bu neng lai de] **yuanyin**] wo zhidao le; [[AjetRC ni bu neng
 he NEG can come DE **reason** I know SFP you no can
 来 的 呢
 lai de] Ø] ne?
 come DE SFP
 'The reason that he cannot come, I know; how about the reason you cannot come?'
 (Huang et. al, 2009: 226, modified)

It therefore seems to be the case that ellipsis of the head nominal is prohibited even after an adjunct clause. In other words, it is unlikely that the problem in (30) or (31) is caused by the complement status of the prenominal clause.

Huang et. al (2009) in fact proposed an account for the inability of the head nominal ellipsis in the adjunct relative clause construction based on the property of the empty operator involved there. More specifically, they claim that the reason why the head nominal cannot be elided after adjunct relative clauses could be because the empty operator needs to be identified by the head nominal in order to be interpreted, and an empty head does not have enough content to identify the operator.³⁵ This account can be easily extended to the analysis of ellipsis in the gapless and content clause constructions if all of them are analyzed as involving an empty operator. That is, the head nominal cannot be elided since it must identify the operator in the prenominal clause.³⁶ On the other hand, since an argument relative clause does not involve an operator but rather direct movement of the head, there is no operator that needs to be identified and head ellipsis is permitted.

35. Alternatively, they mentioned that it could also be possible that the empty operator needs to match with the head in features such as phi-features like person, number, and gender. Since an empty head does not have lexical content, it does not have features. However, if an empty head does not have features, I think it is reasonable to assume that an empty operator also does not have features since it does not have lexical content either. Therefore, I will not adopt this possibility.

36. As will be discussed in Section 6.2.8, when talking about the coordination restriction, some speakers I consulted tolerated head ellipsis in gapless clauses and content clauses. Thus, it seems that such grammatical rule varies among individuals.

6.2.5 Nominalization restriction

According to Huang, argument relative clauses can undergo *de*-nominalization, while gapless clauses and content clauses cannot, as shown by the contrast in (13) and (14) in Chapter 4, repeated here in (34) and (35).

(34) Argument relative clauses

	来	参加	比赛	的	
[NP [ArgRC	lai	canjia	bisai	de]]
	come	participate	race	DE	
	'the ones that came to participate in the race'				(Huang 2016: 453, modified)

(35) Gapless clauses and content clauses

a.

	他	跳舞	的		
*[NP [GaplessCL	ta	tiaowu	de]]	
	he	dance	DE		
	Intended: 'the dancing partner with which he dances/danced'				(Huang 2016, 453, modified)

b.

	李四	杀人	的		
*[NP [ContCL	Lisi	sha-ren	de]]	
	Lisi	kill	DE		
	Intended: 'the fact/news/rumor etc. that Lisi killed a person/people'				(Huang 2016, 453, modified)

In (34), the nominalized relative clause as a whole refers to the missing subject of the verb *canjia* 'participate'. However, in (35) the nominalized relative clause cannot have possible referents such as fact, news, rumor, etc. To explain this, Huang treats *de* in these examples as a nominalizer and a type-shifter of type $\langle\langle e,t\rangle,e\rangle$. He then attributes the above contrast to the different semantic types of argument relative clauses and content clauses. Specifically, argument relative clauses are of type $\langle e,t\rangle$ which can combine with the nominalizer and yield an argument

of type <e>. On the other hand, content clauses or gapless clauses are complements and hence are already referring expressions of type <e> (or events of type <ε>, or propositions of type <s,t>). Therefore, they cannot be type shifted to an argument.

Observe, however, that not only gapless and content clauses but also adjunct relative clauses cannot undergo *de*-nominalization, as in (36).

(36) Adjunct relative clauses

		张三	卖	车	的	不	如
*[NP	[A _{ct} RC	Zhangsan _i	mai	che	de]]	bu	ru
		Zhangsan	sell	car	DE	not	as
		他	租	车	的		好
[NP	[A _{ct} RC	tai	zu	che	de]]	hao	
		he	rent	car	DE	good	

Intended: 'The (place) where Zhangsan sold the car/cars is not as good as the (place) where he rented the car/cars.'

Intended: 'The (time) when Zhangsan sold the car/cars is not as good as the (time) when he rented the car/cars.'

Intended: 'The (way) Zhangsan sold the car/cars is not as good as the (way) he rented the car/cars.'

Intended: 'The (reason) why Zhangsan sold the car/cars is not as good as the (reason) why he rented the car/cars.'

Since adjunct relative clauses are generally treated as relative clauses of type <e,t> just like argument relative clauses, Huang's semantic explanation will face a problem in trying to explain these data. In short, incompatibility with *de*-nominalization does not necessarily reveal the complement status of gapless and content clauses.

6.2.6 *Suo* restriction

As we saw in Chapter 3, Huang (2016) claims that the particle *suo*, a residue of the object relative pronoun from Classical Chinese, can only occur in relative clauses but not in gapless clauses, presenting a contrast between (15) and (16) in Chapter 4 (repeated here as (37) and (38)).

(37) Argument relative clauses

	张三	所	跳	的	舞	
[[ArgRC	Zhangsan	(<i>suo</i>)	tiao	ti	de]	wui]
	Zhangsan	SUO	dance	DE	dance	
	'the dance that Zhangsan did'					

(38) Gapless clauses

	张三	所	弹	钢琴	的	声音
[[GaplessCL	Zhangsan	(* <i>suo</i>)	tan	gangqin	de]	shengyin]
	Zhangsan	SUO	play	piano	DE	sound
	'the sound that arises from Zhangsan playing the piano'					

He states that "the appearance of *suo* implies the existence of an object gap in the relative, but a complement [our gapless clause—YP] is a proposition serving as an argument of the head, thus leaving no room for *suo*." (p. 447)

The use of *suo*, in fact, is quite restricted but not in the way described above by Huang. It can occur in argument relative clauses only when the head nominal is identified as the direct object (or more precisely, as the internal argument) of the predicate as in (37) (Huang et. al 2009).³⁷ It cannot occur when the head nominal is identified with a subject or an indirect object

37. As observed in Jiang (2008), *suo* can also occur with the subject of unaccusative verbs as in (i).

in an argument relative clause, as in (39a) and (39b), respectively. It cannot occur when the head nominal is associated with an adjunct in adjunct relative clauses, either, as in (40).

(39) Argument relative clauses

a. Subject

	所	做	饭	的	保	姆	
[[ArgRC	(* suo)	zuo	fan	de]	baomu]		
	SUO	cook	rice	DE	nanny		
	'the nanny who cooks'						

b. Indirect object

	我	所	送	给	她	花	的	女	孩
[[ArgRC	wo	(* suo)	song-gei	ta	hua	de]	nühai]		
	I	SUO	give	her	flower	DE	girl		
	'the girl to whom I sent the flowers'								

(40) Adjunct relative clauses

	他	所	修	车	的	工	具
[[AjetRC	ta	(* suo)	xiu	che	de]	gongju]	
	he	SUO	fix	car	DE	instrument	
	'the instrument with which he fixed the car'						

(i). 那条 小溪 中 所 飘 过 的 枯叶
 [[na-tiao xiaoxi Zhong ~~ti~~ (**suo**) piao guo de] kuye]
 that-CL small-stream middle SUO float-EXP DE withered-leaf
 'the withered leaves that floated in the river'

In (i), the verb *piao* 'float' is an unaccusative verb and the head *kuye* 'withered leaves' is the subject in the surface structure, which is based-generated as the object of the verb. Therefore, according to Jiang, *suo* is allowed when the head is relativized below vP, i.e., the direct object of ergative verbs or the subject of unaccusative verbs. It is not allowed when the head is relativized above vP, i.e., the subject or adjunct of ergative verbs.

This detail is actually not relevant for my argument here since my purpose is to show that Huang's *suo* argument cannot distinguish complements vs. adjuncts of the head NP.

Suo can occur, in other words, only when the gap identified with the head nominal exists as the internal argument of the predicate within the modifying clause. It then is quite natural that *suo* cannot show up in a gapless clause, which lacks such a gap. (Note that, if my analysis is on the right track, a gap within a gapless clause is created within an Adjunctivizer phrase.) We also note that, as can be seen from the rejection of *suo* in both argument and adjunct clauses in (39) and (40), this restriction has nothing to do with the complement status of the modifying clauses themselves. Therefore, the fact that *suo* cannot occur in gapless clauses does not necessarily show that these clauses themselves are complements as opposed to argument and adjunct relative clauses.

6.2.7 Locality restriction

Huang (2016) also claims that long-distance association between the head nominal and the argument relative clauses is possible, as shown in (41) below, but no such long-distance association is not permitted when a gapless clause is embedded, as shown in (42).

(41) Argument relative clauses

这 就是 我 听说 李四 最 喜欢 的 舞伴
 zhe jiushi [wo tingshuo [Lisi zui xihuan ~~ti~~ de]] **wuban**]
 this is I hear Lisi most like DE **dancing.partner**
 'This is the dancing partner such that I heard that Lisi likes that dancing partner most.'
 (Huang 2016: 449, modified)

(42) Gapless clauses

这 就是 我 听说 李四 跳舞 的 舞伴
 *zhe jiushi [wo tingshuo [Lisi tiaowu de]] **wuban**]
 this is I hear Lisi dance DE **dancing.partner**
 Intended: 'This is the dancing partner such that I heard that Lisi dances/danced with that dancing partner.'
 (Huang 2016: 449, modified)

Recall that, in the argument relative clause construction in (41), the head nominal is analyzed as having moved directly from the embedded relative clause to the head position. Therefore, when the relative clause is predicated of the head nominal in (41), there is a variable-binding relation between the variable and the head nominal. According to Huang, however, the head nominal in a noun complement construction as in (42) needs to be saturated by the complement as a whole and therefore cannot relate to any subpart of it, hence not to any element within an embedded clause.

In Section 5.3, I presented the examples as in (43) and (44) below and argued that such long-distance association involving gapless clauses is possible, in fact in two distinct ways.

(43) Gapless clauses

这 就是 我 想象 他 弹 钢琴 的 声音
zhe jiushi [[GaplessCL **Op_r^j** wo **t_i** xiangxiang [ta tan gangqin] de] shengyin^j]
this is I imagine he play piano DE sound
'This is the (imaginary) sound that arose/arises from my imagining (fantasizing) that he plays/played/will play the piano.'

(44) Gapless clauses

这 就是 我 想象 他 弹 钢琴 的 声音
zhe jiushi [[**Op_r^j** wo xiangxiang [GaplessCL ta **t_i** tan gangqin] de] shengyin^j]
this is I imagine he play piano DE sound
'This is the sound which I imagined (pretended/fantasized/visualized) had arisen from his playing the piano.'

In (43), the head nominal *shengyin* 'sound' is indirectly associated with the embedded gapless clause *ta tan gangqin* "he plays/played/will play the piano" in such a way that the sound arises due to my fantasizing the event of his playing the piano. This yields the interpretation "the sound that arose/arises from my imagining (fantasizing) that he plays/played/will play the piano." In

(44), on the other hand, the head nominal can be associated more directly with the embedded gapless clause and yields the interpretation "the sound which I imagined (pretended/fantasized/visualized) had arisen from his playing the piano." Adopting the proposed operator movement analysis, (43) was analyzed as involving the operator originating in the higher clause. (44), on the other hand, was analyzed as involving the operator originating in the embedded gapless clause and moving to the periphery of the higher clause, in a sense, turning this higher clause into an extended gapless clause.³⁸

In short, I consider that the reported contrast between (41) and (42) is less than trustworthy and falls short of the evidence for the alleged qualitative difference between (argument) relative clauses and gapless clauses, the former being adjuncts while the latter being complements. To the contrary, the proposed operator movement analysis of the gapless clause construction allows us to capture the ambiguous interpretations of the same embedded gapless clause with the two distinct analyses as in (43) and (44).

6.2.8 Coordination restriction

Recall also that Huang (2016) argues that two argument relative clauses can be coordinated. So can two gapless clauses, but an argument relative clause and a gapless clause cannot be coordinated, as shown in (45)-(47).³⁹

38. In fact, I (and several speakers I consulted) find a similar long-distance association between the head nominal and the embedded gapless clause possible in (42) as well. Such speakers also report that they do not find any substantial contrast between (41) and (42). I do not know the exact source of this variability of judgment at this moment, though I am inclined to consider that the semantico-pragmatic factors discussed in Chapter 5 are relevant.

39. Recall that *suo*, a residue of the object relative pronoun inherited from Classical Chinese, has been argued by Huang (2016) to be permitted only in argument relative clauses.

(45) Coordination of two *Argument relative clauses* (= (19) in Chapter 4)

张三 所 发出来 跟 李四 所 听到 的 声音
[[ArgRC Zhangsan suo fa-chulai] **gen** [ArgRC Lisi suo tingdao de] shengyin]
Zhangsan SUO produce **and** Lisi SUO heard DE sound
'the sound that Zhangsan produced and that Lisi heard' (Huang 2016: 447, modified)

(46) Coordination of two *Gapless clauses* (= (20) in Chapter 4)

张三 弹 钢琴 跟 李四 吹 口哨 的 声音
[[GaplessCL Zhangsan tan gangqin] **gen** [GaplessCL Lisi chui koushao de] shengyin]
Zhangsan play piano **and** Lisi blow whistle DE sound
'the sound that arises/arose from Zhangsan playing the piano and Lisi blowing the
whistle' (Huang 2016: 447, modified)

(47) Coordination of *Argument relative clause* & *Gapless clause* (= (21) in Chapter 4)

张三 所 听到 的 跟 李四 吹 口哨 的 声音
*[[ArgRC Zhangsan suo tingdao de] **gen** [GaplessCL Lisi chui koushao de] shengyin]
Zhangsan SUO heard DE **and** Lisi blow whistle DE sound
Intended: 'the sound that Zhangsan heard and arose from Lisi's blowing the whistle'
(Huang 2016: 448, modified)

The problem in (47) is claimed to arise because an (argument) relative clause and a gapless clause involve syntactically and semantically distinct structures, the former being a predicative clause containing a gap and the latter being an argument clause not involving any gap (Huang 2016: 448).

The validity of this argument, however, is questionable. As pointed out by Huang et. al (2009: 231), the conjunction *gen* 'and' can conjoin nominal projections. Although they claim that such nominals must be DemPs, in reality, any identical nominal projections (DemPs, UnitPs or NPs) can be conjoined by *gen*, as shown in (48). (Recall here the internal structure of nominal expressions in (5) in Chapter 2 proposed by Hsu (2013), which I have adopted.)

(48) Coordination of two nominal expressions

- a. 这个 学生 跟 那个 学生
[[DemP zhe-ge xuesheng] **gen** [DemP na-ge xuesheng]]
this-CL student **and** that-CL student
'this student and that student'
- b. 两个 秘书 跟 三个 打字员
[[UnitP liang-ge mishu] **gen** [UnitP san-ge daziyuan]]
two-CL secretary **and** three-CL typist
'two secretaries and three typists'
- c. 秘书 跟 打字员
[NP mishu] **gen** [NP daziyuan]
secretary **and** typist
'a secretary and a typist'

Crucially, however, *gen* cannot conjoin clauses, as shown in (49).

(49) Coordination of two clauses

- 张三 弹 钢琴 跟 李四 吹 口哨
*[Zhangsan tan gangqin] **gen** [Lisi chui koushao]
Zhangsan play piano **and** Lisi blow whistle
Intended: 'Zhangsan played/plays the piano and Lisi blew/blows the whistle.'

This contrast leads us to surmise that, in the grammatical examples (45) and (46), the successfully coordinated elements are two nominal expressions, most likely two NPs, rather than two clauses.⁴⁰ They perhaps involve ellipsis of the head nominal in the first conjunct (and

40. I am grateful for Yoshihisa Kitagawa for pointing out this possibility to me.

accordingly *optional* ellipsis of the prenominal adjunct marker *de* as well), as illustrated in (50) and (51).

(50) Coordination of two NPs involving *Argument relative clauses*

张三 所 发出来 的 声音 跟 李四所 听到 的 声音
 [[NP Zhangsan suo fa-chulai (de shengyin)] gen [NP Lisi suo tingdao de shengyin]]
 Zhangsan SUO produce DE sound and Lisi SUO heard DE sound
 'the sound that Zhangsan produced and the sound that Lisi heard'

(51) Coordination of two NPs involving *Gapless clauses*

张三 弹 钢琴 的 声音 跟 李四吹 口哨 的 声音
 [[NP Zhangsan tan gangqin (de shengyin)] gen [NP Lisi chui koushao de] shengyin]]
 Zhangsan play piano DE sound and Lisi blow whistle DE sound
 'the sound that arises/arose from Zhangsan playing the piano and the sound that
 arises/arose from Lisi blowing the whistle'

As suggested by Thomas Grano (p.c.), if the analysis proposed in (50) and (51) is correct, it can make a semantic predication. On the one hand, according to Huang's analysis, 'the sound that Zhangsan produced and Lisi heard' in (45) refers to one sound described in two ways. On the other hand, according to the proposed analysis, 'the sound that Zhangsan produced and the sound that Lisi heard' in (50) refer to two *distinct* sounds. To test this interpretation, we can use the following sentences in (52).

(52) a. 张三 所 发出来 跟 李四所 听到 的 声音
 [NP Zhangsan suo fa-chulai \emptyset] gen [NP Lisi suo tingdao] de shengyin]
 Zhangsan SUO produce and Lisi SUO heard DE sound
 不 是 一个 声音
 bu shi yi-ge shengyin
 NEG is one-CL sound
 '(The sound) that Zhangsan produced and the sound that Lisi heard are not the same sound.'

- b. 张三 弹 钢琴 跟 李四 吹 口哨 的 声音
 [NP Zhangsan tan gangqin \emptyset] gen [NP Lisi suo tingdao] de shengyin]
 Zhangsan play piano and Lisi blow whistle DE sound
 不 是 一个 声音
bu shi yi-ge shengyin
 NEG is one-CL sound
 '(The sound) that arises/arose from Zhangsan playing the piano and the sound that
 arises/arose from Lisi blowing the whistle are not the same sound.'

Each of (52a) and (52b) involves Huang's example as the subject and the predicate "are not the same sound" specifying the fact that the subject should refer to two sounds. Thus, Huang's analysis will predict that the above sentences are semantically anomalous, while the proposed analysis in (50)-(51) will predict that they are not. Since the sentences sound fine, the test here supports the proposed analysis, under which the subject refers to two sounds involving a conjunction of two NPs.

Now, given the contrast between (45)-(46) and (47), if the ellipsis in (45)-(46) applies in the way described in (50)-(51), it must be the case that this strategy is not available in (47), as illustrated in (53).

(53) Coordination of NP involving *Argument relative clause* & NP involving *Gapless clause*

- 张三 所 听到 的 声音 跟 李四 吹 口哨 的 声音
 [[NP Zhangsan suo tingdao *(de shengyin)] gen [NP Lisi chui koushao de shengyin]]
 Zhangsan SUO heard DE sound and Lisi blow whistle DE sound
 'the sound that Zhangsan heard and the sound that arises/arose from Lisi blowing the
 whistle'

The question is why. One possibility is that backwards ellipsis may not be tolerated when the argument relative clause and the gapless clause constructions are coordinated. In fact, some

speakers I consulted with (and I) tolerate ellipsis applying to the head of the second NP as in (54) below although some speakers still find the ellipsis here somewhat awkward.⁴¹

(54) Coordination of NP involving *Argument relative clause* & NP involving *Gapless clause*

张三 所 听到 的 声音 跟 李四 吹 口哨 的 声音
 [NP Zhangsan *suo* ting-dao de **shengyin**] **gen** [NP Lisi chui koushao de %(**shengyin**)]
 Zhangsan SUO heard DE **sound** **and** Lisi blow whistle DE **sound**
 'the sound that Zhangsan heard and (the sound) that arises/rose from Lisi blowing the whistle'

Interestingly, a contrast similar to that between (53) and (54) can be obtained somewhat more clearly when we reverse the order of the two NPs in such a way that an argument relative clause precedes a gapless clause, as in (55) below. Here, my consultants tolerate the sentences as long as the ellipsis applies forward.

(55) a. Coordination of NP involving *Gapless clause* & NP involving *Argument relative clause*

李四 吹 口哨 的 声音 跟 张三 所 听到 的 声音
 [[NP Lisi chui koushao de **shengyin**] **gen** [NP Zhangsan *suo* tingdao de (**shengyin**)]]
 Lisi blow whistle DE **sound** **and** Zhangsan SUO heard DE **sound**
 'the sound that arises/rose from Lisi blowing the whistle and (the sound) that Zhangsan heard'

41. One speaker indicated that when she heard the first NP *Zhangsan suo tingdao de* 'Zhangsan heard' with the head *shengyin* 'sound' being elided in (53), she did not know what the NP refers to and then thought that it referred to the content of the utterance that Zhangsan heard. Later when she got to the second NP, she realized that the head is *shengyin* 'sound' and so she had to go back and reinterpret the first NP again. I think this gives a good intuitive description as to why these speakers tend not to tolerate backwards ellipsis in this example. For some unknown reason, *de* cannot be omitted when the second NP in (54) is elided.

b. Coordination of NP involving *Gapless clause* & NP involving *Argument relative clause*

李四吹口哨的声音跟张三所听到的声音
[[NP Lisi chui koushao *(de shengyin)] gen [NP Zhangsan suo tingdao de shengyin]]
Lisi blow whistle DE sound and Zhangsan SUO heard DE sound
'the sound that arises/arose from Lisi blowing the whistle and the sound that Zhangsan heard'

In other words, the order of the NPs involving distinct prenominal clauses seems to add another factor.

One thing we should also recall here is the observation made in Section 6.2.4 that head nominal ellipsis is permitted in the argument relative clause construction but is disliked when the prenominal clause involves an empty operator. If the analysis I proposed in (50)-(51) above is on the right track and the ellipsis in question is applying to one of the head nominals in coordinated NPs, we may be able to draw the following generalization about the data examined in this section. That is, ellipsis of the head nominal in question is disliked unless the coordinated NPs are structurally parallel in that both of the clausal modifiers therein involve an empty operator. As discussed above, head nominal ellipsis may also be made difficult for many speakers when it takes place backward irrespective of the type of prenominal clauses involved.⁴²

One prediction that this generalization makes is that coordination of an argument relative clause and an adjunct relative clause should show the similar difficulty for head ellipsis. Consider the coordination in (56) and (57) with the opposite order of an argument relative clause and an adjunct relative clause.

42. Since the observed asymmetry concerns linear order of the ellipsis site and its antecedent, it may not be too far-fetched to consider that some discourse restriction is at work, which is also observed in anaphoric phenomena such as backwards pronominalization.

(56) a. Coordination of NP involving *Argument relative clause* & NP involving *Adjunct relative clause*

我 所 推 荐 的 车 场 跟 他 修 车 的 车 场
[[NP wo suo tuijian *(de chechang)] gen [NP ta xiu che de chechang]]
I SUO recommend DE garage and he fix car DE garage
'the garage where he fixed/fixes the car and the garage that I recommended'

b. Coordination of NP involving *Argument relative clause* & NP involving *Adjunct relative clause*

我 所 推 荐 的 车 场 跟 他 修 车 的 车 场
[[NP wo suo tuijian de chechang] gen [NP ta xiu che de %(chechang)]]
I SUO rcmd DE garage and he fix car DE garage
'the garage where he fixed/fixes the car and (the garage) that I recommended'

In (56), backwards ellipsis is blocked in the first NP; however, many speakers allow ellipsis when it is in the second NP. The reluctance for eliding the head in the second NP among some speakers could be due to the empty operator involved in adjunct relative clauses, which generally does not tolerate an empty head according to Huang et. al (2009). When the order of two relative clauses is reversed in (57), head ellipsis is allowed as long as it is in the second NP.⁴³

43. Some speakers, though, seem to tolerate backwards ellipsis in this construction. For example, Tsai (2008) reports the example in (i), which has the same structure as Huang's "ungrammatical" example (47), regarding it as grammatical.

- (57) a. Coordination of NP involving *Adjunct relative clause* & NP involving *Argument relative clause*

他修车的车场 跟 我所推荐的 车场
 [[NP ta xiu che *(de chechang)] gen [NP wo suo tuijian de chechang]]
 he fix car DE garage and I SUO recommend DE garage
 'the garage that I recommended where he fixed/fixes the car'

- b. Coordination of NP involving *Adjunct relative clause* & NP involving *Argument relative clause*

他修车的车场 跟 我所推荐的 车场
 [[NP ta xiu che de chechang] gen [NP wo suo tuijian (de chechang)]]
 he fix car DE garage and I SUO recommend DE garage
 'the garage where he fixed/fixes the car and that I recommended'

Another predication is that when an adjunct relative clause and a gapless clause are coordinated, ellipsis should be allowed since both types of prenominal clause involves an empty operator similar to the coordination of gapless clauses in Huang. Although the choice of the right head nominal is limited, it may in fact be possible, as in (58).

- (i). Coordination of NP involving *Argument relative clause* & NP involving *Gapless clause*

张三 同时 闻到 妈妈 炒菜 的 跟
 Zhangsan tongshi wendao [NP [GaplessCL mama chao cai de] \emptyset] gen
 Zhangsan simultaneously smell mom fry vegetable DE and
 他 最 怀念 的 味道
 [NP [ArgRC ta zui huainian de] weidao]
 he most miss DE smell

'Zhangsan sensed the smell of Mom's frying vegetables which also was the smell he had missed'

(Tsai 2008, 115, modified)

In (i), the two NPs have an identical head nominal, which is modified by a gapless clause in the first NP, and by an argument relative clause in the second NP. As can be seen, the head of the first NP is elided backward.

- (58) 人们 纪念 他 为 和平 作出 贡献 的 铜像
 [[NP renmen jinian ta wei heping zuochu gongxian (de tongxiang)]
 people commemorate he for peace make contribution DE bronze.statue
 跟 很多 鸽子 驻足 歇息 的 铜像
 gen [NP henduo gezi zhuzu xiexi de tongxiang]
 and many dove stop rest DE bronze.statue
 '(the bronze statue) that was built for people to commemorate his contribution to
 peace and where many doves stop to rest'

It is certainly true that there is an asymmetry between argument relative clauses and gapless clauses, and it still remains to be accounted for how exactly the ellipsis in question is controlled. I hope to have shown, however, that the unacceptability of (47) (repeated below in (59) with Huang's analysis) cannot be ascribed to the mixed coordination of a gapless clause and an argument clause.

(59) Coordination of Argument relative clause & Gapless clause (= (47))

- 张三 所 听到 的 跟 李四 吹 口哨 的 声音
 *[[ArgRC Zhangsan suo tingdao de] gen [GaplessCL Lisi chui koushao de] shengyin]
 Zhangsan SUO heard DE and Lisi blow whistle DE sound
 Intended: 'the sound that Zhangsan heard and arose from Lisi's blowing the whistle'

There is in fact another simple observation that leads me to question the validity of the alleged problem of (59). I found that it is acceptable to conjoin an argument relative clause and a gapless relative clause (rather than the NPs containing them) when we use a different conjunction than *gen*. First, when two clauses are conjoined, *erqie* 'and' rather than *gen* must be used, as shown in (60) (Huang et al. 2009: 231).

- (60) 我 喜欢 他 而且/跟 张三 也 喜欢 他
 [[wo xihuan ta] **erqie/*gen** [Zhangsan ye xihuan ta]].
 I like him **and** Zhangsan also like him
 'I like him and Zhangsan also likes him.' (Huang et. al 2009: 231)

We see then that two clauses, an argument relative clause and a gapless relative clause, can be coordinated successfully with the conjunction *erqie*, as in (61).⁴⁴

(61) Coordination of argument relative clause & gapless clause:

- 好吃 而且 不会 胖 的 甜点
 [NP [[ArgRC t_j haochi] **erqie** [GaplessCL Op_k^i pro t_k bu hui pang de]] tiandian $_j^i$]
 delicious **and** no will fat DE sweet
 'the sweets that are delicious and (when you eat them, you) won't get fat'
 (Huang 2016: 461 modified)

In (61), the first conjunct is an argument relative clause, the head of which is the subject moved to the phrase-final head position, and the second conjunct is a gapless clause which involves an empty operator moved to the periphery of the clause and comes to be associated with the head nominal under our proposed analysis. Grammatical coordination in (61) again undermines the claim that the unacceptability of (47)/(59) arises from the mixed coordination of an argument relative clause and a gapless clause.

To sum up, the coordination arguments based upon the observations on (45)-(47) do not seem to support Huang's claim that gapless clauses must be analyzed as complements.

44. Huang ascribes this example to LaPolla (2012).

6.3 Counter-evidence to the gaplessness tests in Cha (1999)

Analyzing gapless clauses in Korean, Cha (1999) argues that gapless clauses are indeed gapless, unlike argument relative clauses and adjunct relative clauses that contain a gap, and offers several diagnostic tests to make this point. In this section, I will first present Cha's (1999) data and then provide data which suggest that Cha's tests are not sufficient to show that gapless clauses are gapless, at least for the Chinese data.

Firstly, Cha (1999) argues that the ability to insert a resumptive pronoun in the clause implies the existence of a gap. On the one hand, adjunct relative clauses such as (62a) can have a resumptive pronoun as in (62b). On the other hand, no resumptive pronoun seems to be permitted in gapless clauses such as (63).

(62) Adjunct relative clauses

a. [[A_{ject}RC John-i **ti** sakwa-lul kkak-un] **khal_i**]⁴⁵
 John-NOM apple-ACC peel-ADN knife
 'the knife with which John peeled an apple'
 (Cha 1999: 27, modified)

b. [[A_{ject}RC John-i **kukes-ulo_i** sakwa-lul kkak-un] **khal_i**]
 John-NOM *it-with* apple-ACC peel-ADN knife
 'the knife with which John peeled an apple'
 (Cha 1999: 27, modified)

(63) Gapless clauses

a. [[GaplessCL Mary-ka sayngsen-ul kwup-nun] naymsay]
 Mary-NOM fish-ACC grill-ADN smell
 'the smell that arises from Mary grilling fish'
 (Cha 1999: 27, modified)

45. The abbreviations used in the glosses for Korean data are: NOM = nominative case marker; ACC = accusative case marker; DAT = dative case marker; ADN = adnominal marker; TOP = topic marker; DEC = declarative sentence ending.

- b. *[[GaplessCL Mary-ka *kukes* sayngsen-ul kwup-nun] naymsay]
 Mary-NOM it fish-ACC grill-ADN smell
 (Cha 1999: 27, modified)

Secondly, Cha (1999) reports that, in Korean, relative clauses that have a gap such as argument relative clauses and adjunct relative clause can undergo causativization as shown in (64) below while gapless clauses cannot, as shown in (65).

(64) a. Argument relative clauses

- [[ArgRC nay-ka John-eykey mek-**keyha-n**] sakwa]
 I-NOM John-DAT eat-**cause**-ADN apple
 'the apple which I had John eat' (Cha 1999: 28, modified)

b. Adjunct relative clauses

- [[AjctRC nay-ka John-eykey sakwa-lul kkak-**keyha-n**] khal]
 I-NOM John-DAT apple-ACC peel-**cause**-ADN knife
 'the knife with which **I had** John peel an apple' (Cha 1999: 28, modified)

(65) Gapless relative clauses

- *[[GaplessCL nay-ka komwu-lul tha-**keyha-n**] naymsay]
 I-NOM rubber-ACC burn-**cause**-ADN smell
 Intended: 'the smell that arises/arose from me having the rubber burn'
 (Cha 1999: 29, modified)

Cha argues that this contrast arises because the head nominal in each relative clause construction in (64) plays a role in its gap position which was interpretable in the "original" yet-to-be-causativized event. In the gapless relative clause construction in (65), on the other hand, its head nominal was not a constituent of the "original" clause and therefore cannot be related to the new causativized relative clause. This follows, according to Cha, if we consider that the head nominal in the gapless clause construction can be associated with no gap in the modifying clause.

Thirdly, Cha (1999) argues that when a prenominal clause contains a gap, it can form a pseudo-cleft sentence. For example, the adjunct relative clause can form a pseudo-cleft sentence in (66). In contrast, pseudo-cleft sentences cannot be formed by gapless clauses, as shown in (67), which he claims is because gapless clauses do not contain any internal gap.

(66) *Adjunct relative clauses*

[NP [TP John-i sakwa-lu kkak-un kes-un] [VP sakwa-i-ta]
 John-NOM apple-ACC peel-ADN thing-TOP knife-be-DEC

'The thing with which John peeled an apple is a knife, (not other instruments).'

(Cha 1999: 28, modified)

(67) *Gapless clauses*

*[NP [TP komwu-ka tha-nun] kes-un] [VP naymsay-i-ta]
 rubber-NOM burn-ADN thing-TOP smell-be-DEC

Intended: 'What comes from rubber burning is a smell.' (Cha 1999: 28, modified)

I found, however, that all of Cha's tests would face some problems when we try to extend them to Chinese.

First, when applied to Chinese, the test involving resumptive pronouns fails to demonstrate the correlation between the availability of a gap and that of a resumptive pronoun, which Cha claims to exist. Specifically, in the argument relative clause construction in Chinese, when the head is coindexed with the subject or object of the clause as in (68) below, no resumptive pronoun is allowed in these positions. However, it is clear that there is a gap in these positions in this construction, as we have seen in Chapter 3.

(68) Argument relative clauses

a. Subject

她 做 饭 很 好吃 的 保姆
[[ArgRC **ti/*ta** zuo fan hen haochi de] **baomu**]
she make food very good-eating DE nanny
'the nanny who cooks well'

b. Object

保姆 做 它 的 饭
[[ArgRC baomu zuo **ti/*ta** de] **fani**]
nanny make it DE food
'the food that nanny makes'

Second, it is not too difficult to find counterexamples to Cha's causativization test, either. The adjunct relative clause construction in (69) and the gapless clause construction in (70) can be causativized as in (69) and (70), respectively, in both of which the head nominal is interpreted as part of the entire causative event.

(69) a. Adjunct relative clauses

张三 修 车 的 原因
[AjetRC Zhangsan xiu che de] yuanyin]
Zhangsan fix car DE reason
'the reason why Zhangsan fixed the car'

b. 我 让 张三 修 车 的 原因
[AjetRC wo **rang** Zhangsan xiu che de] yuanyin]
I **make** Zhangsan fix car DE reason
'the reason why I had Zhangsan fix the car'

(70) Gapless clauses

- a. 张三 作弊 的 后果
 [[GaplessCL Zhangsan zuobi de] houguo]
 Zhangsan cheat DE consequence
 'the consequences that came from Zhangsan's cheating'
- b. 我 让 张三 作弊 的 后果
 [[GaplessCL wo **rang** Zhangsan zuobi de] houguo]
 I **make** Zhangsan cheat DE consequence
 'the consequences that came from me having Zhangsan cheat'

The gapless clause construction in (71a) below can also be causativized as in (71b).

(71) Gapless clauses

- a. 张三 弹 钢琴 的 声音
 [[GaplessCL Zhangsan tan gangqin de] shengyin]
 Zhangsan play piano DE sound
 'the sound that arose/arises from Zhangsan's playing the piano'
- b. 钢琴 老师 在 课上 让 张三 弹 钢琴 的 声音
 [[GaplessCL gangqin laoshi zai keshang **rang** Zhangsan tan gangqin de] shengyin]
 piano teacher in lesson **make** Zhangsan play piano DE sound
 (i) 'the sound the piano teacher had Zhangsan produce on the piano during
 the lesson'
 (ii) 'the voice with which the piano teacher spoke when directing Zhangsan to
 play the piano in the lesson'

The causativized gapless clause construction in (71b) in fact can be interpreted as the sound that arose from the "original" event that was caused, i.e., Zhangsan's playing the piano, as indicated in (71b-i). (71b) actually has ambiguous interpretation in that the same head nominal can relate to the entire causative event with a reading of an adjunct relative clause. Specifically, it can be interpreted as the voice with which the teacher speaks when directing Zhangsan to play the piano

during the lesson, as shown in (71b-ii). If Cha is correct in claiming that such semantic association is made possible via a gap within the modifying clause, we are led to the conclusion that the gapless clause construction does involve a gap to be associated with the head nominal. In fact, we argued in Section 5.3 that the ambiguity in (71) can be captured by the different positions of the trace of the operator, as shown below:

(71b-i) [[_{GaplessCL} **Op**_i^j gangqin laoshi **rang** [Zhangsan **t**_i tan gangqin] de] shengyin^j
 piano teacher make Zhangsan play piano DE sound

(71b-ii) [[_{AjctRC} **Op**_i^j gangqin laoshi **t**_i **rang** [Zhangsan tan gangqin] de] shengyin^j
 piano teacher make Zhangsan play piano DE voice

Thirdly, when we extend our observation to Chinese, the validity of Cha's pseudo-cleft test for gaplessness also becomes questionable. To begin with, Chinese pseudoclefts usually take the form of equational sentences having a headless relative clause as the background and its missing argument corresponding to the head as the focus of the sentence, as in (72) (Tsai, 1997).

(72) a. 昨天 在 教室 用 扫把 狠狠地 打 晓笛 的 是 阿Q
 [[**[e]**_k zuotian zai jiaoshi yong saoba henhendi da Xiaodi] de] [shi **Akiu**_k]
 yesterday at classroom with broom fiercely beat Xiaodi DE be Akiu
 '(The one) who beat Xiaodi fiercely in the classroom with a broom yesterday is Akiu.'
 (Tsai, 1997: 967, modified)

- b. 昨天 阿Q 在 教室 用 扫把 狠狠地 打 的 是 晓笛
 [[zuotian Akui zai jiaoshi yong saoba henhendi da [e]_k] de] [shi **Xiaodi**_k]
 yesterday Akiu at classroom with broom fiercely beat DE be Xiaodi
 '(The one) who Akiu beat fiercely in the classroom with a broom yesterday is Xiaodi.'
 (Tsai, 1997: 968, modified)

In (72a), *Akiu* is the missing subject in the headless relative clause and in (72b) *Xiaodi* is the missing object. It is true, on the other hand, that the head nominal in the gapless clause construction in Chinese cannot be focalized in the post-copula position in a pseudo-cleft construction, as shown in (73) and (74) below. Their original gapless clauses are shown in the (a) examples.

(73) Gapless clauses

- a. 他 唱 歌 的 童声
 [[GaplessCL ta chang ge de] tongsheng]
 he sing song DE child's voice
 'the child's voice that arises/rose from his singing a song'
- b. 他 唱 歌 的 是 童声
 *[[ta chang ge] de] [shi **tongsheng**]
 he sing song DE be **child's voice**
 Intended: '(the sound) that arises/rose from his singing is a child's voice'

(74) Gapless clauses

- a. 牛排 烧焦 的 糊味
 [[GaplessCL niupai shaojiao de] huwei]
 steak burn DE burning smell
 'the burning smell that arises/rose from steak burning'
- b. 牛排 烧焦 的 是 糊味
 *[[niupai shaojiao] de] [shi **huwei**]
 steak burn DE be **burning smell**
 Intended: '(the smell) that arises/rose from steak burning is a burning smell'

Interestingly, however, not only gapless clauses but also adjunct relative clauses are incapable of forming a pseudo-cleft construction in Chinese. As Tsai (1997) observes, an adjunct cannot appear as a focus in the post-copula position in this construction, as shown in (75).

(75) *Adjunct relative clauses*

- a. 昨天 阿Q 在 教室 狠狠地 打 晓笛 的 是 用 扫把
 *[[zuotian Akiu zai jiaoshi [*e*]_k henhendi da Xiaodi] de] [shi (**yong**) **saoba**]
 yesterday Akiu at classroom fiercely beat Xiaodi DE be **with broom**
 Intended: '(The way) how Akiu beat Xiaodi fiercely in the classroom yesterday is (with) a broom.'
 (Tsai, 1997: 968, modified)
- b. 昨天 阿Q 用 扫把 狠狠地 打 晓笛 的 是
 *[[zuotian Akiu [*e*]_k yong saoba henhendi da Xiaodi] de] [shi
 yesterday Akiu with broom fiercely beat Xiaodi DE be
 在 教室
 (**zai**) **jiaoshi**]
 at **classroom**
 Intended: '(The place) where Akiu beat Xiaodi fiercely with a broom yesterday is (in) the classroom.'
 (Tsai, 1997: 968, modified)

In (75a), *saoba* 'broom' acts as the instrumental adjunct in the headless relative clause, and in (75b), *jiaoshi* 'classroom' is the locative adjunct of the headless relative clause. Neither of them can be focalized in the post-copula position. It is premature, therefore, to conclude that pseudo-clefting in the gapless clause construction is prohibited because no gap exists in the clause. Pseudo-clefting is prohibited even in the adjunct relative clause construction, which is generally analyzed as involving a gap within the clause to be associated with the head nominal.

Moreover, in both the adjunct relative clause construction as in (75) and the gapless clause construction as in (73)-(74) in Chinese, if the missing head of the headless relative is supplied in the form of a general noun, just as the Korean pseudo-clefts in (66) and (67) above

involve *kes* 'thing', both constructions become acceptable, as shown in (76) and (77) below, respectively.⁴⁶

(76) Adjunct relative clauses + general head noun

- a. 昨天 阿Q 在 教室 狠狠地 打 晓笛 的 方式 是
 [[zuotian Akiu zai jiaoshi henhendi da Xiaodi de **fangshi**] [shi
 yesterday Akiu at classroom fiercely beat Xiaodi DE **way** be
 用 扫把
 (yong) saoba]
 with broom

'The way how Akiu beat Xiaodi fiercely in the classroom yesterday is (with) a broom.'
 (Tsai, 1997: 970, modified)

- b. 昨天 阿Q 用 扫把 狠狠地 打 晓笛 的 地点 是
 [[yesterday Akiu yong saoba henhendi da Xiaodi de **didian**] shi
 zuotian Akiu with broom fiercely beat Xiaodi DE **place** be
 在 教室
 [(zai) jiaoshi]
 at classroom

'The place where Akiu beat Xiaodi fiercely with a broom yesterday is (in) the classroom.'
 (Tsai, 1997: 969, modified)

(77) Gapless clause + general head noun

- a. 他 唱 歌 的 声音 是 童声
 [[ta chang ge de] **shengyin**] [shi **tongsheng**]
 he sing song DE **sound** be **child's voice**

'The sound that arises from his singing is a child's voice.'

- b. 牛排 烧焦 的 味道 是 糊味
 [[niupai shaojiao de] **weidao**] [shi **huwei**]
 steak burn DE **smell** be **burning smell**

'The smell that arises from steak burning is a burning smell.'

46. Notice that this is not exactly a pseudo-cleft construction in Chinese but it involves a structure similar to that in Korean pseudo-clefts.

Although I do not have a full analysis for the pseudo-cleft construction in Chinese or the construction in (76)-(77), the parallels between adjunct relative clauses and gapless clauses in their inability to form the former construction and their ability to form the latter construction argue against Cha's claim that his "pseudo-clefting test" shows that gapless clauses do not have any gap.

To sum up, careful examination of Cha's three diagnostic tests leads us to conclude that all of them, in fact, are short of demonstrating true gaplessness of "gapless clauses," permitting us to maintain the proposed operator movement analysis of gapless clauses.

6.4 Implications of ellipsis, nominalization, and pseudo-cleft restrictions

In Section 6.2.4, I have already pointed out the parallel behavior among gapless clause, content clause, and adjunct relative clause constructions in their inability to undergo head nominal ellipsis, contrary to the argument relative construction. Observe again the contrast between (78)-(79) and (80).

(78) a. Gapless clauses

张三	唱	歌	的	声音	比	李四	哭	的	还			
*[[GaplessCL	Zhangsan	chang	ge	de]	shengyin]	bi	[[GaplessCL	Lisi	ku	de]	∅]	hai
Zhangsan	sing	song	DE	sound	than		Lisi	cry	DE		more	
难听												
nanting.												
bad-to-hear												

Intended: 'The sound that arises from Zhangsan singing is more horrible than that from Lisi crying.'
(Huang 2016: 450, modified)

b. Content clauses

你 买了 金 表 的 事 比 他 买了 钻 戒 的
 *[[ContCL ni mai-le jin biao de] **shi**] bi [[ContCL ta mai-le zuanjie de]
 you buy-PERF gold watch DE **fact** than he buy-PERF diamond DE
 更 夸 张
 Ø] geng kuazhang
 more ridiculous

'*The fact that you bought a gold watch is more ridiculous than the one that he bought a diamond.'
 (Huang 2016: 451, modified)

(79) Adjunct relative clauses:

他 不 能 来 的 原 因 我 知 道 了 你 不 能
 *[[NP1 [ta bu neng lai de] **yuanyin**] wo zhidao le; [NP2 [ni bu neng
 he NEG can come DE **reason** I know SFP you no can
 来 的 呢
 lai de] Ø] ne?
 come DE SFP

Intended: 'The reason that he cannot come, I know; how about the reason you cannot come?'
 (Huang et. al 2009: 226, modified)

(80) Argument relative clauses:

他 买 的 手 表 比 你 买 的 好 看
 [[ArgRC ta mai de] **shoubiao**] bi [ArgRC ni mai de] Ø] haokan
 he buy DE watch than you buy DE good-looking

'The wristwatch she bought is better looking than the one you bought.'

In addition, I showed that adjunct relative clauses parallel with gapless clauses and content clauses in their ability to undergo nominalization in Section 6.2.5, as repeated here in (81) and (82).

(83) Argument relative clauses:

来 参加 比赛 的
[NP [ArgRC lai canjia bisai de]]
come participate race DE
'the ones that came to participate in the race'

(Huang 2016: 453, modified)

Finally, I believe that this asymmetrical ellipsis restriction can also explain different abilities to form pseudo-clefts between argument relative clauses and all other prenominal clauses in Chinese, which we discussed in Section 6.3 in dealing with Cha's diagnostic tests for gaplessness. As noticed by Tsai (1997), the pseudo-cleft construction in Chinese involves a parallel syntactic structure with a headless relative clause construction, in which the argument/adjunct missing from the sentence is indicated as the focus of the sentence in the post-nominal position, as in (84) and (85) below.

(84) Head-less pseudo-cleft involving argument relative clauses

昨天 在 教室 用 扫把 狠狠地 打 晓笛 的 是 阿Q
[[[e]_k zuotian zai jiaoshi yong saoba henhendi da Xiaodi] de Ø] [shi Akiu]_k]
yesterday at classroom with broom fiercely beat Xiaodi DE be Akiu
'(The one) who beat Xiaodi fiercely in the classroom with a broom yesterday is Akiu.'

(Tsai, 1997: 967, modified)

(85) Head-less pseudo-cleft involving adjunct relative clauses:

昨天 阿Q 用 扫把 狠狠地 打 晓笛 的 是
*[[yesterday Akiu [e]_k yong saoba henhendi da Xiaodi] de Ø] [shi
zuotian Akiu with broom fiercely beat Xiaodi DE be
教室
jiaoshi]_k]
classroom

Intended: '(The place) where Akiu beat Xiaodi fiercely with a broom yesterday is the classroom.'

(Tsai, 1997: 968, modified)

Similarly to adjunct relative clauses, gapless clauses and content clauses cannot form pseudo-clefts, as shown in (86).

(86) a. Head-less pseudo-cleft involving gapless clause

他 唱 歌 的 是 童 声
 *[[ta chang ge de] Ø] [shi **tongsheng**]
 he sing song DE be **child's voice**

Intended: '(The sound) that arises/arose from his singing is a child's voice.'

b. Head-less pseudo-cleft involving content clause

吃 香蕉 能 得 肺炎 的 是 谣 言
 *[[chi xiangjiao neng de feiyan de] Ø] shi **yaoyan**]
 eat banana can get pneumonia DE is **rumor**

Intended: 'It is a rumor that eating bananas can cause pneumonia.'

The above contrast shows that argument relative clauses can form a pseudo-cleft without an overt head nominal, while all other prenominal clauses cannot form such a construction.

However, if an overt head nominal is added in the form of a generic (or at least less specific) noun to the headless construction in (85) and (86), they then become grammatical, as shown in (87) and (88).

(87) Pseudo-cleft involving adjunct relative clauses:

昨天 阿Q 用 扫把 狠狠地 打 晓笛 的 地点 是
 [[yesterday Akui yong saoba henhendi da Xiaodi de **didian**] shi
 zuotian Akiu with broom fiercely beat Xiaodi DE **place** be
 教室
jiaoshi]
classroom

'The place where Akiu beat Xiaodi fiercely with a broom yesterday is the classroom.'

(Tsai, 1997: 969, modified)

(88) a. *Pseudo-cleft involving gapless clauses:*

他 唱 歌 的 声 音 是 童 声
[[ta chang ge de] **shengyin**] shi **tongsheng**]
he sing song DE **sound** be **child's voice**
'The sound that arises from his singing is a child's voice.'

b. *Pseudo-cleft involving content clauses:*

吃 香蕉 能 得 肺炎 的 消息 是 谣言
[[chi xiangjiao neng de feiyan de] **xiaoxi**] shi **yaoyan**]
eat banana can get pneumonia DE **news** be **rumor**
'The news that eating bananas can cause pneumonia is a rumor.'

In (87) and (88), *didian* 'place', *shengyin* 'sound', and *xiaoxi* 'news' are added to the "headless" prenominal clauses as their generic head nominals. The contrast between (85)-(86) and (87)-(88), in other words, can be considered to have arisen from the restriction imposed on the head nominal ellipsis in adjunct relative clause, gapless clause, and content clause constructions, again demonstrating the contrast between all of these prenominal clauses and argument relative clauses. This in turn also demonstrates the syntactic parallelism among the former group of prenominal clauses.

As discussed in Section 6.2.4, Huang et. al (2009) attribute the ellipsis restriction in the adjunct relative clause construction to the involvement of an empty operator there. According to them, an empty operator needs an antecedent, i.e., a head nominal which can provide its identity. An empty head nominal, however, does not have enough content to identify the operator, hence the ungrammaticality of the sentence arises. If this reasoning indeed is pertinent to the issue in question, we are led to consider that adjunct relative clauses, gapless clauses, and content clauses all involve an empty operator, which needs to be associated with the head nominal, as proposed in this study.

7. Semantics of prenominal clausal modifiers in Chinese

In this chapter, I will first offer my observations about the categorization of different relations holding between the head nominal and the modifying clause. I will then provide formal semantic analyses of adjunct relative clauses, gapless clauses, content clauses, and argument relative clauses in Chinese.⁴⁷

7.1 Different relations between the head and the modifying clause

The previous literature offers very limited data on the interpretations of the gapless clause construction. In order to obtain a fuller picture of its semantics, this study includes a greater variety of data on different kinds of gapless clauses. I recognize at least six major types of semantic relations holding between the head nominal and the gapless clause that modifies it.

In the first type, the head nominal is interpreted as the *effect* of the eventuality denoted by the modifying clause, as exemplified in (1).

- (1) a. 张三 弹 钢琴 的 声音
 [NP [GaplessCL Zhangsan chang ge de] **shengyin**]
 Zhangsan play piano DE **sound**
 'the sound that **arises/arose from** Zhangsan's playing the piano'
- b. 张三 做 饭 的 味道
 [NP [GaplessCL Zhangsan zuo fan de] **weidao**]
 Zhangsan cook rise DE **smell**
 'the smell that **arises/arose from** Zhangsan's cooking a meal'

47. I am grateful to Yoshihisa Kitagawa for navigating my way through the approach presented in this chapter and Thomas Grano for his help with formalization of the semantic analyses.

- c. 张三 救 人 的 回报
 [NP [GaplessCL Zhangsan jiu ren de] **huibao**]
 Zhangsan save people DE **reward**
 'the reward that **was given/provided for** Zhangsan's having saved the person/people'
- d. 张三 作弊 的 下场
 [NP [GaplessCL Zhangsan zuobi de] **xiachang**]
 Zhangsan cheat DE **consequence**
 'the consequences that **arose from** Zhangsan's cheating'
- e. 张三 接受 工作 的 心情
 [NP [GaplessCL Zhangsan jieshou gongzuo de] **xinqing**]
 Zhangsan accept job DE **mood**
 'the mood that **arose** when Zhangsan accepted the job'

In (1), for example, the head nominal *shengyin* 'sound' represents the concrete result of the event of Zhangsan's playing the piano. In (1), the head nominal *xinqing* 'mood' is a state of mind that arose as a consequence of the event of Zhangsan's accepting a job. I will use the expression "effect" as a cover term to refer to all such concrete and abstract consequences that come into existence due to the realization of the eventuality denoted by the gapless clause as its cause.

In the second type, the head nominal is interpreted as the *cause* of the eventuality denoted by the modifying clause in (2).

- (2) a. 张三 追求 真理 的 探究心
 [NP [GaplessCL Zhangsan zhuiqiu zhenli de] **tanjiuxin**]
 Zhangsan pursue truth DE **inquisitive.mind**
 'the inquisitive mind **that urged** Zhangsan to pursue the truth'

- b. 张三 活 下去 的 勇气
 [NP [GaplessCL Zhangsan huo xiaqu de] **yongqi**]
 Zhangsan live down DE **courage**
 'the courage **that let** Zhangsan continue living'

It should be pointed out, however, that this type of relation is less frequently found than others in the gapless clause construction in Chinese. My impression is that it can only be found with certain head nominals that denote purely mental properties such as (X-)*xin* 'heart/mind', *jingshen* 'spirit', or *yongqi* 'courage'. In most other cases, it is rather difficult for the gapless clause to be licensed under such an interpretation, as observed in (3) below. In (3), even the somewhat abstract nominal *guanai* 'love' is not felicitously modifiable.

- (3) a. 张三 活 下去 的 家长 的 关爱
 *[NP [GaplessCL Zhangsan huo xiaqu de] [NP **jiazhang de guanai**]]
 Zhangsan live down DE **parent DE love**
 Intended: 'the parents' love **which motivated** Zhangsan to continue living'
- b. 张三 活 下去 的 至理名言
 *[NP [GaplessCL Zhangsan huo xiaqu de] **zhilimingyan**]
 Zhangsan live down DE **maxim**
 Intended: 'the maxim **which inspired** Zhangsan to continue living'

However, cross-linguistically, this kind of gapless clause seems to be prevalent, as illustrated by the Japanese and Korean examples in (4) below, although its counterpart is noticeably awkward in Chinese as shown in (5).⁴⁸

48. Such a cross-linguistic contrast was first observed by Matsumoto (1988, 1997).

(4) a. [NP [GaplessCL atama-ga yokunaru] **hon**]
 brain-NOM gets better **book**
 'the book **which makes** one's brain get better (= become smarter)'
 (Japanese data from Matsumoto (1997: 48), modified)

b. [NP [GaplessCL John-i nemeci n] **tol**]
 John-NOM fell REL **stone**
 'the stone **which made** John fall' (Korean data from Cha (2005:67), modified)

(5) a. 头脑 变 聪明 的 书
 *[NP [GaplessCL tounao bian congming de] **shu**]
 head become smart DE **book**
 Intended: 'the book **which makes** one's brain get better'
 Matsumoto (1988: 233 modified)

b. 他 摔倒 的 石头
 *[NP [GaplessCL ta shuaidao de] **shitou**]
 he fell DE **stone**
 Intended: 'the stone **which made** him fall'

This cross-linguistic observation suggests that there is nothing inherently wrong with establishing the semantic relation in question between the head nominal and a gapless clause, and that there may be a language-particular factor that discourages it in Chinese. In Section 7.2.5, I will provide my conjecture on this restriction, which is peculiar to the gapless clauses in Chinese.

In the third type of semantic relation between the head nominal and the gapless clause, the head nominal represents some *attribute* of the eventuality denoted by the modifying clause as in (6).

(6) a. 张三 说话 的 耿直
 [NP [GaplessCL Zhangsan shuohua de] **gengzhi**]
 Zhangsan speak DE **candidness**
 'the candidness **with which** Zhangsan speaks'

- b. 张三 做 事 的 完美
 [NP [GaplessCL Zhangsan zuo shi de] **wanmei**]
 Zhangsan deal with thing DE **perfection**
 'the perfection **with which** Zhangsan deals with things'

In (6), the event of Zhangsan's speaking was realized in a frank way. In (6), the event of Zhangsan's dealing with things was realized in a perfect way.

In the fourth type of semantic relation, the head is a *component* of the eventuality of the clause as in (7). In other words, the head nominal and the eventuality demonstrate a part-whole relationship.

- (7) a. 张三 跳舞 的 动作/姿势
 [NP [GaplessCL Zhangsan tiaowu de] **dongzuo/zishi**]
 Zhangsan dance DE **movement/gesture**
 'the movements/gestures **with which** Zhangsan dances'
- b. 张三 学 鸟 叫 的 声音
 [NP [GaplessCL Zhangsan xue niao jiao de] **shengyin**]
 Zhangsan learn bird chirp DE **voice**
 'the voice **with which** Zhangsan mimicked birds' chirps'

In (7a), the event of dancing involves some movements/gestures. In (7b), the event of mimicking birds' chirps involves some particular voice.

In the fifth type, the head nominal seems to indicate the measure(ment), magnitude, extent, degree and the like of the eventualities.

- (8) a. 张三 崇拜 老师 的 程度
 [NP [GaplessCL Zhangsan chongbai laoshi de] **chengdu**]
 Zhangsan admire teacher DE **extent**
 'the extent **to which** Zhangsan admires the teacher'
- b. 张三 出 国 的 频率
 [NP [GaplessCL Zhangsan chu guo de] **pinlü**]
 Zhangsan go.out country DE **frequency**
 'the frequency **with which** Zhangsan travels abroad'
- c. 张三 处理 事情 的 效率
 [NP [GaplessCL Zhangsan chuli shiqing de] **xiaolü**]
 Zhangsan deal with things DE **efficiency**
 'the efficiency **with which** Zhangsan deals with things'

In (8a), the event of admiration can be measured with its extent. In (8b), the event of traveling abroad can be quantified using its frequency. In (8c), the event of dealing with things can be measured by its efficiency.

In the sixth type of semantic relation, the gapless clause describes the content of the head nominal, as shown in (9).

- (9) a. 张三 成功 的 信心/梦想/渴望/计划
 [NP [ContCL Zhangsan chenggong de] **xinxin/mengxiang/kewang/jihua**]
 Zhangsan succeed DE **belief/dream/desire/plan**
 'the belief/dream/desire/plan that Zhangsan succeeds'
- b. 中国 没有 铁路 的 历史
 [NP [ContCL Zhongguo meiyou tielu de] **lishi**]
 China no railway DE **history**
 'the history that China did not have railways'

In (9a), the proposition of Zhangsan's going abroad is the content of Zhangsan's belief, dream, desire, or plan. In (9b), the proposition of China's not having railways is the content of the

history. In other words, the history is characterized by China's lack of railways. This kind of gapless clause is appositive in function but has generally been regarded as a complement clause. As will be clarified further with a semantic analysis below, I will call these "content clauses," and assimilate them to other gapless clauses, extending the proposal made by researchers like Kratzer (2006) and Moulton (2009, 2013, 2015).

In the semantic analyses to be proposed in the following sections, I will divide the above six categories into two kinds. The first kind involves content clauses in which the head nominal stands in a relation with *the proposition denoted by the modifying clause* (as in the sixth case just described above). The second kind involves the first five categories of the gapless clause construction examined above, in which the head nominal is interpreted as *the effect, cause, attribute, component, or degree* of the eventuality of the gapless clause. I will argue that each of the two kinds involves a distinct semantic derivation. Moreover, as we will see later, adjunct relative clauses will be subsumed under the second kind involving eventuality.

7.2 Two kinds of semantic derivations

7.2.1 Proposition cases (Content clauses)

I will develop a semantic analysis of "content clauses" based on the proposal made by Kratzer (2006) and Moulton (2009, 2013, 2015), among others. They claim that when CPs are combined with such nominals as *rumor, belief, story, claim, or assumption*, either as their predicate or complement, they do not denote propositions but rather properties of individuals that carry propositional content. This kind of individuals are referred to as 'content nouns'. In this section, I will first review the concept of content nouns and how content nouns are semantically composed with CPs. I will also make a digression to discuss the arguments for treating content clauses as

adjuncts of NPs in the literature, which points out certain deficiencies in the standard arguments which treat content clauses as complements of the head nominal. Finally, I will adjust the Kratzer-Moulton semantic account and provide the semantic derivation of content clauses in Chinese, assimilating them to other types of prenominal gapless clauses.

7.2.1.1 Content nouns

It was traditionally assumed that the clausal complements selected by verbs such as *believe* and *mention* denote propositions (cf. Hintikka 1969).

(10) John **believes/mentions** [_{CP} that Bob is a fraud].

For example, in (10), the CP can be seen to denote what John believes or mentions, i.e., the proposition that *Bob is a fraud*.

However, it has been argued that this view is too simple (Potts 2002, Moulton 2009, 2013, 2015). Consider the examples in (11) involving the clause-taking NPs.

(11) [_{DP} The **idea/myth/story/rumor/fact**] is [_{CP} that Bob is a fraud].
(Higgins 1973, modified)

According to Potts (2002), the DP subject and the CP in (11) are *equative*, i.e., what the CP denotes, the DP subject also denotes. Therefore, if we follow the traditional idea mentioned above, both of them should denote propositions. However, Moulton claims that the DP subjects cannot refer to propositions because they have properties that do not belong to propositions. For

example, *stories* can be long and boring (*he told us a long and boring story that...*); *ideas* can come into existence at particular times (*he had an idea that...*); and *rumors* can be mean and spread among people (*they spread a mean rumor that...*). On the other hand, propositions, i.e., sets of possible worlds, do not have these properties: they cannot be boring or mean, nor can they be spread among people. Therefore, it could not be the case that the subjects in (11) denote propositions.

Moulton (2009) provides another argument that the DPs in question cannot denote propositions. He points out that we can say that rumors and proposals are false, but they nonetheless remain actual rumors and proposals. In other words, the *content* of the rumor or proposal can be false, but the rumor or proposal itself is real. If rumor and proposal denote propositions, we cannot make this distinction.

According to Moulton (2009: 20), content nouns seem to define or be associated with propositional content. For example, in (12) below, a story might describe what was happening in imaginary worlds or the real world.

(12) The **story** *says/claims/shows* that Mary is the guilty one.

In (12), the predicates *say*, *claim*, and *show* indicate that the CP *Mary is the guilty one* describes the content of the subject, i.e., the story. This suggests that nouns such as *story* carry content.

Under this theory, we can divide nouns into two kinds. On the one hand, there are ordinary nouns that denote or are predicated of ordinary individuals. For example, "apple" is predicated of one individual apple in some world as shown in (13), where *x* is the individual argument and *w* is the world argument.

$$(13) \quad [[\text{apple}]] = \lambda x.\lambda w.\text{apple}(x)(w)$$

On the other hand, content nouns denote or are predicated of contentful individuals that refer to a set of propositions in an evaluation world. The semantic composition is shown in (14), where x_c indicates a "contentful" individual argument (cf. Moulton 2013).

$$(14) \quad [[\text{idea}]] = \lambda x_c.\lambda w.\text{idea}(x_c)(w) \quad (\text{Moulton 2015: 312})$$

In (14), *idea* takes an individual argument and a world argument. It is predicated of an individual idea in a world.⁴⁹

Now let us move on to the semantics of the CP in the equative structure in (11). Moulton argues that if the predication in (11) is equative and if the DP does not denote propositions as we discussed above, then it follows that the CP does not denote propositions either. Following Hacquard (2006), Kratzer (2006, 2012, 2013), Moulton (2009, 2013, 2015) claims that CPs in fact denote contentful individuals just like content nouns, both of which are of the type $\langle e, st \rangle$. This explains why they are in an equative relation in (11).

49. Note that Moulton's term "content noun" actually only includes non-derived nouns, which excludes nominalizations of clause-taking verbs such as *claim*, *assumption*, or *proof*, since these nouns' semantic composition is not exactly the same as that of non-derived nouns. As shown in (i), nominalizations also involve an event argument inherent to the verb root as shown in (i).

(i). $[[\text{noun claim}]] = \lambda x_c.\exists e.\lambda w.\text{claim}(x_c)(e)(w)$ (Moulton, 2009: 41, modified)

In (i), the event variable is bound by existential closure \exists .

However, since according to him both kinds of nouns are predicated of contentful individuals that have propositional content, I will not distinguish these two types of nouns and use "content nouns" to refer to both types.

In the semantic composition of CPs, in order to let the individuals acquire the content from the CPs, Kratzer (2006) proposes the $\text{CONT}(x_c)$ function which links the contentful individuals predicated by the CP to their propositional content as shown in (15).

$$(15) \quad \text{CONT}(x_c)(w) = \{w' : w' \text{ is compatible with the intentional content determined by } x_c \text{ in } w\}$$

(Moulton 2015: 312, after Kratzer 2013:195, (25))

The CONT function takes a contentful individual at an evaluation world and returns a set of possible worlds that are compatible with the content of that individual.

Kratzer (2006) suggests that the complementizer C holds the CONT function. In other words, the role of the complementizer is to say that the content of some individual is the proposition. The semantics of the complementizer is shown in (16).

$$(16) \quad [[C]] = \lambda x_c. \lambda w. \lambda p [\text{CONT}(x_c)(w) = p] \quad (\text{Moulton 2015: 312, after Kratzer 2006, modified})$$

In (16), the complementizer C takes a contentful individual, an evaluation world, and a proposition, and identifies this proposition with the propositional content of the individual. (17) demonstrates an example sentence of the semantics of CP.

$$(17) \quad [[\text{that Bob is a fraud}]] = \lambda x_c. \lambda w. \text{CONT}(x_c)(w) = \lambda w'. \text{Bob is a fraud in } w'$$

The CP in (17) denotes a set of individuals whose content is the proposition that Bob is a fraud. It is of type $\langle e, st \rangle$. Then the CP needs to be combined with a content noun. Since both the CP

and the content noun are predicated of propositions and are of the same type $\langle e, st \rangle$, they can be combined via Intensional Predicate Modification, as shown in (18).

(18) [[idea that Bob is a fraud]] = $\lambda x_c. \lambda w$ [idea(x_c)(w) & [CONT(x_c)(w) = $\lambda w'$. Bob is a fraud in w']]
(Moulton 2015: 313)

The semantic composition in (18) combines a set of ideas in a world with a set of the individuals whose content is that Bob is a fraud. As a result, the combined set denotes a set of ideas in a world whose content is that Bob is a fraud.

7.2.1.2 Arguments against a complement approach

In this section, I will make a digression to discuss the arguments in the literature for treating content clauses as predicates or modifiers of nominals. I will also introduce the arguments reported in the literature which point out the deficiencies of the standard claim that content clauses are complements, i.e., internal arguments of nominal predicates. The conclusion we reach at the end will be in line with the observations made in the earlier chapters that content clauses in Chinese behave on a par with gapless clauses and adjunct relative clauses which are treated as adjuncts instead of complements of the head nominal.

The first two pieces of evidence come from Grimshaw's (1990) observations regarding the properties of clause-taking nouns. First, clause-taking nouns that can take CP "complements" as in (19a), (20a), (21a) cannot take DP complements as in (19b), (20b), (21b).⁵⁰

50. Note that this does not mean that these nouns cannot take any DP argument, as in (i).
(i). [The belief of [_{DP} John]] was gradually accepted by people around him.

- (19) a. John's belief [**CP that Edna left**]
 b. *John's belief of [**DP that idea**] (Moulton 2009: 45, modified)
- (20) a. John's claim [**CP that Edna left**]
 b. *John's claim of [**DP something**] (Moulton 2009: 45, modified)
- (21) a. John's thought [**CP that Edna left**]
 b. *John's thought of [**DP that**] (Moulton 2009: 45, modified)

Another related piece of evidence is from the contrast between argument-structure nominals (ASNs) and non-argument-structure nominals (NASNs), the latter of which includes object nominals. As suggested by their names, NASNs do not take arguments, such as *belief* and *assignment*, while ASNs do, such as (22). Importantly, Grimshaw (1990) observes that ASNs demonstrate more verbal characteristics than NASNs. For example, ASNs can take Aktionsart modifiers like their verbal roots when their internal argument is filled, as in (22).

- (22) a. The Romans **destroyed** the city [**in three hours**]. (Moulton 2015: 315, modified)
 b. the total **destruction** [**DP of the city**] [**in three hours**]
 c. *the total **destruction** [**in three hours**]

In (22a), the verbal root *destroy* is telic since it can be modified by "in three hours." In (22b), the nominalization *destruction* shows the same telicity. However, (22c) cannot take the Aktionsart modifier. The difference between (22b) and (22c) is that *destruction* takes an internal argument in (b) but not in (c).

In (i), *John* is the external argument of *belief*. Kratzer (1996) does not treat external arguments as the arguments of the verb root, i.e., *believe*, which is added by Voice heads. The examples discussed here only involve internal arguments.

In contrast, clause-taking nouns show a different pattern. They cannot take the same Aktionsart modifier as their verbal roots even when they take a CP "complement," as in (23b) and (24b).

- (23) a. John **claimed** [**for years**] [_{CP} *that the earth was flat*].
b. *John's **claim** [**for years**] [_{CP} *that the earth was flat*]
(Moulton 2015: 316, modified)

- (24) a. I **explained** [**in under an hour**] [_{CP} *that I was innocent*].
b. *my **explanation** [_{CP} *that I was innocent*] [**in under an hour**]
(Moulton 2015: 316, modified)

In (23) and (24), the verbal roots, i.e., *claim* and *explain*, are atelic and telic, respectively.

However, their nominalizations cannot take the same Aktionsart modifiers even when they take a CP "complement." This suggests that these nominals are NASNs and not ASNs.

The above examples show that nominals that take a CP "complement" have different properties than the nominals that can take DP arguments. Taking these differences into account, Moulton (2009, 2013, 2015) argues that it is reasonable to assume that the nominals that take CPs cannot take arguments. In other words, the CPs are not the arguments of the nominals. Instead, they are modifiers and combine with the NP via Predicate Modification, as discussed earlier.

The third piece of evidence that content clauses are not arguments of nouns comes from Grimshaw (1990), who observes that true arguments cannot be separated from their selecting nouns by a copula. Compare the genitive phrases *John's* and *building's* in (25) and (26).

Program (Chomsky 1995), in which the content clause is copied with the *wh*-phrase from its original position as the object of VP. *John* in the content clause in the original position is bound by *he*, thus violating Condition C, which requires the R-expression to be free.

However, it has also been reported that the above observation is not robust (Postal 1997, Kuno 1997, 2004, Safir 1999, Lasnik 1998, 1999, McCarthy 2004, Landau 2007). Consider the example in (28) with the context where there does not show a violation of Condition C.

- (28) Context: Professor C. is well-known for being resistant to reviewers' suggestions and criticisms. One proposal in Professor C's most recent submission was uniformly rejected by the reviewers, although they each had very different arguments against it. Professor C, surprisingly, changed his proposal.

The journal editor wondered [*which reviewer's argument that **Professor C's**_i proposal was flawed*] **he**_i ended up accepting. (Moulton 2009: 60, modified)

(28) essentially involves the same structure as (27): the *wh*-phrase moves to the Spec, CP of the embedded clause selected by *wonder*. The *wh*-phrase contains a content clause which has an R-expression *Professor C* coindexed with the pronoun *he* in the main clause. Unlike (27), however, the coindexation in (28) is acceptable and no Condition C violation seems to be induced.

(29) shows more examples of the same structure, which are considered to be acceptable in the previous literature.

(29) Content clauses

- a. Which psychiatrist's view that **John**_i was schizophrenic did **he**_i try to get expunged from the trial records? (Kuno 2004: 335)
- b. Whose allegation that **John**_i was less than truthful did **he**_i refute vehemently? (Kuno 2004: 335)
- c. How many arguments that **John's**_i theory was correct did **he**_i publish?

The examples in (29) all involve content clauses yet are considered acceptable in the literature. Therefore, we need to account for the difference between the acceptable examples in (28) and (29) and the unacceptable one in (27). Moulton assumes that there are at least two confounding factors that result in the instability of Condition C in content clauses. The first confounding factor involves a discourse perspective (Kuno 1997, 2004). The second one involves individuation of content clauses (Jacobson 2004: 27-28ft10).

Let us first look at the concept of discourse perspective in Kuno (1997, 2004). According to him, the sentences in (30) represent a direct discourse perspective.

- (30) a. **John_i** said, "**I_i** am a genius." (Kuno 2004: 329)
b. John said to **Mary_j**, "**You_j** are a genius." (Kuno 2004: 329)
c. John said about **Mary_j**, "**Mary_j/She_j** is a genius." (Kuno 2004: 329)

(30) involves direct quotations, which Kuno calls logophoric complements. The NPs of the logophoric complement refer to the corresponding NPs in the main clause. For example, the first person pronoun *I* refers to *John* in (30a) and the second person pronoun *you* refers to *Mary* in (30b). (30c) is different from (30a-b) in that the NP in the logophoric complement in (30c) can be a full NP *Mary* or a pronoun *she* referring to *Mary*, whereas the NP in (30a-b) can only be the first or second person pronoun.

Moreover, Kuno argues that the NP of the logophoric complement in (30) either refers to the speaker or to the hearer of the proposition that the logophoric complement represents. That

is, *I* is coreferential with *John*, who is the speaker of the proposition "I am a genius." *You* is coreferential with *Mary*, who is the hearer of the proposition "You are a genius." On the other hand, *Mary/she* in (30c) refers to *neither* the speaker *nor* the hearer of the proposition "Mary/she is a genius."

Moreover, the direct discourse perspective in (30) can also be expressed as indirect discourse perspective as in (31).

- (31) a. **John_i** said that **he_i** was a genius.
b. John said to **Mary_j** that **she_j** was a genius.
c. John said about **Mary_j** that **she_j** was a genius.

(Kuno 2004: 329)

In addition, according to Kuno, sentences with complements that do not have direct discourse counterparts are also logophoric complements which include thoughts and feelings as in (32).

- (32) **John_i** thinks that **he_i** is a genius.

Hypothetical Structure: [**John_i** thinks, "**I_i** am a genius."]

(Kuno 2004: 329)

In (32), the sentence with the mental state verb *think* represents an indirect discourse perspective. Although it does not have a corresponding structure representing the direct discourse perspective, Kuno claims that it can have a hypothetical structure with the direct discourse perspective as indicated in (32). This is an important assumption since many content clauses involve NPs denoting mental states such as beliefs, ideas, or thoughts.

Crucially, Kuno claims that the difference in the acceptability of the content clauses between (27) and (28)-(29) can be explained based on the direct discourse perspective. Compare now the ungrammatical (33a-b) and the acceptable (33c) with the indicated binding relations.

- (33) a. *Which claim that **A_i** had defeated Lea did **he_i** later admit he made? (Safir 1999(63))
- b. *The remark that **Churchill_j** was vain was often made to **him_i**. (Kuno 2004: 330)
- c. The journal editor wondered which reviewer's argument that **Professor C's_i** proposal was flawed **he_i** ended up accepting. (Moulton 2009: 60)

Crucially, their hypothetical direct discourse representations along the line (32) can be represented as in (34).

- (34) a. **A_i** made the claim, "**I_i** defeated Lea."
- b. People often made to **Churchill_j** the remark "**You_j** are vain."
- c. The reviewer made the argument about **Professor C_j**, "**Professor C's/his** proposal was flawed."

We will look at the sentences in (34) individually. First, (30) patterns with (34a) repeated here as (35).

(35) **John_i** said, "**I_i** am a genius."

In both (34a) and (35), the first person pronoun *I* in the logophoric complement is coindexed with the speaker of the proposition. In (34a), A1 can be seen as the author or the originator of the claim (Moulton 2009), and in (35), John is the speaker of the proposition "I am a genius."

Second, (34b) patterns with (30) repeated here as (36).

(36) John said to **Mary_j**, "**You_j** are a genius."

In both cases, the second person pronoun *you* in the embedded complement is coreferential with the NP, which is the hearer of the proposition.

Finally, (34c) patterns with (30) repeated here as (37) below.

(37) John said about **Mary_j**, "**Mary_j/She_j** is a genius."

The NP *Mary/she* in the embedded clauses in (37) is coreferential with *Mary* in the main clause, who is *neither* the speaker *nor* the hearer of the proposition "Mary is a genius." Similarly, the NP *Professor C* or the pronoun *he* in the embedded clause in (34c) refers to the NP *Professor C*, who is *neither* the speaker *nor* the hearer of the proposition "Professor C's proposal was flawed."

Kuno claims that a Condition C violation is seemingly induced in the content clause if, in their hypothetical direct discourse representation, the NP in the logophoric complement is coreferential with either the speaker or the hearer of the proposition. Alternatively, no Condition

C violation is induced if the NP in the logophoric complement is coindexed with neither the speaker nor the hearer of the proposition.

This hypothesis can also explain other aforementioned examples of content clauses that seem to be less straightforward, as repeated in (38).

- (38) a. *Which claim that Mary had offended **John_i** did **he_i** repeat? (Moulton 2009: 54)
- b. Which psychiatrist's view that **John_i** was schizophrenic did **he_i** try to get expunged from the trial records? (Kuno 2004: 335)
- c. Whose allegation that **John_i** was less than truthful did **he_i** refute vehemently? (Kuno 2004: 335, modified)
- d. How many arguments that **John's_i** theory was correct did **he_i** publish? (Safir 1999: ft1, modified from Barss 1986)

(38a) is repeated from (27a), where the coindexation between the R-expression and the pronoun is invalid. (38b)-(38d) are repeated from (29a)-(29c), where the coindexation is allowed. Their asymmetry can be reflected in their hypothetical discourse representations in (39).

- (39) a. **John_i** repeated the claim, "Mary had offended **me_i**."
- b. **John_i** try to get expunged from the trial records the psychiatrist's view, "**John_i/he_i** was schizophrenic."
- c. **John_i** refuted the allegation vehemently, "**John_i/he_i** is less truthful."
- d. **John_i** published the argument, "**John's_i/his_i** theory is correct."

In (39a), the NP in the logophoric complement is coreferential with *John*, who is the speaker of the proposition "Mary had offended me." On the other hand, in (39b)-(39d), the NPs in the

logophoric complement are not coreferential with either the speaker or the hearer of the proposition. That is, the view, arguments, and allegation are about John. This is essentially the same as the direct discourse perspective in (37).⁵¹

To sum up, I have shown that Condition C seems may not be violated in (27), and Kuno's observation that logophoricity has the potential to play a role, though what exactly is the source of his observation and how exactly it can be incorporated into the formal analysis is unclear.

In addition, Moulton (2009) discusses another factor that induces the variability of judgments involving the Condition C effect in content clauses, which was first pointed out by

51. Based on this, Kuno claims that Condition C is not the appropriate explanation for the asymmetry of the coindexation of the R-expression in content clauses and relative clauses. He modifies Condition/Principle C as shown in (i).

(i). Principle C': An R-expression is barred from receiving coreferential interpretation vis-à-vis a c-commanding non-anaphor NP in either A- or A'-position.

N.B. Principle C' does not apply to the reconstructed portion of the LF representation. (That is, in a theoretical framework in which the binding theory applies to syntactic structures rather than LF representations, Principles A' and B' apply cyclically, and Principle C' applies post-cyclically.)

(Kuno 2004: 338)

According to (i), Condition/Principle C does not apply when the R-expression is copied or reconstructed to its original position at LF. Therefore, in (38a) repeated below as (iia), Principle C does not apply to the lower copy of John inside VP. Whether the coindexation is acceptable or not is due to its hypothetical direct discourse representation. In this case, since John can be seen as the speaker of the claim as shown in (iib), the coindexation is ruled out and the sentence is ungrammatical.

(ii). a. *Which claim that Mary had offended John_i did he_i repeat [Which claim that Mary had offended John_i]?

b. John_i repeated the claim, "Mary had offended me_i."

However, Kuno's view seems to be based upon his misunderstanding of Chomsky's approach to reconstruction under the copy theory of movement. What is involved in (iia), for example, is overt movement. That is, the in-situ *wh*-phrase within TP is duplicated and pasted in Spec-CP. At PF, the original copy is entirely deleted. At LF, the original copy in-situ is interpreted and induces the reconstruction effect. Then, relevant portions of both original and pasted copies are deleted.

Jacobson (2004: 27-28 ft10). Jacobson observed that most, if not all, of the allegedly ungrammatical cases require us to "individuate" a single instance of the content nouns, for example, the content noun *claim* in (40) (=27)).

(40) *Which claim that Mary had offended **John_i**; did **he_i** repeat? (Moulton 2009: 54)

This question asks the hearer to singularize one claim concerning Mary offending John. However, it is hard to imagine a context where multiple claims with the same content are made, as Moulton (2009: 59) puts it in (41).

(41) The problem traces back to the fact that these question words – *which x* – require the individuation of x's, such as individual claims or arguments. Now, while it is not difficult to individuate claims and arguments in general (even with relative clauses added to them), it requires a richer context to individuate claims that have the same content.

This can account for the reason why it is difficult to create the right context for (40) even when the interpretation is allowed by discourse. In this spirit, I changed the head from "claim" to "reason" with a little tweak of the verb in (40), since I think it is easier to create a context where different reasons concerning the same content are allowed. As shown in (42), the sentence improves dramatically, as expected.

(42) Context: Mary is a journalist who is well-known to speak bluntly. One day, several people rumored that she offended a senator named John in an interview. However, the rumors were different in how exactly Mary offended him. Some person said that Mary offended John because she mentioned his ex-marriage, while other people mentioned other reasons. In a later TV show, the senator clarified the reason why Mary offended him. My co-worker didn't see the show but was curious about what reason he said. Knowing that I saw the show, she came to me and asked "

Which reason why Mary had offended **John_i**; did **he_i** clarify?

In (42), different reasons are presupposed in the background concerning the same rumor. The question is asking to identify (individuate) one reason. Thus, no Condition C violation exists.

Moulton (2009) provides more examples where the individuation of the content noun *claim* is plausible as shown in (43).

- (43) a. *Which witness's claim* that **Mary_i** was at the scene of the crime did **she_i** try to have stricken from the record? (Moulton 2009: 60)
- b. *Which justice's argument* that **Mr. B_i** was within his right to protest the cutbacks did **he_i** refer to in his speech? (Moulton 2009: 60)

It is comparatively easy to imagine multiple witnesses' claims concerning Mary being at the scene of the crime and multiple arguments regarding Mr. B's having the right to protest.

Therefore, the sentences are more easily accepted.

To sum up, if we remove the two confounding factors just discussed, it is possible to show that content clauses may also evade the Condition C effect in a way similar to relative clauses.⁵²

52. It has been observed that there is a bleeding effect of Condition C for adjuncts, as shown in (i).

(i). [Which claim [CP that offended John_i]] did he_i repeat? (Safir 1999: 589(1))

In other words, the claim that content clauses should be distinguished from relative clauses and analyzed as complements of the head nominals does not seem to be well-founded. In turn, it opens up the possibility that content clauses can be analyzed as adjuncts rather than as arguments. In fact, if one ascribes the absence of the Condition C violation in the relevant example, e.g., (43), to the adjunct status of the CPs in question, one would be led to opt for such an analysis. Thus, while I will refrain from pursuing the exact source of the evasion of the Condition C violation in question, I will at least renounce the view that the content clauses must be analyzed as complements or arguments.

7.2.1.3 Semantic derivation of content clauses

In the following discussion, I will adopt the Moulton-Kratzer analysis of content nouns incorporating the CONT function; see (15) above. However, the approach I will propose differs from theirs in two respects. First, I do not use the complementizer (*de* in Chinese) as the host of the CONT function. Instead, I will postulate what I call an empty "adjunctivizer" as the host of this function. The adjunctivizer will select a nominal operator, which will trigger predicate abstraction by its movement and turn the CP into a predicate. Second, I extend the Moulton-Kratzer analysis to nominal phrases containing gapless clauses and adjunct relative clauses,

In (i), the *wh*-phrase at the periphery contains an argument relative clause. The R-expression *John* inside the argument relative clause can be bound by the pronoun *he* as the subject of main clause. Since the sentence is grammatical, there is no Condition C violation induced.

Previous literature proposes a theory of late-merge for relative clauses (Lebeaux 1988, Chomsky 1995, Fox 1999, Fox and Nissenbaum 1999), as shown by the LF structure in (iib) based on the copy theory of Minimalist Program.

(ii). Argument relative clause-late-merger

[Which claim] [_{CP} that offended **John**_i] did **he**_i repeat [Which claim]?

In (ii), the *wh*-phrase is copied from the original position, which remains in-situ at LF. Crucially, according to the theory of late-merge, the relative clause is not present in the copy of the *wh*-phrase in the original position because it is late-merged with the higher copy after movement. Thus Condition C will not be violated since there is no R-expression in the copy in the original position.

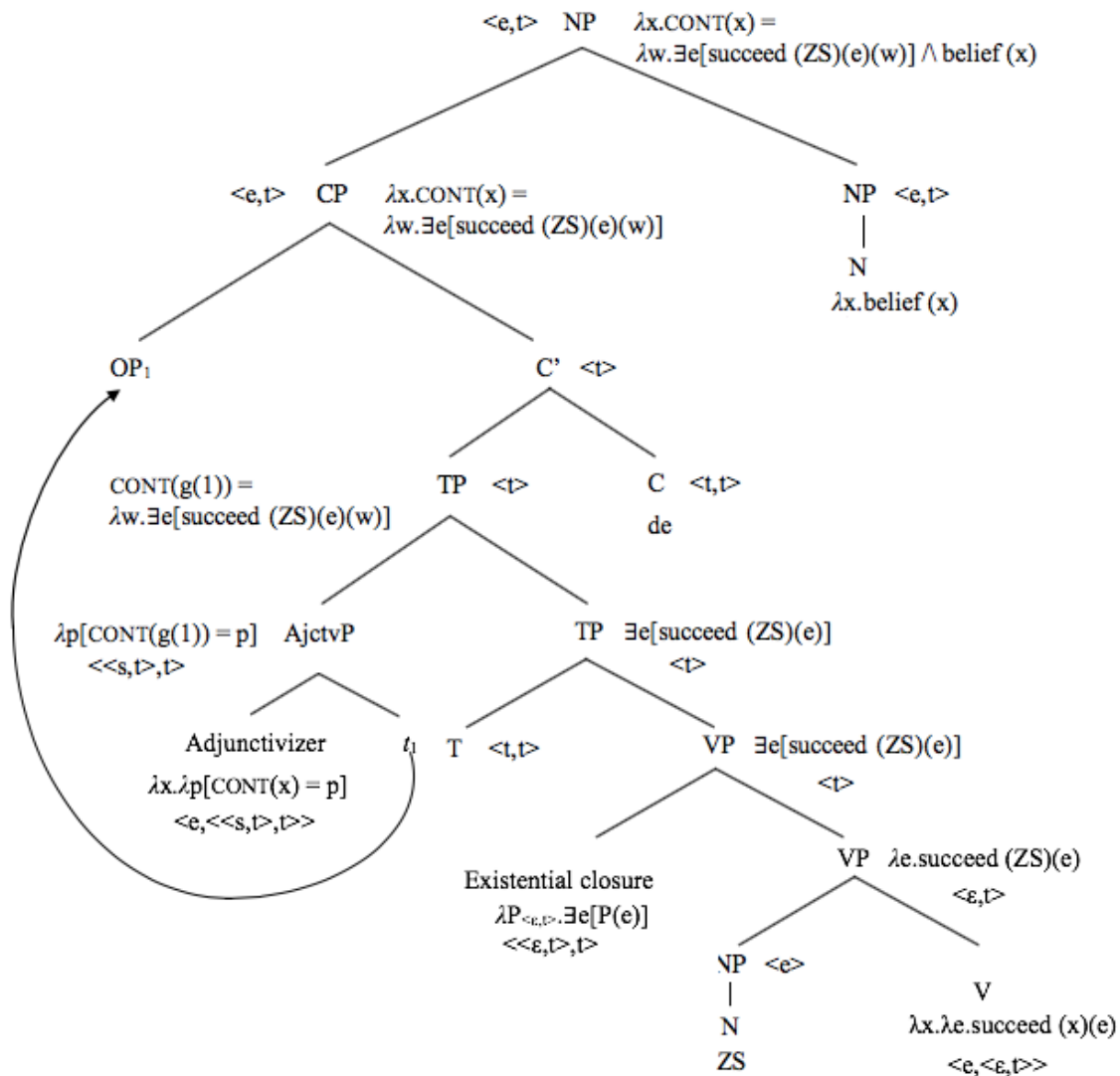
where the head nominal is related to the eventuality of the modifying clause. The semantic derivation of this kind of gapless clause construction can also be computed using the tool of an empty adjunctivizer and a nominal operator.⁵³

Let us first propose the semantic derivation of the content clause, taking (44) below as an example. (45) illustrates the syntax-semantics mapping of this construction.

53. In the following semantic analysis, I will not deal with modality and aspect. Accordingly, the world argument and event argument of the content noun will be suppressed.

- (44)
- | | | | | | | |
|-------------|-----------------|---------|----------|-----------|-----|---------------------|
| | 张三 | 成功 | 的 | 信心 | | |
| [NP [ContCL | Op_i^j | t_i | Zhangsan | chenggong | de] | xinxin_i^j |
| | Zhangsan | succeed | DE | belief | | |
- 'the belief that Zhangsan succeeds'

(45) Syntax-semantics mapping of content clauses



Following Davidson's event semantics (1967), I assume that verbs take a covert event argument because they are predicates of events, which denote sets of events. For example, *succeed* denotes a predicate which is true of an event if it is a succeeding event. In (45), the verb *succeed* takes an

individual argument and a covert event argument. It is of type $\langle e, \langle \varepsilon, t \rangle \rangle$ (ε denoting an event), and selects the agent *Zhangsan* (type $\langle e \rangle$) via Functional Application and returns a VP of type $\langle \varepsilon, t \rangle$. Following event semantics, I assume that the lower VP denotes an eventuality description, i.e., the set of succeeding events whose agent is *Zhangsan*.⁵⁴ Then the operation of existential closure introduces the existential operator \exists to bind the event variable and return a truth value (type $\langle t \rangle$). Since my analysis does not deal with tense, aspect, or modality, I ignore here the semantic contribution of T and treat it as semantically vacuous. I therefore let existential closure return a truth value (type $\langle t \rangle$) and use VP to denote it.⁵⁵ Thus, this higher VP is true if and only if there is an event of *Zhangsan* succeeding. The lower TP then inherits the value of the higher VP. Next, I need to turn the truth value into a proposition since the modifying clause is related to the head and describes its propositional content. This mapping is achieved by a covert Adjunctivizer Phrase (AjctvP). Adjunctivizer as the head of this phrase holds the function CONT, which eventually allows the content of the individual *belief* to be spelled out by the propositional content provided by the clausal modifier. Therefore, the AjctvP in this case has higher scope than the existential closure over events.⁵⁶ In order for the Adjunctivizer Phrase to select a proposition, Intensional Functional Application needs to be applied. This rule first introduces a world argument and turns the truth value into a proposition (type $\langle s, t \rangle$). However, this procedure is

54. I adopt the VP Internal Subject Hypothesis in this dissertation (Kuroda 1988, Fukui and Speas 1986, Kitagawa 1986, Koopman and Sportiche 1985, 1988, Contreras 1987). Note that I put the subject in the base position before it moves to TP for the sake of the simplicity for my semantic analysis. Since *Zhangsan* is not a quantifier, it does not matter which scope it takes in the tree, which will not affect my analysis. In contrast, I put the operator in its post-movement position under CP because in this case it is a quantifier which needs to take a higher scope in the tree. The other reason is that the operator needs to show up in CP for predicate abstraction.

55. Under a more sophisticated analysis, event variables should be closed by aspect, in which case the VP in question should be analyzed as AspectP.

56. As we will see in the next section, the modifying clause can also denote an eventuality which is related to the head nominal via, for example, cause and effect relations, which take scope below the existential closure.

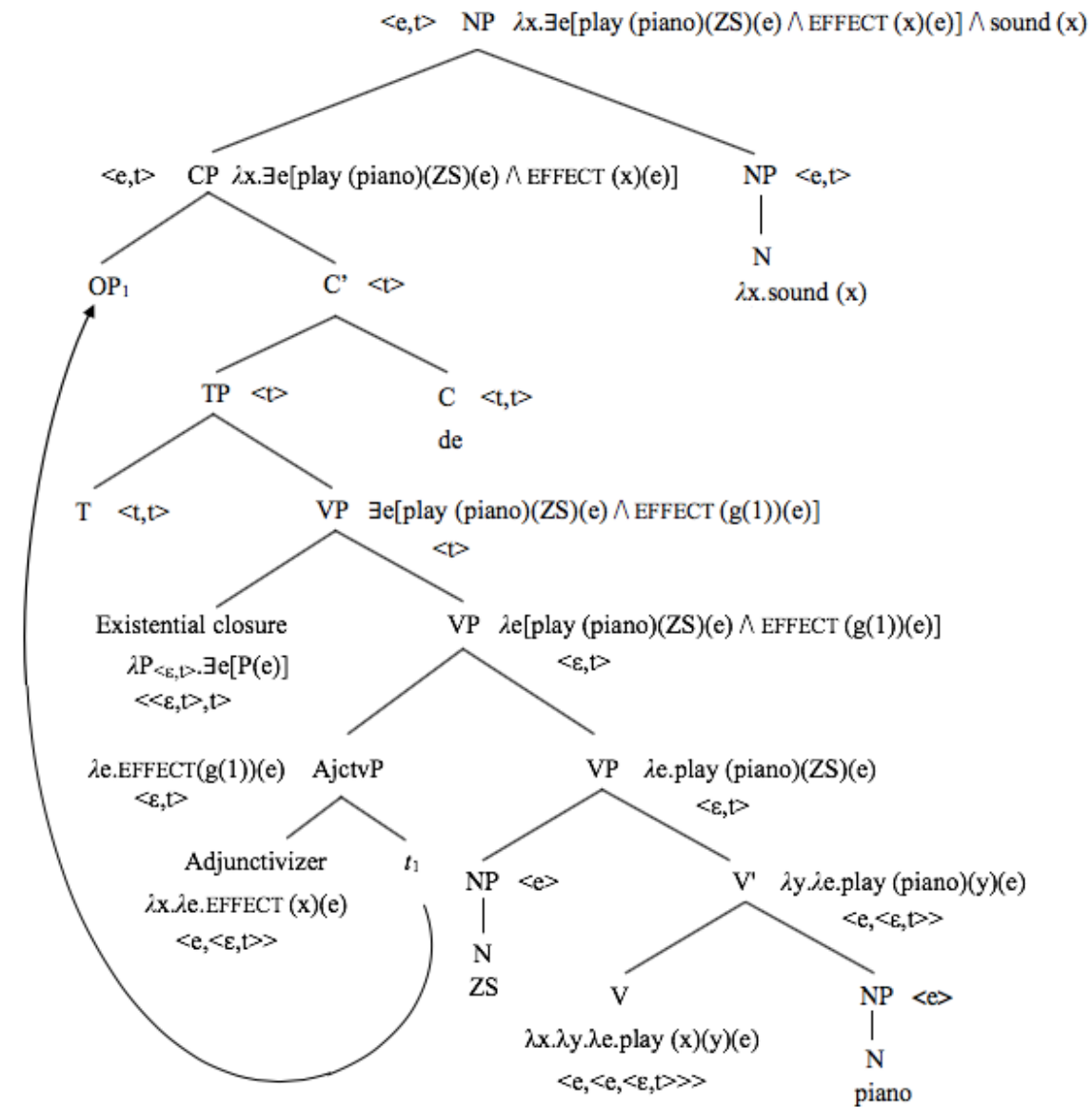
done internally to the semantic rule and is not syntacticized, and so we cannot see it in the tree. The individual variable in the Adjunctivizer P is represented as a trace from the operator movement, which is indexed with the assignment value 1. The function, which is of type $\langle e, \langle \langle s, t \rangle, t \rangle \rangle$, takes a trace of type $\langle e \rangle$ and returns an AjctvP of type $\langle \langle s, t \rangle, t \rangle$. Then the rule enables the AjctvP to select the proposition (type $\langle s, t \rangle$) derived by Intensional Functional Application and return a truth value (type $\langle t \rangle$). This higher TP is true iff the content of the individual $g(1)$ is the proposition that Zhangsan succeeds. Moving on to CP, the modifier-creating particle *de* as the head of CP is semantically vacuous, so the C' inherits the value of TP. When the operator is moved to [Spec, CP], it triggers Predicate Abstraction and returns a CP of type $\langle e, t \rangle$. Now the CP denotes the set of individuals such that their content is the proposition that Zhangsan succeeds. The CP then combines with the head NP *belief*. The head *belief* is a predicate NP of type $\langle e, t \rangle$. It is predicated of individual belief and denotes the set of beliefs. The CP is combined with the head via Predicate Modification and returns another NP of the same type $\langle e, t \rangle$. As a result, the modified NP denotes the set of individuals that are beliefs whose content is the proposition that Zhangsan succeeds.

7.2.2 Eventuality cases (Gapless clauses and adjunct relative clauses)

I would now like to extend the analysis of the content clauses depicted in (45) and put forward the semantic analyses of gapless clauses described in Section 7.1. Taking the example in (46) below, I will illustrate its semantics-syntax mapping on the tree in (47).

- (46) 张三 弹 钢琴 的 声音
 [NP [GaplessCL **Op_i** Zhangsan *t_i* tan gangqin de] shengyini^j]
 Zhangsan play piano DE sound
 'the sound that arises from Zhangsan's playing the piano'

(47) Syntax-semantics mapping of gapless clauses



In (47), the verb *play* is of type $\langle e, \langle e, \langle \epsilon, t \rangle \rangle$ and takes two individual arguments and one covert event argument. It selects the theme *piano* (type $\langle e \rangle$) and the agent *Zhangsan* (type $\langle e \rangle$)

via Functional Application and returns a VP of type $\langle \epsilon, t \rangle$ denoting eventuality description. The lower VP denotes the set of playing events whose agent and theme are *Zhangsan* and *piano*, respectively. Contrary to the clausal modification involving proposition as described in (45) above, the covert Adjunctivizer Phrase has scope below the existential closure since the head nominal of the gapless clause construction in this case is related to the eventuality of the modifying clause. The Adjunctivizer holds the function EFFECT, which takes an individual and an eventuality, and identifies the individual as the effect of the eventuality. The individual variable in Adjunctivizer Phrase is represented as a trace from the operator movement, which is indexed with the assignment value 1. The adjunctivizer, which is of type $\langle e, \langle \epsilon, t \rangle \rangle$ (rather than $\langle e, \langle \langle s, t \rangle, t \rangle \rangle$), takes a trace of type $\langle e \rangle$ and returns an Adjunctivizer Phrase of type $\langle \epsilon, t \rangle$. The Adjunctivizer Phrase and VP are combined via Predicate Modification and return a VP of the same type $\langle \epsilon, t \rangle$. This higher VP denotes the set of events of Zhangsan playing the piano whose effect is the individual $g(1)$. The VP then undergoes existential closure and returns a truth value of type $\langle t \rangle$. This highest VP is true iff there is an event of Zhangsan playing the piano whose effect is individual $g(1)$. Again, suppressing the semantic contribution of T, I will treat TP as semantically vacuous and let it inherit the value of VP. Moving on to CP, I also treat the modifier-creating particle *de* as the semantically vacuous head of CP, so the C' will inherit the value of TP. When the operator is moved to [Spec, CP], it triggers Predicate Abstraction and returns a CP of type $\langle e, t \rangle$. The CP denotes the set of individuals that are the effects of an event of Zhangsan playing the piano. The CP then combines with the head *sound*. Since *sound* is a predicate NP of type $\langle e, t \rangle$, it is predicated of an individual sound and denotes the set of sounds. The CP and the NP then combine via Predicate Modification and return another NP of the same

type $\langle e, t \rangle$. As a result, the modified NP denotes the set of individuals such that they are sounds and the effect of an event of Zhangsan playing the piano.

I propose that the repertoire of the function of Adjunctivizer includes EFFECT, CAUSE, ATTRIBUTE, COMPONENT, and DEGREE, each of which corresponds to each of the different categories of gapless clauses identified in Section 7.1. These functions will identify the head nominal as bearing a certain relation to the eventuality denoted by the modifying clause. Moreover, I also argue that this derivation can be used for adjunct relative clauses, in which the functions would contain LOCATION, TIME, MANNER, INSTRUMENT, and REASON.

There are certain advantages to adopting this semantic analysis. Firstly, it fits the syntactic analysis assimilating gapless clauses and adjunct relative clauses discussed in the earlier chapters. First, I argued that gapless clauses involve a phrase containing an empty adjunctivizer and an empty operator, which undergoes movement similarly to adjunct relative clauses. In Chapters 5 and 6, I also provided independent motivation for the operator-movement approach in both constructions, the nominal status of the empty operator, and the similar syntactic properties gapless clauses and adjunct relative clauses exhibit.

Secondly, it seems reasonable to postulate that the modifier *de* is semantically vacuous since it can occur with a variety of prenominal modifiers. By appealing to 'adjunctivizer + operator', I can avoid assigning specific semantics to *de*. Although some previous studies argue that *de* is predicative (Ning 1993, Cheng and Sybesma 2005), such an analysis is not necessarily sustained since *de* can occur with attributive adjectives, as pointed out by Paul (2005). All these considerations lead me to the hypothesis that predicate abstraction is triggered by the operator in [Spec, CP] rather than any semantic property of *de*.

7.2.3 A generalized adjunctivizer

If the semantic analysis developed in Section 7.2.1.1 appealing to adjunctivizers is on the right track, we may be able to take another step and explore a further generalization. That is, rather than postulating different adjunctivizers with different kinds of functions like EFFECT, CAUSE, ATTRIBUTE, etc., we may be able to postulate a generalized adjunctivizer whose function (perhaps among the limited and designated functions) is ultimately determined in consultation with the pragmatics associated with the utterance.

The versatility of this hypothesis can be appealed to quite effectively when we observe that in certain cases the relation between the head nominal and the modifying clause can be ambiguous, as shown by the Japanese data in (48) below. I appeal to the Japanese data here because, as I mentioned before, relating the head nominal as the cause of the eventuality in gapless clauses tends to be discouraged in Chinese.

- (48) [NP [GaplessCL Sinano-gawa-ga hanran-sita] **tairyoo-no** **mizu**]
 Sinano.river-NOM overflowed large.volume-GEN water
- (i) -ga kinrin-no minka-o mizubitasi-ni-sita
 -NOM neighboring houses-ACC flooded
 'The large volume of water **produced by** the overflow of the Shinano River flooded the neighboring houses.'
- (ii) -wa zyooryuu-no Tikuma-gawa-kara nagarete-kita-mono-desu.
 -TOP upper.stream-GEN Tikuma.river-from flowed.from-that.which-COP
 'The large volume of water which **caused** the overflow of the Shinano River flowed from the Tikuma River, its upper stream.'

Note that the nominal *the large amount of water* in (48) is interpreted as the *effect* of the eventuality expressed by the gapless clause when it appears as the subject of the sentence in (i). The same NP is interpreted, on the other hand, as the *cause* of the eventuality when it appears as

- (50) a. 张三 做 饭 的 颜色
 #[NP [GaplessCL Zhangsan zuo fan de] **yanse**]
 Zhangsan cook rice DE **color**
 'the color that arose from Zhangsan cooking a meal'
- b. 张三 修 车 的 床
 #[NP [GaplessCL Zhangsan xiu che de] **chuang**]
 Zhangsan fix car DE **bed**
 'the bed where Zhangsan fixed the car'

In (50), the NPs are modified by gapless clauses. The reason why these nominal expressions reject any felicitous interpretation is not because they are syntactically ungrammatical but because they are semantically anomalous. More specifically, among the conceivable relations that the event of Zhangsan cooking can hold in the world, it is highly unlikely that this event can be related to color. This is regardless of whatever relation that the adjunctivizer will decide in the specific context. In other words, based on human's world knowledge, we are unlikely to naturally connect the event of Zhangsan cooking with the existence of color. Similarly, our world knowledge strongly discourages us to conceive of a bed as the location of fixing the car. These phenomena suggest to us a need for pragmatic filtering for the legitimate association of the eventuality denoted by the gapless clause and the modified head of the entire nominal expression, where the association of the two is established by way of the function of the adjunctivizer and Predicate Modification induced by the movement of the empty operator as the nominal complement of this adjunctivizer. In this respect, postulation of a generalized adjunctivizer is perhaps a reasonable extension, which has the potential to bring in some simplification of the syntactic and semantic analyses proposed above.⁵⁷

57. For instance, the computation of the syntactic objects for the two distinct interpretations of the gapless clause construction in (49) perhaps involves less burden if the only thing the language user needs to do is

If such an appeal to pragmatics turns out to be sensible, it brings out a contrast between argument relative clauses on the one hand and gapless clauses and adjunct relative clauses on the other. The head nominal modified by an argument relative clause is selected by the verb within the modifying clause. Their relation is therefore decided by the thematic role inherent to the verb and hence there is less room for pragmatics to play a role and less room for ambiguity or infelicity. On the other hand, there is no such selection of the head nominal within adjunctive relative clauses, gapless clauses, or content clauses since the head nominal is related to the modifying clause via the adjunctivizer. The semantic relation between the head nominal and the clause therefore can be rather loose and depend on pragmatics. In Section 7.2.5, I will discuss how to avoid a possible overgeneration of interpretation in Chinese.

7.2.4 Yoon's (1993) R-relation

While the idea of generalized adjunctivizer presented above has been developed independently, I have learned that a similar idea dubbed as "R-relation" had already been explored by Yoon (1993) in dealing with the gapless clause construction in Korean. In this section, while giving fair credit to him, I will review Yoon's (1993) R-relation, compare it with my generalized adjunctivizer, and conclude that his hypothesis cannot be adapted to capture the gapless clause constructions in Chinese.

Before jumping into the concept of R-relation, a word on Yoon's assumption on the syntax of Korean relative clauses is in order. According to Yoon, Korean argument relative clauses do not involve movement and hence traces either. Instead, he claims that a *pro* is base-

simply to introduce one and only generalized adjunctivizer from the lexicon rather than having to select the specifically correct type out of a choice of several adjunctivizers when the Numeration is formed.

generated inside the relative clauses and coindexed with the head nominal. He argues that this analysis is justified because Korean relative clauses do not show Subjacency or island effects. On the other hand, Yoon assumes that gapless clauses and adjunct relative clauses are indeed gapless.

Yoon (1993) proposes an R-relation to establish the relation between the head and the modifying clause. The R relation is a relation parameter that is instantiated as a specific relation in a given context. Yoon argues that a relation is appropriate if it is familiar and salient in the discourse. Following the Familiarity Condition of Heim (1982), he proposes the condition in (51).

(51) Condition for R-relations in Korean: (Yoon 1993: 218)

R-relations must be familiar and maximally salient.

Along the line of the Moulton-Kratzer's $CONT(X_c)$ function, Yoon argues that the complementizer *UN* in Korean holds the R-relation, which links the clause to the head nominal.⁵⁸ Let us look at

58. I gloss *UN* as ADN to follow the tradition which treats *UN* as an adnominal marker to the clausal-final verb (Cha 1999, 2005, Jo 2015, Lee and Stromwold 2007, among others). It is controversial whether *UN* is the complementizer of a relative clause in Korean. One argument against such an analysis is that *UN* can also involve tense/aspect of the clause. Consider the contrast in (i).

- (i). a. [[Sunae-ka Seoul-ey Ka-ss-ta] UN] sasil
 Sunae-NOM Seoul-to go-PAST-DEC ADN fact
 'the fact that Sunae went to Seoul'
 b. [Sunae-ka Seoul-ey ka UN] Sasil
 Sunae-NOM Seoul-to go PAST.ADN fact
 'the fact that Sunae went to Seoul'

(Jo 2002: 112, modified)

According to Jo (2002), (ia) has the morpheme *-ta* which is the dec(larative) sentence ending. In addition, (ia) has the morpheme *-ss*, which marks the past tense feature of the verb. Therefore, it is safe to assume that the function of *UN* in (ia) is a complementizer. On the other hand, (ib) does not have the morpheme marking the clause type, such as whether the clause is declarative or interrogative. *UN* in this case marks both the tense and the prenominal clause. Therefore, it is not a complementizer in this case. According to Jo (2002), it closes off an "incomplete TP," which lacks a sentence ending indicating its clause type.

- (53) a. [John-i Tom-ul ccilu UN] nalssi
 John-NOM Tom-acc stabbed ADN weather
 'weather under which John stabbed Tom'
- b. [Mary-ka ka UN] salam
 Mary-NOM went ADN person
 'person such that Mary went'

According to Yoon, if in a context where John is seasonally depressive and homicidal, the specific weather could act as a cause for John's abnormal behavior. In this case, R-relation is instantiated as CAUSE for the eventuality of stabbing as the familiar and salient relation in this context. Similarly, as for (53b), it would be possible to imagine a scenario where each person has to go to some place for someone. For example, Jerry went to the cinema for his mother and Mary went there for someone else. In this context, the R-relation is specified as BENEFICIARY, which is a familiar relation in the context and as a result (53b) is acceptable.

In addition, according to Yoon, R-relation also exists in argument relative clauses, which involve a *pro*. In this case, the function is constrained not only by context but also by the semantics of the predicate in the relative clause. (54a) is an example of argument relative clause. Its semantic compositions are shown in (54b-c).

- (54) a. [John-i **pro**_i manna UN] **salam**_i
 John-NOM met ADN person
 'person that John met'
- b. $\lambda x[\text{person}(x) \ \& \ \exists e[[\text{meeting}(e) \ \& \ \text{AGENT}(e,\text{John}) \ \& \ \text{THEME}(e,x')] \ \& \ \mathbf{R-rel}(e,x)]]$
- c. $\lambda x[\text{person}(x) \ \& \ \exists e[[\text{meeting}(e) \ \& \ \text{AGENT}(e,\text{John}) \ \& \ \text{THEME}(e,x')] \ \& \ \mathbf{THEME}(e,x)]]$

The semantic compositions in (54b) and (54c) are similar to those of (52b-c) discussed earlier: the predicate *meeting* in the relative clause has a bound event variable. It also selects an agent, i.e., *John*, and a theme which is not saturated. Crucially, in this case, the R-relation needs to be identified with the theme by coindexing x and x' . Here are Yoon's (1993, 219) own words on the process of coindexing in (55).⁵⁹

- (55) "I propose the coindexing process between x and x' as follows. There are several candidates for R-relation between x and e , e.g. AGENT, THEME, REASON, etc. A person is not usually considered as a reason for an event of meeting in a normal context. Therefore, it is not familiar and salient enough in that context. AGENT and THEME are familiar and salient enough for such an event with a transitive verb. There is only one free variable x' in the [relative clause] in [(54)], which has the THEME role of the event. Thus, x' is eventually coindexed with x , assuming that thematic roles are unique (cf. Chomsky (1981)). In fact, this is the only way the [relative clause] in [(54)] is licensed in a normal context under the condition [(51)]. This results in coindexing of x and x' ."

Yoon proposes the partial inventory for potential familiar relations in (56).

- (56) (Partial) Inventory of Potential Familiar Relations:
[AGENT, THEME, LOCATION, SOURCE, GOAL, TIME, INSTRUMENT, REASON, CAUSE,
BENEFICIARY, RESULT, SIGN, METHOD, TOPIC]

There are three problems with adapting Yoon's approach to our analysis. First, according to Yoon, a relation can be considered as salient and familiar if enough context is given. Therefore, the inventory in (56) is theoretically infinite. However, as I will discuss in the next section 7.2.5,

59. The content in the square brackets [] is added by me.

it has been observed that the empty adjunctivizer cannot be allowed in some contexts such as the example in (57).

- (57) 他 来 的 小\镇
 *_{[NP} [ta lai- de] xiao\zhen]
 he come DE town
 Intended: 'the town where he came from' (Ning 1993: 96, modified)

The ungrammaticality of (57) is surprising since the head *xiao\zhen* 'town' can be treated as the location of the eventuality of the clause. According to Yoon, this should be allowed if enough context is given. However, (57) is considered ungrammatical by native speakers very robustly (Ning, 1993). I will argue that the empty adjunctivizer in this case is blocked by an overt one as the following sentence in (58) is grammatical.

- (58) 他 从 那\里 来 的 小\镇
 _{[NP} [ta **cong** nali lai- de] xiao\zhen]
 he **from** there come DE town
 'the town where he came from'

In (58), the adjunct relative clause contains an overt adjunctivizer *cong* 'from'. The resumptive NP *nali* 'there' is required to occur with it. I will argue that the semantics of the adjunctivizer in this case is not lexically light enough to be empty. In other words, the relation between the head and the clause is too specific in this situation to license an empty adjunctivizer, whose function is more general in nature. A detailed explanation with more examples similar to (57)-(58) will be provided in the next section. All in all, treating the complementizer as the holder of R-relation will not be able to explain the blocking effect between overt and empty adjunctivizers.

Secondly, Yoon's syntactic assumption about Korean prenominal clauses cannot be adapted to Chinese. Specifically, he assumes that Korean argument relative clauses do not involve movement and a gap but rather involve a *pro*, while Korean adjunct relative clauses and gapless clauses are gapless. As discussed earlier, I have established my view that all Chinese prenominal clauses including argument relative clauses, adjunct relative clauses, and gapless clauses are gapped, as can be shown by the fact that they establish island effects.

Thirdly, Yoon states that the R-relation also exists in argument relative clauses, which I find to be redundant because the relation between the head and the clause is already determined by the theta role of the predicate in the clause since the head is the argument of the predicate. Under the approach proposed in this dissertation, an adjunctivizer is not needed for argument relative clauses. It only plays a role in other kinds of prenominal clauses when the head nominal is not an argument of the predicate of the clause, in which case we need to connect the head to the clause in some other way.

7.2.5 Blocking effect of the empty adjunctivizer

Recall the contrast between Japanese (/Korean) and Chinese observed in Section 7.1, as in (59).

(59) *Japanese*:

[NP	[GaplessCL	atama-ga	yokunaru]	hon]	(= (4))
		brain-NOM	gets better	book	
		'the book which makes one's brain get better (= become smarter)'			

b. *Chinese*:

	头脑	变	聪明	的	书
*[NP [GaplessCL	tounao	bian	congming	de]	shu]
	head	become	smart	DE	book
	'the book which makes one's brain get better'				

It was observed that the interpretation of the head nominal as the *cause* of the eventuality denoted by the modifying gapless clause is more constrained in Chinese than it is in Japanese and Korean, which also permit gapless clauses. I would now like to explore a possible source of this cross-linguistic contrast in this section.

The issue in fact seems to be of a more general kind. Ning (1993) observes that neither gapless clauses nor adjunct relative clauses are allowed when they involve certain types of adjuncts associating the head nominal and the clause. He names those adjuncts comitative adjunct, goal adjunct, dative adjunct, comparative adjunct, and ablative adjunct. Those are illustrated in (60), respectively.

(60) a. *Comitative Adjunct*:

	他	跳舞	的	姑娘
*[NP [ta	tiaowu	de]	guniang]
	he	dance	DE	girl
	Intended: 'the girl with whom he danced'			
	(Ning 1993: 96, modified)			

b. *Goal Adjunct*:

	他	笑了笑	的	人
*[NP [ta	xiao-le-xiao	de]	ren]
	he	smile-PERF-smile	DE	person
	Intended: 'the person to whom he cast a smile'			
	(Ning 1993: 96, modified)			

c. Dative Adjunct:

他 送 了 一 本 书 的 人
 *[NP [ta song-le yi-ben shu de] ren]
 he send-PERF one-CL book DE person
 Intended: 'the person to whom he sent a book' (Ning 1993: 96, modified)

d. Comparative Adjunct:

他 高 的 人
 *[NP [ta gao de] ren]
 he tall DE person
 Intended: 'the person he is taller than' (Ning 1993: 96, modified)

e. Ablative Adjunct:

他 来 的 小 镇
 *[NP [ta lai- de] xiaozhen]
 he come DE town
 Intended: 'the town where he came from' (Ning 1993: 96, modified)

Under the approach argued for earlier in this chapter, especially the one postulating a generalized adjunctivizer, all of (59) and (60) should be regarded as cases in which the introduction of the empty adjunctivizer is prohibited under any pragmatic context.⁶⁰

As summarized in Chapter 4, Ning postulates a covert adjunct relative operator of the form [PP [P Ø] Op-R<DOMAIN>] in adjunct relative clauses in Chinese. He assumes that adjunct relative clauses are divided into two kinds, one involving "primary adjuncts," whose DOMAIN includes <PLACE>, <TIME>, <MANNER>, <INSTRUMENT>, and <REASON>, and the other involving "secondary adjuncts," whose DOMAIN does not include them. He further claims that the empty operators involved in the primary adjuncts correspond to the English single *wh*-

60. Yoshihisa Kitagawa pointed out to me that (60a-c) are grammatical in Japanese, while (60d) is not grammatical and (60e) needs more specific context. It seems that there is some cross-linguistic variation as to which head-clausal relation is considered too specific and hence requires an overt adjunctivizer.

adjunct operators: *where, when, how, and why*.⁶¹ Based upon these assumptions, Ning argues that the reason why the adjunct relative clauses in (59) and (60) are not allowed is that the adjuncts involved in them do not correspond to any single *wh*-adjunct operator in English and hence lacks any empty adjunct operator that can properly represent them in Chinese. Although there may be some truth to this observation about the correlation between an empty adjunct operator in Chinese and the lexicalized *wh*-operators in English, that observation in and of itself does not offer any formal account of the unacceptability of the NPs in (59) and (60).

In order to deal with the fact that the empty operator is not allowed in the aforementioned cases, I would like to make a crucial appeal to the notion of blocking effects. The observation relevant to the proposal is that (59) and (60) become acceptable when an overt morpheme representing functional relation is introduced. Firstly, in (59), it is the functional monomorphemic items *rang/shi* 'let', which signify the causal relation, as shown in (61).

- (61) 让/使 头脑 变 聪明 的 书
 [NP [GaplessCL **rang/shi** tounao bian congming de] shu]
 let head become smart DE book
 'the book **which makes** one's brain get better'

I would like to argue that the awkwardness of (59) and (60) is induced by the so-called blocking effect (or elsewhere condition). The amount of lexical information involved in the adjunctivizers indeed seems to play a crucial rule. For example, overt locative adjunctivizers can be safely

61. Recall that Ning proposes that there is another type of empty operator which is associated with the resultative adjunct VP in gapless clauses.

replaced by empty adjunctivizers only when they carry relatively light locational information such as *zai* 'at/in' as in (62).

- (62) a. 张三 修 车 的 商店
 [NP [Zhangsan xiu che de] shangdian]
 Zhangsan fix car DE store
 'the store where Zhangsan fixed the car'
- b. 张三 在 那个 商店 修了 车
 Zhangsan **zai** na-ge shangdian xiu-le che
 Zhangsan **at** that-CL store fix-PERF car
 'Zhangsan fixed the car at that store.'

On the other hand, the introduction of an empty adjunctivizer is preempted in (59) and (60) due to the existence of overt and more specified adjunctivizers like *gen* 'with' and *chao* 'to' in Chinese, as in (63), (The overt adjunctivizer is also accompanied by an obligatory resumptive NP as its object.).^{62, 63}

62. Since it is well-known that Chinese prepositions are historically derived from verbs, I believe it is not unreasonable to assume that the categories of verb and preposition need not be demarcated clearly when their functions are realized as empty adjunctivizers.

63. Note that the earlier examples in (2) can also allow *rang/shi* 'let' in the clause, as in (i).

- (i). a. 让/使 张三 追求 真理 的 探究心
 [NP [GaplessCL **rang/shi** Zhangsan zhuiqiu zhenli de] tanjiuxin]
let Zhangsan pursue truth DE inquisitive.mind
 'the inquisitive mind **that urged** Zhangsan to pursue the truth'
- b. 让/使 张三 活 下去 的 勇气
 [NP [GaplessCL **rang/shi** Zhangsan huo xiaqu de] yongqi]
let Zhangsan live down DE courage
 'the courage **that let** Zhangsan continue living'

One possibility is that when *rang/shi* 'let' is not present in the modifying clause, as in (i), the head nominal should be interpreted other than the cause of the eventuality denoted by the clause. As suggested by Thomas Grano, one possibility is that the modifying clause specifies what kind of inquisitive mind and courage the head denotes. For example, the courage is specifically about Zhangsan's continuing to live. The other possibility could be that these sentences actually belong to the content clause. That is, the

(63) a. Comitative Adjunct

他 跟 她 跳舞 的 姑娘
[NP [ta gen ta tiaowu de] guniang]
he with her dance DE girl
'the girl with whom he danced'

b. Goal Adjunct

他 朝 他 笑了笑 的 人
[NP [ta chao ta xiao-le-xiao de] ren]
he to he smile-PERF-smile DE person
'the person to whom he cast a smile'

c. Dative Adjunct

他 给 他 送-了 一 本 书 的 人
[NP [ta gei ta song-le yi-ben shu de] ren]
he to he send-PERF one-CL book DE person
'the person to whom he sent a book'

d. Comparative Adjunct

他 比 他 高 的 人
[NP [ta bi ta gao de] ren]
he than he tall DE person
'the person he is taller than'

e. Ablative Adjunct:

他 从 那里 来 的 小镇
[NP [ta cong nali lai- de] xiaozhen]
he from there come DE town
'the town where he came from'

modifying clause identifies the content of the inquisitive mind and courage. This is possible especially because the head nominals are a specific type denoting mental properties such as *-xin* 'heart/mind', *yongqi* 'courage', and *jingshen* 'spirit', as mentioned earlier. Thus it is possible that they are content nouns taking content arguments.

However, I noticed that although the above examples are fine in Korean, the corresponding sentences are not allowed in Chinese unless there is an overt adjunctivizer specifying the temporal relation between the clause and the head as in (67).

- (67) a. 熊 死-了 后 的 尸体
 [NP [xiong si-le *(hou) de] shiti]
 bear die-PERF after DE corpse
 'the bear's corpse after it died'
- b. 雪 融化 后 的 水
 [NP [xue ronghua ??(hou) de] shui]
 snow melt after DE water
 'the water after the snow melted'

In (67), *hou* 'rear/back/afterwards/after' is required in the clause to signify that the corpse is the effect of the eventuality of dying and the water is the effect of snow melting.

Although I cannot provide an explanation for why such gapless clauses are not allowed in Chinese at this point, I would like to offer some observations about the generalization of these data. As suggested by Thomas Grano (p.c.), the predicates of the clauses in (67) are change of state verbs such as *si* 'die' and *ronghua* 'melt'. Change of state verbs are verbs that involve a change in the internal composition of an entity undergoing a particular event (Levin 1993, Wright 2002). The following examples in (68) also involve change of state verbs and they seem to follow the same pattern as (67).

- (68) a. 玻璃 打破 后 的 碎片
 [NP [boli dapo *(hou) de] suipian]
 glass break after DE fragment
 'the fragments after glass broke'

- b. 铁 被 腐蚀 后 的 铁锈
 [NP [tie bei *fushi* *(**hou**) de] tiexiu]
 iron BEI corrode after DE rust
 'the rust after the iron underwent corrosion'
- c. 树木 枯萎 后 的 残枝落叶
 [NP [shumu *kuwei* *(**hou**) de] canzhiluoye]
 tree wither after DE broken.branches.fallen.leaves
 'the broken branches and fallen leaves after the tree withered'
- d. 牛肉 变 干 后 的 牛肉干
 [NP [niurou *bian ban* *(**hou**) de] niurougan]
 beef become dry after DE beef jerky
 'the beef jerky after the beef became dry'
- e. 毛虫 蜕变 后 的 蝴蝶
 [NP [maochong *tuibian* ??(**hou**) de] hudie]
 caterpillar metamorphosize **after** DE butterfly
 'the butterfly after the caterpillar undergoes metamorphosis'

The examples in (68) also involve change of state verbs. For example, in (68a), *dapo* 'break' denotes the change of the internal composition of the glass. In (68b), *fushi* 'corrode' signals the internal change of the iron. In these examples, the gapless clauses cannot be licensed without the

overt adjunctivizer *hou* denoting the temporal relation between the head and the eventuality of the clause.^{65, 66}

65. It may be true that temporal relation is always not allowed in gapless clauses. Consider the example in (i).

- (i). 我 在 中国 时 的 总统
 [NP [wo zai zhongguo *(shi) de] zongtong]
 I in China time DE president
 'the president when I was in China'

There is a simultaneous temporal relation between the head *zongtong* 'president' and the eventuality of the clause. That is, the president existed during the time I was in China. The adjunctivizer *shi* 'time' cannot be omitted in this situation.

Therefore, we could speculate that the amount of lexical information involved in the adjunctivizers concerning temporal relation is too specific to be omitted. In other words, we could also say that the relation between the head and the clause is too complicated to be licensed without further specification by an adjunctivizer.

66. Note that some gapless clauses can also involve an overt adjunctivizer. For example in (i), the adjunctivizer *shi* 'time' can be added to the gapless clause.

- (i). 张三 弹 钢琴 时 的 声音
 [NP [Zhangsan tan gangqin shi de] shengyin]
 Zhangsan play piano time DE sound
 'the sound when Zhangsan plays the piano'

However, we cannot say that the blocking effect does not apply in (i). The reason is that the meaning of (i) and that of the gapless clause without the overt adjunctivizer are not the same. Specifically, although the gapless clause denotes the sound of Zhangsan playing the piano, i.e., his musical performance, (i) does not have to be the sound of his musical performance. It can refer to any sound that exists simultaneously during the event of his playing. For example, it could be a weird squeaking noise coming from the piano bench or the noise arising from Zhangsan's keeping rhythm with his foot.

Since the two sentences give rise to potentially distinct referential content of the head noun, the use of an overt adjunctivizer and that of a covert one need not compete for each other. That can be considered to be the reason why blocking effect does not arise here.

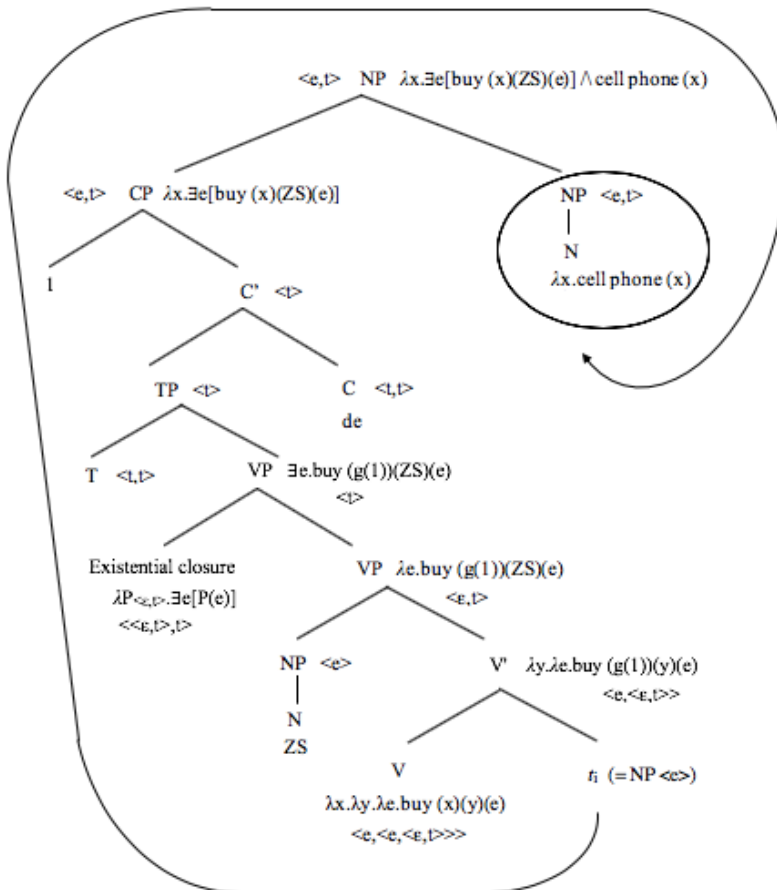
7.3 Semantics of argument relative clauses (A promotion analysis)

Finally, I would also like to offer a semantic analysis for argument relative clauses to complete the picture of the semantics of different kinds of Chinese prenominal clauses. As discussed in Chapter 3, the so-called promotion analysis of the argument relative clause construction has been offered in the literature, under which the head nominal is claimed to be extracted out of the relative clause as described in (69).

- (69)
- | | | | | | |
|------------|---------------------------------------|-----|----------------|------------|-----------|
| | 张三 | 买 | 的 | 手机 | |
| [NP [ArgRC | Zhangsan | mai | t _j | de] | shouji;] |
| | Zhangsan | buy | DE | cell phone | |
| | 'the cell phone that Zhangsan bought' | | | | |

I have adopted this syntactic analysis and now would like to claim that its syntax-semantics mapping is carried out as exemplified in (70).

(70) Syntax-semantics mapping of argument relative clauses



In (70), the verb *buy* is of type $\langle e, \langle e, \langle e, t \rangle \rangle$, which takes two individual arguments and one covert event argument. With the application of Functional Application, it composes with the theme $g(1)$, which is a trace with the assignment value 1, and the agent *Zhangsan*, returning a VP of type $\langle e, t \rangle$. This VP denotes an eventuality type, in particular, the set of buying events whose agent and theme are *Zhangsan* and $g(1)$, respectively. Then this VP undergoes existential closure and returns a truth value of type $\langle t \rangle$. This higher VP is true iff there is an event in which *Zhangsan* buys $g(1)$. With my treatment of TP and C as being semantically vacuous, the truth value $\langle t \rangle$ is projected to C'. Then following Heim and Kratzer (1998: 186), I assume that there is

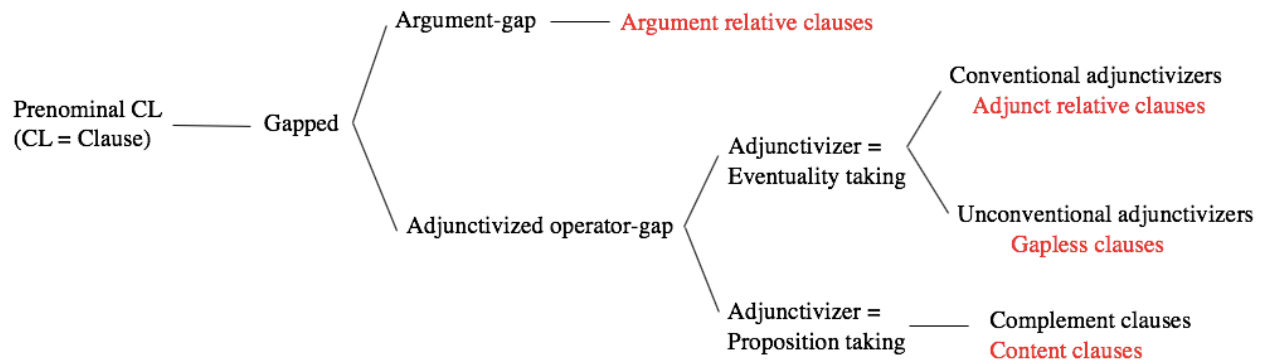
an adjoined index 1 at CP below the landing site of the moved phrase, which binds the trace as a variable binder.⁶⁷ This index will trigger Predicate Abstraction to turn the CP into a predicate of type $\langle e, t \rangle$ to combine with the predicate NP of type $\langle e, t \rangle$ via Predicate Modification. The CP denotes the set of individuals which are the themes of the buying event by *Zhangsan*. The NP head *cell phone*, which is directly moved from within the relative clause in syntax under the promotion analysis, denotes the set of cell phones. The modified NP then denotes the set of individuals such that they are cell phones and the themes of the buying event by *Zhangsan*. In the semantic analysis of argument relative clauses, we do not need to postulate a covert Adjunctivizer Phrase because the relation between the head and the modifying clause is specified by the thematic role of the predicate. In the case of (70), the head NP is the theme of the event. This makes a sharp contrast with the semantic analyses of content clauses, and gapless clauses and adjunct relative clauses presented in (45) and (47) above.

67. I need to clarify that Heim and Kratzer do not adjoin the index at CP: they sandwich it in just below the moved phrase and do not assign any category to the resulting phrase. It should also be clarified that Heim and Kratzer do not assume a promotion analysis of relative clauses. It just so happened that their semantics was importable more or less without adjustment to a promotion analysis.

8. Summary and conclusion

In sum, this study redefines the nominal-clausal relations in Chinese as described in (71).

(71) Redefining nominal-clausal relations in Chinese



According to this analysis, all prenominal clausal modifiers are gapped. They are divided into two groups depending on whether the gap is induced by the direct movement of the head in the argument position or by an adjunctivizer and an empty operator in the adjunct position. The first case involves argument relative clauses and the latter involves what have been labelled in the literature as adjunct relative clauses, gapless clauses, and content clauses. In argument relative clauses, the relation between the head and the modifying clause is decided by the thematic role inherent in the verb. In the latter case, the relation is decided by the adjunctivizer. More specifically, for adjunct relative clauses and gapless clauses, the adjunctivizer takes the eventuality of the clause and relates it to the head nominal. For content clauses, the adjunctivizer takes the proposition of the clause and supplies it as the specified content of the head nominal. Finally, the difference between adjunct relative clauses and gapless clauses is that the adjunctivizers in adjunct relative clauses introduce what is regarded as conventional adjuncts,

i.e., location, time, instrument, manner, and reason, whereas the adjunctivizers in gapless clauses introduce unconventional ones (and hence have failed to be analyzed as adjuncts to date) such as cause, effect, attribute, component, and degree. I hope the readers would agree that when (71) is compared with the proposals in previous works summarized in (4) at the outset of Chapter 1, the analysis proposed in this dissertation offers a simpler, more comprehensible, and less chaotic view of prenominal clauses in Mandarin Chinese.

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C103	Ebonics Controversy	Fall 2017
C104	Thinking of Language	Spring 2017

Chinese Flagship Program at Indiana University-Bloomington <i>Chinese tutor</i>	August-May 2019-2020 September-May 2015-2018 Bloomington, IN
Department of Linguistics at Indiana University <i>Grader for LING 310 Syntax</i>	August-May 2019-2020 Bloomington, IN
DePauw University <i>Chinese/English Translator</i>	October-March 2016-2017 Remote
UNC Library East Asian Resources <i>Temporary Research Assistant</i>	January-May 2014-2015 Chapel Hill, NC
Department of Asian Studies, The University of North Carolina at Chapel Hill <i>Chinese Tutor</i>	February-May 2014-2015 Chapter Hill, NC
Liaoning Provincial Foreign Affairs Office, China <i>Chinese/English Translator</i>	March-April 2012 Liaoning, China

RESEARCH PRESENTATIONS

Forthcoming	Patterson, Yina and Yoshihisa, Kitagawa. On the so-called Gapless clauses in Chinese. The 32 th North American Conference on Chinese Linguistics (NACCL-32). University of Connecticut, Storrs, Connecticut, September 18-20. Abstract accepted for presentation.
April 2019	Patterson, Yina. Gapped Chinese Gapless Clauses. Paper presented at the 2 nd New Interdepartmental Conference on Linguistics Area Studies. Department of Linguistics at Indiana University Bloomington. Bloomington, Indiana.
April 2016	Patterson, Yina. Negative Raising in Mandarin. Paper presented at the 10 th Annual Linguistics Department Graduate Conference at Indiana University Bloomington. Bloomington, Indiana.
April 2014	Patterson, Yina and Melinda Johnson. Fifty Year Lag: Korean Phonology in the American Classroom. Paper presented at the Annual SLA Graduate Student Symposium. University of Wisconsin-Madison. Madison, Wisconsin.

HONORS & AWARDS

- 2020 Spring Conference Travel Award, East Asian Studies Center
Indiana University – Bloomington
- 2017 Honorable mention in the Daniel Dinnsen Excellence in Teaching recognition
Indiana University – Bloomington
- 2013 Outstanding Student Leader, Northeastern University, China
- 2012 Zhoujingwen Scholarship, Northeastern University, China
- 2012 Northeastern University Scholarship
- 2011 Undergraduate Thesis Award, Northeastern University, China
- 2010 Jianlong Group Scholarship, Northeastern University, China
- 2009 Bayi Iron and Steel Company Scholarship, Northeastern University, China
- 2009 Outstanding Individual of NEU Leadership Program
Northeastern University, China
- 2008 Chinese Government Scholarship, Ministry of Education of China

VOLUNTEER & SERVICE

- 2018-2020 Committee member, LDS Institute Student Council, Bloomington, Indiana
- 2016-2018 Treasure, Linguistics Club at IU, Indiana University Bloomington, Indiana
- 2008-2009 Chair, English Club at NEU, Northeastern University, China

LICENSES & CERTIFICATIONS

- 2019 Certificate for Participation in ACTFL Writing Guidelines Familiarization Workshop
American Council on the Teaching of Foreign Languages
- 2018 Certificate for Participation in ACTFL OPI Familiarization Workshop
American Council on the Teaching of Foreign Languages

SKILLS

Computer languages: Python, R, Stata

Computer software: Microsoft Word, Excel, PowerPoint, Praat

Languages: Native Mandarin Chinese, Advanced English, Introductory French
Linguistics knowledge of Japanese and Russian